# ALASKA'S MINERAL INDUSTRY 1996

by
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A.H. Clough, and M.W. Henning

Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys
**SPECIAL REPORT 51**


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Publication of this report is required by Alaska Statute 41 "to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; the location and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of Alaska."

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# FOREWORD

*Alaska's Mineral Industry 1996*, Alaska Division of Geological & Geophysical Surveys' Special Report 51, is the 16th annual report produced jointly by the Department of Natural Resources and the Department of Commerce and Economic Development. The primary objective of the report is to provide accurate information about Alaska's mineral industry during each calendar year. Most of the information is provided voluntarily by private industry, Native corporations, individuals, and government agencies.

Mineral exploration expenditures in 1996 were $44.6 million, an increase of almost 30 percent from $34.3 million in 1995. Development expenditures increased 165 percent from $148.6 million in 1995 to $394.0 million in 1996. The value of minerals produced in the state also increased by 10 percent, from $537.2 million in 1995 to $590.4 million in 1996. As a consequence, the total value of the mineral industry in 1996 was $1,029.0 million, up 23 percent from the $720.1 million in 1995, and the first time that the industry has exceeded one billion dollars in a single year.

Highlights of 1996 exploration include the discovery, for the second consecutive year, of another massive sulfide deposit by Cominco Alaska Inc. just to the north of the Aqqaluk orebody discovered in 1995; the discovery of sufficient gold reserves at Nixon Fork by Consolidated Nevada Goldfields Inc. to replace the gold mined in 1996; and continued successful drilling at the Donlin Creek prospect by Placer Dome U.S. Inc. Other major projects that continued to attract attention were the True North gold project near Fairbanks, the Pogo gold project near Delta Junction, the Delta Belt project near Tok and the Niblack project on Prince of Wales Island. Exploration activity on Native-owned lands by junior companies continued to increase during 1996.

Major development projects of 1996 include completion of the Fort Knox gold mine near Fairbanks and the Illinois Creek gold-silver mine near Galena, continued activity at the Healy Clean Coal Project powerhouse, expansion of the Red Dog zinc mine near Kotzebue and of Kennecott's Greens Creek Mine near Juneau. The Kensington gold mine north of Juneau continued with the permit process, and the Sealaska Corp. developed a high-grade limestone deposit at Calder Bay on Prince of Wales Island.

As it has been for the past few years, Cominco's Red Dog Mine was the state's most valuable mineral asset in 1996, shipping almost 765,300 tons (694,200 tonnes) of zinc-, lead-, and silver-bearing concentrates to markets in Asia, Europe, and Canada. The Greens Creek Mine reopened in July 1996 and was able to ship almost 43,000 tons (39,000 tonnes) of concentrate to overseas buyers before the end of the year. About the same number of placer mines operated in 1996 as in the previous year, including the new Cripple Creek joint venture near Fairbanks, and in total produced 99,500 ounces (3,094 kilograms) of gold during the year. The Nixon Fork underground gold mine produced 38,500 ounces (1,197 kilograms) of gold and 177 tons (160.5 tonnes) of byproduct copper.

# FOREWORD

Employment in 1996 increased slightly to 3,737 full-time-equivalent jobs, but there was a slight decline in the numbers employed in placer mines and in the production of building stone. Offsetting these losses was an increase in exploration and development employment, and in hardrock mining.

Claim staking activity increased quite dramatically in 1996, predominantly on State land, though even on federal land there was more activity than in the past seven years. There was a threefold increase in 1996 in the applications for tax credits permitted by the Exploration Incentives Bill over those received in 1995.

The Division of Geological & Geophysical Surveys had a productive year with geologic mapping projects completed in the Rampart and Ruby-Poorman areas. The Division contracted for airborne geophysical surveys in southcentral and eastern interior Alaska. These maps were released in the Spring of 1997.

For the third year, the Department of Natural Resources presented reclamation awards to mining companies, and the Alaska Gold Co. received the 1996 award for outstanding mine reclamation at Nome from the Alaska Division of Mining & Water Management.

Tom Bundtzen and Al Clough, two longtime authors of the Alaska Mineral Industry report series, both resigned from state service in August 1997, and will pursue careers in the private sector. Sixteen years ago, Tom Bundtzen, Gil Eakins, and Cleland Conwell of DGGS authored the first annual Alaska minerals report of this series, a product of a unique partnership between the Department of Natural Resources (DNR) and the Department of Commerce & Economic Development (DCED). *Alaska's Mineral Industry 1981* was selected Alaska's best government document by the Alaska State Library, in competition with more than 1,500 other Alaskan publications. The 1981 minerals report later competed with entries from the other 49 states for recognition by the American Library Association Government Documents Roundtable.

This first report has served as a blueprint for subsequent reports that described mineral industry activity in the 49th state, mainly using data provided by the private sector. Bundtzen has been either senior or second author of every annual Alaska mineral industry report published since 1981. Al Clough began working on the annual Alaska mineral industry report series in 1991, and supplied much of the material published from the southeastern region of the state during his tenure at DCED. We thank both Tom and Al for their important contributions to this report series.

Milton A. Wiltse, Director and State Geologist
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Division of Trade and Development

Jules Tileston, Director
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# Alaska's Mineral Industry 1996

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## EXECUTIVE SUMMARY

This report summarizes activity in the Alaskan mineral industry during the 1996 calendar year, and is made possible by information provided on mineral questionnaires returned to the Division of Geological & Geophysical Surveys. As in past years this is a cooperative venture between the Division of Geological & Geophysical Surveys (DGGS) and the Division of Mining & Water Management (DMWM) in the Department of Natural Resources (DNR) and the Division of Trade & Development (DTD) in the Department of Commerce & Economic Development (DCED).

The year 1996 saw increases in all three mine-related categories: exploration increased 30 percent over the 1995 value to $44.6 million, development was up 165 percent to $394.0 million, and production increased 10 percent to $590.4 million. For the first time the cumulative value of the Alaska mineral industry, as measured by the sum of exploration and development expenditures and the value of production, exceeded $1 billion (table 1; fig. 1).

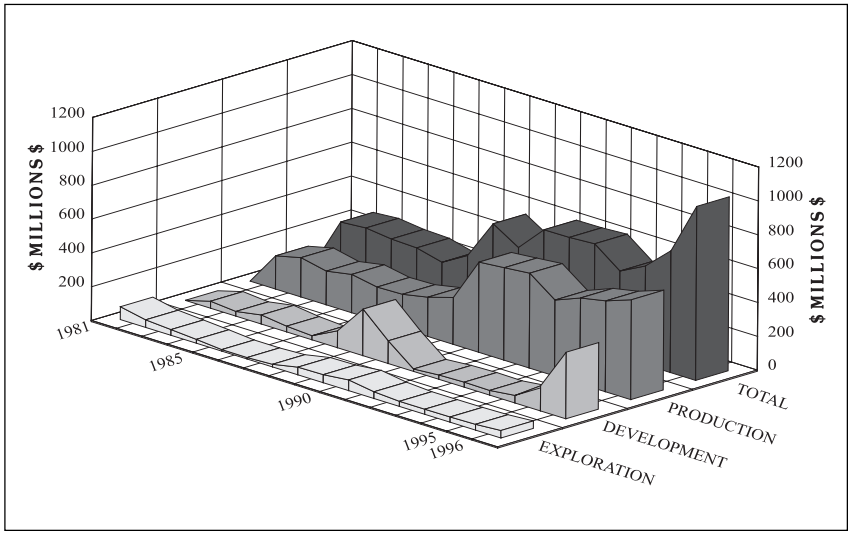
Promising Alaska exploration and development projects include the Kensington gold mine near Juneau,

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

| | Exploration (expenditure) | Development (expenditure) | Production (value) | Total |
|---|---|---|---|---|
| 1981 | $ 76.0 | $ 26.4 | $ 188.6 | **$ 291.0** |
| 1982 | 45.0 | 41.6 | 196.4 | **283.0** |
| 1983 | 34.1 | 27.8 | 232.4 | **294.3** |
| 1984 | 22.8 | 53.6 | 199.4 | **275.8** |
| 1985 | 9.2 | 34.1 | 226.6 | **269.9** |
| 1986 | 8.9 | 24.3 | 198.5 | **231.7** |
| 1987 | 15.7 | 100.3 | 202.4 | **318.4** |
| 1988 | 45.5 | 275.0 | 232.2 | **552.7** |
| 1989 | 47.8 | 134.3 | 277.0 | **459.1** |
| 1990 | 63.3 | 14.3 | 533.0 | **610.6** |
| 1991 | 39.9 | 25.6 | 546.5 | **612.0** |
| 1992 | 30.2 | 30.0 | 560.8 | **621.0** |
| 1993 | 30.3 | 27.7 | 448.7 | **506.7** |
| 1994 | 31.1 | 44.9 | 507.5 | **583.5** |
| 1995 | 34.3 | 148.6 | 537.2 | **720.1** |
| 1996 | 44.6 | 394.0 | 590.4 | **1,029.0** |
| **TOTAL** | **$578.7** | **$1,402.5** | **$5,677.6** | **$7,658.8** |

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

Figure 1. *Alaska's mineral industry total value, 1981-96.*

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[2]Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska 99709-3645.
[3]Alaska Division of Trade & Development, 9th Floor, State Office Bldg., Juneau, Alaska 99811.
[4]Alaska Division of Mining & Water Management, 3601 C Street, Suite 800, Anchorage, Alaska 99503.

the True North gold property near Fairbanks, the Donlin Creek gold prospect near Flat, the Pogo gold prospect near Delta Junction, and the Calder limestone and the Niblack polymetallic projects on Prince of Wales Island.

## EMPLOYMENT

The Alaska mineral industry provided an estimated 3,737 full-time equivalent jobs in 1996, an increase of 332 jobs or 9 percent from the 3,406 Alaskan mine-related jobs in 1995 (table 2; fig. 2). Most of the job increase is attributed to: (1) new hardrock mine employment at the Greens Creek polymetallic mine near Juneau and the Nixon Fork gold–copper mine near McGrath; (2) mineral development projects at the Red Dog lead–zinc–silver mine near Kotzebue, the Illinois Creek gold project near Galena, and the Fort Knox gold project near Fairbanks; and (3) new exploration jobs statewide. Contrasting the increases in hardrock mineral-related job opportunities was a decrease in employment at placer gold mines and some industrial mineral operations.

## EXPLORATION

Reported exploration expenditures statewide in 1996 were $44.6 million, up almost 30 percent from the $34.3 million documented for 1995. Major projects were reported in most areas of the state, but the eastern interior, southwestern and southeastern areas claimed 84 percent of the investment (fig. 3).

## DEVELOPMENT

Development expenditures jumped in 1996 to $394.0 million, up 165 percent from 1995, driven by construction at the Fort Knox Mine near Fairbanks and the Illinois Creek Mine near Galena, and by expansion at the Greens Creek Mine near Juneau and the Red Dog Mine near Kotzebue. Significant expenditures were also invested in permitting at the Kensington Mine near Juneau and at the Cripple Creek placer gold mine near Fairbanks.

## PRODUCTION

The gross value of Alaska's mineral production in 1996 was $590.4 million, up 10 percent from 1995 levels. Continuing improvements in the milling and recovery circuits at the Red Dog Mine allowed a slight increase in concentrate production from slightly less ore; sulfide concentrate throughput is expected to increase by about 35 percent as the upgrades are implemented in the next few years. Greens Creek Mine resumed shipment of polymetallic sulfide concentrates in 1996, and gold production from the Nixon Fork Mine near McGrath approximately equaled production loss caused by closure of the Valdez Creek placer mine in 1995.

## GOVERNMENT ACTIONS

Applications for mining tax credits tripled in 1996, indicating that the Exploration Incentives Bill signed into law by Governor Knowles in 1995 is taking effect.

Table 2. *Estimated Alaska mine employment, 1990–96*[a]

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| Gold/silver/mining | | | | | | | |
| Placer | 1,151 | 1,240 | 1,251 | 1,205 | 1,150 | 975 | 825 |
| Lode | N/A | N/A | N/A | N/A | - - | 38 | 138 |
| Polymetallic | 265[b] | 35[b] | 240[b] | 26 | - - | - - | 68 |
| Base metals | 350 | 331 | 349 | 376 | 311 | 397 | 407 |
| Recreational | 315 | 320 | 325 | 270 | 280 | 255 | 260 |
| Sand & gravel | 645 | 685 | 640 | 580 | 640 | 577 | 598 |
| Building stone | 160 | 165 | 145 | 205 | 210 | 200 | 149 |
| Coal | 115 | 115 | 115 | 109 | 115 | 120 | 115 |
| Peat | N/A | 45 | 40 | 49 | 55 | 30 | 38 |
| Tin, jade, soap-stone, ceramics, platinum | 40 | 25 | 20 | 20 | 25 | 20 | 20 |
| Mineral development | 95 | 133 | 164 | 132 | 115 | 637 | 862 |
| Mineral exploration | 374 | 268 | 137 | 164 | 182 | 157 | 257 |
| **TOTAL** | **3,510** | **3,362** | **3,426** | **3,136** | **3,083** | **3,406** | **3,737** |

[a]Calculated on a 260-day work year.
[b]Revised estimate based on new company data.
N/A = Not available.
- - Not reported.

Twelve companies filed applications for 106 exploration projects with claims for $26.5 million in tax credits in 1996, up from 33 projects claiming $13.3 million in 1995.

DGGS continued the DNR program of airborne geophysical surveys, completing the Manley–Rampart area and flying new surveys in the Petersville–Collinsville area north of Anchorage, and in the Upper Chulitna area near Cantwell. Previous surveys have helped spur exploration activity, particularly in the Fairbanks district.

The total number of new and active state mining claims jumped from 25,106 in 1995 to 36,002 in 1996, an increase of 43 percent, and a record number in recent years. This figure does not include numerous "prospecting sites" or several large "upland mining leases" that have been initiated in recent years.

State Department of Environmental Conservation (DEC) Commissioner Michele Brown announced an agreement with the U.S. Environmental Protection Agency (EPA) to allow the state to certify general National Pollution Discharge Elimination System (NPDES) permits for placer mines.

The Alaska Mental Health Trust Land Office managed over 1,500 valid existing mining claims, including those at Fort Knox gold mine, and issued three mineral exploration licenses affecting 20,000 acres of Trust land in 1996.

The State Division of Mining & Water Management (DMWM) presented an award for outstanding mine reclamation to the Alaska Gold Co. for its work at Nome.

**ACKNOWLEDGMENTS**

The authors wish to thank all the companies, agencies, and individuals that responded to the questionnaires. Without your voluntary and timely information this report would not be possible.

Tom Bundtzen and Joni Robinson of DGGS mailed 985 questionnaires in December 1995, and 161 were completed and returned. Dick Swainbank worked on the Executive Summary, and with help from Al Clough wrote the Exploration, Development, and Drilling sections, and co-authored the Government Actions section with Mitch Henning and Tom Bundtzen. Tom Bundtzen also worked on the Executive Summary, wrote the Production and Metal Recycling sections and constructed Appendixes B, D, and E. Joni Robinson updated Appendix A.

On the production team Ann-Lillian Schell designed the cover, Alfred Sturmann and Gail Davidson completed graphics illustrations, Paula Davis edited the final version, and Joni Robinson designed the publication and did the desktop publishing. Funds for printing were provided by the Division of Trade & Development.

This is the first time that this report has been prepared completely digitally with figures scanned in and only a digital file sent to the printer. We appreciate the patience of the production team in dealing with a multitude of factors that were new to this agency and required a great deal of experimentation and research.

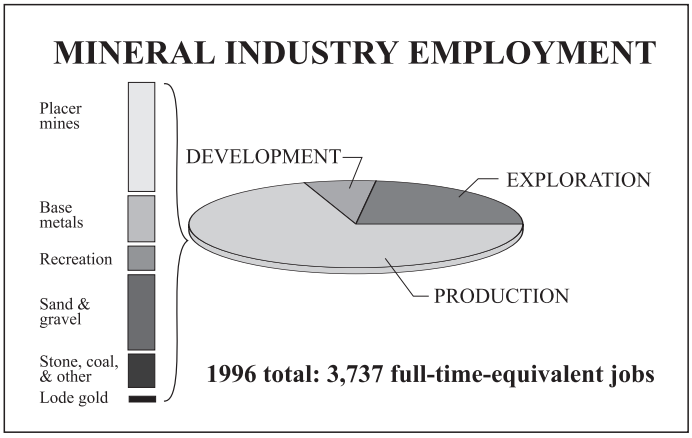



Figure 2. *Mineral industry employment by category, 1996.*

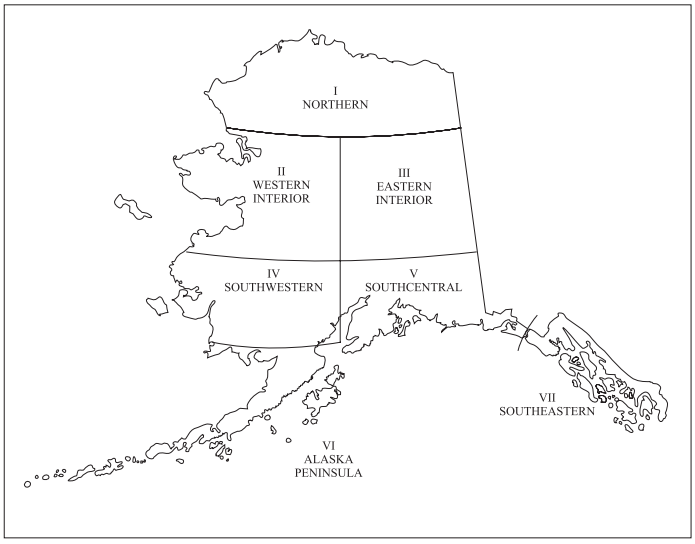



Figure 3. *Regions of mineral activity in Alaska as described in this report.*

# EXPLORATION

Reported exploration expenditures throughout Alaska in 1996 were $44.6 million, up 30 percent from the $34.3 million spent in 1995. Table 3 shows expenditures by region and commodity, and table 4 shows the trends over the last 15 years. Gold deposits continue to be the most popular exploration target, with polymetallic deposits a distant second preference, and base metal deposits a distant third (fig. 4). Figure 5 shows selected projects.

Table 5 shows a summary of claim activity in the state over the last eight years. Information shown in *Alaska's Mineral Industry 1995* as Appendix A (Total active claims and new claims staked in 1993, 1994, and 1995) and Appendix B (1995 Prospecting sites on State lands) have been omitted this year due to difficulties handling the many new prospecting sites and mining claims with the reduced staffing of the agency responsible.

In 1996, 10,176 new mining claims were staked, including 1,979 on state-selected lands, compared to 4,889 in 1995. The number of active state mining claims on state-owned land, 19,837, is calculated by subtracting the number of abandoned claims from the rental billings sent to claimants. In addition, 5,449 mining claims on state-selected lands were active in 1996, for a total of 25,286 active claims. There were 3,048 new prospecting sites located, but a backlog has prevented a tally of the number of sites currently active.

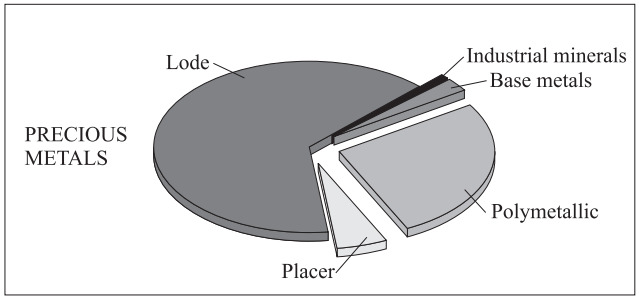



Figure 4. *Exploration expenditures by commodity.*

Table 3. *Reported exploration expenditures and employment in Alaska, 1996*

| | Northern | Western | Eastern interior | South-central | South-western | Alaska Peninsula | South-eastern | Total |
|---|---|---|---|---|---|---|---|---|
| **Exploration expenditures** | | | | | | | | |
| Base metals | $ 600,000 | $ - - | $ 500,000 | $ - - | $ - - | $ - - | $ - - | $ 1,100,000 |
| Polymetallic | 435,000 | 1,000,000 | 3,568,364 | 400,000 | 150,000 | - - | 6,430,000 | 11,983,364 |
| Precious metals | | | | | | | | |
| Placer | 210,000 | 1,082,600 | 276,000 | 184,000 | 26,000 | 500,000 | 101,000 | 2,399,600 |
| Lode | - - | 1,720,000 | 13,967,000 | 1,432,000 | 11,420,000 | - - | 300,000 | 28,839,000 |
| Coal and peat | - - | - - | - - | - - | - - | - - | - - | - - |
| Industrial minerals | - - | - - | - - | - - | - - | - - | 400,000 | 400,000 |
| Other[a] | - - | - - | - - | - - | - - | - - | - - | - - |
| **TOTAL** | **$1,245,000** | **$3,802,600** | **$18,311,364** | **$2,016,000** | **$11,596,000** | **$500,000** | **$7,231,000** | **$44,581,964** |
| **Exploration employment** | | | | | | | | |
| Employment | | | | | | | | |
| Workdays | 1,880 | 5,033 | 21,105 | 2,101 | 20,795 | 500 | 15,772 | **67,466** |
| Workyears[b] | 7 | 20 | 81 | 8 | 80 | 2 | 60 | **258** |
| Number of companies reporting[c] | 7 | 15 | 27 | 11 | 8 | 1 | 9 | **78** |

- - Not reported.
[a]Jade, platinum, gemstones.
[b]Based on 260-day workyear.
[c]Some companies were active in several areas.

New federal mining claims in 1996 were 1,571, including a single contiguous group of 900 claims; the total number of active federal claims in 1996 increased to 10,912.

For the first time in more than 10 years, there was more exploration in the eastern interior region than in southeastern Alaska. Southwestern Alaska jumped into second place due to the activity at Donlin Creek (table 3).

Exploration highlights during 1996 include: (1) the discovery at the Red Dog Mine of another large zinc–lead massive sulfide deposit near the Aqqaluk massive sulfide deposit, which was discovered in 1995; (2) intense activity in the Donlin Creek–Flat area by Placer Dome U.S. Inc., Cominco Alaska, and Ventures Resource Alaska Corp.; (3) continued success at Sumitomo's Pogo prospect near Delta Junction; (4) American Copper & Nickel Co. Inc.'s robust programs at the Tok and Nikolai prospect areas in the east-central Alaska Range; and (5) continued drilling programs at the La Teko/Newmont Exploration Ltd. True North gold prospect near Fairbanks.

Table 4. *Reported exploration expenditures in Alaska by commodity, 1982–96*

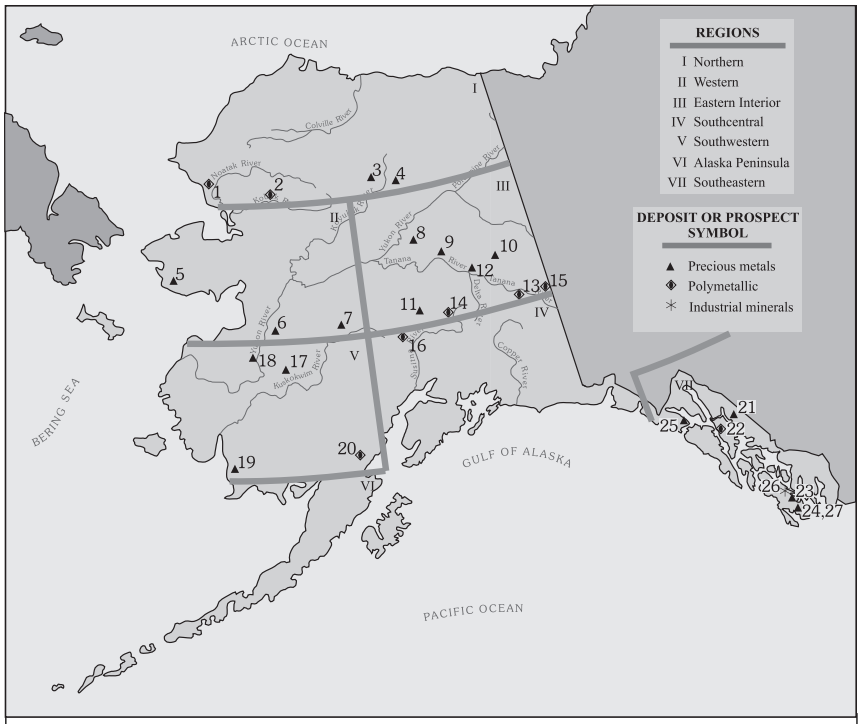
| | Base metals | Polymetallic[a] | Precious metals | Industrial minerals | Coal and peat | Other | Year's Total |
|---|---|---|---|---|---|---|---|
| 1982 | $31,757,900 | $ N/A | $ 10,944,100 | $ - - | $ 2,900,000 | $ 15,300 | **$ 45,617,300** |
| 1983 | 9,758,760 | N/A | 20,897,555 | 2,068,300 | 1,338,454 | 70,000 | **34,133,069** |
| 1984 | 4,720,596 | N/A | 14,948,554 | 270,000 | 2,065,000 | 279,500 | **22,283,650** |
| 1985 | 2,397,600 | N/A | 6,482,400 | - - | 270,000 | - - | **9,150,000** |
| 1986 | 1,847,660 | N/A | 6,107,084 | 170,000 | 790,000 | - - | **8,914,744** |
| 1987 | 2,523,350 | N/A | 11,743,711 | 286,000 | 1,150,000 | 31,000 | **15,734,061** |
| 1988 | 1,208,000 | N/A | 41,370,600 | 160,200 | 2,730,000 | - - | **45,468,800** |
| 1989 | 3,503,000 | N/A | 43,205,300 | 125,000 | 924,296 | 5,000 | **47,762,596** |
| 1990 | 5,282,200 | N/A | 57,185,394 | 370,000 | 321,000 | 97,000 | **63,255,594** |
| 1991 | 4,789,500 | N/A | 34,422,039 | 92,000 | 603,000 | 2,000 | **39,908,539** |
| 1992 | 1,116,000 | 3,560,000 | 25,083,000 | 25,000 | 425,000 | - - | **30,209,000** |
| 1993 | 910,000 | 5,676,743 | 23,382,246 | 163,500 | - - | 125,000 | **30,257,489** |
| 1994 | 600,000 | 8,099,054 | 18,815,560 | 225,000 | 2,554,000 | 810,000 | **31,103,614** |
| 1995 | 2,770,000 | 10,550,000 | 20,883,100 | 100,000 | - - | 3,000 | **34,306,100** |
| 1996 | 1,100,000 | 11,983,364 | 31,238,600 | 400,000 | - - | - - | **44,581,964** |
| **TOTAL** | **$74,284,566** | **$39,869,161** | **$366,708,643** | **$4,455,000** | **$16,070,750** | **$1,437,800** | **$502,686,520** |

[a]Polymetallic deposits considered as a separate category for the first time in 1992.
N/A = Not available.
- - Not reported.

Table 5. *Summary of claim activity, 1989–96*

| Year | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|
| **New claims** | | | | | | | | |
| State | 3,928 | 2,573 | 3,391 | 2,606 | 2,042 | 3,365 | 4,889 | 10,716[a] |
| Federal | 1,562 | 1,888 | 1,299 | 695 | 601 | 341 | 376 | 1,571 |
| **Subtotal** | **5,490** | **4,461** | **4,690** | **3,301** | **2,643** | **3,706** | **5,265** | **12,287** |
| **Active claim assessment** | | | | | | | | |
| State | N/A | 32,275 | 29,754 | 26,615 | 25,684 | 22,601 | 20,217 | 25,586[b] |
| Federal | N/A | 25,792 | 23,222 | 20,254 | 9,298 | 8,495 | 7,766 | 9,346 |
| **Subtotal** | **64,225** | **58,067** | **52,976** | **46,869** | **34,982** | **31,096** | **27,983** | **34,632** |
| Total state | N/A | 34,848 | 33,145 | 29,221 | 27,726 | 25,966 | 25,106 | 36,002 |
| Total federal | N/A | 27,680 | 24,521 | 20,949 | 9,899 | 8,836 | 8,142 | 10,912 |
| **TOTAL** | **69,715** | **62,528** | **57,666** | **50,170** | **37,625** | **34,802** | **33,248** | **46,914** |

[a]In addition, 3,048 new prospecting sites, equivalent in area to 12, 192 mining claims, were located in 1996. Includes 1,979 new claims on state-selected land.
[b]Includes 5,449 claims on state-selected land with 1,195 of these having paid rental.
N/A = Not available.
Information provided by Ronna Graham (Division of Mining & Water Management) and Don Baggs (U.S. Bureau of Land Management).




**I Northern Region**
1. Red Dog Mine—Cominco Alaska Inc.
2. Ambler Mineral Belt—Kennecott Exploration Co., Teck Corp.
3. Wiseman Area—Silverado Mines (U.S.) Inc., Venture Resources Alaska Corp.
4. Chandalar Lake—Footwall Exploration Inc./Newcoast America Inc.

**II Western Region**
5. Nome Area—Kennecott Exploration Co., Cominco Alaska Inc., Altar Resources
6. Illinois Creek—USMX Inc.
7. Nixon Fork—Consolidated Nevada Goldfields Corp.

**III Eastern Interior Region**
8. Sawtooth Mountain—ASA Inc./Montague J-V
9. Fairbanks district
   a. True North—Newmont Exploration Ltd.
   b. Fort Knox—Fairbanks Gold Mining Inc.
   c. Ester Dome—Silverado Mines (U.S.) Inc.
   d. General—Amax Gold Exploration, Placer Dome U.S. Inc.
   e. Golden Summit—International Freegold Inc.
10. Stoneboy—WGM/Sumitomo Metal Mining Canada Ltd.
11. Liberty Bell Joint Venture
12. Richardson district—Kennecott, Cyprus-Amax
13. Tok area—American Copper & Nickel Co. Inc. (ACNC)
14. Nikolai—ACNC
15. Taurus—Cross Canada International Resources

**IV Southcentral Region**
16. Golden Zone—Addwest Minerals Inc.

**V Southwestern Region**
17. Donlin Creek—Placer Dome U.S. Inc., Cominco Alaska Inc., Ventures Resource Alaska Corp.
18. Stuyahok—Calista Corp.
19. Goodnews Bay—Corral Creek Corp.
20. Pebble Copper—Cominco Alaska Inc.

**VI Alaska Peninsula Region**

**VII Southeastern Region**
21. Alaska-Juneau—Echo Bay Mines Alaska Inc.
22. Greens Creek—Kennecott Greens Creek Mining Co.
23. Hetta Inlet—American Copper & Nickel Co. Inc.
24. Dolomi—Sealaska Corp.
25. Dream—Henkins/Eichman
26. Calder Bay—Sealaska Corp.
27. Niblack—Abacus Minerals Inc./Teck Corp.

Figure 5. *Selected exploration projects in Alaska, 1996.*

## NORTHERN REGION

Exploration expenditures reported from the northern region in 1996 were $1.25 million, only about one-third of the $3.45 million spent in 1995.

Drilling by Cominco Alaska Inc. at the Red Dog Mine intercepted 190 feet (58 meters) of 12 percent zinc, 4 percent lead, and 2 ounces of silver per ton (68.62 grams per tonne) in hole 583 at about 600 feet (183 meters) depth immediately north of the Aqqaluk deposit that was discovered in 1995. A second hole (635) about 400 feet (122 meters) from hole 583, cut 110 feet (33 meters) of 20 percent zinc, 4 percent lead, and 3 ounces of silver per ton (103 grams per tonne) at 725–835 feet (221–255 meters) below the surface. Definition drilling of the new ore horizon will continue in 1997.

Far North leased 50 percent of about 50,000 acres (20,235 hectares) in the Chandalar Lake area in the eastern Brooks Range to a joint venture between Footwall Explorations Inc. and Newcoast America Inc.

Kennecott Exploration Co. conducted a fixed-wing airborne geophysical survey of part of the Ambler copper belt on the south flank of the central Brooks Range.

WGM of Anchorage, with funding from Ventures Resources Alaska Corp., conducted a wide-ranging grassroots exploration program in the area northeast of Wiseman. A series of copper porphyry, gold–silver–copper skarn, and polymetallic sulfide deposits in the area are controlled by Doyon Ltd., a Native corporation. The Bureau

of Land Management, in cooperation with DGGS, plans an airborne geophysical survey of the area in 1997.

Bendall Mining–Alaska spent time exploring for placer gold on Fay Creek in the Wiseman area, and Silverado Mines (U.S.) Inc. also explored in the Nolan Creek area in conjunction with reclamation.

Farther east in the Chandalar Lake area, Gold Dust Mines did a little exploratory trenching as it mined the Big Creek placer owned by Little Squaw Gold Co.

Paradise Valley Mining Inc. continued exploration and testing for hardrock gold north of Bettles and reported a good season for recreational mining.

**WESTERN REGION**

In 1996 exploration expenditures in the western region were $3.8 million, slightly less than the $4.7 million spent the year before.

Kennecott Exploration Co. conducted an airborne geophysical survey in the Candle area of the Seward Peninsula, but most of their efforts were expended on drill programs at the Aurora, Lindblom, and Bonanza Hill properties and trenching mineralized zones near Mt. Distin. All this activity was on land owned or controlled by the Bering Straits Native Corp. (BSNC). Cominco Alaska Inc. explored BSNC land in the Aurora trend northwest of Nome. The Alaska Gold Co. conducted an active exploration program near Nome, including 30,000 feet (9,144 meters) of reverse-circulation drilling. Nova Natural Resources Corp. pursued subsea placer operations in the Nome area with a mobile suction dredge similar to the "Tamrod" that was tested by Westgold a few years ago.

Thurman Oil and Mining completed a substantial 52-hole placer drilling program on Bering Straits land (fig. 6) on Dahl Creek, and trenched a virgin placer gold paystreak in this area of historic mining.

In the McGrath area there was a flurry of exploration and staking spurred by the exploration at Donlin Creek, near Crooked Creek. Northwest Land Resources conducted geophysical and geological surveys at Colorado Creek in the Innoko district, and ASA Inc. continued exploration near Von Frank Mountain and elsewhere in the Kuskokwim Mountains.

Consolidated Nevada Goldfields Corp. (CNGC) had an active exploration program in conjunction with its mining at the Nixon Fork Mine. In the immediate vicinity of the mine, gold reserves were increased by 38,145 ounces (1,186 kilograms). An airborne geophysical survey of their 56,000-acre (22,663-hectare) landholdings revealed a large target with a signature similar to the Nixon Fork Mine near the Eagle Creek skarn deposit. Near the Nixon Fork Mine, disseminated gold mineralization was drilled in the Nixon Fork stock; one hole yielded 188 feet (57 meters) of 0.03 ounces per ton (1.03 grams per tonne) gold. Much of the land explored near the Nixon Fork Mine was leased from Doyon Ltd.

Flat Creek Mining Co. drilled some reverse-circulation holes on Flat Creek, and Lost River Mining had a substantial program at Tripple Creek a few miles east of Nome. N.B. Tweet & Sons reported exploration near Taylor, also on the Seward Peninsula.

**EASTERN INTERIOR REGION**

Exploration increased dramatically in the eastern interior region with activity reported from Tanana in the west to the Canadian border in the east. Expenditures were at least $18.3 million, up 72 percent from $10.6 million in 1995.

Much of the mineral exploration took place near Fairbanks. The largest program was that of Newmont Exploration Ltd. at the True North gold property about 15 miles (24 kilometers) north of Fairbanks; this project is a joint venture owned by La Teko Resources Ltd. and Newmont Exploration Ltd. Gold at True North is associated with quartz–carbonate veins in carbonaceous schists, and quartzite associated with calcareous eclogites in the Chatanika Terrane. The style of

Figure 6. *In 1996, Thurman Oil and Mining explored about 800 acres (324 hectares) of land owned by Bering Straits Native Corp. near Dahl Creek on the Seward Peninsula. Information from 52 drill holes defined a virgin placer gold paystreak in an area that was historically mined for placer gold. Photo courtesy of Tom Sparks, Bering Straits Native Corp.*

mineralization is thought to be different from the igneous-hosted gold at Fort Knox, about 8 miles (13 kilometers) to the southeast, although altered igneous rocks close to True North contain some gold. The drilling was directed to prove continuity of mineralization within the 5,000 by 2,500 foot (1,524 by 752 meter) core area, and to determine the limits of mineralization. A $2.5 million payment was made to La Teko at year end as part of the buy-in agreement whereby Newmont can earn 65 percent of the deposit.

Placer Dome U.S. Inc., Silverado Mines (U.S.) Inc., International Freegold Inc., and La Teko have claim blocks strategically covering the northeastern and southwestern extensions of the thrust contact of the Chatanika Terrane, which is complicated by northwest-trending high-angle faults. At year end Silverado had an Agreement in Principle with Homestake Mining Co. to sell the holdings near True North attesting to the interest in the type of mineralization at True North.

Silverado trenched and drilled the St. Paul, Rhyolite, and other targets in its Ester Dome property 6 miles (10 kilometers) west of Fairbanks, and staked a large group of claims north of the Chatanika River, about 15 miles (24 kilometers) northwest of Ester Dome. Grateful Dog Mining reported exploration in the Livengood area.

Ryan Lode Mines Inc., a wholly-owned subsidiary of La Teko Resources Ltd., actively explored its holdings at Juniper Creek about 15 miles (24 kilometers) northeast of True North, and on adjacent land leased from the University of Alaska. Additional exploration was reported on Discovery Gulch in the Circle district and on Lucky Gulch in the Valdez Creek district. Together with the State Department of Environmental Conservation (DEC) and the Fairbanks Municipal Utilities System (FMUS) the company worked on a demonstration project that utilized sewage sludge additive to reclaim mine tailings at the Ryan Lode Mine on Ester Dome near Fairbanks. The successful completion of the project indicated that reclamation projects could help in the disposal of sewage treatment products elsewhere in the state.

International Freegold Inc. drilled several targets within its Golden Summit claim block which extends from north of the Fort Knox Mine to the True North property. Avalon Development Co., as operator, drilled 20,000 feet (6,096 meters) on the Dolphin prospect, where gold is associated with sulfides in and adjacent to a small, 91-million-year-old granitic stock. The nearby Cleary Hill high-grade gold mine was also drilled by Avalon, but results have not been released. The Too Much Gold zone about 4 miles (6 kilometers) east of the Cleary Hill Mine was also drilled in 1996, and results confirm that the gold is contained in a shallow-dipping zone in sericitized schist. Regional exploration has identified several new targets within the Golden Summit claim group for further exploration in 1997.

Placer Dome U.S. Inc. drilled its holdings in the Chatanika Terrane southwest and northeast of True North, but no results have been announced.

American Copper & Nickel Co. Inc. (ACNC) concentrated most of its activity in the Delta Mineral Belt polymetallic targets southwest of Tok, including large-loop (UTEM) geophysical surveys and 14,000 feet (4,267 meters) of core drilling in very steep terrain. At its Nikolai copper–nickel–PGE (platinum-group element) prospect near Summit Lake, ACNC conducted UTEM and mapping/geochemical programs in preparation for a 1997 drilling program. Selected grab samples from the Nikolai prospect contain up to 6.9 percent nickel, 3.3 percent copper, 0.3 percent cobalt, 0.09 ounces per ton (3.09 grams per tonne) palladium and 0.46 ounces per ton (15.6 grams per tonne) platinum.

WGM Inc., in a joint venture funded by Sumitomo Metal Mining Canada Ltd. and the Metal Mining Agency of Japan (MMAJ), continued drilling at the Pogo gold prospect northeast of Delta Junction in late 1995 (fig. 7). MMAJ had announced several high-grade gold intercepts, including 1.83 ounces per ton (62.8 grams per tonne) gold over 22 feet (6.7 meters) and 0.19 ounces per ton (6.5 grams per tonne) gold over 79 feet (24 meters) in an apparently flat-lying deposit. A 1996 drilling program found one 34 foot (10.4 meter) intercept that contained 0.93 ounces per ton (31.8 grams per tonne) gold with 3.3 feet (1 meter) of 9.43 ounces per ton (322.9 grams per tonne) gold.

WGM Inc. also actively explored prospects west of Tanana and in the Seventymile and Fortymile drainages on land owned by Doyon Ltd., a regional Native corporation, with funds provided by Ventures Resource Corp.

Significant claim staking activity occurred in the Richardson district 30 miles (48 kilometers) west of Delta. Cyprus–Amax Gold, Kennecott Exploration Co., and several individuals staked hundreds of claims around the core claims held by Tri-Valley Corp. in this prospective epithermal gold–silver district.

Kennecott Exploration Co. was also exploring near Livengood, about 80 miles (128 kilometers) north of Fairbanks. Cyprus–Amax was active in the Fairbanks area. A small drilling program was undertaken at the Liberty Bell Joint Venture gold–arsenic–copper deposit near Healy by lessees of Pacific Northwest Resources Co. The Dry Creek polymetallic massive sulfide deposit near Wood River was drilled by Grayd Resources.

ASA Inc. got a late start, but managed a modest drill program in the Rampart area on Doyon Ltd. land before freeze-up.

Doyon Ltd. began a drill program in Grant Creek in the Melozitna District near Tanana with the stated intention of bringing into production a placer gold mine that

would provide employment for local shareholders. This is Doyon's first venture into placer mining.

Reliance Geological Services spent most of the summer on the Taurus porphyry copper–gold prospect near the Canadian border north of Tok conducting geochemical and geophysical surveys, and a drill program for Cross Canada International Resources.

Placer gold exploration in this region was up slightly from the previous year, with 12 operators active. The only company reporting exploration in the Fairbanks area was Polar Mining Inc., which had a drill program near Fox. Several companies explored creeks between Fairbanks and Circle: A.J. Mining was active on Faith Creek, Underwood Mining Co. did some restaking and testing in the White Mountains and on Bonanza Creek, and Paul & Co. had projects on Bonanza and Fryingpan creeks. The Fortymile area had exploration on Uhler Creek by Chickaman Mining, drilling on Napoleon Creek by Double J Mining, trenching and test-pitting on Chicken Creek and Mosquito Fork by Geo Quest, work in the Eagle area by Hayden Exploration and Mining, test-pitting on Squaw and Canyon creeks by Maxwell Mine and Exploration, and Taylor Mining reported some exploration on the Fortymile River.

In the Circle camp, Colledge Enterprises reported drilling on Bottom Dollar Creek, Heflinger Mining and Equipment did some exploration near Livengood, and Inca Mining Association continued exploration in Specimen Creek west of Paxson.

Lakloey Inc. reported exploration for quarry rock along the Tanana River for riprap and armor rock. The State Department of Transportation and Public Facilities also looked for local sources of rock.

## SOUTHCENTRAL REGION

Mineral exploration activities in the southcentral region focused on evaluation of hardrock mineral deposits. Expenditures in 1996 were $2.0 million, or double the amount spent in 1995. The State of Alaska invested in a high definition airborne geophysical survey of the Upper Chulitna and the Petersville–Collinsville areas in 1996. Results of the Chulitna survey were released February 7, 1997, and the Petersville survey results were released March 12.

Addwest Minerals Inc. continued its exploration around Mines Trust's Golden Zone Mine in the Upper Chulitna district, flying airborne geophysics and drilling both core and reverse-circulation holes.

Farther east, International CanAlaska Resources Ltd. managed a small drill program at its Rainbow Hill property above Valdez Creek before winter set in. There was also renewed interest in the Pass Creek (Denali Copper) prospect near the head of Valdez Creek, but the results of Trabits Minerals activity are unknown. Denali Valley

Figure 7. *WGM Inc., operator for Sumitomo Metal Mining Canada Ltd., worked and housed a crew of 40 at their Pogo gold prospect camp about 35 miles (56 kilometers) northeast of Delta Junction in the historic Goodpaster mining district. Surface sampling and drilling indicate promising high-grade gold deposits near the margins of a 90-million-year-old intrusive complex. Photo by T.K. Bundtzen.*

Mines LLC reported exploration in the Valdez Creek and Willow Creek areas. Gold Cord Mine also did a little drilling in the Willow area.

Battle Mountain Gold conducted an airborne geophysics program in the Valdez Creek area following its purchase of Hemlo Gold in March of 1995.

Several placer miners reported exploration projects. Lake Creek Placers trenched and sampled placer deposits for gold and platinum-group elements. The Hasson operation spent some time exploring for gold in the Petersville area west of Talkeetna, H & H Exploration & Mining was active on Fergy Gulch and Big Boulder Creek in the nearby Collinsville area, Mrak Placer Mine drilled on Willow Creek, and Lucky Creek Mine did some trenching for placer gold on Lucky Gulch in the Valdez Creek drainage.

## SOUTHWESTERN REGION

This area saw some of the most active exploration in 1996, with reported expenditures of $11.6 million, a fourfold increase over the $2.45 million spent in 1995.

Placer Dome U.S. Inc. conducted an aggressive $9.67 million exploration effort at the Donlin Creek prospect in the Kuskokwim mineral belt, including construction of an 80-person camp, a 4,921 foot (1,500 meter) airstrip to accommodate Hercules C-130 aircraft, and completion of a 133,000 foot (40,540 meter) drill core program in 109 holes (fig. 8). Earlier exploration by Westgold Inc. looked at seven areas of alteration or mineralization in 65-million-year-old plutonic rocks; individual deposits are named the Lewis, Rochelieu, Far Side, Dome, Quartz, Queen, and Snow. Based on their combined 1995 and early 1996 results, Placer Dome estimated a resource of 3.6 million ounces (111,972 kilograms) of gold exists adjacent to the Lewis and Rochelieu mineralized areas. Placer Dome U.S. Inc. plans to drill additional footage in 1997 to further define and upgrade the gold resource estimate. Donlin Creek is on land owned by the Calista Corp., and Calista shareholders were a large part of the workforce.

Other companies active in the Kuskokwim mineral belt include Cominco Alaska Inc., Teck Corp., and a WGM Inc./Ventures Resource Alaska Corp. joint venture. The latter group were also active on Doyon Ltd. land to the northeast.

Corral Creek Corp. leased land from the Calista Corp. and searched for lode platinum mineralization at Red Mountain and Susie Mountain in the Goodnews Bay Mining District, Alaska's premier historic producer of placer platinum.

Late in 1996 Cominco increased its holdings in the vicinity of its Pebble Copper porphyry copper–gold prospect near Lake Iliamna.

Alaska Construction and Mining Inc. (Don Harris) explored on Moose, Deadwood, and Fourth of July creeks near Flat; Julian Creek Mine did some trenching and explored on Julian Creek; and Little Creek Mine reported trenching on Little and Bedrock creeks.

Figure 8. *The Donlin Creek exploration camp north of Crooked Creek as it appeared in 1996. Operator Placer Dome U.S. Inc. has delineated resources of 3.6 million ounces (111,960 kilograms) of gold based on about 100,000 feet (30,480 meters) of drilling. Photo courtesy of Placer Dome U.S. Inc.*

**SOUTHEASTERN REGION**

The pace of exploration was less hectic in southeastern Alaska in 1996 than in the early 1990s, and was less dominated by a few operations. About $7.2 million was spent, compared to the $12.2 million exploration reported in 1995.

American Copper & Nickel Co. Inc. had a robust program at Hetta Inlet on land leased from Sealaska Corp., but despite aggressive geophysical, geochemical, geologic, and drilling programs could not discover an orebody, and released the land to Sealaska.

Teck Corp. conducted a large drill program at the Abacus/Pamicon Niblack property on southern Prince of Wales Island, and continued to identify wide intercepts of good grade in a series of occurrences within the polymetallic property. Teck Corp. announced late in the year that one ore zone in the Niblack deposit contained 1.8 million tons (1.63 million tonnes) grading 0.12 ounces per ton (4.1 grams per tonne) gold, 1.37 ounces per ton (46.9 grams per tonne) silver, 1.50 percent copper, and 2.64 percent zinc.

Sealaska Corp. announced late in the year that it will develop its Calder limestone quarry in 1997, with the town of Klawock benefiting from construction of much of the processing and shipping facility.

Westmin Resources Ltd. conducted an exploration program to include drilling on Zarembo and Woewodski islands near Wrangell. Westmin and Kennecott Exploration Co. explored the Mansfield Peninsula of northern Admiralty Island and looked for Greens Creek style mineralization. As part of their work, Kennecott flew an airborne electromagnetic (EM) survey late in the season.

Elsewhere in the Mansfield Peninsula, Alaska Dano Mining Co. conducted surface exploration on their patented claims between Hawk Inlet and Funter Bay and also restaked adjacent federal lands.

In northern Southeast Alaska, Katzehin Exploration conducted reconnaissance exploration adjacent to the Katzehin River valley, across Lynn Canal from Haines. Katzehin searched for shear-hosted gold deposits with limited success. Hyak Mining Co. did some exploration at East Point and North Chichagof.

Placer exploration was reported by the Foster Operation on Porcupine Creek near Haines, and by Snow Lion Mining Co. on Caribou Creek and the alluvial fan of Porcupine Creek.

# DEVELOPMENT

Construction activities at the Red Dog Mine near Kotzebue, the Fort Knox Mine near Fairbanks, the Illinois Creek Mine near Galena, the Nixon Fork Mine near McGrath, and the Greens Creek, Kensington and Alaska–Juneau mines near Juneau increased development expenditures in 1996 to $394 million, compared with $148.6 million in 1995. The 1996 mineral development cost estimate exceeds the previous high of $275 million spent in 1988, when the Red Dog and Greens Creek mines were under construction. Table 6 shows development expenditures and employment by region, and table 7 shows the commodities of interest over the past 15 years. Figure 9 shows the location of selected projects.

**NORTHERN REGION**

At the Red Dog Mine, Cominco Alaska Inc. began a $200 million mine and mill upgrade project. The project will also expand the concentrate storage and loading facilities at the port near Kivalina in 1997. It is anticipated that this upgrade will allow mine output to expand by 35 percent by 1999, with the addition of about 100 new jobs.

Arco Alaska Inc. reported some gravel pit development in the vicinity of the Kuparuk oilfields of the North Slope of the Brooks Range.

Silverado Mines (U.S.) Inc. completed engineering and reclamation work on its placer property at Nolan Creek near Wiseman.

**WESTERN REGION**

Alaska Gold Co. initiated a substantial development program in conjunction with its open-pit mining operation at Nome. Offshore gold potential attracted Nova Natural Resources Corp. to Nome. Nova is developing a remote-controlled cutter-head suction dredge similar to that recommended by Westgold shortly before the BIMA dredge shut down in 1990.

N.B. Tweet & Sons reported a little placer stripping near Taylor on the Seward Peninsula.

USMX Inc. conducted the largest development project in the region and used C-130 and C-133 aircraft to fly 65,000 tons of supplies and equipment to the Illinois Creek Mine construction site from Galena. By the end of the year the camp was expanded, the limestone kiln was completed, the pit was readied for mining, and the heap leach liner was installed (figs. 10, 11).

Further east, near McGrath, Consolidated Nevada Goldfields Corp. (CNGC) continued to develop more reserves using surface and underground drilling at its Nixon Fork Mine, though most of the development occurred in 1995. Late in the year CNGC announced that

exploration had added gold reserves that were approximately equal to the amount that was mined and processed in 1996.

## EASTERN INTERIOR REGION

The major mine construction project in this area was the Fort Knox Mine, which was developed by Fairbanks Gold Mining Inc. A workforce of up to 800 completed the power line to the site, the freshwater dam and tailings dam, the in-pit crusher, coarse-ore conveyor, apron feeders, and all components of the mill (fig. 12). Total costs for the entire 27-month mine development project have been estimated to be $370 million, and the first gold bars were poured on December 20, 1996.

Yellow Eagle Mining Inc. developed a substantial placer gold mine west of Fairbanks near Ester. KMM

Table 6. *Reported mineral development expenditures and employment in Alaska by commodity and region, 1996*

| | Northern | Western | Eastern interior | South-central | South-eastern | Total |
|---|---|---|---|---|---|---|
| | | | **Development expenditures** | | | |
| Base metals | $60,000,000 | $ - - | $ - - | $ - - | $ - - | $ 60,000,000 |
| Polymetallic | - - | - - | - - | - - | 60,100,000 | 60,100,000 |
| Precious metals | | | | | | |
| Placer | 50,000 | 830,000 | 1,352,000 | 10,000 | - - | 2,242,000 |
| Lode | - - | 31,800,000 | 217,000,000 | - - | 22,000,000 | 270,800,000 |
| Coal and peat | - - | - - | 100,000 | 300,000 | - - | 400,000 |
| Industrial minerals | 45,000 | - - | - - | - - | 400,000 | 445,000 |
| **TOTAL** | **$60,095,000** | **$32,630,000** | **$218,452,000** | **$310,000** | **$82,500,000** | **$393,987,000** |
| | | | **Development employment** | | | |
| Employment | | | | | | |
| Workdays | 40,056 | 13,647 | 121,770 | 980 | 47,800 | 224,203 |
| Workyears[a] | 154 | 52 | 468 | 4 | 184 | 862 |
| Number of companies reporting[b] | 4 | 5 | 8 | 3 | 4 | 23 |

- - No expenditures reported.
[a]Based on 260-day workyear.
[b]Some companies active in more than one area.

Table 7. *Reported mineral development expenditures in Alaska by commodity, 1982–96*

| | Base metals | Polymetallics | Precious metals | Industrial minerals | Coal and peat | Total |
|---|---|---|---|---|---|---|
| 1982 | $ 10,270,000 | $ N/A | $ 19,320,000 | $ 4,251,000 | $ 7,750,000 | **$ 41,591,000** |
| 1983 | 19,500,000 | N/A | 7,112,500 | 1,000,000 | 250,000 | **27,862,500** |
| 1984 | 10,710,500 | N/A | 15,058,555 | 579,000 | 27,000,000 | **53,348,055** |
| 1985 | 13,000,000 | N/A | 16,890,755 | 1,830,000 | 2,400,000 | **34,120,755** |
| 1986 | 3,260,800 | 8,000,000 | 12,417,172 | 124,000 | 530,000 | **24,331,972** |
| 1987 | 38,080,000 | 48,000,000 | 13,640,848 | 188,000 | 342,000 | **100,250,848** |
| 1988 | 165,500,000 | 69,000,000 | 40,445,400 | - - | - - | **274,945,400** |
| 1989 | 118,200,000 | 411,000 | 6,465,350 | 7,000,000 | 2,196,000 | **134,272,350** |
| 1990 | - - | 4,101,000 | 7,136,500 | 30,000 | 3,079,000 | **14,346,500** |
| 1991 | - - | 8,000,000 | 14,994,350 | 262,000 | 2,318,000 | **25,574,350** |
| 1992 | 80,000 | 4,300,000 | 23,151,300 | 404,000 | 1,655,000 | **29,590,300** |
| 1993 | - - | 10,731,136 | 15,103,000 | 433,500 | 1,400,000 | **27,667,636** |
| 1994 | 10,000,000 | 5,000,000 | 27,392,850 | 5,000 | 2,545,000 | **44,942,850** |
| 1995 | 11,200,000 | 9,590,000 | 127,165,750 | 426,000 | 200,000 | **148,581,750** |
| 1996 | 60,000,000 | 60,100,000 | 273,042,000 | 495,000 | 400,000 | **393,987,000** |
| **TOTAL** | **$459,801,300** | **$227,233,136** | **$619,236,330** | **$16,977,500** | **$52,065,000** | **$1,375,628,266** |

N/A = Figures not available prior to 1986.
- - Not reported.

reported significant development at its Faith Creek operation, and several smaller placer gold mines reported development expenditures, mainly for stripping frozen overburden. Polar Mining Inc. began development of a new mine site north of Fairbanks near Fox. Polar Mining had a robust placer development project preparing its pit at Fox, north of Fairbanks, for mining.

Geo Quest reported placer development work on Chicken Creek and the Mosquito Fork in the Fortymile—mainly stripping, road and pond construction. Stripping was also reported by Gypsy Luck Inc. in the Bonnifield district, by Heflinger Mining & Equipment at Livengood, by Maxwell Mining & Exploration at Squaw Creek in the Fortymile area, and by Wilde Enterprises at Circle. Underwood Mining Co. also reported some development at Bonanza Creek near Circle.

Usibelli Coal Mine Inc. reported a modest reverse-circulation drilling program at its Two Bull Run coal lease near Healy.

## SOUTHCENTRAL REGION

Lake Creek Placers reported pond construction and stripping at its gold and platinum-group element (PGE) placer mine.

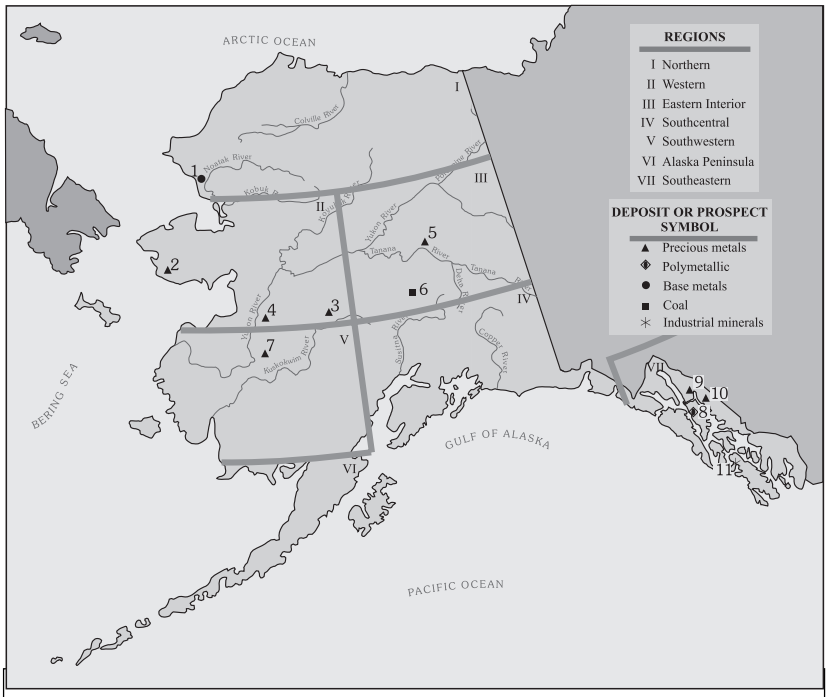
Nerox Corp. did some development tunneling at its Evan Jones coal mine east of Palmer.

## SOUTHWESTERN REGION

Paul Sayer of Little Creek Mine stripped overburden and constructed mine access roads on Little Creek. Spencer Lyman of Lyman Resources of Alaska removed overburden on Queen Gulch, but was mostly occupied helping Placer Dome U.S. Inc. prepare the airstrip and camp for its aggressive exploration of the nearby Donlin Creek gold–polymetallic prospect.

## SOUTHEASTERN REGION

Coeur Alaska Inc. and Echo Bay Mines Alaska Inc. both reported the permitting of their Kensington and Alaska–Juneau (A–J) mines, respectively, as development activity in 1996. At the Kensington Mine there was renewed permitting to allow discharge of treated effluent into Sherman Creek, and continuing engineering




**I Northern Region**
1. Red Dog—Cominco Alaska Inc. (mill circuit/port storage)

**II Western Region**
2. Nome area—Alaska Gold Co. (stripping pit); Nova Natural Resources (equipment testing)
3. Nixon Fork—Consolidated Nevada Goldfield Corp. (underground)
4. Illinois Creek—USMX Inc. (pit development and heap leach pad preparation)

**III Eastern Interior Region**
5. Fairbanks area
   a. Fort Knox, Fairbanks Gold Mining Inc. (mine construction)
   b. Several open pit and underground placer mines
6. Healy Clean Coal Project—Usibelli Coal Mine Inc.

**IV Southcentral Region**

**V Southwestern Region**
7. Several placer mines (stripping overburden)

**VI Alaska Peninsula Region**

**VII Southeastern Region**
8. Greens Creek—Kennecott Greens Creek Mining Co. (access drifting)
9. Kensington Mine—Couer Alaska Inc. (engineering and baseline studies)
10. Alaska–Juneau Mine—Echo Bay Mines Alaska Inc. (portal and access drifts, ramps and declines)
11. Calder limestone—Sealaska Corp. (bulk sample shipment)

Figure 9. *Selected mineral development projects in Alaska, 1996.*

studies throughout the year. Echo Bay completed another feasibility study of the A–J project, and concluded that the more selective mining method proposed would not be economic. Hence, on December 31, Echo Bay Alaska decided to take a write-off of its entire $57 million investment, and create a $20 million fund to cover the estimated reclamation and closure costs.

Kennecott Greens Creek Mining Co. (KGCMC) reopened the Greens Creek Mine on Admiralty Island in July 1996. KGCMC developed the new southwest orebody, redesigned the mill, and built a new tailings facility. At mid year, Kennecott initiated production and anticipated full-scale operations in 1997.

The Foster Operation removed some timber in preparation for placer mining, and Sealaska Corp. reported permitting and engineering work in development of its Calder limestone deposit, which should be in production in 1997.

Figure 10. *In 1996, a lime kiln was constructed at USMX Alaska Inc.'s Illinois Creek Mine south of Galena. Local marble is roasted and used to elevate the pH of the cyanide leach solutions. Photo by Randy Brandon.*

Figure 11. *The impervious synthetic liner for the heap leach pads at the Illinois Creek Mine was installed in 1996. Photo by Randy Brandon.*

Figure 12. *Construction of the tailings dam was completed at Fairbanks Gold Mining Inc.'s Fort Knox gold mine northeast of Fairbanks. Photo courtesy of Fort Knox Gold Mining Inc.*

# PRODUCTION

The value of 1996 Alaskan mineral production is estimated to be $590.4 million, 10 percent or $53.1 million more than 1995 levels (table 8). Values of individual commodities, as a percentage of total gross production, are zinc (61.2 percent); gold (10.6 percent); lead (8.8 percent); coal (6.4 percent); sand and gravel (5.4 percent); stone (3.9 percent); silver (3.2 percent); and platinum, copper, jade, soapstone, and peat (0.2 percent).

Mineral production statistics as reported in tables 8-16 originate from approximately 200 gold, polymetallic, coal, and industrial mineral mines and quarries that operated in all seven geographic regions as used in this report series (fig. 3). Figures 13-15 graph sand and gravel, gold and coal production; figure 16 shows selected mine sites. Appendixes D and E report historical Alaskan mineral production by year for both metallic and nonmetallic mineral commodities.

Alaskan mineral production estimates for 1996 were derived from: (1) 161 DGGS mineral questionnaires returned from Native corporations, petroleum firms, mining companies, individuals, boroughs, municipalities, and government agencies; (2) a phone survey of about 40 additional metallic and nonmetallic mineral producers; (3) Alaska Placer Mining Application (APMA) records; and (4) material use summaries provided by the Alaska Department of Transportation and Public Facilities (DOTPF).

About one-third of the industrial mineral companies and all energy mineral producers provided unit-values for mineral commodities. We computed unit-value of metals by averaging 12 monthly commodity prices published by the Mining Journal Limited (Brewis, 1997). Therefore, value estimates given in table 8 do not take into account transportation, refining, or other costs incurred during the mining process; this is especially true for metals recovered from sulfide concentrates.

Metals continued to dominate mineral production and accounted for 84 percent of 1996 Alaskan mineral production value. Overall the value for metals increased 12 percent from $442.68 million in 1995 to $496.43 million in 1996. Improved prices for zinc and lead and the reopening of the Greens Creek polymetallic mine in southeastern Alaska by Kennecott Greens Creek Mining

Co. accounted for most of this value increase (table 8). The giant Red Dog zinc–lead–silver mine in northwestern Alaska, which is operated by Cominco Alaska Inc. and owned by NANA Corp., continued to be the world's largest zinc mine for the third consecutive year. Planned mine and mill expansion at Red Dog, which got underway in 1996, will add to an increasingly dominant Alaskan position in the world's zinc markets.

Alaska's silver regained some of its luster in 1996; mine output increased from 1.23 million ounces (38 tonnes) silver in 1995 to 3.68 million ounces (114 tonnes) silver in 1996 or by nearly 200 percent. The

Table 8. *Estimated mineral production in Alaska, 1994–96*[a]

| | Quantity | | | Estimated values[b] | | |
|---|---|---|---|---|---|---|
| **Metals** | **1994** | **1995** | **1996** | **1994** | **1995** | **1996** |
| Gold (ounces) | 182,100 | 141,882 | 161,565 | $ 70,290,600 | $ 56,043,390 | $ 62,622,594 |
| (kilograms) | 5,663 | 4,410 | 5,024 | | | |
| Silver (ounces) | 1,968,000 | 1,225,730 | 3,676,000 | 10,391,040 | 6,655,714 | 19,078,440 |
| (kilograms) | 61,205 | 38,120 | 114,324 | | | |
| Platinum (ounces) | 5 | 1 | 2 | 2,065 | 430 | 790 |
| (grams) | 158 | 31 | 62 | | | |
| Copper (tons) | NR | NR | 390 | NR | NR | 803,400 |
| (tonnes) | NR | NR | 354 | | | |
| Lead (tons) | 36,447 | 58,530 | 70,086 | 25,512,900 | 34,428,600 | 52,284,000 |
| (tonnes) | 33,065 | 53,098 | 63,582 | | | |
| Zinc (tons) | 329,003 | 359,950 | 366,780 | 296,102,700 | 345,552,000 | 361,646,000 |
| (tonnes) | 298,472 | 326,547 | 332,743 | | | |
| Tin (pounds) | W | W | NR | W | W | NR |
| (kilograms) | W | W | NR | | | |
| **Subtotal** | | | | **$402,299,305** | **$442,680,134** | **$496,435,224** |
| **Industrial minerals** | | | | | | |
| Jade and soapstone (tons) | 2.3 | 2.0 | 2.0 | $ 20,000 | $ 25,000 | $ 25,000 |
| (tonnes) | 2.1 | 1.8 | 1.8 | | | |
| Sand and gravel (million tons) | 13.5 | 9.8 | 9.9 | 40,950,651 | 30,886,821 | 32,203,260 |
| (million tonnes) | 12.3 | 8.9 | 8.9 | | | |
| Building stone (million tons) | 3.8 | 2.8 | 3.0 | 27,038,008 | 22,163,703 | 23,557,637 |
| (million tonnes) | 3.5 | 2.6 | 2.7 | | | |
| **Subtotal** | | | | **$ 68,008,659** | **$ 53,075,524** | **$ 55,785,897** |
| **Energy minerals** | | | | | | |
| Coal (tons) | 1,490,000 | 1,670,000[c] | 1,481,000 | $ 36,750,000 | $ 41,300,000 | $ 38,000,000 |
| (tonnes) | 1,351,730 | 1,487,808 | 1,343,563 | | | |
| Peat (cubic yards) | 87,900 | 35,000 | 38,000 | 439,500 | 157,500 | 175,000 |
| (cubic meters) | 67,208 | 26,761 | 29,055 | | | |
| **Subtotal** | | | | **$ 37,189,500** | **$ 41,457,500** | **$ 38,175,000** |
| **TOTAL** | | | | **$507,497,464** | **$537,213,158** | **$590,396,121** |

[a]Production data from DGGS questionnaires, phone interviews with mine and quarry operators, Alaska Department of Transportation and Public Facilities, and federal land management agencies.
[b]Values for selected metal production based on average prices for each year; for 1996—gold ($387.60/ounce); silver ($5.19/ounce); platinum ($395/ounce); copper ($1.03/lb); zinc ($0.49/lb); lead ($0.37/lb). All other values provided by mine operators.
[c]Adjusted from new company data.
NR = None reported.
W = Withheld.

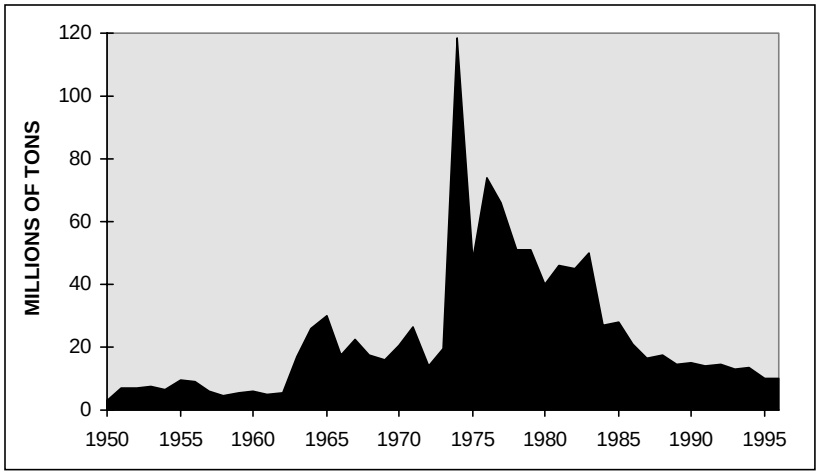



Figure 13. *Sand and gravel production in Alaska 1950–96.*

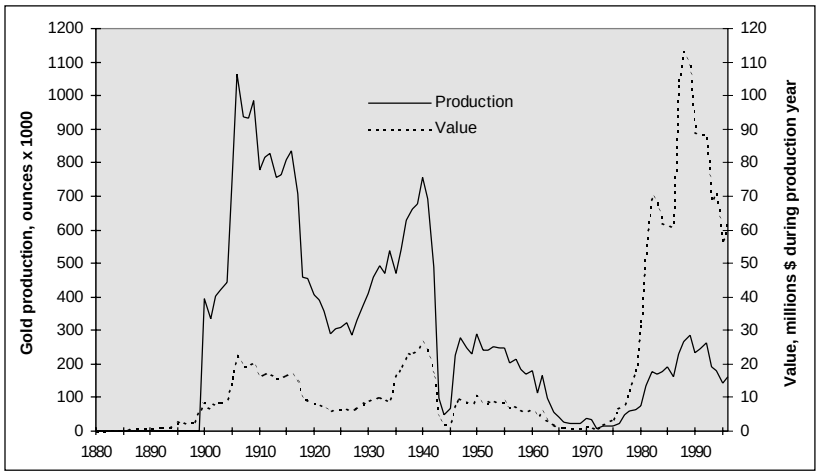



Figure 14. *Amount and value of gold production in Alaska 1880–1996.*

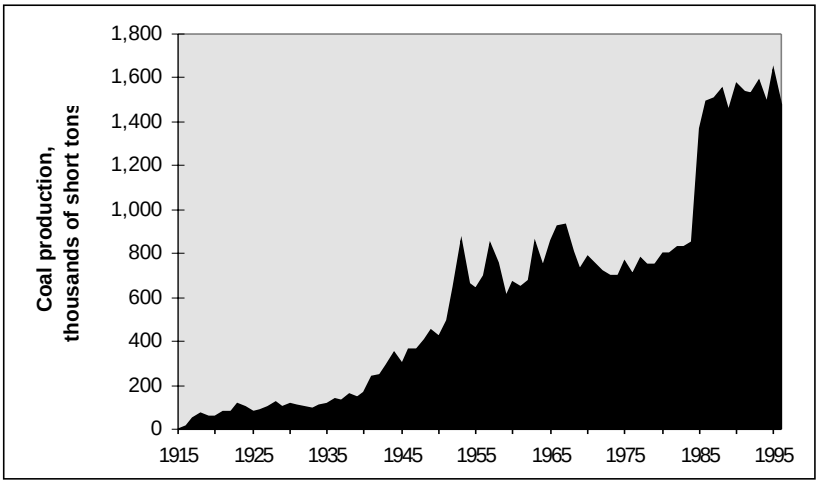
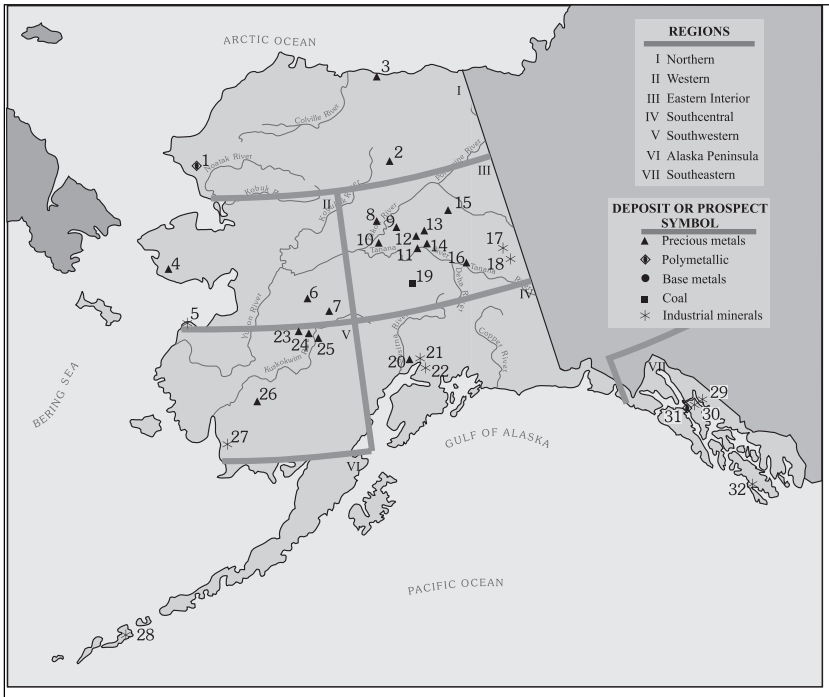



Figure 15. *Coal production in Alaska 1915–96.*

reopening of the Greens Creek silver–polymetallic mine by Kennecott Greens Creek Mining Co. was responsible for virtually all of this increase. Full production at Greens Creek will probably more than double Alaskan silver output in 1997.

In 1996 an estimated 144 placer and three lode mines produced 161,565 ounces (5,024 kilograms) gold worth $62.62 million, an increase of 14 percent in quantity and 13 percent in value from 1995 levels (table 9). Itemized, 62,065 ounces (1,930 kilograms) gold or 38 percent was derived from hardrock mines while 99,500 ounces (3,094 kilograms) gold or 62 percent was from placer operations. The number of operating placer mines in 1996 was about the same as in 1995; however, the big drop in placer mine output—from 135,642 ounces (4,218 kilograms) gold in 1995 to 99,500 ounces (3,094 kilograms) gold in 1996—was mainly due to the 1995 closure of Cambior Alaska's Valdez Creek Mine, the state's largest gold mine for 11 of 12 years between 1984 and 1995. The placer industry, which provided 825 jobs in 1996, has stabilized and isn't expected to decline further. Furthermore, the planned gold output from the Fort Knox hardrock gold operation near Fairbanks, which as of April 1997 is ahead of schedule, should help triple Alaskan bullion production to approximately 550,000 ounces (17,105 kilograms) refined gold during calendar year 1997.

The ten top gold producers in 1996 were: Nixon Fork Mining Co. (McGrath–McKinley district); Alaska Gold Co. (Cape Nome district); Fairbanks Gold Mining Inc. (Fairbanks district); Polar Mining Inc. (Fairbanks district); Alaska Placer Development (Livengood–Tolovana district); Kennecott Greens Creek Mining Co. (Juneau–Admiralty districts); Yellow Eagle Mining Inc. (Fairbanks district); the




**I Northern Region**

1. Red Dog Mine, Noatak district—zinc-lead-silver (germanium)
2. Little Squaw Gold Mining Co. placer properties, Chandalar district—gold-silver
3. Prudhoe Bay and Kuparuk pits (numerous)—sand and gravel

**Metallic mines 6**
**Industrial mineral producers 5**

**II Western Region**

4. Alaska Gold Co. open pit placer mines, Cape Nome district—gold-silver
5. Stephen's Hill Pit, Stebbins Native Corp.—sand and gravel, stone
6. Rosander Mining Co., Innoko district—gold-silver
7. Nixon Fork Mining Co., McGrath-McKinley district—gold-copper-silver

**Metallic mines 24**
**Industrial mineral producers 4**

**III Eastern Interior Region**

8. Rick Swenson, Hot Springs district—gold-silver
9. Alaska Placer Development, Livengood-Tolovana district—gold-silver
10. Cassiterite Placers, Hot Springs district—gold-silver (tin)
11. Yellow Eagle Mining Inc., Fairbanks district—gold-silver
12. Polar Mining Inc., Fairbanks district—gold-silver-screened aggregate
13. Fairbanks Gold Mining Inc. (Fort Knox), Fairbanks district—gold-silver
14. Little Eldorado Group, Fairbanks district—gold-silver
15. KMM Mining, Circle district—gold-silver
16. Sunshine Services, Delta district—sand and gravel-topsoil
17. Eastwind Inc., Fortymile district—sand and gravel-stone
18. Geo Quest, Fortymile district—gold-silver
19. Usibelli Coal Mine Inc., Bonnifield district—coal

**Metallic mines 92**
**Industrial mineral producers 15**

**IV Southcentral Region**

20. Mrak Placer Mine, Hatcher Pass district—gold-silver
21. Landscape Supply Corp., Hatcher Pass district—topsoil-peat
22. Hermon Brothers Construction Co., Anchorage district—sand and gravel

**Metallic mines 8**
**Industrial mineral producers 11**

**V Southwestern Region**

23. Little Creek Mine, Innoko district—gold-silver
24. Clark-Wiltz Partnership, Innoko district—gold-silver
25. Manzie Magnuson, McGrath-McKinley district—gold-silver
26. NYAC Mining Co., Nyac district—gold-silver
27. Knik Construction Co.-Platinum Village, Goodnews Bay district—rock

**Metallic mines 13**
**Industrial mineral producers 3**

**VI Alaska Peninsula Region**

28. Dutch Harbor Aggregate, Kodiak/Unga Island district—stone

**Metallic mines 0**
**Industrial mineral producers 4**

**VII Southeastern Region**

29. Bruce Morley, Juneau-Admiralty district—sand and gravel
30. Juneau Redimix Inc., Juneau-Admiralty district—sand and gravel-stone
31. Kennecott Greens Creek Mining Co., Juneau-Admiralty district—silver-zinc-gold-lead-copper
32. Sealaska Corp., Ketchikan district—limestone

**Metallic mines 3**
**Industrial mineral producers 10**

Figure 16. *Selected production projects, 1996.*

Table 9. *Reported refined gold production, number of operators, and industry employment in Alaska, 1995–96*[a]

| Region | Number of operators | | Production in ounces of gold | | Number of employees | |
|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1995 | 1996 | 1995 | 1996 |
| Northern | 6 | 5 | 6,265 (195 kg) | 1,450 (45 kg) | 58 | 14 |
| Western | 25 | 24 | 38,100 (1,184 kg) | 74,200 (2,308 kg) | 261 | 338 |
| Eastern Interior | 89 | 92 | 53,690 (1,670 kg) | 74,789 (2,326 kg) | 376 | 456 |
| Southcentral | 10 | 8 | 35,094 (1,090 kg) | 3,100 (96 kg) | 232 | 16 |
| Southwestern | 13 | 13 | 8,548 (265 kg) | 8,500 (264 kg) | 80 | 80 |
| Southeastern | 2 | 3 | 185 (6 kg) | 8,026 (250 kg) | 6 | 69 |
| **TOTAL** | **145** | **147** | **141,882 (4,410 kg)** | **161,565 (5,024 kg)** | **1,013** | **973** |

[a]1996 production includes 62,740 ounces gold from Nixon Fork, Fort Knox, and Greens Creek hardrock projects; 1995 production includes 6,213 ounces gold from Nixon Fork hardrock project; all other sources for both years (235,169 ounces gold) are placer mines.

Clark–Wiltz partnership (Innoko–Tolstoi district); Little Eldorado Group (Fairbanks district); and Ed Lapp and Sons (Circle district). These companies produced 119,337 ounces (3,711 kilograms) gold or 74 percent of the statewide total for the year.

The average cost to produce an ounce of gold, as determined from records supplied by 18 small, medium, and large placer mines, was $336 per ounce of gold ($10.44 per gram) in 1996, compared to $327 per ounce of gold ($10.17 per gram) reported by 20 placer operations in 1995 (table 10). The costs for the combined small and medium sized operations were comparable for both 1995 and 1996; however, increased costs from the large mine category caused most of the $10 per ounce ($0.27 per gram) cost increase for 1996 mine operators. Based on seven years of records from 1990 through 1996, costs for medium-sized operations have averaged $283 per ounce of gold ($8.80 per gram) while costs for small-scale operations have averaged $278 per ounce of gold ($8.64 per gram) (see footnote to table 10 for size definitions). Costs incurred at large-scale placer mines have averaged $339 per ounce ($10.54 per gram) of gold during the same period. The cost to mine placer gold from all sizes of mines during the seven year period averaged $332 per ounce ($10.32 per gram), which reflects the dominance of economic data provided by large mines.

The value of Alaska's industrial minerals advanced 5 percent from $53.1 million in 1995 to $55.8 million in 1996. This total included about 9.9 million tons (8.9 million tonnes) of sand and gravel worth $32.2 million (table 11); 3.0 million tons (2.7 million tonnes) of stone worth $23.6 million (table 12); and $25,000 worth of jade and soapstone. More sand and gravel was used for North Slope petroleum development than in the last several calendar years. Significant amounts of crushed stone and riprap were used at the Fort Knox and Illinois Creek gold projects in the eastern interior and western regions, respectively.

Coal and peat production declined 8 percent from $41.5 million in 1995 to $38.2 million in 1996. Usibelli Coal Mine Inc., the state's only coal producer, extracted 1,143,000 tons (1,036,930 tonnes) of coal from its Poker Flats pit and 338,000 tons (306,635 tonnes) of coal from its Gold Run Pass pit in the Nenana Coal field near Healy, Alaska. Peat and top soil production was reported from eight small Anchorage, Wasilla, Delta Junction, and Fairbanks companies.

## NORTHERN REGION

### METALS

During 1996, Cominco Alaska Inc. milled 2,312,600 tons (2,098,000 tonnes) of zinc–lead–silver ore at the Red Dog open-pit mine north of Kotzebue. Cominco shipped 646,800 tons (586,700 tonnes) of zinc concentrate and 118,500 tons (107,500 tonnes) of lead concentrate from the port site near Kivalina to Canadian, Circum-Pacific, and European smelters. Red Dog remained the world's largest zinc mine and accounted for approximately 7 percent of the world's mine-produced zinc. In addition, byproduct germanium and indium are recovered from Red Dog zinc concentrate

Table 10. *Production costs for selected Alaska placer gold mines, 1990–96*

| Mine size | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| | | | | **Number of mines** | | | |
| Small[a] | 8 | 21 | 23 | 19 | 24 | 11 | 9 |
| Medium[b] | 11 | 8 | 6 | 4 | 6 | 5 | 5 |
| Large[c] | 5 | 5 | 5 | 2 | 4 | 4 | 4 |
| **TOTAL** | **24** | **34** | **34** | **25** | **34** | **20** | **18** |
| | | | | **Production in ounces** | | | |
| Small[a] | 1,856 | 3,582 | 3,842 | 3,919 | 2,789 | 1,459 | 1,433 |
| Medium[b] | 12,132 | 8,431 | 5,759 | 5,825 | 7,471 | 5,890 | 5,058 |
| Large[c] | 54,497 | 84,539 | 128,992 | 25,335 | 48,864 | 43,390 | 49,240 |
| **TOTAL** | **68,485[d] (2,124 kg)** | **96,552[e] (3,002 kg)** | **138,593[f] (4,310 kg)** | **35,079[g] (1,091 kg)** | **59,124[h] (1,839 kg)** | **50,739[i] (1,578 kg)** | **55,731[j] (1,733 kg)** |
| | | | | **Total reported mine costs** | | | |
| Small[a] | $ 560,600 | $ 1,018,606 | $ 940,000 | $ 1,031,500 | $ 989,076 | $ 336,300 | $ 389,754 |
| Medium[b] | 3,314,000 | 2,518,239 | 1,460,000 | 1,905,125 | 2,597,782 | 1,440,000 | 1,222,700 |
| Large[c] | 18,990,000 | 31,857,228 | 41,650,000 | 7,605,000 | 16,706,600 | 14,795,000 | 17,159,024 |
| **TOTAL** | **$22,864,600** | **$35,394,073** | **$44,050,000** | **$10,541,625** | **$20,293,458** | **$16,571,300** | **$18,771,478** |
| | | | | **Unit cost per ounce** | | | |
| Small[a] | $302 | $284 | $245 | $263 | $354 | $231 | $271 |
| Medium[b] | 273 | 298 | 255 | 327 | 347 | 245 | 242 |
| Large[c] | 348 | 376 | 322 | 300 | 341 | 341 | 348 |
| **TOTAL** | **$334** | **$366** | **$318** | **$300** | **$343** | **$327** | **$336** |

[a]10-650 oz gold/yr.
[b]650-2,500 oz gold/yr.
[c]>2,500 oz gold/yr.
[d]36% of total Alaska placer gold production.
[e]46% of total Alaska placer gold production.
[f]61% of total Alaska placer gold production.
[g]19% of total Alaska placer gold production.
[h]32% of total Alaska placer gold production.
[i]37% of total Alaska placer gold production.
[j]56% of total Alaska placer gold production.

that is processed at Cominco's Trail, British Columbia smelter. Improved performance of the Red Dog mill resulted in a 2 percent increase in concentrate from 1995 to 1996 even though the amount of ore processed during the same time period decreased by 7 percent (table 13; fig. 17).

Approximately 80 percent of the 417 employees on the Red Dog payroll are Alaskan residents; about 50 percent are shareholders of NANA Corp., the owner of the deposit. In 1996, Cominco Alaska Inc. agreed to pay the Northwest Arctic Borough $60 million over the next 15 years as payment in lieu of borough land taxes.

Placer gold mine production in the northern region dropped 77 percent from 6,265 ounces (195 kilograms) gold in 1995 to 1,450 ounces (45 kilograms) gold in 1996. Much of this decline is due to reduced activities by Silverado Mines (U.S.) Inc. at its Nolan Creek property in the Koyukuk–Nolan district. While conducting an extensive reclamation program, Silverado successfully mined a lower section of the Nolan Bench that had been stripped by a previous operator prior to statehood. In addition Silverado explored for underground pay on Thompson Pup and Hammond River. Davis Creek Mine began a small operation on Davis Creek, tributary to the

Table 11. *Reported sand and gravel production and industry employment in Alaska by region, 1996*

| Region | Companies and agencies reporting[a] | Tons | Estimated unit value ($/ton)[b] | Total value | Estimated number of employees |
|---|---|---|---|---|---|
| Northern | 4 | 1,512,338 | $4.50 | $ 6,805,521 | 40 |
| Western | 2 | 378,582 | 6.25 | 2,366,138 | 35 |
| Eastern Interior | 11 | 2,892,869 | 2.60 | 7,521,459 | 182 |
| Southcentral | 9 | 3,530,850 | 2.55 | 9,003,668 | 231 |
| Southwestern | 3 | 335,000 | 2.85 | 954,750 | 25 |
| Alaska Peninsula | 3 | 762,771 | 3.80 | 2,898,530 | 45 |
| Southeastern | 6 | 478,053 | 5.55 | 2,653,194 | 40 |
| **TOTAL** | **38** | **9,890,463 (8,972,627 tonnes)** | **3.26** | **$32,203,260** | **598** |

[a]From 32 returned questionnaires and 6 phone canvass responses.
[b]Values are based on price and cost estimates from 16 producers (42% of the canvass and about 40% of the total product value).

Table 12. *Reported stone production and industry employment in Alaska by region, 1996*[a]

| Region | Companies and agencies reporting[b] | Tons | Estimated unit value ($/ton)[c] | Total value | Estimated number of employees |
|---|---|---|---|---|---|
| Northern | 1 | 13,000 | $10.50 | $ 136,500 | 2 |
| Western | 2 | 313,000 | 8.00 | 2,504,000 | 23 |
| Eastern Interior | 4 | 1,846,670 | 7.50 | 13,850,025 | 60 |
| Southcentral | 2 | 115,575 | 7.50 | 866,812 | 15 |
| Southwestern | - - | - - | - - | - - | - - |
| Alaska Peninsula | 1 | 100,000 | 10.00 | 1,000,000 | 4 |
| Southeastern | 4 | 611,800 | 8.50 | 5,200,300 | 45 |
| **TOTAL** | **14** | **3,000,045 (2,721,640 tonnes)** | **8.50** | **$23,557,637** | **149** |

[a]Includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone.
[b]Derived from 13 questionnaires.
[c]Unit value based on data supplied by nine operations or 75 percent of the total. Unit values for different stone products vary widely.
- - Not reported.

South Fork of the Koyukuk River. Compass Mining again operated a small drift on Linda Creek.

Gold Dust Mines Inc. leased and mined placer ground on Big Creek from Little Squaw Gold Mining Co. (LSGM) in the Chandalar district east of the Pipeline corridor. LSGM is negotiating leases on additional placer ground in the Little Squaw, Big Squaw, and Tobin Creek areas for the 1997 season.

Paradise Valley Mining operated a commercial placer mine in conjunction with a tourist-oriented recreational mine venture on Birch Creek east of Wild Lake. Paradise entertained about 50 groups of argonauts from five different countries during their 120-day mining season.

### Industrial Minerals

Sand and gravel use in the northern region more than doubled from 604,580 tons (548,470 tonnes) worth $2.72 million in 1995 to 1,512,338 tons (1,371,990 tonnes) worth $6.81 million in 1996. Oil field development on Alaska's North Slope was responsible for all of the increase.

ARCO Alaska mined about 315,000 tons (285,770 tonnes) of sand and gravel from pit #23 at Prudhoe Bay and C and E pits at the Kuparuk field to support new drill pad construction and access preparation, and road maintenance programs at both petroleum-producing centers.

BP Exploration mined a total of approximately 475,000 tons (430,920 tonnes) of sand and gravel from five existing mine sites on the North Slope. Approximately 465,000 tons (421,850 tonnes) of the total was used to develop the Milne Point oil field northeast of Prudhoe Bay.

The northern region of DOTPF reported that approximately 720,000 tons (653,180 tonnes) of processed and pit-run sand and gravel and 13,000 tons (11,790 tonnes) of rock were used to maintain the Dalton Highway north of the Yukon River. A few thousand tons of gravel were used for municipal road maintenance work at Barrow and Kotzebue.

Alyeska Pipeline Service Co. drew gravel and riprap from seven pits along the Trans Alaska Pipeline haul road (Dalton Highway) from Prospect Creek to Galbraith Lake for routine maintenance projects.

## WESTERN REGION

### Metals

Gold production in the western region increased dramatically in 1996 from levels established since about

Table 13. *Cominco Alaska's Red Dog Mine, production statistics, 1990–96*

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| Ore milled (tons) | 996,700[a] | 1,599,300 | 1,582,000 | 1,874,600[a] | 2,339,500 | 2,485,900 | 2,312,600 |
| (tonnes) | 904,200 | 1,450,900 | 1,435,200 | 1,700,600 | 2,121,900 | 2,225,200 | 2,098,000 |
| Ore grade | | | | | | | |
| Zinc | 26.5% | 22.5% | 19.9% | 18.4% | 18.8% | 19.0% | 18.7% |
| Lead | 8.5% | 6.6%[a] | 6.0% | 5.7%[a] | 5.7% | 5.8% | 5.0% |
| Silver | | | | | | | |
| (oz/ton) | 3.6[a] | 2.8 | 2.9 | 2.8 | 2.8 | 2.8 | 2.8 |
| (g/tonne) | 123[a] | 96 | 99 | 96 | 96 | 96 | 97 |
| Concentrate | | | | | | | |
| Zinc (tons) | 337,400 | 410,700 | 405,900 | 465,600 | 588,100 | 645,100 | 646,800 |
| (tonnes) | 306,100[a] | 372,600 | 368,200 | 422,400 | 533,400[a] | 585,200 | 586,700 |
| (grade) | 56.9%[a] | 57.1% | 57.0% | 54.8% | 55.8% | 55.6% | 55.3% |
| Lead (tons) | 56,600[a] | 76,600[a] | 28,000 | 48,700 | 59,700 | 101,300 | 118,500 |
| (tonnes) | 51,400 | 69,500 | 25,400 | 44,200 | 54,200[a] | 91,900 | 107,500 |
| (grade) | 55.1% | 57.2% | 57.0% | 50.9% | 54.9% | 55.0% | 55.6% |
| Bulk | | | | | | | |
| concentrate (tons) | 49,600 | 34,100 | 41,000 | 25,500 | 10,200 | 7,200 | 0 |
| (tonnes) | 45,000 | 31,000 | 37,200 | 23,100 | 9,300 | 6,500 | 0 |
| Bulk concentrate (grade) | | | | | | | |
| Zinc | 31.7% | 32.8% | 23.0% | 16.2% | 19.8% | 17.7% | 0.0% |
| Lead | 22.9% | 20.9% | 27.0% | 38.9% | 36.0% | 39.1% | 0.0% |
| **Total concentrate (tons)** | **443,600** | **521,400** | **474,900** | **539,800** | **658,000** | **753,600** | **765,300** |
| **(tonnes)** | **402,500** | **473,100** | **430,800** | **489,700** | **596,900[a]** | **683,600** | **694,200** |
| Employees | 350 | 331 | 349 | 376[a] | 311 | 397 | 417 |

[a]Revised slightly from Bundtzen and others (1996) based on new company data.
SOURCE: Gary Coultier and Jim Kulas, Cominco Alaska Inc.

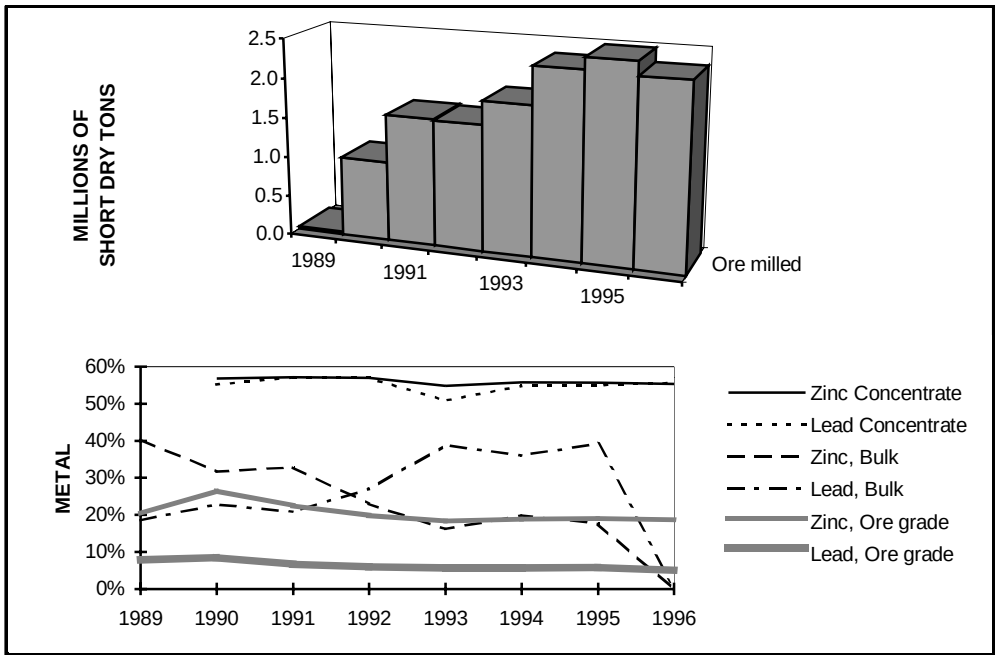



Figure 17. *Ore and metal contents of concentrate shipped from Red Dog Mine, 1989-96.*

1990. DGGS questionnaires and a phone canvass survey indicate that 23 placer and one lode mine produced 74,200 ounces (2,308 kilograms) gold in 1996, a 95 percent increase from 38,100 ounces (1,184 kilograms) gold produced from 25 mines in 1995. Gold mining provided 338 full-time equivalent jobs in the western region in 1996, compared to 261 jobs in 1995.

The chief reason for this increase in gold production and employment was the successful achievement of full scale production at the Nixon Fork gold–copper hardrock mine, which was Alaska's largest gold producer in 1996. Nixon Fork Mining Co., the operating subsidiary for Consolidated Nevada Goldfields Corp. (CNGC), mined and milled 39,900 tons (36,197 tonnes) of ore and produced 38,500 ounces (1,197 kilograms) gold and 354,000 pounds (160,574 kilograms) byproduct copper from underground orebodies at the Nixon Fork Mine 35 miles (54 kilometers) northeast of McGrath, Alaska. CNGC employed 71 year-round employees that operate on a two week–one week swing shift schedule. An estimated 65 percent of the jobs are held by Alaskan residents, and 10 percent are from nearby villages. The Nixon Fork operation is entirely supported by aircraft, and gold–copper concentrates are flown from the mine site by Woods Air Service of Palmer, Alaska, en route to smelting facilities of Dallo Inc. at Kosaka, Japan.

Alaska Gold Co. processed 650,000 cubic yards (497,000 cubic meters) of pay gravels and produced 23,500 ounces (731 kilograms) of gold from open-pit mining operations in the Cape Nome district. The company has mothballed dredges 5 and 6, but is exploring the possibility of reactivating one of their dredges in 1998. Only one Alaskan gold dredge—the two-cubic-foot bucket capacity dredge of N.B. Tweet & Sons Inc. in the Kougarok district—produced gold in 1996. Floating bucketline stacker dredges have operated every year in Alaska since 1900 (Spence, 1996).

Golden Glacier Inc., a mining subsidiary of Bering Straits Native Corp. (BSNC), leased a small tract of placer ground to the Alaska Gold Co., which produced placer gold from the BSNC tract during the 1996 season. BSNC noted that this is the first metallic mineral production from their lands since passage of the 1971 Alaska Native Claims Settlement Act.

Other placer mines were also operating in the Cape Nome district. Bert Pettigrew mined on Anvil Creek and Betty Krutch again mined fractions of pay on Specimen Gulch. Walsh Mining recovered gold from their operation on Dexter Creek. Beehive Mining mined placer gold in the Granite Mountain area and Ralph Anderson mined in the Kougarok district.

Approximately 20 suction dredgers and hand miners recovered placer gold in strandline deposits along the coastline from Cape Nome westward to the mouth of the Cripple River, a distance of about 35 miles (56 kilometers). Storm deposits of varying ages contain the most promising gold concentrations.

Taiga Mining Inc. (Taiga) again leased the Hogatza Dredge and placer claims from the Alaska Gold Co. in the Koyukuk–Hughes district and produced placer gold but less than the last several years. Taiga is aggressively exploring nearby streams in the Clear Creek drainage.

For the first time since this report series was initiated 16 years ago, there was no reported placer gold production in the Ruby–Poorman district of the Yukon River drainage. However, further to the south, longtime mine operator Rosander Mining Co. recovered placer gold from the Colorado Creek placer deposit about 40 miles (64 kilometers) north of McGrath. Rosander Mining, which employed six during the year, continues to be one of the most successful gold producers in the Kuskokwim Mountains.

#### Industrial Minerals

Sand and gravel production in the western region declined in 1996 from 1995 levels. Two respondents reported 378,582 tons (343,450 tonnes) of sand and gravel output in 1996, down from 993,882 tons (901,650 tonnes) produced in 1995. Decreased road maintenance and construction by DOTPF was the chief reason for the decline. DOTPF reported that a total of 198,254 tons (179,860 tonnes) of sand and gravel were used in airport and road construction projects throughout the western region. Stebbins Native Corp. mined and sold more than 44,000 cubic yards (32,710 cubic meters) of sand and gravel from their Stephens Hill Pit to improve and expand the Stebbins Airport (fig. 18).

Board of Trade Inc., owned and operated by Jim West Jr. of Nome, continued to extract riprap from the Cape Nome quarry during 1996 and sold about 10,000 tons (9,072 tonnes) of granitic orthogneiss to the local Nome market.

USMX of Alaska, Inc. mined more than 160,000 tons (145,150 tonnes) of shot rock and schist to construct heap leach pads and other infrastructure at its Illinois Creek property southwest of Galena. This mine is scheduled to achieve production in mid 1997. Coupled with production from Nixon Fork and long-established placer mining sources, western Alaska has become one the state's premier gold-producing regions.

### EASTERN INTERIOR

#### Metals

In 1996, about 62 percent or 92 of Alaska's 147 mechanized gold mines operated throughout the eastern interior region in the historic Fairbanks, Circle, Hot

Figure 18. *Brice Inc., contractor for DOTPF, constructed the Stebbins Airport using pit run gravel and rock from the Stephen's Hill Pit, which is owned by Stebbins Native Corporation. Photo courtesy of DOTPF.*

Springs, Livengood–Tolovana, Richardson, Fortymile, Seventymile, and Bonnifield mining districts. An estimated 74,789 ounces (2,329 kilograms) of gold worth $28.98 million was recovered from area mines, compared to 53,690 ounces (1,670 kilograms) of gold worth $21.20 million in 1995, an increase in quantity and value of 37 and 34 percent, respectively. The Fort Knox gold mine started up late in the year and the placer industry stabilized, although several operators complained that severe aufeis (icing) conditions on the creeks delayed mining activities until mid summer.

Fairbanks Gold Mining Inc. (FGMI), the operating subsidiary for Amax Gold Inc., initiated gold production at the Fort Knox gold mine 15 miles (24 kilometers) northeast of Fairbanks. From mid November to the end of December, FGMI mined and milled 769,728 tons (698,300 tonnes) of ore and recovered 16,085 ounces (500 kilograms) of refined gold during the initial "blowing in" of the mine's production components (table 14; fig. 19). The six weeks of gold output was enough for Fort Knox to be the third largest producer of gold behind the Alaska Gold Co. and Nixon Fork Mining Co. operations in the western region. On December 20, 1996, the company poured 2,128.1 ounces (66 kilograms) gold of approximately 930 fineness in three bars during a ceremony attended by state officials, Fairbanks North Star Borough (FNSB) Assembly members, Alaska legislators, and media. At year's end, FGMI provided 243 year-round jobs that paid an average of $17.50 per hour plus $5.50 an hour in benefits. About $76 million will be added to the Alaskan economy annually by the Fort Knox operation, which includes a $300,000 weekly payroll and a multi-million dollar electric bill to Golden Valley Electric Association (GVEA). All local users of electric power have already benefited from a GVEA rate reduction made possible by the Fort Knox project.

About $1.46 million in mine property taxes were paid to the FNSB in 1996. Property taxes to be paid to the FNSB in 1997 are projected to be approximately $4.10 million. The Fort Knox mine is largely on Alaska state lands that were included in the 1994 Alaska Mental Health Trust (AMHT) lands court-approved settlement. The AMHT land office within the Department of Natural Resources actively manages AMHT land resources (including Fort Knox lands) on behalf of the AMHT Authority for revenue generation and protection of land values.

Polar Mining Inc. (PMI), Alaska's fourth largest gold producer in 1996, mined a total of 3,270,560 cubic yards (2,500,670 cubic meters) of overburden and processed 527,000 cubic yards (402,950 cubic meters) of pay gravel at their lower Goldstream Valley mine operation in the Fairbanks district. PMI ceased sluicing operations in August, and moved the mine infrastructure to newly acquired property in upper Goldstream Creek near Fox. PMI, which provided 38 full-time jobs in 1996, reported less-than-anticipated earnings from the 1996 season, but expects to improve gold productivity at their new mine site near Fox in 1997.

Cripple Creek Venture (CCV), a joint venture between mine operator Yellow Eagle Mining Inc. (YEMI) and Exploration Orbite V.S.P.A. Inc., developed Alaska's first new large-scale placer mine near Ester in the Fairbanks district; active mining took place from June to November. The paystreak that is being worked by Yellow Eagle Mining Inc. straddles the auriferous, ancestral channels of Ester and Cripple creeks and is estimated to contain 280,000 ounces (8,708 kilograms) of placer gold. The washing plant and other plant infrastructure was purchased by YEMI from Cambior Alaska's Valdez Creek Mine, which ceased operations in September 1995. YEMI employed 28 seasonal workers

Table 14. *Basic information about the Fort Knox Mine (from Fairbanks Gold Mining Inc.)*

**Mine Life**
- Current projection 12 years

**Work Force**
- 255 employees
- 91 percent Alaska hires

**Operating Period**
- 24 hours per day
- 356 days per year mining
- 365 day per year milling

**Production Rate**
- 13 million tons of ore per year at a rate of 36,000 to 50,000 tons or ore per day through the mill (mining and milling rates will vary seasonally)

**Pit**
- Final size 5,200 feet E/W by 2,600 feet N/S (265 acres)
- Bottom elevation 910 feet
- Crest elevation 2,110 feet
- 30 feet high benches
- Overall pit slope 42 to 45°
- Haul roads 100 feet wide, 8 percent grade

**Development Rock**
- 36,000 to 50,000 tons per day
- Waste to ore ratio 1.05:1

**Crushing/Conveying**
- Gyratory crusher, 60 inches by 102 inches
- Conveyor, 54 inches wide by ½ mile long
- Stockpile, 36,000 tons live

**Milling**
- SAG mill, 34 feet diameter by 15 feet long driven by two 6,000 hp electric motors
- Ball mills (2), 20 feet diameter by 30 feet long each driven by a 7,000 hp electric motor
- Grind 80 percent passing 100-mesh
- High capacity thickener 110 feet diameter
- Leach tanks (7) 56 feet 3 inches diameter by 50 feet 8 inches high
- Carbon-in-leach tanks (6) 56 feet 3 inches diameter by 44 feet 6 inches high; carbon density 10 gm/L; advance rate 12 tons per day
- 24 hours total retention time in leach/CIL
- Conventional carbon stripping and electrolytic gold recovery
- Overall gold recovery 90 percent

**Tailing Detoxification**
- Cyanide detoxification tanks (2) 4 feet diameter by 36 feet high
- Two hours retention

**Tailing Disposal**
- Annual production 13 million tons deposited in a 200 million (dry) ton capacity tailing impoundment
- Sub-aerial deposition during summer
- Sub-aqueous deposition during sinter

**Equipment**
- Hydraulic shovels (2) 23-yard
- Loader (1) 23-yard
- Trucks (9) 150-ton
- Blast hole drills (4) 45,000-lb pulldown class
- Support equipment: track dozers, rubber-tired dozer, motor graders, water trucks, backhoe

**Electrical Requirements**
- 35 megawatts supplied by Golden Valley Electric Association via a 29-mile, 138 kV powerline
- 270 million kWh/yr consumption

**Water Supply**
- 5,600 gallons per minute (gpm) water (5,250 gpm recycle water plus 350 gpm makeup water) at 36,000 tons per day ore. Adequate makeup water can be supplied for 50,000 tons per day ore.

Figure 19. *The primary sag mill and ball mills grind ore at the Fort Knox Mine near Fairbanks. From mid November to December 31, 1996, an estimated 769,728 tons (698,300 tonnes) of ore were processed in the mill during initial "blowing in" of the mine. Photo by A.H. Clough.*

in 1996 and expects to expand operations and employ 36 seasonal workers in 1997.

Little Eldorado Group completed its third season working its placer deposits with underground drift mining methods on Little Eldorado Creek about 2 miles (3.6 kilometers) east of Olnes. Using low profile loaders and excavators, a crew of six mined 17,000 cubic yards (13,000 cubic meters) of high grade, auriferous pay during the winter and sluiced the gravels during summer months.

R.B. Gravel Co. (Jerry Hassel) mined a paystreak on Ready Bullion Creek near Ester, and Roger Moore mined pay from the Seattle Bench, an ancestral channel of Ester Creek. Cook's Mining produced gold from Lower Fairbanks Creek, and will develop a similar-sized cut during 1997 in conjunction with land reclamation of previously mined areas. Alf Hopen leased placer ground from the Alaska Gold Co. on Upper Cleary Creek, and will mine in the same area in 1997.

Mining activities in the Circle district stabilized after a several years of decline. Ed Lapp and Sons Mining (ELSM) was the largest producer in the Circle district, and the tenth largest gold producer in Alaska. ELSM mined paystreaks on both Eagle and Ketchum Creeks, but will focus on the Ketchum Creek property in 1997. KMM Mining (Sam and Roberta Kopenberg) successfully mined Faith Creek for the tenth year, but encountered severe aufeis formation (glaciering), which made it necessary to strip up to 20 feet (6 meters) of ice off the payzone as late as July 4, 1996. Paul and Company recovered from a poor 1995 season and successfully worked pay on Bonanza Creek and tested ground on Frying Pan Creek. Cynthia Underwood also tested a small paystreak on Bonanza Creek at 114 mile Steese Highway and washed about 50 cubic yards (38 cubic meters) of gold-bearing gravel.

The Fortymile district continued to maintain 22 small suction dredge and mechanized operations as it has for many years. This is the oldest placer district in Alaska with gold production records from the U.S. Mint dating back to 1882. Geo Quest (Mike Busby) was again the Fortymile district's largest gold mine (fig. 20), and worked pay on Chicken Creek. Geo Quest experienced some operational problems during the fall due to low water conditions; lower grade ground was worked as well. Another dozer-mechanized mine was 45 Pup Mining, which operated a small washing plant on 45 Pup near Chicken. This operation also experienced severe aufeis problems similar to those encountered by KMM Mining on Faith Creek in the Circle district.

Suction dredge operations in the Fortymile district continued at the same levels as in 1995. Chief among these include Taylor's Mining on the Mosquito Fork of Fortymile River, Forest Hayden in the Eagle A-1 Quadrangle, Double–J Mining on Napoleon Creek, and Chickaman Mining (Earl Schene) on Uhler Creek.

Alaska Placer Development operated Alaska's fifth largest gold mine on the Livengood Bench in the Livengood–Tolovana district. The company operated with a crew of ten seasonal employees and conducted a vigorous exploration program in conjunction with mining activities to ascertain the full extent of the payzone.

Several mines recovered pay in the Rampart district south of the Yukon River. Steve Losonsky mined a small cut on Hunter Creek (fig. 21) below a much larger operation of Green Mining and Exploration (Green). In 1996 Green moved into the Rampart district from the Ruby–Poorman district, where they had mined for about ten years. Also active in the area was Jim Munsell on Little Hoosier Creek and another mining company on Hoosier Creek.

South of the Rampart district, Bob Bettisworth mined on Eureka Creek and Rick Swenson mined on Doric Creek.

Three small firms reported gold production in the Bonnifield district, which is located in the foothills of the Alaska Range. Totat Mining and Gypsy Luck Inc. mined pay in the Totatlanika River drainage, while Tachik Mining Co. operated on Moose Creek, a tributary of the Nenana River. All three firms complained that extensive sheets of aufeis covered their previous year's workings and in some cases their mining equipment.

Earl Voytilla again mined upper Tenderfoot Creek in the Richardson district near Delta Junction, and John Rubel mined a small cut at the head of Junction Creek, also in the Richardson district.

### Industrial Minerals

Eleven companies and firms reported that 2,892,869 tons (2,624,410 tonnes) of sand and gravel were quarried in the eastern interior region, compared to 3,207,012 tons (2,909,400 tonnes) mined in 1995, a decrease of 10 percent. Results from four companies and agencies indicate that riprap, shot rock, and crushed rock use also declined—from 2,388,000 tons (2,166,390 tonnes) in 1995 to 1,846,670 tons (1,693,470 tonnes) in 1996, a drop of 23 percent. A decrease in public works projects administered by DOTPF was the reason for the decline in the use of sand and gravel. A decrease in crushed stone and riprap use at the Fort Knox mine caused most of the decrease in stone production. Major road improvement projects are nearing completion in the eastern interior region, and a modest decrease in both sand and gravel and stone production is also expected in 1997. The Alaska DOTPF continues to search for a competent riprap source for erosion control projects in the northern Richardson Highway region.

Figure 20. *Geo Quest (Mike Busby) operated a placer gold mine on Chicken Creek in the Fortymile district. Geo Quest was the largest producer of placer gold in the Fortymile district during 1996. Photo by Mike Busby.*

Riprap has become scarce and is found at considerable distances away from where it is needed—namely highway sections along the Tanana River.

The largest project in the eastern interior was the completion of road improvements on the Taylor Highway from mile 3 through mile 31. Eastwind Inc., the general contractor, utilized 950,000 tons (861,840 tonnes) of sand and gravel, and about 125,000 tons (113,400 tonnes) of crushed rock to finish the work (fig. 22).

Polar Mining Inc. (PMI), better known for its gold production, processed and sold about 44,000 tons (39,920 tonnes) of crushed and screened aggregate from their lower Goldstream Creek placer mine. PMI and the Alaska Gold Co. donated several thousand tons of the screened product to the Goldstream Valley Lions Club in order to supply a material base for a new community park in Goldstream Valley. Likewise Yellow Eagle Mining Inc., which operated a placer gold mine near Ester, provided washed gravel for road construction in the Fairbanks area—including the George Parks Highway rebuild project at the Geist Road–Chena Pump Road intersection.

Other companies that used sand and gravel and aggregate included Earthmovers Inc., H & H Contractors, and Fairbanks Sand and Gravel. Alyeska Pipeline Service Co. drew modest amounts of gravel and crushed stone from 16 pits along the pipeline system from Isabel Pass to the Yukon River crossing for routine maintenance projects.

About 1,300,000 tons (1,179,360 tonnes) of rock of all classifications was used to complete the tailings dam

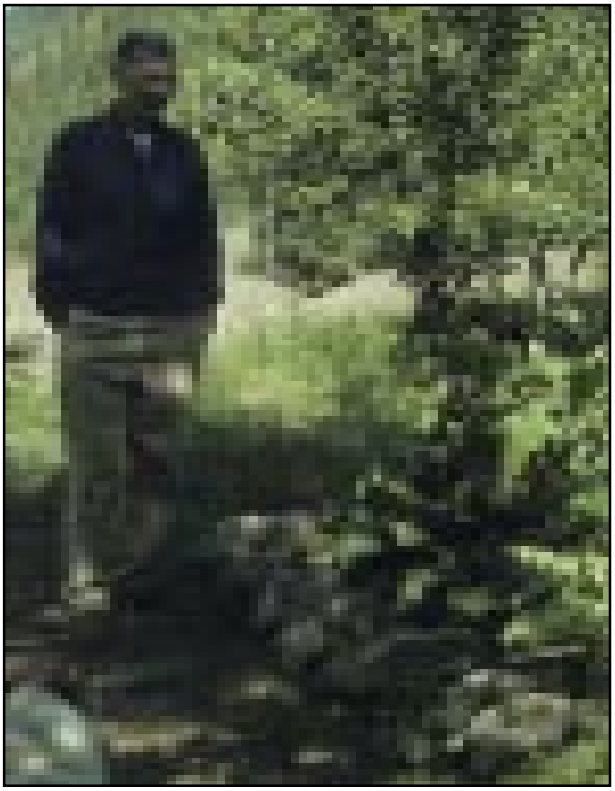


Figure 21. *Longtime placer miner Steve Losonsky stands beside rhubarb that was planted in Hunter Creek (Rampart district) several years before gold was discovered by Felix Pedro in the Fairbanks district (circa 1902). The plant has been harvested by several generations of placer miners. Photo by T.K. Bundtzen.*

facility at the Fort Knox gold mine northeast of Fairbanks. An undisclosed amount of basalt was quarried and sold by Yutan Construction Co. at the Browns Hills quarry off Badger Road near Fairbanks.

Sunshine Services Inc. mined sand and gravel from two pits in the Delta Junction area. Other sand and gravel producers active in the Delta area include Delta Concrete, Kurt's Construction, and Russ (Sandlin) Construction. Wilder Construction opened up a new pit in 1996 on land leased from Bruce Barton for the Nistler Road paving project.

### Coal, Peat, and Topsoil

The value of coal, peat, and topsoil from the eastern interior region declined 8 percent from $41 million in 1995 to $38 million in 1996. However, the drop merely reflects a normal range in production fluctuations associated with the amount of coal loaded and shipped to South Korea by Usibelli Coal Mine Inc. (UCM). As for a number of years now, UCM again operated Alaska's only coal mine located in the Nenana Coal field near Healy, Alaska. The company extracted 1,143,000 tons (1,036,930 tonnes) subbituminous coal from their Poker Flats pit and 338,000 tons (306,635 tonnes) subbituminous coal from their Gold Run Pass pit. Of this, 776,000 tons (703,990 tonnes) were exported through the Port of Seward to the Korean Electric Power Co. in Honam, South Korea. The remaining 705,000 tons (639,580 tonnes) of coal were purchased and burned by the owners of six interior power plants, which collectively generate about 155 megawatts of electric power.

The calendar year 1996 was a time of change and anticipation for UCM. The Healy Clean Coal Project (HCCP), which was selected for matching funding under the U.S. Department of Energy's Clean Coal Technology Program in 1989, was about 80 percent complete by the end of the year (fig. 23). During the summer and fall, the project proceeded with fabrication of structural steel, fabrication of tanks, and installation of silos (Green, 1996). Construction of the boiler, combustor, baghouse and sulfur removal equipment was well underway. The HCCP is designed to use state-of-the-art emission technologies and generate 53 megawatts of electric power. Under the agreement with the U.S. Department of Energy, systems testing for the HCCP using initially a propane-based fuel will begin in the summer of 1997. Subbituminous coal will be tested in the fall of 1997, with commercial power generation scheduled for mid 1998. During full operations, about 300,000 tons of so-called waste coal—coal that would not normally be recovered from the mine pits—will be used in the HCCP plant on an annual basis.

With the anticipation of increasing coal production, UCM began a major equipment upgrade program in 1995 and 1996 with purchases of two new Caterpillar model 785, 150-ton haul trucks with additional Cat 785 truck purchases planned for future years. These vehicles will replace the existing fleet of nine 95-ton capacity Dresser Haulpack trucks and two 75-ton capacity WABCO trucks that have served the mine for nearly 15 years (Green, 1996). The decision by Amax Gold Inc. to use Caterpillar 785 trucks for the Fort Knox project influenced UCM's decision to purchase new rolling stock for their coal mine operation at Healy. In addition, a new $3.6 million RH 170 shovel is being added to the UCM fleet. These new upgrades will require UCM to expand the widths and load limits of their mine road network. A new coal screening plant is also being installed, which will result in a higher quality coal product that will produce less fly ash during combustion.

With UCM's recent purchase of the Wishbone Hill coal mine near Palmer from owner Cook Inlet Region

Figure 22. *Eastwind Inc. of Anchorage, subcontractor for DOTPF, screened and crushed pit run rock for construction of the road base from miles 3 through 31 of the Taylor Highway. Photo by T.K. Bundtzen.*

Inc., it is anticipated that blending Healy and Wishbone Hill coals will produce a more competitive coal that will be prepared for export to Pacific Rim buyers.

In April 1996, UCM's 14,000-gallon water truck and other heavy equipment was mobilized to help fight and contain the fire that burned the Princess Hotel near Denali National Park (Green, 1996).

Peat and topsoil production, which is used exclusively for horticultural purposes, was reported from Great Northwest Inc., Exclusive Landscaping, and College Peat Inc. of Fairbanks and Sunshine Services of Delta Junction. Subcontractors of Exclusive Landscaping mined approximately 18,000 cubic yards of peat from the newly opened Goldstream Valley mine, Alaska's top peat production pit in 1996.

## SOUTHCENTRAL REGION

### METALS

Metal production in the southcentral region declined dramatically in 1996, mainly because of the closure of Cambior Alaska's Valdez Creek placer mine in late 1995. Our records show that eight mine operators produced 3,100 ounces (96 kilograms) gold, compared to ten operations and 35,094 ounces (1,090 kilograms) of gold production in 1995, a drop of more than 90 percent in both bullion output and employment (table 9). Unless new mines open or mothballed operations reopen, this low level of gold production will probably continue for several years in the southcentral region.

Mrak Placer Mine Inc. continued their long and consistent output of placer gold from Willow Creek in the Hatcher Pass district, and washed about 10,000 cubic yards (7,646 cubic meters) of pay. Mrak also conducted a rotary drill program to find additional reserves, and will continue the exploration program in 1997. To the north, Claude Morris was active on Lucky Gulch in the Valdez Creek district near the formerly productive Valdez Creek placer mine site.

Empire Exploration Inc. worked the Zolata and "Hill 3830" mines in the Yentna–Cache Creek district; however, an exceptionally dry season and permitting problems limited 1996 output. Lake Creek Placers again mined a gold–platinum paystreak on Lake Creek in the Petersville area and completed their most successful season ever, washing about 5,750 cubic yards (4,396 cubic meters) of auriferous gravel during the summer

Figure 23. *The Healy Clean Coal Project (HCCP) near Healy was about 80 percent complete by the end of 1996. The HCCP plant will generate 53 megawatts of electric power using state-of-the-art emission control technologies. Photo courtesy of Usibelli Coal Mine Inc.*

and fall season. Lake Creek Placers also accounted for Alaska's only production of platinum metals (table 8). This aggressive firm plans to continue work through the winter of 1996-97, and may design an underground drift to explore deep, auriferous conglomerate beds on their mining property. Martin Herzog also completed a modest program in the Yentna–Cache Creek district.

#### Industrial Minerals

During 1996 the southcentral region again led the state in sand and gravel output although production dropped modestly from levels established in 1995. Nine agencies and private firms reported that 3,530,850 tons (3,203,190 million tonnes) worth $9.0 million was produced in 1996, down from 4,179,460 tons (3,791,600 tonnes) worth $10.7 million mined in 1995, a 15 percent decline. However, stone use jumped from 89,175 tons (80,900 tonnes) worth $445,000 in 1995 to 115,575 tons (104,850 tonnes) worth $866,812, a 95 percent value increase. Major projects that utilized sand and gravel include the DOTPF McCarthy Road project (fig. 24), and the Tudor Road upgrade in the Anchorage area.

Aggregate producers dominated industrial mineral production activities in the southcentral region. Hermon Brothers Construction Co. mined significant tonnages of pit-run gravel from their mine at 1.5 mile George Parks Highway. Chugach Alaska Corp. drew 300,000 tons (291,600 tonnes) of gravel from numerous small pits in the Palmer–Wasilla area and throughout the Chugach Alaska region in support of various DOTPF highway, municipal, and timber projects.

Operators mining privately-held pits on the Kenai Peninsula were kept busy during the construction season. Dibble Creek Rock mined gravel from a small pit near Anchor Point. Alaska Road Builders in Soldotna mined aggregate to supply three small municipal projects in the Kenai–Soldotna area. Hopkin Brothers Construction also quarried gravel from their Seldovia pit for construction projects near Kenai. Northern Oil Operations Inc. mined about 8,500 cubic yards (6,500 cubic meters) in Kenai for road improvement work.

Subcontractors of DOTPF mined about 44,500 tons (40,370 tonnes) of rock and nearly 550,000 tons (498,960 tonnes) of gravel to upgrade the McCarthy Road near Chitina.

#### Peat and Topsoil

Landscape Supply Corp., the largest peat and topsoil producer in the southcentral region, mined more than 8,000 cubic yards (6,116 cubic meters) of peat and topsoil from its Palmer–Fishook pit. Expanded markets will up their total in 1997.

### SOUTHWESTERN REGION

#### Metals

Placer gold output from 13 small companies in the southwestern region remained steady at about 8,500 ounces (264 kilograms) gold worth $3.29 million in 1996, compared to 8,548 ounces (265 kilograms) gold worth $3.37 million reported in 1995. The largest mine operator in southwestern Alaska was the Clark–Wiltz Partnership (CWP), which reached full-scale production in 1996. CWP employed a crew of 12 and mined a

Figure 24. *Miller-Beck General, subcontractor to DOTPF, mines sand and gravel from the Collins pit for road base installation from miles 44 through 47 of McCarthy Road. Photo courtesy of DOTPF.*

narrow but rich payzone on Podesie Creek, a tributary to Ganes Creek in the Innoko district near McGrath (fig. 25). The mobile operation simultaneously reclaims the creek bottom as the washing plant is towed upstream. CWP is also exploring pay zones on Ganes Creek near the old Holky or Magnuson Dredge and along terrace levels of the Innoko River.

Little Creek Mine, operated by Paul, Andy and T.J. Sayer, continued their longtime mining venture on Little Creek in the Innoko district. Little Creek Mine worked 10 Pup and will continue the placer mining in 1997 while exploring hardrock prospects with USMX, which is evaluating the lode potential of a block of Alaska Mental Health Trust lands in the Ophir area.

Other companies that mined in southwestern Alaska include: Chase Brothers Mining on Flat Creek, a tributary to Stuyahok River, Marshall district; Anderson Mining on Yankee Creek, Innoko district; Ed Plano on Anvil Gulch near Ophir, Innoko district; Robbie Roberts on Ophir Creek, Innoko district; Manzie Magnuson on Madison Creek, Innoko district; Alvin Agoff on Prince Creek, Iditarod district; Flat Creek Mining on Flat Creek in the Iditarod district; Mark Matter on Marvel Creek, Nyac district; and Manzie Magnuson on Candle Creek, McGrath–McKinley district. Minor production test work was conducted by two small firms on Julian and Prince creeks in the Iditarod district.

#### Industrial Minerals

Knik Construction Co. mined about 10,000 tons (9,072 tonnes) of gravel for a road project at Platinum south of Bethel. Calista Corp. mined gravel and aggregate from various locations in their region for village, airport, and roadbase needs.

### ALASKA PENINSULA REGION

#### Industrial Minerals

Dutch Harbor Aggregate mined approximately 150,000 tons (136,080 tonnes) of stone worth $1 million from their Little South America property near Dutch Harbor in the Aleutian Islands; the extensive excavations supplied materials for fishery development programs. Koniag Inc. mined more than 146,000 cubic yards (132,451 cubic meters) of gravel and unspecified amounts of shot rock on Afognak Island for road development required for timber harvesting on its lands.

### SOUTHEASTERN REGION

#### Metals

Metallic mineral production in the southeastern region was revitalized by the reopening of the Greens Creek mine on Admiralty Island near Juneau. Kennecott–Greens Creek Mining Co. placed the Greens Creek silver–polymetallic mine back into production in

Figure 25. *The Clark-Wiltz Partnership mined a placer gold paystreak on Podesie Creek, tributary to Ganes Creek, in the Innoko district west of McGrath. This was the largest placer mine in southwestern Alaska during 1996. Photo by T.K. Bundtzen.*

July 1996, almost six months ahead of schedule. The underground mine had operated from 1989 through the first quarter of 1993, but closed down due to low metal prices. From July 1996 to the end of December, Kennecott mined 135,000 tons (122,470 tonnes) of ore and produced approximately 43,000 tons (39,010 tonnes) of concentrates that contained (payable) 2,476,000 ounces (77,004 kilograms) of silver, 7,480 ounces (233 kilograms) of gold, 9,100 tons (8,255 tonnes) of zinc, 4,200 tons (3,810 tonnes) of lead, and 213.2 tons (193.4 tonnes) of copper.

About 265 people worked at Greens Creek mine during the 1996 production phase of the mine. The Kennecott employee base includes underground miners, mill employees, geologists, mining and environmental engineers, and management and transportation infrastructure staff. The new Greens Creek mine is designed to annually produce 62,000 ounces (1,928 kilograms) of gold, 11 million ounces (342,139 kilograms) of silver, 40,000 tons (36,290 tonnes) of zinc, 20,000 tons (18,144 tonnes) of lead, and about 1,000 tons (907 tonnes) of copper, which will make it one of the nation's largest producers of silver and zinc.

Two small placer gold companies mined gold in the Porcupine district near Haines. Big Nugget mine employed a crew of four for 100 days on their claims on Porcupine Creek, but encountered water-filled underground drifts about 4 feet (1.2 meters) above bedrock that flooded their open pit. Big Nugget mine will cut a drainage ditch in 1997 to remove the excess water. Snow Lion Mining Co. worked modest pay zones on nearby Cahoon Creek and the alluvial fan of Porcupine Creek, where abundant fine gold was encountered.

#### Industrial Minerals

Production of stone and sand and gravel in the southeastern region increased several fold from 1995 levels. Six firms produced 478,053 tons (433,690 tonnes) of sand and gravel worth $2.65 million in 1996 compared to 228,760 tons (207,530 tonnes) worth $1.06 million in 1995. Four more firms quarried 611,800 tons (555,024 tonnes) of shot rock and riprap worth $5.20 million in 1996, compared to 129,097 tons (117,120 tonnes) worth $0.92 million in 1995. Road upgrades on Prince of Wales Island, urban road projects in the Juneau area, and support work at the Greens Creek Mine contributed to the increase. Contrasting these trends were decreased logging road construction throughout the Tongass National Forest.

Bruce D. Morely Inc. mined gravel on North Douglas Island for road upgrades in nearby Douglas. Juneau Ready-Mix Inc. pulled sand and gravel from the Lemon Creek and Montana Creek pits north of Juneau for a variety of pad construction and road maintenance projects throughout the Juneau area. RSH Co. also mined gravel and small amounts of crushed rock from sources in Lemon Creek drainage for unspecified uses. The City of Thorne Bay mined and sold 4,785 cubic yards (3,658 cubic yards) of shot rock to local contractors; the City plans to reclaim the land for commercial property upon pit closure.

Sealaska Corp. mined shot rock for various buyers from quarries on their landholdings in the southeastern region. In addition Sealaska initiated a promising new industrial mineral export project at their limestone quarry near Calder on Prince of Wales Island. Mining and processing of a 13.3 million ton (12.1 million tonne) calcium carbonate deposit is expected to begin in the first quarter of 1997. Initial products will consist of : (1) ground calcium carbonate for horticultural, environmental, and industrial applications; and (2) crushed and screened material for wallboard, roofing, and animal feed manufacturing. The significance of Sealaska's ground-breaking efforts is that the Calder project will be the first Alaskan mine in 20 years to export an industrial mineral product beyond the borders of the state.

# DRILLING

Table 15 summarizes drill activity in the state in 1996. Although there was no placer thawfield drilling, most regions reported considerable hardrock drill activity; in the northern, southwestern, and southeastern regions all activity was core drilling. The total footage drilled, 729,000 feet (222,241 meters), is more than in any year since 1990 (table 16). After a lapse of several years, placer drilling increased substantially, mainly due to activity by Alaska Gold Co. near Nome and Polar Mining Inc. near Fairbanks. Continuing the trend of the last few years, very little exploration or development drilling was reported from coal projects. Hardrock drilling reached a near record in 1996 (fig. 26). Core drilling, of which 215,000 feet (65,532 meters) was underground, surpassed reverse-circulation drilling, except in western, eastern interior, and southcentral regions. This probably reflects the ease of access in these areas. Table 17 is a listing of companies reporting significant drilling programs in 1996.

Table 15. *Drilling footage by region in Alaska, 1996*

| Type of drilling | Northern | Western | Eastern interior | South-central | South-western | Alaska Peninsula | South-eastern | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Placer exploration | - - | 51,700 | 10,080 | - - | - - | - - | - - | **61,780** |
| Placer thawfield | - - | - - | - - | - - | - - | - - | - - | - - |
| **Placer subtotal** | - - | **51,700** | **10,080** | - - | - - | - - | - - | **61,780** |
| **Coal subtotal** | - - | - - | **8,500** | - - | - - | - - | - - | **8,500** |
| Hardrock core | 33,790 | 31,000 | 79,698 | 7,000 | 133,000 | - - | 239,842 | **524,330**[a] |
| Hardrock rotary | - - | 43,000 | 83,827 | 7,700 | - - | - - | - - | **134,527** |
| **Hardrock subtotal** | **33,790** | **74,000** | **163,525** | **14,700** | **133,000** | - - | **239,842** | **658,857** |
| **TOTAL (feet)** | **33,790** | **125,700** | **182,105** | **14,700** | **133,000** | - - | **239,842** | **729,137** |
| **TOTAL (meters)** | **10,232** | **38,313** | **55,506** | **4,481** | **40,272** | - - | **73,104** | **222,241** |

- - Not reported.
[a]215,000 feet of core drilling was underground.

Table 16. *Drilling footage reported in Alaska, 1982–96*

| Year | Placer Exploration | Placer Thawing | **TOTAL PLACER** | **TOTAL COAL** | **TOTAL HARDROCK** | Hardrock Core[a] | Hardrock Rotary[a] | **TOTAL FEET** | **TOTAL METERS** |
|---|---|---|---|---|---|---|---|---|---|
| 1982 | 30,000 | 94,000 | **124,000** | **80,000** | **200,000** | - - | - - | **404,000** | **123,139** |
| 1983 | 23,000 | 30,000 | **53,000** | **12,000** | **180,500** | - - | - - | **245,500** | **74,828** |
| 1984 | 31,000 | 98,000 | **129,000** | **25,700** | **176,000** | - - | - - | **330,700** | **100,797** |
| 1985 | 46,000 | 34,000 | **80,000** | **8,700** | **131,700** | - - | - - | **220,400** | **67,177** |
| 1986 | 32,400 | 227,000 | **259,400** | **28,800** | **50,200** | - - | - - | **338,400** | **103,144** |
| 1987 | 50,250 | 130,000 | **180,250** | **19,900** | **115,100** | 95,600 | 19,500 | **315,250** | **96,088** |
| 1988 | 152,000 | 300,000 | **452,000** | **26,150** | **353,850** | 223,630 | 130,230 | **832,000** | **253,593** |
| 1989 | 97,250 | 210,000 | **307,250** | **38,670** | **332,230** | 242,440 | 89,790 | **678,170** | **206,700** |
| 1990 | 78,930 | 105,000 | **183,930** | **18,195** | **760,955** | 648,600 | 112,355 | **963,080** | **293,547** |
| 1991 | 51,247 | 130,000 | **181,247** | **16,894** | **316,655** | 205,805 | 110,850 | **514,796** | **156,910** |
| 1992 | 6,740 | 65,000 | **71,740** | **12,875** | **359,834** | 211,812 | 148,022 | **444,449** | **135,502** |
| 1993 | 25,216 | - - | **25,216** | - - | **252,315** | 124,325 | 127,990 | **277,531** | **84,591** |
| 1994 | 21,000 | - - | **21,000** | **8,168** | **438,710** | 347,018 | 91,692 | **467,878** | **141,781** |
| 1995 | 27,570 | - - | **25,570** | - - | **415,485** | 363,690 | 51,795 | **443,055** | **135,043** |
| 1996 | 61,780 | - - | **61,780** | **8,500** | **658,857** | 524,330[b] | 134,527 | **729,137** | **222,241** |

[a]Core and rotary drilling not differentiated prior to 1987.
[b]215,000 feet of core drilling was underground.
- - Not reported.

Table 17. *Companies reporting significant drilling programs in Alaska in 1996*

| | |
|---|---|
| American Copper & Nickel Co. Inc. | Kennecott Greens Creek Mining Co. |
| Addwest Minerals Inc. | Liberty Bell Joint Venture |
| Alaska Gold Co. | Newmont Exploration Ltd. |
| ASA Inc. | Placer Dome U.S. Inc. |
| Cominco American Inc. | Polar Mining Inc. |
| Consolidated Nevada Goldfields Corp. | Sealaska Corp. |
| Cross Canada International Resources | Silverado Mines (U.S.) Inc. |
| Grayd Resources | Sumitomo Metal Mining Canada Ltd. |
| International Freegold Inc. | Teck Corp. |
| International CanAlaska Resources Ltd. | Usibelli Coal Mine Inc. |
| Kennecott Exploration Co. | Westmin Resources Ltd. |

Figure 26. *Jason Bressler (left) of WGM and Hidetoshi Takaoka of Sumitomo Metal Mining Canada Ltd. at the Nana-Dynatech drill rig at the Liese Creek site, Pogo Prospect, north of Delta Junction. Photo by R.C. Swainbank.*

# METAL AND MINERAL PRODUCT RECYCLING

Alaska's metal recycling industry remained relatively strong, despite a modest weakening in the prices for ferrous and nonferrous scrap. Interviews with nine firms indicate that 44,000 tons (39,917 tonnes) of ferrous scrap worth $3.75 million and 9,550,000 pounds (4,331,000 kilograms) of nonferrous scrap worth $4.71 million were recycled in 1996, down about $0.65 million in value from 1995 levels (table 18). Metal recycling firms employed about 100 during 1996. Nonferrous scrap continues to be dominated by firms in Fairbanks, Anchorage, and on the Kenai Peninsula. Aluminum and copper scrap was shipped by K&K Recycling, C&R Pipe and Steel, the Anchorage Recycling Center, ABC Towing, and Alaska Metals Recycling.

Unfortunately, the Anchorage Recycling Center, the state's largest recycling center, was forced to downsize their overall recycling activities in Alaska as the result of low prices received for glass, paper, plastics, and tin. The company, which lost $475,000 in 1996, continues to recycle the higher-priced metals but has mothballed their plastic, paper, and glass recycling activities until prices and demand improve.

On a similar vein, K&K Recycling, which has processed and sold scrap metal for two decades in the eastern interior region, will continue to pay customers for aluminum, lead, brass, radiators, stainless steel, and copper, and will accept without charge steel, cast iron, and tin. However, K&K will not accept paper, glass, and plastics at this time.

Lead recycling in 1996 was maintained at about the same level as 1995 with an average of about 1,560 tons (1,415 tonnes) produced annually during the last two years. ABS Alaskan was again the Interior's largest exporter of lead-acid batteries and shipped forty-one 40,000-pound (18,144 kilograms) capacity tractor trail-

ers loaded with used batteries to G&B Batteries Inc. (G&B) in California. Both G&B and RSR Battery Inc. operate custom smelters in California; these firms currently purchase most of the available Alaskan lead-acid batteries. Other lead recyclers include Battery Specialists in Anchorage, NAPA Auto Parts and Exide Corp. in both Anchorage and Fairbanks, and Jackovich Construction and Industrial Supply in Fairbanks.

Alaskan ferrous scrap output increased mainly as the result of export activity of Alaska Metals Recycling (AMR) of Anchorage. This company managed to load up two PANAMAX freighters with approximately 40,000 tons (36,288 tonnes) of ferrous scrap en route to buyers in Taiwan and Korea (fig. 27). AMR plans to continue operations in 1997 by expanding their company's coverage with a focus on the Fairbanks area and expansion of activities into the nonferrous metals.

Table 19 summarizes Alaskan metal recycling quantities during the ten-year period 1987–96. This data is derived from the canvassing of many small recycling

Table 18. *Reported scrap metal and mineral-based recyclable products exported from Alaska, 1995–96*[a]

| | 1995 | | | 1996 | | |
|---|---|---|---|---|---|---|
| | Quantity | | Estimated | Quantity | | Estimated |
| **Commodity** | **Pounds** | **Kilograms** | **value**[b] | **Pounds** | **Kilograms** | **value** |
| **Nonferrous scrap** | | | | | | |
| Aluminum | 3,164,100 | 1,435,235 | $2,400,000 | 2,900,000 | 1,315,440 | $2,000,000 |
| Brass | 178,199 | 80,830 | 109,818 | 100,000 | 45,360 | 55,000 |
| Copper | 1,186,430 | 538,164 | 1,601,800 | 900,000 | 408,240 | 960,000 |
| Lead[c] | 3,105,375 | 1,408,590 | 1,055,830 | 3,150,000 | 1,428,840 | 1,200,000 |
| Radiators | 21,387 | 9,701 | 64,161 | - - | - - | - - |
| Stainless steel | 76,160 | 34,546 | 342,720 | - - | - - | - - |
| Undistributed nonferrous scrap | 578,000 | 262,181 | 42,850 | 2,500,000 | 1,134,000 | 500,000 |
| **Subtotal** | **8,309,651** | **3,769,247** | **5,367,179** | **9,550,000** | **4,331,880** | **4,715,000** |
| **Ferrous scrap** | 72,600,000 | 32,931,360 | 3,484,800 | 88,000,000 | 39,916,800 | 3,750,000 |
| **Nonmetallic mineral-based products** | | | | | | |
| Glass | 550,000 | 249,480 | - - | - - | - - | - - |
| Plastic (HDPE#2 and battery case) | 68,250 | 30,958 | 12,500 | - - | - - | - - |
| **TOTAL** | **81,527,901** | **36,981,045** | **$9,114,479** | **97,550,000** | **44,248,680** | **$8,465,000** |

[a]All production data in 1995 and 1996 provided by Alaska Metal Recycling (Anchorage), ABS Alaskan (Fairbanks), ABC Towing (Anchorage), C and R Pipe and Steel Inc. (Fairbanks), Channel Sanitation (Juneau), Action Auto (Fairbanks), Hilltop Wreckers (Chugiak), Anchorage Recycling Center (Anchorage), Fairbanks North Star Borough (Fairbanks), Battery Specialists (Anchorage), BP Exploration (Anchorage), United Battery Services (Portland, Oregon), K&K Recycling (Fairbanks), and Jackovich Construction and Industrial Supply (Fairbanks).
[b]Value estimates for 1995 and 1996 determined from *Metals and Mineral Annual Review - 1996* (Brewis and others, 1997). We emphasize that the price estimates do not include transportaion, preparation, or refining costs.
[c]Lead volume estimates judged to be conservative for both years.
- - Not reported.

Figure 27. *Alaska Metal Recycling of Anchorage, Alaska's largest scrap producer, collected, processed, and shipped about 40,000 tons (36,290 tonnes) of ferrous scrap to circum-Pacific buyers during 1996. Photo by Chris Alexander, Alaska Metal Recycling Inc.*

firms reported in this mineral industry report series. During this time 28,730.6 tons (26,064.0 tonnes) of nonferrous scrap, 261,914.5 tons (237,609.0 tonnes) of ferrous scrap, and 1,819.0 tons (1,650.2 tonnes) of undistributed metallic commodities or 292,463.5 tons (265,323 tonnes) of all types of metallic scrap worth $65.06 million were shipped by Alaskan scrap outlets to domestic and international markets. Asian buyers have purchased most of Alaska's ferrous scrap, while North American buyers have purchased most of Alaska's nonferrous scrap products. Because steel mills on the west coast of North America have increased their ferrous scrap feed requirements, more Alaskan ferrous scrap may eventually make its way to North American buyers. Some Alaska-based lead-acid battery vendors believe that the Alaskan used battery supply is large enough to support a small in-state smelter, thereby capable of adding value and jobs to Alaska's metal recycling industry.

Table 19. *Quantity and value of reported scrap metal and mineral based recyclable products exported from Alaska, 1987–96*[a]

| | In tons | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Copper**[b] | **Lead** | **Aluminum** | **Undistributed metallic**[c] | **Ferrous** | **Other**[d] | **Value**[e] |
| 1987 | 894.8 | 237.0 | 583.0 | 35.0 | 45,000.0 | - - | $8,409,980 |
| 1988 | 756.5 | 47.2 | 1,197.3 | 193.6 | 14,011.5 | 300.0 | 9,514,570 |
| 1989 | 718.8 | 604.0 | 1,450.0 | 877.5 | 24,000.0 | 416.9 | 8,128,200 |
| 1990 | 292.5 | 1,800.0 | 750.0 | 3.2 | 12,500.0 | - - | 3,570,000 |
| 1991 | 265.6 | 1,500.0 | 670.0 | 9.2 | 2,315.4 | - - | 2,634,650 |
| 1992 | 138.5 | - - | 222.1 | 42.8 | 23,642.3 | - - | 3,052,908 |
| 1993 | 346.7 | 850.9 | 1,263.3 | 11.5 | 31,828.4 | 517.0 | 6,257,850 |
| 1994 | 419.5 | 875.0 | 1,211.8 | 11.5 | 28,316.9 | 276.0 | 5,915,835 |
| 1995 | 682.3 | 1,552.7 | 1,582.1 | 337.7 | 36,300.0 | 309.1 | 9,114,479 |
| 1996 | 500.0 | 1,575.0 | 1,450.0 | 1,250.0 | 44,000.0 | - - | 8,465,000 |
| **TOTAL (tons)** | **5,015.2** | **9,041.8** | **10,379.6** | **2,772.0** | **261,914.5** | **1,819.0** | **$65,063,472** |
| **(metric tonnes)** | **4,550.0** | **8,202.7** | **9,416.4** | **2,514.8** | **237,609.0** | **1,650.2** | |

[a]Derived from published DGGS Alaska Mineral Industry Special Report series 1987–95.
[b]Includes brass.
[c]Includes nickel-cobalt alloys, zinc, car radiators, manganese, magnesium, and stainless steel.
[d]Includes glass, battery casing, and plastic.
[e]Gross values determined from average commodity prices for respective years.
- - Not reported.

# GOVERNMENT ACTIONS

The total number of active Alaska state claims increased from 25,106 in 1995 to 36,002 in 1996, a 43 percent increase. The total number of active federal claims remained at about the same level of approximately 8,000 during both 1995 and 1996.

Applications for mineral exploration tax credits tripled in 1996, with 12 companies applying for 106 projects with claims for $26.5 million. In 1995, the year Governor Knowles signed the Mineral Exploration Incentives Bill, there were 33 project mineral incentive applications with a total value of $13.3 million. The bill allows deductions of up to $20 million of documented exploration costs for a new mine from up to 50 percent of the taxes, rents and royalties due to the State over a period of up to 15 years. The tax credits are fully transferable for a given project.

The state DMWM completed permitting requirements for the Illinois Creek heap-leach gold project near Galena, which should reach production by the second quarter of 1997.

The Alaska Mental Health Trust Land Office, which was established in 1995 after the settlement of lengthy litigation to reconstitute the Trust, issued three exploration permits affecting 20,000 acres in 1996, and managed over 1,500 active existing mining claims, including some at the Fort Knox Mine near Fairbanks. The Land Office is established within the Alaska Department of Natural Resources and has utilized Division

of Land's Geographic Information System to prepare a set of full-color Mental Health Trust Land maps to identify locations and opportunities. About 9 percent of the gross revenue of $1.4 million in Fiscal Year 1996 was derived from minerals and materials.

Table 20 shows the revenues to the state derived from mining activity, but does not include the much larger amount that mines pay to local municipalities. For example, Usibelli Coal Mine Inc. is the largest taxpayer in the Denali Borough, and the Red Dog Mine announced an agreement with the Northwest Arctic Borough to pay $60 million over the next 15 years as Payments In Lieu of Taxes.

The state DMWM presented the Alaska Gold Co. an award for outstanding reclamation of formerly mined lands in the Cape Nome district. Sixteen Alaskan mineral firms have received state mine reclamation awards in the last three years.

Ryan Lode Mines Inc., the State Department of Environmental Conservation (DEC), and the Fairbanks Municipal Utilities System (FMUS) worked on a demonstration project that utilized Fairbanks sewer sludge to reclaim mine tailings on Ester Dome near Fairbanks (fig. 28). The successful completion of the project indicated that this application could substantially reduce mine reclamation costs and provide a use for sewage treatment products in other parts of the state.

The Alaska Department of Natural Resources (DNR) contracted WGM Inc. to conduct airborne geophysical surveys in the Chulitna and Yentna mining areas of southcentral Alaska, and part of the Rampart mining district in the eastern interior region. Maps of the Upper Chulitna, Rampart-Manley (extended area), and Petersville/Collinsville areas were released to the public in February and March 1997. DNR contracted Sanders Geophysics to conduct an aeromagnetic survey of the Bethel Basin in the southwestern region. Maps were released to the public in April 1997. DNR also initiated a coalbed methane study, which is designed to investigate the potential to extract methane gas from coalbeds for use in remote Alaskan bush areas. DGGS also geologically mapped the Rampart district and the southern Ruby-Poorman district; preliminary summaries of both studies will be released in 1997.

The State Department of Environmental Conservation (DEC), the Alaska Miners Association (AMA), and environmental groups debated changes in the National Pollution Discharge Elimination System (NPDES) permit for placer mines that were submitted by Region 10 of the U.S. Environmental Protection Agency (EPA). Of particular concern to miners was how the NPDES modifications would affect the ability of small suction dredge operators to mine in such areas as the historic Nolan, Fortymile, and Sunrise districts in the northern, eastern

Table 20. *Revenues paid to the State of Alaska by Alaska's mineral industry, 1991–96*[a]

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|
| **Mineral rents and royalites** | | | | | | |
| State claim rentals | $ 626,164 | $ 537,355 | $ 523,661 | $ 709,568 | $ 712,559 | $ 929,744 |
| Production royalties | 11,736 | 7,815 | 7,917 | 12,015 | 6,762 | 6,208 |
| Mining license | 598,971 | 465,153 | 425,607 | 481,907 | 484,035 | 481,000 |
| Annual labor | - - | - - | - - | - - | - - | 62,900 |
| **Subtotal** | **1,236,871** | **1,010,323** | **957,185** | **1,203,490** | **1,203,356** | **1,479,852** |
| **Coal rents and royalties** | | | | | | |
| Royalties | 1,188,063 | 1,294,825 | 1,486,100 | 1,399,912 | 1,866,952 | 1,348,841 |
| Rents | 130,363 | 198,835 | 198,835 | 198,835 | 172,024 | 206,515 |
| **Subtotal** | **1,318,426** | **1,493,660** | **1,684,935** | **1,598,747** | **2,038,976** | **1,555,356** |
| **Material sales** | | | | | | |
| Mental Health | 34,141 | 104,845 | 5,300 | 54,772 | 106,505 | 126,000 |
| Division of Land | 706,220 | 491,235 | 561,414 | 174,484 | 351,094 | 431,815 |
| SPCO | 0 | 161,408 | 150,000 | 136,752 | 115,744 | 44,403 |
| School fund | 3,548 | 3,279 | 3,011 | 1,564 | 8,812 | n/a |
| **Subtotal** | **743,909** | **760,767** | **719,725** | **367,572** | **582,155** | **$602,218** |
| **TOTAL** | **$3,299,206** | **$3,264,750** | **$3,361,845** | **$3,169,809** | **$3,824,487** | **$3,637,426** |

[a]Does not include state corporate income taxes, which were not released for this study, or taxes paid to individual municipalities.
n/a = not available.

interior, and southcentral regions. In November DEC Commissioner Michele Brown announced an agreement reached between federal and state agencies and special interest groups that would allow the state to certify new federal "general" NPDES permits without having to go through the costly "individual" NPDES permit process.

Governor Tony Knowles created a special water quality working group to study and make recommendations for 12 natural resource-related criteria regulated by state and federal agencies. These include arsenic, acute toxicity, dissolved metals, and petroleum (hydrocarbon) residual levels—all of which affect mine-related activities.

During 1996 the Alaska Legislature and Governor enacted legislation which extended the allowable underground mine shifts from 8 hours to 10 hours.

(a)

(b)

Figure 28a, b. *Ryan Lode Mine tailings area before (a) and after (b) application of pasteurized sewage sludge. Previously, it was difficult to re-vegetate the mine tailings on this property. The successful completion of the project indicated that sewage sludge application could substantially reduce mine reclamation costs and provide a use for sewage treatment products in the other parts of the state. Photos courtesy of Shelly Stephenson, Ryan Lode Mines Inc.*

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Green, C.B., 1996, editor, Usibelli Coal Miner, vol. 15, October, 8 pages.
Spence, C.C., 1996, The Northern Gold Fleet: University of Illinois Press, 302 pages.

# APPENDIX A

## State and federal agencies and private interest groups involved in mineral development activities, 1996

**(Note: The *1997 Service Directory of the Alaska Miners Association* lists technical and professional consultants and companies available for work in Alaska. The report is available for $15 from the Association's Anchorage office.)**

### STATE OF ALASKA AGENCIES

**DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT**
State Office Building, 9th Fl.
P.O. Box 110800 (mailing)
Juneau, AK 99811-0800
(907) 465-2500
(907) 465-3767 (fax)

Function: *Promotes economic development in Alaska.*

**Division of Trade and Development**
3601 C St., Ste. 700
Anchorage, AK 99503-5934
(907) 269-8110
(907) 269-8125 (fax)

State Office Building, 9th Fl.
P.O. Box 110804 (mailing)
Juneau, AK 99811-0804
(907) 465-2017

751 Old Richardson Hwy., Ste. 205
Fairbanks, AK 99701
(907) 452-7464
(907) 456-8173 (fax)

Function: *Primary advocacy agency in state government for economic growth. Researches and publishes economic data on Alaska's mining industry. Attracts capital investment by advertising Alaska's resource potential. Provides research staff aid for the Alaska Minerals Commission. The Division also encourages the development of new markets for Alaska resources; increases the visibility of Alaska and its products in the international marketplace; and makes referrals and provides technical assistance to those interested in developing export markets for Alaska-produced or value-added goods and services.*

**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5010
Public Information (907) 465-5060

Function: *Issues permits for activities, including mining, 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.*

ADEC - Northern Public Service Area
610 University Ave.
Fairbanks, AK 99709-3643
(907) 451-2184
(907) 451-2188 (fax)

ADEC - Central Public Service Area
555 Cordova St.
Anchorage, AK 99501
(907) 269-7500
Permits/Compliance Assistance
1-800-510-2332 (inside Alaska only)
(907) 269-7500 (outside Alaska)
e-mail: compass@envircon.state.ak.us
(907) 269-7652 (fax)

ADEC - Juneau Public Service Area
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5350
(907) 465-5362 (fax)

Nome District Office
P.O. Box 1815
Nome, AK 99762-1815
(907) 443-2600
(907) 443-5961(fax)

**DEPARTMENT OF FISH AND GAME**
1255 W. 8th St.
P.O. Box 25526 (mailing)
Juneau, AK 99802-5526
(907) 465-4100

Habitat and Restoration Division
(907) 465-4105

Function: *Protects habitat in fish-bearing fresh waters and manages refuges, sanctuaries, and critical habitats. Requires permits for any work involving: the blockage of fish passage; equipment crossings or operation in fresh waters used by anadromous fish; use, diversion, or pollution of streams containing anadromous fish; construction, exploration, or development work in state game refuges, game sanctuaries, and critical habitat areas.*

Northern Regional Office
Habitat and Restoration Division
1300 College Rd.
Fairbanks, AK 99701-1599
(907) 459-7289

Southcentral Regional Office
Habitat and Restoration Division
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2285

Southeastern Regional Office
Habitat and Restoration Division
802 3rd St., 2nd Fl.
P.O. Box 240020 (mailing)
Douglas, AK 99824-0020
(907) 465-4290

**OFFICE OF MANAGEMENT AND BUDGET**
Division of Governmental Coordination
240 Main St., Ste. 500
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562

Function: *Conducts coordinated state review of permits for mining projects within Alaska's Coastal Management Zone. Provides information to applicants on project design for consistency with the policies and standards of the Alaska Coastal Management Program. Coordinates state response to direct federal actions, including proposed regulations, that affect Alaska's mining industry.*

Southcentral Regional Office
3601 C St., Ste. 370, Frontier Bldg.
Anchorage, AK 99503-5930
(907) 561-6131
(907) 561-6134 (fax)

Southeastern Regional Office
240 Main St., Ste. 500
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562

**DEPARTMENT OF NATURAL RESOURCES**
400 Willoughby Ave., 5th Fl.
Juneau, AK 99801-1724
(907) 465-2400
website: www.dnr.state.ak.us

**Division of Forestry**
3601 C St., Ste. 1034, Frontier Bldg.
Anchorage, AK 99503-5937
(907) 269-8463

Function: *Establishes guidelines to manage mining in state forests.*

Interior Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2660

Coastal Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801-1724
(907) 465-2491

**Division of Geological & Geophysical Surveys**
794 University Ave., Ste. 200
Fairbanks, AK 99709-3645
(907) 451-5000
(907) 451-5050 (fax)
e-mail:
website: wwwdggs.dnr.state.ak.us

Function: *Conducts geological and geophysical surveys to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; locations and supplies of construction materials; potential geologic hazards to buildings, roads, bridges, and other installations and structures; and other surveys and investigations as will advance knowledge of the geology of Alaska and general geologic inventories. Publishes a variety of reports that contain the results of these investigations. Advises the public and government agencies on geologic issues. Maintains a library of geologic bulletins, reports, and periodicals. Maintains a drill-core storage facility at Eagle River.*

Geologic Materials Center
P.O. Box 772805
Eagle River, AK 99577-2805
(907) 696-0079

**Division of Land**
3601 C St., Ste. 1122, Frontier Bldg.
Anchorage, AK 99503-5947
(907) 269-8503
(907) 269-8904 (fax)

Function: *Manages surface estate and resources, including materials (gravel, sand, and rock). Handles statewide and regional land-use planning. Issues leases, material-sale contracts, mill-site permits, land-use permits, and easements for temporary use of State land and access roads.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2700
(907) 451-2751 (fax)

Southcentral Regional Office
3601 C St., Ste. 1080, Frontier Bldg.
Anchorage, AK 99503-5937
(907) 269-8552
(907) 269-8913 (fax)

Southeastern Regional Office
400 Willoughby Ave. 4th Fl.
Juneau, AK 99801-1724
(907) 465-3400
(907) 586-2954 (fax)

**Division of Mining & Water Management**
3601 C St., Ste. 800, Frontier Bldg.
Anchorage, AK 99503
(907) 269-8624

**A. Mining**

Function: *Principal agency for management of mining and reclamation on state land in Alaska. Maintains a mining information office in Fairbanks. Issues property rights to leasable minerals; adjudicates locatable mineral filings. Issues permits for hard-rock and placer-mining activity. Maintains records of mineral locations, permits, and leases. Provides technical, legal, and land-status information. Administers the Alaska Surface Mining Control and Reclamation Act (ASMACRA), which includes permitting and inspection of coal mining activity and reclamation of abandoned mines.*

**B. Water Management**

Function: *Manages water resources of the state; issues water-appropriation permits and certificates; responsible for safety of all dams in Alaska; conducts surveys to determine the locations, quantity, and quality of ground and surface water.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2790 (Mining)
(907) 451-2772 (Water)

Southeastern Regional Office
400 Willoughby, 4th Fl.
Juneau, AK 99801
(907) 465-3400

**Division of Parks and Outdoor Recreation**
3601 C St., Ste. 1200, Frontier Bldg.
Anchorage, AK 99503-5921
(907) 269-8700

Function: *Manages approximately 3,000,000 acres of state park lands primarily for recreational uses, preservation of scenic values, and watershed. Responsible for overseeing mining access, recreational mining activity, and valid mining-claim holdings within state park lands. The Office of History and Archaeology reviews mining permit applications on all lands within the state for impacts to historic resources.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4613
(907) 451-2695

Southeastern Regional Office
400 Willoughby Ave., 4th Fl.
Juneau, AK 99801-1724
(907) 465-4563

Office of History and Archaeology
3601 C St., Ste. 1278, Frontier Bldg.
Anchorage, AK 99503-5921
(907) 269-8721

**DEPARTMENT OF PUBLIC SAFETY**
450 Whittier St.
P.O. Box 111200 (mailing)
Juneau, AK 99811-1200
(907) 465-4322

**Division of Fish and Wildlife Protection**
5700 East Tudor Rd.
Anchorage, AK 99507-1225
(907) 269-5509

Function: *Enforces state laws, in particular AS Title 16. Acts as enforcement arm for Alaska Department of Fish and Game. Protects Alaska's fish and wildlife resources through enforcement of laws and regulations governing use of natural resources within Alaska. These laws are in Alaska Statutes 08, 16, 46, and Alaska Administrative Code's 05, 12, and 20.*

**DEPARTMENT OF REVENUE**
State Office Bldg.
11th Fl., Entrance A
P.O. Box 110400 (mailing)
Juneau, AK 99811-0400
(907) 465-2300

**Income and Excise Audit Division**
State Office Bldg.
11th Fl., Entrance B
P.O. Box 110420 (mailing)
Juneau, AK 99811-0420
(907) 465-2320
(907) 465-2375 (fax)
e-mail: fish_excise@revenue.state.ak.us

Function: *Issues licenses for mining, production, and sale of minerals. Administers mining-license tax based on net income, including royalties. New mining operations—except sand and gravel mining—can apply for and receive certificates of tax exemption for the first 3½ years of operation. (Tax returns must be filed annually.)*

## UNIVERSITY OF ALASKA

**College of Science, Engineering, and Mathematics**
Department of Geology & Geophysics
308 Natural Sciences Bldg.
900 Yukon Dr.
University of Alaska Fairbanks
Fairbanks, AK 99775-5780
(907) 474-7565
(907) 474-5163 (fax)
e-mail: geology@zorba.uafadm.alaska.edu
website: http://www.uaf.edu/geology

Function: *Provides undergraduate and graduate education in geology and geophysics and conducts basic and*

*applied research in geologic sciences. Offers B.S., M.S., and Ph.D. program options in general geology, economic geology, petroleum geology, geophysics, and ice-snow-permafrost geophysics.*

**School of Mineral Engineering**
PO Box 755960
Brooks Building - Rm. 209
University of Alaska Fairbanks
Fairbanks, AK 99775-5960
(907) 474-7366
(907) 474-6994 (fax)
e-mail: FYSME@uaf.edu
website: www.uaf.edu

Function: *Provides undergraduate and graduate education programs in geological engineering, mining engineering, mineral preparation engineering, and petroleum engineering. Through research programs conducts laboratory and field studies to promote mineral and energy development.*

**Mineral Industry Research Laboratory (MIRL)**
School of Mineral Engineering
O'Neill Resources Bldg., Rm. 212B
University of Alaska Fairbanks
Fairbanks, AK 99775-7240
(907) 474-7135
(907) 474-5400 (fax)

Function: *Conducts applied and basic research in exploration, development, and utilization of Alaska's mineral and coal resources with emphasis on coal characterization, coal utilization, coal upgrading, coal preparation, mineral beneficiation, fine gold recovery, hydrometallurgy, and environmental concerns. Publishes reports on research results and provides general information and assistance to the mineral industry.*

**Mining Extension Program**
Duckering Bldg., Rm. 401
University of Alaska Fairbanks
Fairbanks, AK 99775-5800
(907) 474-7702

Function: *Offers prospecting and introductory mineral and mining courses under an open admissions policy.*

**Mining and Petroleum Training Service**
155 Smithway, Ste. 101
University of Alaska Anchorage
Soldotna, AK 99669
(907) 262-2788

Function: *Provides direct training and assistance to mine operators, service and support companies, and governmental agencies in mine safety and health, mining extension, vocational mine training, and technical transfer. Specialized training services in hazardous materals, first aid and CPR, industrial hygiene, and professional safety education and consulting are available on demand.*

## FEDERAL AGENCIES

**U.S. DEPARTMENT OF THE INTERIOR**
Office of the Secretary
1689 C St., Ste. 100
Anchorage, AK 99501-5151
(907) 271-5485
(907) 271-4102

Function: *Coordinates the Department of the Interior's policy and stewardship with DOI bureaus for the management of over 200 million acres of public land in Alaska.*

**Bureau of Land Management**
Alaska State Office and Anchorage Mineral Assessment Team
222 West 7th Ave., Ste. 13
Anchorage, AK 99513-7599
(907) 271-5477
Mineral Law Team - (907) 271-3833
Public Room - (907) 271-5960

Function: *Administers federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). Issues leases for all federal leasable minerals including oil and gas, coal, phosphates, and oil shale. Arranges for sale of minerals other than leasable or salable materials, including sand, gravel, or stone. Issues right-of-way and special-use permits. Monitors mining operations to insure protection of surface resources. Maintains land-status plats and issues patents. Records federal mining claims and annual assessment affidavits.*

*The Anchorage Mineral Assessment Team (formerly the Alaska staff of the Bureau of Mines) aids development of a viable mineral industry in Alaska with emphasis on field programs focused towards the identification of type, amount and distribution of mineral deposits in Alaska. The field information is augmented by other Bureau programs which provided information on beneficiation technologies (research); economic feasibility studies (potential supply); and economic and environmental effects of mineral development (policy analysis). Information is provided to other government agencies to aid land planning and land use decisions, and to the private sector to identify targets of opportunity for further exploration and/or development.*

Anchorage District Office
6881 Abbott Loop Rd.
Anchorage, AK 99507-2599
(907)9.5

Tok Field Office
P.O. Box 309
Tok, AK 99780
(907) 883-5121

**Fairbanks Support Center and Land Information Office (Public Room)**
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2251

Function: *Primary contact for information on interior and northern regions.*

**U.S. Fish and Wildlife Service**
Region 7 Office
1011 East Tudor Rd.
Anchorage, AK 99503
(907) 786-3542

Function: *Administers the federal public lands in national wildlife refuges, issues special-use permits for activities on refuges, reviews permits and applications for various mining activities on all private and public lands and waters, and provides information to regulatory agencies on fish and wildlife and their habitat. Makes recommendations to regulatory agencies to mitigate adverse environmental impacts.*

U.S. Fish and Wildlife Service
Northern Alaska Ecological Services
101 12th Ave., Rm. 110
Box No. 19
Fairbanks, AK 99701
(907) 456-0327
(907) 456-0208 (fax)

U.S. Fish and Wildlife Service
Southeast Alaska Ecological Services
3000 Vintage Blvd., Ste. 201
Juneau, AK 99801-7100
(907) 586-7240
(907) 586- 7154 (fax)

U.S. Fish and Wildlife Service
Western Alaska Ecological Services
605 West 4th Ave., Rm. G-62
Anchorage, AK 99501
(907) 271-2888
(907) 271-2786 (fax)

**U.S. Geological Survey**
Geological Division

4200 University Dr.
Anchorage, AK 99508-4663
(907) 786-7403

Function: *Investigates and reports on the occurrence, quality, quantity, and environmental characteristics of mineral resources, the processes that create and modify them, models for assessing mineral endowment, and the potential impacts of mineral development. A major aspect of this research involves 1:125,000-scale geologic mapping.*

Water Division
4230 University Dr., Ste. 201
Anchorage, AK 99508
(907) 786-7100

U.S. Geological Survey Earth Science Information Center
National Mapping Division
4230 University Dr., Rm. 101
Anchorage, AK 99508-4664
(907) 786-7011

Function: *Publishes and distributes all available topographic maps of Alaska, digital products, and aerial photography.*

**National Park Service**
Alaska Regional Office
2525 Gambell St.
Anchorage, AK 99503
(907) 257-2626

Function: *Administers lands within the national park system in Alaska. Manages oil and gas operations and pre-existing valid mining claims in parklands through plans of operation under Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.*

**U.S. DEPARTMENT OF LABOR**
**Mine Safety and Health Administration**
1000 Bucannon Blvd., Ste. 4
Boulder City, NV 89005

Juneau Field Station
Federal Building
P.O. Box 22049
Juneau, AK 99802-2049
(907) 586-7165

Function: *Administers health and safety standards to protect the health and safety of metal, nonmetal and coal miners. Cooperates with the State to develop health and safety programs and develops training programs to help prevent mine accidents and occupationally caused diseases. Under agreement with the Coal Mine Safety and Health Office, the MSHA metal/nonmetal section has assumed responsibility for enforcement and training activities at coal mines in Alaska.*

**Mine Safety and Health Administration**
Coal Mine Safety and Health, District 9
P.O. Box 25367
Denver, CO 80225
(303) 231-5458
(303) 231-5553 (fax)

Function: *Administers health and safety standards according to the Code of Federal Regulations to protect the health and safety of coal miners; requires that each operator of a coal mine comply with these standards. Cooperates with the State to develop health and safety programs and develops training programs to help prevent coal or other mine accidents and occupationally caused diseases in the industry.*

**U.S. DEPARTMENT OF AGRICULTURE**
**Forest Service**
Regional Office
Federal Bldg.
P.O. Box 21628
Juneau, AK 99802-1628
(907) 586-7869
(907) 586-7843 (fax)

Function: *Provides joint administration of general mining laws on national forest system lands with the Bureau of Land Management. Cooperates with Department of Interior agencies in the review and issuance of mineral leases. Issues permits for disposal of sand, gravel, and stone.*

**U.S. ENVIRONMENTAL PROTECTION AGENCY**
**Region 10 Regional Office**
1200 6th Ave., MS OW-130
Seattle, WA 98101
(206) 553-1746

Function: *Issues National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act to regulate effluent discharges. Implements a compliance enforcement program. Maintains regulatory and review authority over wetland and NEPA/EIS-related issues.*

Alaska Operations Office
222 West 7th Ave., Ste. 19
Anchorage, AK 99513-7588
(907) 271-5083

Alaska Operations Office
410 Willoughby Ave., Ste. 100
Juneau, AK 99801
(907) 586-7619

**U.S. DEPARTMENT OF THE ARMY**
**Corps of Engineers**
Regulatory Branch
Attention: CEPOA-CO-R
P.O. Box 898
Anchorage, AK 99506-0898
(907) 753-2712 or (800) 478-2712 (in Alaska only)
(907) 753-2716 (fax)

Function: *Regulates structures or work in navigable waters of the U.S. and discharge of dredged or fill material into U.S. waters, including wetlands. Examples of regulated mining activities include construction of berms, dikes, diversions, ponds, overburden stripping, stockpiling, and reclamation activities.*

## COOPERATIVE STATE-FEDERAL AGENCIES

**Alaska Public Lands Information Center**
250 Cushman St., Ste. 1A
Fairbanks, AK 99701
(907) 456-0527
(907) 456-0514 (fax)
(907)456-0532 (TDD for hearing impaired)

Function: *Clearinghouse for general information on outdoor recreation in Alaska. Information sources include U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geological Survey, National Park Service, Alaska Departments of Natural Resources and Fish and Game, and Alaska Division of Tourism.*

## BOARDS AND COMMISSIONS

**Alaska Minerals Commission**
Irene Anderson, Chair
c/o Sitnasuak Native Corp.
PO Box 905
Nome, AK 99762
(907) 443-2632
(907) 443-3063 (fax)

Function: *The Minerals Commission was created by the Alaska State Legislature in 1986 to make recommendations to the Governor and the Legislature on ways to mitigate constraints on the development of minerals in Alaska. The Commission has published annual reports since 1987.*

**Citizens' Advisory Commission on Federal Areas**
3700 Airport Way

Fairbanks, AK 99709
(907) 451-2775

Function: *The Citizens' Advisory Commission on Federal Areas was established in 1981 by the Alaska Legislature to protect the rights of Alaskans to continue their traditional uses of federal lands throughout the state. This was done in response to Congressional enactment in December 1980 of the Alaska National Interest Lands Conservation Act (ANILCA), which placed millions of acres of federally owned lands into conservation system units with restrictive land-use and management requirements.*

**Alaska Science & Technology Foundation**
4500 Diplomacy Dr., Ste. 515
Anchorage, AK 99508
(907) 272-4333

Function: *The Foundation was created to make public funds available for long-term investment in economic development and technological innovation within the state and to improve the health status of its residents. Through the awarding of grants for basic and applied research and development, the Foundation will enhance the state's economy and help build its science and engineering capabilities.*

## CHAMBERS OF COMMERCE

**Alaska State Chamber of Commerce**
217 Second St., Ste. 201
Juneau, AK 99801
(907) 586-2323
(907) 463-5515 (fax)

Function: *The State Chamber of Commerce researches and formulates positions on Alaskan resource development. Recommendations for consideration are submitted to the State Chamber of Commerce board of directors.*

Juneau Chamber of Commerce
124 West 5th Ave.
Juneau, AK 99801
(907) 586-6420

Greater Fairbanks Chamber of Commerce
250 Cushman St., Ste. 2D
Fairbanks, AK 99701-4665
(907) 452-1105
(907) 456-6968

Anchorage Chamber of Commerce
441 West 5th Ave., Ste. 300
Anchorage, AK 99501
(907) 272-2401
e-mail: info@anchoragechamber.org
web-site: www.anchoragechamber.org

## PUBLIC INTEREST GROUPS AND ASSOCIATIONS

**Alaska Clean Water Alliance**
P.O. Box 1441
Haines, AK 99827
(907) 766-2296
(907) 766-2290 (fax)

**Alaska Miners Association, Inc.**
Statewide Office
501 West Northern Lights Blvd., Ste. 203
Anchorage, AK 99503-2565
(907) 276-0347
(907) 278-7997 (fax)

Anchorage Branch
501 West Northern Lights Blvd., Ste. 203
Anchorage, AK 99503-2565
(907) 276-0347

Denali Branch
P.O. Box 1000
Healy, AK 99743
(907) 683-2226, ext. 719

Fairbanks Branch of AMA
P.O. Box 73069
Fairbanks, AK 99707
(888) 474-2081

Juneau Branch of AMA
P.O. Box 21684
Juneau, AK 99802-1684
(907) 586-4704
(907) 463-5712

Kenai Branch of AMA
P.O. Box 242
Sterling, AK 99672
(907) 262-6383

Nome Branch of AMA
P.O. Box 1974
Nome, AK 99762
(907) 443-2632

**Alaska Women in Mining**
Fairbanks Branch
P.O. Box 83542
Fairbanks, AK 99708
(907) 479-9750

Juneau Branch
P.O. Box 34044
Juneau, AK 99804
(907)586-4161

Anchorage Branch
P.O. Box 240334
Anchorage, AK 99524
(907) 276-6762

**Alaskans for Juneau**
P.O. Box 22428
Juneau, AK 99802-2428
(907) 463-5065

**American Institute of Professional Geologists**
7828 Vance Dr., Ste. 103
Arvada, CO 80003
(303) 431-0831
(303) 431-1332 (fax)
e-mail: aipg@aipg.com

Alaska Section
P.O. Box 92082
Anchorage, AK 99509-2082
(907) 562-3279

**National Wildlife Federation**
750 W. Second Ave., Ste. 200
Anchorage, AK 99501
(907) 258-4800
(907) 258-4811 (fax)

**Northern Alaska Environmental Center**
218 Driveway St.
Fairbanks, AK 99701-2895
(907) 452-5021
(907) 452-3100
e-mail: naec@mosquitonet.com

**Northwest Mining Association**
10 North Post St., Ste. 414
Spokane, WA 99201
(509) 624-1158
(509) 623-1241 (fax)
email: nwma@nwma.org
Internet: http://www.nwma.org

**Placer Miners of Alaska**
P.O. Box 81110
Fairbanks, AK 99708
(907) 479-3100

**Resource Development Council for Alaska, Inc.**
121 W. Fireweed Ln., Ste. 250
Anchorage, AK 99503
(907) 276-0700
(907) 276-3887 (fax)

**Sierra Club Legal Defense Fund**
325 Fourth St.
Juneau, AK 99801
(907) 586-2751
(907) 463-5891 (fax)
e-mail: SCLDFAK@IGC.APC.ORG

Sierra Club Legal Defense Fund
11 East Main St., Ste. C
Bozeman, MT 59715
(406) 586-9699
(406) 586-9695 (fax)

**Society for Mining, Metallurgy, and Exploration Inc.**
P.O. Box 625002
Littleton, CO 80162-5002
(303) 973-9550
(303) 973-3845 (fax)

Secretary Treasurer-John Rishel
1505 Atkinson Dr.

Anchorage, AK 99504
(907) 337-0511

**Southeast Alaska Conservation Council (SEACC)**
419 6th St., Ste. 328
Juneau, AK 99801
(907) 586-6942
(907) 463-3312 (fax)
e-mail: info@seacc.org
website: http:/www.juneau.com/seacc/

**Trustees for Alaska**
725 Christensen Dr., Ste. 4
Anchorage, AK 99501

## ORGANIZED MINING DISTRICTS

**Circle Mining District**
P.O. Box 80674
Fairbanks, AK 99708
(907) 488-6058

**Fairbanks Mining District**
105 Dunbar
Fairbanks, AK 99701
(907) 456-7642

**Forty-Mile Miners Association**
P.O. Box 3885
Palmer, AK 99645
(907) 746-4404

**Haines Mining District**
P.O. Box 149
Haines, AK 99827
(907) 766-2228

**Iditarod Mining District**
John A. Miscovich
General Delivery
Flat, AK 99584

**Juneau Mining District**
P.O. Box 20765
Juneau, AK 99802
(907) 789-4065

**Kantishna Mining District**
P.O. Box 84608
Fairbanks, AK 99708

**Koyukuk Mining District**
P.O. Box 9066
Coldfoot, AK 99701

**Livengood-Tolovana Mining District**
P.O. Box 55698
North Pole, AK 99705
(907) 488-6453

**Valdez Creek Mining District**
P.O. Box 875534
Wasilla, AK 99687-5534

**Yentna Mining District**
13004 NE 9th Ave.
Vancouver, WA 98685

## MINERAL EDUCATION PROGRAMS

**ALASKA MINERAL AND ENERGY RESOURCE EDUCATION FUND (AMEREF)**
c/o RDC
121 W. Fireweed Ln., Ste. 250
Anchorage, AK 99503
(907) 276-0070
(907) 276-3887 (fax)

Function: *A nonprofit corporation formed to help prepare students in grades K-12 to make informed decisions about Alaska's mineral and energy resources.*

**Alaska Department of Education**
801 W. 10th St., Ste. 200
Juneau, AK 99801-1894
(907) 465-8719

## NATIVE REGIONAL CORPORATIONS

**AHTNA INCORPORATED**
**Main Office**
P.O. Box 649
Glennallen, AK 99588-0649
(907) 822-3476
(907) 822-3495 (fax)

**Anchorage Office**
406 Fireweed Ln., Ste. 204
Anchorage, AK 99503
(907) 274-7662
(907) 274-6614 (fax)

**THE ALEUT CORPORATION**
4000 Old Seward Hwy., Ste. 300
Anchorage, AK 99503-6087
(907) 561-4300
(907) 563-4328 (fax)

**ARCTIC SLOPE REGIONAL CORPORATION**
P.O. Box 129
Barrow, AK 99723-0129
(907) 852-8633
(907) 852-5733 (fax)

**Anchorage Office**
301 Arctic Slope Ave., Ste. 300
Anchorage, AK 99518-3035
(907) 349-2369
(907) 349-5476 (fax)

**BERING STRAITS NATIVE CORPORATION**
P.O. Box 1008
Nome, AK 99762-1008
(907) 443-5252
(907) 443-2985 (fax)

**BRISTOL BAY NATIVE CORPORATION**
800 Cordova St.
P.O. Box 100220 (mailing)
Anchorage, AK 99510-0220
(907) 278-3602
(907) 276-3924 (fax)

**CALISTA CORPORATION**
601 W. 5th Ave., Ste. 200
Anchorage, AK 99501-2226
(907) 279-5516
(907) 272-5060 (fax)

**CHUGACH ALASKA CORPORATION**
560 E. 34th Ave., Ste. 200
Anchorage, AK 99503-4196
(907) 563-8866
(907) 563-8402 (fax)

**COOK INLET REGION INC. and its subsidary North Pacific Mining Corporation**
P.O. Box 93330
Anchorage, AK 99509-3330
(907) 274-8638
(907) 263-5183 (fax)

**DOYON LTD.**
201 1st Ave., Ste. 300
Fairbanks, AK 99701
(907) 452-4755
(907) 456-6785 (fax)

**KONIAG INCORPORATED**
4300 B St., Ste. 407
Anchorage, AK 99503
(907) 561-2668
(907) 562-5258 (fax)

**NANA REGIONAL CORPORATION**
P.O. Box 49
Kotzebue, AK 99752
(907) 442-3301
(907) 442-2866 (fax)

**Anchorage Office**
1001 E. Benson Blvd.
Anchorage, AK 99508
(907) 265-4100
(907) 265-4123 (fax)

**SEALASKA CORPORATION**
One Sealaska Plaza, Ste. 400
Juneau, AK 99801
(907) 586-1512
(907) 586-2304 (fax)

# APPENDIX B

## Selected significant mineral deposits and mineral districts in Alaska[a]

The alphabetized list of mineral deposits and mineral districts is keyed to the list of explanatory paragraphs that follow. For example, The Lik deposit in the alphabetized list is "**Lik,** 1, (fig. B-1)." This says that the location of Lik is shown as number 1 in figure B-1.

**Alaska-Juneau,** 100, (fig. B-3).
**Anderson Mountain,** 54, (fig. B-1).
**Apex-El Nido,** 104, (fig. B-3).
**Apollo-Sitka mines,** 86, (fig. B-3).
**Arctic,** 9, (fig. B-1).
**Avan Hills,** 12, (fig. B-3).
**Baultoff,** 75, (fig. B-2).
**Bear Mountain,** 21, (fig. B-2).
**Big Creek/Ladue,** 58, (fig. B-1).
**Big Hurrah,** 32, (fig. B-3).
**Binocular and other prospects,** 72, (fig. B-1).
**Bohemia Basin,** 103, (fig. B-3).
**Bokan Mountain,** 122, (fig. B-3).
**Bonanza Creek,** 45, (fig. B-2).
**Bond Creek,** 73, (fig. B-2).
**Bonnifield district massive sulfide deposits,** 54, (fig. B-1).
**Bornite,** 8, (fig. B-1).
**Brady Glacier,** 98, (fig. B-3).
**BT,** 54, (fig. B-1).
**Buck Creek,** 23, (fig. B-2).
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**Windy Creek,** 36, (fig. B-2).
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[a]This generalized summary does not describe all of the known 6,400 mineral deposits in Alaska.

NOTE: In cooperation with DGGS and the Russian Academy of Sciences, the USGS published Open-File Report 93-339 (Nokleberg and others, 1993), *Metallogenesis of mainland Alaska and the Russian northeast*, which describes 273 lode deposits and 43 significant placer districts in Alaska.

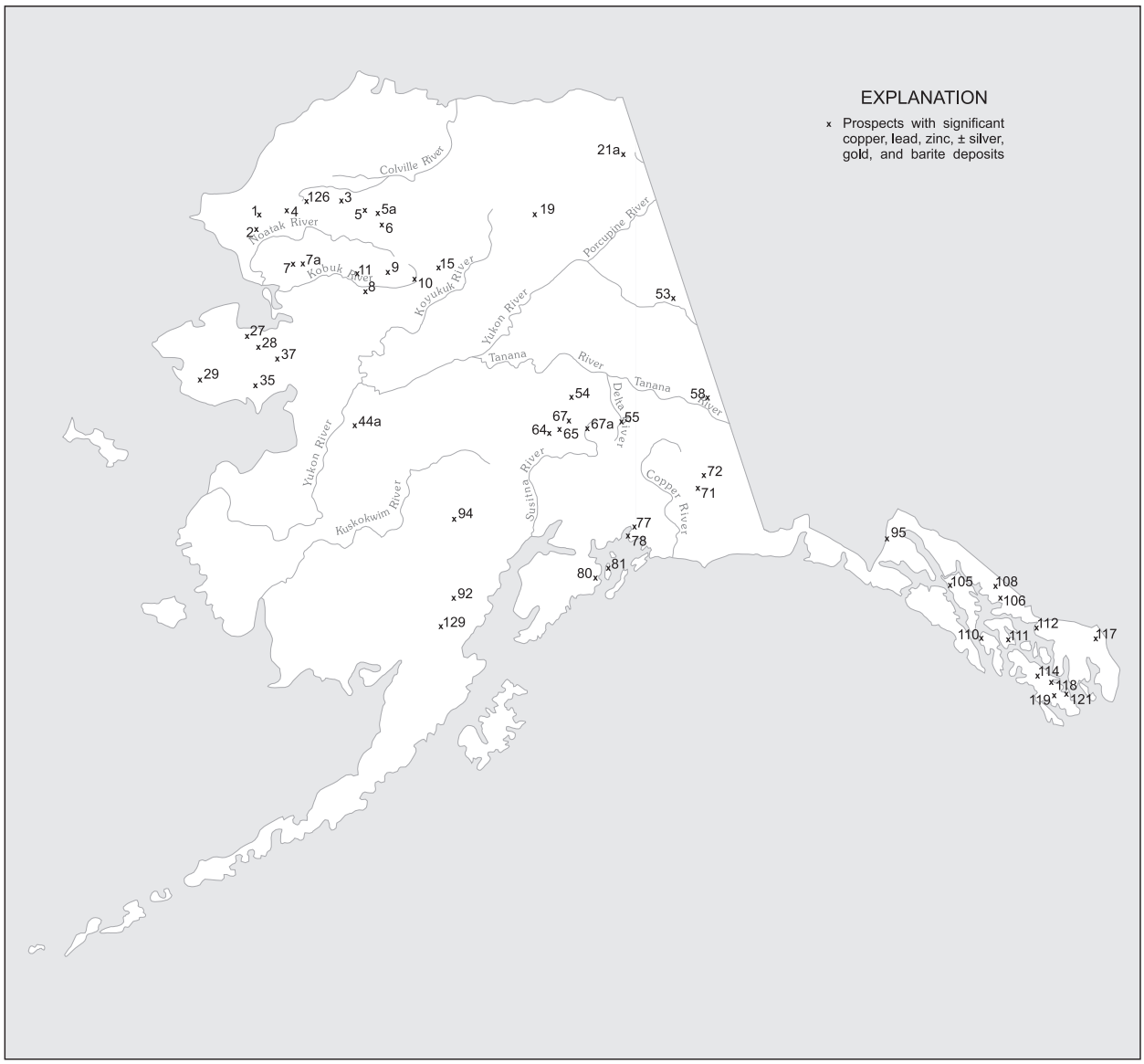


Figure B-1. *Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 1995.*

Map no.

1 **Lik** - Major strata-bound massive sulfide (Zn-Pb-Ag-Ba) deposit in black shale and chert. Proven reserve (Lik) estimate of 21.77 million tonnes (24 million tons) of 9% Zn, 3.1% Pb, and 48 g/tonne (1.4 oz/ton) Ag (fig. B-1).

2 **Red Dog** - At least three major strata-bound massive sulfide deposits hosted in Pennsylvanian or Mississippian shale; similar to locality 1. (a) The Main Deposit at Red Dog contains 52.2 million tonnes (57.5 million tons) of measured and indicated ore grading 19.5% Zn, 5.3% Pb, with 100 g/tonne (2.9 oz/ton) Ag. (b) The Aqqaluk Deposit contains 76 million tonnes (84 million tons) grading 13.7% Zn, 3.6% Pb, and 66 g/tonne (1.9 oz/ton) Ag. (c) The Hilltop Deposit with an inferred reserve is 14.1 million tonnes (15.55 million tons) grading 10.0% Zn, 2.7% Pb, and 41 g/tonne (1.2 oz/ton) Ag. (fig. B-1).

3 **Drenchwater** - Mississippian and Pennsylvanian shales and cherts contain three strata-bound base metal occurrences spatially related to acid volcanics. In the lowest unit, a siliceous mudstone, contains a 0.6 m (2-ft) layer with up to 23% Zn. An overlying gray chert contains up to 11% Zn and up to 5% Pb with some Ag in fracture fillings. At the top of the overlying tuffaceous layer, Ag-bearing Zn and Pb mineralization outcrops discontinuously for at least 1,982 m (6,500 ft), and contains up to 26% Zn and 51% Pb in grab samples (fig. B-1).

4 **Ginny Creek** - Epigenetic, disseminated Zn-Pb-Ag deposits with barite in sandstone and shale of Noatak Sandstone of Late Devonian through Early Mississippian age. Random grab samples of surface float contain 0.3% to 3.0% Zn and highly variable amounts of Pb and Ag (fig. B-1).

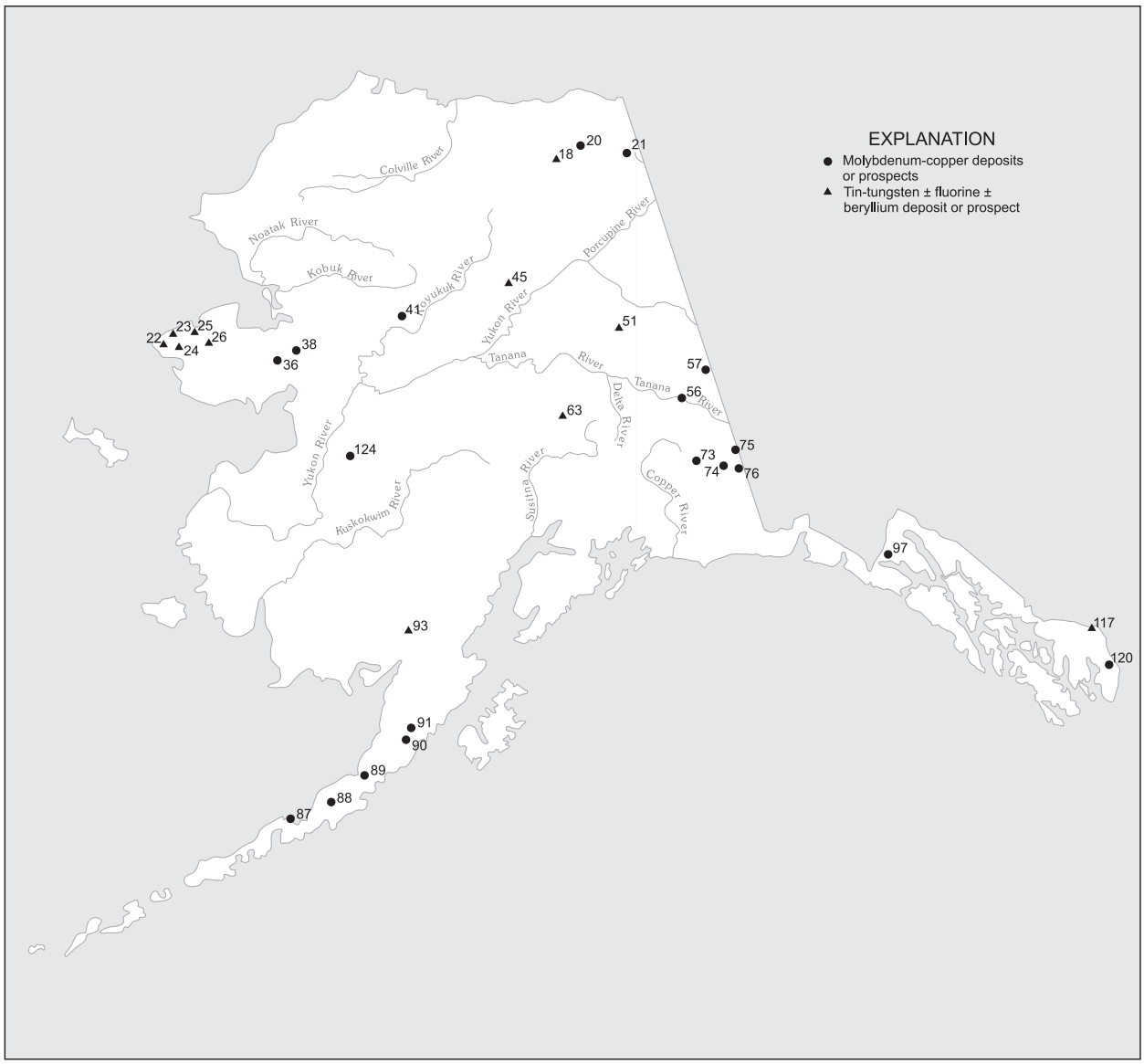


Figure B-2. *Significant molybdenum-copper and tin-tungsten with credits of fluorite and beryllium deposits in Alaska, 1995.*

5 **Story Creek** - Epigenetic replacement deposits of Zn-Pb-Ag-Cu-Au hosted in brecciated zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Grab samples of high-grade material contain up to 0.43% Cu, 34% Pb, 28.8% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 1,028 g/tonne (30 oz/ton) Ag (fig. B-1).

5a **Kivliktort Mountain** - Mineralized float is widespread on the north flanks of the mountain, apparently spatially related to the contact between shales at the base of the hills and coarse-grained siliceous clastic rocks on the upper slopes. Rock samples containing up to 30% Zn have been reported (fig. B-1).

6 **Whoopee Creek** - Epigenetic replacement deposits of Zn-Pb-Cu-Ag-Au-Cd in breccia zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Random grab samples of mineralized material contain 0.24% Cu, 0.37% Cd, 46% Zn, 44% Pb, 4.8 g/tonne (0.14 oz/ton) Au, and 507 g/tonne (14.8 oz/ton) Ag (fig. B-1).

7 **Omar** - Epigenetic replacement deposits of Paleozoic age; include bedded barite occurrences. Grab samples contain 15.3% Cu, 0.15% Pb, 0.95% Zn, 0.05% Co, and 10 g/tonne (0.3 oz/ton) Ag (fig. B-1).

7a **Frost** - Possible 8.2 million tonnes (9 million tons) barite in pods, lenses, and wavey-banded quartz-calcite-barite veins. Chalcopyrite and galena occur in the veins which cross cut Paleozoic limestone and dolomite for a minimum distance of 1.6 km (1 mi). Selected samples contain up to 13.2% Zn (fig. B-1).

8 **Bornite** - Major strata-bound Cu-Zn deposit in brecciated carbonate rock of Devonian age; 4.56 million tonnes (5.0 million ton) orebody contains 4.0% Cu and accessory Zn and Co. Larger reserve estimate of 36.2 million tonnes (40 million tons) of about 2% Cu and undisclosed amount of Zn and Co. At grade of 1.2% Cu, reserves are 91 million tonnes (100 million tons) (fig. B-1).

9 **Arctic** - Major volcanogenic (Cu-Zn) massive sulfide deposit hosted in sequence of metarhyolite, metatuff, and graphitic

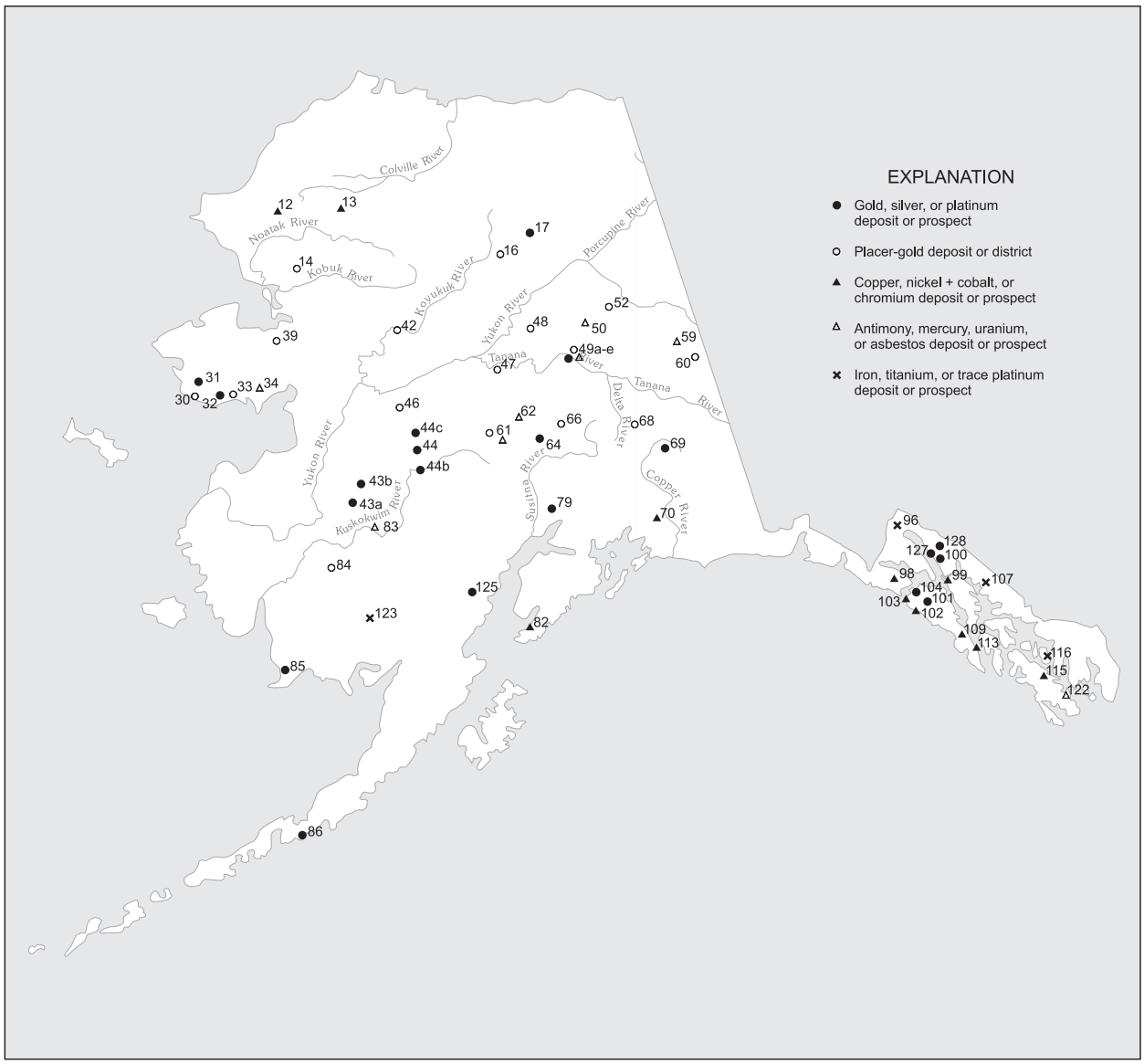


Figure B-3. *Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 1995.*

schist of Devonian age; indicated reserves of 36.3 million tonnes (40 million tons) grade 4.0% Cu, 5.5% Zn, 0.8% Pb, 55 g/tonne (1.6 oz/ton) Ag, and 0.69 g/tonne (0.02 oz/ton) Au (fig. B-1).

10 **Sun** - Major (Cu-Pb-Zn-Ag) massive sulfide deposit in sequence of middle Paleozoic metarhyolite and metabasalt. Average grades are 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 103 to 377 g/tonne (3 to 11 oz/ton) Ag (fig. B-1).

11 **Smucker** - Middle Paleozoic volcanogenic massive sulfide deposit; 915 m (3,000 ft) long and up to 58 m (190 ft) wide contains significant tonnage of Cu-Pb-Zn ore that grades 1.5% Pb, 5 to 10% Zn, 103 to 343 g/tonne (3 to 10 oz/ton) Ag, with minor Au (fig. B-1).

12 **Avan Hills** - Disseminated chromite in layered ultramafic rocks; grab samples contain up to 4.3% Cr with 0.51 g/tonne (0.015 oz/ton) PGM (fig. B-3).

13 **Misheguk Mountain** - Chromite occurrences similar to those in Avan Hills (fig. B-3).

14 **Klery Creek** - Lode and placer Au deposits worked intermittently from 1909 through 1930s. Total production through 1931, mostly from placer deposits, estimated at 974 kg (31,320 oz) Au (fig. B-3).

15 **Ernie Lake** - (Ann Creek) Strata-bound massive sulfide occurrence in metarhyolite, metatuff, and marble. Gossan zones strongly anomalous in Cu-Pb-Zn and Ag (fig. B-1).

16 **Koyukuk-Nolan mining district** - Major placer Au district; from 1893 to 1995, produced an estimated 10,580 kg (340,152 oz) Au. Significant deep placer reserves remain (fig. B-3).

17 **Chandalar mining district** - Major Au producing district; substantial production in excess of 2,000 kg (64,367 oz) Au

through 1995 from lode and placer sources; lode Au found in crosscutting quartz veins that intrude schist and greenstone. Active development of placer deposits and lodes in progress. Inferred lode reserves estimated to be 40,800 tonnes (45,000 tons) with grade of 69 g/tonne (2 oz/ton) Au (fig. B-3).

18 **Porcupine Lake** - Stratiform fluorite occurrences and argentiferous enargite, tetrahedrite associated with felsic volcanic rocks of late Paleozoic age. Reported grades of up to 25% to 30% fluorite ($CaF_2$) reported, with grab samples of 4.8% Cu (fig. B-2).

19 **Wind River** - Strata-bound Pb-Zn massive sulfide prospects; reported grades of up to 5% Pb (fig. B-1).

20 **Esotuk Glacier** - Disseminated Mo-Sn-W-Pb-Zn mineralization in skarns associated with Devonian(?) schistose quartz monzonite. Grab samples contain up to 0.08% Sn and 0.15% W (fig. B-2).

21 **Bear Mountain** - Major stockwork Mo-W-Sn occurrence in intrusive breccia. Rock samples containing up to 0.8% Mo and 0.6% W occur within a 14 ha (35 acre) area where soil samples average more than 0.2% $MoS_2$, and an adjacent 10 ha (25 acre) area where rubble contains wolframite has soils averaging greater than 0.12% $WO_3$. Rubble crop in this area indicates a Tertiary porphyry system as the source of the Mo and W (fig. B-2).

21a **Galena Creek** - Steeply dipping veins contain up to 21% Cu, 3.5% Zn, and 1.3% Pb with 189 g/tonne (5.5 oz/ton) Ag on the east side of the creek, and a large area of disseminated mineralization and veinlets contains predominantly Zn on the ridge west of the creek (fig. B-1).

22 **Cape Creek** - Major placer Sn producer. More than 454 tonnes (500 tons) Sn produced from 1935 to 1941; from 1979 to 1990, produced 940 tonnes (1,040 tons) Sn. Derived from Cape Mountain in contact zone of Cretaceous granite and limestone (fig. B-2).

23 **Buck Creek** - Major placer Sn producer. More than 998 tonnes (1,100 tons) Sn produced from 1902 to 1953 (fig. B-2).

24 **Lost River** - Major Sn, fluorite, W, and Be deposit associated with Cretaceous Sn granite system. More than 317 tonnes (350 tons) Sn produced from skarn and greisen lode sources. Measured reserves amount to 22.3 million tonnes (24.6 million tons) that grade 0.15% Sn, 16.3% $CaF_2$, and 0.03% $WO_3$, based on 13,720 m (45,000 ft) of diamond drilling (fig. B-2).

25 **Ear Mountain** - Placer Sn district and Sn-Cu-Au-Ag-Pb-Zn skarn mineralization of Cretaceous age. Area also anomalous in U (fig. B-2).

26 **Kougarok Mountain** - Sn deposit hosted in quartz-tourmaline-topaz greisen of Cretaceous age. Grades may average 0.5% Sn and 0.01% Ta and Nb, but a high grade resource of 136,050 tonnes (150,000 tons) grading 1% + Sn has been identified, with incrementally higher tonnage at lower grades (fig. B-2).

27 **Hannum** - Stratiform, carbonate-hosted Pb-Zn-Ag massive sulfide deposit of mid-Paleozoic age in heavily oxidized zone that ranges from 9 to 46 m (30 to 150 ft) thick. Mineralized zone reported to assay up to 10% Pb, 2.2% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 60.3 g/tonne (1.76 oz/ton) Ag (fig. B-1).

28 **Independence Creek** - Pb-Zn-Ag massive sulfide deposit; high-grade ore shipped in 1921 contained 30% Pb, 5% Zn, up to 5,141 g/tonne (150 oz/ton) Ag. Mineralization restricted to shear zone in carbonates (fig. B-1).

29 **Sinuk River region**- Several Pb-Zn-Ag-Ba-F bearing massive sulfide deposits and layered Fe deposits in carbonate and metavolcanic rocks of Nome Group. Mineralized zones extend for over 2,440 m (8,000 ft) along strike (fig. B-1).

30 **Nome mining district** - Major placer Au producer. Production from 1897-1995 in excess of 151,600 kg (4,874,449 oz) Au all from placers. Sporadic Sb and W production in past (fig. B-3).

31 **Rock Creek** - About 10.0 million tons grading 2.5 g/tonne (0.072 oz/ton) Au in vein swarms and stringers in an area 457 m (1,500 ft) long, 152 m (500 ft) maximum width and 91 m (300 ft) deep (fig. B-3).

32 **Big Hurrah** - Epigenetic vein deposit in black slate and metasedimentary rocks of the Soloman schist. Deposit contains some W mineralization and has produced over 840 kg (27,000 oz) Au from nearly 45,350 tonnes (50,000 tons) milled ore. Proven, inferred, and indicated reserves total 94,328 tonnes (104,000 tons) that grade 21 g/tonne (0.61 oz/ton) Au, 19 g/tonne (0.55 oz/ton) Ag, and credits of $WO_3$ (fig. B-3).

33 **Solomon and Council mining districts** - Major placer Au districts; produced over 32,550 kg (1,046,513 oz) through 1995. Three structurally controlled Au deposits in Bluff area—Daniels Creek, Saddle, and Koyana Creek—contain minimum inferred reserves of 5.9 million tonnes (6.5 million tons) grading 3.4 g/tonne (0.1 oz/ton) Au (fig. B-3).

34 **Kachauik** - U prospect in Cretaceous alkalic intrusive rocks. Highly anomalous geochemical values and U concentrations of 1,000 ppm reported (fig. B-3).

35 **Omalik** - Vein-type Pb-Zn-Ag massive sulfide prospect in Paleozoic carbonate rocks; from 1881 to 1900, produced 363 tonnes (400 tons) of Pb-Zn ore that averaged about 10% Pb and 1,371 g/tonne (40 oz/ton) Ag. Grades of oxidized Zn ore reported to be up to 34% Zn (fig. B-1).

36 **Windy Creek** - Disseminated Mo-Pb-Zn mineralization in quartz veins and skarns with reported values as high as 0.15% Mo (fig. B-2).

37 **Quartz Creek** - Significant Pb-Zn-Ag mineralization; reported grades of 15% combined Pb-Zn and 343 g/tonne (10 oz/ton) Ag (fig. B-1).

38 **Placer River** - Significant Mo-F mineralization disseminated in intrusive rocks. Reported values of 0.2% Mo (fig. B-2).

39 **Fairhaven/Inmachuk district** - Placer deposits with 10,812 kg (347,671 oz) production from 1902-1995; significant reserves remaining in a large ancestral channel system. Large base metal sulfide concentrations and U values in concentrates (fig. B-3).

40 **Poovookpuk Mountain** - Porphyry Mo mineralization. Reported grades of up to 0.25% Mo (fig. B-2).

41 **Purcell Mountain** - Mo and Ag occurrences associated with Cretaceous alkalic igneous plutons, alaskite, and bostonite dikes (fig. B-2).

42 **Koyukuk-Hughes mining district** - Production of 7,211 kg (231,888 oz) Au from 1930 to 1995, mainly from Alaska Gold Company dredge at Hogatza; dredge reactivated in 1981, but deactivated in 1984, and reactivated again in 1990. Nonfloat mechanized operation on Utopia Creek produced significant amount of placer Au from 1930 to 1962 (fig. B-3).

43a **Iditarod district** - Major placer Au district; produced 48,560 kg (1,561,524 oz) Au through 1995. Significant reserves of lode-Au and lode-W at Golden Horn deposit Chicken Mountain, and other known lodes in region associated with shear zones and monzonite intrusive rocks of Late Cretaceous age (fig. B-3).

43b **Innoko-Tolstoi mining district** - Major placer Au district with significant lode Au-Sb-Hg potential; lode sources for placers are volcanic-plutonic complexes of Late Cretaceous and dike swarms that intrude Mesozoic flysch; mining district produced 21,965 kg (706,267 oz) Au through 1995 almost all from placer deposits. New discovery on Vinasale Mountain south of McGrath is Au-polymetallic deposit in monzonite stock (fig. B-3).

44 **Nixon Fork** - Promising Au-Cu deposits; Nixon Fork mine produced 1,851 kg (59,500 oz) Au from Late Cretaceous skarns associated with quartz monzonite-Devonian limestone contact zones. Underground mining resumed in October, 1995 (fig. B-3).

44a **Illinois Creek** - Near-surface geologic resource is 5.76 million tonnes (6.35 million tons) at 2.4 g/tonne (0.070 oz/ton) gold and 51.47 g/tonne (1.5 oz/ton) silver (fig. B-1).

44b **Vinasale Mountain** - Intrusive hosted gold deposit. Au mineralization is associated with arsenopyrite and pyrite and within zones of phyllic and silicic alteration hosted within a 69 Ma quartz monzonite stock. Both disseminated an veinlet mineralization exist. An inferred reserve of 10.3 million tonnes (11.35 million tons) grading 2.4 g/tonne (0.07 oz/ton) has been identified by drilling (fig. B-3).

44c **Von Frank Mountain** - Gold and very weak copper mineralization are associated with chalcopyrite, pyrite, and rare molybdenite within a zone of quartz stockwork veining hosted in a 69 Ma quartz-diorite stock. The stock is a cupola of the larger Von Frank Pluton. Drill intercepts include thicknesses up to 429 feet with an average grade of 0.013 opt Au. Higher grade intercepts include 0.035 opt Au up to 135 ft. (fig. B-3).

45 **Bonanza Creek** - Skarn-type W mineralization along intrusive contact; no published information available (fig. B-2).

46 **Ruby mining district** - Placer Au-Sn district; produced more than 14,830 kg (476,751 oz) Au from 1931 to 1995; mining district also contains Pb-Ag prospects with grades reportedly as high as 2,811 g/tonne (82 oz/ton) Ag (fig. B-3).

47 **Hot Springs mining district** - Placer Au-Sn district; produced more than 17,685 kg (568,632 oz) Au and over 326,590 kg (720,000 lb) cassiterite through 1995. Includes Eureka and Tofty subdistricts (fig. B-3).

48 **Livengood-Tolovana mining district** - Placer Au district; produced more than 15,440 kg (496,417 oz) Au since discovery in 1914 to 1995. Substantial reserves remain mainly on Livengood Bench, a Pliocene ancestral channel (fig. B-3).

49 **Fairbanks mining district** - Nationally ranked Au-producing district; largest producer in Alaska. Produced about 249,500 kg (8,022,434 oz) Au from placer deposits (1902-1995). Major lode-Au and lode-Sb producer; produced more than 9,472 kg (304,548 oz) Au and over 1.8 million kg (4 million lb) Sb from veins and shear zones through 1990. Production of W exceeded 4,000 STU since 1915, all derived from skarn near Cretaceous quartz monzonite (fig. B-3).

49a **Fort Knox** - Disseminated Au deposit within granodiorite/quartz monzonite pluton near Fairbanks. Proven and probable reserves, open at depth, are 128,000 kg (4,117,000 oz) of gold in 158.3 million tonnes (174.5 million tons) of rock (fig. B-3).

49b **Ryan Lode** - Based on a 0.51 g/tonne (0.015 oz/ton) cutoff, total reserves in the metasediment-hosted Ryan Lode and subparallel igneous-hosted Curlew Shear are 25,573 kg (822,200 oz) of gold in 13.2 million tonnes (14.6 million tons) of rock. A geologic resource of about 74,468 kg (2.4 million oz) occurs within the total shear zone system (fig. B-3).

49c **Grant Mine** - A series of subparallel Au-bearing quartz veins in the schist and quartzite of Ester Dome based on exploration in 1990. Indicated reserves on one vein system, the O'Dea, are 192,285 tonnes (212,000 tons) of 12 g/tonne (0.36 oz/ton) Au. Other similar vein systems have been identified within the property (fig. B-3).

49d **True North** - Au occurs in siderite-quartz veins in carbonaceous quartzite and schist within a terrane containing eclogitic rocks. The proven and probable mineable reserve is 6.24 million tonnes (6.87 million tons) grading 2.23 g/tonne Ag (0.065 oz/ton) for a contained 13,872 kg (446,000 oz) Au. Further exploration is expected to increase the reserve base (fig. B-3).

49e **Dolphin** - Recently recognized mineralized intermediate intrusion contains anomalous gold, arsenic, bismuth, and antimony. Discovery hole in 1995 intercepted 100 m of 1.68 g/tonne (330 ft of 0.049 oz/ton) gold (fig. B-3).

50 **Mt. Prindle** - Significant U-rare-earth mineralization in Mesozoic alkaline igneous rocks. Rock geochemical values of up to 0.7% U; up to 15% rare-earth elements reported (fig. B-3).

51 **Twin Mountain** - Significant W mineralization associated with skarn development along contact zone of quartz monzonite stock of Cretaceous age (fig. B-2).

52 **Circle mining district** - Currently one of Alaska's largest producing placer-Au district; produced 31,960 kg (1,027,607 oz) Au since discovery in 1893 to 1995. Has significant potential for Sn, W, and Au mineralization from variety of lode sources (fig. B-3).

53 **Three Castle Mountain, Pleasant Creek, Casca VABM** - Strata-bound Pb-Zn massive sulfide mineralization. Reported grades of up to 17% Zn and 2% Pb (fig. B-1).

54 **Bonnifield district massive sulfide deposits (Anderson Mountain, Dry Creek, Sheep Creek, Virginia Creek, BT, Liberty Belle)** - Significant volcanogenic Cu-Pb-Zn-Ag massive sulfide deposits of Devonian to Mississippian age in Bonnifield mining district. Potential for high-grade deposits reported. Includes Liberty Bell strata-bound Au-B deposit and mineralization in Sheep Creek; latter contains Sn as well as base metals (fig. B-1).

55 **Delta massive sulfide belt** - Contains at least 30 known volcanogenic massive sulfide deposits and occurrences.

Grades from 0.3% to 1.1% Cu, 1.7% to 5.7% Zn, 0.5% to 2.3% Pb, 24 to 69 g/tonne (0.7 to 2.0 oz/ton) Ag, and 0.61 to 2.1 g/tonne (0.018 to 0.061 oz/ton) Au; estimated potential reserve of 34.6 million tonnes (40 million tons) for all deposits (fig. B-1).

56 **Mosquito, Peternie** - Porphyry Mo prospects of early Tertiary age; reported grades of up to 0.17% Mo (fig. B-2).

57 **Taurus** - Significant major porphyry Cu-Au prospect of Paleocene age. East Taurus Zone contains inferred reserves of 126 million tonnes (140 million tons) grading about 0.30% Cu and 0.34 g/tonne (0.01 oz/ton) Au, and 0.03% Mo (fig. B-2).

58 **Big Creek/Ladue** - Strata-bound Pb-Zn-Ag massive sulfide prospects in metavolcanic rocks (fig. B-1).

59 **Slate Creek** - At least 50 million tonnes (55 million tons) of 6.3%, high-quality chrysotile asbestos in serpentinized ultramafic rocks of Permian(?) age (fig. B-3).

60 **Fortymile mining district** - Major placer Au district. Produced over 16,640 kg (534,974 oz) placer and very minor lode Au since discovery in 1883 to 1995, the longest continuous production of gold (113 years) of any Alaskan mining district (fig. B-3).

61 **Kantishna mining district** - Major placer Au and lode Ag-Au-Pb-Zn-Sb-W district. Produced 3,089 kg (99,307 oz) placer and lode-Au, about 9,549 kg (307,000 oz) lode Ag, and 2.3 million kg (5million lb) Sb from shear zones and vein deposits hosted in metamorphic units of Yukon-Tanana terrane. Nearly 90 lode deposits have been identified; potential exists for significant Ag-Au-Pb-Zn resources. Metalliferous strata-bound base metal deposits occur in schist and quartzite (fig. B-3).

62 **Stampede mine** - Major Sb deposit; produced more than 1.42 million kg (3.5 million lb) Sb from large shear zone in polymetamorphic rocks of Yukon-Tanana terrane (fig. B-3).

63 **Coal Creek** - Greisen-hosted Sn-Cu-W deposit in "McKinley" age pluton (55 million-year-old). Reported reserves of 4.54 million tonnes (5 million tons) of ore that grade 0.28% Sn and 0.3% Cu with credits of W, Ag, and Zn (fig. B-2).

64 **Golden Zone mine** - Major Au-Cu-Ag deposits in Late Cretaceous breccia pipe and skarn deposits. Produced more than 49 kg (1,581 oz) Au, 268 kg (8,617 oz) Ag, and 19,051 kg (42,000 lb) Cu. On the basis of recent (1994) drilling, the Pipe, Bunkhouse, and Copper King deposits contain 12.1 million tonnes (13.3 million tons) grading 3.25 g/tonne (0.095 oz/ton) gold (figs. B-1 and B-3).

65 **Nim Prospect** - Porphyry Cu-Ag-Au deposit of Late Cretaceous age. Reported grades of up to 5.0% Cu and 309 g/tonne (9 oz/ton) Ag (fig. B-1).

66 **Valdez Creek district** - About 15,813 kg (508,454 oz) Au production through 1995. Cambior Alaska Inc., the largest placer mine in Alaska, operated in this district until September, 1995 (fig. B-3).

67 **Denali Prospect** - At least six small, strata-bound Cu lodes in volcanic sedimentary rocks of Triassic age that may contain 4.54 million tonnes (5 million tons) ore that grade about 2% Cu with credits of Ag (fig. B-1).

67a **Zackly** - Disseminated copper and gold in a garnet-pyroxene skarn and marble. Reserves are estimated as 1.27 million tonnes (1.4 million tons) grading 2.6 percent Cu and 6.0 g/ton (0.175 oz/ton ) Au (fig. B-1).

68 **Chistochina** - Porphyry Cu prospects of Tertiary age and placer-Au district; produced more than 5,637 kg (181,261 oz) Au and small amount Pt from placer deposits (fig. B-3).

69 **Nabesna mine** - Classic high-grade Au skarn that envelopes quartz diorite of Jurassic(?) age; produced over 2,068 kg (66,500 oz) Au from about 79,816 tonnes (88,000 tons) of ore from 1930 to 1941 (fig. B-3).

70 **Spirit Mountain** - Massive and disseminated Cu-Ni mineralization in mafic-ultramafic complex (fig. B-3).

71 **Kennecott deposits** - Major stratiform Cu-Ag massive sulfide deposits localized near contact between Chitistone Limestone and Nikolai Greenstone of Triassic age; contained some of highest grade Cu lodes mined in North America. From 1911 to 1938, produced more than 544 million kg (1.2 billion lb) Cu and 311,028 kg (10 million oz) Ag from 4.35 million tonnes (4.8 million tons) ore. Some reserves remain (fig. B-1).

72 **Binocular and other prospects** - Kennecott-type Cu-Ag massive sulfide deposits (fig. B-1).

73 **Bond Creek - Orange Hill** - Two major porphyry Cu-Mo deposits of Late Cretaceous age; reported inferred reserves of 770 million tonnes (850 million tons) ore that grade 0.3 to 0.5% Cu and 0.03% Mo (fig. B-2).

74 **Carl Creek** - Porphyry Cu prospect in altered intrusive complex; similar to locality 73 (fig. B-2).

75 **Baultoff** - Porphyry Cu prospect in altered intrusive rocks; inferred reserves of 132 million tonnes (145 million tons) of 0.20% Cu similar to locality 73 (fig. B-2).

76 **Horsfeld** - Porphyry Cu prospect; similar to locality 73 (fig. B-2).

77 **Midas mine** - Significant strata-bound Cu (Ag-Au-Pb-Zn) massive sulfide deposit in volcanic sedimentary rocks of Tertiary Orca Group. Produced more than 1.5 million kg (3.3 million lb) Cu from 44,760 tonnes (49,350 tons) ore (fig. B-1).

78 **Ellamar** - Strata-bound Cu-Zn-Au massive sulfide deposit in sediment of Eocene(?) Orca Group. Produced more than 7.3million kg (16 million lb) Cu, 1,596 kg (51,307 oz) Au, and 5,960 kg (191,615 oz) Ag from about 273,764 tonnes (301,835 tons) ore (fig. B-1).

79 **Willow Creek, Independence, Lucky Shot, War Baby** - Major lode-Au (Ag-Cu-Pb-Zn-Mo) in veins that cut Mesozoic quartz diorite. Produced more than 18,860 kg (606,400 oz) Au from lode sources and about 1,729 kg (55,600 oz) Au from associated placer deposits (fig. B-3).

80 **Latouche, Beatson** - Major strata-bound Cu-Zn-Ag massive sulfide deposits in Orca Group sedimentary rocks and mafic volcanic rocks. Produced more than 93 million kg (205 million lb) Cu from 5.4 million tonnes (6 million tons) ore. Inferred reserves of 4.53 million tonnes (5 million tons) ore that grade 1% Cu, 1.5% Pb+Zn (fig. B-1).

81 **Rua Cove** - Major strata-bound Cu-Zn massive sulfide deposit in complex ore shoots enclosed in mafic volcanic rocks of Orca Group. Reported reserves of over 1 million tonnes (1.1 million tons) ore that grade 1.25% Cu (fig. B-1).

82 **Red Mountain and Claim Point** - Significant Cr occurrence associated with layered ultramafic complexes of Tertiary age at Red Mountain near Seldovia. More than 35,419 tonnes (39,951 tons) metallurgical-grade ore shipped through 1976; huge low-grade Cr resource may remain, of which 27 million tonnes (30 million tons) grade 5.1% $Cr_2O_3$ (fig. B-3).

83 **Red Devil** - Major Hg-Sb deposit; high-grade epithermal Hg-Sb deposit hosted in shear zones in Kuskokwim Group sedimentary rocks. More than 1.24 million kg (35,000 flasks) Hg produced from 68,025 tonnes (75,000 tons) ore (fig. B-3).

84 **Donlin Creek-Aniak district** - Significant placer Au district. Aniak mining district produced 17,680 kg (568,601 oz) Au from placer deposits, mainly from the Nyac and Donlin Creek areas. Gold-polymetallic deposits hosted in granite porphyry dikes and sills of Donlin Creek area recently estimated to contain 40.4 million tonnes (44.5 million tons) grading 2.75 g/tonne (0.08 oz/tonne) gold (fig. B-3).

85 **Goodnews Bay** - Major placer Pt district; estimated to have produced over 17,261 kg (555,000 oz) refined PGE metals from 1934 to 1976; one of the largest known PGE metal resources in United States. Possible resources of 45 million $m^3$ (60 million $yd^3$) of deep, PGE-bearing gravels remain. Lode source believed to be Alaskan-type zoned ultramafic complex of Jurasssic or Cretaceous age. Possible significant offshore placer potential (fig. B-3).

86 **Apollo-Sitka mines** - Major lode Au deposits; produced more than 3,347 kg (107,600 oz) Au from ore that averaged about 7.5 g/tonne (0.22 oz/ton) Au. Inferred reserves are 678,440 tonnes (748,000 tons) grading 26 g/tonne (0.76 oz/ton) Au, 74 g/tonne (2.16 oz/ton) Ag, with base metal credits (fig. B-3).

87 **Pyramid** - Late Tertiary porphyry Cu-Mo deposit; inferred reserves of 113 million tonnes (125 million tons) ore that grade 0.4% Cu and 0.03% Mo reported (fig. B-2).

88 **Ivanof** - Late Tertiary porphyry Cu prospect; grades of up to 0.72% Cu reported. Potential for large tonnages (fig. B-2).

89 **Weasel Mountain, Bee Creek** - Porphyry Cu-Mo prospect of late Tertiary to Quaternary age; grades of up to 0.48% Cu and 0.035% Mo reported. Potential for moderate tonnages of low-grade mineralization (fig. B-2).

90 **Mike deposit** - Porphyry Mo prospect of late Tertiary age; grades of up to 0.21% Mo reported. Potential for large tonnages of low-grade Mo mineralization (fig. B-2).

91 **Rex deposit** - Porphyry Cu prospect similar to locality 90; grades of up to 0.3% Cu reported. Potential for moderate reserves of low-grade mineralization (fig. B-2).

92 **Kasna Creek** - Major stratiform Cu-Pb-Zn and skarn-sulfide deposits of Mesozoic age in mafic, volcanic, and sedimentary rocks; reported reserves of over 9,070,000 tonnes (10 million tons) ore that grade more than 1% Cu (fig. B-1).

93 **Sleitat Mountain** - High-grade east-west-trending, Sn-W-Ag topaz-quartz greisen system hosted in 59 million-year-old old binary granite and in hornfels. Zone up to 1,915 m (3,000 ft) long and 152 m (500 ft) wide. One drill-hole showed 26 m (85 ft) of 1.8% Sn, and 0.4% W. Inferred resources are 58 to 96 million kg (128 to 212 million lb) Sn in 26.3 million tonnes (29 million tons) ore (fig. B-2).

94 **Jimmy Lake** - Complex Cu-Ag-Sn mineralization of late Tertiary(?) age; reported grades of up to 3,599 g/tonne (105 oz/ton) Ag and 3% Cu (fig. B-1).

95 **Haines Barite** - Major stratiform Ba-Pb-Zn-Cu-Ag deposit in pillow basalt-dominated section of Paleozoic or Triassic age; consists of 15- to 18-m (48- to 60-ft)-thick zone of 60% barite with upper zone [0.6 to 2.4 m (2 to 8 ft) thick] of massive sulfides that contain 2% Pb, 3% Zn, 1% Cu, up to 137 g/tonne (4 oz/ton) Ag, and 4 g/tonne (0.12 oz/ton) Au. Estimated to contain 680,250 tonnes (750,000 tons) of 65% barite with Zn and Ag credits (fig. B-1).

96 **Klukwan** - Major Fe-Ti deposits in zoned ultramafic complex of Mesozoic age; reported to contain 2.7 billion tonnes (3 billion tons) of material that contains 16.8% Fe and 1.6 to 3.0% Ti (fig. B-3).

97 **Nunatak** - Porphyry Mo deposit; reported reserves of 7.7 million tonnes (8.5 million tons) ore that grades 0.125% Mo and 117 millions tonnes (129 million tons) of 0.04% Mo (fig. B-2).

98 **Brady Glacier** - Major Ni-Cu deposit in layered gabbro-pyroxenite complex of Tertiary age. Proven reserves of 91 million tonnes (100 million tons) ore that grade 0.5% Ni, 0.3% Cu reported and about 0.03% Co; also contains PGE concentrations (fig. B-3).

99 **Mertie Lode and Funter Bay mining district** - Contains substantial reserves of lode Au mineralization. Past production totaled about 466 kg (15,000 oz) Au. Deposits also contain significant Ni-Cu and Pb-Zn-Ag mineralization. Funter Bay deposit contains reported reserves of 507,920 tonnes (560,000 tons) that grade 0.34% Ni, 0.35% Cu, and 0.15% Co in gabbro-pipe system (fig. B-3).

100 **Alaska-Juneau** - Major lode Au deposit that consists of 30 to 90 m (100- to 300-ft) wide zone that contains en echelon, Au-bearing quartz veins in metamorphic rocks; produced more than 109,482 kg (3.52 million oz) Au from 80 million tonnes (88.5 million tons) ore from 1893 to 1944. Reserves (all categories), of 96 million tonnes (105.7 million tons) of 1.7 g/tonne (0.05 oz/ton) Au remain (fig. B-3).

101 **Chichagof and Hirst Chichagof** - Major lode-Au deposits in quartz veins that cut Mesozoic graywacke; produced more than 23,949 kg (770,000 oz) Au, most of which was produced at Chichagof mine. Inferred leased reserves estimated to be 3,110 kg (100,000 oz) Au (fig. B-3).

102 **Mirror Harbor** - Ni-Cu mineralization in layered-gabbro complex of Mesozoic age; reported proven reserves of 7,256 tonnes (8,000 tons) of 1.57% Ni and 0.88% Cu and reported inferred reserves of several million tons ore that grade 0.2% Ni and 0.1% Cu (fig. B-3).

103 **Bohemia Basin** - Major Ni-Cu-Co mineralization in layered mafic complex similar to locality 102; reported reserves of 20 million tonnes (22 million tons) ore that grade 0.33 to 0.51% Ni, 0.21 to 0.27% Cu, and 0.02% Co, all of which are recoverable with standard flotation technology (fig. B-3).

104 **Apex-El Nido** - Significant lode Au-W deposits that occur as crosscutting veins in graywacke; produced more than 1,555 kg (50,000 oz) Au (fig. B-3).

105 **Greens Creek** - Major sediment-hosted Pb-Zn-Cu-Ag-Au volcanogenic massive sulfide deposit of Devonian or Triassic age; most recent reserve estimate of the original oredbody is 10 million tonnes (11.0 million tons) grading 4.1 g/tonne (0.12 oz/ton) Au, 456 g/tonne (13.3 oz/ton) Ag, 12.8% Zn, and 4.0% Pb. Additional reserves in the southwest orebody are 1.81 million tonnes (2.0 million tons) grading 13.5% Zn, 5.5% Pb, 9.25 g/tonne (0.27 oz/ton) Au, and 1,131 g/tonne (33 oz/ton) Ag. Total combined reserves and resources of the mine are estimated to be 16.34 million tonnes (18 million tons) (fig. B-1).

106 **Sumdum** - Volcanogenic Cu-Pb-Zn massive sulfide deposit in Mesozoic metamorphic complex with potential strike length of over 3,048 m (10,000 ft). Inferred reserves of 24 million tonnes (26.7 million tons) ore that grade 0.57% Cu, 0.37% Zn, and 10 g/tonne (0.3 oz/ton) Ag reported (fig. B-1).

107 **Snettisham** - Fe-Ti deposit in mafic zoned-intrusive complex; reported grades of about 18.9% Fe and 2.6% Ti (fig. B-3).

108 **Tracy Arm** - Strata-bound Cu-Zn-Pb massive sulfide prospect in Mesozoic schist; over 335 m (1,100 ft) long and up to 3.7 m (12 ft) thick. Reported grades of 1.5% Cu, 3.9% Zn, 26 g/tonne (0.76 oz/ton) Ag, and 0.44 g/tonne (0.013 oz/ton) Au (fig. B-1).

109 **Red Bluff Bay** - Significant chrome mineralization in Mesozoic ultramafic complex (probably ophiolite); reported reserves of 517 tonnes (570 tons) of material that grade 40% Cr and 26,303 tonnes (29,000 tons) that grade 18 to 35% Cr (fig. B-3).

110 **Cornwallis Peninsula** - Volcanogenic Cu-Pb-Zn-Ag-Ba massive sulfide deposit of Triassic(?) age; reported grades of up to 20% Pb-Zn and 788 g/tonne (23 oz/ton) Ag 9 (fig. B-1).

111 **Castle Island** - Stratiform barite deposit of Triassic age hosted in carbonate and pillow basalt; about 776,390 tonnes (856,000 tons) of raw and refined barite produced from 1963 to 1980; also contains Zn, Pb, and Cu sulfides. Reported to be mined out (fig. B-1).

112 **Groundhog Basin** - Area contains several massive sulfide prospects in Mesozoic schist and gneiss whose origins are now thought to be plutonic associated. Reported grades of up to 8% Pb, 994 g/tonne (29 oz/ton) Ag, and 17 g/tonne (0.5 oz/ton) Au. Sn has also been recently identified. Area also contains potential for porphyry Mo deposits (fig. B-1).

113 **Snipe Bay** - Ni-Cu deposit in zoned mafic-ultramafic complex; inferred reserves of 390,000 tonnes (430,000 tons) of 0.3% Ni, 0.3% Cu, and 4.4 g/tonne (0.13 oz/ton) Ag reported (fig. B-3).

114 **Kasaan Peninsula** - Major skarn-type Cu-Fe-Au massive sul-fide deposit of Jurassic age; area has produced over 12.7 million kg (28 million lb) Cu, and 1,711 kg (55,000 oz) Ag. Reported reserves of 3.6 million tonnes (4 million tons) ore that grade 50% Fe and less than 2% Cu (fig. B-1).

115 **Salt Chuck** - Cu-PGM-Ag-Au deposit in contact zone between pyroxenite and gabbro within Alaskan-type zoned mafic-ultramafic pluton. From 1900 to 1941, 2.3 million kg (5 million lb) Cu, over 622 kg (20,000 oz) PGM, and Au and Ag credits were produced from 294,775 tonnes (325,000 tons) ore (fig. B-3).

116 **Union Bay** - Significant Fe-Ti mineralization in ultramafic complex; area also contains Pt and V concentrations (fig. B-3).

117 **Hyder mining district** - Area produced more than 22,675 tonnes (25,000 tons) high-grade W-Cu-Pb-Zn-Ag ore from 1925 to 1951 from crosscutting ore shoots in Texas Creek granodiorite of Tertiary age. Area also contains potential for porphyry Mo-W mineralization and massive sulfide-skarn Pb-Ag-Au-W deposits (figs. B-1 and B-2).

118 **Jumbo** - Cu-Fe-Mo-Ag skarn deposit; produced more than 4.5 million kg (10 million lb) Cu, 8,708 kg (280,000 oz) Ag, and 218 kg (7,000 oz) Au from 113,375 tonnes (125,000 tons) ore. Zoned magnetite-Cu skarns are associated with epizonal granodiorite pluton of Cretaceous age. Reported reserves of 589,550 tonnes (650,000 tons) ore that grade 45.2% Fe, 0.75% Cu, 0.3 g/tonne (0.01 oz/ton) Au, and 2.74 g/tonne (0.08 oz/ton) Ag (fig. B-1).

119 **Copper City** - Stratiform Cu-Zn-Ag-Au massive sulfide deposit hosted in late Precambrian or earliest Paleozoic Wales Group. Reported grades of up to 12.7% Cu, 2.7% Zn, 86 g/tonne (2.5 oz/ton) Ag, and 6.9 g/tonne (0.2 oz/ton) Au (fig. B-1).

120 **Quartz Hill** - A porphyry molybdenum deposit hosted in a 25 million-year-old composite felsic pluton. Probable reserves, according to Cominco Ltd., are 210 million tonnes (232 million tons) with a grade of 0.22% $MoS_2$, and possible reserves are 1.1 billion tonnes (1.2 billion tons) with 0.12% $MoS_2$ (fig. B-2).

121 **Niblack** - Volcanogenic Cu-Pb-Au-Ag massive sulfide deposit hosted in Precambrian(?) Wales Group or Ordovician to Silurian Descon Formation; produced more than 635,000 kg (1.4 million lb) Cu, 342 kg (11,000 oz) Au, and 467 kg (15,000 oz) Ag. Recent drilling results on Gold Zone include 50 m (164 ft) grading 3.77 g/tonne (0.11 oz/ton) gold, 0.41% copper, and 1.09% zinc (fig. B-1).

122 **Bokan Mountain** - Numerous U-Th prospects associated with Jurassic peralkaline intrusive complex; from 1955 to 1971, produced more than 108,840 tonnes (120,000 tons) ore that graded about 1% $U_3O_8$. Contains inferred reserves of about 36.2 million tonnes (40 million tons) of 0.126% Nb and up to 1% REE metals (fig. B-3).

123 **Kemuk Mountain** - Magmatic Fe-Ti deposit hosted in Cretaceous(?) pyroxenite. Inferred reserves of 2.17 billion tonnes (2.4 billion tons) that average 15 to 17% Fe, 2 to 3% $TiO_2$, and 0.16% $P_2O_5$ (fig. B-3).

124 **McLeod** - Porphyry Mo deposit that contains quartz-molybdenite fissure veins in quartz-feldspar porphyry. Chip samples contain up to 0.09% Mo (fig. B-2).

125 **Johnson River** - Epigenetic(?) quartz-sulfide stockwork or massive sulfide deposit hosted in volcaniclastic, pyroclastic, and volcanic rocks of Jurassic Talkeetna Formation. Deposit has drilled out reserves at a $50/tonne cutoff with no cut of high Au assays, 997,542 tonnes (1,099,580 tons) grading 10.35 g/tonne (0.32 oz/ton) Au, 7.84 g/tonne (0.24 oz/ton) Ag, 0.76% Cu, 1.17 Pb, and 8.37% Zn (fig. B-3).

126 **Nimiuktuk River** - Small hill of massive, high-grade barite estimated to contain at least 1.36 million tonnes (1.5 million tons) barite. Widespread stream-sediment Ba anomalies in area indicate further barite potential (fig. B-1).

127 **Kensington** - Stockworks of quartz veins in sheared and chloritized quartz diorite produced 9,886 tonnes (10,900 tons)

grading 6 g/tonne (0.18 oz/ton) Au prior to 1930. Recent reserve estimates indicate at least 10.4 million tonnes (11.5 million tons) grading 4.9 g/tonne (0.143 oz/ton) Au. Subparallel Horrible vein system contains 3.56 million tonnes (3.93 million tons) grading 3.7 g/tonne (0.11 oz/ton) Au (fig. B-3).

128 **Jualin** - Five quartz-fissure veins in Cretaceous quartz diorite, more than 4,573 m (15,000 ft) of underground workings; produced 1,505 kg (48,387 oz) Au, mainly prior to 1930. Reserves estimated at 0.97 million tonnes (1.07 million tons) of 12 g/tonne (0.349 oz/ton) Au (fig. B-3).

129 **Pebble Copper** - Cu-Au porphyry with identified resource of 454 million tonnes (500 million tons) grading 0.35% Cu and 0.4 g/tonne (0.012 oz/ton) Au with Mo in the 0.03% to 0.04% range (fig. B-1).

# APPENDIX C

## Mining licenses issued by and received from the Alaska Department of Revenue, 1996

Entries include in this order: company name, (region), address, resource, site of operation, mining district, and license number. Alaska Peninsula Region (APR), Eastern Interior Region (EIR), Northern Region (NR), Southcentral Region (SCR), Southwestern Region (SWR), Southeastern Region (SER), Undistributed (UR), Western Region (WR), and not given (NG).

**A & L Mining (WR)**
PO Box 1974
Nome, AK 99762
Gold-Silver
Coffee Creek
Cape Nome district
ML 9067

**Ackels, Del (NR)**
PO 61520
Fairbanks, AK 99706-1720
Gold-Silver
Big Creek
Chandalar district
ML 9036

**Addwest Minerals Inc. (SCR)**
5460 Ward Rd., #202
Arvada, CO 80002
Gold, Copper
W. Fork Chulitna River
Valdez Creek district
ML 5661

**Administrative Services (EIR)**
PO Box 70495
Fairbanks, AK 99707-0495
Mineral
Ketchum
Circle district
ML 9151

**AG Mining (SWR)**
PO Box 106
McGrath, AK 99627-0106
Gold, Silver
Dodge Creek
Innoko district
ML 5706

**Alaska Placer Development (EIR)**
626 2nd St., Suite 202
Fairbanks, AK 99701
Gold, Silver
Livengood Creek
Livengood district
ML 9377

**Alaska Three Metals Mine Corp. (SCR)**
HC 89 Box 345
Wasilla, AK 99688
Gold, Silver
Sheep Creek
Hatcher Pass district
ML 5595

**Alaska/Nevada Gold Mines Ltd. (EIR)**
626 2nd St., Suite 202
Fairbanks, AK 99701
Gold-Silver
Livengood Creek
Livengood-Tolovana district
ML 7226

**AM Mining Ltd. (EIR)**
PO Box 10263
Fairbanks, AK 99710-0263
Gold-Silver
Dome Creek APMA #9135
Fairbanks district
ML 99091

**Anchorage Sand & Gravel Co. Inc. (SCR)**
1040 O'Malley Rd.
Anchorage, AK 99515
Gravel
Anchorage district
ML 99028

**Anderson & Son Mining (SWR)**
Allan Anderson
PO Box 277
McGrath, AK 99627-0277
Gold-Silver
Yankee Creek
Innoko district
ML 6205

**Angell, William R. (EIR)**
417 Glacier Ave.
Fairbanks, AK 99701
Gold-Silver
Fortymile River
Fortymile district
ML 9381

**Arctic Mining (EIR)**
PO Box 30144
Central, AK 99730
Gold-Silver
Crooked Creek
Circle district
ML 5888

**AU Mining Co. (WR)**
PO Box 292
Willow, AK 99688
Gold-Silver
Candle Creek
Candle district
ML 5853

**AU Mining Co. (WR)**
PO Box 292
Willow, AK 99688
Gold-Silver
Mud Creek
Candle district
ML 7388

**Bayless, Bill (EIR)**
Drawer F
Copper Center, AK 99573
Gold-Silver
Franklin Street
Fortymile district
ML 9088

**BHD Mining (EIR)**
13201 62nd Ave. E
Puyallup, WA 98373
Gold-Silver
N. Fork Twelvemile
Circle district
ML 5841

**Beerman, W.J. (SCR)**
2416 S. 1st St.
Yakima, WA 98901
Gold-Silver
Big Four Creek
Chistochina district
ML 7160

**Bell, Rocky J. (SCR)**
PO Box 353
Sterling, AK 99672
Gold
Crown Point Mine
Hope-Sunrise district
ML 99087

**Bendall, Lawrence A. (NR)**
2255 Solstice Ave.
Fairbanks, AK 99709
Gold-Silver
Fay; Rt. Fork Vermont Creek
Koyukuk-Nolan district
ML 9160

**Bergman, Kevin (EIR)**
PO Box 71488
Fairbanks, AK 99707
Gold-Silver
Ester Creek
Fairbanks district
ML 9402

**Berry Enterprises (EIR)**
1101 Barnette St.
Fairbanks, AK 99701
Gold-Silver
Ketchum Creek
Circle district
ML 99084

**Bickell, D. Harvey (EIR)**
PO Box 1026
Dawson City, YT Y0B 1G0
Gold-Silver
Near Walker Fork
Fortymile district
ML 9356

**Blondeau, Wayne (SCR)**
PO Box 602
Valdez, AK 99686
Gold
Mineral Creek
Prince William Sound district
ML 5556

**Blue Ribbon Inc. (SCR)**
PO Box 871906
Wasilla, AK 99688
Gold
Tributary of Cottonwood Creek
Yentna-Cache Creek district
ML 99082

**Botnan, Ted R. (EIR)**
9950 Stephen Richards Dr.
Juneau, AK 99801
Gold
Treasure Creek
Fairbanks district
ML 5951

**Bras, Cy (EIR)**
703 Swires Rd.
Kenai, AK 99611
Gold-Silver
Canyon Creek
Fortymile district
ML 9004

**Brooks Range Exploration Co. Inc. (SCR)**
3240 Wiley Post Loop
Anchorage, AK 99517
Gold
Lake Creek Mt. Top
Yentna-Cache Creek district
ML 5875

**Brooks Range Ventures Inc. (SCR)**
3240 Wiley Post Loop
Anchorage, AK 99517
Gold-Silver
Lake Creek
Yentna-Cache Creek district
ML 7093

**Buds Gravel Services (SCR)**
PO Box 194
Anchor Point, AK 99556
Gravel
Lot 1, Section 31
Kenai Peninsula
ML 99034

**Burgett, Norm (NR)**
3350 Thomas St., #19
Fairbanks, AK 99709
Gold-Silver
Midnight Creek
Ruby-Poorman district
ML 6907

**Burns, John R. (EIR)**
PO Box 5
Chicken, AK 99732-0005
Gold-Silver
Davis Creek
Fortymile district
ML 4419

**Carlo & Sons Mining Co. (EIR)**
2113 Southern Ave.
Fairbanks, AK 99709
Gold-Silver
Hunter Creek
Rampart district
ML 7122

**Carlson, Robert D. (SCR)**
PO Box 77135
Eagle River, AK 99577-1375
Gold-Silver
Upper Cache Creek
Yentna district
ML 6043

**Cassiterite Placers Inc. (EIR)**
413 Cowles St.
Fairbanks, AK 99701
Gold-Silver
Cache, Sullivan, Quartz, & Tofty creeks
Hot Springs district
ML 7437

**Caswell, James W. (SCR)**
PO Box 196
Cantwell, AK 99729
Limestone
Valdez Creek district
ML 7437

**Catt, Bruce D. & Barbara (EIR)**
PO Box 45
Central, AK 99730
Gold-Silver
Crooked Creek
Circle district
ML 9310

**Chase, Ernest M. (SWR)**
PO Box 141
Aniak, AK 99588
Gold-Silver
Flat Creek
Marshall-Anvik district
ML 5611

**Christensen, Robert & Kathleen (NG)**
PO Box 871075
Wasilla, AK 99687-1075
Gold, Heavy Metals
Unknown district
ML 5722

**Chukchi Contracting Inc./ Chukchi Miners (NR)**
PO Box 778
Kotzebue, AK 99752
Gold
Old Glory Creek
Noatak district
ML 9420

**CIRI (SCR)**
PO Box 93330
Anchorage, AK 99509
Chromium
Eklutna area
Anchorage-Hatcher Pass district
ML 99021

**CIRI (SCR)**
PO Box 93330
Anchorage, AK 99509
Unknown commodity
Tyonek area
Anchorage district
ML 99023

**CIRI (SCR)**
PO Box 93330
Anchorage, AK 99509
Chromium
Seldovia area
Homer district
ML 99024

**CIRI (SCR)**
PO Box 93330
Anchorage, AK 99509
Chromium
Seldovia area
Homer district
ML 99025

**Clara Bea Inc. (WR)**
PO Box 2561
Seward, AK 99723
Gold-Silver
Candle Creek
Fairhaven district
ML 7489

**Cogan, Andrew B. (NG)**
PO Box 75133
Fairbanks, AK 99707
Unknown commodity
Unknown district
ML 9410

**Colledge, Lyle (EIR)**
PO Box 60478
Fairbanks, AK 99706-0478
Gold-Silver
Bottom Dollar Creek
Circle district
ML 108

**Cominco American Inc. (WR)**
15124 E. Euclid Ave.
Spokane, WA 99216
Gold
Divide & Quartz creeks, APMA #9315
Cape Nome district
ML 99092

**Congdon, Carl J. (NG)**
PO Box 2893
Soldotna, AK 99669-2893
Gold
Quail Creek
Unknown district
ML 7104

**Conway, James P. (SCR)**
HC 2 Box 7660
Palmer, AK 99645-7660
Gold-Silver
Poorman Creek
Yentna-Cache Creek district
ML 5689

**Cook Island Partnership (SCR)**
6129 Petersburg St.
Anchorage, AK 99507
Gravel
Anchorage Industrial Park
Anchorage district
ML 99000

**Cook, Fred A. (EIR)**
PO Box 311
Delta Junction, AK 99737-0311
Gold-Silver
Portage Creek
Bonnifield district
ML 9248

**Cook's Mining (EIR)**
PO Box 70456
Fairbanks, AK 99707-0456
Gold-Silver
Fairbanks Creek
Fairbanks district
ML 5955

**Cook's Mining (EIR)**
PO Box 70456
Fairbanks, AK 99707-0456
Gold-Silver
Fairbanks Creek
Fairbanks district
ML 6973

**Cope, Roger C. (NG)**
PO Box 75404
Fairbanks, AK 99707-5404
Gold-Silver
Louis Creek
Unknown district
ML 9411

**Crabb, James A. (EIR)**
PO Box 30109
Central, AK 99730-0109
Gold-Silver
Half Dollar Creek
Circle district
ML 6740

**Cullips Excavating Inc. (SCR)**
6129 Petersburg St.
Anchorage, AK 99507
Unknown commodity
Tract 4, Plat 74-2191
Unknown district
ML 99086

**Dart, James C. (EIR)**
PO Box 18
Manley Hot Springs, AK 99756
Gold-Silver
Boulder Creek
Hot Springs district
ML 6010

**Delima, Don P. (EIR)**
POBox 56106
Manley Hot Springs, AK 99756
Gold-Silver
Boulder Creek
Hot Springs district
ML 7194

**Derrick Ent. Inc. (EIR)**
PO Box 73574
Fairbanks, AK 99707
Gold-Silver
Crooked Creek
Circle district
ML 5925

**DeWitt, Estill (SCR)**
2260 Belmont Dr.
Anchorage, AK 99517
Gold-Silver
Caribou & Alfred Creek
Nelchina district
ML 99075

**Diehl, Ray (EIR)**
PO Box 153
Yerington, NV 89447-0153
Gold-Silver
Platt Creek
Bonnifield district
ML 9153

**Double J Mining (EIR)**
Judd Edgerton
PO Box 34
Chicken, AK 99732-0034
Gold-Silver
Napoleon Creek
Fortymile district
ML 7485

**Ellis, Ed (SCR)**
PO Box 13443
Trapper Creek, AK 99683-3443
Gold-Platinum
Lake Creek
Yentna district
ML 5607

**Emerson, Robert C. (EIR)**
1811 Phillips Field Rd.
Fairbanks, AK 99701
Gold-Silver
St. Patrick, Happy, & Eva creeks
Fairbanks district
ML 5913

**Faa, Thomas E. (EIR)**
PO Box 10906
Fairbanks, AK 99710
Gold-Silver
Moose Creek
Bonnifield district
ML 6801

**Faa, Thomas E. (EIR)**
PO Box 10906
Fairbanks, AK 99710
Gold-Silver
Eva Creek
Bonnifield district
ML 9194

**Fabrizio, Jerry (SER)**
PO Box 601
Haines, AK 99827-0601
Gold-Silver
Porcupine Creek
Porcupine district
ML 6438

**Fair, Dan W. (NG)**
3457 Old Richardson Hwy.
North Pole, AK 99705
Unknown commodity
Unknown district
ML 9144

**Faulkner, Harry Sr. (SWR)**
PO Box 1307
Bethel, AK 99559-1307
Gold-Silver
Ophir Creek
Aniak-Tuluksak district
ML 6157

**Fichtelman, Guy/Don Collier (EIR)**
PO Box 70
Chicken, AK 99732-0070
Gold-Silver
Fortymile River
Fortymile district
ML 9177

**Fisher, Paul S. (EIR)**
PO Box 71041
Fairbanks, AK 99707-1041
Gold-Silver
Doric Creek
Hot Springs district
ML 9317

**Flame Petro-Minerals Corp. (EIR)**
185 10751 Shellbridge Way
Richmond, BC V6X 2W8
Gold-Silver
Fish Creek
Fairbanks district
ML 9378

**Flat Creek Mining Co. Inc. (SWR)**
PO Box 81464
Fairbanks, AK 99708
Gold-Silver
Flat Creek
Marshall district
ML 5824

**Flat Creek Placers (SWR)**
General Delivery
Flat, AK 99584
Gold-Silver
Flat Creek
Iditarod district
ML 5503

**Flat Pick Mining (EIR)**
PO Box 115
Central, AK 99730-0115
Gold-Silver
Switch Creek
Circle district
ML 6892

**Fleek, Joseph L. (EIR)**
3457 Old Richardson Hwy.
North Pole, AK 99705
Gold-Silver
Ptarmigan Creek
Circle district
ML 9405

**Fogarty, James & Sharon (EIR)**
3498 Laurance Rd.
North Pole, AK 99705
Gold-Silver
Flume Creek
Fairbanks district
ML 9373

**Four Brothers Mining (EIR)**
PO Box 81117
Fairbanks, AK 99708-1117
Gold-Silver
Totatlanika River Tributary
Bonnifield district
ML 7147

**Gavora, Steven R. (EIR)**
1967 Camomile Ln.
Fairbanks, AK 99712
Gold-Silver
Fairbanks Creek
Fairbanks district
ML 9084

**Geo Quest (EIR)**
Michael Busby
PO Box 71
Chicken, AK 99732
Gold-Silver
Chicken Creek
Fortymile district
ML 6794

**George, Roy (EIR)**
PO Box 54
Chicken, AK 99732
Gold-Silver
South Fork Fortymile
Fortymile district
ML 99081

**Gibson, Wayne (WR)**
1610 Southern
Fairbanks, AK 99709
Gold-Silver
Golden Creek
Gold Hill-Melozitna district
ML 9032

**Girdwood Mining Co. (SCR)**
PO Box 1089
Anchorage, AK 99587-1089
Gold-Silver
Crow Creek
Anchorage district
ML 5590

**Glacier Six Enterprises (EIR)**
Vic E. Justis
10819 Spur Hwy., Suite 281
Kenai, AK 99611
Gold-Silver
Broxson Creek AOMA #7311
Delta River district
ML 99090

**Glacier Six Enterprises (EIR)**
Vic E. Justis
10819 Spur Hwy., Suite 281
Kenai, AK 99611
Gold-Silver
Broxson Creek
Delta-River district
ML 731

**Glassburn, Don E. (EIR)**
PO Box 107
Central, AK 99730
Gold-Silver
Gold Dust Creek
Circle district
ML 7010

**Globe Creek Mining Inc. (EIR)**
1684 Chena Ridge Rd.
Fairbanks, AK 99709
Limestone
Globe Creek
Livengood-Tolovana district
ML 99089

**Gold Hill Mining Co. (EIR)**
30033 Redwood Hwy.
Cave Junction, OR 97523
Gold-Silver
Harrison Creek
Circle district
ML 7289

**Gold Star Mining (EIR)**
Ross Novak
PO Box 83200
Fairbanks, AK 99708-3200
Gold-Silver
Eureka Creek
Hot Springs district
ML 9065

**Goodson, Richard (EIR)**
2605 E. 50th #8
Anchorage, AK 99507
Gold-Silver
South Fork Fortymile
Fortymile district
ML 6005

**Goodson, Richard (EIR)**
2605 E. 50th, #8
Anchorage, AK 99507
Gold-Silver
North Fork Fortymile
Fortymile district
ML 9374

**Gorensen, Ednumd J. (SCR)**
PO Box 91
Seward, AK 99664
Gold-Silver
Tonsina Creek
Nelchina district
ML 5730

**Granath, Gene A. (SCR)**
PO Box 574
Kenai, ak 99611-0574
Gold-Silver
Falls Creek
Hope-Sunrise district
ML 5633

**Granite Creek Mining (SWR)**
PO Box 261
McGrath, AK 99627-0261
Gold-Silver
Granite Creek
McKinley-Iditarod district
ML 6223

**Grant, Willie Eugene (EIR)**
PO Box 40
Eagle, AK 99738
Gold-Silver
Seventymile River
Eagle district
ML 9304

**Green Mining & Exploration (EIR)**
PO Bxo 61455
Fairbanks, AK 99701

Gold-Silver
Hunter Creek
Rampart district
ML 9396

**Greene, Steve (EIR)**
1648 Tamarack
Fairbanks, AK 99709
Gold-Silver
Davis Creek
Fortymile district
ML 9089

**Groppel, Chris L. (EIR)**
PO Box 1060
Delta Junction, AK 99737-1060
Gold-Silver
Tenderfoot Creek
Richardson district
ML 5944

**Gumaer, Mark & Robin (WR)**
PO Box 1682
Nome, AK 99762-1682
Gold-Silver
Dick Creek
Kougarok district
ML 7223

**Hall, John B. (NR)**
PO Box 72700
Fairbanks, AK 99707-2700
Gold-Silver
Linda
Koyukuk district
ML 7203

**Hammond, Charles Richard (EIR)**
PO Box 7
Chicken, AK 99732-0007
Gold-Silver
45 Pup
Fortymile district
ML 7049

**Hannah, John (EIR)**
PO Box 61117
Fairbanks, AK 99706-1117
Gold-Silver
Flume, Moose, & Pedro creeks
Fairbanks district
ML 9035

**Hansen, Erik (EIR)**
PO Box 97
Ester, AK 99725-0097
Gold-Silver
Banner Creek
Richardson district
ML 9406

**Hartman, Michael G. (WR)**
PO Box 4501
Kent, WA 98032-4501
Gold-Silver
Poorman Creek
Ruby, Poorman district
ML 6004

**Hassel, Gerald (EIR)**
PO Box 49
Ester, AK 99725-0049
Gold-Silver
Ready Bullion Creek
Fairbanks district
ML 7201

**Hasson, Peter (NR)**
PO Box 13171
Trapper Creek, AK 99683
Gold-Silver
Gold Creek
Koyukuk-Nolan district
ML 6581

**Hayden, Forest A. (EIR)**
PO Box 110930
Anchorage, AK 99511
Gold-Silver
Baby & Squaw creeks
Fortymile district
ML 99093

**Heflinger Mining Co.(EIR)**
665 10th Ave., #307
Fairbanks, AK 99701
Gold-Silver
Livengood Creek
Livengood-Tolovana district
ML 7235

**Heflinger, Fred (EIR)**
PO Box 82390
Fairbanks, AK 99708
Gold-Silver
Walker Fork
Fortymile district
ML 9124

**Herndon & Thompson Leasing Co. (SCR)**
41745 Bear Creek Rd.
Homer, AK 99603
Gravel
Homer district
ML 99018

**Herndon & Thompson Leasing Co. (SCR)**
41745 Bear Creek Rd.
Homer, AK 99603
Gravel
Homer district
ML 99019

**Herning, Bruce G. (EIR)**
PO Box 73846
Fairbanks, AK 99707-3846
Gold-Silver
Palmer Creek
Fairbanks district
ML 4482

**Herzog, Martin M. (SCR)**
438 Sundew Lane
Fairbanks, AK 99712
Gold-Silver
Cache Creek
Yentna district
ML 6073

**High Bench Mining Co. (WR)**
Daniel Walsh
4600 Mars Dr.
Anchorage, AK 99507
Gold-Silver
Dexter & Anvil creeks
Cape Nome district
ML 5994

**Hoffman, Russell D. (SCR)**
HC 60 Box 153
Copper Center, AK 99573
Gold-Silver
Ruby Gulch
Chistochina district
ML 6116

**Hoffman, Russell D. (SCR)**
HC 60 Box 153
Copper Center, AK 99573
Gold-Silver
Slate Creek
Chistochina district
ML 9389

**Hoffman, Russell D. (SCR)**
HC 60 Box 153
Copper Center, AK 99573
Gold-Silver
Chistochina River
Chistochina district
ML 4065

**Hopen, Alf M. (EIR)**
PO Box 74246
Fairbanks, AK 99707
Gold-Silver
Cleary Creek
Fairbanks district
ML 99039

**Houston, Larry E. (SCR)**
6421 Rockridge Dr.
Anchorage, AK 99516
Gold-Silver
Lake Creek
Yentna district
ML 2521

**Hunt, Jim W.**
PO Box 9020
Coldfoot, AK 99701-9020
Gold-Silver
Prospect Creek
Koyukuk-Nolan district
ML 9425

**Jackson Mining Co. (EIR)**
936 Coppet St.
Fairbanks, AK 99709
Gold-Silver
Totatlanika River
Bonnifield district
ML 7469

**JD Mining (EIR)**
403 Henderson Rd.
Fairbanks, AK 99709
Gold-Silver
Hoosier Creek
Rampart district
ML 5948

**Jensen, Daniel D. (EIR)**
PO Box 12
Delta Junction, AK 99737-0012
Gold-Silver
McComber Creek
Delta River district
ML 7593

**Jiles, Overton J. (NG)**
5250 Auburn Folsom Rd.
Loomis, CA 95650
Gold
Gold Bottom Gulch
Unknown district
ML 7249

**Jones, Robert R. (EIR)**
PO Box 3132
Anderson, AK 99744
Gold-Silver
California Creek
Bonnifield district
ML 3116

**Keller, Robert W. (EIR)**
PO Box 385
Huntington, OR 97909-0385
Gold-Silver
Totatlanika River
Bonnifield district
ML 5889

**Kelly, Tim (EIR)**
PO Box 112
Manley, AK 99756
Gold-Silver
North Fork Creek
Hot Springs district
ML 7057

**Kennecott Exploration Co. (WR)**
E. 5603 Third Ave.
Spokane, WA 99212
Gold-Polymetallic
Snake River
Cape Nome district
ML 5899

**Kennecott Greens Creek Mining Co. (SER)**
PO Box 32199
Juneau, AK 99803
Gold-Silver-Polymetallic
Greens Creek
Juneau-Admiralty district
ML 99002

**Kile, Alvin & Eric (EIR)**
PO Box 140424

Anchorage, AK 99514-0424
Gold-Silver
Canyon & Camp creeks
Fortymile district
ML 5838

**KMM Co. (EIR)**
PO Box 80067
Fairbanks, AK 99708-0067
Gold-Silver
Faith Creek
Circle district
ML 9149

**Knutson, Theodore (EIR)**
PO Box 1298
Chouteau, OK 74337-1298
Gold-Silver
Mammoth Creek
Circle district
ML 7323

**Kralik, Jan (WR?)**
PO Box 1793
Nome, AK 99762-1793
Gold-Silver
Gold Run
Unknown district
ML 5864

**Krizak, Rudy (EIR)**
PO Box 1253
Nome, AK 99762-1253
Gold-Silver
Crooked Creek
Circle district
ML 6001

**Krzykowski, Ben (EIR)**
PO Box 60091
Fairbanks, AK 99706-0091
Gold-Silver
Big Eldorado Creek
Fairbanks district
ML 5981

**Ksir, William (SCR)**
HC 31 Box 5080A
Wasilla, AK 99654
Gold-Silver
Lucky-Iron, Trib of Cache Creek
Yentna district
ML 5530

**Kukowski, Dave (EIR)**
P.O Box 6
Chicken, AK 99732
Gold-Silver
Mosquito River
Fortymile district
ML 7220

**Kurt's Construction (EIR)**
Kurt Ueeck
HC 60 Box 3560
Delta Junction, AK 99737-3560
Gravel
Miltan Road area
Fairbanks district
ML 99007

**L&R Mining (EIR)**
PO Box 51
Salcha, AK 99714-0051
Gold
Salcha River
Fairbanks district
ML 7458

**LaCross, Jack (SCR)**
PO Box 387
Trapper Creek, AK 99683
Gold-Silver
Fergy Creek
Yentna-Cache Creek district
ML 6348

**Lankford, Steve E. (SCR)**
HC 89 Box 540
Willow, AK 99688-0549
Gold-Silver
Albert Creek
Nelchina district
ML 6104

**Las, Alan E. (EIR)**
PO Box 10243
Fairbanks, AK 99710-0243
Gold-Silver
Smith & Pool creeks
Fairbanks district
ML 5934

**Las, Alan E. (EIR)**
PO Box 55069
North Pole, AK 99705-5069
Gold-Silver
No Grub Creek
Fairbanks district
ML 7362

**Leach, Clifford Jr. (EIR)**
102 Drake Mews
Sonoma, CA 95476
Gold-Silver
South Fork Fortymile River
Fortymile district
ML 9145

**Likins, David (EIR)**
PO Box 106
Eagle, AK 99738-0106
Gold-Silver
Fortymile River
Fortymile district
ML 6731

**Lines, Lester E. (EIR)**
PO Box 103820
Anchorage, AK 99510-3820
Gold-Silver
North Fork Harrison Creek
Circle district
ML 7332

**Little Eldorado Group (EIR)**
W.L. Shaffer
PO Box 80148
Fairbanks, AK 99708-0148
Gold-Silver
Little Eldorado Creek
Fairbanks district
ML 9094

**Longbotham, Roy E. III (SWR)**
PO Box 751
Bethel, AK 99559
Gold
Murray Creek
Bethel district
ML 5726

**Losonsky, Steve (EIR)**
PO Box 80321
Fairbanks, AK 99708-0321
Gold-Silver
Hunter Creek
Rampart district
ML 7328

**Loud, Richard L. (EIR?)**
PO Box 10570
Fairbanks, AK 99710-0570
Unknown commodity
Unknown district
ML 6006

**Lounsbury Mining Inc. (NR)**
PO Box 70983
Fairbanks, AK 99707-0983
Gold-Antimony
Union Gulch
Koyukuk-Nolan district
ML 99097

**Lucky Seven Mining Co. (EIR)**
Ron Roman
PO Box 71614
Fairbanks, AK 99707-1614
Gold-Silver
Last Chance Creek
Fairbanks district
ML 9105

**Luhrs, James Jr. (SCR)**
333 Lake Shore Drive #8
Anchorage, AK 99517
Gold-Silver
Alfred Creek
Nelchina district
ML 5692

**Martin, Edward D., Jr. (SCR)**
PO Box 521
Cooper Landing, AK 99572
Gold-Silver
Hargood Creek
Hope-Sunrise district
ML 5076

**Mascott Mining Inc. (NR)**
PO Box 264
Ridgway, CO 81432
Gold
Hammond River
Koyukuk-Nolan district
ML 5843

**Mason, Arnold J. (EIR)**
PO Box 140467
Anchorage, AK 99514
Gold
North Creek
Cache district
ML 5516

**Matter, Mark (SWR)**
PO Box 44
Aniak, AK 99557-0044
Gold-Silver
Marvel Creek
Aniak-Tuluksak district
ML 5617

**Maxwell, Leslie or Barbara (EIR)**
3910 Loc Sault Ave.
Anchorage, AK 99516
Gold-Silver
Canyon Creek
Fortymile district
ML 6344

**McPherson, Roger (EIR)**
1042 Gilmore St.
Fairbanks, AK 99701
Gold-Antimony
Hattie Creek
Fairbanks district
ML 7015 & 9380

**Mercer, Jerry (WR)**
3230 E. Flamingo #291
Las Vegas, NV 89121
Gold-Silver
Little Boulder
Cape Nome district
ML 9344

**Merrill, Ivan (SCR)**
PO Box 3503
Seward, AK 99664
Unknown commodity
Unknown district
ML 5670

**Metco Inc. (SCR)**
HCR 64 Box 300
Seward, AK 99664
Gravel
Homer district
ML 99016

**Miller, Lawrence (NG)**
PO Box 182
Healy, AK 99743
Unknown commodity
Unknown district
ML 9372

**Millie Creek Mine (SWR)**
Daniel C. Herman
PO Box 86
Red Devil, AK 99656
Gold
Millie Creek
Aniak district
ML 99085

**Minex International Inc. (NG)**
PO Box 103
Girdwood, AK 99587-0103
Unknown commodity
Unknown district
ML 5006

**Misco-Walsh Mining Co. (SWR)**
General Delivery
Flat, AK 99584
Gold-Tungsten
Otter Creek, Golden Horn Lode
Iditarod district
ML 5504

**Mitchell, Harold (EIR)**
PO Box 65
Chicken, AK 99732-0065
Gold-Silver
Mosquito Fork
Fortymile district
ML 7282

**Montogomery, Melvin or Lois (EIR)**
6028 Mackay
Anchorage, AK 99518
Gold-Silver
Gilliand Creek
Fortymile district
ML 9168

**Monzulla, Vincent C. (EIR)**
2920 Monzulla Ln.
Fairbanks, AK 99712
Gold-Tungsten
Victoria Creek
Fairbanks district
ML 625

**Moore, Roger (EIR)**
288 Rambling Rd.
Fairbanks, AK 99712
Gold-Silver
Ester Creek
Fairbanks district
ML 9331

**Morgan, Tom (EIR)**
842 Poirier St.
Coq, BC V3J 6C2
Canada
Gold
McCord Creek
Fairbanks district
ML 5893

**Mrak, William (SCR)**
PO Box 1963
Palmer, AK 99645-1963
Gold
Willow & Grubstake creeks
Hatcher Pass district
ML 6220

**Mullikin, Christopher L. (WR)**
PO Box 790
Homer, AK 99603-0790
Gold-Silver
Boulder & Turner creeks
Kougarok district
ML 9061

**Mullikin, Dan (WR)**
PO Box 790
Homer, AK 99603-0790
Gold-Silver
Noxpaga & Boulder creeks
Kougarok district
ML 7271

**Munsell, James L. (EIR)**
PO Box 81155
Fairbanks, AK 99708-1155
Gold-Silver
Little Minook Jr.
Rampart district
ML 5862

**NB Tweet & Sons (WR)**
PO Box 1107
Nome, AK 99762-1107
Gold-Silver
Kougarok River
Kougarok district
ML 5845

**N-R Enterprises (SCR)**
Carol R. Neeley
PO Box 88
Glennallen, AK99588
Gravel
Nelchina district
ML 99072

**Neitz, Frank (SWR)**
PO Box 7002
Bethel, AK 99559
Gold-Silver
Murray & New York creeks
Aniak-Tuluksuk district
ML 6156

**Nevers, Harold A. (EIR)**
8148 Pinewood Dr.
Juneau, AK 99801
Gold-Silver
American Creek
Hot Springs district
ML 7284

**Newmont Exploration Ltd. (EIR)**
1818
Fairbanks, AK 99712
Gold-Silver
Dome & Little Eldorado creeks
Fairbanks district
ML 7522

**Nicholson, Doug & Peter Frantz (NR)**
3865 Ullrbahn
Fairbanks, AK 99709
Gold-Silver
Linda Creek
Koyukuk district
ML 9080

**Nordeen, William H. (NR)**
PO Box 9013
Fairbanks, AK 99701-9013
Gold-Silver
Emma Creek
Koyukuk-Nolan district
ML 7372

**Northern Lights Mining Inc. (SCR)**
PO Box 1110
Cedar City, UT 84720-1110
Gold
Jay Creek
Valdez Creek district
ML 9244

**Nova Natural Resources Corp. (WR)**
PO Box 481388
Denver, CO 80248-1388
Gold-Silver
Cape Nome district
ML 9092

**Nyac Mining Co. (SWR)**
Tuluksak Dredging Ltd.
415 8th Ave.
Anchorage, AK 99501
Gold-Silver
Bear Creek
Aniak-Tuluksak district
ML 5641

**O'Brien-Gunn, Fritz (EIR)**
PO Box 821
Orland, CA 95963
Gold-Silver
South Forth Fortymile
Fortymile district
ML 9385

**O'Donnell, Franklin L. Jr. (EIR)**
7110 Canaday Rd.
Salcha, AK 99714
Gold-Silver
Moose Creek
Bonnifield district
ML 8978

**Okanogan Gold Co. (SCR)**
PO Box 4879
Vancouver, WA 98662-4879
Gold-Silver
Maclaren River
Valdez Creek district
ML 5672

**Old Yeller Mine (SCR)**
Ralph Simonson
72382 Palmer Jct. Rd.
Elgin, OR 97827
Gold-Silver
Surprise Creek
Valdez Creek district
ML 6736

**Oliver, Jim (NR)**
2208 Eureka #9
Anchorage, AK 99503
Gold-Silver
Big Creek
Chandalar district
ML 5647

**Olson, Alan G. (WR)**
PO Box 165
Palmer, AK 99645-0165
Gold-Silver
Candle Creek
Candle district
ML 6219

**Olson, Gordon E. (EIR)**
7100 N. Milford Rd.
Holly, MI 48442
Gold-Silver
Jack Wade Creek
Fortymile district
ML 5923

**Olson, Stephen G. (EIR)**
PO Box 106
Tok, AK 99780-0106
Gold-Silver
Liberty Creek
Fortymile district
ML 5883

**Olson, Steven L. (EIR)**
PO Box 10655
Fairbanks, AK 99712-0655
Gold-Silver
Eagle Creek
Fortymile district
ML 6925

**Omega Mining Co. (EIR)**
Richard Ott
PO Box 72748
Fairbanks, AK 99707
Gold-Silver
Omega Creek
Fortymile district
ML 9062

**Oudekerk, James A. (EIR)**
PO Box 351
Healy, AK 99743-0351
Gold-Silver
Rex Creek
Bonnifield district
ML 9353

**Owen, Ted (EIR)**
12307 E. Stillwater
Redding, CA 96003
Gold-Silver
Walker Fork
Fortymile district
ML 9039

**Parson, Anthony C. (WR)**
PO Box 1496
Nome, AK 99762
Gold
Iron Creek
Kougarok district
ML 9033

**Patrick Mike (EIR)**
2015 S. Main St.
Corona, CA 91720
Gold-Silver
Fortymile
Fortymile district
ML 9337

**Paul & Co. (EIR)**
PO Box 83102
Fairbanks, AK 99708
Gold-Silver
Frying Pan Creek
Circle district
ML 9167

**Penz, Dave (SWR)**
PO Box 29
Russian Mission, AK 99657
Gold
Buster Creek
Marshall district
ML 6216

**Pharis, Michael & Jim Olmstead (NR)**
3410 Tileson Way
North Pole, AK 99705
Gold-Silver
Gold Creek
Koyukuk-Nolan district
ML 9403

**Philpott, Roy (EIR)**
PO Box 72198
Fairbanks, AK 99707-2198
Gold-Silver
Smith Creek
Koyukuk-Nolan district
ML 5830

**Plano, Dan and Cindy (SWR)**
PO Box 878275
Wasilla, AK 99687-8275
Gold-Silver
Anvil Creek/Innoko River
Innoko district
ML 5570

**Polar Mining Inc. (EIR)**
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold-Silver
Goldstream Creek
Fairbanks district
ML 9428

**Polar Mining Inc. (EIR)**
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold-Silver
Goldstream Creek
Fairbanks district
ML 7278

**Porter, James E. (NG)**
PO Box 892
Craig, AK 99921-0892
Unknown commodity
Unknown district
ML 5713

**Prince Creek Mining Co. (SWR)**
PO Box 2791
Palmer, AK 99645-2791
Gold-Silver
Prince Creek
Iditarod district
ML 6092

**Quartz Creek Exploration Co. (SCR)**
Milo Floth
P.O Box 242
Sterling, AK 99672-0242
Gold-Silver
Quartz Creek
Hope district
ML 6208

**Read, Donald M. (EIR)**
PO Box 71638
Fairbanks, AK 99707-1638
Gold-Silver
Vault Creek Bench
Fairbanks district
ML 7293

**Red Samm Construction Inc. (SER)**
PO Box 3097
Bellevue, WA 98009-3097
Sand & Gravel
Lena Point, Juneau
Juneau district
ML 99073

**Redmond, Richard J. (NG)**
PO Box 8700
Indian, AK 99540-8700
Unknown commodity
Unknown district
ML 6366

**Reed, Scott, C. (EIR)**
PO Box 453
Crown King, AZ 86343
Gold-Silver
North Fork Fortymile
Fortymile district
ML 9387

**Regner, Leo A. (EIR)**
PO Box 72733
Fairbanks, AK 99707-2733
Gold-Silver
Lilliwig & Engle creeks
Fortymile district
ML 6037

**Renk, Russell (WR)**
641 W. 91st Ave.
Anchorage, AK 99515
Gold-Silver
Willow Creek
Solomon district
ML 5718

**Roberts, Robert W. (EIR)**
PO Box 225
Tok, AK 99780
Gold-Silver
Chicken Creek
Fortymile district
ML 7303

**Roberts, Roger L. (SWR)**
PO Box 7
Ophir-Takotna, AK 99675-0007
Gold-Silver
Ophir & Gold Run creeks
Innoko district
ML 8078

**Roop, John Sr. (EIR)**
9499 Brayton Dr., #22
Anchorage, AK 99507
Gold-Silver
Fortymile River
Fortymile district
ML 5974

**Rosander Mining Co. (WR)**
PO Box 129
McGrath, AK 99627-0129
Gold-Silver
Colorado Creek
Innoko district
ML 6806

**Rowallan Inc. (SCR)**
PO Box 318
Clam Gulch, AK 99568-0318
Gold-Silver
White & Valdez creeks
Valdez Creek district
ML 5552

**RSH Company (SER)**
Ralph Horecny
PO Box 211474
Auke Bay, AK 99821-1474
Sand & Gravel
Lemon Creek
Juneau district
ML 99014

**RSH Company (SER)**
Ralph Horecny
PO Box 211474
Auke Bay, AK 99821-1474
Sand & Gravel
Lemon Creek
Juneau district
ML 99015

**Rubel, John D. (EIR)**
8183 Richardson Hwy.
Salcha, AK 99714
Gold-Silver
Banner Creek
Richardson district
ML 7334

**Rybachek, Stanley C. (EIR)**
PO Box 55698
North Pole, AK 99705-5698
Gold-Silver
Tolovana River
Livengood-Tolovana district
ML 5912

**Salter & Associates Inc. (EIR)**
PO Box 30
Manley, AK 99756
Gold-Silver
Joe Bush Creek
Hot Springs district
ML 7067

**Sather, Norman M. (EIR)**
1213 Coppet St.
Fairbanks, AK 99709
Gold-Silver
Fairbanks Creek
Fairbanks district
ML 7112

**Saunders, Peter H. (NR)**
1475 Durango Trail
North Pole, AK 99705
Gold-silver
Nolan, Acme, & Archibald creeks
Koyukuk-Nolan district
ML 9426

**Sayer, Paul (SWR)**
PO Box 10
Homer, AK 99603-0010
Gold-Silver
Little Creek
Innoko district
ML 6233

**Schafer, Beatrice/Terry Russell (NG)**
PO Box 55074
North Pole, AK 99705-5074
Unknown commodity
Unknown district
ML 9390

**Schene, Earl L. (EIR)**
PO Box 66
Chicken, AK 99732-0066
Gold-Silver
Uhler Creek
Fortymile district
ML 6937

**Schnabel, John J. (SER)**
PO Box 149
Haines, AK 99827

Gold-Silver
Porcupine Creek
Porcupine district
ML 7401

**Scofield, Walter P. (EIR)**
PO Box 945
Tok, AK 99780-0945
Gold-Silver
South Fork Fortymile
Fortymile district
ML 7451

**Secon Inc. (SER)**
10505 NE 38th Pl.
Kirkland, WA 98033
Sand & Gravel
Lena Point
Juneau district
ML 99070

**Sencibaugh, Ronald D. (EIR)**
PO Box 771824
Eagle River, AK 99577
Gold-Silver
Mosquito Fork, Fortymile River
Fortymile district
ML 9383

**Seuffert, George Jr. (EIR)**
7705 Port Orford Dr.
Anchorage, AK 99516
Gold-Silver
Deadwood Creek
Circle district
ML 5872

**Seuffert, George Jr. (EIR)**
7705 Port Orford Dr.
Anchorage, AK 99516
Gold-Silver
Jack Wade Creek
Fortymile district
ML 9401

**Severson, Randy (NG)**
PO Box 624
Soldotna, AK 99669
Unknown commodity
Unknown district
ML 5723

**Shilling, John A. (EIR)**
PO Box 81424
Fairbanks, AK 99708-1424
Gold-Tin
Thanksgiving Creek
Hot Springs district
ML 7503

**Shorey, Timothy A. (NR)**
1272 Rangeview Rd.
North Pole, AK 99705
Gold-Silver
Gold Creek
Koyukuk-Nolan district
ML 9382

**Siks, Jan K. (EIR)**
PO Box 695
Northport, WA 99157-0695
Gold-Silver
South Fork Fortymile River
Fortymile district
ML 9183

**Silverado Mines (U.S.) Inc. (NR)**
PO Box 83730
Fairbanks, AK 99708-3730
Gold-Antinomy
Nolan Creek
Koyukuk-Nolan district
ML 7084

**Silverado Mines (U.S.) Inc. (EIR)**
PO Box 83730
Fairbanks, AK 99708-3730
Gold-Polymetallic
Upland areas
Fairbanks district
ML 7130, ML 9319

**Simpson, Brian (EIR)**
PO Box 119
Eagle, AK 99738-0119
Gold-Silver
American Creek
Fortymile district
ML 9422

**Sipes, John (EIR)**
2741 Perimeter Dr.
North Pole, AK 99705
Gold-Silver
Deadwood Creek
Circle district
ML 7387

**Skidmore, Sam C. (EIR)**
PO Box 70470
Fairbanks, AK 99707
Gold-Silver
Vault & Treasure creeks
Fairbanks district
ML 6732

**Skookum Mining (EIR)**
PO Box 10139
Fairbanks, AK 99710-0139
Gold-Silver
Portage Creek
Bonnifield district
ML 8875

**Slisco Inc. (SER)**
5151 Rose Valley rd.
Kelso, WA 98626
Gold-Silver
Porcupine Creek
Porcupine district
ML 5946

**Smith, Carl R. (EIR)**
PO Box 764
Tok, AK 99780
Gold-Silver
Eagle Creek
Fortymile district
ML 9058

**Smith, Robert L. (NG)**
729 W. Cucharras
Colorado Springs, CO 80905
Unknown commodity
Unknown district
ML 99083

**Smith, William L. (SCR)**
906 Cunningham St.
Anchorage, AK 99501
Gold-Silver
Silvertip Creek
Seward district
ML 6054

**Soule, Harold L. (SCR)**
2840 E. 142nd Ave.
Anchorage, AK 99516
Gold-Silver
Windy Creek
Valdez Creek district
ML 5560

**Sparks, James W. (EIR)**
2015 Shepherdia Dr.
Anchorage, AK 99508
Gold-Silver
Faith Creek
Circle district
ML 5940

**Stebbins Native Corp. (WR)**
PO Box 70110
Stebbins, AK 99671
Gravel, sand, & stone
Unidentified
Candle district
ML 99011

**Stec, Russell E./Larry Fine (WR)**
PO Box 940316
Houston, AK 99694-0316
Gold-Silver
East Fork Iron Creek
Solomon district
ML 6491

**Sternberg, Tom (NG)**
3154 E. 19th Ct.
Anchorage, AK 99508
Unknown commodity
Unknown district
ML 5725

**Stough, Richard B. (EIR)**
PO Box 711
Wrangell, AK 99929-0711
Gold-Silver
Dome Creek
Fairbanks district
ML 4277

**Stultz, Donald D. (EIR)**
PO Box 700
Nome, AK 99762
Gold-Silver
Oregon Creek
Cape Nome district
ML 5983

**Surf Food Products, Inc. (AP)**
7716 97th Ave. SW
Tacoma, WA 98498
Gravel-Rock
Kodiak district
ML 5731, ML 9404

**Surprise Mining Co. (SCR)**
Aubrey, Larson, Staggs
PO Box 11700
Chickaloon, AK 99674-1170
Gold-Silver
Glass Creek
Hatcher Pass district
ML 5727

**Swenson, Lloyd D. (EIR)**
1843 Bridgewater Dr.
Fairbanks, AK 99709
Gold-Silver
Slate Creek
Rampart district
ML 7343

**Swenson, Richard A. (EIR)**
PO box 16205
Two Rivers, AK 99716-6205
Gold-Silver
Doric Creek
Hot Springs district
ML 6872

**Tachik, Wayne H. (EIR)**
PO Box 3503
Soldotna, AK 99669-3503
Gold-Silver
Moose Creek
Bonnifield district
ML 6719

**Tachik, Wayne H. (EIR)**
PO Box 3503
Soldotna, AK 99669-3503
Gold-Silver
Eva Creek
Bonnifield district
ML 9193

**Taiga Mining Co. Inc. (WR)**
4740 E. 115th Ave.
Anchorage, AK 99516
Gold-Silver
Aloha Creek
Koyukuk-Hughes district
ML 9016

**Taiga Mining Co. Inc. (WR)**
4740 E. 115th Ave.
Anchorage, AK 99516
Gold-Silver

Clear Creek
Koyukuk-Hughes district
ML 9017

**Taiga Mining Co. Inc. (WR)**
4740 E. 115th Ave.
Anchorage, AK 99516
Gold-Silver
Bear & Ida creeks
Koyukuk-Hughes district
ML 9139

**Taiga Mining Co. Inc. (WR)**
4740 E. 115th Ave.
Anchorage, AK 99516
Gold-Silver
Dry Creek
Koyukuk-Hughes district
ML 9388

**Tallini, Roger P. (EIR)**
PO Box 3474
Flagstaff, AZ 86003-3474
Gold-Silver
South Fork Fortymile River
Fortymile district
ML 9028

**Taylor, Larry R. (EIR)**
PO Box 101
Eagle, AK 99738-0101
Gold-Silver
Fortymile River
Fortymile district
ML 9179

**The Gravel Station (SCR)**
PO Box 3489
Palmer, AK 99645-3489
Sand & Gravel
The Pippel Pit
Hatcher Pass district
ML 99012

**The Gravel Station (SCR)**
Turner
PO Box 3489
Palmer, AK 99645-3489
Sand & Gravel
Hornung Property
Hatcher Pass district
ML 99013

**Thompson, Kevin (SCR)**
PO Box 875534
Wasilla, AK 99687-5534
Gold-Silver
Gold Hill above White Creek
Valdez Creek district
ML 5729

**Thompson, Kevin (SCR)**
PO Box 875534
Wasilla, AK 99687-5534
Gold-Silver
Roosevelt Creek
Valdez Creek district
ML 5634

**Thurman Oil & Mining Inc. (EIR)**
925 Aurora Dr.
Fairbanks, AK 99709
Gold-Silver
Rhode Island Creek
Hot Springs district
ML 9125

**Thurman Oil & Mining Inc. (WR)**
925 Aurora Dr.
Fairbanks, AK 99709
Gold-Silver
Boulder Creek
Cape Nome district
ML 9394

**Thurman Oil & Mining Inc. (SCR?)**
925 Aurora Dr.
Fairbanks, AK 99709
Gold-Silver
Eldorado Creek
Valdez Creek district (?)
ML 9397

**Thurman Oil & Mining Inc. (EIR)**
925 Aurora Dr.
Fairbanks, AK 99709
Gold-Tin
Woodchopper Creek
Hot Springs district
ML 9188

**Thurman Oil & Mining Inc. (WR)**
925 Aurora Dr.
Fairbanks, AK 99709
Gold-Silver
Quartz 7 & Dahl creeks
Candle district
ML 9398

**Tileson Mining (EIR)**
PO Box 55823
North Pole, AK 99705-5823
Gold-Silver
California Creek
Bonnifield district
ML 9192

**Toohey, Cynthia (SCR)**
PO Box 113
Girdwood, AK 99587-0113
Gold-Silver
Crow Creek
Anchorage district
ML 5564

**Trautner, John James (SCR)**
PO Box 909
Girdwood, AK 99587
Gold-Silver
Canyon Creek
Hope-Sunrise district
ML 6417

**Treesh, James W. (SCR)**
18550 Man'O'War Rd.
Eagle River, AK 99577
Gold-Silver
No Name & Cherry creeks
Hope-Sunrise district
ML 5954

**Treesh, James W. (SCR)**
18550 Man'O'War Rd.
Eagle River, AK 99577
Gold-Silver
No Name Creek
Hope-Sunrise district
ML 9384

**Treesh, James W. (SCR)**
18550 Man'O'War Rd.
Eagle River, AK 99577
Gold-Silver
Canyon Creek
Hope-Sunrise district
ML 9386

**Tri-Con Mining Inc. (EIR)**
PO Box 83730
Fairbanks, AK 99708
Gold
Marshall Gulch
Fairbanks district
ML 9375

**Trinity Mining (WR)**
Cheryl Jong
PO Box 372
Kotzebue, AK 99752-0372
Gold-Silver
Washington Creek
Kougarok district
ML 5844

**TruDeck Mining (EIR)**
PO Box 135
Healy, AK 99743-0135
Polymetallic
Sheep Creek
Bonnifield district
ML 9369

**Usibelli Coal Mine Inc. (EIR)**
PO Box 1000
Healy, AK 99743
Coal
Gold Run Pass Mine
Bonnifield district
ML 99001

**Usibelli Coal Mine Inc. (EIR)**
PO Box 1000
Healy, AK 99743
Coal
Poker Flats Mine
Bonnifield district
ML 99071

**Vander Wal, Jon K. (EIR)**
HC Box 3100
Healy, AK 99743
Gold-Silver
Thistle Creek
Bonnifield district
ML 9198

**Voytilla, Earl W. (EIR)**
PO Box 58901
Fairbanks, AK 99713
Gold-Silver
Tenderfoot
Richardson district
ML 5868

**Voytilla, Earl W. (EIR)**
PO Box 58211
Fairbanks, AK 99711
Gold-Silver
Buckeye
Richardson district
ML 9334

**Walton, Ross (EIR)**
1247 Hartzog Lp.
North Pole, AK 99705
Gold-Silver
Dome Creek
Fairbanks district
ML 5847

**Watts, Donald (EIR)**
PO Box 81515
Fairbanks, AK 99708
Gold-Silver
Grubstake Creek
Bonnifield district
ML 5865

**Weathers, Douglas & Edith (SCR)**
PO Box 8082
Nikiski, AK 99635-8082
Gold-Silver
Cache Creek
Yentna district
ML 6209

**Western Artic Mining (WR)**
PO Box 543
Nome, AK 99762-0543
Gold
Dome & Iron creeks
Solomon district
ML 9053

**Wicken, James T. (NR)**
1709 Central Ave.
Fairbanks, AK 99709
Gold
Gold Creek
Koyukuk-Nolan district
ML 5947

**Wiggers, Dan A. (NR)**
HC 30 Box 5283
Wasilla, AK 99654-5382
Gold-Silver
Hammond River
Koyukuk-Nolan district
ML 6859

**Wilde, Jim & Lore (EIR)**
PO Box 30068
Central, AK 99730
Gold-Silver
Switch Creek
Circle district
ML 5998

**Wilder, Richard (EIR)**
117 Elray St.
Fairbanks, AK 99709
Gold-Silver
Little Boulder
Hot Springs district
ML 5939

**Wilkinson, Fred D. (EIR)**
PO Box 1
Central, AK 99730
Gold-Silver
Ketchem Creek
Circle district
ML 5997

**Willard, Gerald L. (NG)**
PO Box 875532
Wasilla, AK 99687
Unknown commodity
Unknown district
ML 5724

**Williams, Ann J. (SWR)**
1908 W. Hillcrest Dr., #5
Anchorage, AK 99517
Gold-Silver
Granite Creek
Iditarod district
ML 6601

**Willis, Dean L. (EIR)**
PO Box 30063
Central, AK 99730-0063
Gold-Silver
Crooked Creek
Circle district
ML 5929

**Wise, Kenneth G. (EIR)**
PO Box 212313
Anchorage, AK 99521
Gold-Silver
Mosquito Fork
Fortymile district
ML 6412

**Wolff, Gordon C. (SCR)**
618 W. 86th Ct.
Anchorage, AK 99515
Gold-Silver
Peters Creek
Yentna-Cache Creek district
ML 8083

**Wood, James (WR)**
PO Box 58597
Fairbanks, AK 99711-8597
Gold-Silver
Little Boulder Creek
Cape Nome district
ML 6953

**Woodruff, Charles B. (NG)**
PO Box 2278
Fairbanks, AK 99707-2278
Unknown commodity
Unknown district
ML 6793

**Wrede, Ron (EIR)**
2116 NE 80
Seattle, WA 98115
Gold-Silver
Switch Creek
Circle district
ML 9049

**Wright, Richard L. (NR)**
3410 Tileson Way
North Pole, AK 99705
Gold-Silver
Gold Creek
Koyukuk-Nolan district
ML 9085

**Wright, Robert P. (EIR)**
PO Box 60783
Fairbanks, AK 99706-0783
Gold-Silver
Last Chance Creek
Fairbanks district
ML 9155

**Yellow Eagle Mining Inc. (EIR)**
PO Box 80566
Fairbanks, AK 99708
Gold-Silver
Ester & Cripple creeks
Fairbanks district
ML 9127

**Young, Jeff (SCR)**
HC 03 8106
Palmer, AK 99645
Gold-Silver
Caribou Creek
Nelchina district
ML 5733

**Zimmer, George W. (WR)**
PO Box 140174
Anchorage, AK 99514-0174
Gold-Silver
Quartz Creek
Koyukuk district
ML 5555

**Zimmerman, Charles J. (EIR)**
PO Box 41
Manley Hot Springs, AK 99756
Gold-Silver
Kilarney Creek
Hot Springs district
ML 9392

**Zimmerman, J.D. (EIR)**
PO Box 12
Manley Hot Springs, AK 99756
Gold-Silver
Tanawanda (off stream)
Hot Springs district
ML 7051

# APPENDIX D
## Primary metals production in Alaska, 1880-1996[a]

| Year | Gold | | Silver | | Mercury | | Antimony | | Tin | | Lead | | Zinc | | Platinum | | Copper | | Chromium | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (oz) | (m$) | (oz) | (t$) | (flask[b]) | (t$) | (lb) | (t$) | (lb) | (t$) | (tons) | (t$) | (tons) | (t$) | (oz) | (t$) | (lb) | (m$) | (tons) | (t$) |
| 1880-1899 | 1,153,889 | 23.85 | 496,101 | 329.0 | -- | -- | -- | -- | -- | -- | 250 | 17.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1900 | 395,030 | 8.17 | 73,300 | 45.5 | -- | -- | -- | -- | -- | -- | 40 | 3.4 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1901 | 335,369 | 6.93 | 47,900 | 28.6 | -- | -- | -- | -- | -- | -- | 40 | 3.4 | -- | -- | -- | -- | 250,000 | 0.04 | -- | -- |
| 1902 | 400,709 | 8.28 | 92,000 | 48.5 | -- | -- | -- | -- | 30,000 | 8.0 | 30 | 2.5 | -- | -- | -- | -- | 360,000 | 0.04 | -- | -- |
| 1903 | 420,069 | 8.68 | 143,600 | 77.8 | -- | -- | -- | -- | 50,000 | 14.0 | 30 | 2.5 | -- | -- | -- | -- | 1,200,000 | 0.16 | -- | -- |
| 1904 | 443,115 | 9.16 | 198,700 | 114.9 | -- | -- | -- | -- | 28,000 | 8.0 | 30 | 2.5 | -- | -- | -- | -- | 2,043,586 | 0.28 | -- | -- |
| 1905 | 756,101 | 15.63 | 132,174 | 80.2 | -- | -- | -- | -- | 12,000 | 4.0 | 30 | 2.6 | -- | -- | -- | -- | 4,805,236 | 0.75 | -- | -- |
| 1906 | 1,066,030 | 22.04 | 203,500 | 136.4 | -- | -- | -- | -- | 68,000 | 38.6 | 30 | 3.4 | -- | -- | -- | -- | 5,871,811 | 1.13 | -- | -- |
| 1907 | 936,043 | 19.35 | 149,784 | 98.8 | -- | -- | -- | -- | 44,000 | 16.8 | 30 | 3.2 | -- | -- | -- | -- | 6,308,786 | 1.26 | -- | -- |
| 1908 | 933,290 | 19.29 | 135,672 | 71.9 | -- | -- | -- | -- | 50,000 | 15.2 | 40 | 3.4 | -- | -- | -- | -- | 4,585,362 | 0.61 | -- | -- |
| 1909 | 987,417 | 20.41 | 147,950 | 76.9 | -- | -- | -- | -- | 22,000 | 7.6 | 69 | 5.9 | -- | -- | -- | -- | 4,124,705 | 0.54 | -- | -- |
| 1910 | 780,131 | 16.13 | 157,850 | 85.2 | -- | -- | -- | -- | 20,000 | 8.3 | 75 | 6.6 | -- | -- | -- | -- | 4,241,689 | 0.54 | -- | -- |
| 1911 | 815,276 | 16.85 | 460,231 | 243.9 | -- | -- | -- | -- | 122,000 | 52.8 | 51 | 4.5 | -- | -- | -- | -- | 27,267,778 | 3.40 | -- | -- |
| 1912 | 829,436 | 17.14 | 515,186 | 316.8 | -- | -- | -- | -- | 260,000 | 119.6 | 45 | 4.1 | -- | -- | -- | -- | 29,230,491 | 4.82 | -- | -- |
| 1913 | 755,947 | 15.63 | 362,563 | 218.9 | -- | -- | -- | -- | 100,000[c] | 44.1[c] | 6 | 0.6 | -- | -- | -- | -- | 21,659,958 | 3.35 | -- | -- |
| 1914 | 762,596 | 15.76 | 394,805 | 218.3 | -- | -- | -- | -- | 208,000 | 66.6 | 28 | 1.3 | -- | -- | -- | -- | 21,450,628 | 2.85 | -- | -- |
| 1915 | 807,966 | 16.70 | 1,071,782 | 543.3 | -- | -- | 520,000 | W | 204,000 | 78.8 | 437 | 41.1 | -- | -- | -- | -- | 86,509,312 | 15.14 | -- | -- |
| 1916 | 834,068 | 17.24 | 1,379,171 | 907.4 | -- | -- | 1,200,000 | W | 278,000 | 121.0 | 820 | 113.2 | -- | -- | 8 | 0.7 | 119,654,839 | 29.50 | -- | -- |
| 1917 | 709,049 | 14.66 | 1,239,150 | 1,020.6 | -- | -- | 500,000 | W | 200,000 | 123.3 | 852 | 146.6 | -- | -- | 53 | 5.5 | 88,793,400 | 24.40 | 1,100 | W |
| 1918 | 458,641 | 9.48 | 847,789 | 847.8 | -- | -- | 540,000 | W | 136,000 | 118.0 | 564 | 80.1 | -- | -- | 284 | 36.6 | 69,224,951 | 17.10 | 1,100 | W |
| 1919 | 455,984 | 9.42 | 629,708 | 705.3 | -- | -- | -- | -- | 112,000 | 73.4 | 687 | 72.1 | -- | -- | 569 | 73.7 | 47,220,771 | 8.80 | -- | -- |
| 1920 | 404,683 | 8.37 | 953,546 | 1,039.7 | -- | -- | -- | -- | 32,000 | 16.1 | 875 | 140.0 | -- | -- | 1,478 | 160.1 | 70,435,363 | 13.00 | -- | -- |
| 1921 | 390,558 | 8.07 | 761,085 | 761.1 | 45 | 1.5 | -- | -- | 8,000 | 2.4 | 759 | 68.3 | -- | -- | 40 | 2.7 | 57,011,597 | 7.40 | -- | -- |
| 1922 | 359,057 | 7.42 | 729,945 | 729.9 | -- | -- | -- | -- | 2,800 | 0.9 | 377 | 41.5 | -- | -- | 29 | 2.8 | 77,967,819 | 10.50 | -- | -- |
| 1923 | 289,539 | 5.98 | 814,649 | 668.1 | -- | -- | -- | -- | 3,800 | 1.6 | 410 | 57.4 | -- | -- | -- | -- | 85,920,645 | 12.60 | -- | -- |
| 1924 | 304,072 | 6.29 | 669,641 | 448.6 | 2 | 0.3 | -- | -- | 14,000 | 7.1 | 631 | 100.9 | -- | -- | 28 | 2.6 | 74,074,207 | 9.70 | -- | -- |
| 1925 | 307,679 | 6.36 | 698,259 | 482.4 | 44 | 3.6 | W | W | 28,600 | 15.4 | 789 | 140.6 | -- | -- | 10 | 1.2 | 73,055,298 | 10.30 | -- | -- |
| 1926 | 324,450 | 6.70 | 605,190 | 377.0 | 22 | 1.7 | W | W | 16,000 | 10.4 | 778 | 124.4 | -- | -- | 3,570 | 274.5 | 67,778,000 | 9.49 | -- | -- |
| 1927 | 286,720 | 5.97 | 350,430 | 215.0 | -- | -- | -- | -- | 53,400 | 34.0 | 1,008 | 127.0 | -- | -- | -- | -- | 55,343,000 | 7.25 | -- | -- |
| 1928 | 331,140 | 6.85 | 351,730 | 187.0 | -- | -- | -- | -- | 82,000 | 41.0 | 1,019 | 118.0 | -- | -- | 120 | 9.0 | 41,421,000 | 5.96 | -- | -- |
| 1929 | 375,438 | 7.76 | 472,900 | 252.0 | 4 | 0.5 | -- | -- | 77,200 | 35.0 | 1,315 | 166.0 | -- | -- | 475 | 32.0 | 40,570,000 | 7.13 | -- | -- |
| 1930 | 408,983 | 8.47 | 408,570 | 157.3 | -- | -- | -- | -- | 29,400 | 9.3 | 1,365 | 136.5 | -- | -- | -- | -- | 32,651,000 | 4.24 | -- | -- |
| 1931 | 459,000 | 9.51 | 352,000 | 102.0 | 15 | 1.2 | -- | -- | 8,200 | 2.0 | 1,660 | 126.0 | -- | -- | 393 | 14.0 | 22,614,000 | 1.88 | -- | -- |
| 1932 | 493,860 | 10.20 | 234,050 | 66.0 | 8 | 0.5 | -- | -- | -- | -- | 1,260 | 75.6 | -- | -- | -- | -- | 8,738,500 | 0.55 | -- | -- |
| 1933 | 469,286 | 9.70 | 154,700 | 55.0 | -- | -- | -- | -- | 5,800 | 2.3 | 1,157 | 85.6 | -- | -- | 605 | 18.6 | 29,000 | 0.02 | -- | -- |
| 1934 | 537,281 | 8.78 | 154,700 | 100.0 | -- | -- | -- | -- | 8,200[c] | 4.3 | 839 | 62.1 | -- | -- | 2,555 | 85.6 | 121,000 | 0.06 | -- | -- |
| 1935 | 469,495 | 16.43 | 286,600 | 206.0 | -- | -- | -- | -- | 98,800 | 49.8 | 815 | 65.2 | -- | -- | 8,685 | 259.6 | 15,056,000 | 1.25 | -- | -- |
| 1936 | 540,580 | 18.92 | 484,306 | 375.0 | -- | -- | -- | -- | 226,000 | 105.0 | 941 | 86.6 | -- | -- | 5,654 | 241.9 | 39,267,000 | 3.72 | -- | -- |
| 1937 | 627,940 | 21.98 | 494,340 | 382.0 | -- | -- | 962,000 | 147.6 | 372,000[c] | 202.3[c] | 823 | 97.1 | -- | -- | 9,823 | 313.4 | 36,007,000 | 4.74 | -- | -- |
| 1938 | 662,000 | 23.17 | 479,853 | 310.0 | 8 | 0.6 | 444,000 | 54.8 | 210,000 | 89.1 | 994 | 91.5 | -- | -- | 41,000 | 2,460.0 | 29,760,000 | 2.98 | -- | -- |
| 1939 | 676,780 | 23.68 | 201,054 | 136.5 | -- | -- | 210,000 | 25.9 | 66,000 | 38.0 | 937 | 88.1 | -- | -- | 33,900 | 2,034.0 | 278,500 | 0.04 | -- | -- |
| 1940 | 755,900 | 26.45 | 191,679 | 136.3 | 156[c] | 130.9 | 306,000 | 42.8 | 92,000 | 52.0 | 840 | 72.0 | -- | -- | 28,886 | 1,093.0 | 110,000 | 0.02 | -- | -- |
| 1941 | 692,314 | 24.23 | 199,700 | 142.0 | W | W | 774,000 | 87.3 | 93,600[c] | 61.0[c] | 742 | 58.0 | -- | -- | 22,630 | 813.0 | 144,000 | 0.02 | -- | -- |
| 1942 | 487,657 | 17.07 | 135,200 | 96.0 | W | W | 316,000 | 41.0 | 5,600 | 2.5 | 523 | 44.0 | -- | -- | 22,000 | 779.0 | 48,000 | 0.01 | -- | -- |
| 1943 | 99,583 | 3.49 | 31,700 | 22.0 | 786 | 153.4 | 368,000 | 33.3 | 2,000[c] | 1.0[c] | 200 | 22.0 | -- | -- | 27,900 | 1,020.0 | 54,000 | 0.01 | 5,564 | 186.3 |
| 1944 | 49,296 | 1.73 | 15,240 | 10.8 | 841 | 165.0 | 70,080 | 30.0 | -- | -- | 44 | 5.8 | -- | -- | 33,616 | 2,017.0 | 4,000 | 0.01 | 1,845 | 64.6 |
| 1945 | 68,117 | 2.38 | 9,983 | 6.2 | 275 | 180.0 | W | W | -- | -- | 11 | 1.8 | -- | -- | 22,949 | 1,377.0 | 10,000 | 0.01 | -- | -- |
| 1946 | 226,781 | 7.93 | 41,793 | 26.3 | 699 | 68.7 | W | W | -- | -- | 115 | 25.0 | -- | -- | 22,882 | 1,418.7 | 4,000 | 0.01 | -- | -- |
| 1947 | 279,988 | 9.79 | 66,150 | 46.3 | 127 | 10.6 | 52,000 | 16.1 | 2,000 | 2.2 | 255 | 76.5 | 226 | 0.15 | 13,512 | 1,351.2 | 24,000 | 0.06 | -- | -- |
| 1948 | 248,395 | 8.69 | 67,341 | 58.7 | 108 | 7.8 | 88,000 | 29.3 | 10,000 | 10.8 | 317 | 88.9 | 226 | 0.15 | 13,741 | 1,209.2 | 28,000 | 0.07 | -- | -- |
| 1949 | 229,416 | 8.03 | 36,056 | 32.4 | 102 | 7.9 | 88,000 | 31.3 | 114,000 | 100.8 | 49 | 11.2 | 226 | 0.15 | 17,169 | 1,545.2 | 7,700 | 0.02 | -- | -- |

## APPENDIX D
## continued

| Year | Gold (oz) | Gold (m$) | Silver (oz) | Silver (t$) | Mercury (flask[b]) | Mercury (t$) | Antimony (lb) | Antimony (t$) | Tin (lb) | Tin (t$) | Lead (tons) | Lead (t$) | Zinc (tons) | Zinc (t$) | Platinum (oz) | Platinum (t$) | Copper (lb) | Copper (m$) | Chromium (tons) | Chromium (t$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 289,285 | 10.13 | 52,638 | 48.0 | W | W | W | W | 158,000 | 170.3 | 144 | 27.5 | -- | -- | W | W | 12,000 | 0.03 | -- | -- |
| 1951 | 239,628 | 8.38 | 32,870 | 29.8 | 28 | W | 1,718,000 | 2,061.6 | 138,000 | 198.0 | 21 | 7.2 | -- | -- | W | W | 2,000 | 0.01 | -- | -- |
| 1952 | 240,571 | 8.42 | 31,825 | 28.7 | 40 | W | 740,000 | 1,406.0 | 180,000 | 243.9 | 1 | 0.3 | -- | -- | W | W | -- | -- | W | W |
| 1953 | 253,771 | 8.88 | 35,387 | 32.1 | 1,023 | 270.0 | W | W | 98,000 | 105.9 | -- | -- | -- | -- | 17,489 | 1,696.4 | -- | -- | W | W |
| 1954 | 248,511 | 8.70 | 33,694 | 31.8 | 1,046 | 276.0 | -- | -- | 398,000 | 409.9 | -- | -- | -- | -- | 18,790 | 1,615.9 | 8,000 | 0.02 | 2.953 | 208.0 |
| 1955 | 249,294 | 8.73 | 33,693 | 30.4 | 43 | 12.0 | -- | -- | 172,000 | 182.5 | 1 | 0.3 | -- | -- | 17,253 | 1,466.5 | 2,000 | 0.01 | 7,082 | 625.3 |
| 1956 | 204,300 | 7.33 | 26,700 | 24.1 | 3,414 | 837.0 | 134,400 | 150.0 | -- | -- | 1 | 0.3 | -- | -- | 17,934 | 1,829.3 | -- | -- | 7,200 | 711.5 |
| 1957 | 215,467 | 7.54 | 28,862 | 26.0 | 5,461 | 1,349.0 | 71,120 | 80.0 | -- | -- | 9 | 3.0 | -- | -- | 15,479 | 1,377.6 | -- | -- | 4,207 | 431.0 |
| 1958 | 186,000 | 6.53 | 24,000 | 22.0 | 3,380 | 774.0 | -- | -- | -- | -- | -- | -- | -- | -- | 10,284 | 647.9 | 10,000 | 0.03 | -- | -- |
| 1959 | 171,000 | 5.99 | 22,000 | 20.0 | 3,750 | 852.0 | -- | -- | -- | -- | -- | -- | -- | -- | 10,698 | 770.3 | 72,000 | 0.04 | -- | -- |
| 1960 | 180,000 | 6.30 | 23,000 | 21.0 | 4,450 | 938.0 | W | W | -- | -- | -- | -- | -- | -- | 13,352 | 1,054.8 | 82,000 | 0.04 | -- | -- |
| 1961 | 114,228 | 3.99 | -- | -- | 4,080 | 816.0 | -- | -- | -- | -- | -- | -- | -- | -- | 16,133 | 1,274.5 | 184,000 | 0.06 | -- | -- |
| 1962 | 165,142 | 5.78 | -- | -- | 3,843 | 711.0 | -- | -- | -- | -- | -- | -- | -- | -- | 12,520 | 951.5 | -- | -- | -- | -- |
| 1963 | 99,000 | 3.48 | 6,100 | 9.0 | 400 | 76.0 | W | W | -- | -- | 5 | 1.1 | -- | -- | 12,322 | 961.1 | -- | -- | -- | -- |
| 1964 | 58,000 | 2.05 | 7,200 | 6.0 | 303 | 95.0 | 46,400 | 60.3 | -- | -- | -- | -- | -- | -- | 13,010 | 1,522.2 | 22,000 | 0.01 | -- | -- |
| 1965 | 43,000 | 1.51 | 5,000 | 6.0 | 180 | 104.0 | 46,400 | 60.3 | -- | -- | 14 | 4.0 | -- | -- | 10,365 | 1,368.2 | 64,000 | 0.03 | -- | -- |
| 1966 | 27,325 | 0.96 | 7,000 | 9.0 | 185 | 101.0 | 16,000 | 19.2 | -- | -- | 19 | 4.3 | -- | -- | 9,033 | 1,273.7 | -- | -- | -- | -- |
| 1967 | 22,948 | 0.80 | 6,000 | 9.0 | 161 | 79.0 | 20,000 | 22.0 | -- | -- | -- | -- | -- | -- | 7,888 | 1,238.4 | W | W | -- | -- |
| 1968 | 21,000 | 0.81 | 3,000 | 6.5 | 156 | 78.0 | 6,000 | 6.0 | -- | -- | -- | -- | -- | -- | 8,433 | 1,652.9 | -- | -- | -- | -- |
| 1969 | 21,227 | 0.88 | 2,000 | 4.2 | 238 | 100.0 | 94,000 | 100.0 | -- | -- | 2 | 0.5 | -- | -- | 8,500 | 2,321.2 | -- | -- | -- | -- |
| 1970 | 38,400 | 1.38 | 4,000 | 7.0 | 3,100 | 1,260.0 | 365,000 | 410.0 | -- | -- | -- | -- | -- | -- | 6,015 | 925.1 | W | W | -- | -- |
| 1971 | 34,000 | 1.36 | 2,000 | 4.0 | 675 | 285.0 | 68,000 | 74.0 | 34,000 | 47.0 | -- | -- | -- | -- | 5,407 | 625.6 | -- | -- | -- | -- |
| 1972 | 8,639 | 0.56 | 1,000 | 2.0 | 125 | 44.0 | 160,000 | 185.0 | W | W | -- | -- | -- | -- | 6,478 | 985.5 | -- | -- | -- | -- |
| 1973 | 15,000 | 1.86 | 13,200 | 22.0 | 70 | 52.5 | 420,000 | 515.0 | 10,000 | 12.0 | 6 | 2.0 | -- | -- | 5,524 | 964.5 | -- | -- | -- | -- |
| 1974 | 16,000 | 2.56 | 1,500 | 3.5 | 70 | 52.5 | 80,000 | 95.0 | W | W | -- | -- | -- | -- | 4,351 | 1,067.0 | -- | -- | -- | -- |
| 1975 | 14,980 | 3.35 | 6,000 | 25.0 | -- | -- | 120,000 | 145.0 | 22,000 | 60.0 | -- | -- | -- | -- | 3,726 | 623.3 | -- | -- | -- | -- |
| 1976 | 22,887 | 6.90 | 6,500 | 24.0 | -- | -- | 160,000 | 165.0 | W | W | 14 | 6.0 | -- | -- | 3,212 | 515.2 | -- | -- | 8,000[c] | 1,200.0[c] |
| 1977 | 50,000 | 7.80 | 8,000 | 20.0 | -- | -- | W | W | W | W | -- | -- | -- | -- | 6,891 | 1,119.8 | -- | -- | -- | -- |
| 1978 | 60,000 | 12.00 | 6,000 | 50.0 | -- | -- | W | W | W | W | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1979 | 65,000 | 18.00 | 6,500 | 93.0 | -- | -- | 100,000 | 125.0 | 100,000 | 830.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1980 | 75,000 | 32.00 | 7,500 | 111.0 | -- | -- | -- | -- | 120,000 | 984.0 | 31 | 29.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1981 | 134,200 | 55.20 | 13,420 | 111.3 | W | W | -- | -- | 106,000 | 700.0 | -- | -- | -- | -- | 900 | 200.0 | -- | -- | -- | -- |
| 1982 | 175,000 | 69.90 | 22,000 | 198.0 | -- | -- | -- | -- | 198,000 | 1,365.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1983 | 169,000 | 67.60 | 33,200 | 332.0 | -- | -- | 22,400 | 45.0 | 215,000 | 1,100.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1984 | 175,000 | 62.13 | 20,000 | 159.0 | 5 | 1.5 | 135,000 | 225.8 | 225,000 | 400.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1985 | 190,000 | 61.18 | 28,500 | 171.0 | 27 | 10.0 | 65,000 | 98.0 | 300,000 | 650.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1986 | 160,000 | 60.80 | 24,000 | 134.4 | 12 | 2.8 | 45,000 | 67.5 | 340,000 | 890.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1987 | 229,707 | 104.51 | 54,300 | 391.0 | -- | -- | -- | -- | 288,000 | 460.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1988 | 265,500 | 112.84 | 47,790 | 282.0 | W | W | -- | -- | 300,000 | 950.0 | -- | -- | -- | -- | 25 | 13.8 | -- | -- | -- | -- |
| 1989 | 284,617 | 108.7 | 5,211,591 | 27,300.0 | -- | -- | -- | NR | 194,000 | 672.0 | 9,585 | 7,700.0 | 19,843 | 29,400.0 | -- | -- | -- | -- | -- | -- |
| 1990 | 231,700 | 89.20 | 10,135,000 | 50,675.0 | -- | -- | -- | -- | 57,000 | 200.0 | 44,220 | 30,954.0 | 181,200 | 253,680.0 | -- | -- | -- | -- | -- | -- |
| 1991 | 243,900 | 88.29 | 9,076,854 | 39,110.0 | | | | | 6,800 | 22.1 | 69,591 | 33,403.7 | 278,221 | 278,221.0 | 15 | 5.3 | -- | -- | -- | -- |
| 1992 | 262,530 | 88.46 | 9,115,755 | 34,913.0 | -- | -- | -- | -- | 1,500 | 5.9 | 68,664 | 31,585.0 | 274,507 | 301,957.7 | -- | -- | -- | -- | -- | -- |
| 1993 | 191,265 | 68.64 | 5,658,958 | 24,333.0 | -- | -- | -- | -- | 21,000 | 50.6 | 38,221 | 13,759.6 | 268,769 | 236,516.7 | 3 | 1.2 | -- | -- | -- | -- |
| 1994 | 182,100 | 70.29 | 1,968,000 | 10,391.0 | -- | -- | -- | -- | -- | -- | 36,447 | 25,512.9 | 329,003 | 296,102.7 | 5 | 2.1 | -- | -- | -- | -- |
| 1995 | 141,882 | 56.04 | 1,225,730 | 6,655.0 | -- | -- | -- | -- | -- | -- | 58,098 | 34,428.6 | 359,950 | 345,552.0 | 1 | 0.4 | -- | -- | -- | -- |
| 1996 | 161,565 | 62.62 | 3,676,000 | 19,078.0 | -- | -- | -- | -- | -- | -- | 70,086 | 52,284.0 | 366,780 | 361,646.0 | 2 | 0.8 | 780,000 | 0.80 | -- | -- |
| Other[c] | -- | -- | -- | -- | 1,438 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 71,946 | 17,091.9 | -- | -- | -- | -- |
| **TOTAL (metric)** | **33,539,713 (1,043 tonnes)** | **2,062.10** | **66,085,573 (2,055 tonnes)** | **228,802.4** | **40,945 (1,411,521 kg)** | **9,910.5** | **11,070,800 (5,021 tonnes)** | **6,655.1** | **7,287,700 (3,305 tonnes)** | **12,523.5** | **421,212 (382,124 tonnes)** | **232,636.9** | **2,078,951 (1,886,024 tonnes)** | **2,103,076.6** | **668,548[d] (20,793 kg)** | **65,815.7** | **1,374,573,932 (623,507 tonnes)** | **228.84** | **39,951 (35,419 tonnes)** | **3,426.7** |

[a]From published and unpublished state and federal documents.
[b]76-lb flask.
[c]Not traceable by year.
[d]Crude platinum; total production of refined metal is about 575,000 oz.

W = Withheld.
-- = Not reported.
t$ = Thousand dollars.
m$ = Million dollars.

# APPENDIX E

## Production of industrial minerals, coal, and other commodities in Alaska, 1880-1996

| Year | Coal | | Sand and gravel | | Building stone[a] | | Barite | | Other[b] |
|---|---|---|---|---|---|---|---|---|---|
| | s. tons | m$ | s. tons | m$ | s. tons | m$ | s. tons | t$ | $ |
| 1880-1899[c] | 19,429 | 0.14 | - - | - - | 7,510 | 0.04 | - - | - - | - - |
| 1900 | 1,200[d] | 0.02[d] | - - | - - | 510 | 0.01 | - - | - - | - - |
| 1901 | 1,300[d] | 0.02[d] | - - | - - | 700 | 0.01 | - - | - - | 500 |
| 1902 | 2,212[d] | 0.02[d] | - - | - - | 800 | 0.01 | - - | - - | 255 |
| 1903 | 1,447 | 0.01 | - - | - - | 920 | 0.01 | - - | - - | 389 |
| 1904 | 1,694 | 0.01 | - - | - - | 1,080 | 0.02 | - - | - - | 2,710 |
| 1905 | 3,774 | 0.02 | - - | - - | 970 | 0.02 | - - | - - | 740 |
| 1906 | 5,541 | 0.02 | - - | - - | 2,863 | 0.03 | - - | - - | 19,965 |
| 1907 | 10,139 | 0.05 | | - - | 3,899 | 0.03 | - - | - - | 54,512 |
| 1908 | 3,107[d] | 0.01[d] | - - | - - | 2,176 | 0.03 | - - | - - | 81,305 |
| 1909 | 2,800 | 0.02 | - - | - - | 1,400 | 0.01 | - - | - - | 86,027 |
| 1910 | 1,000[d] | 0.01[d] | - - | - - | W | W | - - | - - | 96,408 |
| 1911 | 900[d] | 0.01[d] | - - | - - | W | W | - - | - - | 145,739 |
| 1912 | 355[d] | 0.01[d] | - - | - - | W | W | - - | - - | 165,342 |
| 1913 | 2,300 | 0.01 | - - | - - | W | W | - - | - - | 286,277 |
| 1914 | 1,190 | 0.01 | - - | - - | W | W | - - | - - | 199,767 |
| 1915 | 1,400 | 0.03 | - - | - - | W | W | - - | - - | 205,061 |
| 1916 | 12,676 | 0.05 | - - | - - | W | W | - - | - - | 326,731 |
| 1917 | 54,275 | 0.27 | - - | - - | W | W | - - | - - | 203,971 |
| 1918 | 75,816 | 0.41 | - - | - - | W | W | - - | - - | 171,452 |
| 1919 | 60,894 | 0.35 | - - | - - | 50,014 | 0.29 | - - | - - | 214,040 |
| 1920 | 61,111 | 0.36 | - - | - - | 37,044 | 0.27 | - - | - - | 372,599 |
| 1921 | 76,817 | 0.49 | - - | - - | 59,229 | 0.31 | - - | - - | 235,438 |
| 1922 | 79,275 | 0.43 | - - | - - | 54,251 | 0.30 | - - | - - | 266,296 |
| 1923 | 119,826 | 0.76 | - - | - - | 83,586 | 0.41 | - - | - - | 229,486 |
| 1924 | 99,663 | 0.56 | - - | - - | 35,294 | 0.26 | - - | - - | 348,728 |
| 1925 | 82,868 | 0.40 | - - | - - | 32,193 | 0.19 | - - | - - | 454,207 |
| 1926 | 87,300 | 0.46 | - - | - - | 33,283 | 0.20 | - - | - - | 423,000 |
| 1927 | 104,300 | 0.55 | - - | - - | 41,424 | 0.22 | - - | - - | - - |
| 1928 | 126,100 | 0.66 | - - | - - | 63,347 | 0.31 | - - | - - | - - |
| 1929 | 100,600 | 0.53 | - - | - - | 54,766 | 0.26 | - - | - - | 194,000 |
| 1930 | 120,100 | 0.63 | - - | - - | 66,234 | 0.33 | - - | - - | 157,300 |
| 1931 | 105,900 | 0.56 | - - | - - | 59,175 | 0.29 | - - | - - | 108,000 |
| 1932 | 102,700 | 0.53 | - - | - - | 54,167 | 0.27 | - - | - - | 223,400 |
| 1933 | 96,200 | 0.48 | - - | - - | 56,291 | 0.28 | - - | - - | - - |
| 1934 | 107,500 | 0.45 | - - | - - | 64,234 | 0.36 | - - | - - | 46,155 |
| 1935 | 119,425 | 0.50 | - - | - - | 74,049 | 0.38 | - - | - - | 46,755 |
| 1936 | 136,593 | 0.57 | - - | - - | 76,379 | 0.38 | - - | - - | 45,807 |
| 1937 | 131,600 | 0.55 | - - | - - | 50,057 | 0.25 | - - | - - | 147,048 |
| 1938 | 159,230 | 0.62 | - - | - - | 189,090 | 0.21 | - - | - - | 125,302 |
| 1939 | 143,549 | 0.60 | 42,332 | 0.02 | - - | - - | - - | - - | - - |
| 1940 | 170,174 | 0.88 | 515,011 | 0.10 | - - | - - | - - | - - | - - |
| 1941 | 241,250 | 0.97 | 530,997 | 0.09 | - - | - - | - - | - - | 1,367,000 |
| 1942 | 246,600 | 0.99 | W | W | - - | - - | - - | - - | 1,124,000 |
| 1943 | 289,232 | 1.84 | W | W | - - | - - | - - | - - | - - |
| 1944 | 352,000 | 2.37 | 712,496 | 0.50 | - - | - - | - - | - - | 2,350,309 |
| 1945 | 297,644 | 1.87 | W | W | - - | - - | - - | - - | 5,910,704 |
| 1946 | 368,000 | 2.36 | W | W | - - | - - | - - | - - | 2,005,241 |
| 1947 | 361,220 | 2.55 | W | W | 219,000 | 1.00 | - - | - - | 5,927,319 |
| 1948 | 407,906 | 2.79 | W | W | 67,341 | 0.33 | - - | - - | 1,257,699 |
| 1949 | 455,000 | 3.60 | W | W | W | W | - - | - - | 7,181,886 |

[a]Building-stone production figures for 1880-1937 are for the southcentral and interior regions of Alaska only.
[b]Includes 2.4 million lb $U_3O_8$ (1955-71); 505,000 tons gypsum (1905-26); 286,000 lb $WO_3$ (intermittently 1916-80); 94,000 lb asbestos (1942-44); 540,000 lb graphite (1917-18 and 1942-50); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880-1993).
[c]Production not traceable by year.
[d]When state (territorial) and federal figures differ significantly, state figures are used. Figures for sand and gravel production in 1974 show state estimates (118,740,000 s. tons; 240.94 m$) and federal (42,614,000 s. tons; 88.96 m$). The federal estimate was not added to total production.
[e]Marble quarried on Prince of Wales Island, southeastern Alaska (1900-41).
m$ = Million dollars.
t$ = Thousand dollars.
- - = Not reported.
W = Withheld.

| Year | Coal | | Sand and gravel | | Building stone[a] | | Barite | | Other[b] |
|---|---|---|---|---|---|---|---|---|---|
| | s. tons | m$ | s. tons | m$ | s. tons | m$ | s. tons | t$ | $ |
| 1950 | 421,455 | 3.03 | 3,050,020 | 2.38 | W | W | - - | - - | 2,100,000 |
| 1951 | 494,333 | 3.77 | 6,818,000 | 3.54 | W | W | - - | - - | 3,600,000 |
| 1952 | 648,000 | 5.77 | 6,817,800 | 3.54 | W | W | - - | - - | 9,052,000 |
| 1953 | 861,471 | 8.45 | 7,689,014 | 5.08 | 47,086 | 0.17 | - - | - - | 1,231,350 |
| 1954 | 666,618 | 6.44 | 6,639,638 | 6.30 | 283,734 | 0.47 | - - | - - | 1,572,150 |
| 1955 | 639,696 | 5.76 | 9,739,214 | 8.24 | 265,740 | 0.29 | - - | - - | 1,552,427 |
| 1956 | 697,730 | 6.37 | 9,100,000 | 8.30 | 50,000 | 0.02 | - - | - - | 1,551,500 |
| 1957 | 842,338 | 7.30 | 6,096,000 | 8.79 | 528,000 | 1.95 | - - | - - | 2,751,000 |
| 1958 | 759,000 | 6.93 | 4,255,000 | 3.87 | 615,000 | 2.07 | - - | - - | 695,000 |
| 1959 | 602,000[d] | 5.88[d] | 5,600,000 | 5.10 | 54,000 | 0.20 | - - | - - | 1,338,000 |
| 1960 | 669,000[d] | 5.95[d] | 5,892,000 | 5.35 | 80,000 | 0.30 | - - | - - | 975,000 |
| 1961 | 650,000[d] | 5.87[d] | 5,241,000 | 4.19 | - - | - - | - - | - - | - - |
| 1962 | 675,000[d] | 6.41[d] | 5,731,000 | 5.36 | - - | - - | - - | - - | - - |
| 1963 | 853,000 | 5.91 | 16,926,000 | 22.01 | W | W | W | W | 2,589,000 |
| 1964 | 745,000 | 5.01 | 26,089,000 | 18.49 | W | W | W | W | 4,912,000 |
| 1965 | 860,000[d] | 5.88[d] | 29,959,000 | 33.93 | W | W | W | W | 5,296,000 |
| 1966 | 927,000 | 6.95 | 17,457,000 | 21.79 | W | W | 44,000 | 350.0 | 6,167,000 |
| 1967 | 930,000 | 7.18 | 22,300,000 | 26.25 | W | W | W | W | 4,924,000 |
| 1968 | 812,000[d] | 5.03[d] | 17,515,000 | 20.73 | W | W | 91,000 | W | 4,117,000 |
| 1969 | 728,000[d] | 4.65[d] | 16,205,000 | 18.62 | 1,954,000 | 3.90 | 90,000 | 850.0 | 5,163,000 |
| 1970 | 786,000[d] | 5.28[d] | 20,375,000[d] | 26.07[d] | 6,470,000 | 10.01 | 134,000[d] | 1,875.0 | 7,994,000 |
| 1971 | 748,000[d] | 5.05[d] | 26,391,000 | 41.99 | 2,658,000 | 5.07 | 102,000[d] | 1,075.0 | - - |
| 1972 | 720,000[d] | 6.26[d] | 14,187,000 | 15.21 | 652,000 | 3.01 | W | W | - - |
| 1973 | 700,000[d] | 6.23[d] | 19,350,000 | 19.01 | 5,967,000 | 12.00 | 112,000 | 1,792.0 | 12,846,000 |
| 1974 | 700,000 | 7.34 | 118,740,000[d] | 240.94[d] | 5,484,000 | 12.95 | 110,000 | 1,895.0 | 14,495,000 |
| | | | 42,614,000 | 88.96 | | | | | |
| 1975 | 766,000 | 7.81 | 48,145,000 | 95.78 | 8,877,000 | 26.65 | 2,000[d] | 30.0 | 12,731,000 |
| 1976 | 705,000 | 8.00 | 74,208,000[d] | 204.73[d] | 6,727,000 | 20.09 | W | W | 14,019,000 |
| 1977 | 780,000[d] | 12.00[d] | 66,126,000 | 134.25 | 4,008,000 | 17.47 | - - | - - | 14,486,000 |
| 1978 | 750,000 | 15.00 | 51,100,000 | 122.00 | 3,437,000 | 14.65 | 22,000 | 750.0 | - - |
| 1979 | 750,000 | 16.00 | 50,900,000 | 104.90 | 3,650,000 | 15.45 | 20,000 | 800.0 | 930,000 |
| 1980 | 800,000 | 16.00 | 40,000,000 | 86.00 | 3,700,000 | 15.40 | 50,000 | 2,000.0 | 97,500 |
| 1981 | 800,000 | 17.60 | 46,000,000 | 88.20 | 4,200,000 | 19.30 | - - | - - | 256,000 |
| 1982 | 830,000 | 18.00 | 45,000,000 | 91.00 | 3,400,000 | 15.60 | - - | - - | 150,000 |
| 1983 | 830,000 | 18.00 | 50,000,000 | 105.00 | 5,270,000 | 25.00 | - - | - - | 242,000 |
| 1984 | 849,161 | 23.75 | 27,000,000 | 95.00 | 2,700,000 | 16.00 | - - | - - | 875,875 |
| 1985 | 1,370,000 | 39.73 | 28,184,080 | 112.06 | 2,500,000 | 12.00 | - - | - - | 559,000 |
| 1986 | 1,492,707 | 40.10 | 20,873,110 | 75.76 | 4,200,000 | 20.32 | - - | - - | 384,800 |
| 1987 | 1,508,927 | 42.35 | 16,696,374 | 42.66 | 1,805,000 | 11.62 | - - | - - | 388,400 |
| 1988 | 1,551,162 | 44.30 | 17,264,500 | 48.75 | 3,600,000 | 24.65 | - - | - - | 389,000 |
| 1989 | 1,452,353 | 41.46 | 14,418,000 | 39.88 | 2,914,000 | 20.34 | - - | - - | 1,492,000 |
| 1990 | 1,576,000 | 44.99 | 15,013,500 | 40.82 | 3,200,000 | 22.10 | - - | - - | 400,000 |
| 1991 | 1,540,000 | 39.00 | 14,160,011 | 45.45 | 3,000,000 | 22.50 | - - | - - | 462,000 |
| 1992 | 1,531,800 | 38.30 | 14,599,746 | 42.20 | 2,900,000[e] | 22.97 | - - | - - | 430,000 |
| 1993 | 1,586,545 | 38.10 | 13,162,402 | 40.64 | 3,561,324 | 26.21 | - - | - - | 465,000 |
| 1994 | 1,490,000 | 36.75 | 13,518,321 | 40.95 | 3,843,953 | 27.04 | - - | - - | 459,500 |
| 1995 | 1,640,000 | 41.30 | 9,847,550 | 30.89 | 2,811,152 | 22.13 | - - | - - | 182,500 |
| 1996 | 1,481,000 | 38.00 | 9,890,463 | 32.20 | 3,000,045 | 23.56 | - - | - - | 200,000 |
| Other[d] | - - | - - | - - | - - | 2,300,000[e] | W | 79,000 | W | - - |
| **TOTAL (metric)** | **49,829,428 (45,205,257 tonnes)** | **817.65** | **1,116,070,577 (1,012,499,227 tonnes)** | **2,294.89** | **112,256,310 (101,838,924 tonnes)** | **499.79** | **856,000 (776,563 tonnes)** | **11,417.0** | **177,329,872** |

## U.S. Customary Units/Metric Units Conversion Chart

| To convert from: | To: | Multiply by: |
|---|---|---|
| | **Weight/Mass** | |
| ounces (avoirdupois) | grams | 28.350 |
| ounces (troy) | grams | 31.1035 |
| pounds | kilograms | 0.4536 |
| short tons | metric tons | 0.9072 |
| grams | ounces (avoirdupois) | 0.03527 |
| | ounces (troy) | 0.03215 |
| kilograms | pounds | 2.2046 |
| metric tons | short tons | 1.1023 |
| | **Length** | |
| miles | kilometers | 1.6093 |
| yards | meters | 0.9144 |
| feet | meters | 0.3048 |
| | centimeters | 30.48 |
| | millimeters | 304.80 |
| inches | centimeters | 2.54 |
| | millimeters | 25.4 |
| kilometers | miles | 0.6214 |
| meters | yards | 1.0936 |
| | feet | 3.2808 |
| millimeters | feet | 0.00328 |
| | inches | 0.03937 |
| centimeters | inches | 0.3937 |
| | **Area** | |
| square miles | square kilometers | 2.590 |
| acres | square meters | 4,046.873 |
| | hectares | 0.4047 |
| square yards | square meters | 0.8361 |
| square feet | square meters | 0.0929 |
| square inches | square centimeters | 6.4516 |
| | square millimeters | 645.16 |
| square kilometers | square miles | 0.3861 |
| square meters | acres | 0.000247 |
| | square feet | 10.764 |
| | square yards | 1.196 |
| hectares | acres | 2.471 |
| | square meters | 10,000.00 |
| square centimeters | square inches | 0.155 |
| square millimeters | square inches | 0.00155 |
| | **Volume** | |
| cubic yards | cubic meters | 0.7646 |
| cubic feet | cubic meters | 0.02832 |
| cubic inches | cubic centimeter | 16.3871 |
| cubic meters | cubic yards | 1.3079 |
| | cubic feet | 35.3145 |
| cubic centimeters | cubic inches | 0.06102 |
| gallons (U.S.) | liters | 3.7854 |
| liters | gallons (U.S.) | 0.2642 |
| milliliters | ounces (fluid) | 0.03381 |
| ounces (fluid) | milliliters | 29.5735 |

Temperature conversions:
From degrees Fahrenheit to degrees Celsius, subtract 32 and multiply by 5/9.
From degrees Celsius to degrees Fahrenheit, multiply by 9/5 and add 32.

SOURCE: *Minerals Today,* February 1993, U.S. Bureau of Mines.