Gran Valn. ISL - DOH RIVER -7-7(1) of ASH RIVER PROJECT VANCOUVER ISLAND HUDBAY COAL COMPANY 1979-08-01 (C.LICENCES DROPPED) C.L. N.05 . H2 84- 4303 GEOLOGICAL BRANCH ASSESSMENT REPORT U0040



# Hudbay Coal Company

A Division of Hudson's Bay Oil and Gas Company Limited

Telephone (403) 231-3711 - 700 Second Street S.W. - Calgary, Alberta, Canada T2P 0X5

1979-11-15 M AND P	INISTRY OF MINES ETPOLEUM DEGOURCES
Rec'd	NOV 2 7 1979
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Energy, Mines and Petroleum Resources Province of British Columbia Attn. Mr. A. Matheson, Coal Inventory Group VICTORIA, British Columbia V8V 1X4

Dear Alex:

Thank you very much for your comments and help during my Victoria visit on November 8th.

As I mentioned, our firm is somewhat new to the British Columbia exploration scene and therefore has had its problems in following the regulatory processes for such basic exploration programs. However, please find enclosed a complete program report on our Port Alberni venture. If there are any problems with this, please do not hesitate to call.

We would appreciate the maximum period of confidentiality on this report if possible.

Sincerely,

R.(S. Gee, P. Geol. Director Coal Exploration

RSG:ma Encl.

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### LIST OF ILLUSTRATIONS

Figure I	General Location Map	HC 1902R
	Structure Profiles	
	A-A <sup>1</sup>	HC 2136S
	B-B1	HC 2137S

### MAPS

Location and Accessbility	1:50,000	HC	1869 L40
Geology Map	1:20,000	HC	450(a)
Correlation Chart	1:500	HC	2374-L32

#### 1.0 SUMMARY

The Ash River Project consisted of evaluating coal-bearing lands in the Ash River Valley on Vancouver Island. The Ash River lands were held under an option and sale agreement with Ramm Venture Corporation. The Ash River property consists of a series of twenty coal licences (CL 4284 to CL 4303) encompassing 5182 hectares.

The coal licences are located in the central part of Vancouver Island approximately 26 air kilometres northwest of Alberni, British Columbia in the general area of geographic coordinates 49° N and 125° 02 W. (See Accessibility and Lease Map).

During June and July 1979, 14 drillholes (1280 metres) were completed on the Ash River lease block. The drilling consisted of 13 drillholes to define structure and stratigraphy and one drillhole to core the coal. All the holes were geophysically logged using Gamma-Ray-Neutron, Density and Caliper. When drilling conditions permitted a Focus-beam log was also used. The original program was budgeted for \$150 000.00. However, results dictated that the program be terminated early. The total estimated cost to complete the program was \$120 000.00. The infield supervision and preliminary geological report draft was conducted and prepared by R. J. Talbot, P. Geol. of the TJT Holdings Limited, Calgary, Alberta.

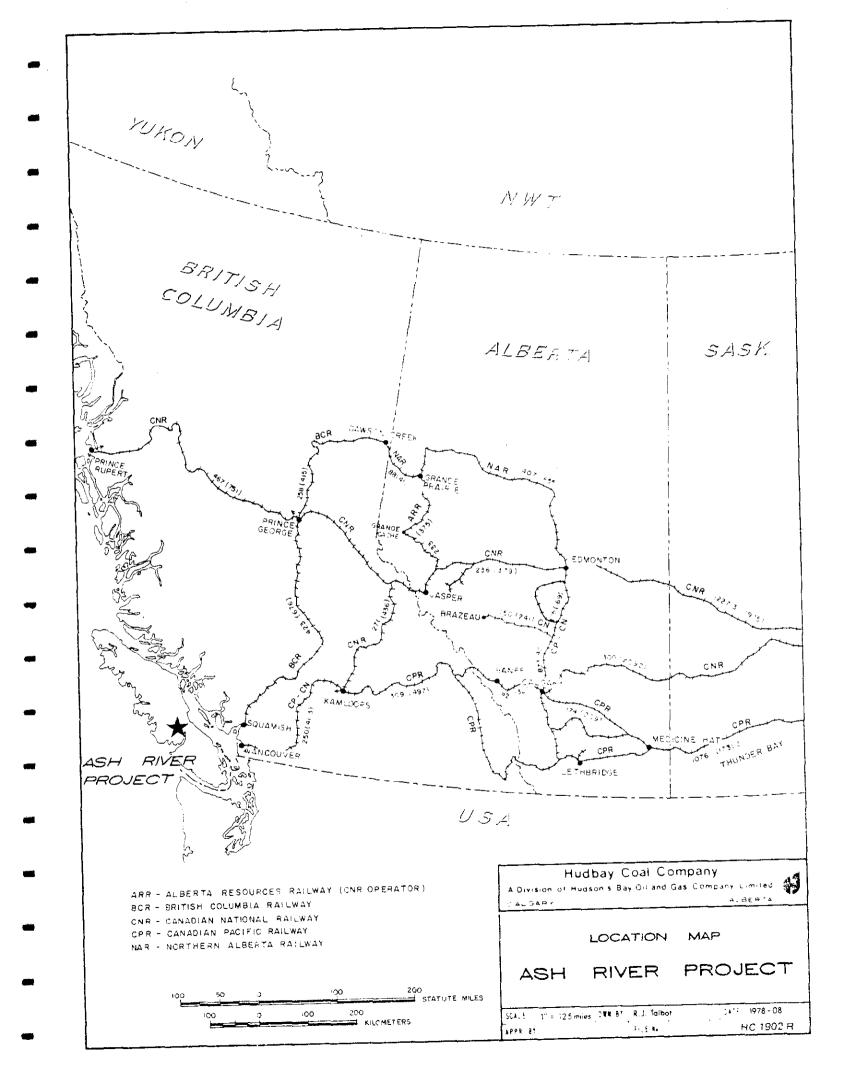
The coal licences of the Ash River project are thought to encompass the coal-bearing zones of the Extension-Protection and Comox Formations. The drilling and limited surface mapping conducted during the program indicated the presence of synclinal structure.

Compilation of the data indicates that there are four coal zones present throughout the property. However, responses on the geophysical logs and examination of the core showed that the coal zones were extremely poor quality, thin and very discontinuous and often shaling out.

Due to the very poor nature of the coal, it was not feasible to estimate coal tonnages. There is no possibility of the seams being mineable in terms of continuity, thickness or coal quality.

#### 1.1 RECOMMENDATION

Results of the drilling on the Ash River property have indicated that the coal is discontinuous, thin and extremely poor quality. It would be recommended that no further work be completed on the property and that all licences be dropped and the agreement with Ramm Venture Corporation be terminated.



#### 2.0 LOCATION, ACCESSIBILITY AND LAND USE

The Ash River prospect is located in the central part of Vancouver Island approximately 26 km northwest of Alberni, British Columbia in the general area of geographic coordinates 49°27'N and 125°02'W.

Access to the prospect area is by a good all-weather logging road. The property can be reached by travelling from Alberni via Highway #4 west 8 km to the Sproat Lake Provincial Park turnoff. Access to the property is gained by continuing northwest along a paved secondary highway 8 km to Great Central Lake. From Great Central the southern end of the Ash River prospect is reached by travelling 16 km on gravel logging roads. Accessibility within the lease block occurs on well maintained logging roads that allow travel to all parts of the lease block.

The town of Alberni is the major logging and pulp mill center on Vancouver Island. It is linked to the east side of the Island by good highways and existing railways. The deep seaport facilities accommodate all shipping requirements for the west coal and central portions of Vancouver Island.

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3.0 LEASES

Hudson's Bay Oil and Gas through an option and sale agreement with Ramm Venture Corporation of Vancouver obtained coal licence rights on coal licences (CL 4284 to CL 4303) representing a 5182 hectare parcel of land.

The lands are designated as the following blocks on NTS Sheet 92F6: 74, 85, 291, 396, 397, 474, 491, 492, 497, 536, 537, 604, 605, 637, 639, 700, 803, 1284

- 6

#### 4.0 PHYSIOGRAPHY

The Ash River lease block is situated in the Ash River Valley on the western side of Vancouver Island. The lease block is flanked on the east and west sides by the mountains of the Beaufort Range.

Within the lease block the topography consists of gently rolling hills with slopes varying from 5 to  $20^{\circ}$ . The relief on the lease block is considered moderate ranging from 240 m to 490 m above sea level.

The forest cover on the lease block consists primarily of stands of firs and spruce with occasional intermixing of deciduous trees. The low lying areas (ie stream valleys) contain thick stands of alders. The undergrowth on the lease block is extremely thick and varied. The primary plant types appear to consist of ferns and various types of bushes.

The drainage in the area is to the southeast. There are two lakes, Elsie and Dickson, which receive most of the runoff from the mountains and streams. Water then flows out of these lakes southeastward towards Alberni by way of Ash River and Lanterman Creek to Great Central Lake.

#### 5.0 GEOLOGY

#### 5.1 REGIONAL GEOLOGY

Most of the Ash River project area is overlain by glacial and fluvioglacial deposits of clay, silts, gravels and till. Due to these deposits there are few outcrops except in the deeply incised river channels and along road cuts.

Within the project area and surrounding countryside the formations of interest are clastic continental rocks thought to be Tertiary in age. The sedimentary rocks are flanked on all sides by Karnutsen Volcanics thought to be Triassic in age. The general stratigraphy of the project area indicates that the sediments occur in the Naniamo Group and are as follows:

> Extension - Protection Haslam Comox

The coal-bearing sequences occur in the Extension-Protection and Comox Formations. The Comox Formation is the lower part of a depositional cycle. The clastic material of the formation is quartz-feldspathic with numerous intercalations of carbonaceous shales and coal. The base of the Comox is marked by the Benson Member conglomerate. The Haslam Formation occurs as poorly bedded sandy shales and shaley sandstones with abundant fossils. The Extension-Protection Formation occurs as coarse clastic facies where conglomerate pebbly sandstone arkosic sandstones and coal seams are interbedded.

The structures of the project and surrounding areas are likely greatly influenced by the Beaufort Range which is the major geological influence in the area. The Beaufort Mountains flank the eastern side of the project area.

#### 5.2 STRUCTURE

The Ash River project represents an area of clastic continental rocks flanked unconformably on all sides by volcanics.

Regional geologic mapping and drilling on the project indicates the presence of a synclinal structure (See Geology Map). The axis of the syncline trends to the northwest-southeast at approximately  $320^{\circ}$ . The available information indicates that the structure plunges to the southeast at  $3^{\circ}$  to  $5^{\circ}$ . In the southern part of the project area structure profile A-A<sup>1</sup> shows the syncline occurs as a broad synclinal structure. The western limb is dipping at 10° to 15°, while the eastern limb is slightly steeper dipping from 20° to 30°. The strike of the beds varies from  $320^{\circ}$  to  $345^{\circ}$ . In the northern end of the lease block the syncline has become tighter and more compressed. Structure profile B-B<sup>1</sup> coordinated with drilling and surface information indicates that the eastern limb of the syncline is now dipping from  $37^{\circ}$  to  $55^{\circ}$  to the west. The dips on the eastern limb have remained constant at  $10^{\circ}$  to  $15^{\circ}$  giving the syncline a monoclinal shape. The strikes in the northern end of the project area are variable ranging from  $290^{\circ}$  to  $335^{\circ}$ .

#### 5.3 STRATIGRAPHY

The stratigraphic units of interest on the Ash River project area are those clastic continental rocks contained within the Nanaimo Group. The Nanaimo Group represents four transgressive cycles grading upward from non-marine coarse clastic to marine fine clastic sediments and a fifth cycle with only non-marine coarse clastics. The units of interest within the Nanaimo Group are the following:

> Comox Formation Haslam Formation Extension - Protection Formation

The above formations represent the first depositional cycle and bottom part of the second depositional cycle.

#### 5.3.1 COMOX FORMATION

This formation is the lower part of the first depositional cycle. The Comox Formation has a basal conglomerate called the Benson Member. The Benson-type facies are dark green and brown colored, poorly bedded fanglomerates and associated greywackes occurring in irregular lenticular masses of small areal extent and variable thickness. The components are unsorted subangular boulders, pebbles and grit, mainly of pre-Cretaceous volcanic material. The Comox-type facies, immediately above the Benson Member is a variant of the Extension-type facies (to be discussed later). The clastic material is quartzfeldspathic. It contains numerous intercalations of carbonaceous shale and coal. This facies contains the coal of the Nanaimo Group. There are a total of eight seams in the Comox of which three are of interest. The seam thicknesses are as follows:

> Seam #1 0.76 - 2.10 m Seam #2 1.06 - 1.20 m Seam #4 0.90 - 2.10 m

The thickness of the formation in the Nanaimo Basin is 90 to 275 m. Seams 1 to 4 occur over a stratigraphic interval of 50.5 m.

#### 5.3.2 HASLAM FORMATION

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The Haslam Formation is the upper part of the first depositional cycle. The beds are poorly bedded sandy shales and shaley sandstones with abundant fossils indicating nearshore deposition. The thickness of the Haslam varies from 85 to 300 m.

#### 5.3.3 EXTENSION - PROTECTION FORMATION

The formation is the basal part of the second depositional cycle. The Extension-type facies is the kind of coarse clastic facies where conglomerate, pebbly sandstone and arkosic sandstone are interbedded. The components are well-worn, well-sorted and consist mainly of resistant rock types like quartzites, black argillites and light green or grey chert. The sandstones are commonly cross-bedded and consist mainly of quartz, feldspar, biotite and hornblende. In the coal mining areas the Extension-Protection formation has been divided as follows:

Protection Formation	-	mainly sandstone
Douglas Seam	-	coal
Newcastle Formation	-	conglomerate, sandy shale
Newcastle Seam	-	coal
Cranberry Formation	**	mainly conglomerate
Wellington Seam	-	coal
East Wellington Seam	-	sandstone

The two seams considered mineable are the Wellingtone #1 Seam - 2.1 m and the Douglas Seam - 1.5 m.

Due to the fact that the formations cannot be distinguished outside the coal mining areas of Nanaimo and Comox, the members will be referred to as one formation, Extension-Protection. The maximum thickness of the Extension-Protection is reported to be 580 m.

#### 5.3.4 KARMUTSEN FORMATION

The Karmutsen Formation consists of volcanics thought to be Triassic in age. The volcanics form an unconformity on all sides of the project area with the sedimentary rocks within the lease boundary.

#### 5.4 COAL FACIES

In the 14 rotary drillholes completed and geophysically logged it was found that all three units in the Nanaimo Group were intersected. Available information indicates that the Extension-Protection and Comox Formations contain the coal-bearing sequence.

The Comox Formation is reported to have eight coal seams of variable thickness. Drilling indicates that the Comox does indeed have these coal seams. However, response on the geophysical logs show that the coals are extremely dirty with the coal in most cases representing less than 25% of the coaly interval. Correlations between logs indicate that the zones are very discontinuous and shale out throughout the property.

The information available for the Extension-Protection Formation indicates that there are three seams present:

- 1. Douglas Seam
- 2. Newcastle Seam
- 3. East Wellington Seam

The geophysical logs from the project indicate that the coal seams of the Extension-Protection are present. However, on the Ash River leases, the responses in the geophysical logs show that the seams are of extremely poor quality, with the coal representing only 20 to 35% of the coaly zone. Correlations of the logs indicate that the seams are very thin and discontinuous.

In general the seams present on the Ash River project are very dirty and discontinuous. There is no possibility of the coal quality being good enough to allow the coal interval to be mined economically. To confirm responses on the geophysical logs, coals of the Comox Formation were cored (ARR-7914C) with a VTM core barrel. Examination of the core showed that the coal only represented 20 - 25% of the entire coaly interval.

#### 6.0 DRILLING SUMMARY

The Ash River project consisted of drilling the coal-bearing sequence of the Extension-Protection and the Comox Formations.

The program consisted of drilling 14 rotary boreholes to various depths (total metreage - 1280 m). The holes were completed using a 1976 Chicago Pneumatic T-650 supported with a 1979 International IHC pipe carrier. All holes were drilled with air using a down hole hammer. In all cases the overburden was cased with 15 cm casing. Casing was set by using a casing hammer.

All the boreholes were logged geophysically with Gamma-Ray-Neutron, Density and Caliper tools. Where drilling conditions allowed a Focusbeam log was run to supplement the above logs.

Of the 14 drillholes, 13 were exploration holes used to define structure and stratigraphy. One hole was a core hole in which the coal bearing sequence was cored using a VTM core barrel. The drilling is summarized on the following drillhole summary sheets and drillers logs.

The total estimated cost to complete the Ash River drilling program is \$115,000.00. The cost can be distributed as follows:

Consulting	\$	15	000.00
Expenses		4	000.00
Geophysical logging		19	190.00
Communications		2	500.00
Support Vehicle		3	300.00
Drilling		56	976.00
Miscellaneous (drafting, equipment etc.)		14	000.00
Total Cost	\$1	114	966.00
Approximately	Ş ]	115	000.00

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Hudbay Coal Company	
ROTARY (Reverse Circulation) DRILL	HOLE LOG

Page 1 of 1

	Ash River	HOLE NUMBER	ARR-7901
	Ken's Drilling	LOCATION	Vancouver Island
	1979-06-16	SURVEYED LOCAT	ION <u>548035N 4895 E</u>
	MPANYRoke Oil		
	GR-N, Density, Caliper		
	'EST)		
COMMENTS_	Hole in good shape. Drillers L	og. Hole making	water at 18.3 m.

ROM	то	LOG	REMARKS
) <sub>m</sub>	3.7 m	Overburden (Sand and Gravel)	
3.7	10.7	Sandstone	
LO.7	11.6	Coal	La San
1.6	17.7	Sandstone	
.7.7	18.0	Shaley Coal	
18.0	18.9	Sandstone	
18.9	28.9	Volcanics	
		T.D 28.9	
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•	COAL FIELD Ash River	HOLE NUMBER ARR-7902
1	COMPANYKen's Drilling	
	DATE1979-06-17	SURVEYED LOCATION 548060N 5025N
ļ	LOGGING COMPANYRoke 011	ELEVATION1125 ft (343 m)
,	LOGS RUN GR-Res., N, Density, Caliper	ANGLE / BEARING
	DEVIATION (TEST)	WATER HORIZON 94.1 ft (28.7 m)
	COMMENTS Hole caved at 180 ft (55 m). Hole	e making 80 to 100 gallons per minute.
ſ	Could not be logged open hole pass 180 ft	

FROM	то	LOG	REMARKS
Om	3.9 m	Overburden (Gravels and Boulders)	
3.9	4.3	Clay and Tills	
4.3	7.3	Sandy Clay	
7.3	7.6	Coaly Shale	,
7.6	35.4	Shale	
35.4	35.7	Soft Coal	
35.7	54.8	Shale	
54.8	70.1	Soft Shale	
70.1	73.8	Sandstone	
73.8	78.0	Shale	
78.0	86.8	Sandstone	
86.8	95.7	Shale (Water flowing at approximately 80 -	100 GPM)
95.7	130.8	Sandstone	
130.8	139.0	Shaley Saltstone	
139.0	140.2	Shale	
140.2	143.9	Sandstone	
143.9	145.7	Shale	······································
145.7	146.9	Sandstone	
		T.D. 482.0	

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COAL FIELD Ash River				HOLE NUMBER ARR-7903		
}				LOCATION Vancouver Island		
-	DATE	1979-06-21	1	SURVEYED LOCATION 54820	07N 4892E	
				_ ELEVATION _ 1200 ft (366.0 m)		
<b></b>	LOGS RUN_	GR-Res., N.,	, Density, Caliper, FBL	ANGLE / BEARING Verti	cal	
				WATER HORIZON		
-				et to 13 ft. Hole making		
	<u></u>	(1 - 2 gal)	lons) at 17 ft. Driller	rs log.		
	FROM	то	LC	G	REMARKS	
	0 m	<u>1.2 m</u>	Overburden (Boulder an	ud Till)		
	1.2	6.7	Sandstone			
, 	6.7	30.2	Shale			
	30.2	83.8	Sandstone			
-	83.8	86.0	Shale			
l	86.0	89.0	Sandstone and Shale			
<b></b>	89.0	93.0	Sandstone (Water flow	- 10-15 GPM)		
	93.0	111.3	Silty Sandstone			
			· .			
			T.D. 111.3 m			
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T	COAL FIELD Ash River	HOLE NUMBER ARR-7904
		LOCATION Vancouver Island
1	DATE1979-06-22	SURVEYED LOCATION 548413N 4737E
	LOGGING COMPANYRoke 0i1	ELEVATION 1400 ft (427.0 m)
-	LOGS RUN GR-N, Density, Caliper, FBL	ANGLE/BEARING Vertical
	DEVIATION (TEST)	WATER HORIZON 8.5 m
	COMMENTS Set 76.5 ft of casing. Hole in go	
	34 ft (35 GPM). Drillers Log.	

FROM	то	LOG	REMARKS
0 m	22.6 m	Overburden (Clay and Gravel)	
22.6	27.4	Sandstone	
27.4	30.2	Coal	
30.2	31.1	Shale	
31.1	32.0	Sandstone	<b></b>
32.0	32.3	Coal	
32.3	33.5	Sandstone	
33.5	41.5	Shale	
41.5	42.1	Sandstone	
42.1	42.4	Coal	
42.4	43.3	Sandstone	
43.3	58.8	Interbedded Shales and Sandstones	
58.8	66.5	White Sandstone (100 to 150 GPM)	
66.5	71.3	Volcanics	
		T.D. 71.3 m	· · · · · · · · · · · · · · · · · · ·
		1.D. /1.0 m	

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COAL FIELD -	Ash River		HOLE NUMBER ARR-7	202
	Ken's Dri	lling	LOCATION Vanco	ouver Island
	1979-06-2		SURVEYED LOCATION	
			ELEVATION2010 ft	
			ANGLE / BEARING Ver	
DEVIATION (1	TEST)	casing Hole in goo	— WATER HORIZON 93.8 od condition. Drillers	
COMMENTS		g water at 112.5 m (2		10g.
<b></b>				
FROM	то		LOG	REMARKS
0 m	.3 m	Overburden		
.3	8.2	Sandstone	A second s	
8.2	19.8	Shaley Sandstone		
19.8	20.4	Sandstone		
20.4	21.0	Shaley Sandstone		
21.0	36.3	Sandstone		
36.3	37.2	Shaley Sandstone (V	Vater 2 - 3 GPM)	
37.2	38.4	Sandstone		
38.4	58.2	Sandstone and Shale	2	
58.2	58.5	Sandstone		
58.5	58.8	Shale		
58.8	63.7	Sandstone		
63.7	67.4	Shale and Sandstone	e	
67.4	93.6	Sandstone		
93.6	102.1	Shale		
102.1	105.5	Sandstone		
105.5	108.5	Coal		↓ → →) →
108.5	109.1	Shale		
109.1	110.4	Sandstone		
110.4	110.6	Shale		
110.6	117.4	Sandstone		
117.4	124.7	Shale		
124.7	131.7	Sandstone (10 - 15	GPM)	
131.7	133.8	Shale and Coal		

	LOGGING COL LOGS RUN DEVIATION·(*	Ken's Dril 1979-06-23 MPANYRoke GR-N, Densit	ling Oil Enterprises y, Caliper, FBL	HOLE NUMBER ARR-7905   LOCATION Vancouver Island   SURVEYED LOCATION 548435N   ELEVATION 2010 ft (612.8 m)   ANGLE / BEARING Vertical   WATER HORIZON 93.8 m	
Ī	FROM TO L			LOG REMARKS	
	133.8 m	148.2 m	Sandstone		

	FROM	то	LOG	REMARKS
	133.8 m	148.2 m	Sandstone	
4				
	r		T.D. 148.2 m	
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COAL FIELD Ash River		HOLE NUMBER ARR-7	906			
	Ken's l	Drilling	LOCATION Vanco	LOCATION Vancouver Island		
		SURVEYED LOCATION 548300N 4868E				
LOGGING COMPANY_Roke Oil Enterprises LOGS RUN_GR-N, Density, Caliper, FBL						
			00			
DEVIATION	(TEST)	20 ft Water hit a	WATER HORIZON 28. t 45 ft (2 - 3 GPM). Dr			
COMMENTS			$\frac{1}{2}$ $\frac{1}$	111015 LOg.		
FROM	то		LOG	REMARKS		
0 m	2.7 m	Overburden				
2.7	5.8	Sandstone				
5.8	19.2	Interbedded Shale	and Sandstone			
19.2	20.4	Shale				
20.4	22.6	Sandstone				
22.6	26.8	Shale				
26.8	29.9	Sandstone		· · · · · · · · · · · · · · · · · · ·		
29.9	34.8	Shale	<u></u>			
34.8	37.2	Sandstone				
37.2	42.4	Shale				
42.4	57.0	Sandstone (at 85.9	m - 10 - 15 GPM)	······		
57.0	123.5	Interbedded Shale	and Sandstone			
123.5	134.7	Conglomerate				
134.7	140.2	Sandstone				
140.2	142.7	Sandstone and Cong	lomerate			
142.7	150.0	Sandstone				
150.0	157.0	Volcanics				
		T.D. 157.0 m				
	_		······································			
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	COMPANYKen's Drilling DATE1979-06-26 LOGGING COMPANYRoke Oil Enterprises LOGS RUNGR-N, Res., FBL, Density, Caliper DEVIATION (TEST) COMMENTSHole lost due to caving at 85 ft.			SURVEYED LOCATION 54 ELEVATION 1090 ft ANGLE / BEARING Ver WATER HORIZON 7.0	uver Island 7922N 5022E tical m
	FROM	то	LC	G	REMARKS
	0 m	18.3 m	Overburden (Gravel a	nd Clay)	
-	18.3	18.9	Sandstone		
ľ	18.9	19.5	Gravel		
-	19.5	25.9	Sandstone		
			T.D. 25.9 m		
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COMPANYKen's Drilling			orilling -28 Oil Enterprises Density, Caliper	SURVEYED LOCATION ELEVATION1090 ANGLE / BEARING WATER HORIZON	Vancouver Island 547912N 5022 E ft (332.3 m) Vertical 60 m
-	FROM	то	LC	OG	REMARKS
- F	0 m	<u>    1.5 m</u>	Overburden (Gravel)		
<b>-</b>	1.5	13.7	Blue Clay		· .
	13.7	20.1	Gravel (Water 1 - 2	gallons/minute)	
┓	20.1	34.5	Shaley Sandstone		
	34.5	37.2	White Sandstone		
Ļ	37.2	37.5	Shale		
-	37.5	39.3	Sandstone		••••••••••••••••••••••••••••••••••••••
ŀ	39.3	39.9	Coaly Shale	• •••	
	39.9	48.8	Green Shale		
ļ	48.8	49.7	Brown Shale		
	49.7	55.8	Conglomerate		
	55.8	62.5	Volcanics		
			T.D. 62.5 m	****	
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COAL FIELD	Ash Rive	er	HOLE NUMBER	ARR-7909	
COMPANY	COMPANYKen's Drilling		LOCATION Vancouver Island		
• DATE	1979-06-	- 30	SURVEYED LOCATION	547809N 5438E	
		Oil Enterprises			
			ANGLE / BEARING Vertical		
DEVIATION	TEST)		WATER HORIZON 58.2 m		
	Hole in go	ood condition. Drille	ers log.		
	····				
FROM	то		LOG	REMARKS	
<u> </u>	6.7 m	Overburden			
6.7	8.2	Sandstone			
8.2	49.1	Shale			
49.1	49.7	Shaley Sandstone			
49.7	52.1	Shale			
52.1	53.0	Sandstone			
53.0	62.5	Shale			
62.5	63.7	Sandstone			
63.7	66.2	Shale			
66.2	67.4	Sandstone			
67.4	147.8	Shale (115.2 - 5 G	PM, 117.7 - 10 GPM)		
4		T.D. 147.8 m			
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COAL FIELD	Ash Rive	r	HOLE NUMBER	ARR-7910
COMPANY	Ken's Dr	illing		Vancouver Island
	DATE 1979-07-01			
		0il Enterprises		
T		y, Caliper		
DEVIATION-(	TEST)		WATER HORIZON	20.3 m
7		good condition. Hole	making 10 GPM.	
FROM	то	LC	DG	REMARKS
0 m	17.9 m	Overburden (Till and	Gravel)	
17.9	40.5	Shale		
40.5	41.2	Sandstone		
41.2	44.8	Shale		
44.8	71.3	Sandstone		
71.3	77.7	Shale		
77.7	80.8	Sandstone		
80.8	82.9	Shale		
82.9	107.3	Sandstone		
107.3	108.2	Conglomerate		
108.2	111.3	Sandstone		
111.3	121.9	Sandstone (Water at	10 GPM)	
<b>4</b> 121.9	125.6	Siltstone		
125.6	126.5	Sandstone		
<b>4</b> 126.5	127.7	Shale		
127.7	132.9	Shaley Sandstone		
<b>•</b> 132.9	133.8	Conglomerate		
133.8	134.8	Sandstone and Shale		
<b>•</b> 134.8	135.1	Conglomerate		
135.1	143.3	Shale		
<b>1</b> 43.3	144.2	Shale and Sandstone		
144.2	153.9	Sandstone		
•				
		T.D. 153.9 m		

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	OAL FIELD.	Ash River	· · · · · · · · · · · · · · · · · · ·	HOLE NUMBER	ARR-7911	
	COMPANY Ken's Drilling		LOCATION	Vancouver Island		
			)5	_ SURVEYED LOCATION _	547695N 5143E	
		MPANYRoke	e Oil Enterprises	ELEVATION 1040 ft (317.0 m)		
ωų LC	LOGS RUN GR-N, Density, Caliper			ANGLE / BEARING	Vertical	
	EVIATION-(	TEST)	·	_ WATER HORIZON		
cc	MMENTS_	Casing	g set to 120 ft (36.5 m			
		· · · · · · · · · · · · · · · · · · ·				
		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		·	
ļ	FROM	то	L	0G	REMARKS	
	0 m	27.1 m	Overburden (Till)			
- 	27.1	32.9	Blue Clay			
	32.9	36.6	Gravel			
]	36.6	50.5	Volcanics			
			T.D. 50.5 m			
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	Ash Rive	er	HOLE NUMBER	ARR-7912
		illing		
		.06		
		e Oil Enterprises		
LOGS RUN	GR-N, Densi	ty, Caliper	ANGLE / BEARING	Vertical
	TEST)		WATER HORIZON	19.3 m
COMMENTS_		good condition. Hole		
	(12/ ft).	Drillers log. Set	22.9 m (75 ft) of (	casing.
FROM	то		LOG	REMARKS
Om	22.9 m	Overburden (Clays 8	Gravels)	
22.9	41.2	Shaley Sandstone		
41.2	41.8	Sandstone		
41.8	42.4	Shaley Sandstone		
42.4	43.3	Sandstone		
43.3	54.3	Green Sandstone (53	5.4 - hole making 50	) to 100 GPM)
54.3	55.8	Grey Sandstone		
55.8	124.1	Sandstone		
124.1	127.7	Shaley Coal		
127.7	128.7	Sandstone		
128.7	138.4	Shale		
138.4	139.9	Sandstone		
139.9	140.8	Shale		
140.8	142.1	Shaley Sandstone		
142.1	143.5	Sandstone		
143.5	146.3	Conglomerate		
		· · · · · · · · · · · · · · · · · · ·		
		T.D. 146.3 m		
		· · · · · · · · · · · · · · · · · · ·		
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COAL FIELD	Ash River		RR-7913
COMPANY	Ken's Drilling		ancouver Island
DATE	1979-07-09	_ SURVEYED LOCATION _	548033N 4896N
	PANYRoke Oil Enterprises	ELEVATION	1010 ft
	GR-N, Density, Caliper	ANGLE / BEARING	Vertical
	ST)		No water in hole
COMMENTS	Dilot hole for coring Drill		

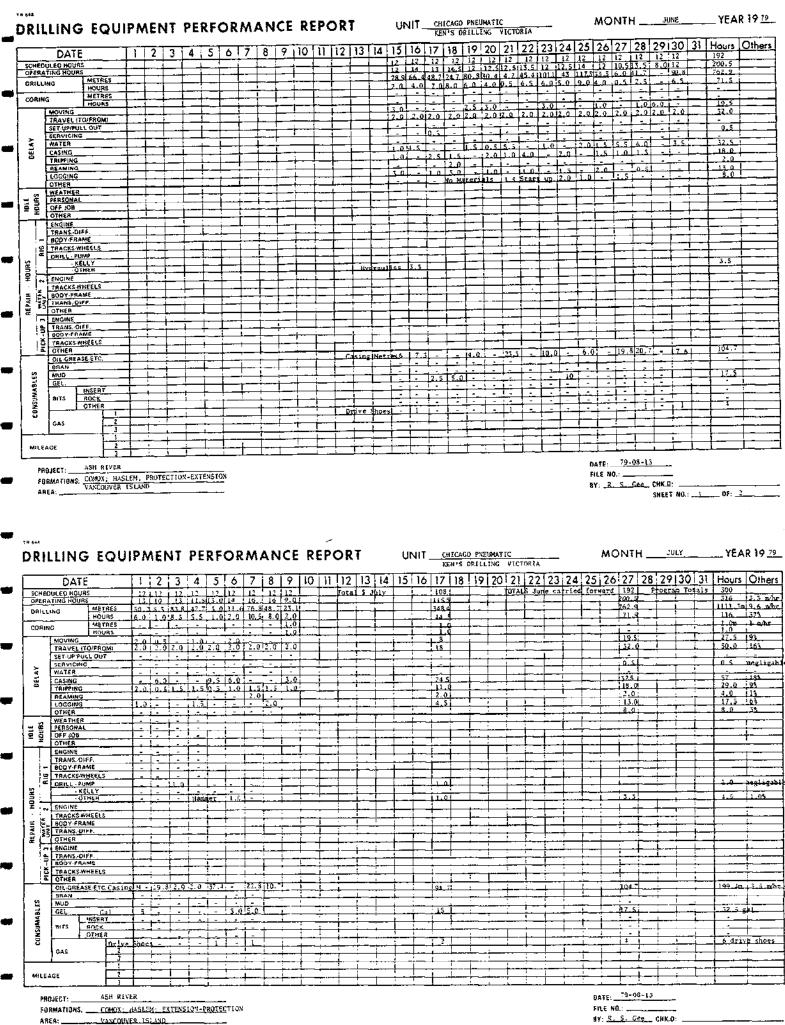
ROM	то	LOG	REMARKS
) m	3.7 m	Overburden (Sand & Gravel)	
5.7	10.7	Sandstone	
.0.7	11.6	Coal	
.1.6	17.2	Sandstone	
		T.D. 17.2 m	
·····			

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COAL FIELD Ash	River	HOLE NUMBER AF	R-7914C					
COMPANYKer	's Drilling		incouver Island					
		SURVEYED LOCATION 548031N 4897E						
1			307.9 m (1010 ft)					
GR-N, Den	sity, Caliper	ANGLE / BEARING Vertical						
DEVIATION (TEST)	····	WATER HORIZON	No water in hole.					
COMMENTS Drill	ers log. Core hole.	Interval from 10.97 to	12.0 cored					
with	VTM core barrel.							
	······································							
FROM TO		LOG	REMARKS					
От <b>3.7</b> п	Overburden							
3.7 10.9	Sandstone							
10.9 12.0	Coal (Interval core	ed)	1					
12.0 15.2	Sandstone							
	T.D. 15.2 m							
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TOTAL CONTR.	ACT HOURS	CHARGEA	BLE (CONT	RACT RI	igs c	NLY	)	(	6.0	h	rs	at	13	5.0	)0/	hr								7.0	ня
IDLE TIME (SPE	CIFY)		WEATHE	R	-			PER	SON	NEL		.0 H				JOB								-	ня
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AUXILIARY	EQUIP	MENT (SP	PECIFY)			160	0 ft a	t 7	7.50,	/ft									HR	s.
TOTAL CON	TRACT	HOURS	CHARGE	ABLE (CONT	RACTR	ugs c	DNLY)	1.	0 h	rs at	: 13	5.00	/hr				2.0		HR	s.
IDLE TIME	SPECIF	Y)		WEATHE	R			PERS	SONNE				FFJOB						HR	s.
MISCELLAN	EOUS:	TIME PE	RSONNE	-						@ 2	10.0	0/hr							HR	s.
REPAIRS (S	PECIFY	- TYPE,	UNITS, T	IME)			PIC	KUP	l	WAT	ER UI	чт		I	RIG		TOTAL F	EP	AIR HRS	5.
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							TRACK	BODY FRAME	ENGINE	OTHER	BODY FRAME	TRACES-WHE ENGINE	OTHER KELLY	DRILL PUMP	TRACK-WHEE BODY FRAME	ENGINE				
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MAKE				GALS		 			BRAN	l 					UNIT					
TYPE									MUD						MAKE					
SIZE				TRANS- DIFF					GEL	fom	- 2	.5 g	als.		SIZE					_
SERIAL NO.				HYDRAULIC		Ţ			CASI	IG (FT.					SERIAL	NO.				
FOOTAGE				MISC.		Ì	-		STEM					-	REASO	N				

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	DATE:	9-06	5-18	_ DRILI	ER Jim	Ross			DRI	ILL CO	MP	PANY	γ Ke	en 's	s Di	<u>:11</u>	lin	g d	RIL		WAT			
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-	MISCELLAN	EOUS	: TIME PE	RSONNEL							6	40	.0	07h:	r	_		_		• <u> </u>	1			HRS
	REPAIRS (SI	PECIF	Y - TYPE.	UNITS, T	IME)			PICH	CUP	,	W	ATER	a UN	IT	Τ			RIG			тот	AL RE	PAIF	R HRS.
-								s				-			1				ļ		1			
-								OTHER TRACKS-WHEELS	CODY FRAME	TRANS-DIFF ENGINE	OTHER	TRANS-DIFF	BODY FRAME	TRACES-WHEEL	OTHER	KELLY	DRILLPUMP	TRACK-WHEELS	BODY FRAME	TRANS-DIFF				
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		DRIL	L BITS		FUEL	1	Z	3				MA	TE	RAL!	5						PAF	TS		
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	FOOTAGE		1		MISC.					STEM		-		-				R	EAS	ON				

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			1	DAILY	' RE	EPOR	T –	RO	TAR	IY F	RIG	S								- 35	,	
DATE: 197	9-06-19		LER <u>Jim</u>	Ross	<b>.</b>		RI	LLCC	MPA	NYKe	en!s	Dr	i11	inį	g_ D	RIL	L N					
	sh <u>River</u>	HELP	ER <u>Dal</u> e		th		DRIL	LL TY	PE _(	CPN		YEA	R M	OD	EL.			۷ TT		ER :K NO	•	
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<u>ARR-7903</u>		<mark>∕</mark> ∤	265		6	.0_	-+-		<u> </u>		 1								+	<u> </u>		
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CLASS	TRAVEL	MOVIN	GWATER	CASIN	IG T	RIPPING	R£4	AMINO	MUE	DING	LOG	GINC	-		071	ΗER	t		то	TAL	DEL	ΑY
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ION-CHARGEA		1.0																	j	2	0	
AUXILIARY E	QUIPMENT (S	PECIFY)		·			•	269	ft	at	7.5	0/f	t								•	н
TOTAL CONT	RACT HOURS	CHARGE	ABLE (CONT	RACTR	IGS O	NLY)		3.0	hr	s at	: 13	5.0	0/h	r						4.	0	н
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MAKE			GALS	· _			-†	BRAN		<u></u>				_	U	NIT				<u> </u>		
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+	ludbay Coal Company
DAILY	REPORT - ROTARY RIGS

DATE: 79-06-20 DRILLER Jim Ross	DRILL COMPANY Ken's DrillingDRILL NO.
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WATER LOCATION Ash River HELPER Dale Smith DRILL TYPE CPN YEAR MODEL TRUCK NO. FLUID TYPE DRILLING \_\_\_\_\_AIT \_\_\_\_\_ CORING \_\_\_\_\_\_ PICKUP NO.\_\_\_\_\_

		DRILLIA	NG FEET		CORIN	GFEET	HOURS	TOTAL HOURS
	HOLENO.	FROM	то	HOURS	FROM	то	HOOKS	DRILLING
	ARR-7903	265	365	4.0			·	~
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-	TOTAL FEET		100	4.0				4.0

## DELAY HOURS

	CLASS	5	TRAVEL	MOVING SETUP	WATER	CASIN	3	TRIP	PING	R	EAMIN	G	MUD	DING	SLC	GGI	NG			оти	HEF	र		тот	AL	DE	LAY	
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ł	NON CHARG		1.0	1.0				2.	0															-	4	0		
	AUXILIAR	YEQU	IPMENT (SP	PECIFY)		10(	) 1	ft	at	7.	50/f	t															HR	s.
	TOTAL CO	NTRAC	THOURS	CHARGEA	BLE (CONT		GS (	ONL	¥ }	3	.5 h	rs	at	13	55.	00,	'hr	•		-					4.	5	HR	s.
		(SPEC	IFY)		WEATHE	R				PEF	SONN	٤L						08		-							ня	S.
-	MISCELLA	NEOUS	TIME PE	RSONNEL										40.	.00	/h] 											HR	s.
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											<b>-</b>									-				TOT HOU	AL IRS:	1	2.5	
-		DRIL	LBITS		FUEL	1	2	2	3				N	AT	RIA	LS								PART	s			
	MAKE				GALS						BRA	<b>v</b>								U								
-	туре				OIL						MUD									м	AKE							
	SIZE				TRANS- DIFF					_	GEL									Si	Z٤							
-	SERIAL NO.			ł	IYDRAULIC						CASI	NG	1 (FT.	.)						SE	RIA	L N	0.					
	FOOTAGE				MISC.						STEN	1	_							R	EAS	ON						

(1) Field Office (2) Head Office Geology (3) Head Office Engineering (4) Contractor

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ATTACH GEOLOGRAPH HERE	ATTACH	GEOLOGRAPH	HERE
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-						DAIL		EPOR			•	-		GS									-	37		
	DATE:	<u>79-06</u>	-21	_ DRILL	ER <u>Jim</u>	Ross			81	LL CC	MP/	ANY	Kei	ı's	Dr	<u>i1</u>	liŋ	go	RIL	LU			TER			
-	LOCATIO	n Ash	River	_ HELPE	R_Dale	Smit	h	[	RI	LL TY	PE (	IPN		Y	'EA	R M	DD	EL				TR	JCK	١O.		
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1	CLAS	S	TRAVEL	SETUP	WATER	CASI	NG	TR	IPPIN	٩G	REA	MIN	G	NUDO	DING	5  L C	GG	ING			οτ	ΗE	R			тоти	1L I	DEL	AY
T	CHARGEA HOUR		1.0	2.0		1.	0	<u> </u>					1										-				4	0	
: :	NON-CHARC		1.0	1.0									Ī								_						2	0	
Ī	AUXILIAR	Y EQU	IPMENT (SI	PECIFY)						33	32 :	ft	at	. 7.	50	/hr	•												HRS.
Į	TOTAL CO	NTRAG	THOURS	CHARGEA	BLE (CONT	RACTE	ugs	ON	LY)	3	3.0	hr	s	at	13	5.0	0/	'hr									4.	0	HRS.
Į	IDLE TIME	(SPEC	IFY)		WEATHE	R		_		P	ERSC	NNC		1.0					JOB						T				HRS.
۳	MISCELLA	NEOUS	TIME PE	RSONNEL										@ 4	0.	007	hr												HRS.
	REPAIRS (	SPECIF	Y - TYPE,	UNITS, TI	ME)				Pl	CK	UP		۷	NATE	RU	NIT					RIG	;				τοται	RE	PAIR	HRS.
1									i si		1				Í	S					\$	1		1					I
Į									NHEE	Ш	   13			 	ME	VH EEI	i			٩Þ	HEEL	ш Ш							
1								Ľ.	TRACKS-WHEEL	BODY FRAME	TRANS-DIF	шZ	đ	TRANS-DIFF	BODY FRAME	TRACES-WHEELS	NE	æ		DRILL PUMP	TRACK-WHEE	BODY FRAME	0   1   4	HANS-OF	ш				
ļ								OTHER	TRAC	BOD	TRAI	ENGINE	OTHER	TRA	BOD	TRAC	ENGINE	OTHER	KELLY	DAIL	TRA	BOD .	TRAT		ENGINE				
Ĩ										_	1															TOTA		12	.0
7		DRIL	L BITS		FUEL	1		2		3				M	ATE	RIA	LS					_				PARTS		_	
1	MAKE				GALS	<b></b>			<u> </u>		B		1			_					U	NIT							
	ТҮРЕ				01L	<b>.</b>		. <b>_</b>	1_		N	IUD									M	AKI	E					_	
	SIZE				TRANS- DIFF				<u> </u>		G	EL	-								s	ZĘ							
1	SERIAL NO.			H	YDRAULIC						c	ASI	٩G	(FT.)	1	3.0	f	t_			SE	RI4		NO	١.				
1	FOOTAGE				MISC.							TEM									R	EAS	ON	1					

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Hudbay	Coal	Company	
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## DAILY REPORT - ROTARY RIGS

DATE: 79-06-24 DR	ILLER Jim Ross	DRILL COMPANY Ken's Drillin	IgDRILL NO.
			WATER

LOCATION Ash River HELPER Dale Smith DRILL TYPE CPN YEAR MODEL TRUCK NO.

FLUID TYPE DRILLING \_\_\_\_\_\_ Air \_\_\_\_\_ CORING \_\_\_\_\_ PICKUP NO.\_\_\_\_\_

		DRILLIN	IG FEET		CORING	FEET		TOTAL HOURS
ļ	HOLENO.	FROM	<u> </u>	HOURS	FROM	то	HOURS	DRILLING
4	ARR-7905	345	486	5.0		·		
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					· · · · · · · · · · · · · · · · · · ·		· • • • • • • • • • • • • • • • • • • •	
-								
	TOTAL FEET		141	5.0				5.0

## **DELAY HOURS**

								<u>D</u>	ELA	Y	ΗΟι	JR	<u>s</u>														
•	CLAS	s	TRAVEL	MOVING SETUP	WATER	CASIN	G	TRI	PPINC	3 RI	EAMI	ING	MUC	DIN	SLO	GGI	NG		ita:	oti rt				тот,	4L 1	DELAY	
-	CHARGEA HOUR		1.0					-		Ţ						1.	5	<b> </b>							2	5	
Ŧ	NON-CHARC HOUR		1.0	1.0				2.	.0						Ì					1.0	)				5	0	
	AUXILIAR	Y EQU	IPMENT (SP	ECIFY)						1	.41	ft	at	7.	50/	ft										н	RS.
æ	TOTAL CO	NTRAC	T HOURS	CHARGEA	BLE (CONT	RACT RI	GS (	ONL	Y)	1	.5	hr	s a	t 1	35.	00,	/h:	r								н	RS.
	IDLE TIME	(SPEC	IFY)		WEATHE	R				PEF	RSON	NE					F	108								н	RS.
Ŧ	MISCELLA	NEOUS	TIME PE	RSONNEL									୍ଷ	40.	007	hr				_,					-	н	RS.
	REPAIRS (	SPECIF	Y – TYPE,	UNITS, TH	ME)			,	PIC	KUP	e 	_	WAT	ER U	NIT					RIG				TOTAL	REI	PAIR HE	<b>s</b> .
								OTHER	TRACKS-WHEELS	BODY FRAME	TRANS-DIFF		OTHER TRANS-DIFF	BODY FRAME	TRACES-WHEELS	ENGINE	OTHER	KELLY	DRILL PUMP	TRACK-WHEELS	BODY FRAME	TRANS-DIFF	ENGINE				
									ļ				!											TOTA	IL IS:	12.5	
-		DRILL	BITS	l	FUEL	1	2	:	3				\$	ATE	RIA	LS		•		ļ				PARTS			
	MAKE				GALS						884	AN						-		U	TIF						
-	TYPE				OIL			:			MU	D								м/	KE	;					
	SIZE				TRANS- DIFF						XGE	X	10 (	gal	s f	oar	3			SIZ	ZĘ						
-	SERIAL NO.			н	YDRAULIC						CAS	SINC	6 (FT.	)						SE	RIA	LN	о.				
	FOOTAGE			,	wisc.						STE	м								RE	AS	2NC					

(1) Field Office, (2) Head Office Geology, (3) Head Office Engineering, (4) Contractor

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-	•					DAIL	r R	EP	OR	T -	- 8	от	AR	YR	IGS	5							- 41		
	DATE:	06-2	25		LER Jim	Ross			(	SRI		сом	PAN	ly <sup>Ke</sup>	n's	Dr	<u>i11</u>	ing	<u>g</u> 0	RIL				<u> </u>	
	LOCATION	Ash	River	_ HELP	ER_Dale	Smit	h		[	SRI		r y pi	⊑ _Ç	<u>PN</u>		YEA	R M	IOÐI	EL			WA TR	ATER UCK NO	•	
		DRI	LLING .		Air				(	COF	RING	<b>;</b>							_ P	іск	UP NO	<b>J.</b>			
Í	HOLE NO.		p FRO		G FEET TO		н	oui	RS	┢		FRC		1 ING	FEE	T TC				н	OUR\$		TOTA		
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	k,	<u> </u>				•		DE	ELA		100	RS							-				•		
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Į	CLASS	Т	RAVEL	MOVIN SETUP	G WATER	CASI	۷G	raip	PING	RE.	AMI	NGN		DING	LOG	GING			ΟΤ	HEF	1		TOTAL	DEL	AY
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I	HOURS	are		]	·	2.0				$\vdash$				• • • • •			- <del> -</del>								
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	AUXILIARY E												_			-	_					+		_	HAS. HRS.
	TOTAL CONT						103 (								t 1 s			'nr				┿	14.	0	_
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	MISCELLANE			····			1					Τ.								<b></b> .		+-			
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								OTHER	IACKS		TRANS-DIF ENGINE	OTHER	ANS-	BODY F	TRACES-	OTHER	KELLY	DRILL PUMP	ACK	DV F	ANS	ENGINE			
-	1							5	<u><u><u></u></u></u>	<u>치</u> :		5	1	8	E I	5 5	<u> </u>	<u>5</u>	4	ă		-+	TOTAL	<u> </u>	
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	түре				OIL						MUE	2							м	AKE				••	
	SIZE				TRANS DIFF						GEL								S	ZE					
-	SERIAL NO.				HYDRAULIC						CAS	ING	(FT.	)	20	fţ			SE	RIA	LNO.				
	FOOTAGE				MISC.						STE	M							R	EAS	ON				

TR 617				ы	udb	ay C	<b>`</b> م:	ai C	0.77	וממו	οv							_ <b>A</b> `	TAC	H GEOLOG	SRA	РН НЕ	RE
				DAILY		-				-	-	RIGS	3							~ 4	42		
DATE: 79-0	6-26		ER <u>Jim</u>	Ross		(	DRI		ом	IPAN	IY Ķ	len's	s_ <u>D</u> :	ri]	<u>1i</u>	ng	DRI	LL	NO.				
	sh River	_ HELPE	R Dal	<u>e Smith</u>		0	281	ILL T	YP	<u>e</u> <u>C</u>	<u>PN</u>		YEA	RN	ЮÐ	EL	-		!	WATER TRUCK N	NO.	- ·· <b>-</b>	
FLUID TYPE	DRILLING		Air			0	COF	RING								P	PICE	(UP	' NO	·			
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CHARGEABL HOURS	£ 1.0			1.5								2.	.0							4	<b>F</b>	5	
ION-CHARGEAE	LF 1.0	1.0			1.	5														3	3	5	
AUXILIARY E	UIPMENT (S	PECIFY)	· · · · · · · · · · · · · · · · · · ·	•		]	110	) ft	a	t 7	.50	/ft										1	-18
TOTAL CONTR	ACT HOURS	CHARGEA	BLE ICONT	RACTRIGS	ONL	<b>Y)</b> 3	3.5	5 hr	s	at	135	.00/	'hr										ня
IDLE TIME (SP	CIFY)		WEATHEI	8		Ρ	ER	SONN						JOB								1	HR
MISCELLANEO	US: TIME PE	RSONNEL								@4	0.0	0/h1	<u>.</u>										HR
REPAIRS (SPE	IFY - TYPE,	UNITS, TH	ME)			PICK	UP		٧	VATE	RU	TIN				RIG				TOTAL F	łEP	AIRH	85
					OTHER	TRACKS-WHEELS	TRANE DIEE	ENGINE	OTHER	TRANS-DIFF	BODY FRAME	TRACES-WHEELS	OTHER	KELLY	DRILL PUMP	TRACK-WHEELS	BODY FRAME	TRANS-DIFF	ENGINE				
	··· -··	<b>;</b>														_				TOTAL HOURS		12.0	)
DR T	ILL BITS	<u>.</u>	FUEL	1	2	3				м	ATE	RIALS	•						-	PARTS			
MAKE			GALS			 		BRAN	4							U	NIT	-					
ТҮРЕ		}	011			L	-	MUD								м	AK						
SIZE			TRANS DIFF					GEL								SI	ŽE			<u> </u>			
SERIAL NO.		н	YDRAULIC					CASI	NG	(FT.)						SE	RIA	AL N	ю.				
FOOTAGE			wisc.					STEM								R	ĘAS	ΟN					

	°R 617					1	Hudb	ay Co	oal	l Cor	npany	/						_ ^	TTAC	<u>211 (</u>	GEOLOGRA	<u>. PR</u>	HEHE_
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	DATE:7	9-06-	-27	_ DRILL	ER Jim	Ross		D	811		MPANY	Ken	's	Dr	11	ing	<sup>2</sup> DR	ILL					
۲	LOCATION	<u>Ash</u>	River	HELPI	n Dale	<u>Smit</u>	h	D	RII		PE _CPI	N	_ YE	EAR	мо	DE	L			WA TR	ATER UCK NO	•	
	FLUID TY	PE DRI	ILLING .	<u> </u>	Air			C	OR	ING							PIC	KU	P NC	)			
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٦	CHARGEA		1.0			5.9				•										T	6	5	
	NON CHARG	EABLE	1.0		-	<u></u>		.0	<u> </u>								1.5			Ì	3	5	
	AUXILIARY			L	1	<u>l</u>	1	•• 1		20	ft at	7.5	50/7	Ft						┢	7	0	HRS.
	TOTAL COM	ITRACI	r HOURS	CHARGE	ABLE (CONT	RACT R	IGS ONL	Y)			hrs				/hr					Ť			HRS.
ł	IDLE TIME	SPECI	=Y)		WEATHE	R		P	ERS	SONNEI	1.0	hrs	0	FFJO	ЭВ					1	<u>منفقات کانت می</u>		HRS.
-	MISCELLAN	EOUS	TIME PE	RSONNEI	-						@ 40	.00/	/hr										HRS.
	REPAIRS (S	PECIFY	- TYPE,	UNITS, T	IME)			PICK	JP		WATER	UNIT				R	IG			T	TOTAL RE	PAI	R HRS.
							отнея	TRACKS-WHEELS BODY FRAME	TRANS_DIFF	ENGINE	OTHER TRANS-DIFF	BODY FRAME TRACES-WHEELS	ENGINE	ОТНЕЯ	KELLY	DRILL PUMP	HN		TRANS-DIFF	ENGINE			
				·	<u> </u>			T	 					;							TOTAL HOURS:	10	.5
•	ļ,	DRILL	BITS	,	FUEL	1	2	3	$\downarrow$		MA	TERI	AL.S							P	PARTS		
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-	SERIAL NO.		-	 	HYDRAULIC		 		_	CASIN	G (FT.)	(	65.	0			SEF	IAL	NO.				
	FOOTAGE				MISC.					STEM							RE,	450!	N				

TR 617						Нu	db;	ay (	Coa	al	Co	m	Da	nv								_ <u>A</u> T	TAC	H GE	OLOG	RAPH	HERE
					DAILY			-					-	-	RI (	ŝS									- 4	4	
DATE	79-06	-28	_ DRIL	LER Ji	n Ross	5			DR	iLL	. co	MF	PAN	Y K	Сел	's	Dı	<u>il</u>	<u>li</u>	nge	RI	LL	NO.				
LOCA	AS	h River	HELP	ERDa	le Smi	ith			DR	ILL	. TY	ΈE		CPN	I	Y	EA	R M	юD	EL			۱ ۲	WAT TRU	ER CK N	0	
FLUI	TYPE D	RILLING	Air	<u> </u>	<b>-</b>				coi	RIN	١G									P	ICK	UP	NO	•	<del>.</del>		
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] 	ASS	TRAVEL	MOVIN SETUP	GWATER	CASIN	1G	TRIP	PING	RE	EAN	AING	: <b>5</b> /1	UDE	DING	LC	GGI	NG			ot	HEI	R		тс	DTAL	DEI	LAY
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AUXIL	IARY EQL	PPMENT (SI	PECIFY	. <u>h</u>		·					13	7	ft	at	: 7	.50	)/f	[t									HRS.
TOTAL	CONTRA	CT HOURS	CHARGE.	ABLE (CONT	RACTR	IGS (	ONL	Y)			6.	5	hr	s a	it	13	5.0	)0/	hr						7	.5	HRS.
IDLE 1	IME (SPEC	(IFY)		WEATHE	8			f	PER	RSO	NNE						FFJ	юв									HRS.
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REPAI	RS (SPECI	FY – TYPE,	UNITS, T	(ME)				PICI	KUP	<b>,</b>		w	ATE	RU	NIT					RIG				101	TAL R	EPAI	R HRS.
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TYPE				OIL						M	UD									M	AKE			·			
SIZE		·		TRANS- DIFF		<b> </b>				GE	 EŁ						•	•		s	ZE						
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-					:	DAILY			•			Co RO		-	•	١G	iS									- 4	5	
	DATE:	7 <u>9-06</u>	-29	_ DRIL	LER Jim	Ross				.DI	RIL	L CC	M	PAN	y K	en	's	Dr	<u>i1</u>	<u>li</u>	ngo	RI	╘┖					
-	LOCATIO	n Ash	River	_ HELP	ERDal	e Smir	th			Dł	RIL	L TY	'PE		CPN	<b>.</b>	_ Y	EAI	R M	OD	EL						0	
	FLUID TY	PE DR	ILLING		Air					cc	DRI	NG									_ P	іск	U	P NO	•			
٦				RILLIN	GFEET									CÓR	INC	; F(	EET				<u> </u>		<u> </u>	RS				OURS
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1									TRACKS-WHEELS	AME	166			5	FRAME	TRACES-WHEELS				MP	TRACK-WHEEL	AME	IFF					
٦	•							ER	CKS	BODY FRAME	TRANS-DIFF	ENGINE	ER	TRANS-DIFF	¥ FR	CES-	ENGINE	ER	۲	DRILL PUMP	VCK-V	BODY FRAME	TRANS-DI	ENGINE				
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(1) Field Office (2) Head Office Geology (3) Head Office Engineering (4) Contractor

ATTACH	GEOLOGRAPH	HERE

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				ER Dale																						
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H	ludbay	Coal	Company	1
DAILY	REPOR	<b>T</b> -	ROTARY	RIGS

DATE: 79-07-07 DRILLER Jim Ross	DRILL COMPANY Ken's DrillingDRILL NO.
	WATER

LOCATION Ash River HELPER Dale Smith DRILL TYPE CPN YEAR MODEL TRUCK NO. Air \_\_\_\_\_ PICKUP NO. \_\_\_\_\_

FLUID TYPE DRILLING

		DRILLIN	G FEET		CORING	FEET	HOURS	TOTAL HOURS
	HOLE NO.	FROM	то	HOURS	FROM	то	10013	DRILLING
-	ARR-7912	68	320	10.5				
	<u></u>		<u></u>					
-								
-								•
-	TOTAL FEET		252	10.5				10.5

## DELAY HOURS

					-																
CLASS	TRAVEL	MOVING	WATER	CASING	TR	IPPING	REA	MING	MUDDIN	3 LO	GGI	NG		l	отн	1 E F	2		τοτα		ELAY
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IDLE TIME (SPE	CIFY)		WEATHE	R		ş	PERS	ONNE	∟1.0 h			FFJ	ов								HF
MISCELLANEOU	IS: TIME PE	RSONNEL							@ 40.	JU7	nr										ня
REPAIRS (SPEC	FY – TYPE,	UNITS, TH	NE)			PICH	UP		WATER	INIT				F	RIG				TOTAL	REP	AIR HR
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																			HOUR		16
DRI			FUEL	1	2	3			MAT	ERIA	ALS								PARTS		
MAKE			GALS				1	BRAN							U	NIT	Dı	riv	e shoe	;	
TYPE			OIL				!	MUD							M	AKE					
SIZE			TRANS- DIFF				-	GEL 5	gals :	Eoa	m				SI	ZE					
SERIAL NO.		н	YDRAULIC					CASIN	G (FT.)	75	ft				SE	RIA		0.			
FOOTAGE			MISC.				5	STEM							RE	EAS	ON				

(1) Field Office. (2) Head Office Geology, (3) Head Office Engineering, (4) Contractor

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	TR 617						Hud	dba	ау С	So	al	Co	mı	par	זע								_ <u>AT</u>	TACI	H GEOLOGR	APH	HERE
w					1	DAILY			-							IIG	iS								- 54	ŀ	
	DATE: 79	9-07-	08	_ DRILI	LER <u>Jim</u> H	loss				DRI	ILL	L CO	MP	AN	γĶ	en	's	Dr	ril	<u>li</u> 1	ngr	RII					
	LOCATIO	N <u>As</u>	<u>h Rive</u>	<u>r</u> help	ER <u>Dal</u> e	e Smit	:h			DRI	ILL	LTY	PE		PN		_ Y	EAI	R M	OD	EL			T	VATER RUCK NC	)	
	FLUID TY	PE DR	ILLING .	Air					(	COF	RIN	NG.									P	ICK	UP	NO.	,		
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	AUXILIAR	Y EQUI	PMENT (SI	PECIFY)							10	60	ft	at	: 7	.5	0/f	t									HRS.
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۲	MISCELLA	NEOUS	TIME PE	RSONNEL	-							<u> </u>		رو د 	+0.		/ 111 										HRS.
	REPAIRS (S	PECIF	Y – TYPE,	UNITS, T	IME)			r	PIC	KUP	•		W,	ATE				·			RIG	1	<u> </u>		TOTAL RE	PAI	R HRS.
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								OTHER	TRAC	BOD	TRANS-	ENGINE	OTHER	TRA	вору	TRAC	ENGINE	OTHER	KELLY	DRIL	TRAC	BODY	TRA	ENGINE			
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	SIZE				TRANS- DIFF						G	EL.									s	12E					
-	Serial NO.				HYDRAULIC						c,	ASIN	G (	FT.)							s	ERIA	AL N	0.			
	FOOTAGE				MISC.					ļ	ST	ГЕМ									R	EAS	ON				

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LOCATION AS																						•	TRU	ICK N			
FLUID TYPE	RILLING	<u> </u>	<u>Air</u>					CC	ORIN	IG .		Air	•						Pi	ICK	UP	NO	)				
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CHARGEABLE HOURS	1.0			3.0		<u> </u>						<u> </u>		-									+	4		0	
NON-CHARGEABL	E 1.0					1	0																	2		0	
AUXILIARY EQ	UIPMENT (S	PECIFY)	<u> </u>	<u> </u>	ł.				76.	5 1	ft	at	7.	50,	/f1	t											HRS
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IDLE TIME (SPE	CIFY)		WEATHE	R				PE	ERSO	NNI						FF.	ЮВ										HR
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							HEEL	AE AE	Ľ			H.	ME	HEEL				م ا	TEELS	ШN	LL.						
¶						8	TRACKS-WHEELS	FRAME		щ	R	TRANS-DIFF	BODY FRAME	TRACES-WHEELS	ų	н	7	DRILL PUMP	TRACK-WHEELS	BODY FRAME	TRANS-DIFF	L					
						OTHER	<b>TRAC</b>	BODY	TRANS-DI	ENGINE	OTHER	TRAN	PODY	TRAC	ENGINE	OTHER	KELLY	DRILI	TRAC	BODY	TRAN	ENGINE					
1																								TOTAL		9	.0
DRI	LL BITS		FUEL	1	1	2		3	T			M	ATI	ERIA	.L.S					<u>.</u>	L	<u> </u>	PA	RTS			
МАКЕ			GALS						B	RAN	1								U	NIT	•						
TYPÉ			OIL	••••					м	συ									м	AK	E						
SIZE			TRANS- DIFF				1		G	EL									s	IZE					·····		<b>.</b>
SERIAL NO.			IYDRAULIC						c	ASI	NG	(FT.)		35	.0				SE	RI		ю.					
FOOTAGE		<b> </b>	MISC.		<b> </b>		1		ST	TEM	1								R	EAS	ON						

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7.0 <u>MAPS</u>

Structural Profiles	A-A <sup>1</sup>	HC 2136S
	B-B <sup>1</sup>	HC 2137S
Location and Accessibility	1:50,000	HC 1869-L40
Geology Map	1:20,000	HC 450 (a)
Correlation Chart	1:500	HC 2374-L32
Geophysical Logs Microfich	e	
- Gamma Neutro		AAR 7901-14C
- Density Seri	es	AAR 7902-12

DRILL HOL GEOPHYSIC	CAL LOGS A	VAILABLE		ENDING:	Y6: <u>16-06</u> 19 <u>10-07</u> 79 3Y: <u>R. J. Ta</u>	79
GR GAMI GN GAMI	C SITY CALIPER WARRESISTANCE MA NEUTRON MA NEUTRON DE <b>NS</b>	ity cavifer	B P W	PIEZOMETER	STANCE DENSITY CASING (PCV TY) Y DRILL HQLE (C BLE	PE)
ARR-7901	GR ; DC	1	5 5	<del>*************************************</del>		1999
ARR-7902	GR;GN;DC					
ARR-7903	GR;GN;DC	Focus Beam				
ARR-7904	GN;DC	Focus Beam	2			4
ARR-7905	GN;DC	Focus Beam				
ARR-7906	GN;DC	Focus Beam				
ARR-7907	GN					
ARR-7908	GN;DC			· · · · · ·		
ARR-7909	GN;DC;	Fòcus Beam	4			
ARR-7910	GN; DC	Focus Beam	2			
ARR-7911	GN;DC			eniz e la fili de la della della della della della della della della della della della della della della della		
ARR-7912	GN;DC				· · · · · · · · · · · · · · · · · · ·	4
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Completed full scale Gamma-Neutron and Gamma Density Logs 1:100

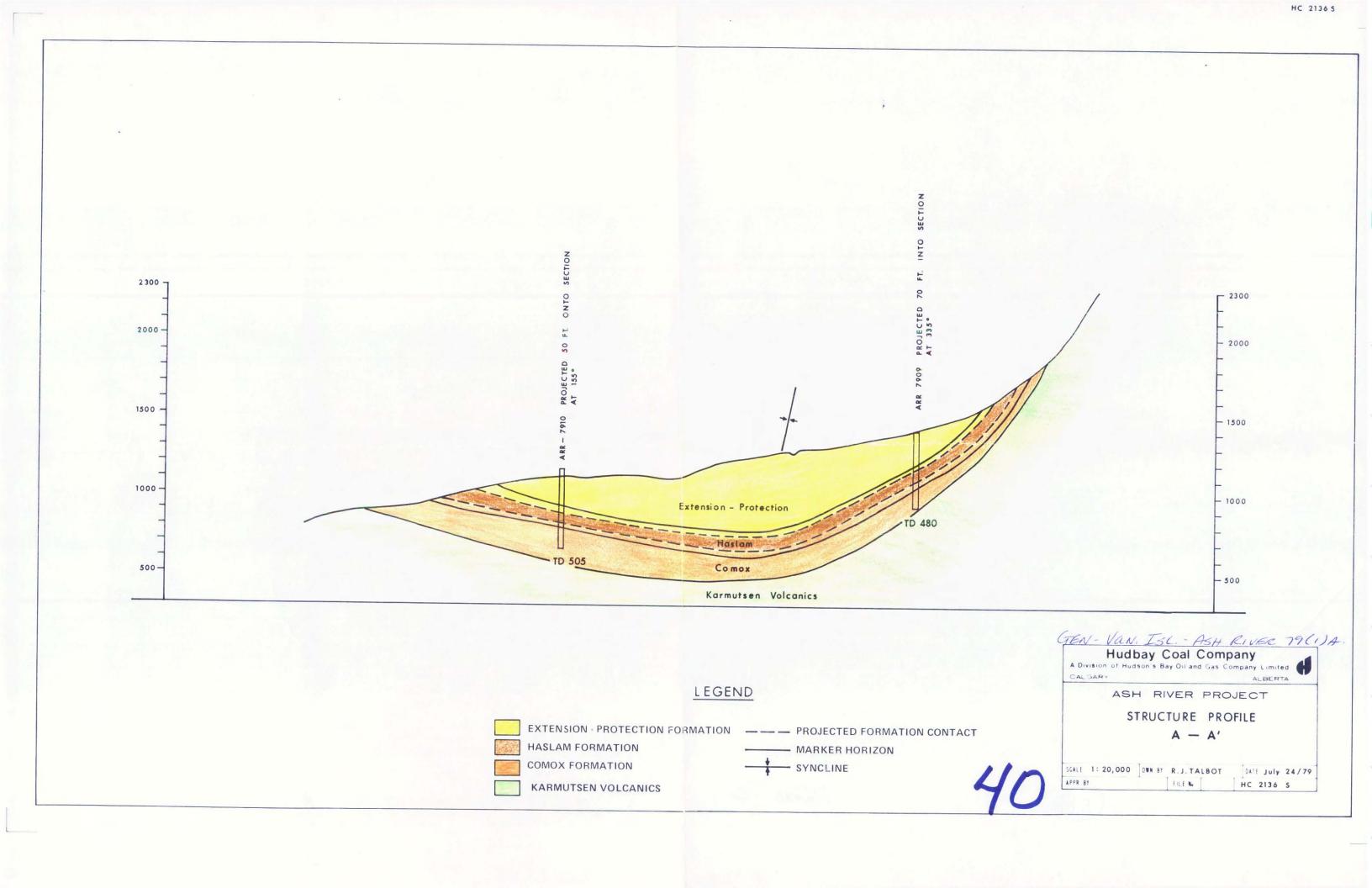
A	AAR	7901	Gamma Ra	y Sidewal	1 Densilog	HC	2348-L47
A	<b>A</b> R	7902	Gamma Ra	y Neutron	Log	HC	2349-L47
A	AR	7903	Gamma Ra	y Neutron	Log	HC	2350-L47
A	١AR	7904	Gamma Ra	y Neutron	Log	HC	2351-L47
A	<b>\A</b> 'R	7905	Gamma Ra	y Neutron	Log	HC	2352-L47
A	AR	7906	Gamma Ra	y Neutron	Log	HC	2353-L47
A	١AR	7907	Hole Aba	ndoned			
A	١AR	7908	Gamma Ra	y Neutron	Log	HC	2354-L47
A	AAR	7909	Gamma Ra	y Neutron	Log	HC	2355-L47
A	<b>A</b> R	7910	Gamma Ra	y Neutron	Log	HC	2356-L47
A	<b>A</b> R	7911	Gamma Ra	y Neutron	Log	HC	2357-L47
P	<b>A</b> R	7912	Gamma Ra	y Neutron	Log	HC	2358-L47
A	٩AR	7913	Gamma Ra	y Sidewal	l Densilog	HC	2359-L47
A	<b>A</b> R	7914C	Gamma Ra	y Sidewal	l Densilog	HC	2360-L47

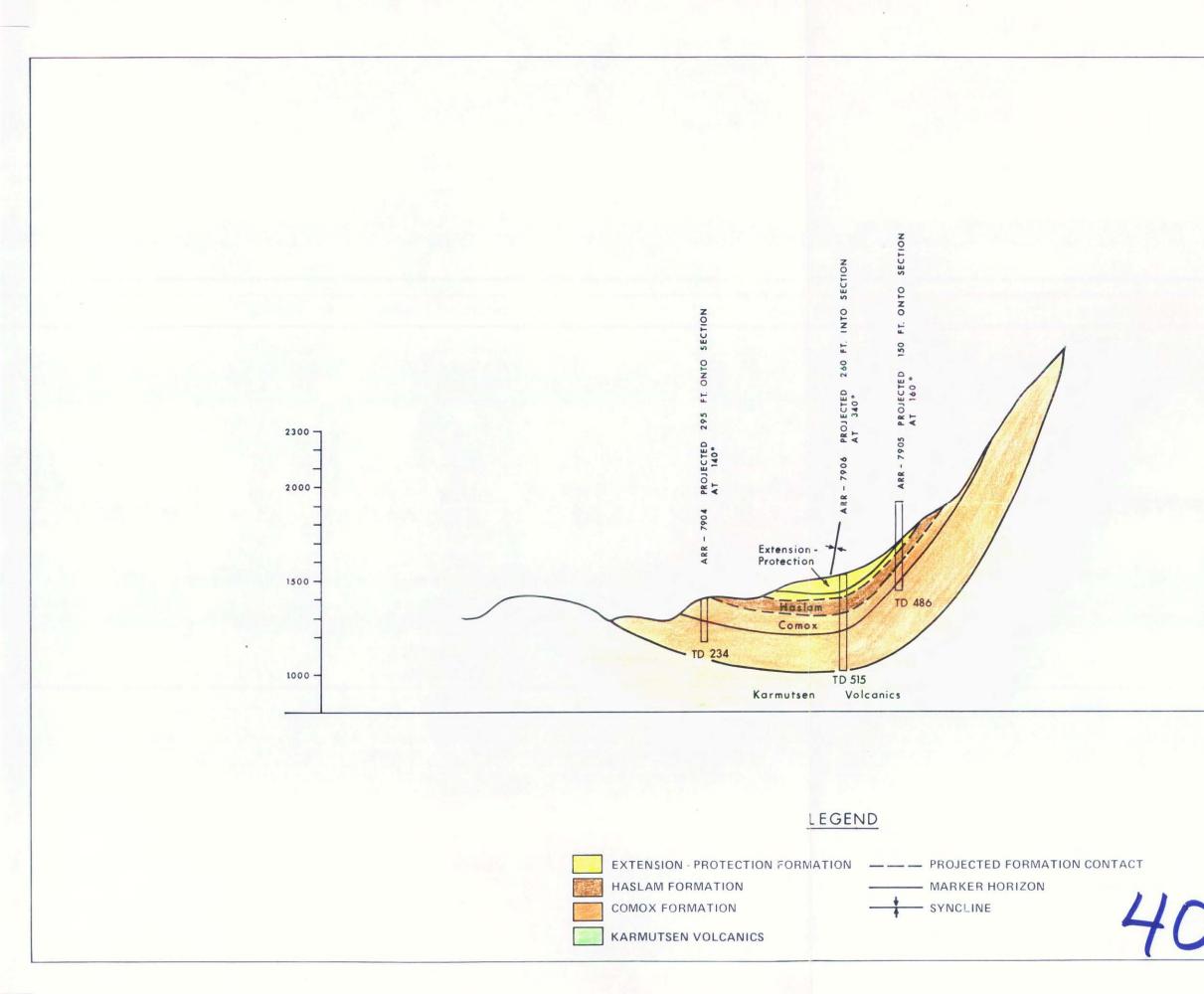
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COMPLETED FULL SCALE SIDEWALL DENSILOGS 1:100 Scale

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A.R.R.	-7902	HC2338	L45
A.R.R.	-7903	HC2339	L45
A.R.R.	-7904	HC2347	L45
A.R.R.	-7905	HC2340	L45
A.R.R.	-7906	HC2341	L45
A.R.R.	-7908	HC2346	L45
A.R.R.	-7909	HC2344	L45
A.R.R.	-7910	HC2342	L45
A.R.R.	-7911	HC2345	L45
A.R.R.	-7912	HC2343	L45





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Hudbay Coal Company		
Hudbay Coal Company A Division of Hudson's Bay Oil and Gas Company Limited		ASH RIVER PROJECT
Hudbay Coal Company A Division of Hudson's Bay Oil and Gas Company Limited CALGARY ALBERTA		STRUCTURE PROFILE
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