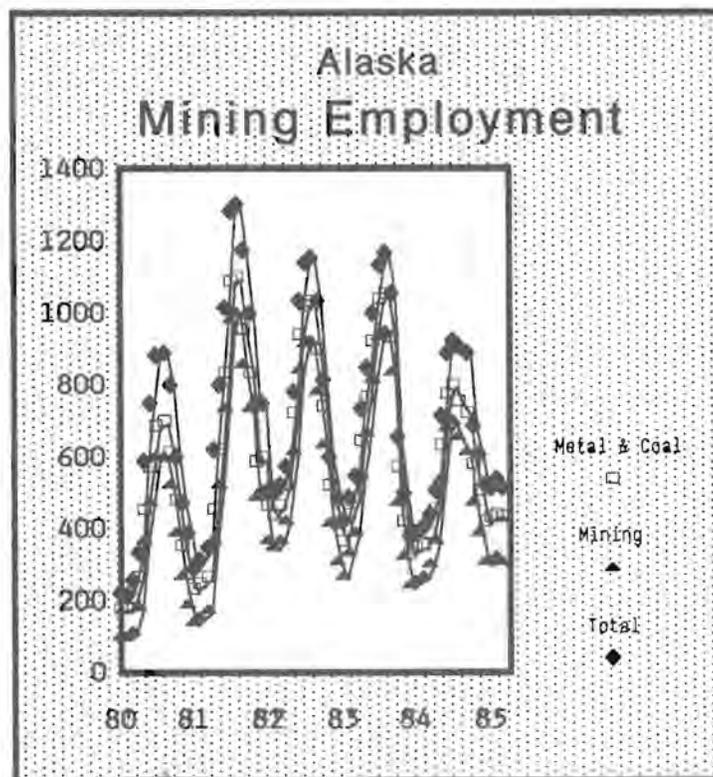


Alaska's Mining Industry

By Ed Eboch

One would assume from news reports of shrinking markets and depressed prices that the future of the mineral mining industry in Alaska, as well as the rest of the United States, is bleak. According to a forecast of lead and zinc prices, made to the Alaska Legislature by Stanford Research Institute, after continuing to drift lower these prices will be only slightly above current prices in real terms by the 1990's. With mineral prices at the lowest level in years mines are closing worldwide. Major oil companies have begun to divest themselves of their mineral mining operations. Mining employment in Alaska is down considerably from the levels of the past several years. Alaska mining companies are reducing their staffs or closing their Alaskan offices. Business-



Week (December 17, 1984) reported the death of mining in the United States. In spite of all the negative news about mining the long-term outlook for mining in Alaska is surprisingly positive.

Current mining employment hardly suggests the potential for mining in Alaska. In 1984 there was an annual average of 653 employees (excluding self employed, which would include a substantial number of placer miners) in mining in Alaska, down from 738 in 1983; 756 in 1982; and 798 in 1981. With coal mining and industrial mining (sand, gravel and other construction-related materials) up from previous years the decline in mining employment is entirely the result of drops in mineral mining employment (Table I). Oil and gas employment is excluded from this analysis.

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Even so, the potential for mineral mining in Alaska and the associated increases in employment is excellent in the long run (early to mid 1990's). There are currently three major projects under development that should come into production with improved mineral prices. At least two of the mining ventures appear to be profitable at current prices, although the rate of return is not attractive. The Greens Creek Joint Venture in the Southeast Region would add 150 employees to mining employment at full production. The Red Dog project in the Northern Region of the state would add up to 420 employees and the Quartz Hill project in the Southeast would add 700 to 900 employees. Other potential mineral mining and coal projects could add hundreds of additional employees to mining employment.

The industrial mining sector (sand and gravel plus building materials) will continue to expand as the population increases and the economy grows. This sector will grow faster as economies of scale will make it possible to produce items locally that are now being imported. Coal mining also offers potential for expanded operation as well as additional coal mines being

brought into production. In addition, a like number of indirect employees would be added to industries in support of these mining operations and to provide service to the employees of the mines.

The settlement of native land claims through the passage of the Alaska Native Claims Settlement Act (ANCSA) and the state land issues through the passage of Alaska's Statehood Act and the Alaska National Interest Lands Conservation Act (ANILCA) has cleared up much of the uncertainty about land available for mineral development. While questions still remain and land selection continues, the transfer of land from federal jurisdiction to state and private ownership should speed the development of mineral and coal resources when mineral prices

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become more favorable.

The benefits to Alaska's economy, besides increased employment, include a more diverse economy and a greater tax base.

With the location of the potential mines spread around the state, especially in the less populated areas, the Alaska economy would have a more solid base for future development. Should all the potential mineral mining operations be developed it may then become attractive for the development of a mineral processing industry in Alaska. This would lead to a more integrated economy and a greater range of investment and employment choices. In the long run (ten years but certainly 20 years when oil and gas resources, even with additional discoveries, will be largely depleted) Alaska will be dependent on development of these mineral resources for a healthy economy.

There are currently few major producers of minerals in Alaska. The largest tin producer in the United States is Lost River Mining in Nome but the value of production was estimated at only \$400,000 in 1984. Gold, coal, and sand and gravel are the

only minerals of any significant value that are currently produced in Alaska. The value of gold produced in 1984 is estimated at \$63 million. Coal production had an estimated value of \$24 million in 1984. The total value of minerals is estimated at just under \$200 million in 1984 (Table I).

Table I
Alaska
Reported Mineral Production
1982-1984

Metals	Volume			Value (000's)		
	1982	1983	1984	1982	1983	1984
Gold(oz)	174900	169000	175000	\$69960	\$67600	\$63000
Antimony(lb)	—	22400	138000	—	25	223
Silver(oz)	22000	32200	20000	198	332	159
Tin(lb)	198000	215000	225000	1365	1100	400
Industrial Metals						
Sand & Gravel(mt)	45	50	27	91000	105000	95000
Crushed Stone(mt)	3.4	5.3	2.7	15600	20000	16000
Coal(ton)	830000	830000	849161	18000	18000	23755
Other				150	242	877
Total				\$196423	\$212399	\$199437

Source: Alaska's Mineral Industry 1984, Alaska Office of Mineral Development & Alaska Division of Geological & Geophysical Surveys.

MINERAL PRODUCTION

Surveys indicate nearly 300 mechanized placer mines with an additional 40 recreational placers producing gold in Alaska. The greatest production is in the Eastern Interior Region where about one-half of the state's gold is produced. The next greatest production is from the Western Region which includes the Seward Peninsula. Alaska Gold Company operating out of Nome is the largest producer in the region. Small amounts of silver are produced around the state and occasionally metals of lesser value have been produced.

While mineral mining has little impact on Alaska's economy in terms of employment or tax revenues it offers the most potential, with possibly the exception of oil and gas, to make a major contribution in the future. Currently there are three projects that



are capable of being placed into production by the early 1990's if not sooner. These three, as well as other potential projects, will be discussed in some detail below.

Cominco-NANA Red Dog Project

The Red Dog project in the De Long Mountains of northwest Alaska, about 80 miles north of Kotzebue, has received the most attention recently because of a request for state assistance in construction of a road and port facility in support of the mine operation. As proposed, the state would be repaid its investment through user fees from the Red Dog Mine and other potential users in the area, where there are other attractive mineral deposits.

The Red Dog property is a world class zinc-lead-silver-barite deposit. The Red Dog deposit is owned by NANA Regional Corporation. The mine would be operated by Cominco Alaska Inc. The main deposit indicates reserves of 85 million tons of 17.1% zinc, 5.0% lead and 2.4 oz/ton of silver. Drilling has indicated additional reserves in the area with potential metal values. The project has progressed to the preliminary development stage with environmental, mine design, and overall mine feasibility under study.

While the success of the Red Dog mining venture is not dependent on state assistance, state support would send a positive signal to the mining industry. The Alaska State Legislature passed a bill that approved the necessary funding to allow the Alaska Industrial Development Authority to build and operate the desired port and road facilities if certain conditions are met, including a guarantee of repayment by Cominco of the costs should the mine not open.

Greens Creek Joint Venture

Knowledgeable professionals feel that the Greens Creek Joint Venture, located in a non-wilderness area in the Admiralty Island National Monument about 18 miles southwest of Juneau, will be the first of the major hard-rock mining projects to begin production. Passage of ANILCA in December of 1980 allowed development of the Greens Creek deposit. Reserves are estimated to be more than 4.0 million tons of ore with 10.3 oz/ton of silver, .09 oz/ton of gold, 6.4% zinc and 2.1% lead.

Current plans are to house the mine work force in Juneau with daily commutes to the mine site by ferry and bus. This project has particular significance to the Juneau economy at a time of declining state revenues and cutbacks in state employment and state contract employment. While the mine employment will be no substitute to the loss of state employment it would have the effect of softening any loss of employees due to state budget cuts and would offer local citizens employment alternatives.

Quartz Hill

The third mining project that should be in production by the 1990's is the U.S. Borax Quartz Hill project located in the Misty Fiords National Monument east of Ketchikan. With the passage of ANILCA the area surrounding Quartz Hill was given an exclusion from the wilderness classification allowing the project to continue. Reserves are estimated to exceed 1.5 billion tons of minable ore with .136% molybdenite with several hundred million tons of surface ore that grades at .2% molybdenite. Original plans were for this mine to be in production by 1987 but a continued low molybdenum price has resulted in a deferred schedule.

U.S. Borax has announced that workers will be housed in Ketch-

ikan rather than at the mine site thereby minimizing the disturbance to the Misty Fiords National Monument. The development of this project will have a significant impact on Ketchikan because of the size of the work force (700 with the initial production rate of 40,000 tons/day and 900 with full production of 80,000 tons/day) and the expected life of the mine (55 years). A third basic industry (along with fishing and lumber) in Ketchikan means a more diverse economy both locally and statewide and greater opportunities for Alaska's Southeast residents.

OTHER MINERAL PROSPECTS

Northern Area

While these are the most prominent mineral deposits in Alaska they are by no means the only attractive prospects. The Lik deposit, 12 miles north of Red Dog, has estimated reserves of 24 million tons of ore that grade at 9% zinc, 3.1% lead and 1.4 oz/ton of silver. An extension of the Lik deposit north of the main deposit is yet to be evaluated but is considered potentially as good as the main deposit. Development of the Red Dog deposit enhances the prospects of the Lik deposit being developed. Also in this area is a joint venture involving the NANA Development Corporation and the Kennecott Corporation where exploration work has been done on the Husky claim group. This general area is considered attractive for other possible mineral deposits and additional exploration activity can be expected with the building by the state of the road and port.

To the east and south of this area, is the Ambler district where the Arctic deposit under development by Kennecott Corporation has indicated reserves of 35-40 million tons of ore with 4.0% copper, 5.5% zinc, .8% lead, 1.6 oz/ton of silver and .02 oz/ton of gold. Kennecott Corporation also holds several other prospects in this area. In addition assessment work has been done by Anaconda Minerals Company and its partner Sunshine Mining Company on several claims groups in the Ambler district including the Tom Tom and the Smucker prospects.

Also included in the northern labor market area is the highly mineralized Seward Peninsula and historic placer gold district. Besides the Lost River tin mine and approximately 35 placer mining operations, exploration and development work in the

area has identified a lead-tin prospect and numerous gold-placer prospects.

Interior Area

In the Interior labor market area about 50% of the state's total gold output is produced. There were approximately 40 medium to large mechanized mines and 80+ recreational ventures in the Circle Mining District near Fairbanks. Because of low base metal prices most of the exploration and development work in this region was for precious metals. However, interest was also shown in tin, tungsten and antimony. There are several attractive known deposits in the Interior Region including the copper, gold, and iron ore of the Zackly and Zackly extension of the south flank of the Alaska Range and the lead-zinc-copper-silver-gold deposits of the Delta Schist Belt of the east-central Alaska Range just south of the community of Tok. Closer to Fairbanks on the Ester Dome several companies have promising precious metal claims. The Grant Mine on Ester Dome is being equipped for production and is scheduled for production late this year. Further east in the Chandalar Mining District (eastern Brooks Range) there has been exploration and development work on gold lode and placer deposits where lode and placer production now occurs.

Southwest Area

In the Southwest labor market area exploration continues at the Goodnews Platinum mine at Goodnews Bay and assessment work continues on a gold-tungsten deposit in the Iditarod Mining District. In the past exploration activity has been heavy on Unga Island; located 550 miles west of Anchorage, where the old Apollo and Sitka gold mines were located, but with disappointing mineral prices activity was reduced considerably this past year. During the past several years major exploration companies have shown interest in base and precious metals on the Alaska Peninsula and other regions of the Southwest labor market area, but activity has been modest compared to other areas of the state.

Gulf Coast Area

One of the most intensively explored prospects in 1984 was the Johnson River copper-lead-zinc-silver-gold deposit on the west

side of Cook Inlet in the Gulf Coast labor market area. This prospect is a joint venture between the Cook Inlet Regional Native Corporation and Anaconda Minerals Company and is located on Native land. An additional discovery six miles north of this area indicates additional gold-silver-lead deposits. It has the additional advantage of being close to tide water. Should the deposit be of a size to be commercial this prospect would have a very good possibility of coming into production in the early 1990's. Additional exploration activity in the Gulf Coast area includes several proposed offshore gold dredging operations in the Cook Inlet area.

Anchorage/MatSu Area

Another attractive deposit is the Coal Creek tin-silver-copper discovery near Hurricane Station in the Anchorage/Matanuska-Susitna labor market area. What appears to be a commercial deposit is near existing transportation systems, the Alaska Railroad and the Parks Highway. Numerous small scale operators conducted exploration in the area but no other major mineral exploration work is currently being undertaken.

Southeast Area

With two of the three most likely mines to be brought into production in the near future the highly mineralized region of the Southeast labor market area offers the greatest potential to have a significant impact on Alaska's economy. Several old precious mines in this area are being explored for consideration of reopening. Several deposits of high-grade copper and zinc, which include precious metals, are being actively explored in the Haines/Skagway area. These include the Jarvis Glacier prospect and the Mt. Henry Clay area northwest of Haines (which has the same geological horizon and series as the Windy Craggy deposits which is 40 miles northwest of Mt. Henry Clay) where several different companies have actively done exploration work. Exploration for precious metals and base metals is going on throughout the Southeast from the Prince of Wales Island in the South to Petersburg/Wrangell area to Yakutat Bay area in the Northern Southeast labor market area. The Southeast could also be impacted by discoveries in the British Columbia and Yukon Territory of Canada. The Windy Craggy deposit which shows over 90 million tons of ore with 3.0% copper, 0.1% cobalt, and significant gold, silver and zinc would

use Alaska waters for export of its concentrate should it come into production. Reopening of the Cyprus-Anvil Mine in Canada northeast of Skagway would mean a revived Skagway economy.

COAL RESOURCES

Although half of the estimated coal resources of the United States are in Alaska, the Usibelli Coal Mine near Healy is the only major operational coal mine in the state. There are a few small one and two-man operations supplying coal to local communities. Previous to the signing of a coal export agreement in late 1984 with Sun Eel Corporation, as purchaser for Korean Electric Power Company (KEPCO) of South Korea, all of the coal produced at the Usibelli mine was used in state. With this new agreement Usibelli expects to increase its production from 800,000 tons/year to over 1.6 million tons/year by the end of 1986. Exports of coal to Korea began in late 1984 from the Usibelli mine.

Coal resources are extensive in both the Northern region and the Gulf Coast-Anchorage/Matsu areas of the state. In the Gulf Coast-Anchorage/Matsu areas exploration drilling has been



conducted in several fields while in the Northern area information on the extent of coal resources has been from petroleum well logs. There has been considerable exploration work done in the Beluga coal field in the past; and during this last year exploration in the Bering River coal field has been undertaken by a joint venture involving the Chugach Alaska Corporation (an Alaskan Regional Native corporation) and the Korean Alaska Development Corporation. These fields are near tide water that is free from ice year round. With continued interest from Korea and other Pacific Rim nations to secure an alternative to dependency on oil it is only a matter of time until these resources will be developed.

INDUSTRIAL MINERALS

The value of industrial mineral production exceeded \$100 million in 1984 as employment doubled. Statewide use of sand and gravel and building stone is concentrated in the North Slope oil fields and in the largest urban areas. With the decline in oil prices, oil companies are beginning to reevaluate their exploration and development plans for the next few years. With oil prices expected to continue to decline oil companies can be expected to reduce their efforts on the North Slope and other areas of the state.

Lower oil prices also mean lesser state revenues which translates into smaller capital construction budgets. While a large percent of funds for roads, ports and airports is federal funds, in most cases these federal funds require matching state funds. The combined impact of a slower oil industry and declining state revenues will mean a weak market for industrial minerals over the next few years. Real growth in this economic sector will not occur until a recovery of oil and/or mineral prices result in mine and oil field construction and an improved revenue picture for the state.

Conclusion

Alaska's mineral and coal resources are extensive. Several deposits are known to be world class and expectations are for additional discoveries to be in the world class range. While some costs in Alaska are a detriment to development, technological improvements in mining are offsetting these disadvantages. Alaska (and Western Canada) is a highly mineralized area

that is still largely unexplored. While there are many known mineral deposits of commercial potential in Alaska much of the state has not had extensive geological and geophysical surveys. The Alaska Department of Geological and Geophysical Surveys has an on-going program to systematically survey Alaska's geology including minerals and construction materials.

There is evidence that State government appreciates and supports the need to begin development of these resources as oil prices and oil production declines. This is evident in the efforts to expedite the permitting process and in support of development of the Red Dog project. Given the cyclical nature of the mining industry and the time it takes to bring a mine into production now may be the most appropriate time for exploration and development. As mineral and coal resources are depleted at existing mines world wide it only becomes a matter of time until the Alaska discoveries will be developed. By concentrating on the short-term, opportunities in mineral and coal development may be missed.

For more detailed information refer to the following publications or contact the appropriate office:

Alaska Mineral Industry 1984, Special Report 38, Alaska Department of Commerce and Economic Development, Office of Mineral Development and Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys, 1985.

Alaska's Resource Inventory 1984, Special Report 36, Department of Natural Resources, Division of Geological and Geophysical Surveys. 1984.

The Mineral Industry of Alaska, U.S. Bureau of Mines Mineral Yearbook, 1983.