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NORTHWEST COAL/TRANSPORTATION STUDY

By

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THIS REPORT HAS NOT BEEN REVIEWED FOR
TECHNICAL CONTENT (EXCEPT AS NOTED IN
TEXT) OR FOR CONFORMITY TO THE
EDITORIAL STANDARDS OF DGGS.

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Note: The enclosed blue-line copies of overlays showing the locations of known coal deposits, transportation options, and a composite of the two, are to be viewed as preliminaries only.

The overlays and text are in rough draft phase.

A comprehensive bibliography of references will accompany the final report upon publication.

An open-file report on work to date will be available by April, 1983.

The final report should be available for study by December, 1983.

This document has not received official DGGS review and publication status, and should not be quoted as such.
NORTHWEST COAL INVESTIGATIONS MAP

KEY FOR MAP

- \( Tc \) TERTIARY, MOSTLY CONTINENTAL, CONGLOMERATE, SANDSTONE, SHALE, AND COAL
- \( Tc \) TERTIARY AND/OR CRETACEOUS, MOSTLY CONTINENTAL, CONGLOMERATE, SANDSTONE, SHALE, AND COAL,
- \( P \) POSSIBLE EXTENT OF TERTIARY BASINS, SOME ARE STILL ACTIVE; THOSE INDICATED ONLY BY ISOLATED DEPOSITS OR EROSIONAL REMNANTS ARE QUERIED (?). THE KNOWN SIZE OF Tc AND Tkc DEPOSITS IS COMMONLY EXAGGERATED TO SHOW ON A MAP OF THIS SCALE,
- \( Cc \) CRETACEOUS, MOSTLY CONTINENTAL, CONGLOMERATE, SANDSTONE, SHALE AND COAL,
- \( Cc \) CRETACEOUS, MOSTLY MARINE, CONGLOMERATE, SANDSTONE, SHALE, LIMESTONE AND SOME COAL,
- \( M \) MISSISSIPPIAN, PARTLY CONTINENTAL, SANDSTONE SHALE, LIMESTONE AND COAL,
- \( A \) COAL BED WITH LOCAL MINING HISTORY,
- \( A \) RECOGNIZED COAL BED,
- \( G \) COAL FRAGMENTS OR REPORTED COAL OCCURRENCES WITHOUT INFORMATION,
- \( A \) APPROXIMATELY LOCATED,
- \( A \) AREAS VISITED, 1982 FIELD SEASON,
- \( B \) BASE METAL LODE DEPOSITS LIKELY TO DEVELOP WITHIN 10 YEARS,
- \( T \) TEST WELLS.
Test well logs showing coal beds. All KPRA wells (a - j) are from Bird (1981).

a Tunalik #1: 27 beds at least 10' thick to 3600' depth
6 beds at least 10' thick to 900' depth

b Kaolak 81: 15 beds at least 10' thick to 9900' depth
6 beds at least 10' thick to 700' depth

c Peard #1: 12 beds at least 10' thick to 1200' depth

d Rugra #1: 14 beds at least 10' thick to 1200' depth
8 beds at least 10' thick to 700' depth

e Meade #1: 16 beds at least 10' thick to 1800' depth
5 beds at least 10' thick to 400' depth

f South Meade #1: 6 beds at least 10' thick to 1400' depth
4 beds at least 10' thick to 400' depth

g Topagoguk #1: 13 beds at least 10' thick to 1000' depth
10 beds at least 10' thick to 600' depth

h East Topagoguk #1: 1 bed 10' thick at 100' depth

i Oumalik #1: 12 beds at least 10' thick to 2700' depth
7 beds at least 10' thick to 900' depth

j East Oumalik #1: 6 beds at least 10' thick to 1100' depth
Test well logs (non-KPRA)

K. Cape Espenberg Cl (Standard Oil Co. of California)
Lignitic coal beds occur down to 5500' but diminish in the upper part of the well. Forbes (1980)

| Nimiuk Point #1 (Standard Oil Co. of California) |
| Thin bed of lignitic coal intersected at 2700'. Forbes (1980) |

i-n Nulato #1 (Paul G. Bonedum)
Poor logs indicate that some coal is present, possibly three separate seams between 300 and 400 feet. Renshaw (1980)
ALL RESOURCE ESTIMATES ARE IN MILLIONS OF SHORT TONS (MT.)

1. North Slope Alaska Total

**Cretaceous** (Nanushuk and Colville Groups)

- **Subbituminous beds** (2.5' < 3000' deep)
- **Bituminous beds** (14" < 3000')

<table>
<thead>
<tr>
<th></th>
<th>Indicated</th>
<th>Inferred</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subbituminous</td>
<td>1609</td>
<td>99,296</td>
<td>100,905</td>
</tr>
<tr>
<td>Bituminous</td>
<td>838</td>
<td>18,454</td>
<td>19,292</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>120,197 mt.</td>
</tr>
</tbody>
</table>

Barnes (1967)
Combined bituminous and subbituminous

<table>
<thead>
<tr>
<th>Est. Resources</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothetical (Subsurface Info)</td>
<td>115,000</td>
<td>3,700,000</td>
</tr>
<tr>
<td>Speculatives (Eastern N. Slope and Offshore)</td>
<td>110,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Identified:</td>
<td>120,000</td>
<td>(Barnes 1967)</td>
</tr>
<tr>
<td>Total:</td>
<td>345,000</td>
<td>4,700,000 mt.</td>
</tr>
</tbody>
</table>

OR: 345 billion - 4.7 trillion tons

Tailleur and Brosge (1975)

Combined bituminous and subbituminous.

Est. strippable reserves (14"< 120' deep) = 478 mt.

USBM (1971)
Western North Slope Only (Map Area)

Cretaceous Nanushuk Group (Corwin Formation)

Subbituminous ($2.5' < 4000'$) = 478,000

Bituminous ($1.2' < 6000'$) = 370,000

Total Bituminous and Subbituminous = 848,000 mt.

Callahan (1980)

2 Chu'kch'i Sea (Offshore)

Cretaceous subbituminous and bituminous

Est. resources available for liquefaction or gasification: 3,000 mt.

McGee and O'Connor (1974)
Meade River

Cretaceous Bituminous and Subbituminous

Est. resources subbituminous ($> 5' < 120'\text{ deep}$) = 135.9 mt.

($7.5' < 1000'\text{ deep}$) = 1,132.5 mt.

($2.5' < 3000'\text{ deep}$) = 39,756.3 mt.

Bituminous ($> 42'' < 120'\text{ }') = 145.5 mt.

($> 42'' < 1000'\text{ }') = 1,212.4 mt.

($> 14'' < 3000'\text{ }') = 2,948.3 mt.

Horizontal to shallow dips, analyses, local production

Barnes (1967); Kaiser Engineers (1977); Rao (1980)
Kugra River (Peard Bay)

Cretaceous Subbituminous

4 beds approximately 5' thick

Est. Resources (<120' deep) = 100.9 mt.

(>1000' deep) = 840.2 mt.

Horizontal beds, analyses

Barnes (1967), Kaiser Engineers (1977)

Kuk River

Cretaceous Subbituminous B

5 beds: 2 beds <5', 2 beds 5'-10', 1 bed >10'

Est. Resources (>10' <120' deep) = 111.0 mt.

(>10' <1000') = 925.2 mt.

(>2.5' (1000') = 1,457.7 mt.

Kugra - Kuk Rivers Area

Beds correlated by Callahan (1980)
Utukok River

Cretaceous Subbituminous C - High Volatile A Bituminous

Subbituminous: 4 beds 4' x 12' thick

Est. Resources (>10' < 120') = 89.7 mt.
(710' (1000')) = 717.0 mt.
(>2.5' < 3000') = 44,738.1 mt.

Bituminous: 14 beds: 4 beds 28", 2 beds 28" - 42", 7 beds 42"

Est. Resources (>42' < 120') = 134.9 mt.
(>42' < 1000') = 1,124.5 mt.
(>14' < 3000') = 2,737.9 mt.

Dips 0-25°, analyses

Barnes (1967), Kaiser Engineers (1977), Affolter et al. (1980)

Kokolik River

Cretaceous Bituminous with coking qualities

17 beds: 4 beds < 28", 3 beds 28" - 42", 10 beds > 42"

Est. resources (>42' < 120') = 88.9 mt.
(>42' < 1000') = 741.0 mt.
(>14' < 3000') = 2,336.1 mt.

Dips 0-22°, Analyses

Barnes (1967), Warfield (1969), Kaiser Engineers (1977)
Kukpowruk Study Area (Howard Syncline)

Cretaceous High Volatile A-B Bituminous, with significant coking properties.

8 beds over 14” overlying a 20’ bed.

Est. Resources $\geq 42" \leq 100' \rightarrow 257 \text{ mt.}$

- with 10:1 stripping ratio $= 20 \text{ mt.}$

Dips $\sim$ Near Verticle, Analyses, Local Production

Callahan (1969), Warfield (1966)

Cretaceous HVA-B Bituminous, Soft Coking, with low ash and sulfur

Strippable Resources $\geq 42", \leq 120' \text{ deep, Stripping ratio 5:1, Maximum dip } 20^\circ \rightarrow 115.3 \text{ mt.}$

Underground Resources $\geq 42", \leq 2000' \text{ deep} > 100 \text{ mt.}$

Knutson (1980)

Kukpowruk River

40 beds: 11 beds $< 28", \text{ cretaceous bituminous, 23 beds } 28" - 42", 17 \text{ beds } > 42"$

Est. Resources $\geq 42" \leq 1000' \rightarrow 961.1 \text{ mt.}$

- $\leq 3000' \rightarrow 3,065.3 \text{ mt.}$

Dips 0" near verticle, analyses, local production

Barnes (1967)
Dead Fall Syncline

Cretaceous Bituminous

Est. Reserves = 500-750 mt.

Dip 0-20°, Analyses

Callahan (1975)

Cape Beaufort (Liz-A Syncline)

Cretaceous high volatile B-C Bituminous with coking properties increasing at depth.

More than 20 beds are correlated.

Est. Resources, measured 35 mt
Indicated 312 mt
Inferred 186 mt

Total 533 mt

Dips 15'-40' (?) Analyses

Callahan (1975, 1980)

Corwin Bluff (Corwin & Thetis Mines)

Cretaceous Bituminous

80 beds > 1 foot, 17 beds 2.5'-9' thick total 74'

Est. Resources (60 feet deep) = 12 mt.

Dips 30-45°, Analyses, Production for Steamers

Sable and Chapman (1955), Chapman and Sable (1960)
12 Cape Beaufort - Corwin Bluff Area

60 beds: 42 beds < 28", 9 beds 28" - 42", 9 beds > 42"

Est. Resources (>42" < 120') = 12.1 mt.

(>42" < 1000') = 100.7 mt.

(>14' < 3000') = 982.3 mt.

Barnes (1967), Kaiser Engineers (1977)
13 Hiak Creek (Cape Lisburne)
Mississippian Semi-bituminous
4-5' bed and faulted exposures
Analyses
Collier (1906)

14 Cape Lewis
Mississippian Semi-bituminous
4' bed and 2 smaller beds
40° dip, Analyses
Collier (1906)

15 Cape Dyer (Kapaloak Creek Section)
Mississippian low volatile bituminous
13 beds 2.5-11' thick totaling 70'
Dips 30° - Berticle, Analyses
Tailleur (1966)

16 Kukpuk River
Mississippian Semi-anthracite
6' bed and other beds
23° dip, Analyses, local production
Conwell and Triplehorn (1976)
17 Cape Thompson
Mississippian Semi-anthracite?
1 foot Bep, sheared
Verticle, Partial Analyses
Conwell and Triplehorn (1976)

18 Noatak River
Tertiary Lignite
2 inch bed
Dip 30°-75°
Ellersieck et al (1979)
19 Eockley Hills

Cretaceous Lignite:

Thin coaly stringers can be traced from creek to creek

Chadwick (1960)

20 Singaraatk Creek

Cretaceous Subbituminous C

4 beds 2' - 3.5' thick total 13'

10° dip, Analyses

Burand (1959)

21 Kallarichuck River

Cretaceous Bituminous:

2 beds 2' thick

Dips 20° and 45°, Analyses in Progress, Local Production

Eakins (1982)

22 Kobuk River (I)

Cretaceous Bituminous

1 or more 2-3 foot bed(s)

Dip 30°, Analyses, Local Production

Smith (1913)
23 Kobuk River (II)

Cretaceous High Volatile C Bituminous
18' bed and many several inch beds
25° dip, Analyses
Eakins (1979)

24 Elephant Point (Dick Slough)

Tertiary Lignite
2 foot and 4 inch beds
Flat lying
Quakenbush (1909), Patton (1973), Klein (1980)

25 Perry Creek

Tertiary? Lignite
2-4' bed
Klein (1980)

26 Chicago Creek Mine

Tertiary? Lignite
80-88' bed
Est. Resources = 2 mt.
Dip 53° or 70°, Analyses,= 100,000 tons produced
Henshaw (1909), Reed (1933), Chadwick (1960)
27 Kugrulk (Wallin) Mine

Tertiary? Subbituminous?

66 foot or 19 foot bed

50°-62° or 67" - 70" dip, analyses ≈ 10,000 tons. produced

Reed (1933), Toenges and Holley (1947)

28 Superior Coal Mine

Tertiary? Lignite

52' bed

Small production

Reed (1933)

29 Kuzitrin River

Tertiary Lignite

1' - 12' bed

Local production

Hopkins (1963), Sainsbury (1973)

30 Wilson Creek

Tertiary? Lignite

3'-10' bed and a smaller bed

Slight dip

Harrington (1919)
Sinuk River (Coal Creek)

Tertiary/Cretaceous? Bituminous?

17 beds 3" - 16"

Dip 30°, Local Production

Collier (1908) Herreid (1970) Sainsbury et al. (1973)
32 Omilak Creek
Tertiary Lignite
18" bed, 24" float

33 Grouse Creek
Tertiary Lignite/Subbituminous C?
15'-35' bed
East-west extent of more than one mile
(West 1948) Miller (1980)

34 Tubutulik River (Location Uncertain)
Cretaceous Lignite/Subbituminous?
Steep dips, thin beds extend for miles
Miller/et al (1972)

35 Koyuk River
Tertiary/Cretaceous? Lignite
4 foot bed, 2 foot bed, and a few several inch seams.
Analysis
Harrington (1919)

36 Unalakleet (Coal Mine Creek)
Tertiary Lignite
At least one 4'-8' bed
Flat lying, analyses in production
37 Ulukok River (Location Uncertain)
   Tertiary? Lignite
   2 foot bed
   Dall (1892)

38 Anvik River
   Cretaceous? Bituminous?
   10' bed and several 2' beds reported
   Local production for black paint
   Collier (1903), Harrington (1918)

39 #1 Mine
   Cretaceous Bituminous
   2.5 - 3 foot bed, 18" bed and two smaller beds
   35° dip, Analyses ≈ 900 tons produced
   Collier (1903) Chapman (1963)

40 Williams Mine (Thein Mine)
   Cretaceous Bituminous
   39" bed and thin stringers
   45° dip, Analyses ≈ 1700 tons produced
   Collier (1903) Chapman (1963)
41 Adolph Muller Prospect

Cretaceous Bituminous

54' bed

20" dip, Analysis

USBM (1946) - Chapman (1963)
42 Blatchford Coal Mine
Cretaceous High Grade Bituminous
Sheared Bed with 2'-8' pockets and 2 beds inches thick
45°-55° dip, Analyses, ≈300 tons produced
Dall (1892), Collier (1903), Chapman (1963)

43 Bush Mine
- Cretaceous Bituminous
Bed at least 4 feet thick
40° dip, Analysis, 400 tons produced?
Collier (1903)

44 Nulato Bed
Cretaceous Bituminous
2.5 foot bed containing 6" of clean coal
40° dip
Collier (1903)

45 Pickart Mine
Cretaceous Bituminous Coking
16" - 30" bed and 1 foot bed with smaller beds
dip 35°, Analyses, Hundreds of tons produced
Collier (1903)

- PROPOSED HARBOR LOCATIONS; (W.A.A.T.S., 1981) (NOS. 1 THROUGH 6, IN ORDER OF PREFERENCE), (LONGYEAR, 1958), (OPTIONS A AND B, IN ORDER OF PREFERENCE).

- PROPOSED RAILROAD ROUTES; (W.A.A.T.S., 1981), (LONGYEAR, 1958)


- EXISTING ROADS, PROPOSED FOR IMPROVEMENTS; (W.A.A.T.S., 1981)


- PROPOSED TRANSPORTATION ROUTES AND OPTIONS, STATE OF ALASKA DEPARTMENT OF TRANSPORTATION, 1982 (IN PRESS) (A., B., C., D. IN ORDER OF PREFERENCE),
Transportation Alternatives Composite

Explanation of D.O.T. proposed alternative transportation routes and options; (D.O.T., 1982)

D.O.T. 40; Minerals-Locators

option a: Road or railroad west through Kobuk River Valley to Cape Krusenstern.

option b: Road or railroad southwest to Cape Darby.

option c: Road through Bettles to the James Dalton Highway at Prospect Creek area, or railroad to the Alaska Railroad at Nenana.

option d: Railroad southeast to Nenana.

D.O.T. 42; Minerals, NANA and others

option a: Road, railroad, pipeline (tramway), to the east, north of the Wulik River to the coast.

option b: Road, railroad, pipeline (tramway), to the east, south of the Wulik River to the coast.

D.O.T. 43; Coal - state and private

option a: Road east to the coast and barge facility. These options would be intended to supply coal as heating fuel for communities in the region, and possibly fuel for the Red Dog and Lik mines.

option b: Road or railroad south to transportation system developed by NANA and others.

D.O.T. 44; Coal - owners

option a: Road north to Kotzebue Sound and shipping.

D.O.T. 45; Minerals - locators

option a: Road or railroad to Port Clarence.

option b: Road or railroad to Nome.

D.O.T. 94; state and federal

option a: Road to the coast. This coal would be used to generate power and for heating in villages in the region. It might also be a source of power for the region's mineral industry.
REFERENCES:


