DGGS offices are located:

3601 C St (10th fl.)
Pouch 7-028
Anchorage, 99510

P.O. Box 7438
State Office Bldg.
Ketchikan, 99901

794 University Ave.
(Basement)
Fairbanks, 99701

230 So. Franklin
(4th fl.)
Juneau, 99801

P.O. Box 2116
Eagle River, 99577

STATE OF ALASKA

Bill Sheffield, *Governor*
Esther Wunnicke, *Commissioner,*
Dept. of Natural Resources

Information Circular 17

COAL RESOURCES OF ALASKA

September 30, 1983

State of Alaska
Department of Natural Resources
DIVISION OF GEOLOGICAL AND
GEOPHYSICAL SURVEYS

Ross G. Schaff
State Geologist

According to Alaska Statute 41, the Alaska Division of Geological and Geophysical Surveys is charged with conducting 'geological and geophysical surveys to determine the potential of Alaska lands for production of metals, minerals, fuels, and geothermal resources; the locations and supplies of ground waters and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct other surveys and investigations as will advance knowledge of the geology of Alaska.'

In addition, the Division shall collect, evaluate, and publish data on the underground, surface, and coastal waters of the state. It shall also file data from well-drilling logs.

DGGS performs numerous functions, all under the direction of the State Geologist—resource investigations (including mineral, petroleum, geothermal, and water), geologic-hazard and geochemical investigations, and information services.

Administrative functions are performed under the direction of the State Geologist, who maintains his office in Anchorage (ph. 276-2653). Other DGGS offices are at:

.794 University Ave.
(Basement)
Fairbanks, 99701

.3601 C St (10th fl.)
Pouch 7-028
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.230 So. Franklin
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Cover: Suntrana Mine (active from 1922 to 1962) on Healy Creek, Nenana coal field. (Photo courtesy Bunnell Collection, University of Alaska Archives.)

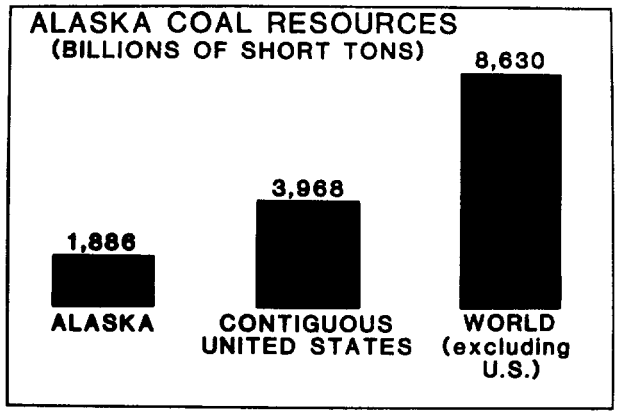
ALASKA'S COAL PROVINCES AND RESOURCES[1]

HISTORY

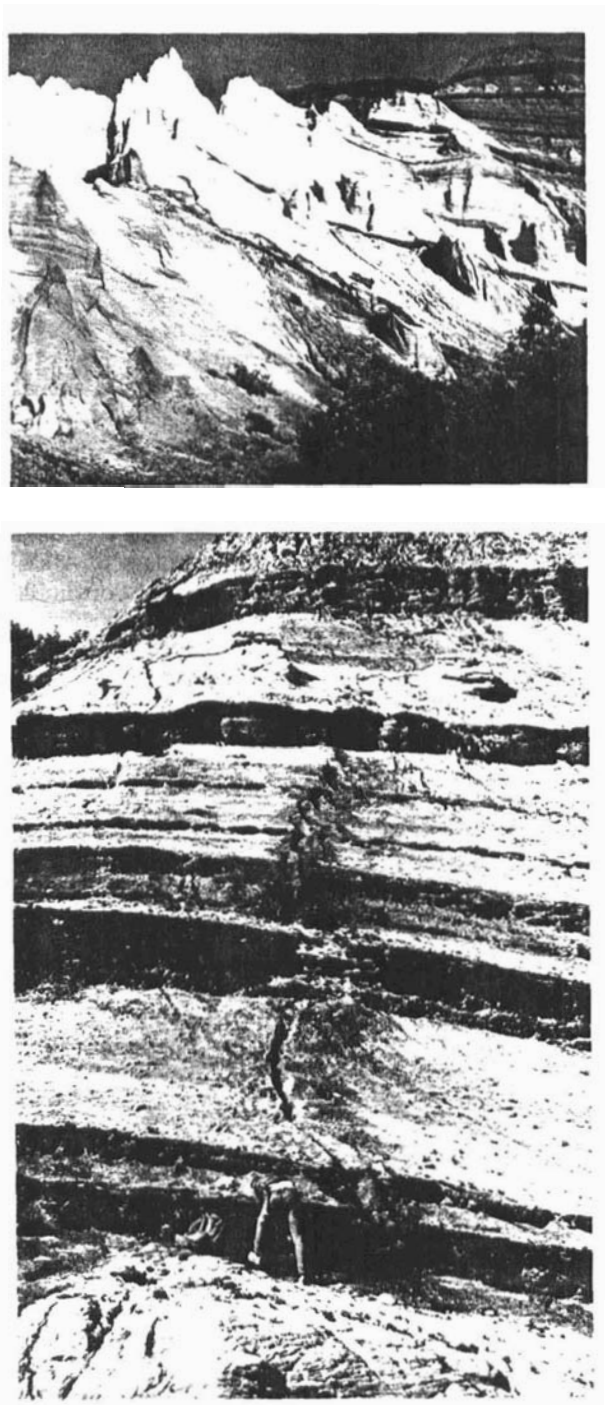
Alaskan coal, which has been mined for over a century, was used in the early days as a power source for whaling ships and for riverboats that plied Alaska's inland waterways, bringing supplies to pioneer gold miners and villages.

The first coal mine in Alaska was opened by the Russian-American Company in 1855 near Port Graham on the Kenai Peninsula; the Russians used the coal for steamships. Coal was mined near the village of Atkasuk on Meade River in northwest Alaska and at Corwin Bluff on the Chukchi Sea, where it was used by whaling ships and cargo freighters. Captain C.L. Hooper is reported to have taken on 20 tons of coal here for his ship, the *Corwin*, in 1881.

Coal has been used by placer miners of the Dutch and Peters Hills area in the northern Susitna lowland. Beginning in 1916, the Cache Creek Dredging Company mined coal at the Short Creek Mine on a small tributary of the Yentna River to supply power for its dredge. The underground coal mine at Suntrana, which operated from 1922 until 1962, was once the largest coal mine in the Territory of Alaska. Coal mined there was used



[1]Presented by R.G. Schaff and R.D. Merritt to the Resource Development Council's International Conference on Coal, Minerals, and Petroleum, Anchorage, Alaska, February 16, 1983.

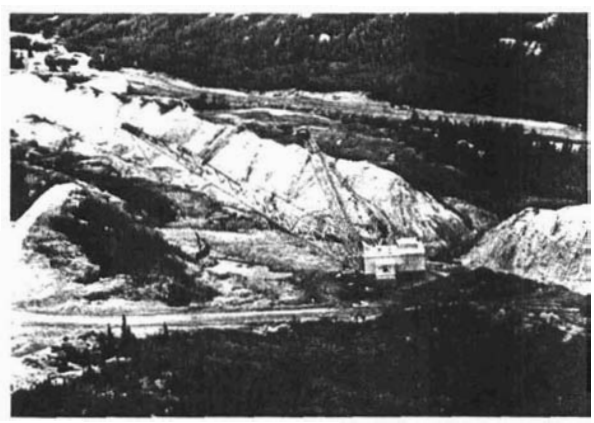


Coal-bearing seams along Coal Creek, northeast side of Mystic Mountain, Wood River coal basin.

to fuel the power plant in Fairbanks, which in turn supplied power to the nearby large, electrically powered gold dredges of the FE Company. Today, the sole operating mine is the Usibelli Coal Mine near Healy, which produces 800,000 tons per year, mostly for Fairbanks use.

PRODUCTION

Underground mining dominated early coal production, but strip mining predominates today. More coal—from more mines—was produced annually 20 years ago than at present. In 1957, the Swanson River petroleum field in Cook Inlet near Anchorage began producing relatively cheap natural gas, and coal consumption decreased markedly. Currently, the Usibelli Coal Mine produces most of its coal at the Poker Flats pit of the Lignite Creek field by using its 'Ace-in-the-hole' dragline, which has a bucket capacity of 33 cubic yards.



Usibelli Coal Mine's 'Ace-in-the-hole' dragline takes 33-cubic-yard 'bites' from Nenana-trend coal seams to help furnish interior Alaska with energy.

PROVINCES, RESOURCES, AND PROSPECTS

The future of coal in Alaska is speculative because of various marketability factors, but it is clear that vast deposits of coal underlie millions of acres of the 'Last Frontier.'

Alaska's resources make up about half of the United States coal-resource base and about one-sixth of the total world-resource base. Table 1 shows resource estimates for Alaskan coal according to the coal-classification system used by the U.S. Bureau of Mines and U.S.

Table 1. *Summary of the coal resources of Alaska (in short tons).*

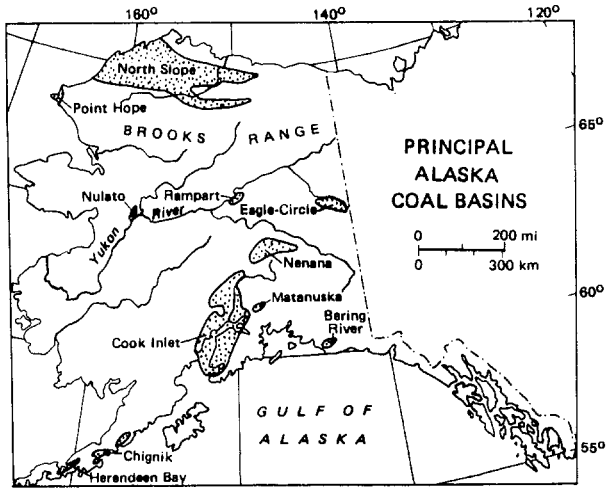
Region	Identified resources	Undiscovered resources
Northern Alaska	150 billion	to 4 trillion
Cook Inlet - Susitna lowland	11 billion	over 1.6 trillion
a. Beluga and Yentna fields	10 billion	to 30 billion
b. Kenai field (including offshore deposits)	300 million	to 100 billion[a] to 1.5 trillion[b]
c. Matanuska field	100 million	to 500 million
d. Broad Pass field	50 million	to 500 million
Nenana trend	7 billion	to 10 billion
Jarvis Creek field	75 million	to 175 million
Other interior coal occurrences		to 3 billion
Bering River field	75 million	to 3.5 billion
Chignik Bay - Herendeen Bay fields	200 million	to 3 billion
	over 160 billion	over 5.5 trillion

[a]To 2,000-foot depth. [b]To 10,000-foot depth.

Geological Survey—namely, undiscovered resources (hypothetical and speculative) and identified resources (indicated and inferred).

Comparing the coal resources of the three major coal provinces—northern Alaska, Cook Inlet-Susitna lowland, and the Nenana trend—allows one to gain an insight into the enormity of the deposits and their relative sizes. Most of Alaska's coals are bituminous, but there is a large secondary class of subbituminous coal and minor lignite and anthracite deposits. Various other coal occurrences are found throughout the state—at Eagle, Circle, Nation River, Yukon River, Farewell-Tanana, Rampart, Jarvis Creek, and Broad Pass. Total identified Alaska coal resources (all ranks) amount to over 160 billion short tons, and hypothetical and speculative resources are as high as 5.5 trillion short tons.

The northern Alaska coal fields form the largest coal-resource province in the nation. It is divided into a southern bituminous subprovince and a large, predominantly subbituminous northern subprovince. The Meade River and Corwin Bluff Mines are in these fields, as are two other coal-bearing exposures of this region—Kukpowruk River and Elusive Creek. These coals are located in the Naval Petroleum Reserve Alaska and occur in the Cretaceous Nanushuk Group on the Arctic Coastal Plain and foothills of the western North Slope. The Nanushuk Group is, in part, a deltaic deposit and is thickest (about 11,000 feet) in the southwestern part of the province, near Cape Lisburne. A 14-foot-thick coal bed crops out at Elusive Creek, and about 20 miles upstream from the mouth of the Kukpowruk River, a 20-foot-thick seam is exposed. In addition,



drilling has encountered numerous 15- to 40-foot-thick beds characteristic of the Nanushuk Group. Identified resources range to 150 billion short tons, and hypothetical and speculative resources range up to 4 trillion short tons.

The Cook Inlet-Susitna lowland is the second largest coal-resource province in the 49th State. It is composed of the Beluga, Yentna, Little Susitna, Matanuska, Broad Pass, and Kenai coal fields plus offshore deposits in Cook Inlet.

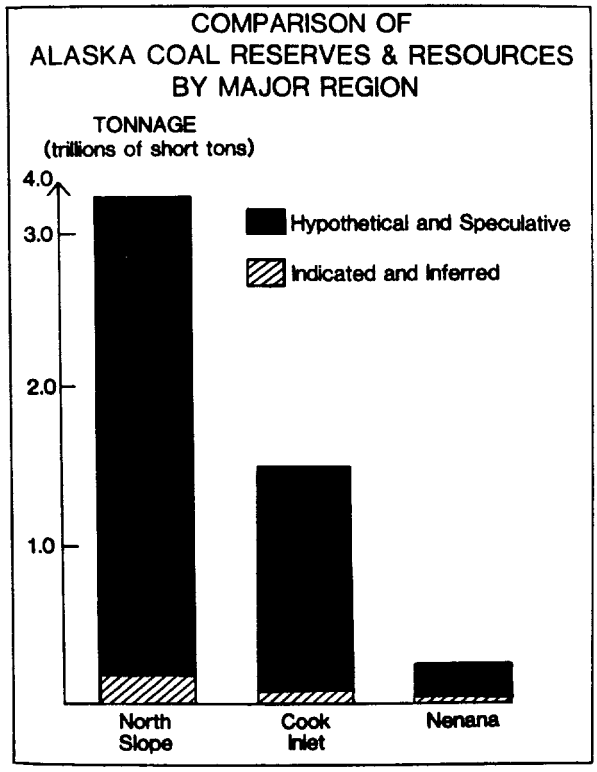
The coals of the Beluga and Yentna fields of the Susitna lowland occur in three formations of the Tertiary Kenai Group. Most of the major minable seams (over 20 foot thick) of the Kenai Group are restricted to the Tyonek Formation, whereas relatively thin lignite and subbituminous coal beds occur in the Beluga and Sterling Formations.

The Capps field, about 8 square miles in area, has two major beds: the Capps seam (55-foot maximum thickness) and the Waterfall seam (25-foot maximum thickness). The Chuitna Bed (or 'Brown seam') of the Beluga field crops out along the Chuitna River; it averages about 28 feet thick and is underlain by five other minable seams—the Yellow, Green, Blue, Orange, and Red seams. Also, an 8-foot-thick bed crops out along Saturday Creek on the western side of the Susitna lowland. Six coal beds (ranging up to 7 feet thick) crop out at Fairview Mountain. Identified resources range to 10 billion short tons; hypothetical and speculative resources range to 30 billion short tons.

Coals also underlie much of the Kenai Peninsula. Thirty-seven beds in the Sterling Formation of the Kenai Group are exposed along the western coast of the Kenai Peninsula. Several of these beds can be observed on the north side of Kachemak Bay near Homer. Identified resources of the Kenai field are about 300 million short tons. Hypothetical and speculative resources to a 2,000-foot depth are around 100 billion short tons (table 1).

The Chickaloon Formation of the Matanuska field contains at least 30 separate coal beds in the upper half of the 3,000-foot-thick unit. Two districts of this field are Wishbone Hill and Anthracite Ridge. Coals in the Wishbone Hill area occur in the Jonesville, Premier, Eska, and Burning Bed groups. Locally, coals of this field have been upgraded to anthracite by complex folding, faulting, and igneous intrusions. Over 100 million tons of coal have been identified for the Matanuska field, and resource estimates range up to 500 million short tons.

Other coals are found in south-central Alaska. The outcrop extent of the Kushtaka Formation delineates the distribution of the coal deposits of the Bering River coal field, east of Cordova. Coals in the western part of the formation are medium-volatile bituminous and grade eastward to low-volatile bituminous, anthracite, and meta-anthracite. The structure of the coal-bearing



formation is complex, and coals occur in pods or lenses; they are discontinuous and either pinch out or are truncated by faults. Hypothetical and speculative resources range up to over 3.5 billion short tons.

The Nenana coal trend forms the third largest coal-resource base in Alaska. The major coal-bearing areas of the Nenana field include Healy Creek, Lignite Creek (now producing), Rex Creek, Tatlanika Creek, Mystic Creek, Wood River, and Jarvis Creek. The Jarvis Creek field, east of the Delta River, marks the eastern-most extent of the trend. Deposits are also found along the Little Tonzona River and even farther west near Farewell—at Windy Fork of the Kuskokwim River.

Thick coal beds (up to 60 feet) of the Suntrana Formation contain most of the Nenana field's coal resources. Major coal deposits occur to the south and west of Jumbo Dome, particularly in the Marguerite Creek and upper Lignite Creek drainage basins. At least 16 coal seams with an aggregate thickness over 100 feet are exposed along Coal Creek on the northeast side of Mystic Mountain in the Wood River coal basin. Identified resources of the Nenana field range to 7 billion short tons and up to 10 billion short tons of hypothetical and speculative resources.

In southwestern Alaska, two relatively unmapped coal occurrences are found on the Alaska Peninsula, at Chignik Bay and Herendeen Bay. Cretaceous bituminous and subbituminous coals of the Coal Valley Member of the Chignik Formation are typically less than 7 feet thick. At Herendeen Bay, up to 17 beds crop out, but most are less than 2 feet thick. Identified resources for the Chignik and Herendeen Bay coal fields range to 200 million short tons; hypothetical and speculative resources range to 3 billion short tons. Thin coal seams are also found on Unga Island.