REPORT ON ARCTIC COAL DEPOSITS IN ALASKA

By Albert L. Toenges[1] and Theodore G. Jolley[2]

GENERAL CONCLUSIONS

Plans for mining coal in the Arctic Regions of Alaska for native villages should be based upon natural conditions of the coal beds; climatic conditions, that is, freezing and thawing; short winter hauls by land; summer long hauls by ocean; reduction of present cost of coal; native ability; native economy; shortage of timber and proper supervision. Two plans can be followed. Plan one is the development of local sources of coal at points nearest each village or group of villages. Plan two is the development of one source of coal, the transportation of coal to a stockpile on the Arctic coast and transportation of this coal by barge to the various villages when the Arctic Ocean is free of ice along the shore.

Plan one (local sources of coal) requires the development of a mine at each local source of supply. This plan would necessitate the purchase of mine plant and equipment for each small local mine. This would be a village participation and require a greater cost for development and equipment. Supervision would be increased but transportation cost would be decreased.

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Plan two (one source of fuel) would require only one mine and equipment, but more transportation equipment, including tugs and barges. The quality of the coal at this source must be such that there is little or no degradation in transportation and storage.

Both plans are workable and are based on underground mining in frozen ground and the sealing of the mine openings in summer to prevent circulation of warm air in the mine. This warm air may cause thawing of the roof which would result in roof falls. A barrier pillar should be left between mine workings and nearby rivers or streams. One disadvantage of depending upon one source of coal for all villages is the possibility that shore passages in the Arctic Ocean might be blocked with ice during some summers. In this event the shipment of coal by barges to the villages would not be possible.

The Native Service owns a small churn drill. Although churn drilling is not recommended for determining the thickness and physical characteristics of coal beds, the expense of transporting a diamond drill and equipment into an area in the Arctic and the cost of this type of drilling is not warranted because of the limited annual demand for coal. If the length of the cable on the churn drill is increased, this drill should be satisfactory for determining the lateral extent of the coal beds and the approximate thickness. However, little information can be obtained regarding the partings in the bed.

The extent of the outcrop, dip and thickness of the coal bed in the Beering, Fairhaven District can be determined by trenching, or test pitting, along the outcrop northwest of the original Chicago Creek Mine.

Bituminous coal in a deposit on the Kukpowruk River, approximately 45 miles upstream from Point Lay, (about 35 air miles S. 20° E.) does not show degradation after long exposure to the weather. This coal could be transported long distances with little or no degradation. This area can be considered under plan 2. The outcrop and the lateral extent of the bed can be determined by churn drilling, trenching or test pitting.

Three areas of coal were investigated near Wainwright. The areas at approximately 12 and 16 miles, respectively, south of Wainwright appear favorable for development. The lateral extent and the approximate thickness of the bed can be determined by churn drilling.

Coal mining is not similar to metal mining and methods applicable to metal mines cannot be used in coal mining. There is always the danger of gas ignitions and, therefore, all coal mines must be ventilated. All openings should be driven in pairs so that one opening is always the intake and the other the exhaust in the ventilating system. Where the mine openings are in coal, as in a slope mine, the development of the slopes produces coal and this coal will partially pay for the development.

The mining plan suggested is simple and when the Eskimos are properly supervised by a mining engineer with coal mining experience, they should become proficient in mining coal. The Native Service should secure the services of an experienced coal-mining engineer, preferably one familiar with coal mining in the States. The mine plant and equipment are estimated to be the minimum necessary to develop a mine in the Arctic.

DESCRIPTION OF AREAS

Deering, Fairhaven Mining District

Two mines were investigated in this area, the George Wallin mine and the Chicago Creek mine. The location of these mines is shown in figure 1. The George Wallin mine is situated on the north bank of the Kugruk River between Reindeer Creek and Montana Creek, approximately 20 miles, S. 45° E. of Deering and approximately 12 miles west of Candle. The Chicago Creek mine is about 4 miles northwest of the George Wallin mine and is at the approximate latitude of 65° 55' north and approximate longitude of 162° 24' west. This mine is on Chicago Creek, 1-1/4 miles east of the Kugruk River and about 16 miles S. 45° E. of Deering and 14 miles west of Candle.

Chicago Creek Mine

The Chicago Creek claim was located in 1905 and surveyed for patent April 16-18, 1907, U. S. Survey No. 194, but the application for patent later was rejected. Figure 2 shows Survey 194 from U. S. Land Office Plat Book.

The mine opening, which is approximately 75 feet above the elevation of the Kugruk River, was caved and no underground examination was possible. However, reference to Plat 194 (figure 2) shows the strike of the coal bed to be N. 9° E. and that the outcrop extends approximately 5,000 feet across the claim. The dip of the bed is shown as 45° W. The portal of the mine slope is in the approximate center of the claim. The Land Office records state "that in 1907 the incline slope had been sunk to a depth of 150 feet with 700 feet of drifts and up raises at the bottom of the incline." It is reported that the mine was gassy.

A sample of weathered black coal from the old coal pile was secured and analyzed by the Analyst of the Alaska Railroad at Anchorage.3/ This analysis, as-received basis, follows:

3/ O'Shea, John J., Chief, Coal Sampler and Analyst, The Alaska Railroad.

	Percent
Moisture	33.8
Volatile matter	39.9
Fixed carbon	19.2
Ash	7.1
B.t.u.	6,825

Development and production began in 1908 and continued until 1911. Approximately 60,000 to 100,000 tons of coal are reported to have been produced. This output is said to have been distributed during the winter months from October 15 to May 15, by from 65 to 100 teams of horses to gold prospectors in the Fairhaven Mining District and in the vicinity of Candle. The mine was abandoned in 1911.

George Mallin Mine

This mine was never surveyed for patent and has operated under a Free Mining and Prospecting Permit since about 1914.

The present main opening of the mine is a drift, which intersects the coal bed and a slope driven from the drift in the coal at an angle, ranging from 20° to 35°, across the dip of the bed. The length of this main opening is approximately 10 feet of drift and 200 feet of slope. A gangway is driven from the bottom of the slope on the strike of the bed for a distance of approximately 600 feet. No planned method of mining is followed. See figure 3.

The strike of the bed is S.15° E. and the dip ranges from 67° to 70° southwest. A measured section of the bed follows:

		Thickness Ft.	In.
	Roof, shaley claystone		
1	COAL	4	0
	Hard sandy clay		4 to 8
2	COAL	6	0
	Sandy clay		4 to 6
3	COAL	8	0
	Bottom, clay shale		

The analyses of coal benches 1, 2 and 3 on an as-received basis are reported by Mr. O'Shea[3] as follows:

	1	2	3
Moisture	32.3	32.9	34.8
Volatile matter	29.2	23.5	26.4
Fixed carbon	31.0	35.0	32.2
Ash	7.5	3.6	6.6
B.t.u.	7,575	8,035	7,555

The entire thickness of the bed is mined. The lump coal is sacked and the slack, minus 1-inch) and the partings are wasted in the mine.

At the time of the investigation, the mine owner drilled and blasted the coal, and the broken coal was sold to the Eskimos and prospectors for 50 cents a sack of lump coal at the face. The purchasers sacked the coal and transported it in a mine car to the slope bottom over steel and wood track. The coal was hoisted to the surface in a sled by a hand winch. The steam hoist at the portal was not in operating condition.

Records of production are not available but it is indicated that approximately 10,000 tons have been produced from the mine. The present annual production is about 25 to 50 tons. Past annual production is reported to have been several hundred tons. The decrease in demand for this coal is said to be because of the increased use of fuel oil and a decrease in the population in the area.

Conclusions on Deering, Fairhaven District

The investigation indicates that there is an area of coal adjacent to the Chicago Creek mine. The extent of the outcrop, dip and thickness of the bed should be determined by trenching or test pitting northwest of the original Chicago Creek mine.

This area appears more favorable than the George Wallin area because:

1. It is 4 miles nearer Deering and Nine Mile Point than the Wallin area. Nine Mile Point is a lighterage dock for Candle.
2. The Alaska Road Commission has marked a tractor trail from Nine Mile Point by Chicago Creek to the Kugruk River. Bridge material for two bridges across intermittent streams was available at the time of the investigation.
3. The area is above flood level. The George Wallin mine is affected by high water of the Kugruk River.
4. The dip of the coal bed is reported to be 45° as against 70° at the Wallin mine.
5. A new mine can be properly planned with less expense than revamping an old mine.
6. The Chicago Creek area is unleased land.

Figure 5.-Two views of coal deposit on Kukpowruk River, approximately 45 miles upstream from Point Lay, Alaska.

The coal requirements for the territory adjacent to the Chicago Creek area is estimated as follows:

	Tons
Deering	300
Candle	500
Kotzebue	800
Other villages	400
	2,000

This output could be obtained during the 6 winter months and could be freighted to Deering and Nine Mile Point in the winter and stored for shipment by boat to Kotzebue in the summer. Other points could be served during the winter months. The mine should be sealed during the summer months when temperatures are above freezing. Particular attention must be given in mining to secure a maximum of lump coal due to the slacking of the coal in storage during the summer months.

A plan of mining adaptable to the physical conditions reported at the old Chicago Creek mine is given in figure 4. This plan requires a minimum of equipment necessary to develop a coal mine for approximately 2,000 tons annual production that could be operated with maximum safety. Gas was reported in the old Chicago Creek mine and mechanical ventilation must be provided. This coal mine should be developed by using the double entry system. During the sinking of the slopes which are in the coal bed, the daily requirement for coal should be obtained.

The Native Service Office requested a list of equipment necessary to open a coal mine. The following are the minimum requirements to develop a coal mine to produce 2,000 tons per year in 6 months' operation at Chicago Creek, based upon the physical conditions reported at the old mine. Trenching and test pitting at the outcrop should determine if these conditions continue to the northwest.

1 - Portable type steam boiler, approximately 50-h.p., complete with injector. This type of boiler is suggested because of its simplicity.

1 - 25-h.p. steam hoist.

1 - 5-h.p. steam engine for driving a 6,000 cu.ft. per min. disc fan.

1 - Disc fan - 6,000 cu.ft. per minute - minimum Bureau of Mines safety code requirements.

1 - 5-k.w. steam engine generator set, D.C., 110 volts. If electric lights are used at the faces underground, no electric cap lamps for miners will be necessary.

Miscellaneous steam and water piping and fittings.

600 - feet of 5/8" steel 7 x 9 haulage rope.

2 - 3-foot steel sheaves

2,000 - feet of 16-lb. mine rail with switches and turnouts.

600 - 4" x 4" x 4' mine ties

12 - 4" x 6" x 12' mine ties

4 - 1-ton capacity mine cars. (Probably can be secured in the Matanuska field)

2,000 - feet of 2-wire waterproof electric cable for underground workings and surface lighting.

5 - dozen 100-watt electric light bulbs

25 - electric light bulb guards

4 - Breast coal augers in sections to make augers up to 10 feet long.

8 - 2-prong coal auger bits.

12 - Coal shovels

12 - Coal miners picks with handles

12 - Coal pick handles (extra)

3,000 - lbs. of permissible explosive (coal)

1,500 - Electric detonators

1 - Hand electric magneto for blasting

2 - Permissible flame safety lamps

500 - feet of electric blasting cable

6 - Wood tamping sticks 1-1/4" x 7' long

250 - yds. Brattice Cloth - 96" wide

1 - Boiler, hoist and shop building

1 - Powder magazine

1 - Detonator storage magazine

2 - Diesel tractors - one with bulldozer attachment

2 - House sleds (Wannagin)

4 - Freight sleds

1 - Blacksmith forge

1 - Set of blacksmith tools

1 - Anvil

1 - Hand winch

1 - Set of mechanics tools

1 - Set of carpenters tools

1 - Set of block and tackle with manila rope

Assortment of bolts, nails, drift pins and irons

Framed timber for slope collars

Lumber for store house and shelter

Extra tracks for tractor and spare parts

200 - Barrels of fuel oil

1 - Snow-and-ice melting tank for water supply

Mine props - 8-foot length

Point Lay Area

Kukpowruk River

The natives of Point Lay have used coal from two sources: one on the Tepsako River about 15 miles east of Point Lay and deposits along the Kukpowruk River. A deposit 45 miles up the Kukpowruk River from Point Lay is of particular interest and importance.

A reconnaissance was made in July 1946 up the Kukpowruk River with a skin boat using mushers, a four-dog team and line to draw the boat upstream. It was necessary to lift the boat off the bottom at rapids and shallow water and progress for the 45 miles was 27 hours or about 1.7 miles per hour.

An outcrop of coal was observed at a point about 5 miles from the mouth of the river. This bed is approximately 5 feet thick but little of this bed was above water level as the river bank is low at this point.

A thin bed, from which 100 sacks of coal had been mined in the past, is about 10 miles up the river. Mining conditions are not favorable.

Coal outcrops at intervals of about a mile apart were observed along the banks of the Kukpowruk River for a distance of about 25 miles, beginning about 20 miles from the mouth of the river. The beds at the first occurrences were thin and dipped steeply (40° to 80°). At about 35 miles up the river, the beds flattened and in many places were at water level or slightly above water level. These beds do not appear to be favorable for mining as they are often under water or beneath overhanging snowbanks. A 3-foot, highly weathered, subbituminous bed with a strike of N. 70° E., dip 5° west, was measured. A fresh sample of the coal could not be secured. At about 39 miles upstream, a 4' 6" bed of coal, which was weathered and showed evidence of cracking and slacking, was observed. The strike of this bed is N. 50° E., dip 5° E.

During the winter considerable coal has been dug from outcrops of beds for a distance of 5 miles, from 30 to 35 miles from the mouth of the river. The openings are near the summer water line of the river. It is assumed that the river level is lower in the fall and winter after the early summer snow run-off and that coal occurrences at or below water level in July would be accessible to mining in the late fall and winter.

A deposit of great interest is about 45 miles from the mouth of the Kukpowruk River. (See figure 5.) This deposit is approximately 35 air miles S. 20° E. from Point Lay and approximately 15 air miles east of the Arctic Ocean coast line. The outcrop of the bed, which is on the northeast bank of the river, is hard and forms a cliff in the river bank and is exposed for about 500 feet along the bank. The strike of the bed, which is approximately at right angles to the river at this point, is S. 85° W., and the dip 7° to 12° N. A section of the bed is as follows:

	Thickness Ft.	In.	
Glacial drift	80	0	
Roof, shaly claystone	20±		
Shaly coal 1/	0	4	
COAL	2	7	)
Bony coal 1/	0	0-3/8	) Analysis C-61130
COAL	3	0-5/8	)
COAL	4	0	Analysis C-61131
COAL	3	0	Analysis C-61132

1/ Excluded from sample

The total bed thickness is about 15 feet, but approximately 3 feet of the bed was under water.

The analyses of the coal, on an as-received basis, follows:

	Sample C-61130 percent	Sample C-61131 percent	Sample C-61132 percent
Moisture.	8.6 (Sample moist)	4.6	4.6
Volatile matter	29.1	35.6	37.0
Fixed carbon. . .	58.0	54.0	54.8
Ash	4.3	5.8	3.6
Sulfur	.1	.2	.1
B.t.u.	12,560	12,820	13,300

Natives report that this bed was observed several miles east of the outcrop and few, if any, white men have seen it.

The coal in the bed is very hard and it was necessary to use a heavy pick to obtain a channel sample. About 50 sacks of this coal (the remainder of 400 sacks that had been mined 4 years ago) were piled on the river bank. The coal in these sacks comprised lumps the size of two fists and there was no disintegration of the lumps to slack. As this coal had been subjected to the elements for 4 years and there was no degradation, the coal should not show slacking in transportation or storage.

Bob Tuckfield, a native of Point Lay, reported a coal bed approximately 10 feet thick, situated about 15 miles east of Point Lay on the Tepsako River. A "grab" sample of this coal was taken from 1,000 pounds of mine-run coal stored in sacks in the basement of the Point Lay school house and the analysis of the coal, on an as-received basis, follows:

	Percent
Moisture	10.5
Volatile matter	37.3
Fixed carbon	49.4
Ash	2.3
Sulfur	.4
B.t.u.	11,800

The natives report that an offensive odor is given off by the burning coal and the coal was not recommended for domestic use by them. The area was not visited. The deposit is probably in the low coastal plains and may not be extensive.

Conclusions on the Kukpowruk River Deposit

45 miles upstream from Point Lay

The estimated annual demand for coal in the villages not too distant from the Kukpowruk deposit is as follows:

	Tons
Point Hope	200
Point Lay	200
Wainwright	800
Other villages	200
Total	1,200

A mine capable of fulfilling these requirements would be small. As the quality of this coal is such that there is little or no degradation, the coal could be transported greater distances to all villages from Kotzebue north. The annual demand would then be approximately 3,200 tons, exclusive of Barrow.

Winter transportation is facilitated by freezing and the distances to villages is less circuitous than summer river travel. It is doubtful if the Kukpowruk River could be navigated by barges in summer because of the many bars and rapids. Therefore, transportation of the coal should be planned for the winter season. Dog sleds and tractors with sleds can travel over the tundra and frozen streams over direct routes in winter. A reconnaissance may show a more direct route west to the Arctic Ocean than the estimated 15 miles. Coal could be stockpiled in winter at a point on the shore and loaded into barges when the ice breaks and the passage to coast towns is open. Probably reasonable barge rates could be obtained from private owners of tugs and barges at Kotzebue or Nome. The feasibility of supplying bituminous coal to all Arctic villages from a mine on the Kukpowruk River can only be determined by a thorough study of all factors involved.

The overburden at the point where the bed was sampled is about 100 feet; 80 feet of glacial drift and 20 feet of shale. As the dip of the bed is 7° to 12° north, the outcrop, which may be buried under the tundra, would be to the south. The outcrop should be investigated by trenching and test pitting to determine the extent of the outcrop and thickness of the bed. A mine can then be opened in the bed at the outcrop. A barrier pillar of coal should be left between the area to be mined and the river. Mining operations should be conducted during the winter months when the overburden is frozen. Winter operation in frozen ground has been successful in the George Wallin mine on the Kugruk River. The mine should be sealed in summer to prevent excessive thawing of the strata overlying the coal. Thus, rock falls would be minimized.

The plan of mining, as shown in figure 4, with some slight modification would be adaptable to the conditions at the Kukpowruk deposit. Daily output can be regulated by the number of working places and number of men employed. The minimum requirements of a mine plant and equipment for the mine shown in figure 4 would supply an output in excess of the needed production, but supplies such as explosives, detonators, and brattice cloth would have to be increased proportionately.

Supervision by an experienced coal-mining engineer is necessary for a successful operation.

Wainwright Area

Kuk River

A reconnaissance of coal deposits along the Kuk River was made in July 1946, and three areas were examined. These deposits are on the east bank of the Kuk River, and coal in these deposits has been mined by the natives from openings in the outcrop along the river bank. The beds are at water level, and are accessible for mining during the winter months when the Kuk River, lagoons and tundra are frozen. These deposits are also accessible by boat in summer, but are not workable at that time because of thawing of the overlying strata.

The topography is rolling to flat and the river banks, which comprise coal, shale, sandstone and glacial drift, are approximately 50 feet high. A description of the areas follows:

Mine Area 1.

The deposit referred to by the natives of Wainwright as Mine 1 is approximately 7 air miles S. 45° E. of Wainwright on the east bank of the Kuk River. The outcrop was covered with snow, and the adit driven through the snow to the coal was filled with water, so a section of the bed could not be measured. Coal had been mined the previous winter, and approximately 10 tons of slack coal were piled on the ground. The strike of the stratum above the bed is S. 3° E. and the dip 7° E. It is indicated that the outcrop extends about 1,000 feet along the shore line at water level.

A sample of the slack coal from last winter's mining was obtained and the analysis on an as-received basis follows:

	Percent
Moisture	25.9
Volatile matter	28.8
Fixed carbon	43.3
Ash	2.0
Sulfur	.2
B.t.u.	9,350

Mine Area 2.

This area is referred to locally as Mine 2, and is approximately 12 air miles S. 20° E. of Wainwright on the east bank of the Kuk River. A measured section of the outcrop follows:

		Thickness Ft.	In.	
	Soft shale roof	1	4	
	1. COAL (Not mined)	2	2	Analysis C-61133
X	2. Rash	0	5	
	3. COAL	3	0	Analysis C-61134 1/
X	4. Clay parting	1	4 2/	
	5. COAL	5	0	Analysis C-61134 1/

The bottom of the bed is at river level.

1/ Coal samples of benches 3 and 5 were combined. Partings "X" excluded from sample.

2/ Clay parting varies in thickness and extent.

Analyses of the coal on an as-received basis follow:

	C-61133 percent	C-61134 percent
Moisture	25.7	24.3
Volatile matter	30.0	30.8
Fixed carbon	42.3	42.5
Ash	2.0	2.4
Sulfur	.3	.2
B.t.u.	9,470	9,510

The cleavage of the bed is both horizontal and vertical. The bed strikes S. 28° W. and dips 5° E. away from the river.

Mine Area 3.

This deposit is about 16 air miles S. 5° W. of Kalmwright on the east bank of the Kuk River, and is referred to by the natives as Mine 3. The outcrop extends for approximately a mile along the river. The strike of the bed is S. 40° E. and dip 5° W., which is toward the river. A section of the bed, shown in figure 6, is as follows:

	Thickness Ft.	In.
Shale roof	0	8
X Rash	0	3
COAL	5	2
X Shale and bone	0	6
COAL	3	9
Bottom at river level		

Partings "X" excluded from sample.

Figure 6.-Coal deposit at Mine 3, Wainwright area, Alaska.

The analysis of the coal on an as-received basis follows:

	Percent
Moisture	26.7
Volatile matter	29.1
Fixed carbon	41.9
Ash	2.3
Sulfur	.2
B.t.u.	9,230

Conclusions on the Wainwright Area

The outcrops of coal at the three deposits investigated show minable coal beds in these areas. These beds are under comparatively shallow cover, about 50 feet, and dips measured range from 5° to 7°. Except at Mine 2, the dip is toward the river and if the dips to the west continue, the extent of the area of coal to the east, inland, may be very limited. However, at Mine 2, the dip is to the east or inland, and if the bed continues on this dip, the area of coal at this deposit may be considerable.

The Native Service advises that the ex-servicemen at Wainwright are interested in opening a coal mine in the vicinity of Mine 3. The extent of the coal bed should be determined before a mine site is selected. The Native Service owns a small churn drill. Although churn drilling is not recommended for determining the thickness and physical characteristics of coal beds, the expense of transporting a diamond drill and equipment into the area and the cost of this type of drilling is not warranted because of the limited annual demand for coal in this area. It is reported that the depth to which this churn drill can drill is limited to 40 feet. No doubt by increasing the length of cable this depth can be materially increased. Churn drill holes will determine the lateral extent of the bed and the approximate thickness, but will not show the thickness or characteristics of the partings. The physical characteristics may not differ much from those observed at the outcrop.

If drilling proves the existence of an area of coal, the deposit can be opened either by two shafts or two slopes driven through the overburden. Drilling may determine the location of the outcrop on the shore side and then the slopes can be driven in coal. A barrier pillar of coal at least 100 feet thick should be left between the river and the limit of the area in which mining is planned toward the river. A plan of mining similar to figure 4 can be used with some modifications. Mining operations should be conducted during the winter months, as advantage then can be taken of frozen ground. The mine openings should be sealed in summer to prevent circulation of warm air, that might cause thawing of the frozen roof and coal with resultant falls of roof. The mine plant and equipment listed for a mine similar to that shown in figure 4 is the minimum necessary to open a mine to supply Wainwright with coal. Mining supplies such as explosives and detonators should be decreased proportionately unless it is planned to ship the coal to other villages.

Transportation of the coal to Wainwright in winter would be by dog sled or tractor sleds. If degradation of the coal is of little importance, the coal can be stockpiled at the mine in winter and transported to Wainwright in summer by barges. Supervision by an experienced coal-mining engineer is essential.

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APPROVED:

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Bituminous Coal Mining Section
Pittsburgh, Pennsylvania
December 10, 1946
ezl

May 16, 1945

Mr. Lowell B. Moon, Chief
Mining Branch
Bureau of Mines
Washington 25, D.C.

Dear Mr. Moon:

Quite a few of the residents along the Arctic coast will be disappointed if the Bureau of Mines discontinue their coal exploration work. As I mentioned in our recent conversation, one of the contributions that the Bureau of Mines has made to the welfare to the Alaska citizens has been to assit in developing the Meade River coal deposit. Enclosed is a clipping from a recent issue of the Fairbanks newspaper.

I have received several letters from Mr. E. M. Calhoun, Government school teacher at Deering requesting that the Bureau of Mines study the coal supply problem in that area. Also enclosed are copies of his letters.

Very truly yours

Robert S. Sanford
Acting Division Chief

Enclosures

cc: File
d. f.

PROPOSED ARCTIC COAST COAL EXPLORATION

In the spring of 1943, the Honorable Ernest Gruening, Governor of Alaska, visited Barrow. After an investigation of the acute fuel shortage in the Barrow area, the Governor recommended that the Bureau of Mines study the nearby coal deposits. As a result of this preliminary examination, the Office of Indian Affairs, assisted by a Bureau of Mines engineer, started a strip coal mine near the big bend of the Meade River in June 1944. Due to the necessity for getting the mine started early in the season to take advantage of all the short working season, the stripping was started without sufficient exploration. As a consequence, the mine location was not suitable for strip mining. However, subsequent drilling has proved a large tonnage of coal suitable for underground mining at this location. This drilling has developed 108,000 tons of subbituminous coal and an indicated tonnage many times this amount. Proximate analysis of this coal shows the heat content to be 11,000 B.T.U. and the ash, 5.0 percent. Coal from the underground mine is now being delivered with tractor-drawn sleds to Barrow and sold for $25 a ton. Coal from the United States landed in Barrow costs $60 per ton. If the hospital, school and other Government establishments use this fuel, the saving to the Government will repay the cost of opening the coal mine in six years and, at the same time, the natives will be able to get fuel at a price they can afford to pay.

At Peard Bay four prospect shafts were sunk on three exposures. This prospecting indicates at least 40,000 tons of subbituminous coal in this area. Proximate analysis of the coal shows 10,000 B.T.U. and 10 percent ash. Approximately 10,000 tons of this coal is favorably located for open-pit mining.

It is fortunate that this small mine was started last summer. There is only one supply steamship a year to Barrow and last fall only part of the year's fuel supply was unloaded.

The Bureau of Mines has been requested by Benjamin W. Thoron, Director of the Division of Territories and Island Possessions, Department of the Interior, Washington, D. C., to continue the coal exploration along the Arctic Coast. Due to transportation problems, it is not possible to have one large mine and ship the coal, but rather several small mines located near the several villages.

It is the opinion of doctors, teachers, missionaries and other residents of the area that an adequate and economical fuel supply would contribute more to the well-being of the Eskimo than any other help the Government could give. The Office of Indian Affairs does not propose charity but to supervise the coal mining and then sell the coal at cost to the Eskimo.

In order to fully appreciate the need for developing small coal mines in northern Alaska it is necessary to have some understanding of the habits and problems of the Eskimo population. It is unfortunate that serious fuel shortages should exist in a country so plentifully supplied with undeveloped coal reserves.

Prior to the coming of the white man to northwestern Alaska, the Eskimos lived in small sod and earthen igloos, which were heated with small lamps burning seal, whale or walrus blubber. Contrary to general impression, the Alaskan Eskimo has never built snow igloos. The sod igloo formerly built, was airtight having a tunnel entrance below the floor level and a small ventilator in the roof. Fresh cold air came in through the tunnel only as fast as the hot air was allowed to escape through the ventilator. Temperatures up to 70° and 80° F. could be maintained with a small seal oil lamp. With the advent of the white traders, missionaries, doctors, and teachers, the Eskimo abandoned his old type of dwelling and built flimsy, poorly-insulated, frame structures in imitation of the large, well-constructed cork-insulated houses of the white man. These uninsulated shacks naturally required more heat than could be supplied by seal oil lamps, so they started to burn driftwood and petroleum residue from oil seeps. The available supply of these materials have been practically exhausted and each year it becomes increasingly difficult for the natives to find sufficient fuel.

The aboriginal Eskimo was a nomad traveling in small groups and living where the hunting was the best. After the white man built the trading posts, schools, missions and hospitals for the Eskimos, villages of several hundred inhabitants have sprung up around these installations. The result has been that too much hunting has exhausted the natural food and fuel supply near these large villages.

Recently Barrow has experienced the poorest whaling in 60 years, -- only one whale has been killed during the last two seasons' hunting. When hunting is good and many whale, seal, and walrus are caught, they have more time to gather fuel.

During the winter 1943-44 fuel became so scarce in Barrow that many families resorted to burning gasoline. This was used by burning a small can of fuel in the firebox of their stoves, providing enough heat to boil a pot of tea and melt a quart or two of water. They exist during the winter on one hot meal a day and sit around a cold stove in their fur clothing.

The winter water supply in northern Alaska is obtained by melting ice. In the fall a supply of ice is cut and transported by dog teams to the village. Thus a shortage of fuel also means a shortage of water with resulting uncleanliness and filth. The net results of these deficiencies are extreme overcrowding of housing facilities, and filthy surroundings. This overcrowding and dirt make ideal conditions for the rapid spread of contagious diseases. Last winter, there was a serious epidemic of influenza at Barrow.

Coal is known to occur in the vicinity of the principal villages, namely, Deering, Candle, Kotzebue, Point Hope, Point Lay and Wainwright. Such a program will not only be an immediate help to the Eskimos, but will add materially to the existing knowledge of the natural resources of northern Alaska. These coal deposits should be sampled, and mining methods suggested, in order that the Office of Indian Affairs may start small coal mines to supply the local need for fuel.

The cost of the project is estimated as follows:

Classified Personnel		
1 engineer, 5 months @ $316.....	$1,580	
W.A.E. Labor		
2 native laborers, 4 months @ $150.....	1,200	
		$2,780
Travel, airplane charter, per diem.....		2,000
Supplies and Equipment.....		500
TOTAL.....		$5,280

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