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SUMMARY REPORT ON COAL RESOURCE POTENTIAL ASSESSMENT OF THE JARVIS CREEK COAL FIELD

by

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SUMMARY REPORT ON COAL RESOURCE POTENTIAL ASSESSMENT OF THE JARVIS CREEK COAL FIELD

August 19, 1994

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INTRODUCTION

The Department of Natural Resources, Division of Geological and Geophysical Surveys previously described criteria for assessing the coal potential for commercial development of state land (memo dated March 31, 1982, Attachment A) as set forth in regulation 11 AAC 85.010 (Attachment B). Based on the published coal resource classification system of the United States Geological Survey (Wood and others, 1983) the coal-potential-rating system, which ranks four grades as High, Moderate, Low, and No potential, for commercial development of coal on state lands is expanded as shown in Figure 1 (page 2).

LOCATION AND GENERAL GEOLOGY

The Jarvis Creek coal field is the easternmost subfield of the Nenana Coal Province (Merritt and Hawley, 1986) and is situated on the north side of the Alaska Range within the Mt. Hayes C-4 quadrangle in East-Central Alaska (fig. 2). The coal field is approximately three to six miles east of the Richardson Highway and is accessible by a six-miles-long gravel road built along a ridge top to an old coal mine site located on Ober Creek. Published reports with geologic information relating to the Jarvis Creek coal field include Moffit (1942; 1954), Thomas (1943), Toenges and Jolley (1949), Wahrhaftig and Hickcox (1955), Warfield (1970), Belowich (1986, 1988), and Rao (1986). Additional unpublished data is found in Metz and others (1981).

The Jarvis Creek coal field is a small, approximately 16 mi^2, sedimentary basin which unconformably rests on Devonian and older metamorphic basement rocks, collectively referred to as the Birch Creek Schist (fig. 3) (Wahrhaftig and Hickcox, 1955). The unnamed coal-bearing rocks are Tertiary in age and their contact with the underlying Birch Creek Schist consists of weathered and friable schist interpreted as a soil horizon (Wahrhaftig and Hickcox, 1955). The rocks are locally overlain by unconsolidated Quaternary surficial deposits.

COAL BEDS

At least thirty subbituminous coal beds ranging in thickness from less than 1 foot up to 10 feet have been identified in outcrop and drill holes within the Jarvis Creek coal field (Wahrhaftig and Hickcox, 1955; Metz and others, 1981; Belowich, 1986, 1988).

Figure 1. COAL-POTENTIAL-RATING SYSTEM

State of Alaska, Department of Natural Resources, Div. of Geological and Geophysical Surveys (ratings of areas for potential for coal development are subject to change when additional geologic information becomes available, August 1994).

1.) HIGH POTENTIAL – Indicates a high potential for coal development and includes areas where minable reserves have been proven by drilling or detailed field investigations

Land rated as high potential for coal development has an estimated 70 percent to more than 90 percent chance of locating minable coal resources. Resources of minable coal are very likely or known based on drilling, detailed mapping, field observations, and/or outcrop measurements; tonnages of potentially minable coal resources can be estimated based on moderate and high degrees of geologic assurance in order to bracket the possible range of resource magnitude. These are based on the measured and indicated coal resource classifications of Wood and others (1983) as follows: a) measured resources– with a high degree of geologic assurance, the area of coal resource is within 1/4 mile of points of thickness measurement within geologic constraints; b) indicated resources– with a moderate degree of geologic assurance, the area of coal resource is extended 3/4 mile from points of thickness measurement within geologic constraints.

Generally, the thickness of a minable coal bed (by surface and underground techniques) is dependent on its coal rank and should be ≥ 14 inches for anthracite and bituminous coal and ≥ 30 inches for lignite and subbituminous coal (Wood and others, 1983). However, coal seams thinner than these limits shall be considered in high potential ratings if currently being mined locally, especially on adjacent lands. Generally, minable coal beds within these thickness limits will have a total ash content of 15 percent or less on an as–received–basis. However, high-ash coal (more than 15 percent total ash on an as–received–basis) shall be considered in high potential ratings if currently being mined locally

Areas with proven minable coal bed thicknesses and coal quality may be assigned a moderate potential rating if the area is very small and therefore contains currently subeconomic coal reserves.

2.) MODERATE POTENTIAL – Indicates areas of moderate potential for coal development and probably warrants exploration. This classification may refer to areas that are reasonable distances from coal outcrops or drill holes so that significant reserves can be projected and inferred to be present at minable depths; or the area is rated as such due to remoteness, complex geologic structure(s), or other constraints.

Land rated as moderate potential for coal development has an estimated 30-70 percent chance of locating minable deposits of coal. Resources of minable coal are likely based on the reasonable inference of the continuity of coal-bearing rock units from surrounding areas. These are based on the inferred and hypothetical coal resource classifications of Wood and others (1983) as follows: a) inferred resources– with a low degree of geologic assurance, the area of coal resource is extended from 3/4 mile to 3 miles from points of thickness measurement; b) hypothetical resources– with a low degree of geologic assurance, the area of coal resources is extended beyond 3 miles from points of thickness measurement within geologic constraints.

Generally, the thickness of a minable coal bed (by surface and underground techniques) is dependent on coal rank and should be ≥ 14 inches for anthracite and bituminous coal and ≥ 30 inches for lignite and subbituminous coal (Wood and others, 1983). However, coal seams thinner than these limits shall be considered in moderate potential ratings if currently being mined locally and are likely present based on the reasonable inference of the continuity of coal-bearing rock units.

May include areas with proven minable coal bed thicknesses and coal quality if the area is very small and therefore contain currently subeconomic coal reserves.

3.) LOW POTENTIAL – Indicates areas where available evidence for the presence of significant economic coal at minable depths is either lacking or suggests that the area has low potential for coal development.

Land rated as low potential for coal development has an estimated 10-30 percent chance of locating minable coal resources. Resources of minable coal are unlikely based on the distant extrapolation of the continuity of coal-bearing rock units from more removed areas; or coal resources are known at considerable depth (>6000 ft) and are currently noneconomic.

4.) NO POTENTIAL – Indicates areas where known coal-bearing formations are absent and hence, the presence of any coal resources is extremely unlikely and there is no potential for coal production (based on currently available geologic data).

Land rated as no potential has an estimated 0-10 percent chance of locating minable coal resources, resources of minable coal are known not to be present or are extremely unlikely based on drilling, field observations, and/or outcrop measurements. In many cases, surface formations are restricted to basement igneous and/or metamorphic rock or other barren strata.

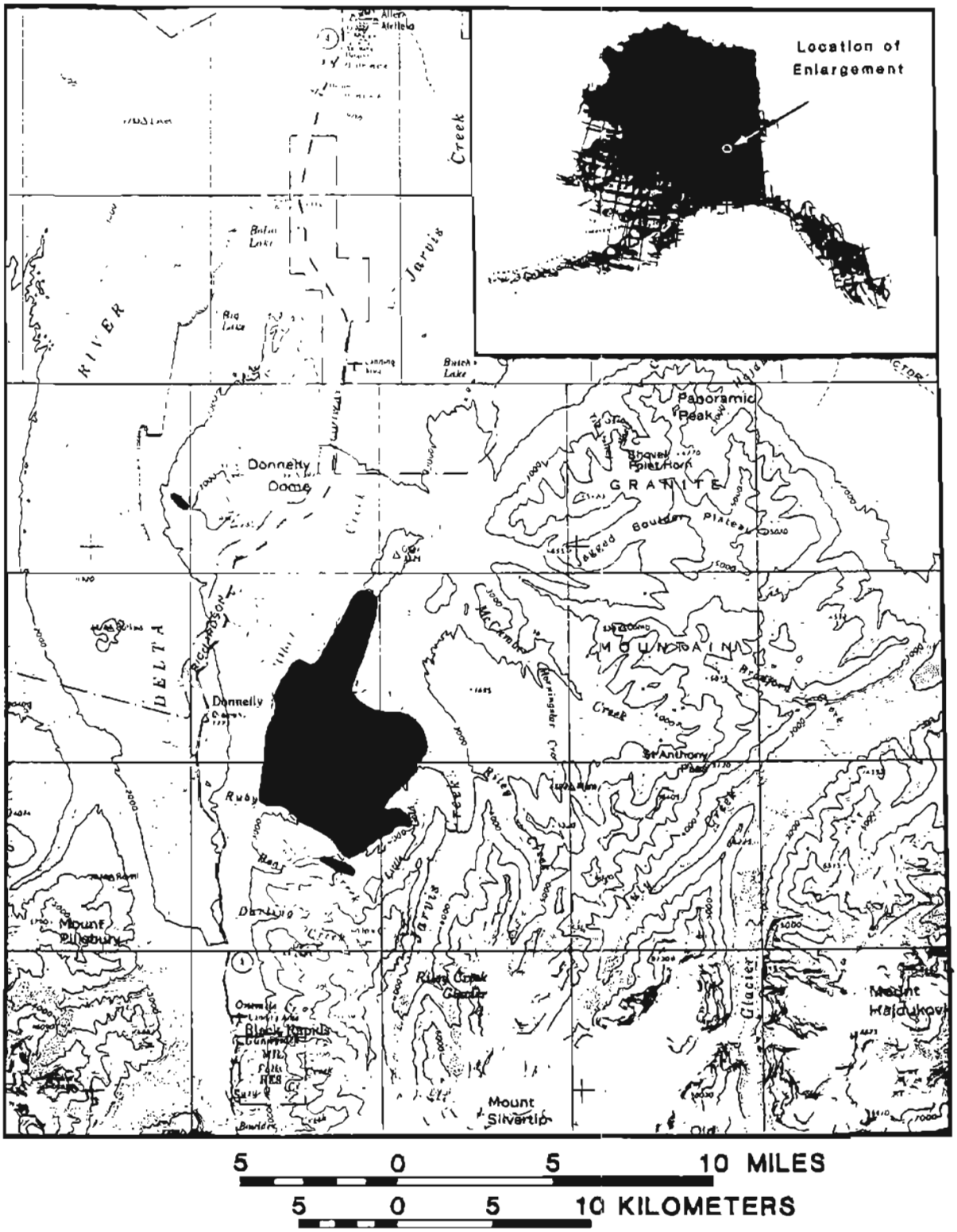

Figure 2. Location of Jarvis Creek coal field (filled in black) in the Mt. Hayes quadrangle, East-Central Alaska. From Belowich (1986), fig. 1, p. 301.

EXPLANATION

Exposure of coal bed

Coal blossom

Clinker from burned coal bed

Area underlain by coal-bearing formation

Limit of area underlain by coal-bearing formation
Dashed where concealed beneath younger deposits

2000

Structure contours on base of coal-bearing formation
Dashed where position is uncertain

4000

Inferred structure contours on former position of base of coal-bearing formation, now removed by erosion

Contact
Dashed where approximately located

Inferred contact

U / D

Fault
U, *upthrown side*; D, *downthrown side*

30

Strike and dip of beds

12

Strike and dip of foliation

3 12

Location of measured section
Figure designations refer to sections on plate II

SEDIMENTARY AND METASEDIMENTARY ROCKS

QUATERNARY

Wind-deposited sand and silt
Cliff-head dunes and blown sand more than 20 feet thick. Shown only east of Jarvis Creek

Qal

Alluvium
Recent stream gravel and alluvial fan deposits

Qtg

Terrace gravel
Stream-deposited gravel capping or underlying terraces 50 feet or more above stream grade; includes kame terrace gravel south of Ruby Creek

Qmy

Younger glacial deposits
Till and glaciofluvial deposits with well-preserved original topography

Qmo

Older glacial deposits
Scattered till mantling hilltops and interfluves; little or no original topography

UNCONFORMITY

TERTIARY

Coal-bearing formation

Tcs

Upper member
Dark-gray claystone and sandstone with scattered coal beds

Tcm

Middle member
Buff arkosic sandstone, with claystone and scattered coal beds; prominent coal and shale zone at base

Tcl

Lower member
Angular quartz sandstone and conglomerate; some claystone, bone, and coal

Tcu

Coal-bearing formation, undifferentiated
Sandstone, claystone, conglomerate and coal

UNCONFORMITY

PRE-CAMBRIAN

pCbc

Birch Creek schist
Quartz-sericite schist

IGNEOUS ROCK

Intrusive rhyolite

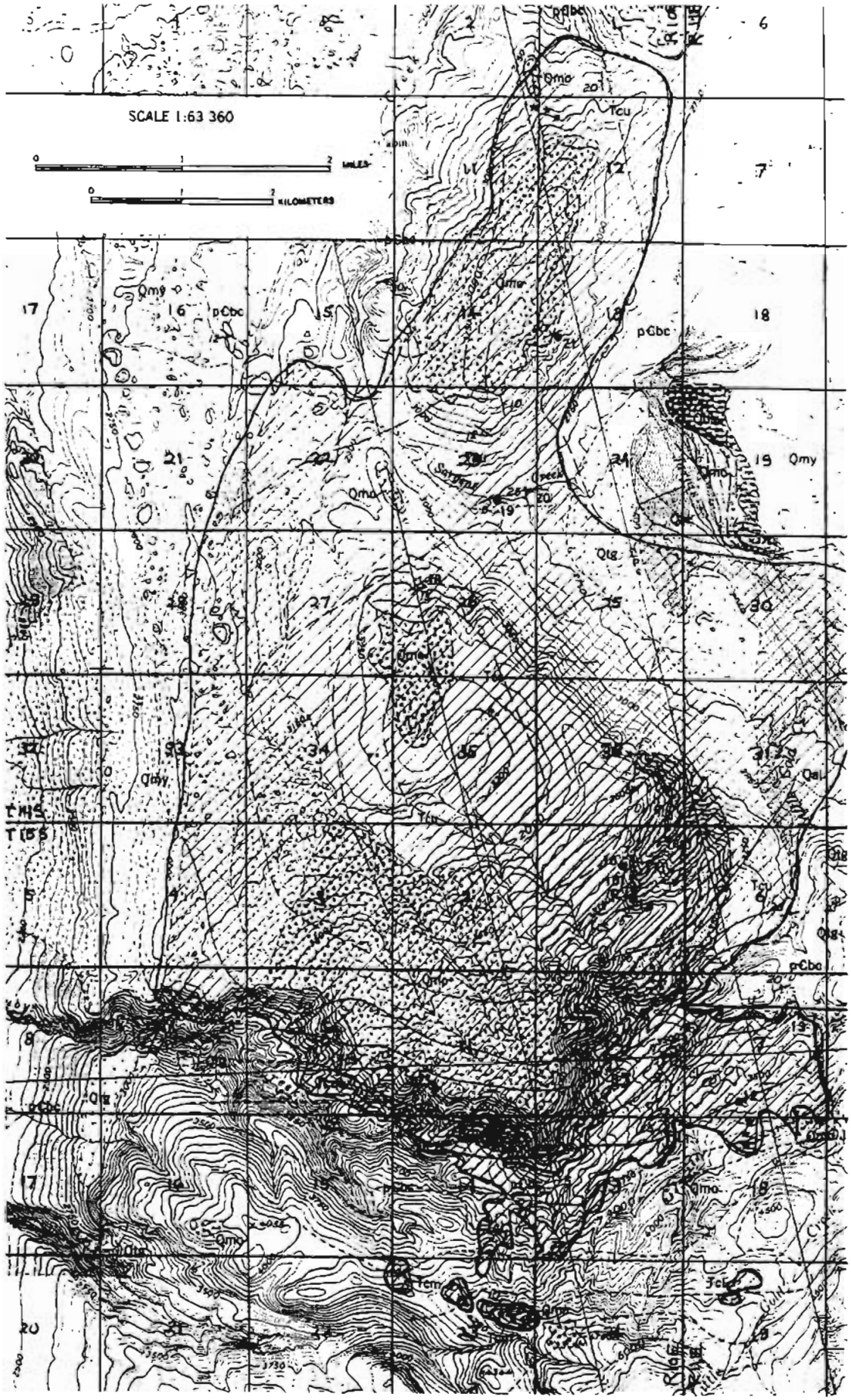

Figure 3. Geologic map of the Jarvis Creek coal field. From Wahrhaftig and Hickcox (1955), plate 10.

Locations of outcrop data points are shown in Figure 5 (1:63,360 scale map of the Mt. Hayes C-4 quadrangle) and summarized in Table 1. Locations of drill hole data points are shown in Figure 6 and summarized in Table 2. The coal-bearing rocks are subdivided into lower, middle and upper members (Tcl, Tcm and Tcs, respectively; fig. 4) based on sandstone composition. These rocks were deposited during Oligocene to Miocene (Tertiary) time and correlate with the Healy Creek Formation (lower and middle members, Jarvis Creek) and Lignite Creek Formation (upper member, Jarvis Creek) of the Healy area (Belowich, 1986).

The lower member (Tcl) is best exposed in the southern part of the coal field, has a maximum thickness of 500 feet, and is characterized by quartz conglomerate and sandstone with beds and lenses of clay, coal, and bone (Belowich, 1988). This member has only one bed thick enough to be considered minable, an 8-ft thick coal bed (*A* seam of Wahrhaftig and Hickcox, 1955) which occurs near the base of the unit.

The middle member (Tcm) is up to 650 feet in thickness and has a basal coal-bearing zone up to 50 feet thick. This member is characterized by arkosic sandstone, silty claystone, thin, lenticular coal beds and numerous iron carbonate concretions (Belowich, 1988). This member crops out only in the south and southeastern part of the Jarvis Creek coal field and contains some coal reserves at its base (*B* and *C* seams of .Wahrhaftig and Hickcox, 1955). This coal zone is laterally continuous for at least two miles (Belowich, 1988). Its maximum observed thickness is approximately 20 feet at its most westerly exposure on upper Ruby Creek. Here, it consists of 11 feet of coal in two separate beds (*B* and *C* seams), and 9 feet of bony coal or fissile carbonaceous shale (Belowich, 1988).

The upper member (Tcs) is predominantly lenticular sandstone, locally concretionary, with interbeds and lenses of siltstone, claystone and coal. This member may be as thick as 900 feet, however, most of the top has been removed by erosion (Belowich, 1988). The upper member occurs throughout the coal field and has fewer beds of minable thickness (Belowich, 1988). Four coal beds which exceed six feet thick occur in the upper member and are probably surface minable.

COAL QUALITY

The heating value (Btu/lb) of Jarvis Creek coals increases down section. Calculated on a moist-mineral matter-free basis, the upper member coals average 9,094 Btu/lb giving an apparent rank of subbituminous C; the middle member coals average 10,006 Btu/lb, giving an apparent rank of subbituminous B; and the lower member coals average 10,593 Btu/lb giving an apparent rank of subbituminous A (Belowich, 1988). Sulfur values are highly variable and range from 0.5 percent to 3 percent (Belowich, 1988). Total ash contents of the Jarvis Creek coals are generally low, with an average of approximately 9 percent for the coal field (Belowich, 1986).

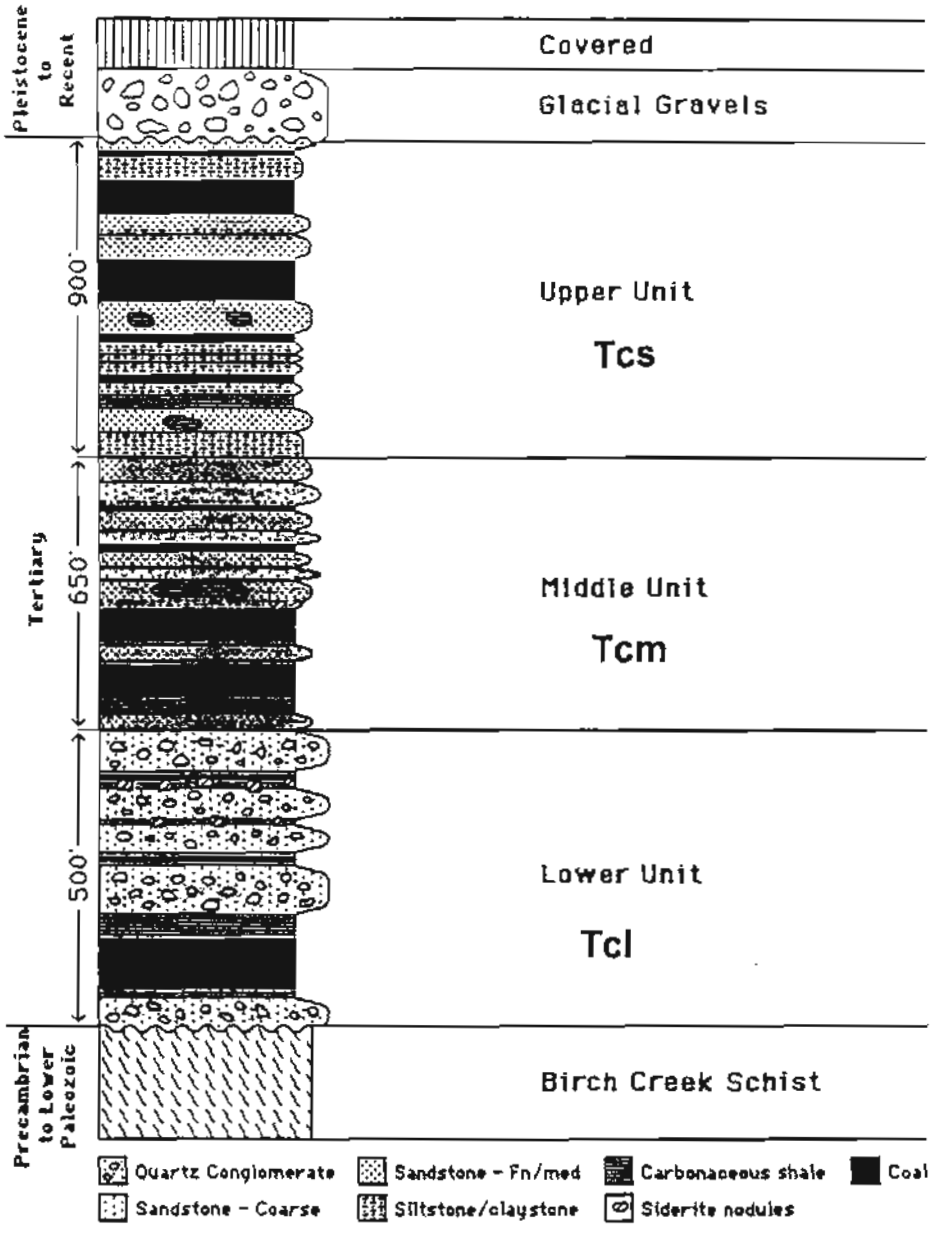

Figure 4. Generalized stratigraphic section for the Jarvis Creek coal field. From Belowich (1986), fig. 2, p. 303.

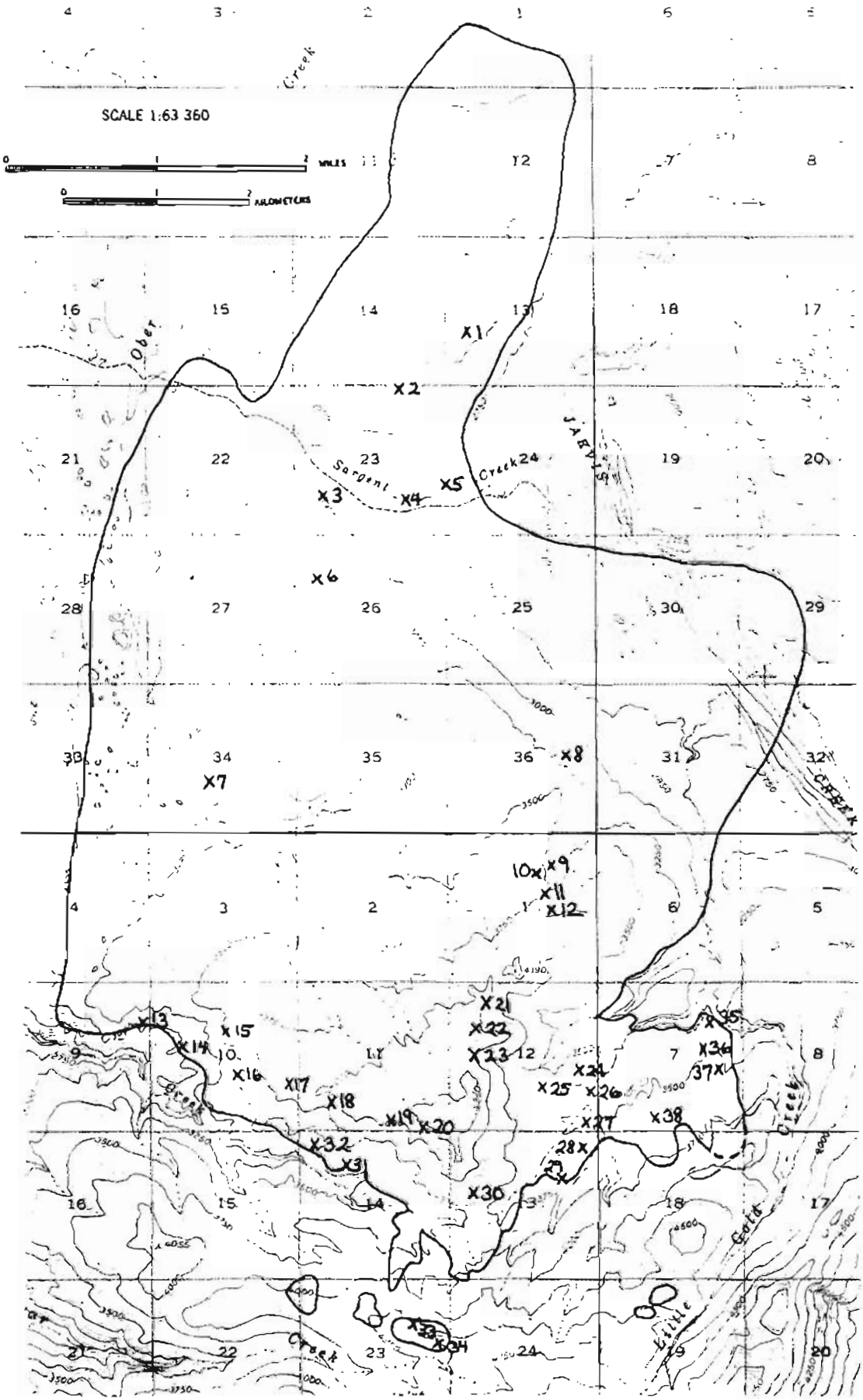

Figure 5. Location of Jarvis Creek coal field outcrop data points given in table 1.

TABLE 1. Outcrops with coal bed thickness data for Jarvis Creek coal field (locations shown on fig. 5).

MAP NO.	MEASURED SECTION(S)	SOURCE[1]	LOCATION			TOTAL COAL THICKNESS (IN FEET)[2]	NO. OF COAL BEDS ≥30" (2.5 FT)[2]	TOTAL MINABLE COAL (IN FT)[2]	MEMBER(S)
			SECTION	TOWNSHIP	RANGE				
1	WH21; BSC4	WH (1955); B (1988)	13	14S	10E	5.5	1	2.5	Tcm
2	BSC3	B (1988)	23	14S	10E	2.5	0	0	Tcs
3	BSC2	B (1988)	23	14S	10E	3	1	3	Tcs
4	WH19; BSC1	WH (1955); B (1988)	23	14S	10E	5.4	1	4.4	Tcs
5	WH20	WH (1955)	24	14S	10E	3.7	0	0	Tcs, Tcm
6	WH18	WH (1955)	26	14S	10E	5.7	0	0	Tcs
7	BJCM	B (1988)	34	14S	10E	13	1	7.5	Tcs
8	BJC1	B (1988)	36	14S	10E	8.5	2	7.5	Tcs
9	WH17; BLGC3	WH (1955); B (1988)	1	15S	10E	27.5	3	8.9	Tcs, Tcm
10	WH16; BLGC2	WH (1955); B (1988)	1	15S	10E	11.4	2	6.6	Tcs
11	WH15	WH (1955)	1	15S	10E	23.3	4	12.2	Tcs
12	WH14; BLGC1	WH (1955); B (1988)	1	15S	10E	2.8	1	2.8	Tcs
13	BRC1	B (1988)	9	15S	10E	13.3	2	5	Tcm
14	BRC2a	B (1988)	10	15S	10E	0	0	0	Tcm
15	BRC2b	B (1988)	10	15S	10E	7	1	2.5	Tcs
16	BRC3	B (1988)	10	15S	10E	8.5	0	0	Tcm
17	WH1; BURC1	WH (1955); B (1988)	10	15S	10E	32.8	4	11.7	Tcs
18	WH3; BURC3	WH (1955); B (1988)	11	15S	10E	88.5	11	35.3	Tcs, Tcm
19	BURC4	B (1988)	11	15S	10E	8.75	2	5.5	Tcs
20	BURC5	B (1988)	11	15S	10E	10	1	3	Tcs
21	WH7; BUC10	WH (1955); B (1988)	12	15S	10E	30.5	4	14.1	Tcs
22	WH6	WH (1955)	12	15S	10E	9.2	0	0	Tcs
23	BUC9	B (1988)	12	15S	10E	31	3	16	Tcs
24	WH10; BUC7	WH (1955); B (1988)	12	15S	10E	29.7	4	22	Tcm
25	WH8; BUC8	WH (1955); B (1988)	12	15S	10E	37.7	5	31.1	Tcm
26	WH9	WH (1955)	12	15S	10E	26.1	2	13	Tcm, Tcl
27	BUC2	B (1988)	12	15S	10E	9	1	8	Tcl
28	WH11	WH (1955)	13	15S	10E	19.2	5	18.6	Tcl
29	BUC1	B (1988)	13	15S	10E	8.5	1	7.5	Tcl
30	WH5; BRGD1	WH (1955); B (1988)	13	15S	10E	20.5	3	13.2	Tcm
31	BURC2	B (1988)	14	15S	10E	13	2	11	Tcm
32	WH4	WH (1955)	14	15S	10E	4.3	1	4.3	Tcm, Tcl

(TABLE 1 continued)

33	WH2; BURC7	WH (1955); B (1988)	23	15S	10E	4.6 (bone)	1	4.6	Tcm, Tcl
34	BURC6	B (1988)	23	15S	10E	2.5	0	0	Tcl
35	WH13	WH (1955)	7	15S	11E	11.6	2	11.6	Tcl
36	BUC4	B (1988)	7	15S	11E	6	1	6	Tcl
37	BUC3	B (1988)	7	15S	11E	2	0	0	Tcl
38	WH12	WH (1955)	7	15S	11E	7	1	7	Tcl

[1] WH (1955)=Wahrhaftig and Hickcox (1955); B (1988)=Belowich (1988)
[2] Thickness for outcrop coal seams were determined from graphic columnar sections (plate 2, Belowich, 1988) and are therefore approximate.

TABLE 2. Drill holes with coal bed thickness data for Jarvis Creek coal field (locations shown on fig. 6).

DRILL HOLE NO.	SOURCE[1]	LOCATION			TOTAL COAL THICKNESS (IN FEET)[2]	NO. OF COAL BEDS ≥30" (2.5 FT)	TOTAL MINABLE COAL (IN FT)[2]	MEMBER
		SECTION	TOWNSHIP	RANGE				
W1	W (1970)	34			~8.5	1	~3 (bone)	Tcs
W2	W (1970)	34			~5.7	1	~3	Tcs
W3	W (1970)	34			~17.6	2	~14.5	Tcs
W4	W (1970)	34			~12	1	~2.5	Tcs
W5	W (1970)	34			13.6	1	9.2	Tcs
W6	W (1970)	34			~24	4	~19	Tcs
W7	W (1970)	34			12.7	2	12.7	Tcs
W8	W (1970)	34			ƒ	ƒ	ƒ	Tcs
W9	W (1970)	34			3.5	0	0	Tcs
W10	W (1970)	34			0	0	0	Tcs
W11	W (1970)	34			0	0	0	Tcs
MB3	M (1981)	34			16.5	2	12.5	Tcs
MB4	M (1981)	34			15.5	1	10	Tcs
MB5	M (1981)	34			17.5	3	15.5	Tcs
MB6	M (1981)	34			16.5	2	12.5	Tcs

[1] W (1970)=Warfield (1970); M (1981)=Metz and others (1981).
[2] Thicknesses approximate where preceded by ~.
ƒ Drilling difficulty, drill hole terminated above mine seam (Warfield, 1970).

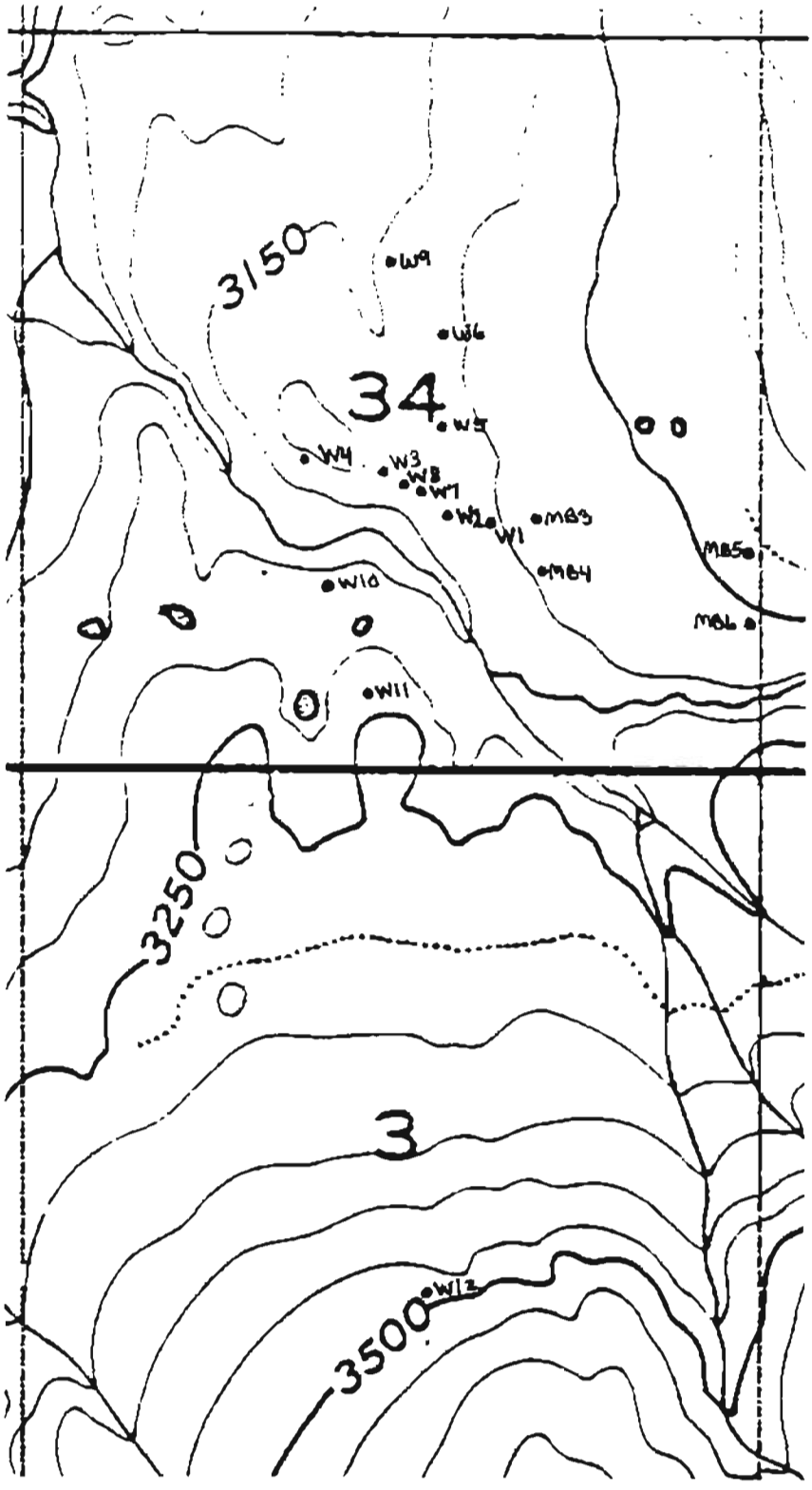

Figure 6. Location of Jarvis Creek drill hole data points in sections 34 and 35, T 14 S, R 10 E, given in table 2.

OVERBURDEN

The nature, thickness and characteristics of strata adjacent to potentially minable beds of coal is important in determining the potential for commercial development of the Jarvis Creek coal field. Belowich (1988) indicates that all of the Jarvis Creek coals are overlain by less than 1500 feet of overburden, with the upper member (Tcs) coals within 100 feet of the top of the plateau, providing a very favorable stripping ratio. The thick, laterally continuous *B* and *C* coal zone (base of middle member, Tcm) dips at an angle of up to 23 degrees into the base of high bluffs and may be difficult to mine by open pit methods (Wahrhaftig and Hickcox, 1955). Metz and others (1981) predicted an initial 2:1 stripping ratio and an ending 5:1 stripping ratio for a proposed mine on Ober Creek.

Belowich (1988) sampled and analyzed the overburden for environmentally unfavorable trace elements and indicates "negligible concentrations" of Cd, Pb, and Be are present. Belowich (1988) concludes that reclamation of the Jarvis Creek coal field could proceed without unusual expense or adverse effects on the environment.

COAL RESERVES

Utilizing available drill hole and outcrop data, Belowich (1988) calculated the measured, indicated, inferred and hypothetical coal reserves (based on coal beds greater than 2.5 feet thick) for the Jarvis Creek coal field. Reserve estimates are provided for each member and are shown in Table 3. Inferred reserves (within 3/4 mile of points of thickness measurement) total over 227 million short tons and hypothetical reserves (over 3 miles from points of thickness measurement) are estimated at greater than 533 million short tons (Belowich, 1988). Previous reserve estimates for the coal field include Wahrhaftig and Hickcox (1955) - 7.5 million short tons inferred; and Metz and others (1981) - 100 million short tons inferred. The increases in coal reserves from the early estimates by Wahrhaftig and Hickcox (1955) to the more recent and much higher tonnage estimates provided by Belowich (1988) can be attributed to the addition of new geologic information. Future drilling and detailed geologic investigations in the Jarvis Creek coal field can further refine these coal reserve estimates. For example, Belowich (1988) indicates that the 533 million short tons of hypothetical coal reserves is based, in part, on the assumption that the major *B* and *C* coal zone (middle member, Tcm) is continuous and underlies most of the Jarvis Creek coal field to the north, a premise that can only be proven by additional drilling.

	*Aggregate Coal Seam Thickness	Measured Reserves	Indicated Reserves	Inferred Reserves	Hypothetical Reserves
Upper Unit	86.3	12,220,080 (18)	27,718,200 (9)	149,529,600 (7)	421,401,600
Middle Unit	28.0	3,964,800 (7)	7,009,200 (2)	77,880,000 (2)	112,147,700
Lower Unit	8.0	1,132,800 (1)	2,265,600 (1)	—	—
Totals	122.3	17,317,680	36,993,000	227,409,600	533,548,800

* denotes total cummulative thickness of coals in each unit greater than 2.5 feet.

Table 3. Coal reserve estimates in short tons for the Jarvis Creek coal filed. Numbers in parentheses mark the number of coal seams used in that particular reserve calculation. From Belowich (1988), table 5, p. 90.

COAL RESOURCE POTENTIAL

Coal resource potential assessment of the Jarvis Creek coal field is facilitated by the very detailed paper and M.Sc. thesis of Belowich (1986, 1988) and the previous detailed work of Wahrhaftig and Hickcox (1955) and Warfield (1970). Most coal fields in Alaska lack detailed exploration studies and drill hole data and are therefore more difficult to assess. Based on interpretations of all available coal resource data summarized above, the coal resource potential of the Jarvis Creek coal field is given by township, range and section in Table 4 and shown in Figure 7 (in pocket). The entire coal field generally has a moderate to high potential for coal development based on the criteria set forth in the Coal–Potential–Rating System, given in Figure 1.

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TABLE 4. Potential for commercial coal development, Jarvis Creek coal field, based on Coal-Potential-Rating System.

LOCATION			POTENTIAL FOR COMMERCIAL COAL DEVELOPMENT 1 HIGH; 2 MODERATE; 3 LOW; 4 NO
TOWNSHIP	RANGE	SECTION	
T14S	R10E	1	2 MODERATE; 4 NO
⇓	⇓	2	2 MODERATE; 4 NO
⇓	⇓	11	2 MODERATE; 4 NO
⇓	⇓	12	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	13	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	14	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	15	2 MODERATE; 4 NO
⇓	⇓	21	2 MODERATE; 4 NO
⇓	⇓	22	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	23	1 HIGH; 2 MODERATE
⇓	⇓	24	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	25	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	26	1 HIGH; 2 MODERATE
⇓	⇓	27	1 HIGH; 2 MODERATE
⇓	⇓	28	2 MODERATE; 4 NO
⇓	⇓	33	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	34	1 HIGH; 2 MODERATE
⇓	⇓	35	1 HIGH; 2 MODERATE
⇓	⇓	36	1 HIGH; 2 MODERATE
T14S	R11E	29	2 MODERATE; 4 NO
⇓	⇓	30	2 MODERATE; 4 NO
⇓	⇓	31	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	32	2 MODERATE; 4 NO
T15S	R10E	1	1 HIGH; 2 MODERATE
⇓	⇓	2	1 HIGH; 2 MODERATE
⇓	⇓	3	1 HIGH; 2 MODERATE
⇓	⇓	4	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	9	1 HIGH; 4 NO
⇓	⇓	10	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	11	1 HIGH; 2 MODERATE
⇓	⇓	12	1 HIGH; 2 MODERATE
⇓	⇓	13	1 HIGH; 4 NO
⇓	⇓	14	1 HIGH; 4 NO
⇓	⇓	15	1 HIGH; 4 NO
⇓	⇓	22	2 MODERATE; 4 NO
⇓	⇓	23	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	24	1 HIGH; 4 NO
⇓	⇓	25	4 NO
⇓	⇓	26	4 NO
⇓	⇓	27	4 NO
⇓	⇓	34	4 NO
⇓	⇓	35	4 NO
⇓	⇓	36	4 NO
T15S	R11E	6	1 HIGH; 2 MODERATE; 4 NO
⇓	⇓	7	1 HIGH; 4 NO
⇓	⇓	18	1 HIGH; 4 NO
⇓	⇓	19	3 LOW; 4 NO

ATTACHMENT A

MEMORANDUM State of Alaska

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

TO: Laurel Murphy
Minerals Adjudicator Manager
Div. of Minerals & Energy Mgt.

DATE: March 31, 1982

FILE NO:

TELEPHONE NO: (907) 474-7147

FROM: Roy D. Merritt
Coal Geologist

SUBJECT: Evaluation of Alaska's Coal Potential

As per your request, we have completed a preliminary evaluation of the coal potential of Alaska's patented and tentatively approved lands. However, this evaluation is very generalized; if you require a more detailed study of specific blocks (i.e., certain townships), please let us know.

A modification of the coal-potential-rating system developed by Eakins and Clough for evaluating applications for coal prospecting permits was used for this assessment. As you know, this method ranks four grades of relative coal potential:

1. Indicates a high potential for coal development and includes areas where reserves have been proven by drilling or detailed field investigations.

2. Indicates areas of moderate potential for coal development and probably warrants exploration. This classification may refer to areas that are reasonable distances from coal outcrops or drill holes so that significant reserves can be projected and inferred to be present; or the area is rated as such due to remoteness, complex geology (structure), or other constraints.

3. Indicates areas where available evidence for the presence of significant coal at mineable depths is either lacking or suggests that the area has a low potential.

4. Indicates areas where coal-bearing formations are absent and hence, there exists no possibility for coal production.

The coal resources for areas of state patented and tentatively approved land have been classified by quadrangle (see appended generalized state-land-activity map). The coal potential has been evaluated for those areas with reported coal occurrences or known fields and overlapping state patented or tentatively approved lands.

Detailed reserve figures and resource evaluations, in the manner of the U.S. Geological Survey and U.S. Bureau of Mines, cannot be computed at this time for Alaskan coal deposits. A data base must be

developed in these regions, and this will require a long-term commitment by the State of Alaska for coal-field investigations.

This obviously is a hasty assessment of the overall coal-development potential in Alaska, and we must emphasize the preliminary nature of this work. It is definitely open to question, and refinements in rankings can be made as further information becomes available. Because of the lack of subsurface data in most areas of Alaska, significant undetected coal resources may exist.

The coal-potential lines shown on the quadrangle maps only broadly outline coal basins or known coal occurrences. These boundaries do not infer that all areas within the encircled regions are of high, moderate, or low potential, but that one or typically several land blocks within the outlined area can be classed as such on the basis of known coal occurrences, extent, and character.

The potential rankings have also been tabulated along with pertinent comments about the character of the coals, and an appended listing of key references is included for each quadrangle. It is interesting to note (but frustrating when faced with this type of evaluation) that detailed geologic mapping has not been completed for most of these quadrangles. However, the available coal-resource studies and geologic maps are listed.

We hope that this work will be of benefit. If you have further questions or require assessment of specific blocks of land, please feel free to call upon us.

Enclosures

cc: Ross Schaff
Bill Barnwell

ATTACHMENT B

CHAPTER 85.
COAL

Article
1. Competitive Leasing (11 AAC 85.005–11 AAC 85.020)
2. Noncompetitive Leasing (11 AAC 85.100–11 AAC 85.120)
3. General Leasing Provisions (11 AAC 85.200–11 AAC 85.285)

Editor's Note: This chapter replaces 11 AAC 84.100 – 11 AAC 84.170 which were repealed 6/18/82. The history lines of sections which evolved directly from repealed sections reflect the history of the provision before that date.

ARTICLE 1.
COMPETITIVE LEASING

Section
5. Leasing procedures in general
10. Competitive designation
15. Bidding terms
20. Right to reject bids

11 AAC 85.005. LEASING PROCEDURES IN GENERAL. Land designated as competitive for coal leasing purposes will be leased under the procedures provided in this chapter and in 11 AAC 82.400 – 11 AAC 82.475. (Eff. 9/5/74, Reg. 51; am 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.010. COMPETITIVE DESIGNATION. (a) Except as provided in (b) of this section, state land will be designated as competitive for coal leasing purposes if the coal potential of the land for commercial development has been determined to be high or moderate by the division of geological and geophysical surveys after reviewing all available data. Land will be ranked as high potential if potentially commercial reserves are proven by drilling or field investigation. Land will be ranked as moderate potential if the probable existence of potentially commercial reserves is indicated by proximity to coal outcrops or drill holes.

(b) Land may not be designated as competitive for coal leasing purposes if the commissioner determines that there exists an irreconcilable conflict with surface use, and that coal

development is not the highest and best use of the land. (Eff. 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.015. BIDDING TERMS. (a) The commissioner will choose an appropriate leasing method and bid variable, including but not limited to, cash bonus, royalty share, or net profit share. The written finding prepared under AS 38.05.035(e) must contain the rationale on which the leasing method decision was based.

(b) Notwithstanding 11 AAC 82.465, the commissioner will, in his discretion, defer up to 50 percent of any cash bonus payments, provided that notice of the deferred bonus payment and method of payment is published before the sale. (Eff. 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.020. RIGHT TO REJECT BIDS. The commissioner will, in his discretion, reject any or all bids, and offer the lease to the next highest qualified bidder if the successful bidder fails to obtain the lease for any reason. The commissioner will not accept any bid that is less than the minimum bid established before the sale. The commissioner will notify any bidder whose bid has been rejected and include in the notice a statement of the reason for the rejection. (Eff. 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

ARTICLE 2.
NONCOMPETITIVE LEASING

Section
100. Leasing procedures in general
105. Noncompetitive designation
110. Coal prospecting permits
115. Permit extensions
120. Permit conversion to lease

11 AAC 85.100. LEASING PROCEDURES IN GENERAL. Land designated as noncompetitive for coal leasing purposes will be leased under the procedures provided in this chapter and in 11 AAC 82.500 – 11 AAC 82.540. (Eff. 9/5/74, Reg. 51; am 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.105. NONCOMPETITIVE DESIGNATION. (a) Except as provided in (b) of this section, state land may be designated as noncompetitive for coal leasing purposes if the commissioner determines that

(1) the land does not qualify for competitive leasing under 11 AAC 85.010; or

(2) the land was offered at a competitive sale and no acceptable bids were received.

(b) Land may not be designated as noncompetitive for coal leasing purposes if the commissioner determines that there exists an irreconcilable conflict with surface use, and that coal development is not the highest and best use of the land.

(c) Land opened for noncompetitive leasing before June 18, 1982 is closed for noncompetitive leasing until the land is reevaluated, and opened under 11 AAC 85.205. (Eff. 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.110. COAL PROSPECTING PERMITS. (a) The commissioner will issue a coal prospecting permit only for land designated as noncompetitive.

(b) A coal prospecting permit issued under this section is a disposal of an interest in land and is subject to the requirements of AS 38.05.035(c), AS 38.05.830, AS 38.05.945, and AS 38.05.946.

(c) A permit for noncompetitive land on which all or part of a permit or lease is expired, relinquished, or otherwise terminated will be issued under the noncompetitive drawing procedure described in 11 AAC 82.515 – 11 AAC 82.540.

(d) An application for a coal prospecting permit

will be handled in an expeditious manner and a decision to deny an application or to initiate the disposal process will be issued within 65 days after the receipt of a completed application.

(e) The filing of an application for a coal prospecting permit does not vest a property right but merely creates a preference right to any permit that may be issued.

(f) Before beginning exploration, a coal prospecting permittee shall file a written notice of intent to explore or obtain an explanation permit, as appropriate, under 11 AAC 90.161 – 11 AAC 90.167 before beginning exploration. No separate prospecting plan of operations is required.

(g) No coal may be removed and marketed or used from lands under prospecting permit except for that amount necessary for sampling and testing.

(h) A copy of all data obtained from the land reflecting all pertinent tests, reports, surveys, and analyses conducted on or pertaining to the permit area must be submitted to the commissioner either upon application for conversion to lease under 11 AAC 85.120 or not more than 90 days after the expiration or termination of the permit. Data submitted under this section will be held confidential in accordance with AS 38.05.035(a)(9) or as otherwise required by law and will only be used for the administration of the functions, responsibilities and duties vested by law in the commissioner. (Eff. 6/18/82, Reg. 82; am 9/28/86, Reg. 99)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.115. PERMIT EXTENSIONS. (a) A permittee may apply for an extension of the term of a coal prospecting permit under AS 38.05.150(c). An application for extension must include

(1) an affidavit stating that the permittee spent an average of at least five dollars per acre per year during the permit period on work which increased the permittee's knowledge of the coal deposit within the area, in accordance with the terms of the permit;

(2) a description of prospecting activities showing to the commissioner's satisfaction, that the permittee substantially complied with the notice of intent to explore or the exploration permit required under 11 AAC 85.110(f) or a statement showing to the commissioner's satisfaction that that compliance was delayed or interrupted by force majeure; and

(3) any additional information requested by the commissioner.

(b) Failure to provide the information or to make a showing as required by (a) of this section will result in denial of an application.

(c) An application for extension of a coal prospecting permit must be filed at least 30 days before the expiration of the permit.

(d) Within 21 days after receipt, the commissioner will review the application for completeness and notify the applicant of any deficiency. A decision will be issued within 65 days after receipt of a completed application. The filing of an application for an extension suspends the expiration of the original term of the permit until the application is either approved or denied.

(e) Repealed 9/28/86.

(Eff. 9/5/74, Reg. 51; am 6/16/82, Reg. 82, am 9/28/86, Reg. 99)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

11 AAC 85.120. PERMIT CONVERSION TO LEASE. (a) At any time during the term of a coal prospecting permit, the permittee is entitled to a noncompetitive coal lease on that portion of the permit area shown to contain coal in commercial quantities or to be needed for mining, reclamation or processing operations of that coal, upon the submission of a satisfactory mining plan.

(b) A plan submitted under (a) of this section may be conceptual and must include

(1) reserve calculations for the coal beds which are classified as to the degree of accuracy using the terms "measured," "indicated," and "inferred" as defined in United States Geological Survey Circular 831 (1980);

(2) qualitative data supported by proximate analyses and calorific values of the coal beds on which the reserve calculations are based;

(3) quantitative data describing coal-bed thickness and continuity on which the reserve calculations are based;

(4) topographic and geologic maps of the area of the permit, indicating the locations of sampling and drilling;

(5) a description of the probable mining method;

(6) evidence of commercial quantities of coal, including the estimated revenues from the sale of coal and the estimated costs of development of the mine and of extracting, removing, processing, transporting, and marketing the coal; the costs of development must include the estimated cost of exercising environmental protection measures, suitably reclaiming the land, and complying with all applicable federal, state, and local laws and regulations; and

(7) any documentation or information that the commissioner requires, in addition to or instead of (1) – (6) of this subsection, to assist in understanding and evaluating the conversion of a prospecting permit to a lease.

(c) In this section, a "satisfactory mining plan" is a plan which shows commercial quantities of coal in an amount and quality determined by the commissioner to be sufficient under present and reasonably anticipated conditions to induce a prudent operator to pursue development.

(d) As required in 11 AAC 85.110(h), an application for conversion to lease must include a copy of all data obtained from the permit land.

(e) Within 21 days after receipt, the commissioner will review the application for completeness and notify the applicant of any deficiency. A decision will be issued within 65 days after receipt of a completed application. The filing of an application for conversion to lease suspends the expiration of the term of the permit until the application is either approved or denied. A decision denying conversion to lease will be accompanied by a detailed description of the grounds or rationale on which the denial is based. (Eff. 9/5/74, Reg. 51; am 6/18/82, Reg. 82)

Authority: AS 38.05.020
AS 38.05.145
AS 38.05.150

Editor's Note: Circular 831 described in 11 AAC 85.120(b)(1) is available from the United States Geological Survey, Public Inquiries Office, 508 West 2nd Avenue, Anchorage, Alaska 99501.

ARTICLE 3.
GENERAL LEASING PROVISIONS

Section
200. Best interest determination
205. Reevaluation
210. Statement of conformity to acreage limitations
215. Lease terms
220. Royalty
225. Royalty value computation
230. Royalty in kind
235. Lease rental
240. Rental and royalty relief
245. Coal lease bond
250. Plan of operations
255. Transfer of interest
260. Limitation on overriding royalties
265. Suspension and termination
270. Coal mining units
275. Cooperative leasing
280. Surface Mining Control and Reclamation Act
285. (Repealed)