R

EXPLORATION ACTIVITIES

OF

NORMAN H. URSEL ASSOCIATES LIMITED

WHITEHORSE TROUGH, YUKON TERRITORY

1970

March 25, 1971.

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INTRODUCTION

Favourable horizons of the Laberge Group (Jurassic) and Tantalus formation (Jurassic or Cretaceous) were explored for coal in the Whitehorse Trough area of the Yukon by Norman H. Ursel Associates Limited during the field work period July 9 to September 9, 1970.

A mobile crew consisting of a geologist and a prospector investigated areas between Braeburn Lake and Tatchum Creek (north of Carmacks). The crew travelled by truck carrying a field camp which was used whenever it was to more advantage than available accommodations. Coal occurrences reported in Geological Survey of Canada publications were examined, and the coal measures were prospected for new occurrences. Topographic maps (1:50,000 series) and air photographs were used for field location. Channel samples, taken at least 5 to 10 feet from the original outcrop surface, were freshly exposed by trenching or bench cutting. Several cycles of drilling, blasting, and mucking were required in most cases. The samples were submitted for proximate analysis, and some for maceral and ultimate analysis.

A McPhar TV-1 scintillometer was operated on nearly all coal prospecting traverses and coal locality examinations since some of the geological conditions favourable for sandstone-type uranium and/or coal-associated uranium occurrences are present.

In the following, the exploration work is discussed by areas.

AREAS INVESTIGATED

Tatchum Creek

An area extending west of Tatchum Creek along the south side of the Yukon River was considered to be favourable because a synclinal structure indicated on a Geological Survey of Canada map (Bostock, 1936, Figure 1) could possibly place the sediments in the favourable upper horizons of the Laberge Group. In addition, coaly shale occurs on the west limb of the same indicated structure, in the vicinity of Five-Finger Rapids. The area was prospected, and outcrop was found to be sparse. Thick bedded to massive, coarse-grained, orange weathering sandstone outcropping on the west bank of Tatchum Creek, about 300 feet above its mouth, strikes 351° and dips 41° NE. This indicates that an anticlinal fold occurs to the west, and therefore the favourable synclinal structure is smaller than anticipated. Coalified plant fragments up to 2 inches long occur in the above sandstone, and black shale or

claystone was found on the west side of Tatchum Creek, but no coal or coal float was discovered.

Five-Finger Mine

The old Five-Finger Mine area was prospected first by traversing to the west from the Dawson-Whitehorse Road, and later from Carmacks by chartered boat on the Yukon River. A camp was set up, the area prospected, and the lowermost of the two seams previously mined was found outcropping a short distance north of the caved entrance to the oldest workings. This locality is on the steep east bank of the Yukon River where recent mudflow and mudslide deposits are common. The seam was opened up by making a bench cut as deep as ground stability would allow, and a channel sample was taken (Sample 18-8-70-11). Local stratigraphic sections were measured, and two units were found which should be useful as markers. These are both very thick bedded or massive, and one is a dolomitic, fresh water limestone, and the other a sandstone with small scale grain size and colour layering. Both units contain distinctive black plant fossils which are elongated perpendicular to bedding, and appear to be roots (or possibly stems).

The coal seam was measured at different places, giving widths of 3.9, 3.5, and 3.1 feet, the latter at the immediate channel site. The seam, which at this locality dips 16° SE, contains a few thin mud partings, and the immediate roof and floor are both dark brown, coaly claystone which might be

partially removed in mining if necessary to provide a greater working height.

Carmacks Area

The coal-bearing horizons of the Tantalus formation were explored from the old Tantalus Mine, east of Carmacks on the south side of the Yukon River, southeastward across an area of recent trench exposures of coal. This was done to gain familiarity with these rocks, which were to be explored later in a less prospected area much further south.

A channel sample was taken across the lower 13.7 feet of a 18.5 foot thick seam in one of the northernmost trenches. (Sample 11/8/70-10). This was a smaller than standard channel, and no attempt was made to expose a fresh face for sampling, since in this case a rough idea of coal quality was adequate.

Coal Creek to Bush Mountain Area

Rocks mapped by Cairnes (1910, Map 10A) as belonging to the Tantalus formation were prospected to the east of the Whitehorse-Dawson Road, in an area from the south side of Bushy Mountain, south to Coal Creek (NTS Sheet 115 H/16E). A few thin coal beds, locally thickened up to 5 feet, were found at different horizons and at different localities along strike. The coal and associated dark shale commonly are extensively deformed, while the sandstone and conglomerate units above and below them, though steeply dipping, may have essentially

parallel bedding attitudes. In other words, the successive competent units exhibit fairly regular attitudes which define the limb of a large fold, while the interbedded, incompetent shale and coal exhibit intricate folds. In several places coal beds changed abruptly from a thickness of about 1 foot to more than 3 feet due to repetition by tight folding plus some flow. Similarly abrupt thickness variations, not involving repetition by folding but thickening and thining by rock flow, suggest that some larger thickened bodies of coal may occur near the noses of the larger fold structures.

The coal in this area is intensively cleated and/or crushed so that lumps larger than 1 inch cubes are rare. Channel samples were taken to determine if this condition, when not entirely due to mechanical crushing, indicated that the coal was low in volatile matter. The samples (23/7/70-1, 23/7/70-5, and 5/9/70-1) were taken from near Coal Creek (north side). Additional sampling of occurrences to the north would be useful in evaluating this area.

Braeburn Lake, Coal Exploration Licence Area NWQ 105E-5

The area is underlain by a series of northwest-trending synclinal and anticlinal folds containing the Laberge Group, which is coal bearing in its upper part in an immediately adjacent area to the west and southwest. There the coal outcrops on the east limb of a syncline in which the younger Tantalus formation

is present. In the next syncline to the east, whose east limb occurs on our licence area, the Tantalus formation is also present, overlying the Laberge Group. The presence of the Tantalus formation suggests the possibility that the favourable upper Laberge horizons occur in the western part of the licence area.

The coal in the area to the west was reported (Cairnes, 1910, Map 11A) at two localities about 7 miles apart along strike. The southernmost locality, which is about 4 miles west southwest of the southwest corner of the licence area, is on the north slope of Division Mountain, and the exposures are on the north side of a small creek. One 7 foot seam, one 4 foot seam, and several smaller seams were reported. Recent trenching in the area has disclosed a coal unit about 45 feet thick, which is essentially one thick "seam", but which includes, in addition to some thin clay and sand partings, a 2.5 foot thick unit consisting of thinly interbedded light brown siltstone and fine-grained sandstone. Average attitude of the hanging wall coarse-grained sandstone is 139°, 77° SW, and of the footwall coarse-grained sandstone is 131°, 72° SW.

Two horizontal channel samples (standard, 3" x 4") were taken at 6 to 10 feet below the original outcrop surface, at the bottom of a bulldozed trench, one from each side of the siltstone/sandstone unit. The channel on the hanging wall side was 8.8 feet long (26/7/70-1) and that on the footwall side

8.3 feet long (27/7/70-1). Both channel samples were ended in coal, since at the time of sampling only this width (about 8.8 + 2.5 + 8.3 feet) was exposed in the trench. These samples were taken to obtain some idea of the quality of coal which might be expected in the same horizons in Licence Area NWQ 105E-5.

The southwest portion of the licence area, where the favourable upper Laberge Group horizons are expected to occur, has little outcrop. The westernmost Laberge Group unit found in outcrop, is a polymictic, pebble to cobble conglomerate, with both rounded and angular rudaceous material, and a greenish grey, coarse grained, gritty sandstone matrix. The thick to very thick resistant beds dip 65 - 80° SW. Between this unit and the stratigraphically lowest outcropping Tantalus beds, there is an unexposed stratigraphic interval which could be as much as 3,800 feet thick. This interval is overly sufficient to accommodate the favourable upper horizons of the Laberge Group, which possibly contain a thick coal seam similar to that on the adjoining property.

Reconnaissance work was carried out to obtain stratigraphic-structural information on the Laberge Group in portions of the licence area to the east. The major rock types are greywacke-type conglomerate, sandstone, argillite, and red sandstone, however, no firm conclusions, having a direct bearing on the search for the upper favourable horizons, can be drawn from this preliminary work in the eastern sector.

Discussion and recommendations

The upper Laberge Group contains high volatile C bituminous rank coal in the northern part of the Whitehorse Trough and sub-bituminous rank coal in the Braeburn Lake area to the south. Because of the substantial seam thickness found in the latter area, it seems advisable to first search for mineable deposits here, and then extend the search to the north. This work should have priority over exploration of the Tantalus formation in the Coal Creek area, where seam thicknesses are generally small, and erratically variable.

Geological mapping, structural-stratigraphic field work, and some bulldozer trenching is recommended for the Braeburn Lake licence area. The stratigraphic work should include an examination of the coal bearing area west of the licence area. A joint-venture with holders of adjacent licence areas may be worked out.

All of which is respectfully submitted,
NORMAN H. URSEL ASSOCIATES LIMITED

Edwin L. Speelman

Edwin L. Speelman, B.Sc.

ELS:tjf

March 25, 1971.

REFERENCES

Bostock, H.S. (1936) Carmacks District, Yukon: Geological Survey of Canada, Memoir 189.

Cairnes, D.D. (1910) Lewes and Nordenskiold Rivers Coal District: Geological Survey of Canada, Memoir 5.

APPENDIX 1

COAL SAMPLE ANALYSES

Location	Sample Number
Five-Finger Mine	18/8/70-11
Carmacks Area	11/8/70-10
Coal Creek	23/7/70-1
	23/7/70-5
	5/9/70-1
Braeburn Lake	26/7/70-1
	27/7/70-1

Mines Branch
Fuels Research Centre

CANADA

Department of Energy, Mines and Resources

File 2968-70

Solid Fuels Laboratory

Ottawa Sept. 4, 1970

REPORT OF ANALYSIS

Sample of Coal submitted by Norman H. Ursel Associates Ltd. designated as Yukon Coal

Date Received		Aug 24, 1970			
Sample Mark		NHUA-18-8-70-11			
Moisture Condition		Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis					
Moisture	%	8.4	0.0		
Ash	%	16.7	18.2		
Volatile Matter	%	32.8	35.8		
Fixed Carbon (By Difference)	%	42.1	46.0		
Ultimate Analysis					
Carbon	%				
Hydrogen	%				
Sulphur	%	0.2	0.3		
Nitrogen	%				
Ash	%				
Oxygen (By Difference)	%				
Calorific Value	Btu/lb Gross	9830	10740		

Moist, Mm-free 12,300

Fusibility of Ash		
Initial Deformation Temperature	°F	
Softening Temperature	°F	
Hemispherical Temperature	°F	
Fluid Temperature	°F	
Grindability Index, Hardgrove		

Screen Analysis
Screen Size

Screen Size	%
	%
	%
	%
	%
	%
	%

Caking properties Non Agglomerate

Remarks: Rank (A.S.T.M.) High Volatile "C"

Reported by: W.J. Montgomery *W.J. Montgomery*
Head, Solid Fuel Laboratory

D. Montgomery
Dr. D.S. Montgomery,
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CANADA

Mines Branch
Fuels Research Centre

Department
of
Energy, Mines and Resources

File 2955-70

Solid Fuels Laboratory

Ottawa Sept. 4, 1970

REPORT OF ANALYSIS

Sample of Coal submitted by Norman H. Ursel Associates Ltd., designated as Yukon Coal

Date Received. . . . . Aug. 21, 1970

Sample Mark. . . . . NHUA 11-8-70-10

	Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis					
Moisture. . . . . %		15.1	0.0		
Ash. . . . . %		~~18.9~~	~~22.2~~		
Volatile Matter. . . . . %		25.6	30.1		
Fixed Carbon (By Difference) . . %		40.4	47.7		
Ultimate Analysis					
Carbon. . . . . %					
Hydrogen. . . . . %					
Sulphur . . . . . %		0.3	0.4		
Nitrogen. . . . . %					
Ash. . . . . %					
Oxygen (By Difference). . . . . %					
Calorific Value. . . . .Btu/lb Gross		7740	9110		

Fusibility of Ash

Initial Deformation Temperature. °F	
Softening Temperature. . . . . °F	
Hemispherical Temperature. . . . °F	
Fluid Temperature. . . . . °F	

Grindability Index, Hardgrove. . .

Screen Analysis

Screen Size

_____ %
_____ %
_____ %
_____ %
_____ %
_____ %

Caking Properties Non Agglomerate

Remarks: Rank (A.S.T.M.) Subbituminous "B"

Reported by: W.J. Montgomery
Head, Solid Fuels Laboratory

D.S. Montgomery

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Department
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File 2919-70

Solid Fuels Laboratory

Ottawa August 18, 1970

REPORT OF ANALYSIS

Sample of coal submitted by Norman H. Ursel Associates Ltd. as per advice dated July 27, 1970 designated as Channel Sample north side Coal Creek.

Date Received	August 6, 1970			
Sample Mark	NHUA-23-7-70-1			
Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis				
Moisture %	19.3	0.0		
Ash %	20.2	25.0		
Volatile Matter %	14.7	18.2		
Fixed Carbon (By Difference) %	45.8	56.8		
Ultimate Analysis				
Carbon %				
Hydrogen %				
Sulphur %	0.6	0.7		
Nitrogen %				
Ash %				
Oxygen (By Difference) %				
Calorific Value Btu/lb Gross	7890	9780		

Fusibility of Ash

Initial Deformation Temperature °F	
Softening Temperature °F	
Hemispherical Temperature °F	
Fluid Temperature °F	

Grindability Index, Hardgrove

Screen Analysis

Screen Size	
	%
	%
	%
	%
	%
	%

Caking properties non agglomerate.

Remarks: Rank (ASTM) Subbituminous "B"

Reported by: W.J. Montgomery

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Mines Branch
Fuels Research Centre

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File 2920-70

Solid Fuels Laboratory

Ottawa August 18, 1970

REPORT OF ANALYSIS

Sample of coal submitted by Norman H. Ursel Associates Ltd. as per advice dated July 27, 1970 designated as Channel Sample north side Coal Creek.

Date Received	August 6, 1970			
Sample Mark	NHUA-23-7-70-5			
Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis				
Moisture %	14.0	0.0		
Ash %	50.9	59.2		
Volatile Matter %	11.2	13.0		
Fixed Carbon (By Difference) %	23.9	27.8		
Ultimate Analysis				
Carbon %				
Hydrogen %				
Sulphur %	0.5	0.6		
Nitrogen %				
Ash %				
Oxygen (By Difference) %				
Calorific Value Btu/lb Gross	4080	4750		

Fusibility of Ash

Initial Deformation Temperature °F	
Softening Temperature °F	
Hemispherical Temperature °F	
Fluid Temperature °F	

Grindability Index, Hardgrove

Screen Analysis

Screen Size	
	%
	%
	%
	%
	%
	%

Caking Properties Non Agglomerate.

Remarks: **Rank (ASTM) Subbituminous "C"**

Reported by: D.S. Montgomery

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Mines Branch
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Department
of
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File 3192-70

Solid Fuels Laboratory

Ottawa Oct. 14, 1970.

REPORT OF ANALYSIS

Sample of coal submitted by Norman H. Ursel Associates Limited as per advice dated Sept. 21,1970 designated as Yukon coal.

Date Received	Sept. 21, 1970			
Sample Mark	NHUA 5-9-70-1			
Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis				
Moisture %	8.0	0.0		
Ash %	11.8	12.9		
Volatile Matter %	13.7	14.9		
Fixed Carbon (By Difference) %	66.5	72.2		
Ultimate Analysis				
Carbon %				
Hydrogen %				
Sulphur %	0.6	0.7		
Nitrogen %				
Ash %				
Oxygen (By Difference) %				
Calorific Value .Btu/lb Gross	9510	10340		
Fusibility of Ash				
Initial Deformation Temperature °F				
Softening Temperature °F				
Hemispherical Temperature °F				
Fluid Temperature °F				
Grindability Index, Hardgrove				

Screen Analysis

Screen Size

_____ %
_____ %
_____ %
_____ %
_____ %
_____ %

Coking properties Nonagglomerate

Rank (A.S.T.M.) Subbutminous "A"

Remarks:

Reported by: W.J. Montgomery, Head,
Solid Fuels Laboratory.

D.S. Montgomery

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CANADA

Mines Branch
Fuels Research Centre

Department
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Energy, Mines and Resources

File 2921-70

Solid Fuels Laboratory

Ottawa August 18, 1970

REPORT OF ANALYSIS

Sample of coal submitted by Norman H. Ursel Associates Ltd. as per advice dated July 27, 1970 designated as Channel Sample, north slope Division Mountain.

Date Received	August 6, 1970			
Sample Mark	NHUA-26-7-70-1			
Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis				
Moisture %	22.5	0.0		
Ash %	13.4	17.3		
Volatile Matter %	26.5	34.3		
Fixed Carbon (By Difference) %	37.6	48.4		
Ultimate Analysis				
Carbon %				
Hydrogen %				
Sulphur %	0.2	0.3		
Nitrogen %				
Ash %				
Oxygen (By Difference) %				
Calorific Value Btu/lb Gross	7490	9660		

Fusibility of Ash

Initial Deformation Temperature °F	
Softening Temperature °F	
Hemispherical Temperature °F	
Fluid Temperature °F	

Grindability Index, Hardgrove

Screen Analysis

Screen Size

% % % % % %

Caking Properties Non Agglomerate.

Remarks: Rank (ASTM) Subbituminous "C"

Reported by: W. Montgomery

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Mines Branch
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File 2922-70

Solid Fuels Laboratory

Ottawa August 18, 1970

REPORT OF ANALYSIS

Sample of coal submitted by Norman H. Ursel Associates Ltd. as per advice dated July 27, 1970 designated as Channel Sample north side Division Mountain.

Date Received	August 6, 1970			
Sample Mark	NHUA-27-7-70-1			
Moisture Condition	Equilibrium Moisture	Dry	As Rec'd	Dry
Proximate Analysis				
Moisture %	17.8	0.0		
Ash %	~~21.1~~	~~25.7~~		
Volatile Matter %	25.4	30.9		
Fixed Carbon (By Difference) %	35.7	43.4		
Ultimate Analysis				
Carbon %				
Hydrogen %				
Sulphur %	0.3	0.3		
Nitrogen %				
Ash %				
Oxygen (By Difference) %				
Calorific Value Btu/lb Gross	6980	8490		
Fusibility of Ash				
Initial Deformation Temperature °F				
Softening Temperature °F				
Hemispherical Temperature °F				
Fluid Temperature °F				
Grindability Index, Hardgrove				

Screen Analysis

Screen Size

_____ %
_____ %
_____ %
_____ %
_____ %
_____ %

Caking Properties Non Agglomerate.

Remarks: Rank (ASTM) Subbituminous "C"

Reported by: D.S. Montgomery

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