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COAL LICENCES 117, 118, 121, and 122

NTS 95D-11 and 95D-14

ROCK RIVER AREA, YUKON TERRITORY

WATSON LAKE MINING DIVISION

Latitude  $60^{\circ} 30'$  to  $61^{\circ} 00'$

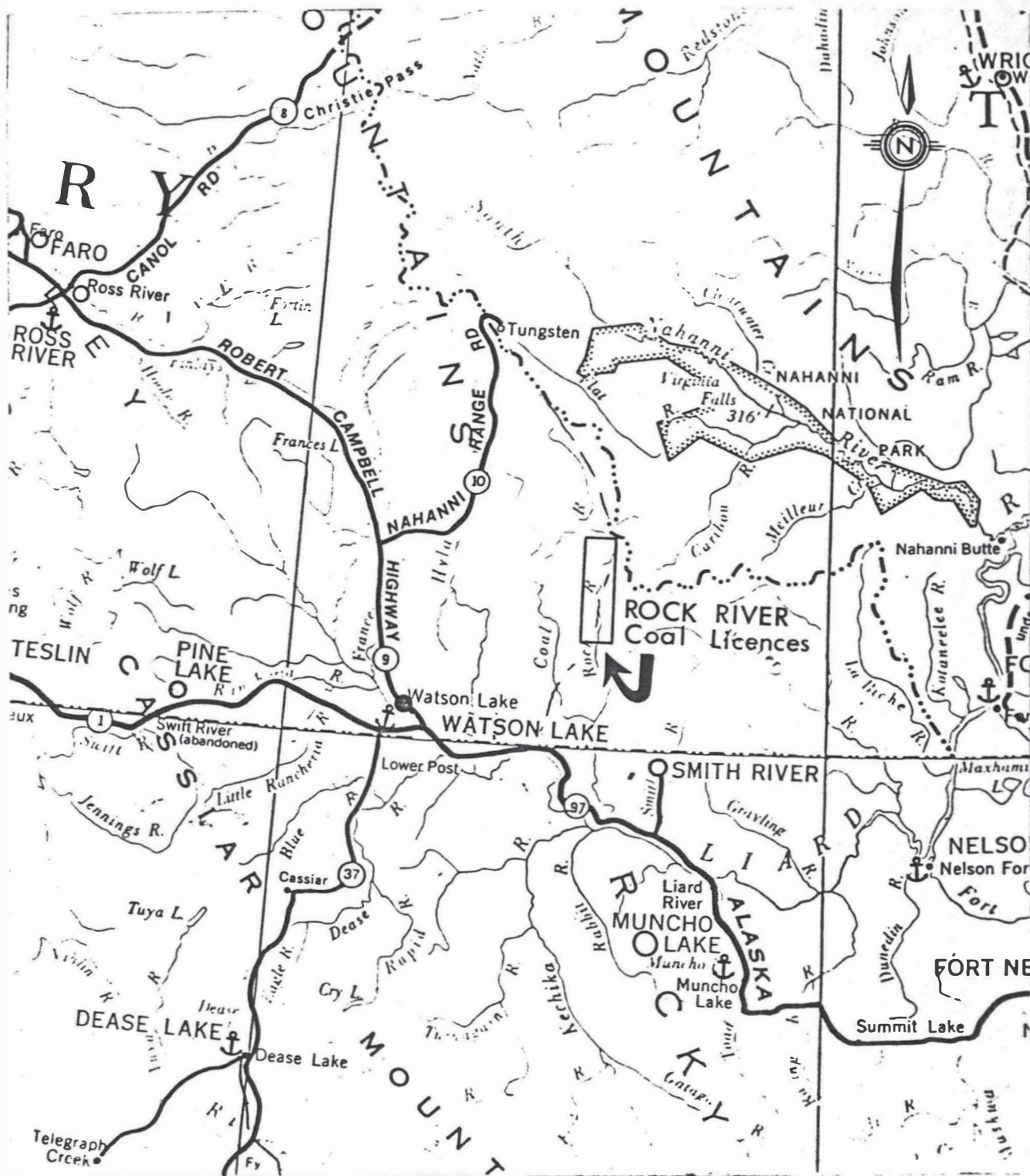
Longitude  $127^{\circ} 00'$  to  $127^{\circ} 15'$

Submitted by:

D.C. Miller,  
Senior Geologist

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SCALE 1: 3,168,000

Conting 50 miles  
 Horewood Pass 140  
 Mase for 120  
 Fen 240

50 miles to Orona Highway  
 50 miles to Conting Road.



**BULPETRO MINERALS LIMITED**  
 KAMLOOPS, BRITISH COLUMBIA

**INDEX MAP**  
**Rock River Coal Licences**  
 Yukon

Drawn by: JCH

N.T.S.: 95 .105

Date: Oct. 14, 1981

Figure No.:

### Location and Access

The centre of the coal licence area is located 121 km northeastward of Watson Lake, Yukon. Access to the area is by helicopter. The coal licences straddle the Rock River Valley where topography is minimal and nearly flat-lying deposits of clay, silt, sand and gravel are dissected by tributary streams of the Rock River.

### Property

The property comprises the following coal licences:

<u>Licence #</u>	<u>NTS Area</u>	<u>Acres</u>	<u>Commencement Date</u> (3 year period)
117	95D-11 S.E.Q.	47,107	July 25, 1980
118	95D-11 N.E.Q.	47,107	July 25, 1980
121	95D-14 S.E.Q.	46,742	July 25, 1980
122	95D-14 N.E.Q.	46,742	July 25, 1980

Coal licences 115, 116, 119, and 120 were formerly held and adjoined the currently held licences to the west. Following ground surveys, rights to coal licences 115, 116, 119, and 120 were relinquished on July 25, 1981. Sulpetro Minerals Limited has the exclusive right to prospect for coal for a 3 year period commencing in July 1980, on licences 117, 118, 121, and 122.

To date, assessment work totalling \$35,466.33 has been submitted and approved. A total of \$2072.87 is required to hold licences 117, 118, 121, and 122 until July 25, 1982. Based on 1981 drilling, over \$200,000 worth of assessment work is pending. Although all drilling was done on licence 118, it may be possible to divide the work over all licences based on the division of 1980-81 assessment work.

### Geology

The coal licences are underlain by Tertiary age coal bearing sediments and Quaternary till and fluvial deposits. These deposits are bounded by Paleozoic

sedimentary rocks on all sides.

Coal crops out on licence 118 on the south bank of an eastward flowing tributary of the Rock River. The exposed coal is approximately 9 metres thick and dips 15 degrees westward. The coal is dull brown to black and contains resinous material. The seam is overlain by 9 metres of clay and a further 15 metres of clay, sand and gravel.

Although this is the only coal outcrop known on the licences, extensive coal float of similar appearance is found along the Rock River and one other tributary stream.

Outcrop Coal Analyses

<u>Description</u>	<u>% Moisture</u>	<u>% Ash</u>	<u>% VM</u>	<u>% FC</u>	<u>% S</u>	<u>Btu/lb</u>
(Outcrop, Average of Two Samples)	(as received)					
	33.14	7.46	32.54	26.87	.61	6780
	(air dried)					
	8.32	10.28	44.56	36.84	.73	9295

Diamond Drilling *Caron Diamond Drilling Ltd.*

Between August 23 and September 16, 1981, 5 diamond drill holes were completed on a spacing of about one kilometre near the coal outcrop. These holes ranged from 122 to 162 metres in depth. Coal intersected by holes 81-1 and 81-2 occurs in thick seams with numerous thin clay interbeds. The best section of coal was intersected in hole 81-1 from 17.07 - 45.72 metres. This section contains 87% coal with 13% clay or coaly clay partings. This coal contains an average of 6714 Btu/lb. with 16.83% ash and 0.86% sulphur at equilibrium moisture (26.2%). A summary of drilling results is listed in the following table:

<u>Hole #</u>	<u>Metres</u>		<u>% Coal</u>	<u>% E.M.</u>	<u>% R.M.</u>	<u>% Ash</u>	<u>% V.M.</u>	<u>% FC</u>	<u>% S</u>	<u>Btu/lb</u>	
	<u>Depth</u>	<u>Intercept</u>									
RR-81-1	0-17.07	17.07	0	No Core - Overburden							
	17.07-45.72	28.65	87	26.2	23.7	17.9	30.8	27.9	0.89	6923	

*all partings > 15% included*

Hole #	Metres		% Coal	% E.M.	% R.M.	% Ash	% V.M.	% FC	% S	Btu/lb
	Depth	Intercept								
RR-81-1 Cont'd.	45.72-60.35	14.63	66	26.1	24.7	20.1	28.4	26.8	1.44	6530
	60.35-79.55	19.20	30	23.4	21.0	20.9	31.1	27.0	1.70	6803
	79.55-88.85	9.30	23	21.2	19.5	33.0	25.4	22.0	1.22	5399
	88.85-117.65	28.80	14	24.7	22.9	21.0	28.5	27.6	1.20	6666
	117.65-153.01	35.36	<u>75</u>	21.9	18.8	34.8	24.7	21.7	2.12	5389
			<u>53.7</u>							
RR-81-2	0-34.14	34.14	0	No Core - Overburden						
	34.14-57.30	23.16	44	27.6	25.0	19.0	29.6	26.4	1.2	6682
	57.30-96.62	39.32	47	23.5	19.4	33.8	26.7	20.0	1.6	5336
	96.62-111.10	14.48	67	28.2	22.6	18.2	30.3	28.8	1.3	7073
	111.10-141.73	30.63	<u>50</u>	19.7	13.6	44.5	22.8	19.1	2.8	4711
			<u>49.9</u>							
RR-81-3	0-25.13	25.13	0	No Core - Overburden						
	25.13-85.72	60.59	15	23.9	18.6	33.4	27.0	21.0	1.3	5512
	85.72-162.15	76.43	<u>8</u>	19.3	15.2	44.3	21.9	18.6	1.9	-
			<u>11.1</u>							
RR-81-4	0-12.80	12.80	0	No Core - Overburden						
	12.80-24.99	12.19	0	Quaternary gravel, sand, clay.						
	24.99-68.83	43.84	3	Few thin seams ranging from 2 - 26 cm; no analyses.						
	68.83-136.25	67.42	<u>17</u>	21.6	13.8	50.0	20.0	16.2	2.3	-
			<u>11.5</u>							
RR-81-5	0-8.23	8.23	0	No Core - Overburden						
	8.23-122.53	114.30	Less than 1% Coal							

NOTE: E.M. = Equilibrium Moisture; R.M. = Residual Moisture; V.M. = Volatile Matter; F.C. = Fixed Carbon; S = Sulphur; all analyses quoted on air dry basis.

## Reserves

Open pit mining with a low stripping ratio appears feasible for coal in the upper sections of holes 1 and 2. Considering the intervals 17.07 - 79.55 metres in hole 1 and 34.14 to 57.30 metres in hole 2, reserves are estimated at 63,000,000 tonnes at equilibrium moisture (26.33%) with 17.6% ash, 1.12% sulphur and with a thermal content of 6635 Btu/lb. The stripping ratio would be approximately 2:1 (waste:coal). Each hole is assumed to have an area of influence of 1 square kilometre. In actual mining, the thermal content would approach 6000 Btu/lb. and the ash content 30% if thin clay partings are unseparable from coal.

Reserves could be increased by including deeper coal sections or coal stratigraphically above the collar elevation of hole 1.

As the 1981 drilling tested only a small area, the potential is good for the discovery of similar deposits within the Tertiary basin.

## Work to Date

Work to date includes the following:

1. Helicopter assisted prospecting and geological survey;
2. topographic mapping at 1:10,000 and 1:50,000 scales, 5 metre contour interval;
3. completion of 5 diamond drill holes totalling 717.81 metres;
4. coal analyses and electrologging of all holes;
5. filing and acceptance of assessment work covering the period July 1980 to July 1981.

## Conclusions

The coal discovered to date is suitable for on site thermal power development. If further coal is discovered, a liquefaction plant might be considered.

A gravity survey followed by diamond drilling of anomalous areas is recommended to complete a preliminary assessment of the coal licences.

Respectfully submitted:



D.C. Miller,

December 7, 1981

1981 10 19

Mr. William C. Leuschner  
Sulpetro Limited  
3200 Bow Valley Square 3  
255 - 5 Avenue S.W.  
Calgary, Alberta  
T2P 3G8

Dear Mr. Leuschner:

RE: ROCK RIVER COAL DEPOSIT, Y.T.

We are pleased to send you the enclosed information on the above deposit on the request of Mr. D. C. Miller of Sulpetro Minerals Limited in Kamloops. We shall try to answer any questions you may have concerning it.

Yours sincerely,



L.B. Halferdahl, Ph.D., P.Eng.

LBH/mt

encl.

✓ cc Mr. D. C. Miller

In 1981 five holes were drilled within about 3 km of an outcrop of coal about 9 m thick along a small tributary of the Rock River near the centre of a block of Tertiary sediments about 45 km long in a northerly direction by about 5½ km wide, possibly a graben. Coal float has been found along the length of the Rock River within this block of Tertiary strata. Drillhole 1 intersected the most coal, with the coal measures dipping up to about 10° westerly. The coal intersected in drillhole 2, though less, is apparently correlatable with that in drillhole 1. Coal in the other three holes was absent or almost absent. The following comments and summary are based on downhole and lithological logs, and analytical data from drillhole 1, with the following parameters:

- 1) All mining will be by surface methods.
- 2) Individual coal seams less than 90 cm thick will not be mined.
- 3) Split seams as thin as 60 cm thick are mineable if the splits are separated by partings less than 90 cm thick.
- 4) Partings thicker than 15 cm will be selectively removed during mining.
- 5) Coal with more than 30 per cent ash on an air-dry basis will not be mined.

These parameters result in several mineable coal intervals as listed in the accompanying table. To a depth of 79.55 m mineable coal intervals total 28.45 m averaging about 6750 Btu/lb at equilibrium moisture. For each square kilometre in-place reserves to a depth of 60.00 m are estimated at about 33 million tonnes with a stripping ratio of 1.07 bank m<sup>3</sup>/tonne at drillhole 1, and to a depth of 79.55 m at about 38½ million tonnes with a stripping ratio of 1.32 bank m<sup>3</sup>/tonne also at drillhole 1. Coal at greater depths or with ash contents of more than 30 per cent will increase these reserves, as will mineable coal higher in the stratigraphic section than that intersected in drillhole 1. Stripping to depths of up to 50 m to 60 m is the most economical for large draglines, as greater depths require rehandling. Stripping ratios less than 10 to 1 are often considered economical, and those less than 3 or 4 to 1 are very favorable. The extent of the coal float along the Rock River suggests reserves several times the preceding amounts.

This coal appears to be very similar to that at Hat Creek in Central British Columbia, but the seams are thinner and ultimate reserves are expected to be less but with rapid thickening in short distances. As the quality of the Rock River coal is too low to permit transporting it far from the Yukon at present, the most likely market for such coal is as fuel for a minemouth power plant. Depending on market studies of the power demands for Watson Lake, developing but not yet producing metal mines within economic distances such as the lead-zinc mine at Howards Pass, and the Lenid and Macmillan Pass tungsten mines, and the Alaska Highway pipeline, the annual production of coal from Rock River could reach the range of one-half to one million tonnes or more. Prices paid for similar coal in Alberta are based on the costs of mining plus a profit, probably of one to two dollars per tonne. In the Yukon, a somewhat higher profit might be possible, because the costs of electricity produced by alternate methods are probably much higher.

Although the quality of the Rock River coal appears suitable for the production of synthetic natural gas, exploration is required to establish reserves of at least 250 million tonnes, the minimum usually required for a synthetic natural gas operation. For

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such production the proximity of the expected Alaska Highway pipeline will be an advantage, but the large reserves of natural gas closer to markets are a disadvantage. Liquefaction is probably a better bet, but like synthetic natural gas, large reserves must be found. Not enough is known about the economics of either of these developing processes to comment here.

*L. B. Halferdahl*

Edmonton, Alberta  
1981 10 16

L. B. Halferdahl, Ph.D., P.Eng.

COAL SEAM DATA FROM DRILLHOLE 1; ROCK RIVER COAL PROSPECT

Seam	Depth (m)		Thickness (m)		S.G. (air dry)	At Equilibrium Moisture		
	Top	Bottom	Seam	Coal		Ash %	Moist %	Btu/lb
J4	16.85	19.00	2.15 ) 0.15p )	6.55	1.37	16.01	26.7	6769
J3	19.15	21.90	2.75 ) 0.30p )					
J2	22.20	23.10	0.90 ) 1.50p )					
J1	23.25	24.00	0.75 )	7.30	1.45	21.89	22.8	6287
H2	24.85	26.85	2.00 ) 0.15p )					
H1	27.00	28.05	1.05 )	7.30	1.37	18.73	24.7	6668
G3	31.30	33.10	1.80 ) 0.30p )					
G2	33.40	38.10	4.70 ) 0.20p )	7.30	1.31	11.09	27.5	7332
G1	38.30	39.10	0.80 )					
F	42.20	44.05	1.85	1.85	1.38	20.45	25.9	6347
E	50.90	53.35	2.45	2.45	1.30	13.08	25.6	7329*
D2	56.30	57.35	1.05 ) 0.50p )	3.20	1.33	19.49	27.7	6208
D1	57.85	60.00	2.15 )					
B2	71.95	72.80	0.85 ) 0.50p )	2.25	1.44	19.58	23.5	6611*
B1	73.30	74.70	1.40 )					
A	77.65	79.55	1.80 ) 1.80	1.80	1.44	20.18	23.0	6528
Total	-	-	-	28.45	-	-	-	-
Average	-	-	1.78	3.56	1.36	15.92	26.2	6750
Range	-	-	0.75	1.85	1.30	11.09	22.8	6208
			2.75	7.30	1.45	21.89	28.7	7332

\* Btu/lb will be slightly lower than those listed when a few partings less than 15 cm thick are included.

p - parting

2.15  
27.2

18.75  
27.2 x 100 = 68.9%

5.65  
15.95 x 100 = 58.9%  
4.35  
17.55 x 100 = 20.9%