ALASKA'S ENERGY AND MINERAL POTENTIAL,

1975

A Situation Report by the
Alaska Field Operation Center
U.S. Bureau of Mines
Juneau, Alaska

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ALASKA'S ENERGY AND MINERAL POTENTIAL, 1975

by

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INTRODUCTION

In December 1971, the U.S. Congress passed the Alaska Native Claims Settlement Act (Public Law 92-203). Section 17 of that Act provides for a Joint Federal-State Land Use Planning Commission for Alaska. The Bureau of Mines Alaska Field Operation Center has worked with the Commission since its inception. The role of the Commission has been that of counselor to the Federal and State governments, the native villages, and the native regional corporations on matters of land-use planning and land selections. The Bureau of Mines has been designated to supply mineral and energy data. This report summarizes currently available data on the mineral and energy potential of Alaska as it relates to the so-called D-2 withdrawals and the transportation-corridor concepts.

The so-called D-2 lands consist of 83.47 million acres of land proposed for national parks, forests, wildlife refuges and wild and scenic rivers withdrawn for study as authorized under section 17 of the Alaska Native Claims Settlement Act. The Act also authorized the reservation of transportation corridors.

This report contains seven desk-size maps. Figures 1 through 3 show areas of petroleum and natural gas, coal, and geothermal energy potential color coded to indicate the relative importance for development. The term "importance" is based upon potential economic viability, accessibility and national or local need. Map 4 shows metallic mineral areas color coded in order of potential productivity. Map 5 shows sedimentary basins considered to have potential for uranium, but data is too scanty to make any estimate of relative importance or potential productivity. Map 6 outlines the metallogenic areas upon which maps 4 and 5 are based. Map 7 shows the principal transportation corridor concepts.

ACKNOWLEDGMENTS

The maps showing metallic minerals, sedimentary basins favorable for uranium, and the metallogenic provinces were compiled by Charles C. Hawley of C. C. Hawley and Associates, consulting geologists located in Anchorage, Alaska. An evaluation of coal potential for each coalfield

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OIL AND GAS

Resource Quality

The quality of the crude oil and natural gas in Alaska is good. The basic characteristics of the crude oil that make it desirable are low sulfur content and moderate to high gravity, averaging less than 1 percent sulfur and about 29° API. The natural gas is high in methane with no sulfur. The caloric content averages over 950 Btu/cu.ft.

Productive Areas

There is only one area in Alaska where significant commerical production is taking place. This is the Upper Cook Inlet area which includes the Kenai Peninsula, offshore Cook Inlet and the west shore of Cook Inlet. The first well that produced commercial quantities of oil in the Cook Inlet Basin was completed in 1957. Since that time five major oilfields have been developed. Estimated reserves of recoverable oil by primary and secondary recovery methods total 2.7 billion barrels, or 36 percent of the estimated oil originally in place (3).

Sixteen dry natural gasfields have been discovered in the Cook Inlet Basin area, but only five fields are being actively produced. Most of the remaining fields are one-well fields which have never been linked to transmission facilities mainly because of a lack of market. Total combined remaining reserves of all natural gasfields in the Cook Inlet Basin are estimated to be nearly 6.7 trillion cubic feet of gas (2).

Several areas north of the Brooks Range have the potential for production once transmission (pipeline) facilities have been installed. Exploratory drilling on the North Slope (outside of NPR-4) was started in 1963 and ranged from the northern foothills of the Brooks Range to the Arctic Coast. The giant of Alaska and North America, the Prudhoe Bay field, was discovered in 1968. The discovery at Prudhoe Bay instigated a new rush of exploratory drilling that resulted in the discovery of additional gasfields and possibly new oilfields. Prudhoe Bay reserves are thought to be near 9.6 billion barrels of oil and 26 trillion cubic feet of gas (6). Reserves in the undeveloped fields are unknown.

Potential Areas

More than 20 sedimentary basins and provinces are known in Alaska. Only six have had any serious drilling; of these, two have proven production capability. Figure 1 shows the areal extent of the various basins and provinces. Color coding indicates those areas deemed to have

a high potential for development. Uncolored areas within a basin or province may also have oil and gas but present knowledge suggests that the likelihood is very low.

COAL

Resource Quality

Alaskan coals are characterized by low sulfur content, large tonnages, and predominately subbituminous grades. In general, most subbituminous coals have high water and ash contents. Most of the coals are not of metallurgical grade, but potentially important deposits of coals having coking characteristics may occur on the North Slope of the Brooks Range.

Productive Areas

The two coalfields that have produced the greatest quantities of coal are the Matanuska field north of Anchorage and the Nenana field south of Fairbanks. From 1916 to 1969, approximately 7.5 million tons of coal were produced from the Matanuska field. Most of this was bituminous coal from the Jonesville area, but some anthracite was produced in the early years. Original reserves of bituminous coals in this field totaled 137 million tons (1). Nearly all activity ceased in 1969 when the powerplants at Anchorage were converted from coal to natural gas.

The Nenana field came into production in 1918 and is productive today. Approximately 16.5 million tons of subbituminous coal have been produced. Annual production is about 700,000 tons (4). The principal markets are electric generating plants at Fairbanks and at the military bases near Fairbanks, and a mine-mouth electric generating plant. Original reserve estimates for this field totaled approximately 6.9 billion tons (1). The coal-bearing formations contain a large number of coalbeds ranging in thickness from a few inches to 60 feet.

Potential Areas

Estimated coal resources of Alaska total 130 billion tons, roughly equivalent to 350 billion barrels of crude oil. About 85 percent of these resources are subbituminous and lignite coals, and over 90 percent occur north of the Brooks Range and west of the Colville River (1). Figure 2 shows the distribution of coal-bearing rocks in Alaska and the estimated relative importance for development. The area considered to have the greatest potential for immediate development is the Susitna field west of Anchorage. Other areas of high potential are the Matanuska field north of Anchorage and the Nenana field south of Fairbanks. The close proximity of these deposits to tidewater or rail transportation is a major factor favoring their utilization.

GEOTHERMAL AREAS

Resource Quality

Most of the known hot springs in Alaska have been characterized as water dominant with relatively low temperatures and limited reservoir capacities. Those geothermal resources located in the Wrangell Mountains or along the Pacific Ocean and, in particular, the Aleutian Island chain, may be exceptions; some may contain greater quantities of hot water and may produce steam when brought to the surface.

Productive Areas

Geothermal hot water has been used on a small scale for space heating, bathing and growing vegetables at many places including Circle, Chena and Manley north of Fairbanks, Baranof and Tenakee in Southeastern Alaska, and at Pilgrim Springs on the Seward Peninsula north of Nome.

Potential Areas

Figure 3 shows the distribution of geothermal sties in Alaska with an assessment of the relative importance for development indicated by color coding. Under the Geothermal Steam Act of 1970, 492,572 acres have been classified as known geothermal resource areas: Pilgrim Springs on the Seward Peninsula and Geyser Spring Basin and Okmok Caldera on Umnak Island in the Aleutian Island chain (7). An additional 10.8 million acres have been classified as geothermal resources provinces (7).

METALLIC MINERALS

Productive Areas

Historically, the metallic minerals that have been most important in Alaska have been gold, copper, silver, mercury, tin and platinum. The Fairbanks and Nome regions have been the most productive of the placer gold areas, accounting for 60 percent of the 21 million ounces produced. The Juneau region produced 75 percent of Alaska's lode gold production of 9 million ounces. The Copper River area including Prince William Sound provided 97 percent of Alaska's total copper production of 690,000 tons. Nearly 86 percent of the State's total came from the Kennecott mines near McCarthy. These mines also accounted for nearly one-half of Alaska's total silver production of 20 million ounces. The primary area for mercury has been the Kuskokwim River region; for tin, the Seward Peninsula; and for platinum, Goodnews Bay.

Metallic mineral production in 1975 was principally placer gold produced in many of the historic mining regions. The gold belt north of the Alaska Range was the scene of most activity. In the Nome area,

one dredge began operating, another was being reconditioned and plans were being made to bring in a third dredge. The Goodnews Bay Mining Company, the only primary producer of platinum in the United States, completed its 41st year of operation.

Potential Areas

Figure 4 shows areas in Alaska having metallic mineral potential as well as historic mining regions. Potential productivity is denoted by color coding. Historical mining regions are shown by a variety of colors, the most widespread being the gold regions shown in yellow.

Mineral exploration has been increasing throughout Alaska in recent years. In 1975 the Brooks Range was the scene of the greatest activity. The Kennecott Copper Corporation has two high-grade copper deposits near Kobuk. Anaconda Copper Company, which recently bought a part interest in the Sunshine Mining Company claims located nearby, announced discovery of a potentially major high-grade copper ore body. The Bureau of Mines announced discovery of a deposit containing barite, lead, zinc and silver 35 miles north of Noatak in the proposed Noatak National Arctic Range. To the east operators exploring the Little Squaw Mine near Chandalar reported ore containing two ounces of gold per ton.

URANIUM

Productive Areas

The only uranium produced in Alaska was from the Kendrick Bay deposit 35 miles southwest of Ketchikan. Discovered in May 1955, the mine produced approximately 39,000 tons of ore averaging 1 percent U_3O_8 between 1957 and 1964 (5). In 1971, an additional 55,000 tons of ore were mined and shipped to a mill near Spokane, Washington for concentrating (5).

Potential Areas

Figure 5 depicts the sedimentary basins in the State which may have uranium potential. Information on uranium concentrations in these sedimentary basins is very scarce. Therefore, no attempt was made to rank the various basins as to their relative importance or favorability for development. Sedimentary-type uranium deposits are usually formed by the dissolving of uranium from a source and its being concentrated in a host rock. In the Western United States the source rocks are generally acidic volcanics or granites and the host rocks are sandstones. The resulting mines and concentrating mills are large installations requiring ground access to supply the needs of the mining complex and accompanying town.

METALLOGENIC PROVINCES

Figure 6 is a matallogenic province map of Alaska. This map provides additional data for those readers who need detailed information that could not be shown on Figures 4 and 5. Metallogenic provinces are areas where one or more periods of metalliferous mineralization have resulted in the occurrences of certain types of minerals and mineral deposits.

CORRIDORS

Under the Alaska Native Claims Settlement Act, the Secretary of the Interior was instructed to reserve public easement across national interest lands and Native-selected lands before issuance of patents. On October 24, 1974, the Corridor Planning Team of the Bureau of Land Management submitted a report to the Director, Bureau of Land Management, that summarized the numerous corridor concepts. The principal purpose of corridors is to transport energy. Figure 7 shows the details of the principal concepts as compiled by the Bureau of Land Management. The corridors shown on this figure also appear in outline on the preceding six figures. For some large areas natural constraints such as mountain passes limit access to a single corridor while for other areas there is opportunity to select one of the several concepts shown.

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