



PLACER DEVELOPMENT LIMITED

A REPORT ON THE EXPLORATION OF
LIARD COAL BASIN, WATSON LAKE, M.D.,
YUKON TERRITORY

REPORT ON THE EXPLORATION OF
THE EXPLORATION LICENCES
61 & 62

N.T.S. 105-A-2-SEQ & SWQ

062002

FOR: Placer Development Limited
BY: D.M. Jenkins
Senior Geologist

DATE: October 12th, 1979

TABLE OF CONTENTS

	<u>Page</u>
Summary & Recommendation	1
Introduction	2
Property and Location	2
Access	2
Work Performed	2
Property Geology	4
State of Qualifications	7

LIST OF ILLUSTRATIONS

Coal Licence Location Map	3
Diamond Drill Hole Location Map	In Pocket
Tentative Stratigraphic Correlation - Cross Section	In Pocket

APPENDICES

Appendix A	Diamond Drill Hole Logs
Appendix B	Geophysical Logs
Appendix C	Certificates of Analyses
Appendix D	Statement of Costs and Copies of Invoices

Summary and Recommendation:

A seven hole diamond drilling exploration program was carried out. It led to the identification of potentially economic quantities of low sulphur lignite coal with a mean calorific content of approximately 5,300 BTU on an as received basis. Apparent lack of seam continuity is a negative aspect of these deposits as now perceived, and is an aspect to which attention will need to be focused as exploration progresses. A positive feature of the deposits is the apparent lack of structural complexity within the area of the drill pattern.

It is recommended that an aggressive program of reconnaissance rotary drilling, supplemented by bore hole logging, be carried out along access roads north of the Alaska Highway. This is necessary to provide an initial data base for evaluating the remainder of the basin. A program consisting of 100 rotary drill holes to an average depth of 100 metres could be expected to cost approximately \$300,000.

LIARD COAL PROJECT

Introduction:

This report summarizes exploration diamond drilling performed during 1979 by Placer Development Limited on Placer's Liard Coal Project.

Property and Location:

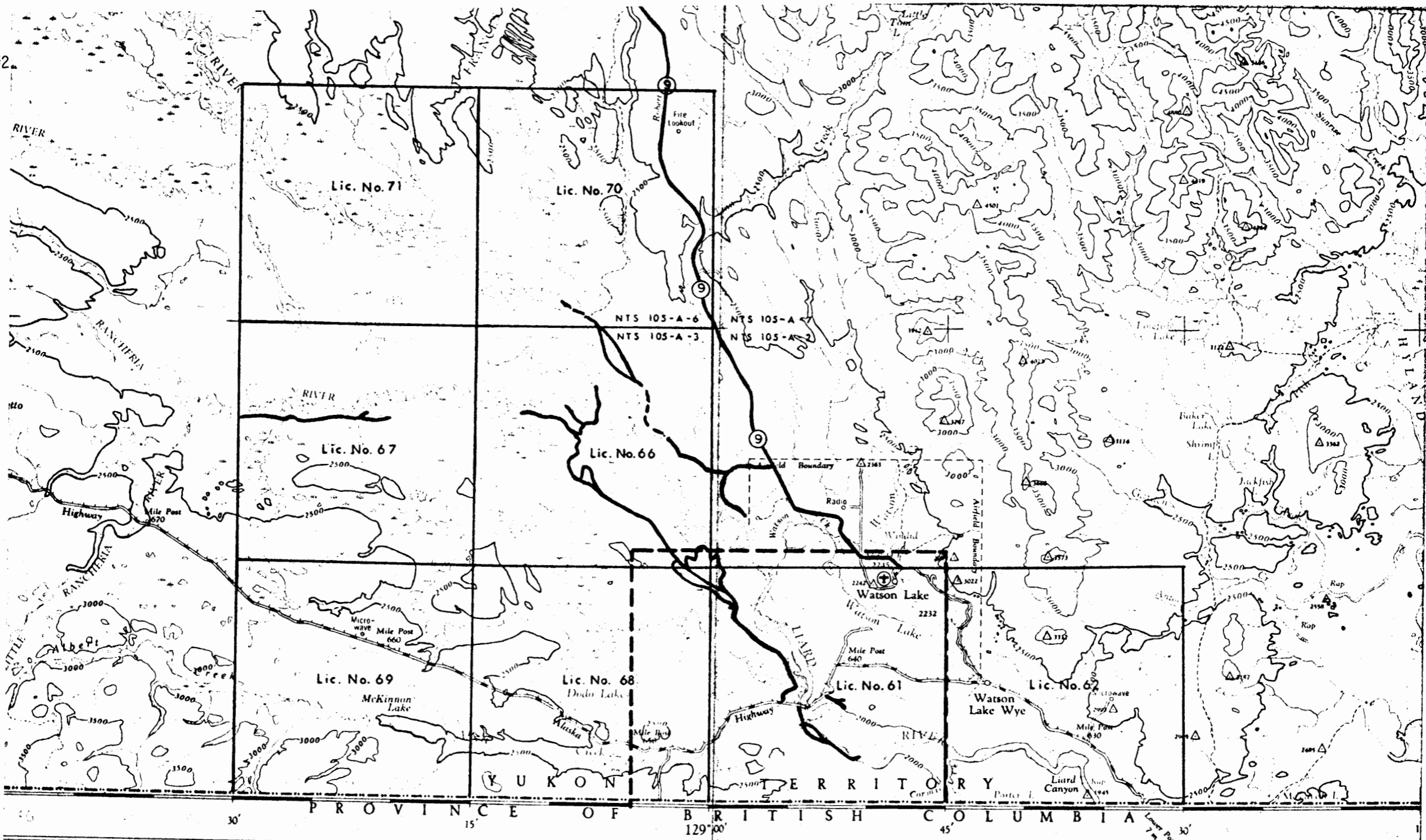
The property consists of eight coal exploration licences numbered 61, 62, 66, 67, 68, 69, 70 and 71. These are located on N.T.S. map sheets 105-A-2, 3 and 6. Watson Lake, Yukon Territory lies within the eastern most coal licence. The remainder of the licences lie west and northwest of Watson Lake and immediately north of the British Columbia - Yukon border. The licence locations are illustrated on the Liard Coal Exploration Licence Map which follows this page.

Access:

The area of the licenses is traversed by the Alaska and Campbell highways. Logging roads constructed by Yukon Forest Products provide additional access in areas adjacent to the public highways. In addition Placer Development has constructed approximately 11 km. of drill site access roads.

Work Performed:

A total of seven diamond drill holes were completed in an area of approximately 3.5 Km. x 4 Km. (see location map in pocket). Total penetration in these holes is 923.6 metres and the drill logs comprise Appendix A of this report. The geophysical logs of the holes comprise Appendix B. Geophysical logging of the holes was carried out by ROKE Oil Enterprises Ltd. A research project based on the geophysical logs is currently in progress. Its purpose is to develop a computer technique for in situ evaluation of lignite coal seams. A geochemical orientation program analyzing for volatile sulphur and volatile hydrocarbons is currently in progress.

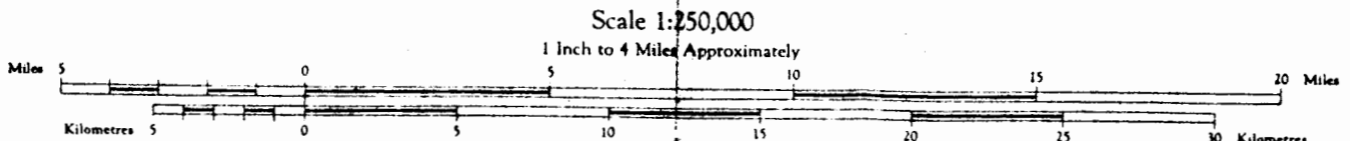


PLACER DEVELOPMENT LIMITED
LIARD COAL, EXPLORATION LICENCES
WATSON LAKE, YUKON TERRITORY

Copies may be obtained from the Map Distribution Office, Department of Mines and Technical Surveys Ottawa.

REFERENCE

Road, Hard Surface, Heavy Duty	3 or more Lanes	Partially completed
" " " " " "	2 Lanes	Route No.
" " " " " "	1 or more Lanes	2 Lanes
" " " " " "	3 or more Lanes	Not less than 14 ft. wide
Other Roads		Poor condition
Trail		
Railway, Double Track		Station
" " " " " "		Stop
Boundary, International		
" " " " " "		
" " " " " "		
" " " " " "		
Electric Power Line		on Steel Towers
		on Wood Poles



ROADS - ROUTES

hard surface - pavee	—————
loose surface - de gravier	-----
cart track - de terre	- - - - -
trail - sentier
Deletions - Suppressions	x x x x x

LEGEND

- THE CAMPBELL HIGHWAY
- LOGGING ROADS
- OUTLINE OF THE LOCATION MAP
- 1:50,000 SCALE

REFERENCE

Triangulation Station	△	Spot Elevation, in feet	.821
Contours, Elevation	— 1500 —	Washed Areas	
" " " " " "	— 2000 —	Swamp or Marsh	
" " " " " "	— 1500 —		
Form Lines	-----		
Stream, Intermittent	~~~~~	Cliff	W.L. 631
Dam	— —	Navigation Light	
Airfield, Military, El. in feet	765	Seaplane Base	⊕
" " " " " "		Seaplane Anchorage	⊕
" " " " " "		Fire Lookout Tower	⊕
Building	⊕	Bench Mark	⊕ B.M.
Church	⊕	Telephone, Trunk Route	⊕ 752
School	⊕ S		

Property Geology

The Paleocene age lignite containing sediments have been penetrated to a maximum depth of 153 metres in a single drill hole. The total stratigraphic range, which has been penetrated by bore holes, is thought to be approximately 180 metres. This is based on rather tenuous stratigraphic correlations. The northern most holes cannot be placed in the existing correlation matrix. This is due to gross changes in lithology and a lack of marked horizons. The base of the Paleocene stratigraphic section has not been identified, therefore the thickness of the Paleocene sediments is unknown as is the total thickness of basin fill in the Liard Coal Basin. Due to the paucity of outcrop, a data base bearing on sediment thickness or distribution does not exist in most areas away from the Liard River on the drill pattern.

The sediments penetrated by the bore holes are classical fining upward sequences of unconsolidated clastic sediments deposited in fluvial environments. These sequences average between 5 and 15 metres thick. Texturally the sediments range from boulder gravels to silty clays and organic clays and coals. Normally the coarsest sediments are granular sized grains. Textural immaturity is characteristic of the finer sands. Sorting tends to increase as grain size increases in the sand size fraction. Mineralogically the coarser sediments are immature and rock fragments are abundant. These rock fragments range in composition from acid and intermediate intrusive, plutonic rocks to chemically equivalent effusive rocks.

Lignitic coal was found in every drill hole. Due to poor recovery, thicknesses and quality of coal are not easily evaluated from the drill core. Some of the coal seams are only known from the geophysical logs. Unfortunately existing geophysical log interpretation technology is not directly applicable to the in situ quality evaluation of this lignite. A research project aimed at resolving this difficulty is in progress and a report is expected in the near future. A definite statement concerning coal quality must await these results.

Arithmetic means of analytical data (Appendix C) for 17 selected samples from diamond drill holes 79-3 thru 79-5 provide an indication of coal quality. These samples were selected because they contain less than 44% ash on an as received basis. These means are as follows:

H ₂ O	28.64%
Ash	19.15%
Sulphur	0.2%
BTU's	5348

Ultimate analyses of the coal have not been carried out. Chemical analyses of the ash area have not been made.

Physically the coal consists of dark brown to black colored very finely divided organic matrix. Varying amounts of wood chips, charcoal and grass or leaf fragments comprise the remainder of the carbonaceous materials. Inorganic contaminants consist largely of silt or clay size material dispersed through the coal and is not readily identified in quantities approaching 10%. The coal contacts are generally gradational, through increases in the quantity of clay, to organic clay.

The coal seams range in thickness up to approximately 6.5 metres including all splits and dirty coal. The best drill hole had an aggregate thickness of coal seams, exceeding one metre in thickness, of approximately 17 metres. This was contained within a 49 metre stratigraphic thickness. The top of this interval lies 87 metres below the surface.

The coal beds as indicated by the current data base are lenticular in cross section and persistence of a simple bed or sequence of beds throughout the basin or a major portion of the basin is not to be expected. An east-west cross section from DDH79-2 to DDH79-5 (in pocket) illustrates the degree of continuity which might be expected. It is however possible that continuity along the sedimentary strike may be greater. This direction has not been defined.

A corollary to the lack of continuity of individual coal beds is that individual beds will probably demonstrate strong variations in coal quality.

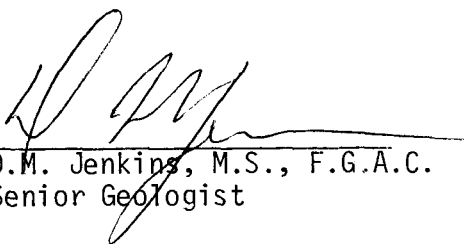
Based on the tentative correlation of coal seams, the structure of the sediments within the drill pattern south of the Alaska Highway is flat with a maximum dip of approximately 2-5°NE. Short wavelength folds of low amplitude could occur between the wide spaced drill holes but there is no unequivocal evidence to suggest this structural complexity in the vicinity of the drill pattern. It is conceivable that broad warps with amplitudes approaching the imprecision of the drill hole collar elevations do exist. Precise surveying of the drill hole collars would resolve this ambiguity.

STATEMENT OF QUALIFICATIONS

I, D.M. Jenkins, with business address at 700 Burrard Building, Vancouver, B.C., V6E-3A8, do hereby certify that I have supervised the field work and have assessed and interpreted the data resulting from this work on coal exploration licenses 61 and 62.

I also certify that: -

1. I am a graduate of the University of South Florida (B.C. Geology, 1963).
2. I am a graduate of the University of Florida (M.S. Geology, 1966).
3. I was a graduate student at the University of Cincinnati from 1966 to 1970.
4. I have engaged in mineral exploration since 1970.
5. I am a fellow of the Geological Association of Canada.



D.M. Jenkins, M.S., F.G.A.C.
Senior Geologist

APPENDIX A

DIAMOND DRILL HOLE LOGS

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

HOLE No. 79-1
SHEET No. 1 of 4

GRID: _____

LOCATION: NTS 105A 2W, 033 538 BEARING: _____
DATE COLLARED: 19 April 79 LENGTH: 120.2 m
DATE COMPLETED: 25 April 79 DIP: 90°

LATITUDE: 60°01'23"
DEPARTURE: 128°56'25"
ELEVATION: ±2300' (701 m)

PROPERTY: Liard Coal Basin
CORE SIZE: HQ LOGGED BY: D.M. JENKINS
SCALE OF LOG: 1:200 DATE: 26 April 1979

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% A.S.H.		% V.M.		% F.C.		CALORIFIC VALUE		% S	% H	% N	% O	E.S.I.		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
4		Cased																				
12																						
16	30%	Sand: UNCONSOL., Coarse-ly. Coarse grnd., Well sorted Sub. rounded, Min. immature Lt. greenish grey color																				
20	26%	Sand: UNCONSOL., Fine to med. grnd., sorted, Sub. ANG., Min. immature, 5-10% MUSCOVITE Lt. BRN. color																				
24	0%																					
28																						
30	140%	Sand: as @ 18-21m with claystone beds, sand has Laminae of finely divided CARBONACEOUS material @ 30.8																				

GRID: _____

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: Jenkins HOLE No. 79-1
DATE: 26 April 1979 SHEET No. 2 of 4

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	US E.	Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
30																					
07																					
34																					
67		Claystone: Lt. grey, massive - crudely laminated, 5% plant debris + charcoal																			
47		12cm core of Tree Trunk @ 37.2m, 6cm @ 41m, 10cm @ 42m																			
07		Siltstone below 40.2m Laminae @ 35° to core axis																			
30																					
42																					
35		As above with fine gravel beds																			
43		As above less gravel beds																			
07																					
46																					
		Sands UNCONSOL., fine grnd., poorly sort. Carbonaceous																			
2		Wood: 4cm core																			
50																					
07				58901																	
10		Coal: DK, BRN., finely divided organic matter w/ 5% wood, 1% pyrite																			
16		Claystone: Buff w/ plant debris thin fine gravel beds																			
54																					
30																					
67		Coal: DK. brn., finely divided organic matter w/ minor woody matter																			
58																					
07																					
19		Sand: UNCONSOL., med.-course grnd., well sorted, min. immature similar to 12.2-18m																			
19																					
07																					
07																					
0																					
66		Claystone: Buff colored, upto 5% plant debris																			

GRID: _____

DEPTH m	m black & % sec.	ROCK TYPE DESCRIPTION	Graph Log	Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	L.S.I.	Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
66																						
67	187	4cm coal @ bottom																				
70	607	Sand: Unconsol. med. grnd at bottom grading to silt @ top																				
	472	fining upward sequence as above																				
	0%																					
74	0%																					
	99%	Sand: Unconsol., med grnd.																				
	0%																					
78	0%																					
	0%																					
82	0%																					
	19%	Coal: DK. brn., soft, finely divided organic matter, few ident. grass blades			58902																	
86	66%	Sand: Unconsol., coarse to v. v. coarse and well sorted @ bottom, finer grnd + poorly sorted towards top, grades to micaceous silt @ top.																				
	50%																					
90	0																					
	0																					
94	0																					
	<17	interlaminated coal and silt.																				
	98.1																					
98	0	Coal: Dirty, finely divided			58903																	
	66	98.7 organic w/ clay bands																				
	57%	Coal: Dirty, weakly bedded, finely divided organics w/ 37% charcoal, clay bands			58904																	
	60%	101.7 Clay to 101.7m																				
102																						

GRID: _____

DEPTH m	m block & % loc.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	U.S. I.		Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
102	87%	101.7 - 103.6 Coal: DK Brn, soft, massive, min. woody material argil. @ bottom		58905																	
106	95%	Interbedded silt and clay - Lt. grn to white, weak bedding 90° to core axis																			
110	56%	Silt, med gray, sandy, thin bedded - laminated, organic partings																			
114	67%	113.4 Conglomerate: py + siliceous cemented Coal: 20% woody fragments 8cm clay band		58906																	
118	86%	114.9 20cm of clay bands 116.4 Coal: N. dirty ± 50% clay 49% 117.9		58907																	
122	0%	TD 120.2 Rod broke - hole abandoned																			
126																					
130																					
134																					
138																					
142																					
146																					
150																					
154																					
158																					
162																					
166																					
170																					
174																					
178																					

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: Jenkins HOLE No. 79-2
DATE: 31 April 1969 SHEET No. 2 of 4

GRID: _____

DEPTH m	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
				MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	L.S. %	Reflec.	Sp. Gravity
					as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
95%	Coal: DK brn - B/K, v. fine grnd matrix w/10% wood fragments		58911																	
100%	grading into clay by interbeds below 34.6m		58912																	
100%			58913																	
33%	Clay-silt: Lt. grey; micaceous, poorly bedded grading from silt @ bottom to clay @ top. Org. organic rich beds																			
26%	Clay-sand: Interbedded clay, silt, and unconsolidated sand, thin coal beds (max. thickness 4cm)																			
22%																				
55%	Silt: Lt. grey, micaceous with abundant organic matter																			
87%																				
6%	bedding @ 90° to core axis																			
27%	Wood fragment cored @ 46m																			
75%	Gravel-sand: medium gravel-coarse sand; Lt grey; unconsolidated																			
80%	mineralogically immature (coarser clasts are largely rock fragments)																			
80%	moderately sorted																			
10%																				
07%																				
41%	Silt; Lt grey; sandy @ bottom argill @ top; micaceous; organic fragments common																			
07%																				
20%	20cm of coal: DK brn. finely divided organic matter w/several % wood chips		58914																	
93%																				

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: D.M. Jenkins HOLE No. 79-2
DATE: 2 May 1979 SHEET No. 3 of 4

GRID: _____

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	I.S. E.		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
68		Clay and Argil. silt; Lt. grey; micaceous 5-10% organic fragments bedding not obvious																				
72																						
76		Sand: fine grained, silty (poorly sorted) w/ thin (± 6cm) bed of argil. silt abundant organic partings in sand @ 90° to core axis																				
80		Sand: As above but w/ coarse grain intervals																				
84		Sand: fine grain.; poorly sorted w/ abundant coal partings; grading upward through silt to clay to coal parting																				
88																						
92		Gravel clasts to 5cm recovered source unknown																				
96		Silt and silty clay; med grey micaceous																				
100		Sand: Unconsol.; fine grain.; poorly sorted; cohesive due to matrix; grades upward to silt																				
104		Sand: Unconsol.; coarse grain. well sorted																				
108		Sand: med grey; fine grain, poorly sorted (silty) very thinly bedded																				
112																						

PLACER DEVELOPMENT LIMITED

EXPLORATION DEPARTMENT

HOLE No. 79-3
SHEET No. 1 of 5

GRID: _____

LOCATION: NTS 105AZW/1041554 BEARING: _____
DATE COLLARED: 4 May 1979 LENGTH: 500' (153 m)
DATE COMPLETED: 9 May 1979 DIP: -90

LATITUDE: 60° 03' 16"
DEPARTURE: 128° 55' 33"
ELEVATION: 2190' (667 m)

PROPERTY: Liard Coal
CORE SIZE: HQ LOGGED BY: M. Boyd + D. Jenkins
SCALE OF LOG: 1:200 DATE: 10 May 1979

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% ASH		% V.M.		% F.C.		CALORIFIC VALUE		% S	% H	% N	% O	I.S.I.		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
0																						
4																						
8																						
12		Casing																				
16																						
20		Clay - Ground up coal mixed w/ sand + clay																				
24	47%	Sand: Lt. grey; coarse grnd; well sorted; grades upward into fine grnd less well sorted sand @ 23 cm then grades upward to sandy micaceous silt @ top; 2cm coal parting @ top																				
28	31%																					
	43%																					
	43%																					
	68%	SANDY, LT. GREY, ETC. WELL SORTED BEDDING HARD UPWARD INTO V.F. CLAY WHICH GRADUALLY INTO INTERLIVE AT 23 CM																				
	34%	DAILY, FINE GRAINED TO MEDIUM GRAINED CLAY GRADING UP INTO MICACEOUS, POORLY BEDDED & COILED SANDSTONE																				
	61%	Coal - black, hard; finely divided organic matter																		Sent to Roke		

DEPTH m m block & % sec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
				MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	I.S.C.	Reflec.	Sp. Gravity
					as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
32	51% CLAY, V.F. GRAINED, LITTLE MATRIX, GREY THROUGHOUT																			
	57% SANDSTONE: FINE GRAINED, GRAINES UNWASHED INTO V.F. DIRTY CLAY & SAND BECOMING VISIBLE CHARCOAL VISIBLE IN QUANTITY AT 32-32.5m																			
	39% SANDSTONE: DIRTY BROWN, F. GRAINED, GRAINING INTO VERY ORGANIC CLAY WITH INTERMITTENT STIPS OF FINE LAMINATED COAL. ONE 2cm BED ONE 5cm BED																			
36	92% SANDSTONE, F. GRAINED, LITTLE MATRIX, WELL SORTED, NO BITUMEN CLAY ORGANIC GRAINED UNWASHED INTO POOR QUALITY COAL. COLOUR THEN ADDED TO F. PARTLY ORGANIC CLAY																			
	20% CLAY, SLIGHTLY ORGANIC, F. GRAINED																			
40	12.5% QUARTZ, HIGHLY SILICIOUS ROCKS, PEBBLES AND VERY COARSE GRAINED SAND, FINELY MICACEOUS QUARTZ & FELDS																			
	14% HIGHLY SILICIOUS ROCK, PEBBLES AND V. COARSE GRAINED QUARTZ, PLAG. FELDSPAR AND SANDSTONE SAND BIOTITE & MUSCOVITE, POORLY SORTED.																			
	6% BOHSE GRAINED SAND AND SILICIOUS QUARTZ S.A. ABOVE. POORLY SORTED. FINE.																			
44	30% QUARTZ, PLAG. FELDSPAR, C. GRAINED SAND																			
	16%																			
48	93% Silt and clay: Lt. grey - Ben; Sandy; IN part high organic content in clay																			
52	Gravel: coarse pebble to cobble size; No matrix recovered; clasts consist of quartz, argillite, and acid intrusive rock types.																			
	41%																			
56																				
60																				
	30% sand: med-DK. grey, fine grnd. poorly sorted micaceous; thin bedded w/ coal partings																			
	50%																			
	87%																			
	87%																			

PLACER DEVELOPMENT LIMITED

EXPLORATION DEPARTMENT

LOGGED BY: D. Jenkins HOLE No. 79-3
 DATE: 10 May, 1979 SHEET No. 3 of 5

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	F. S. I.		Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
60	100%																				
	43%																				
72	100%	Clay: Lt. greenish grey - DK. BRN., silty w/ sand @ bottom, moderate organ. @ top																			
	71%	Sand: Lt. grey - med. BRN; fine grnd poorly sorted w/ increasing proportion of silt and clay matrix @ top;																			
	100%																				
76	50%	Local thin coal partings; locally thin bedded																			
	113%																				
	52%	Clay bed; Lt. green silty clay w/ silt and fine sand interbeds. Clay is soft and plastic increasing organic content towards base																			
80	90%																				
	43%	Coal: DK. BRN. - Black; hard; finely divided organic matrix w/ grass molds			81.0														Send sample for Logging Correlation		
	105%	Clay-silt: Clay - Blue grey; silty compact w/ little plasticity w/ 20-30 cm interbeds of silt and sandy silt in top 3m			82.75																
84	67%																				
88																					
92																					
96																					
100																					
	100%																				
	100%	1-2cm Coal partings @ 102.7m																			

GRID: _____

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: D. Jenkins HOLE No. 79-3
DATE: 10 May 79 SHEET No. 4 of 5

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	F. S. I.	Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
109	93%	Clay: as above; lower 0.5m gradational to coal by interbeds of coal																			
	73%	Coal: Compact w/ clay chips and grass fine																			
108	94%	Sand: Lt grey; fine grnd; poorly sorted thin bedded w/ coal partings																			
	46%																				
	93%	Coal 15cm + organic Clay																			
112	63%	Sand: Lt. grey; fine-med. grnd poorly sorted; Rare 1mm thick clay and coal partings (deformed by drilling)																			
	87%																				
	6%																				
116	0%																				
	66%																				
120	100%																				
	59%																				
	55%																				
	67%	Coal partings @ 123-124 m																			
124	33%																				
	0%																				
128	0%																				
	93%																				
132	0%	Clay: Blue grey mat. w grn. + yellow; silty + sandy; mica; compact w/ narrow zones of moderate plasticity																			
	0%	Thin silt beds w/ abund. muscovite																			
	10%	Coal ball @ 137.5																			
	0%																				
140	100%																				

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: D. Jenkins HOLE No. 79-3
DATE: 14 May 79 SHEET No. 5 of 5

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	L.S.T. E.S.T.	Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
140																					
	90%	Coal parting @ 142 - 3cm thick																			
	95%																				
144	100%																				
	50%	Coal parting 146.9 - 34cm thick																			
	100%	Coal parting 147.8 - 1cm thick																			
148	100%																				
	100%	Clay as @ 132m																			
	100%																				
152	83%																			shear @ 40° CA	
		TD 153 m																			
156																					
160																					
164																					
168																					
172																					
176																					

PLACER DEVELOPMENT LIMITED

EXPLORATION DEPARTMENT

HOLE No. 29-4
SHEET No. 1 of 5

GRID: _____

LOCATION: NTS105A2 w/ (049547) BEARING: _____
DATE COLLARED: _____ LENGTH: 143.8m

LATITUDE: 60°01'54"
DEPARTURE: 128°5-4'43"
ELEVATION: 2300' (701m)

PROPERTY: Liard Coal
CORE SIZE: 14 Ø LOGGED BY: Dm Jenkins
SCALE OF LOG: 1:200 DATE: 13 May, 1979

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
					MOISTURE %	% A.S.H.		% V.M.		% F.C.		CALORIFIC VALUE		% S	% H	% N	% O	F.S.I.		Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
0																					
4																					
8																					
12																					
16																					
20																					
24	26%	Sand: Lt. grey; med. grnd. w/ 5cm cobbles @ Top; sorted @ base & poorly sorted near top w/ clay interbeds.																			
28	37%	Clay: Lt. grey - Dk. brn.; silty; non-plastic w/ minor silt interbeds; highly organic @ 26.51m & 28.04m																			
	90%																				
	0%																				
22	0%																				

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES													REMARKS								
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O		% S _t	Reflec.	Sp. Gravity					
68	51%	Coal: 46 cm Bn; wood chips + charcoal																								
	93%	Clay: Lt. grey; silty; compact non-plastic																								
	40%	Sand: Lt. grey; v. fine grnd. @ base																								
72	29%	grading upward to silt w/ abundant mica and clay matrix																								
	78%	Sand: med. grey; coarse grnd; micaceous grades upward to fine sand.																							Minor float coal @ base	
	91%	Sand: Lt. grey; v. fine grnd. grading upward to silt, to clay-organic clay to 20 cm coal bed.																								
76	76%																									
	56%	Sand: Lt grey-med. grey; v. coarse grnd to med grnd; well sorted to moderately sorted; mica.																								
	36%																									
80	0%																									
	88%																									
84	26%	Sand-silt-clay-coal: Thin interbeds of sediments ranging from v. coarse sand to coal partings																								
	53%																									
	52%	Clay: Lt. grey-DK Bn; non-plastic; ± 50% organic rich clay; Coal beds as marked																								
88	100%																									
	71%	Coal: DK Bn-Black; 75% finely divided organic w/ 25% discernible plant fragments including char; Upper 10 cm containing ± 30% clay as partings; 62 cm org. clay parting from 90.0-90.6 m; 12 cm clay parting from 92.15-92.27 m		58926																						Sent to Roke for study
	95%			58927																						
92	98%	Coal hard w/ exception of 10 cm soft coal near base		58928																						
	73%			58929																						
	89%	Clay: Lt. grey; silty; non-plastic; w/ silt and organic laminae in lower half																								
	100%																									
	100%	Sand: Lt. grey; coarse near base grading to fine grnd. @ top; sorted @ base less well sorted @ top																								
100	26%	organic laminae @ top																								
	87%	organic clay: Lt. grey-DK Bn; w/ 30 cm coal bed																								
	100%	Clay: med. grey: silty + silt laminae @ base and organic @ top																								

PLACER DEVELOPMENT LIMITED

EXPLORATION DEPARTMENT

LOGGED BY: LCM
DATE: _____

HOLE No. 79-1
SHEET No. 4 of 5

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	E.S.T.		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
104		Clay + silt as above																				
	84%																					
	53%	Sand: Thin to med. beds of sand (coarse to fine grnd) and v. fine gravel																				
108	60%																					
	57%																					
	16%	6 cm coal bed @ 110.33m																				
112	83%																					
	65%	Clay: med. grey - DK. brn.; Non-plastic; silty (more silty @ base) coal beds w/ organic clay margins in upper 2/3																				
116	87%																					
	87%	Sand: Lt. grey; coarse grnd @ base grading upward to laminated silt @ top																				
	67%																					
120	78%	Coal: Dk. brn. finely divided organic matter w/ ± 30% Lt. brn 120.0			58930															Roka		
	87%	wood fragments; Top 12 cm are sandy; Interbeds of clay from 121.3/121.4 m			58931																	
124	95%	Clay: w/ thin interbeds of silt and sand			58932																	
	97%	Coal: Dk. Brn.; hard; 75% matrix w/ 25% wood and grass stems - top is a shear @ 45°; 19 cm clay bd @ 127.10-127.29			58933															Roka		
128	97%				58934															Desicated		
		5cm coal band @ 128.9m			58935																	
	94%	Clay: Lt. grey; In part laminated w/ silt and coal; Non plastic																				
	91%																					
132	93%	Coal: Dk. brn; Hard; 50% finely divided matrix + 50% larger plant frag. ment; Some narrow bands are 50% clay			58920																	
	60%																					
	10%	Coal and interbed clay																				
136	27%	Silt: Lt. grey; micaceous; micro x laminated; w/ thin bds of clay																				
140																						

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

HOLE No. LC-79-5
SHEET No. 1 of 4

GRID: _____

LOCATION: NTS 105A2 W/2 (056555) BEARING: _____
DATE COLLARED: 14 May 1979 LENGTH: 139.2 m
DATE COMPLETED: 18 May 1979 DIP: -90°

LATITUDE: 60°02'20"
DEPARTURE: 128°53'56"
ELEVATION: _____

PROPERTY: Liard Coal
CORE SIZE: HQ LOGGED BY: D Jenkins
SCALE OF LOG: 1:200 DATE: 30 May 1979

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
					MOISTURE %	% A.S.H.		% V.M.		% F.C.		CALORIFIC VALUE		% S	% H	% N	% O	L.S.I.		Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
0																					
4																					
8																					
12																					
16																					
20	10%	Sand: Lt. grey; v. coarse grnd; apparently well sorted w/ little fine grnd matrix; mineralogically immature w/ abundant feldspar & 5-10% ferro-mag minerals and f.g. dark rock clasts (very little mica)																			
24	8%	"																			
28	13%	Finer grnd @ 28.0m w/clay bds.																			
	6%	Gravel w/ clay: clasts to 2cm relationship of gravel + clay is ambiguous																			
32	15%																				

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

LOGGED BY: Wny HOLE No. 79-5
DATE: _____ SHEET No. 2 of 4

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. Log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS				
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	I.S.T.		Reflec.	Sp. Gravity		
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis										
32	17%	Gravel: 38.7-32.6 m; Clasts rided to sub-graded; to 7.5 cm max. diam., av. diam ± 4cm; Clasts consist of basalt, qtz, and meta-sediments; clay mixed w/ pebbles below 35.6m probably indicates grinding of underlying																						
36	17%	fining upward sequence 32.6-31.68m is f.g. sand @ base w/lt. grey micaceous clay @ top																						
40	33%	Clay: Lt-med grey - DK Brn; massive; high organic content w/ 4cm long wood fragments																						
	47%	Coal: Ground up by drilling constant																						
41	100%	Clay: Lt. grey; massive-weakly bdd; locally silty; high organic content and coal partings																						
	86%	46.9-47.3m																						
	100%	49.6-50.0m																						
48	100%	57.6-52.4m																						
	80%	Thin bd coarse sand @ 50.1m																						
	62%																							
52	83%																							
	90%	Sand: Lt-med. grey; fine-med. grnd poorly sorted; w/ abundant organic partings																						
	23%																							
56	93%	Clay: Lt. grey - yellow grey; massive to v. weakly bdd; silty - v. silty; non-plastic																						
	97%	Organic clay 57.5-57.9 m																						
60	93%	Sand: med. grey; coarse grnd; well sorted @ base; finer grnd. & less																						
	41%	well sorted above w/ more mica and organic partings, grading to silt-clay																						
	0%	clay bed @ 60.2m & 59.9m																						
64	0%																							
	18%	30cm Coal = Side wall density Log indicates ± 0.5m clay band below																						
	92%	Coal: DK. Brn. mod. hard; mostly finely divided organic; dirty; grad. lower			58936																			
68																								

Hoiz making
H.P. @ 63m

To Roke

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. Log Structure	SAMPLE NO.	COAL ANALYSES												REMARKS				
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N		% O	E.S.I.	Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
104	107%	as above																			
	40%																				
108	73%	Coal: ± 25% wood in a matrix of finely divided organic matter		58941																	
	100%	Silt + Clay: Interbdd in bds of clay + silt and bds gradational between silt + clay - bds poorly defined																			
	100%																				
112	87%	Silt: Lt. grey - brn; thin bds - laminated w/ thin clay interbds; 40% coal partings in top 30 cm																			
	45%	Sand: Lt. grey; v. coarse grnd. grading to fine gravel @ base, @ the top grades to silt over width of 10cm																			
116	53%																				
	82%																				
	100%	Clay: Organic gradational to coal																			
120	98%	Coal: Dk. Brn; Hard; 25% wood fragments; grass frags. abundant; 13cm of clay partings; contacts gradational		58942																	
	98%	Clay: Organic																			
	100%	Clay: Med. grey - cream - Dk Brn; Locally silty + gradational to silt; Organic w/ coal partings																			
124	93%	122.7 - 124.2 124.7 - 126.4																			
	100%																				
128	83%																				
	57%																				
	100%																				
132	100%	Coal: v. Dirty w/ high clay content + clay partings																			
	72%	Silt: white - cream w/ brn. hues in top 1.8m + lower 20cm; v. fine grnd. w/ abundant clay; bds not visible; pos. leached zone under coal																			
136	20%																				
140		TD 139.2m																			

GRID: _____

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	E. S. I.		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
68																						
72																						
76																						
80																						
84		Gravel as from 36.6-42.6 m																				
88																						
92		<5% Sand: med. grn. Very disturbed by drilling <10% Coal: Sand: Clay: gravel Very disturbed by drilling Clay: Lt. grey ±95% Coal: very dirty due to abundant clay content + ± 40% clay partings ±100% Clay: Organic w/ abundant wood frags.																				
96		100% Clay: Lt. grey; silty; massive - very poorly bdd.; minor disem. organic matter + rare organic partings TD 98.14 m																				
100																						
104																						

PLACER DEVELOPMENT LIMITED
EXPLORATION DEPARTMENT

HOLE No. 79-7
SHEET No. 1 of 4

GRID: _____

LOCATION: NTS 105 AZ w/a (043578) BEARING: _____
DATE COLLARED: 25 May 1979 LENGTH: 140.8 m
DATE COMPLETED: 29 May 1979 DIP: -90

LATITUDE: 60° 03' 33"
DEPARTURE: 128° 55' 23"
ELEVATION: 2070'

PROPERTY: Liard Coal Basin
CORE SIZE: H 9 LOGGED BY: D Jenkins
SCALE OF LOG: 1:200 DATE: 31 May 79

DEPTH m	m block & % rec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES													REMARKS					
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O		F. S. I.	Reflec.	Sp. Gravity		
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis										
0																							
4																							
8																							
12																							
16																							
20																							
24																							
28																							
32																							

Cased to 21.33

Nil Recovery

GRID: _____

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	L.S. %		Reflec.	Sp. Gravity
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
32	0%	?																				
	20%	Sand: med. grey; coarse to very coarse grnd w/locally abund. fine gravel; Moderately sorted; predominately gts w/± 20% feldspar + ± 5% Ferro-mag. minerals and dark rock clasts, minor muscovite																				
36	13%																					
	15%																					
40	11%																					
	24%																					
	24%																					
44	0%																					
	0%																					
	54%																					
48	0%																					
	8%																					
	0%																					
52	0%																					
	14%																					
	0%																					
56	21%																					
	13%	Gravel: Coarse w/ cobbles to >10cm max. diam - average 4-5cm; rounded-sub rounded; clasts composed of acid plutonic rx, basalt, meta-sediments, and gtc.																				
60																						
		Tricolored																				
64																						
68																						

GRID: _____

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. log Structure	SAMPLE NO.	COAL ANALYSES														REMARKS		
					MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	I.S.I.		Reflec.	Sp. Gravity
						as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis								
68	±75%	Gravel: as above																			
72																					
76																					
80																					
84	79%																				
	±75%																				
88																					
92																					
96																					
100	16%	Sand; Coarse-f. grnd; sorted to poorly sorted; abundant mica, rare wood frag.																			
	97%																				
104		Clay parting Thickness unknown																			

GRID: _____

DEPTH m	m block & %rec.	ROCK TYPE DESCRIPTION	Graph. Log	Structure	SAMPLE NO.	COAL ANALYSES														REMARKS			
						MOISTURE %	% ASH		% V. M.		% F. C.		CALORIFIC VALUE		% S	% H	% N	% O	F. S. I.		Reflec.	Sp. Gravity	
							as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis	as recvd.	dry basis									
104	3%	Sand: v. coarse grnd.; v. disturbed by drilling (lag deposit at bottom of hole?)																					
	0%																						
108	0%																						
	5%																						
	18%	Clay: Organic Coal: only 8cm recovered; severely contaminated																					
112	62%	Clay: organic w/ 5-10% wood frags.																					
	100%	Coal																					
	86%	Coal: Clean; fine grnd w/ 10% wood minor char. Clay: Organic w/ 5% wood frags																					
116	100%	Clay: Lt. grey; massive to poorly bdd; w/ 2-5% organic frags																					
	70%	Silt: Lt. grey; argill.; micaceous; abundant organic parting; v. thin bdd-laminated interbdd in 5-10cm thick units w/ clay bds																					
120	58%																						
	51%																						
	80%	Sand: Lt. grey; med-fine grnd.; med-poorly sorted; rare thin clay bds and organic partings																					
124	64%																						
	0%																						
	15%																						
128	30%																						
	58%	Clay: Lt. grey - white w/ med grey mottling; silty; bds not obvious																					
132	±86%																						
	±80%																						
	0%																						
136	66%	Clay: Organic; thin bdd-laminated w/ coal partings @ 136.2 ± 6cm 137.7 ± 7cm 138.2 to 138.4m																					
140		Clay: Lt. grey mottled w/ med-dk grey w/circ. patterns; massive; silty																					

Total Depth
140.8m

APPENDIX B

GEOPHYSICAL LOGS

ROKE

OIL ENTERPRISE LTD. CALGARY, ALBERTA

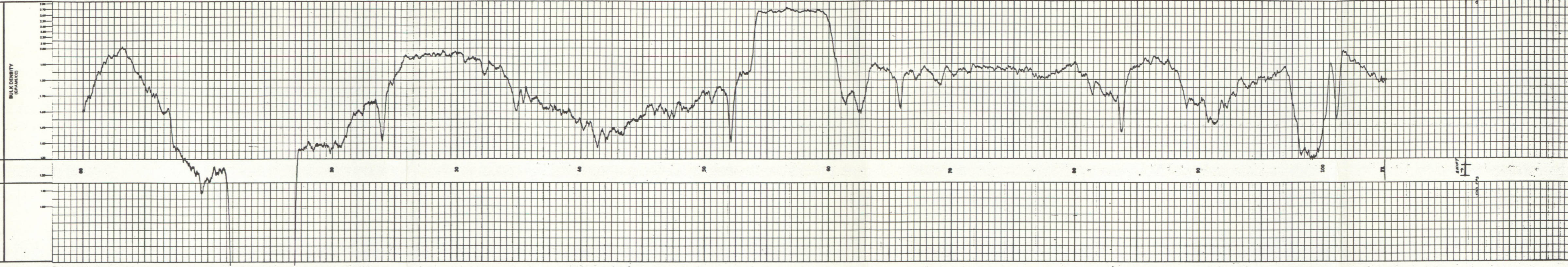
FILE NO. COMPANY: SLACK DEVELOPMENT LIMITED
 WELL: 799-1
 LOCATION: T-162
 FIELD: LEARD BASIN
 PROVINCE: SASKATCHEWAN
 LOGGED THROUGH DIRECTION: LOGGED 2 N 10 W
 DRILL TOOL: 2 3/4

Run No. 0002
 Date: 26 APR 1979
 From Reading: 1005 M
 Let. Reading: 0
 Footage Logged: 1005
 Depth Reached: 1006
 Depth Driller: 1005.9
 Casing Rate: 1.66
 Casing Driller: WATER
 Fluid Type: WATER
 Liquid Level: 1.66
 Min. Dam: 1001

Operating Time: 1 HOUR
 Truck No. 1330

Recorded By: STM Witnessed By: JONES

GENERAL DATA		GAMMA RAY		NEUTRON	
NO.	DEPTH	NO.	DEPTH	NO.	DEPTH
1	0	1	0	1	0
2	105	2	105	2	105
3	200	3	200	3	200
4	300	4	300	4	300
5	400	5	400	5	400
6	500	6	500	6	500
7	600	7	600	7	600
8	700	8	700	8	700
9	800	9	800	9	800
10	900	10	900	10	900
11	1000	11	1000	11	1000



ROKE

OIL ENTERPRISE LTD. CALGARY, ALBERTA

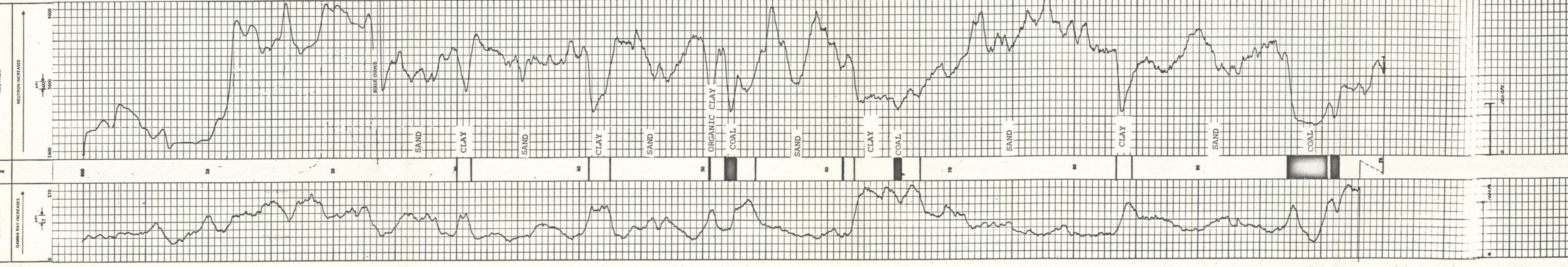
FILE NO. COMPANY: SLACK DEVELOPMENT LIMITED
 WELL: 799-1
 LOCATION: T-162
 FIELD: LEARD BASIN
 PROVINCE: SASKATCHEWAN
 LOGGED THROUGH DIRECTION: LOGGED 2 N 10 W
 DRILL TOOL: 2 3/4

Run No. 0002
 Date: 26 APR 1979
 From Reading: 1005 M
 Let. Reading: 0
 Footage Logged: 1005
 Depth Reached: 1006
 Depth Driller: 1005.9
 Casing Rate: 1.66
 Casing Driller: WATER
 Fluid Type: WATER
 Liquid Level: 1.66
 Min. Dam: 1001

Operating Time: 1 HOUR
 Truck No. 1330

Recorded By: STM Witnessed By: JONES

EQUIPMENT DATA		LOGGING DATA	
NO.	DEPTH	NO.	DEPTH
1	0	1	0
2	105	2	105
3	200	3	200
4	300	4	300
5	400	5	400
6	500	6	500
7	600	7	600
8	700	8	700
9	800	9	800
10	900	10	900
11	1000	11	1000



ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC TWP RGE S. M. WELL **LC - 79 - 2**

LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Service: **GRN**

Number of Runs: **GROUND LEVEL** E.M. K.B.
 Meters Measured from: **GROUND LEVEL** Above Perm. Drum C.S.G.
 Meters Measured from: G.L. METRIC

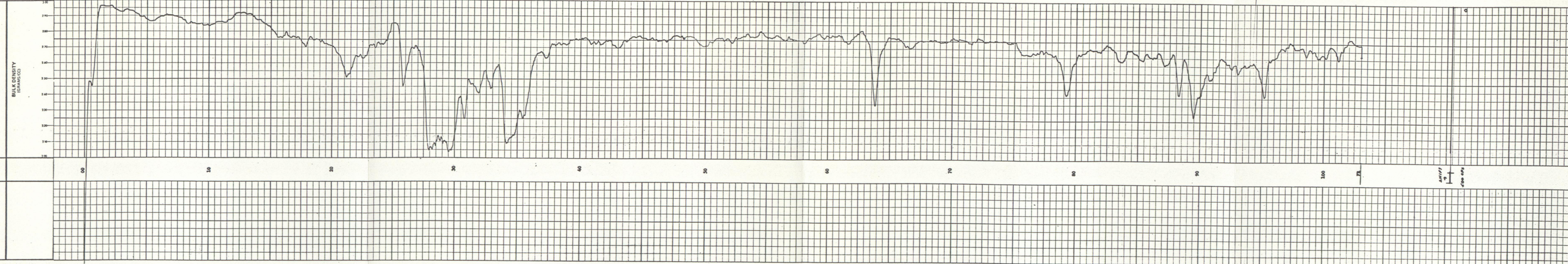
Run No. **ONE**
 Date: **4 MAY 1979**
 Log Reading: **103 M**
 Log Depth: **0**
 Distance Logged: **103**
 Depth Reached: **108**
 Depth to: **130**
 Logging Rate: **114**
 Log Type: **MD**
 Log Level: **FULL**
 M. Drum: **NO**

Operating Time: **1 HOUR**
 Truck No: **130**

Recorded By: **SEM** Reviewed By: **JENKINS**

GENERAL		LOGGING DATA	
LOG NO.	ONE	LOG DATE	4 MAY 1979
LOG DEPTH	103 M	LOG TYPE	MD
LOG LEVEL	FULL	LOG DISTANCE	103 M
LOG TYPE	MD	LOG RATE	114 M/H
LOG METER	NO	LOG SERIAL NO.	130

EQUIPMENT DATA	
LOGGING UNIT	LOGGING UNIT
LOGGING UNIT NO.	LOGGING UNIT NO.
LOGGING UNIT TYPE	LOGGING UNIT TYPE
LOGGING UNIT SERIAL NO.	LOGGING UNIT SERIAL NO.



ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC TWP RGE S. M. WELL **LC - 79 - 2**

LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Service: **DENS**

Number of Runs: **GROUND LEVEL** E.M. K.B.
 Meters Measured from: **GROUND LEVEL** Above Perm. Drum C.S.G.
 Meters Measured from: G.L. METRIC

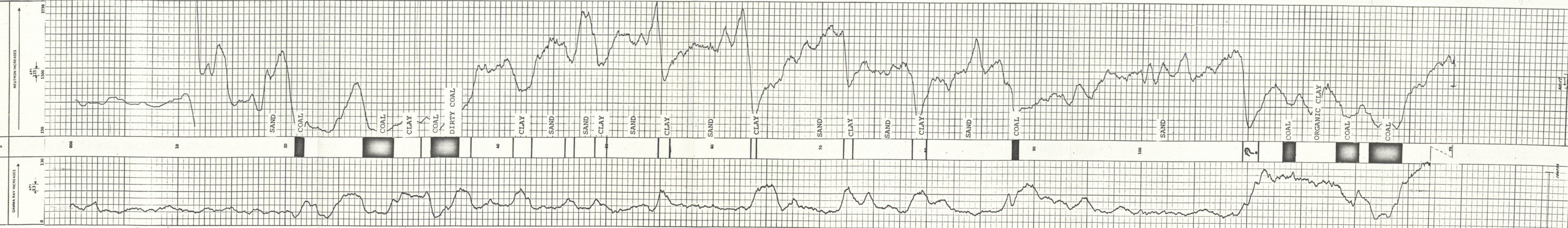
Run No. **ONE**
 Date: **3 MAY 1979**
 Log Reading: **129 M**
 Log Depth: **0**
 Distance Logged: **129.3**
 Depth Reached: **130**
 Depth to: **130**
 Logging Rate: **114**
 Log Type: **MD**
 Log Level: **FULL**
 M. Drum: **NO**

Operating Time: **1 HOUR**
 Truck No: **130**

Recorded By: **SEM** Reviewed By: **JENKINS**

GENERAL		LOGGING DATA	
LOG NO.	ONE	LOG DATE	3 MAY 1979
LOG DEPTH	129.3 M	LOG TYPE	MD
LOG LEVEL	FULL	LOG DISTANCE	129.3 M
LOG TYPE	MD	LOG RATE	114 M/H
LOG METER	NO	LOG SERIAL NO.	130

EQUIPMENT DATA	
LOGGING UNIT	LOGGING UNIT
LOGGING UNIT NO.	LOGGING UNIT NO.
LOGGING UNIT TYPE	LOGGING UNIT TYPE
LOGGING UNIT SERIAL NO.	LOGGING UNIT SERIAL NO.



GENERAL		LOGGING DATA	
LOG NO.	ONE	LOG DATE	3 MAY 1979
LOG DEPTH	129.3 M	LOG TYPE	MD
LOG LEVEL	FULL	LOG DISTANCE	129.3 M
LOG TYPE	MD	LOG RATE	114 M/H
LOG METER	NO	LOG SERIAL NO.	130

ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. _____ COMPANY **PLACER DEVELOPMENT LIMITED**

WELL **LC - 79 - 3**

LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY**

GROUND LEVEL **4** m

Other Services: **GR, PRL**

Log Measured from: **GROUND LEVEL**

Log Depth Measured from: **GROUND LEVEL**

Run No. **790**

Date **9 MAY 1979**

File Reading **152 M**

Log Reading **0**

Range Logged **152**

Depth Reached **153**

Depth to Log **153**

Core Depth **19**

Fluid Type **MUD**

Log Level **9**

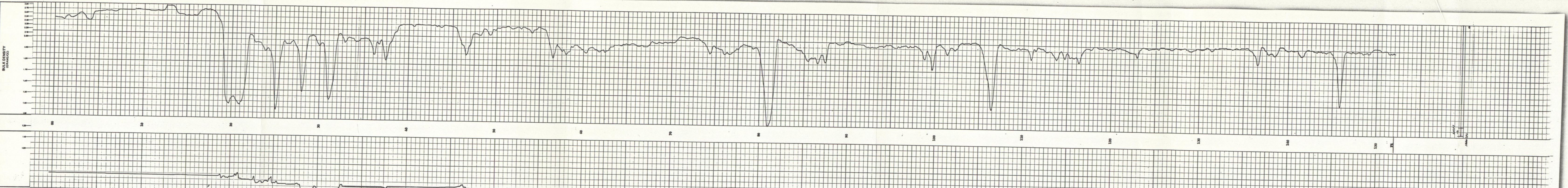
M. Depth **82**

Operating Time **2 HOURS**

Truck No. **130**

Recorded By: **EDM** Witnessed By: **JOB 185**

GENERAL		CALIBRATION	
DATE	TIME	DATE	TIME
1	0	3	1000
2	0	3	1000
3	0	3	1000
4	0	3	1000
5	0	3	1000
6	0	3	1000
7	0	3	1000
8	0	3	1000
9	0	3	1000
10	0	3	1000



ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. _____ COMPANY **PLACER DEVELOPMENT LIMITED**

WELL **LC - 79 - 3**

LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY**

GROUND LEVEL **4** m

Other Services: **PRL, BHS-CAL**

Log Measured from: **GROUND LEVEL**

Log Depth Measured from: **GROUND LEVEL**

Run No. **070**

Date **9 MAY 1979**

File Reading **152 M**

Log Reading **0**

Range Logged **152**

Depth Reached **153**

Depth to Log **153**

Core Depth **19**

Fluid Type **MUD**

Log Level **9**

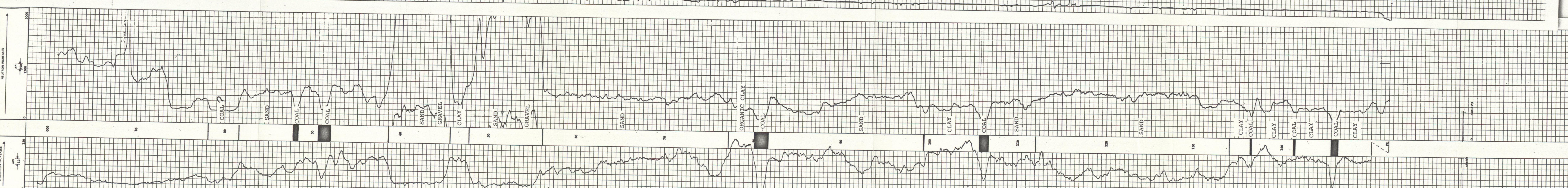
M. Depth **82**

Operating Time **3 1/2 HOURS**

Truck No. **130**

Recorded By: **EDM** Witnessed By: **JOB 185**

EQUIPMENT DATA		LOADING DATA	
DATE	TIME	DATE	TIME
1	0	3	1000
2	0	3	1000
3	0	3	1000
4	0	3	1000
5	0	3	1000
6	0	3	1000
7	0	3	1000
8	0	3	1000
9	0	3	1000
10	0	3	1000



ROKEL
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY: **PLACER DEVELOPMENT LIMITED**

WELL: **LC - 79 - 3**

LOCATION: **LEARD BASIN**

PROVINCE: **TIKON TERRITORY** DISTRICT: **PR**

GROUND LEVEL: **4m** ABOVE PERM. DATUM

Other Services: **PHI, PFL**

Run No. **790**

Date: **9 MAY 1979**

Log Reading: **152 H**

Log Rate: **0**

Factor Logged: **152**

Depth: **153**

Depth to Log: **153**

Log Rate: **19**

Log Type: **MID**

Log Level: **9**

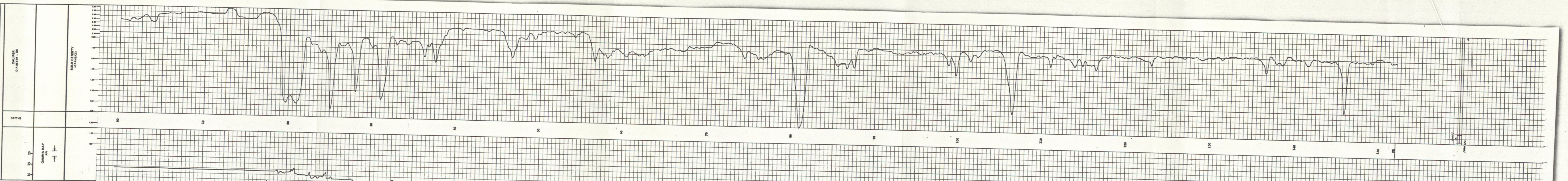
Log Date: **90**

Operating Time: **2 HOURS**

Truck No. **130**

Recorded By: **SKM** Witnessed By: **JOBERTS**

GENERAL	EQUIPMENT DATA	LOGGING DATA
RUN NO. 1 DATE 9 MAY 1979 LOG READING 152 H LOG RATE 0 FACTOR LOGGED 152 DEPTH 153 DEPTH TO LOG 153 LOG RATE 19 LOG TYPE MID LOG LEVEL 9 LOG DATE 90	LOGGING DATA LOGGING DATE 9 MAY 1979 LOGGING TIME 2 HOURS LOGGING RATE 19 LOGGING TYPE MID LOGGING LEVEL 9 LOGGING DATE 90	LOGGING DATA LOGGING DATE 9 MAY 1979 LOGGING TIME 2 HOURS LOGGING RATE 19 LOGGING TYPE MID LOGGING LEVEL 9 LOGGING DATE 90



ROKEL
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY: **PLACER DEVELOPMENT LIMITED**

WELL: **LC - 79 - 3**

LOCATION: **LEARD BASIN**

PROVINCE: **TIKON TERRITORY** DISTRICT: **PR**

GROUND LEVEL: **4m** ABOVE PERM. DATUM

Other Services: **PHI, MDS-CAL**

Run No. **082**

Date: **9 MAY 1979**

Log Reading: **152 H**

Log Rate: **0**

Factor Logged: **152**

Depth: **153**

Depth to Log: **153**

Log Rate: **19**

Log Type: **MID**

Log Level: **9**

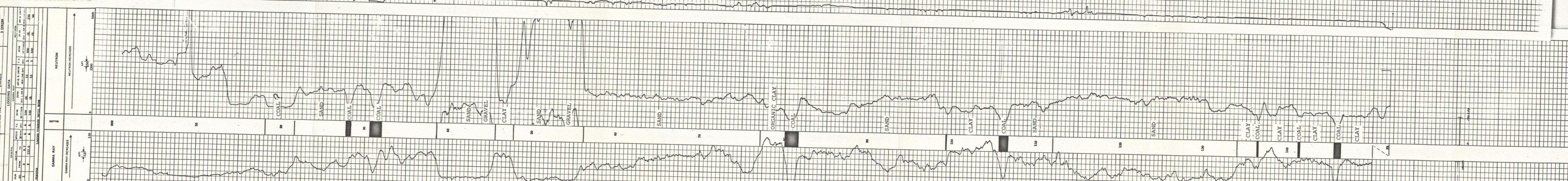
Log Date: **90**

Operating Time: **14 HRS**

Truck No. **130**

Recorded By: **SKM** Witnessed By: **JOBERTS**

EQUIPMENT DATA	LOGGING DATA	LOGGING DATA
EQUIPMENT DATA LOGGING DATE 9 MAY 1979 LOGGING TIME 14 HRS LOGGING RATE 19 LOGGING TYPE MID LOGGING LEVEL 9 LOGGING DATE 90	LOGGING DATA LOGGING DATE 9 MAY 1979 LOGGING TIME 14 HRS LOGGING RATE 19 LOGGING TYPE MID LOGGING LEVEL 9 LOGGING DATE 90	LOGGING DATA LOGGING DATE 9 MAY 1979 LOGGING TIME 14 HRS LOGGING RATE 19 LOGGING TYPE MID LOGGING LEVEL 9 LOGGING DATE 90



ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC. WELL **LC - 79 - 6**

TYPE LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Services **CON + DEV**

Permeation Datum **GROUND LEVEL** 5 m K.S.

Log Measured from **GROUND LEVEL** Above Perm. Datum CGS

Well Depth Measured from **GROUND LEVEL** METRIC G.L.

Run No. **ONE**

Date **24 MAY 1979**

First Reading **95.5 M**

Last Reading **0**

Footage Logged **95.5**

Depth Reached **96.5**

Depth Driller

Casing Hole

Casing Driller

Fluid Type **MUD**

Liquid Level **9.2**

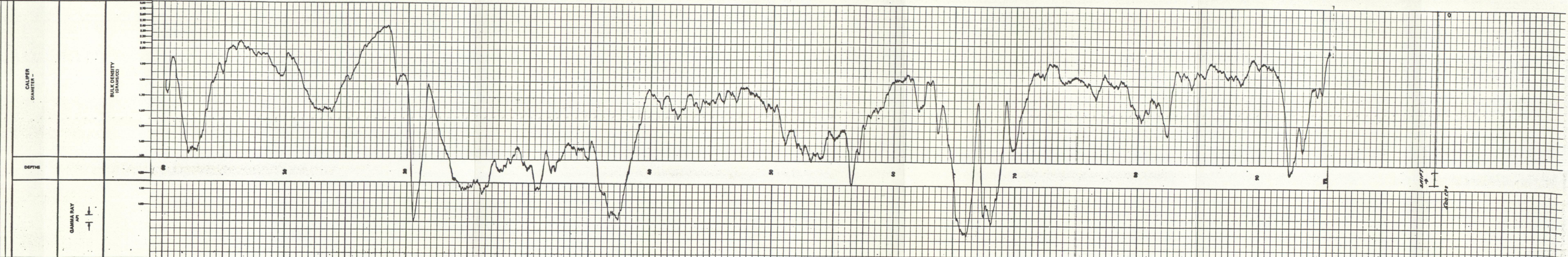
Min. Diam. **89**

Operating Time **14 HOURS**

Truck No. **130**

Recorded By **STH** Witnessed By **JENKINS**

GENERAL		GAMMA RAY		NEUTRON	
NO.	FROM	NO.	FROM	NO.	FROM
1	0	1	0	1	0



ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC. WELL **LC - 79 - 6**

TYPE LOCATION **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Services **DENS-DEV**

Permeation Datum **GROUND LEVEL** 5 m K.S.

Log Measured from **GROUND LEVEL** Above Perm. Datum CGS

Well Depth Measured from **GROUND LEVEL** METRIC G.L.

Run No. **ONE**

Date **24 MAY 1979**

First Reading **98 M**

Last Reading **0**

Footage Logged **98**

Depth Reached **98.3**

Depth Driller

Casing Hole

Casing Driller

Fluid Type **MUD**

Liquid Level **9.2**

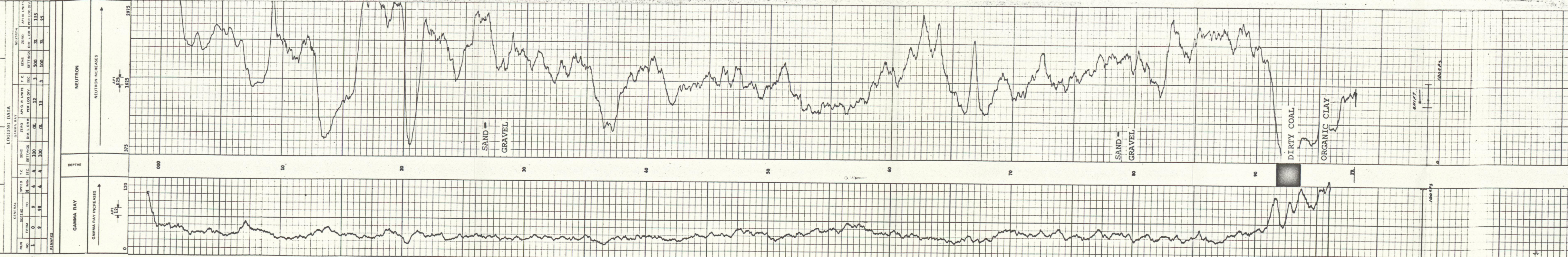
Min. Diam. **89**

Operating Time **1 HOUR**

Truck No. **130**

Recorded By **STH** Witnessed By **JENKINS**

GENERAL		GAMMA RAY		NEUTRON	
NO.	FROM	NO.	FROM	NO.	FROM
1	0	1	0	1	0



ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC WELL **IC - 79 - 7**

TRIP LOCATION

RGE M FIELD **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Service **GEN, PRL, DEV**

Permit No. **GROUND LEVEL** Elevation **0** K.B.

Log Measured From **GROUND LEVEL** Above Perm. Denom. **0** C.S.

Well Depth Measured From **GROUND LEVEL** G.L.

Run No. **001**

Date **30 MAY 1979**

Last Reading **137.2**

Fast Reading **0**

Forecast Logged **137**

Depth Reached **138**

Depth Driller **140.8**

Casing Size **36.5**

Casing Driller

Fluid Type **MED**

Liquid Level **3**

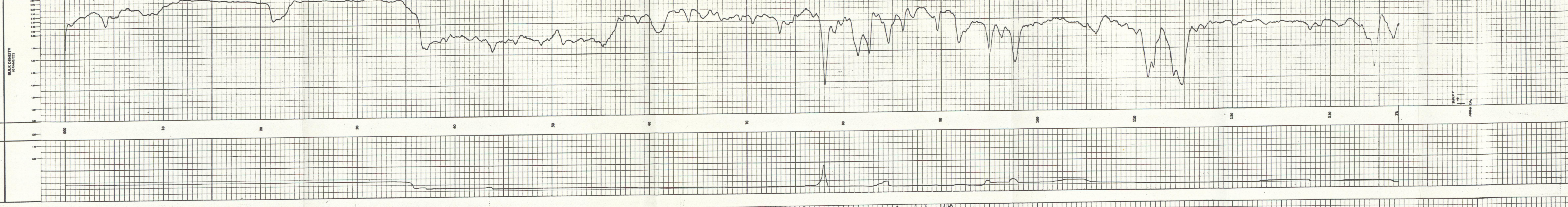
Min. Diam **102**

Operating Time **2 HOURS**

Truck No. **130**

Recorded By **STK** Witnessed By **JZWLDS**

GENERAL		GAMMA RAY		NEUTRON	
NO.	DEPTH	NO.	DEPTH	NO.	DEPTH
1	0	1	0	1	0
2	137	2	137	2	137
3	137	3	137	3	137



ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY **PLACER DEVELOPMENT LIMITED**

LSD SEC WELL **IC - 79 - 7**

TRIP LOCATION

RGE M FIELD **LIARD BASIN**

PROVINCE **YUKON TERRITORY** Other Service **GEN, CAL, PRL, DEV**

Permit No. **GROUND LEVEL** Elevation **0** K.B.

Log Measured From **GROUND LEVEL** Above Perm. Denom. **0** C.S.

Well Depth Measured From **GROUND LEVEL** G.L.

Run No. **001**

Date **30 MAY 1979**

Last Reading **138.2**

Fast Reading **0**

Forecast Logged **138**

Depth Reached **138.3**

Depth Driller **140.8**

Casing Size **36.5**

Casing Driller

Fluid Type **MED**

Liquid Level **3**

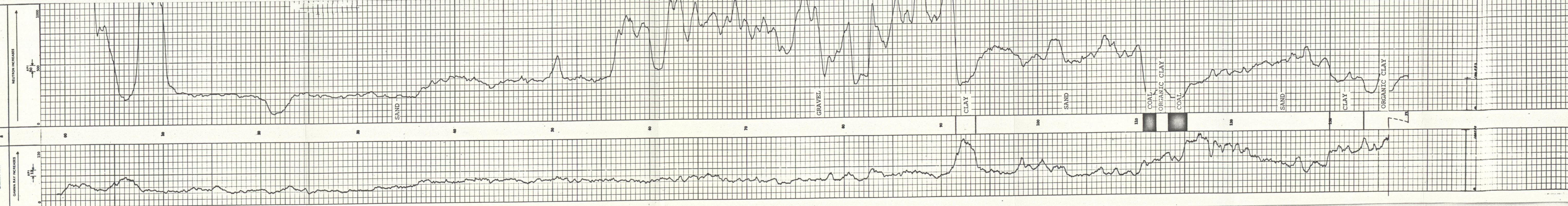
Min. Diam **102**

Operating Time **1 HOUR**

Truck No. **130**

Recorded By **STK** Witnessed By **JZWLDS**

GENERAL		GAMMA RAY		NEUTRON	
NO.	DEPTH	NO.	DEPTH	NO.	DEPTH
1	0	1	0	1	0
2	137	2	137	2	137
3	138	3	138	3	138



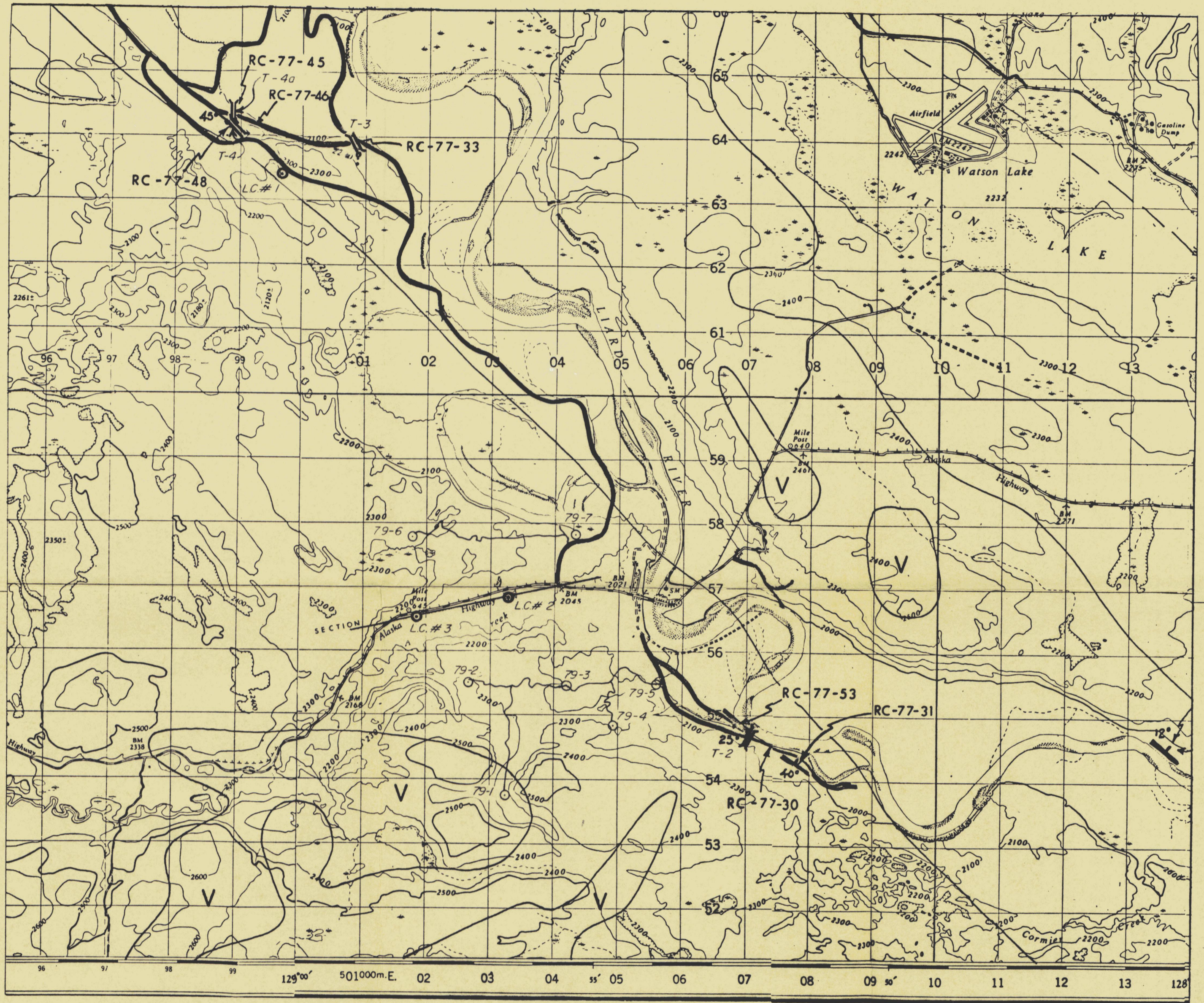
APPENDIX C

CERTIFICATES OF ANALYSES

APPENDIX D
STATEMENT OF COSTS &
COPIES OF INVOICES

STATEMENT OF COSTS
FOR LIARD COAL PROJECT

Supervision	\$304.75
Site Preparation	4,505.71
Equipment Expense	2,623.39
Equipment Maintenance	1,406.42
Roads and Trails	4,995.78
Camp Operations	8,823.92
Telephone & Teletype	175.15
Vehicle Expense	3,090.94
Freight	1,532.72
Travel	1,853.38
Helicopter Expense	4,249.60
Surveying Geological	3,288.85
Surveying Geophysical	12,160.01
Analyses	703.00
Diamond Drilling	91,311.60
Geological Studies	3,302.00
Environmental Studies	<u>1,140.98</u>
	\$145,458.22



LEGEND

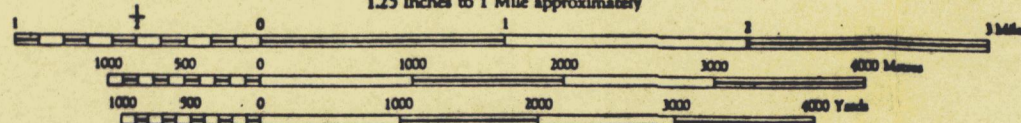
(GEOLOGY AFTER I. BOROVIC, 1978)

- V VOLCANIC FLOWS
- 40° STRIKE AND DIP OF BEDS
- O.L.C.#1 DIAMOND DRILL HOLE
- T-2 TRENCH

PLACER DEVELOPMENT LIMITED

**LIARD COAL
LOCATION MAP**

Scale 1:50,000
1.25 Inches to 1 Mile approximately



INDEX TO ADJOINING SHEETS

