Appendix 3

BIRTLEY ENGINEERING (CANADA) LTD.

Subsidiary of Great West Steel Industries Ltd.

5112-3rd ST. S.E., CALGARY, ALBERTA T2H 1J6 PHONE 403-253-3719

REPORT NO. CS0087

A REPORT

TO

WELDWOOD OF CANADA LIMITED

ON THE WASHABILITY AND

PLANT WASHING TESTS

PERFORMED ON THE

HAMILTON LAKE BULK SAMPLE

1976

Submitted By:

BIRTLEY ENGINEERING (CANADA) LTD.
Coal Science & Minerals Testing

Frank J. Horvat

Frank J. Horvat,
Manager.

March 30, 1976.

000560 (1)

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BIRTLEY ENGINEERING (CANADA) LTD.

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A REPORT TO

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ON THE WASHABILITY AND PLANT WASHING TESTS

PERFORMED ON THE

HAMILTON LAKE BULK SAMPLE

1. INTRODUCTION

The Hamilton Lake bulk sample was delivered in forty (40), forty-five (45) gallon drums to the Coal Science & Minerals Testing Division Plant in Calgary, on March 8, 1976.

The sample was processed according to the work flow sheet shown in Figure 1.

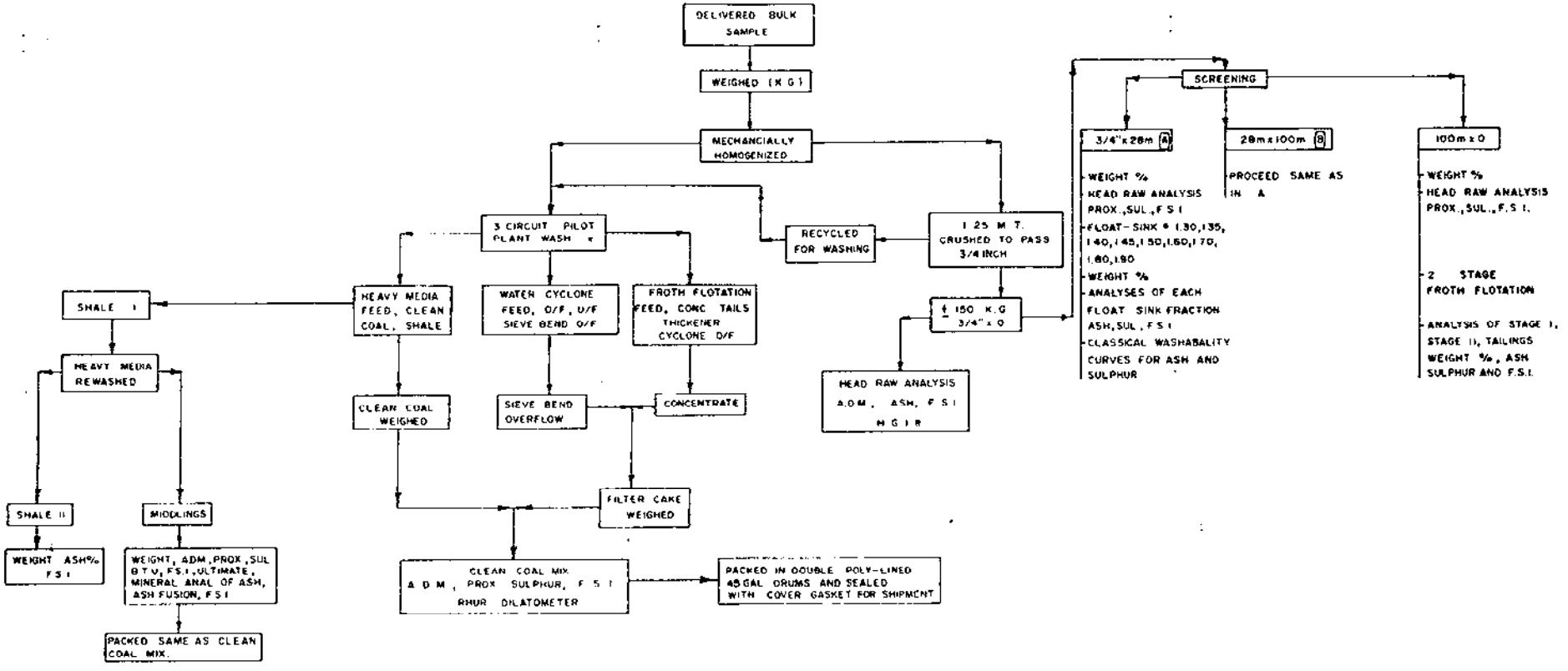
The washability was performed for sulphur, in addition to the washability for ash when high sulphurs were reported in the head samples, and some visable pyrites were observed in the raw coal. Calcite was evident as a deposit on the fracture surfaces of the raw coal along with the pyrites.

The first part of the report is made up of the analytical data, with washability curves being drawn for ash and sulphur. The last part summarizes the pilot plant wash results by means of the plant balance sheet, and the analysis of the various plant products, including clean coal and middlings.

Some adjustment in yields was made necessary by the removal of the shale partings during sampling, and these are outlined in Table 9.

A brief commentary finalizes the report.

FIGURE 1



* ALL PLANT SAMPLES ANALYSED FOR ASH AND F.S.I.

R HARDGROVE GRINDABILITY INDEX

BIRTLEY ENGINEERING (CANADA) LTD.

Title: WORK FLOWSHEET FOR WELDWOOD OF CANADA LTD MARCH 1976

Date: MAR 29/76

Drawn: L. Bailey

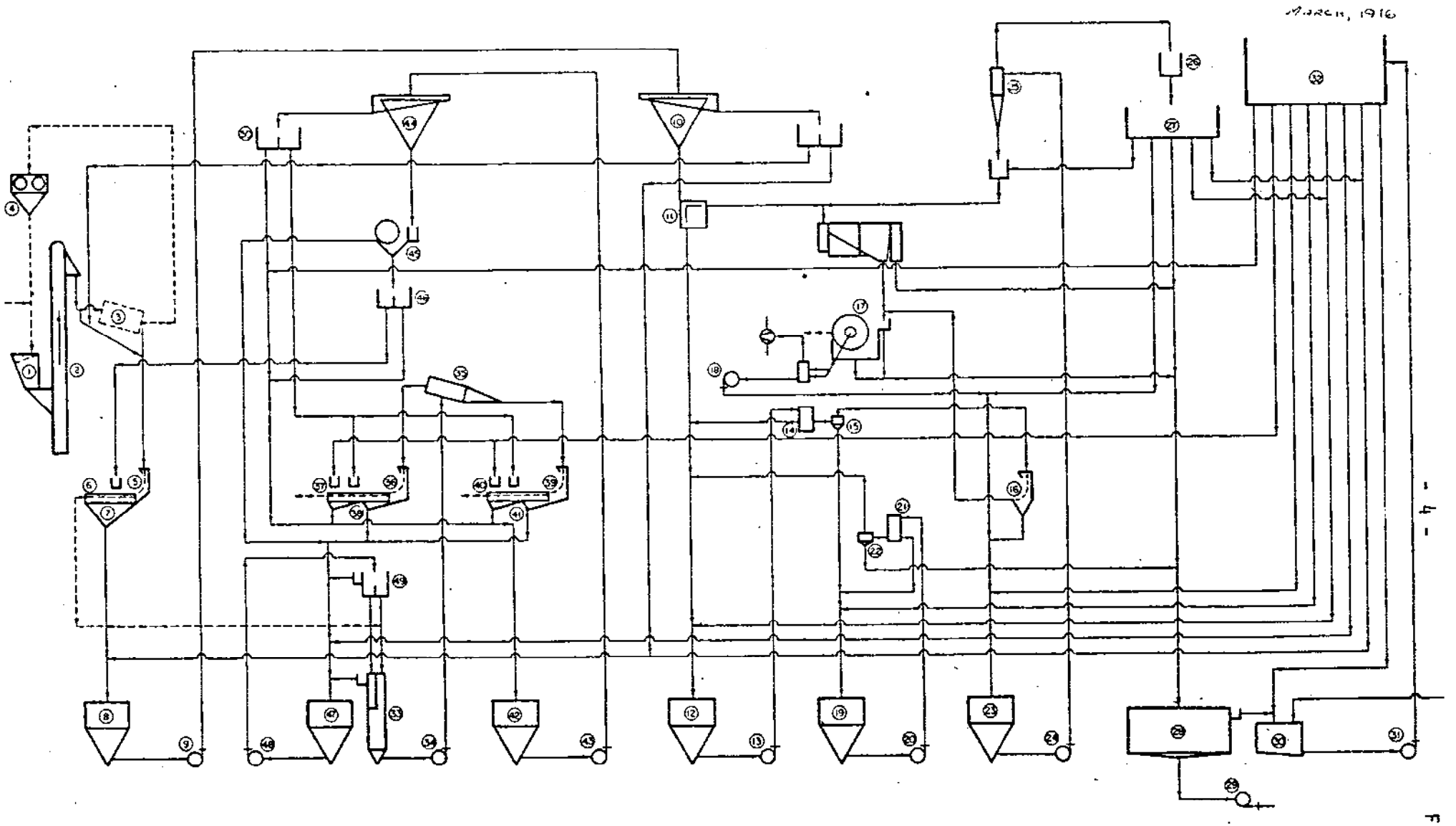


FIGURE 2

1. Feed Bin
2. Elevator
3. Rotary Screen
4. Jaw Crusher
5. Sieve Bend
6. Deslimming Screen
7. Underflow Collector
8. ZBM-O Raw Coal Collection Tank
9. Pump
10. Settling Cone
11. Diverter
12. Primary Water Only Cyclone Feed Tank
13. Pump
14. Distributor
15. Primary Water Only Cyclone
16. Sieve Bend
17. Vacuum Filter
18. Filtrate Water Pump
19. Secondary Water Only Cyclone Feed Tank
20. Pump
21. Distributor
22. Secondary Water Only Cyclone
23. Thickening Cyclone Feed Tank
24. Pump
25. Thickening Cyclone
26. Overflow Distributor
27. Head Box
28. Thickener
29. Waste Disposal Pump
30. Clarified Water Collection Tank
31. Clarified Water Pump
32. Clarified Water Head Box
33. Cyclone Feed Tank
34. Pump
35. DSM Cyclone
36. Sieve Bend
37. C.C. Drain and Rinse Screen
38. Underflow Collector
39. Sieve Bend
40. Discard Drain and Rinse Screen
41. Underflow Collector
42. Dilute Medium Tank
43. Pump
44. Settling Cone
45. Magnetic Separator
46. Splitter Box
47. Correct Medium Tank
48. Pump
49. Distribution Box
50. Splitter Box

TEST PLANT FLOWSHEET

COAL SCIENCE & MINERALS TESTING

DIV. OF BIRTLEY ENGINEERING (CANADA) LTD. CALGARY, ALTA

MARCH, 1976

TABLE 1

WELDWOOD OF CANADA LIMITED

ADIT Hamilton Lake LAB. NO. 7259

	SIZE AND RAW ANALYSES										
	SIZE FRAC.	WT.%	ASH%	R.M.%	V.M.%	F.C.%	S.%	F.S.I.	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S.%
*	+2"	34.2									
**	2" X 3/4"	37.2									
***	3/4" X 28M	85.7	27.4	0.8	28.7	43.1	2.26	7 1/2	85.7	27.4	2.26
***	28M X 100	8.5	23.2	0.6	30.1	46.1	1.94	8	94.2	27.0	2.23
***	100M X 0	5.8	27.2	0.5	30.3	42.0	2.13	7 1/2	100.0	27.0	2.23
****	HEAD RAW	100.0	27.8	0.7	28.3	43.2	2.03	6 1/2	H.G.I.	63	

Sulphur Forms	Sulfate S.%	Sulfide S.%	Organic S.%	Total S.%
	Trace	1.39	0.82	2.21

* As Received

** +2" crushed to -2"

*** +3/4" crushed to pass 3/4"

**** Gross Sample

FROTH FLOTATION: 100M X 0					4:1=Ker: MIBC, 0.48 lb/T 10% P.D. 1 min. conditioning			
					CUMULATIVE			
PRODUCT	WT. %	ASH %	F.S.I.	S. %	WT. %	ASH %	S.%	
STAGE I	57.0	9.3	8 1/2	1.69	57.0	9.3	1.69	1st min. froth
STAGE II	9.0	18.6	8	2.08	66.0	10.6	1.74	2nd min. froth
TAILS	34.0	57.3	1/2	2.77	100.0	26.4	2.09	

TABLE 2

WELDWOOD OF CANADA LIMITED

ADIT Hamilton Lake LAB. NO. 7260

SINK - FLOAT ANALYSES							
3/4" X 28M							
S.G.	WT. %	ASH %	F.S.I.	S. %	CUMULATIVE		
					WT. %	ASH %	S%
-1.30	36.0	5.3	9	1.27	36.0	5.3	1.27
1.30-1.35	14.4	11.0	8 1/2	1.60	50.4	6.9	1.36
1.35-1.40	6.8	16.0	7	1.86	57.2	8.0	1.42
1.40-1.45	5.0	20.0	6 1/2	2.75	62.2	9.0	1.53
1.45-1.50	3.2	24.4	5	3.19	65.4	9.7	1.61
1.50-1.60	5.4	29.7	5	3.55	70.8	11.2	1.76
1.60-1.70	3.8	39.0	2 1/2	3.40	74.6	12.7	1.84
1.70-1.80	3.7	45.8	1 1/2	3.65	78.3	14.2	1.93
1.80-1.90	3.5	52.9	1	3.43	81.8	15.9	1.99
+1.90	18.2	71.6	0	3.79	100.0	26.0	2.32

TABLE 3

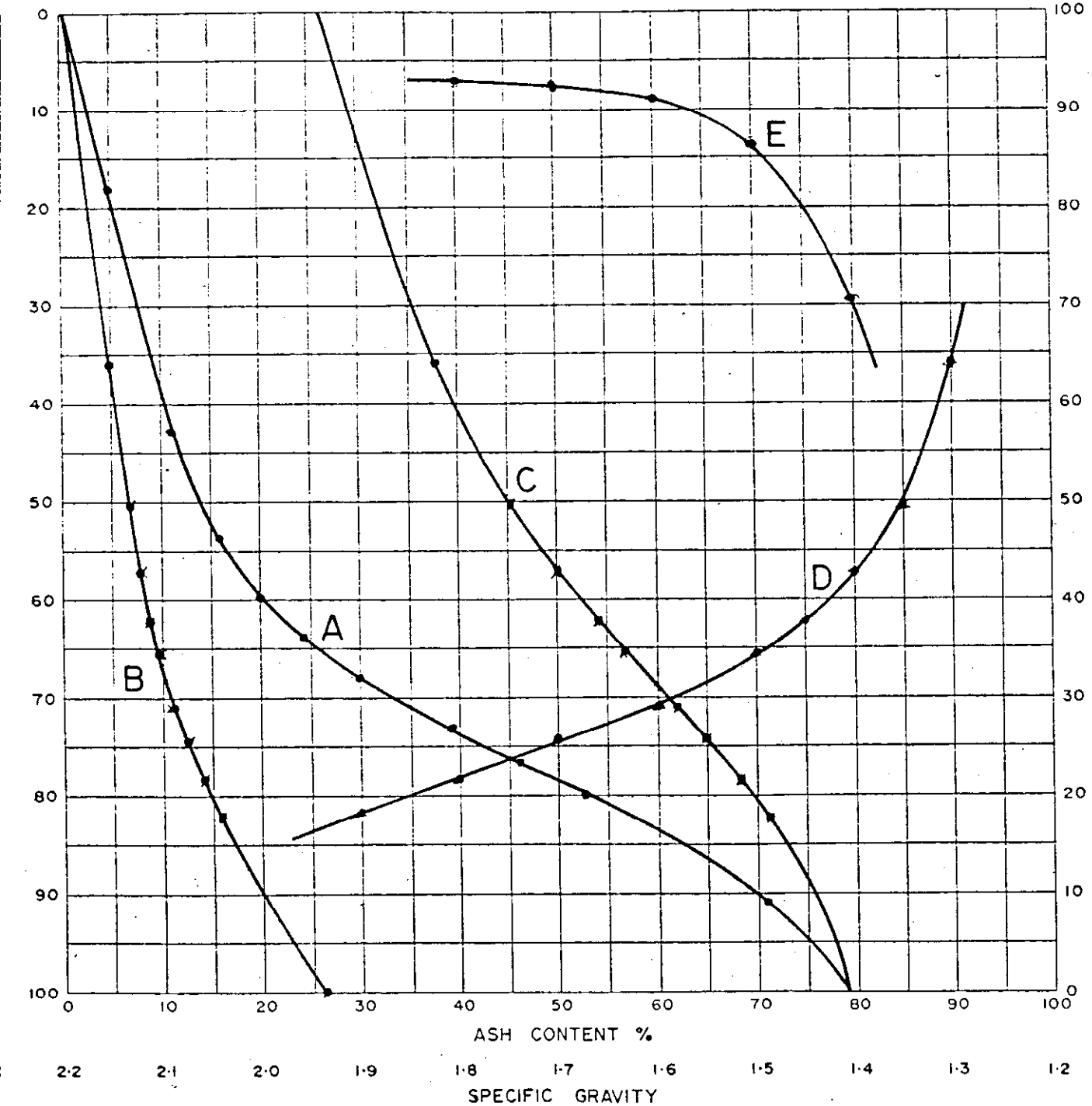
WASHABILITY FOR ASH

WELDWOOD CANADA LTD. BULK SAMPLE LAB. NO.7260 3/4" X 28M

--DIRECT--			--CUM FLOATS--			--CUM SINKS--				+-0.1 DISTR	
S.G.	WT>	ASH>	WT> ASH	CUM WT> ASH TT	CUM WT>	SINK WT ASH>	SINK WT ASH>	WT>	ASH>	S.G.	WT>
1	2	3	4	5	6	7	8	9	10	11	12
1.30	36.00	5.30	1.91	1.91	36.00	5.30	24.12	64.00	37.68	1.30	0.00
1.35	14.40	11.00	1.58	3.49	50.40	6.93	22.53	49.60	45.43	1.40	29.40
1.40	6.80	16.00	1.09	4.58	57.20	8.01	21.44	42.80	50.10	1.50	13.60
1.45	5.00	20.00	1.00	5.58	62.20	8.97	20.44	37.80	54.08	1.60	9.20
1.50	3.20	24.40	.78	6.36	65.40	9.73	19.66	34.60	56.83	1.70	7.50
1.60	5.40	29.70	1.60	7.96	70.80	11.25	18.06	29.20	61.85	1.80	7.20
1.70	3.80	39.00	1.48	9.45	74.60	12.66	16.58	25.40	65.26	1.90	0.00
1.80	3.70	45.80	1.69	11.14	78.30	14.23	14.88	21.70	68.58	2.00	0.00
1.90	3.50	52.90	1.85	12.99	81.80	15.88	13.03	18.20	71.60	2.10	0.00
9.99	18.20	71.60	13.03	26.02	100.00	26.02	0.00	.00	0.00	2.20	0.00

BIRTLEY ENGINEERING

THE CLASSICAL WASHABILITY CURVES



A Primary Curve

B Clean Coal Curve

C Discard Curve

D Specific Gravity – Yield Curve

E ± 0·1 S. G. Distribution Curve

FIGURE 3

BIRTLEY ENGINEERING (CANADA) LTD.	
COAL · SCIENCE & MINERALS TESTING	
CLIENT	WELDWOOD OF CANADA LTD
ADIT/SEAM NO.	BULK SAMPLE 3/4" x 28 M.
DATE	MAR. 29/76
SIGNED	K. M. LAU

TABLE 4

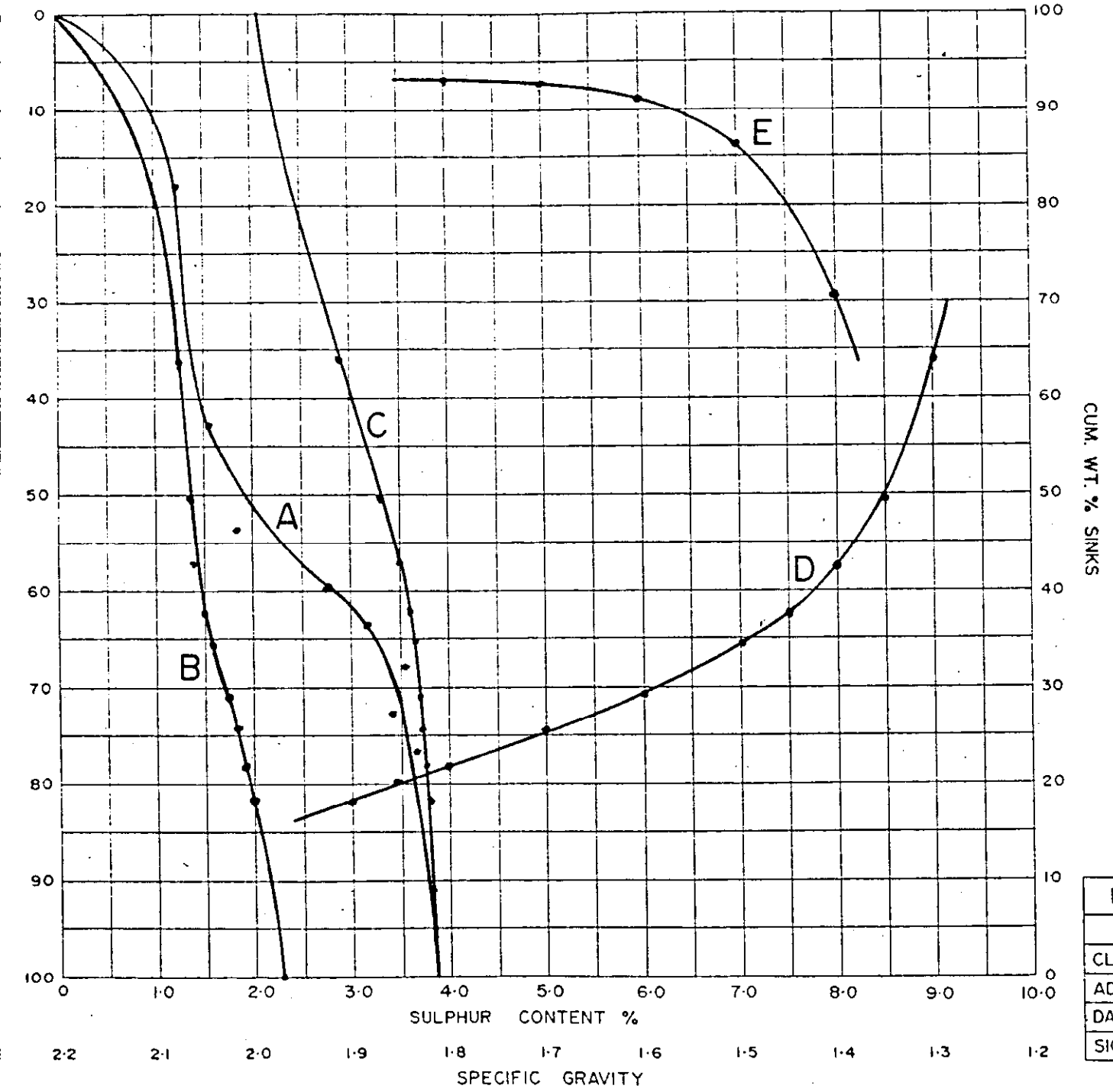
WASHABILITY FOR SULPHUR

WELDWOOD CANADA LTD. BULK SAMPLE LAB. NO.7260 3/4" X 28M

--DIRECT--			--CUM FLOATS--				--CUM SINKS--			+-0.1 DISTR	
S.G.	WT>	S >	WT> CUM S	WT> CUM TT S	WT>	S >	SINK WT S >	WT>	S >	S.G.	WT>
1	2	3	4	5	6	7	8	9	10	11	12
1.30	36.00	1.27	.46	.46	36.00	1.27	1.86	64.00	2.91	1.30	0.00
1.35	14.40	1.60	.23	.69	50.40	1.36	1.63	49.60	3.29	1.40	29.40
1.40	6.80	1.86	.13	.81	57.20	1.42	1.51	42.80	3.52	1.50	13.60
1.45	5.00	2.75	.14	.95	62.20	1.53	1.37	37.80	3.62	1.60	9.20
1.50	3.20	3.19	.10	1.05	65.40	1.61	1.27	34.60	3.66	1.70	7.50
1.60	5.40	3.55	.19	1.25	70.80	1.76	1.07	29.20	3.68	1.80	7.20
1.70	3.80	3.40	.13	1.37	74.60	1.84	.94	25.40	3.72	1.90	0.00
1.80	3.70	3.65	.14	1.51	78.30	1.93	.81	21.70	3.73	2.00	0.00
1.90	3.50	3.43	.12	1.63	81.80	1.99	.69	18.20	3.79	2.10	0.00
9.99	18.20	3.79	.69	2.32	100.00	2.32	0.00	.00	0.00	2.20	0.00

BIRTLEY ENGINEERING

THE CLASSICAL WASHABILITY CURVES



A Primary Curve

B Clean Coal Curve

C Discard Curve

D Specific Gravity – Yield Curve

E ± 0·1 S. G. Distribution Curve

FIGURE 4

BIRTLEY ENGINEERING (CANADA) LTD.	
COAL · SCIENCE & MINERALS TESTING	
CLIENT	WELDWOOD OF CANADA LTD
ADIT/SEAM NO.	BULK SAMPLE 3/4" x 28 M.
DATE	MAR. 29/76
SIGNED	K. M. Lau

TABLE 5

WELDWOOD OF CANADA LIMITED

ADIT Hamilton Lake LAB. NO. 7260

SINK - FLOAT ANALYSES							
28M X 100M							
					CUMULATIVE		
S.G.	WT. %	ASH %	F.S.I.	S. %	WT. %	ASH %	S. %
-1.30	44.8	3.7	9	0.98	44.8	3.7	0.98
1.30-1.35	12.4	8.3	8 1/2	1.35	57.2	4.7	1.06
1.35-1.40	6.2	13.0	7	1.67	63.4	5.5	1.12
1.40-1.45	3.6	17.9	5 1/2	2.01	67.0	6.2	1.17
1.45-1.50	2.5	20.7	3 1/2	2.13	69.5	6.7	1.20
1.50-1.60	3.4	27.6	3	2.55	72.9	7.7	1.27
1.60-1.70	2.5	35.4	1 1/2	2.74	75.4	8.6	1.31
1.70-1.80	1.8	43.4	1	2.46	77.2	9.4	1.34
1.80-1.90	2.3	50.6	1	2.53	79.5	10.6	1.38
+1.90	20.5	70.7	0	2.71	100.0	22.9	1.85

TALBE 6

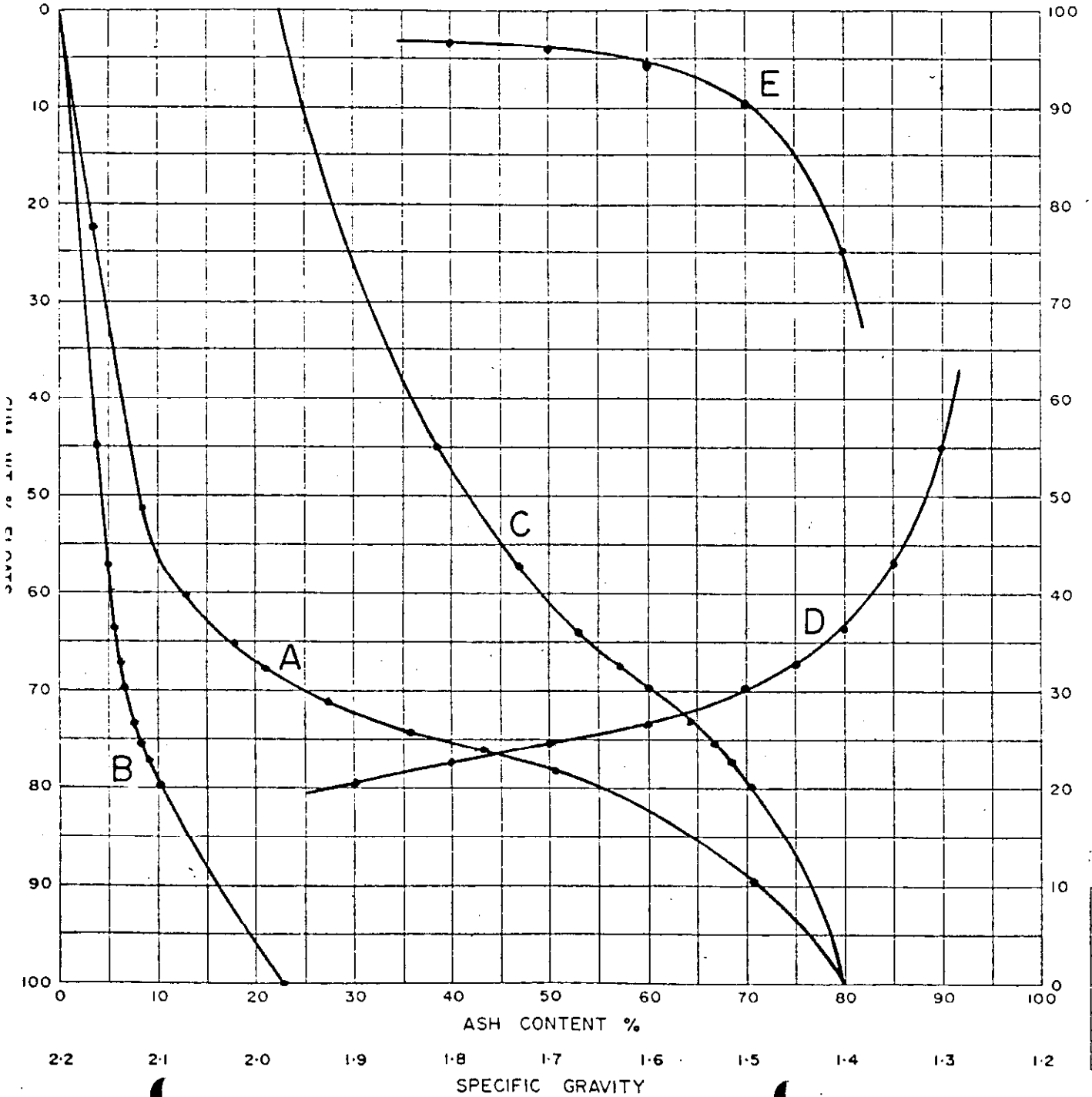
WASHABILITY FOR ASH

WELDWOOD CANADA LTD. BULK SAMPLE LAB. NO.7260 28M X 100M

--DIRECT--			--CUM FLOATS--			--CUM SINKS--				+-0.1 DISTR	
S.G.	WT>	ASH>	WT> ASH	CUM WT> ASH TT		WT>	ASH>	SINK WT ASH>	WT>	ASH>	S.G.	WT>
1	2	3	4	5		6	7	8	9	10	11	12
1.30	44.80	3.70	1.66	1.66	44.80		3.70	21.26	55.20	38.51	1.30	0.00
1.35	12.40	8.30	1.03	2.69	57.20		4.70	20.23	42.80	47.27	1.40	24.70
1.40	6.20	13.00	.81	3.49	63.40		5.51	19.42	36.60	53.07	1.50	9.50
1.45	3.60	17.90	.64	4.14	67.00		6.17	18.78	33.00	56.91	1.60	5.90
1.50	2.50	20.70	.52	4.65	69.50		6.70	18.26	30.50	59.88	1.70	4.30
1.60	3.40	27.60	.94	5.59	72.90		7.67	17.32	27.10	63.92	1.80	4.10
1.70	2.50	35.40	.89	6.48	75.40		8.59	16.44	24.60	66.82	1.90	0.00
1.80	1.80	43.40	.78	7.26	77.20		9.40	15.66	22.80	68.67	2.00	0.00
1.90	2.30	50.60	1.16	8.42	79.50		10.60	14.49	20.50	70.70	2.10	0.00
9.99	20.50	70.70	14.49	22.92	100.00		22.92	0.00	.00	0.00	2.20	0.00

BIRTLEY ENGINEERING

THE CLASSICAL WASHABILITY CURVES



A Primary Curve

B Clean Coal Curve

C Discard Curve

D Specific Gravity – Yield Curve

E ± 0·1 S. G. Distribution Curve

FIGURE 5

BIRTLEY ENGINEERING (CANADA) LTD.	
COAL SCIENCE & MINERALS TESTING	
CLIENT	WELDWOOD OF CANADA LTD
ADIT/SEAM NO.	BULK SAMPLE 28 x 100 M
DATE	MAR. 29/76
SIGNED	K. M. Lau

TABLE 7

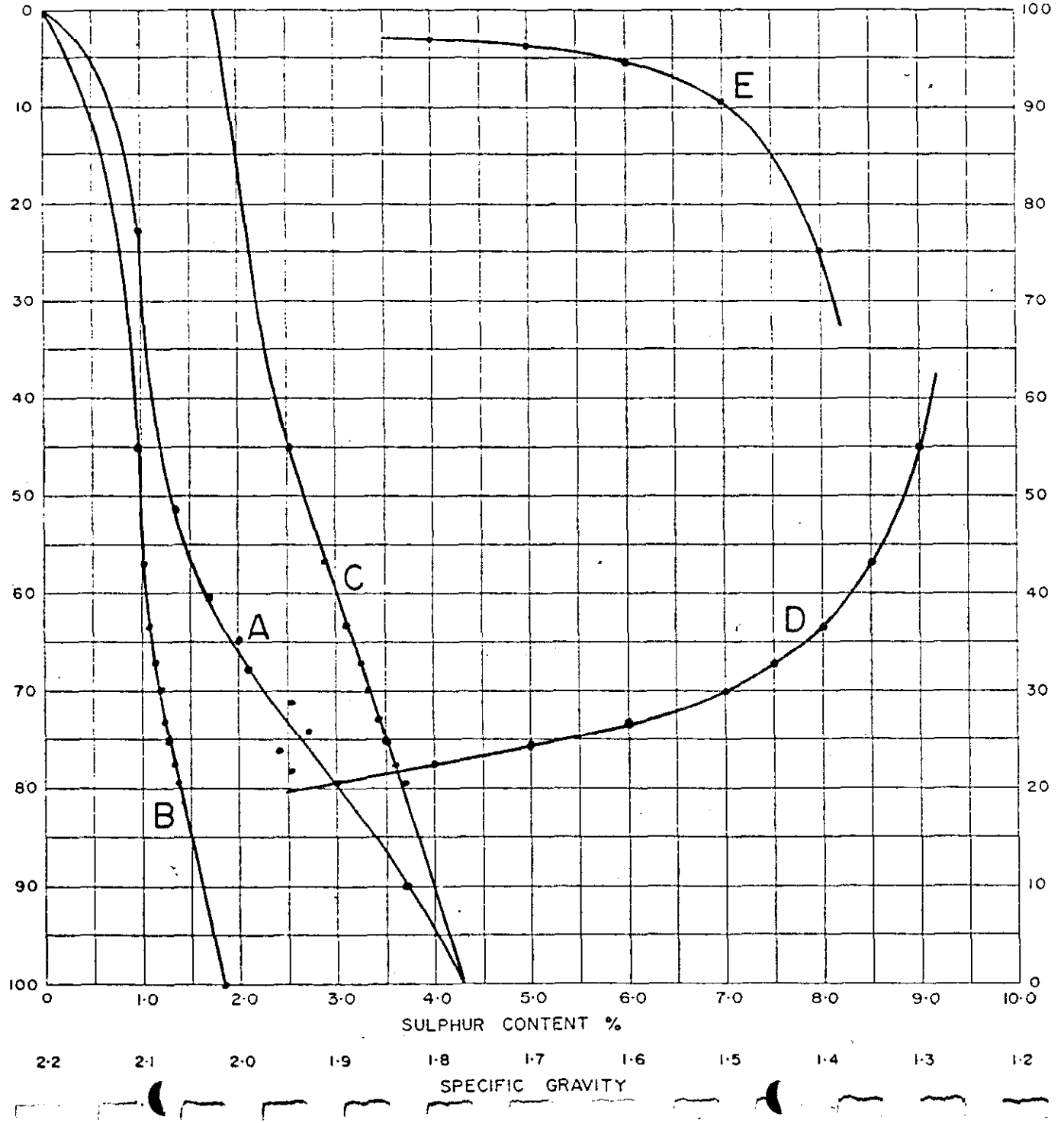
WASHABILITY FOR SULPHUR

WELDWOOD CANADA LTD. BULK SAMPLE LAB. NO.7260 28M X 100M

--DIRECT--			--CUM FLOATS--				--CUM SINKS--			+-0.1 DISTR	
S.G.	WT>	S >	WT> CUM S	WT> CUM TT S	WT>	SINK S >	SINK WT S >	WT>	S >	S.G.	WT>
1	2	3	4	5	6	7	8	9	10	11	12
1.30	44.80	.98	.44	.44	44.80	.98	1.41	55.20	2.56	1.30	0.00
1.35	12.40	1.35	.17	.61	57.20	1.06	1.25	42.80	2.91	1.40	24.70
1.40	6.20	1.67	.10	.71	63.40	1.12	1.14	36.60	3.13	1.50	9.50
1.45	3.60	2.01	.07	.78	67.00	1.17	1.07	33.00	3.25	1.60	5.90
1.50	2.50	2.13	.05	.84	69.50	1.20	1.02	30.50	3.34	1.70	4.30
1.60	3.40	2.55	.09	.92	72.90	1.27	.93	27.10	3.44	1.80	4.10
1.70	2.50	2.74	.07	.99	75.40	1.31	.86	24.60	3.51	1.90	0.00
1.80	1.80	2.46	.04	1.04	77.20	1.34	.82	22.80	3.59	2.00	0.00
1.90	2.30	2.53	.06	1.09	79.50	1.38	.76	20.50	3.71	2.10	0.00
9.99	20.50	3.71	.76	1.85	100.00	1.85	0.00	.00	0.00	2.20	0.00

BIRTLEY ENGINEERING

THE CLASSICAL WASHABILITY CURVES



A Primary Curve

B Clean Coal Curve

C Discard Curve

D Specific Gravity – Yield Curve

E ± 0·1 S. G. Distribution Curve

FIGURE 6

BIRTLEY ENGINEERING (CANADA) LTD.	
COAL SCIENCE & MINERALS TESTING	
CLIENT	WELDWOOD OF CANADA LTD.
ADIT/SEAM NO.	BULK SAMPLE 28 x 100 M.
DATE	MAR. 29/76
SIGNED	K. M. Lau

TABLE 8

March 12th, 1976.

Mr. Don Symonds,
Manager,
Birtley Engineering (Canada) Ltd.,
Box 5488, Stn. "A",
Calgary, Alberta,
T2H 1J6.

Dear Don;

With reference to the first sample sent to you from Hamilton Lake, we advise that the shale bans were picked out from the sample before dispatch. However the vertical section of the seam was measured as follows:

Roof	-	Shale	
16"	-	Coal	
8"	-	Shale	Total Seam 6 ft. 1 ins.
27"	-	Coal	
5"	-	Shale	
17"	-	Coal	
Floor			

We trust you will be able to compute the yields from this information.

Yours truly,

N.E. Roberts.

NER:ls

TABLE 9

WELDWOOD OF CANADA LIMITED

Float-Sink of 3/4" X 28M Adjusted for Inclusion of Shale Bands Removed in Sampling

S.G.	WT. %	ASH %	CUM. WT. %	CUM. ASH %
-1.30	29.4	5.3	29.4	5.3
1.30-1.35	11.8	11.0	41.2	6.9
1.35-1.40	5.6	16.0	46.8	8.0
1.40-1.45	4.1	20.0	50.9	9.0
1.45-1.50	3.6	24.4	53.5	9.7
1.50-1.60	4.4	29.7	57.9	11.2
1.60-1.70	3.1	39.0	61.0	12.7
1.70-1.80	3.0	45.8	64.0	14.2
1.80-1.90	2.9	52.9	66.9	15.9
+1.90	33.1	78.8*	100.0	37.0

*Assuming an ash content of 85% for the shale partings, which amounted to 22.4% of the seam.

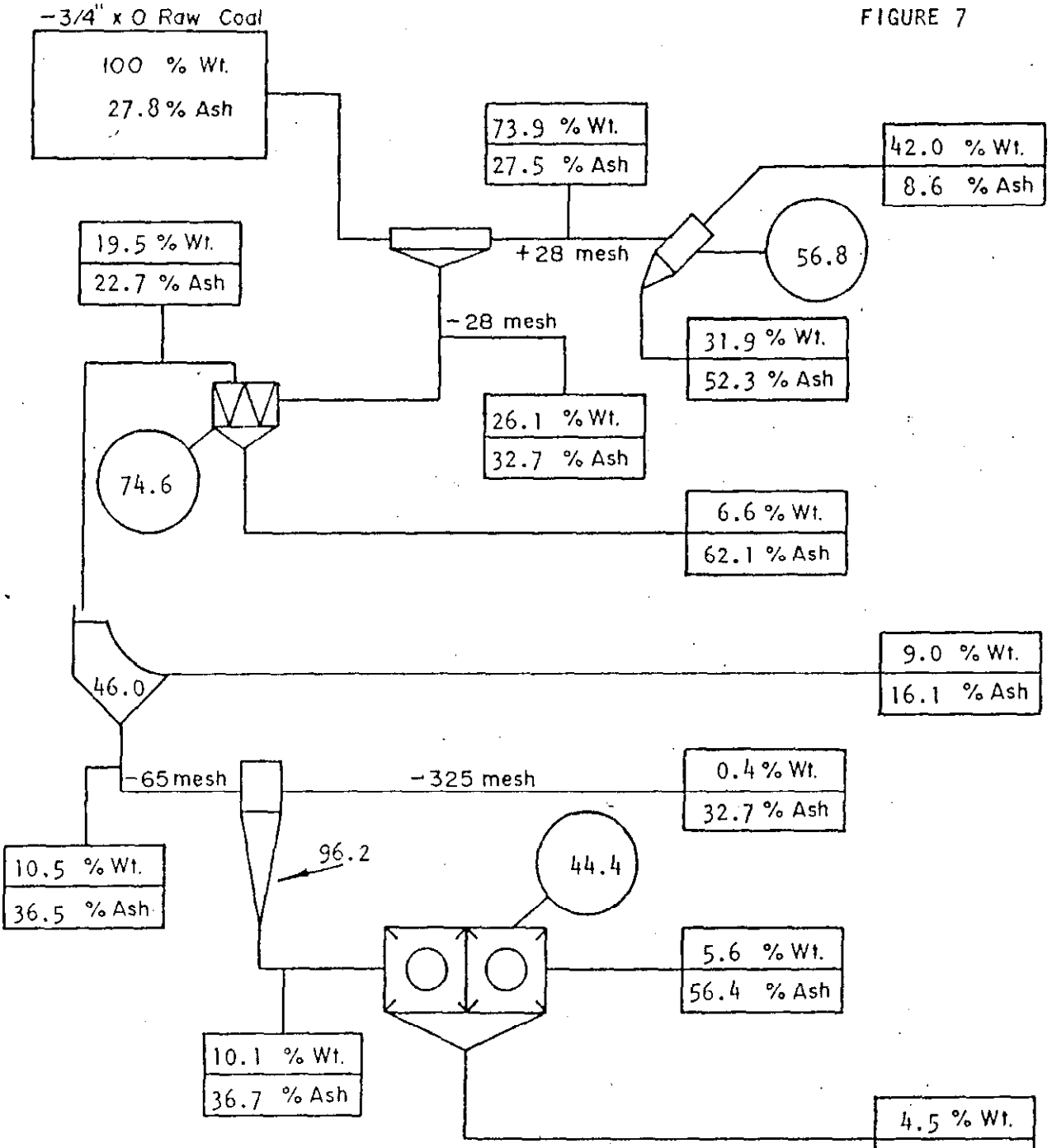
DISTRIBUTION OF SHALE AND COAL IN THE HAMILTON LAKE SEAM

SEAM DISTRIBUTION	PARTING DISTRIBUTION	PARTING DIST. BY VOLUME %	PARTING DIST. BY WT. %**
Coal	16"	21.9	20.7
Shale	8"	11.0	13.8*
Coal	27"	37.0	34.9
Shale	5"	6.8	8.6*
Floor	--	----	

* Not included in the bulk sample.

**Assuming an S.G. of 1.50 for coal and 2.00 for shale.

FIGURE 7



OVERALL YIELD = 55.5 CALCULATED
50.8 ACTUAL

LEGEND:

○ *CIRCUIT YIELD %*

Wt. *WEIGHT %*
Ash *ASH CONTENT (AIR DRIED)*

BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
WELDWOOD OF CANADA LIMITED ADIT - HAMILTON LAKE LAB. NO. 7259 PLANT BALANCE SHEET	MARCH 29, 1976. Drawn

TABLE 10

BIRTLEY ENGINEERING (CANADA) LTD.

Coal Science & Minerals Testing Div.

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA*

ADIT Hamilton Lake LAB. NO. 7259 DATE OF WASH March 18, 1976.

Raw Coal Analysis: A.D.M. 4.1% Ash% 27.8 F.S.I. 6 1/2 H.G.I. 63

Delivered Bulk Weight 6.962 Metric Tons

Washed Weight 6.799 Metric Tons

* All weight and analyses are on Air Dried Basis unless otherwise indicated.

TABLE 11

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

HEAVY MEDIUM CIRCUIT

ADIT Hamilton Lake LAB. NO. 7259

1. S.G. of Separation 1.44
2. Feed Ash Content 27.5 % F.S.I. 7 1/2
3. Clean Coal Estimated Weight 2.942 M.T.
4. Clean Coal Analysis - Ash 8.6 % F.S.I. 8 1/2
5. Reject Estimated Weight 2.081 M.T.
6. Reject Analysis - Ash 52.3 % F.S.I. 1 1/2
7. Estimated 3/4" X 28M in Circuit 5.023 M.T. 73.9 Wt.%
8. Yield Clean Coal (Weighted): $\frac{3}{3+5}$ 58.6 %
9. Yield Clean Coal (Calculated Ash Balance) - $\frac{6-2}{6-4}$ 56.8 %

TABLE 12

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

HEAVY MEDIUM CIRCUIT - MIDDLINGS WASH

ADIT Hamilton Lake LAB. NO. 7259

1. S.G. of Separation 1.60
2. Feed Ash Content 52.3 % F.S.I. 1 1/2
3. Clean Coal Estimated Weight 0.532 M.T.
4. Clean Coal Analysis - Ash 26.8 % F.S.I. 4 1/2
5. Reject Estimated Weight 1.106 M.T.
6. Reject Analysis - Ash 62.2 % F.S.I. 1/2
7. Estimated 3/4" X 28M in Circuit _____ M.T. _____ Wt.%
8. Yield Clean Coal (Weighted): $\frac{3}{3+5}$ 32.5 %
9. Yield Clean Coal (Calculated Ash Balance) - $\frac{6-2}{6-4}$ 28.0 %

TABLE 13

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

WATER ONLY CYCLONE CIRCUIT

ADIT Hamilton Lake LAB. NO. 7259

1. Vortex Finder Clearance (VFC) 1.27 CM 0.5 Inches
2. Feed Pressure 1.4 KG/CM^2 20 P.S.I.
3. Feed Rate 23.2 $M^3/Hr.$ 85 IG/Min.
4. Feed Pulp Density 90-140 g/l. 9-14 Solids W/V
5. Sample Analysis:-

	SCREEN SIZE	WT. %	ASH %	F.S.I.	CUM WT. %	CUM ASH %	HEAD ASH	HEAD F.S.I.
FEED							32.7	5 1/2
O'FLOW	+65M	46.0	10.0	9	46.0	10.0	22.7	8
	65M XO	54.0	32.3	5	100.0	22.0		
U'FLOW							62.1	1
S B O							16.1	8 1/2
T C O*	+325M	3.7	14.4	8	3.7	14.4	32.7	1
	325M X O	96.3	33.8	1/2	100.0	33.1		

6. Yield - Total W.O. Cyclone Circuit = 74.6
7. Est. Yield of 28 X 65 Mesh Coal = 34.3
   (as % of 28 Mesh X O Feed)
8. Est. 28M X O in circuit (Plant Feed - HM Products) 1.776 M.T. 26.1 %

* Thickner Cyclone Overflow

TABLE 14

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

FROTH FLOTATION CIRCUIT

ADIT Hamilton Lake LAB. NO. 7259

1. Reagents: Kerosene-Methylisobutylcarbinol (MIBC).

2. Feed Pulp Density 150-240 g/l 15-24 % Solids W/V

3. Sample Analysis:

	ASH	F.S.I.
FEED	36.7	6
CONC.	12.0	8
TAILS	56.4	1 1/2

4. Impeller Type - Birtley-Humboldt Multi-Wobble

5. Yield Calculated (Ash Balance) 44.4 %

6. Filter Cake (Sieve Bend O'Flow & Flotation Conc.)
   Wt. Recovered 0.515 M.T.

7. Filter Cake - Ash% 15.2 F.S.I. 8 1/2

TABLE 15

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

ADIT Hamilton Lake LAB. NO. 7259 DATE OF WASH March 18, 1976.

a) Raw Coal

Delivered Weight	=	6.962 M.T.
Ash %	=	27.8
F.S.I.	=	6 1/2
Estimated Washed Wt.	=	6.799 M.T.

b) Heavy Media Circuit

Estimated Proportion of +28 Mesh in Feed = 73.9%

Effective S.G. = 1.44

Raw Feed	27.5	%Ash	7 1/2	F.S.I.
Clean Coal	8.6	%Ash	8 1/2	F.S.I.
Reject	52.3	%Ash	1 1/2	F.S.I.

Calculated Yield = 56.8%

Weighed Yield = 58.6%

c) Water-Only Cyclone Circuit

Raw Feed	32.7	%Ash	5 1/2	F.S.I.
Overflow	22.7	%Ash	8	F.S.I.
Underflow	62.1	%Ash	1	F.S.I.

Calculated Yield = 74.6

% of +65 Mesh in O/F = 46.0

Sieve Bend Overflow	16.1	%Ash	8 1/2	F.S.I.

d) Froth Flotation Circuit

Raw Feed	36.7	%Ash	6	F.S.I.
Concentrates	12.0	%Ash	8	F.S.I.
Tails	56.4	%Ash	1 1/2	F.S.I.

Calculated Yield = 44.4

TABLE 16

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

BULK WASHING SUMMARY (Cont.)

ADIT Hamilton Lake LAB. NO. 7259

e) Clean Coal Mix Analysis

(i) Proximate Analysis

ADM% 5.8 RM% 0.8 ASH% 9.9 VM% 32.2 FC% 57.1 S% 1.52 F.S.I. 8 1/2 BTU/LB 13,655

(ii) Ultimate Analysis

H_2O%	C%	H%	N%	S%	ASH%	O%
0.41	76.12	5.03	1.30	1.44	10.15	5.55

(iii) Rhur Dilatometer Test

Softening °C 366° Max. Dil. °C 446° Max. Cont. % 27%

Max. Dil. % 126% G. No. = 1.068

(iv) Gieseler Plastometer Test

Initial Softening Temp. °C	Max. Fluid Temp. °C	Solidification Temp. °C	Maximum Fluidity (DDM)
394	442	475	2013

(v) Mineral Analysis of Ash

SiO_2 %	Al_2O_3 %	Fe_2O_3 %	CaO %	MgO %
35.06	22.68	13.30	12.29	0.66

Na_2O %	K_2O %	SO_3 %	P_2O_5 %	TiO_2 %
0.46	0.40	12.64	1.06	1.51

(vi) Ash Fusion Temperatures °F

Atmosphere	Initial Deformation	Spherical	Hemispherical	Fluid
Oxidizing	2440	2460	2480	2500
Reducing	2360	2430	2450	2500

FUEL RESEARCH & INSTRUMENT COMPANY
Charleston, West Virginia

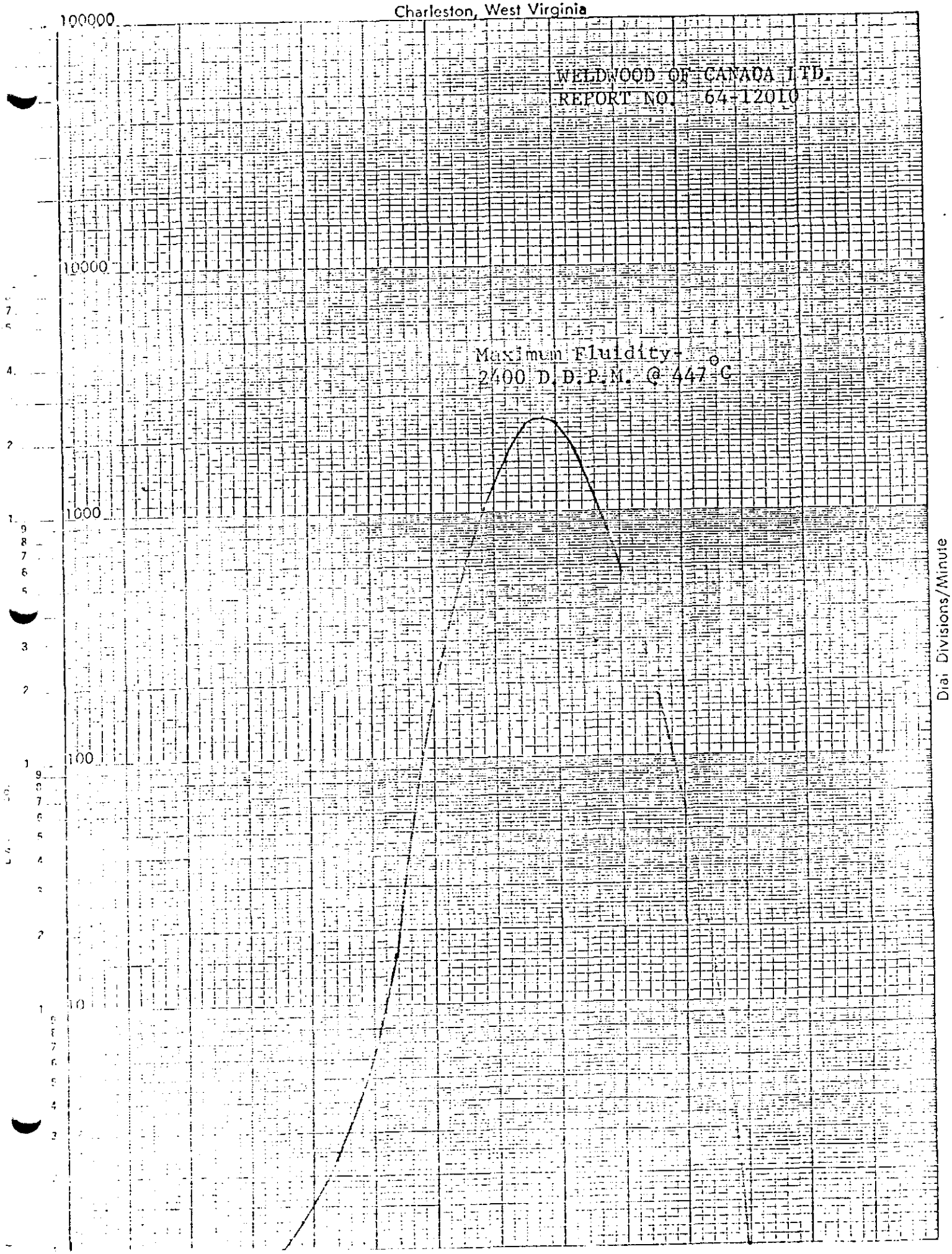


TABLE 17

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

BULK WASHING SUMMARY (Cont.)

ADIT Hamilton Lake LAB. NO. 7259

(vii) Hardgrove Grindability Index 57

(f) Middlings Coal Analysis

(i) Proximate Analysis

ADM% 4.7 RM% 0.9 ASH% 26.8 VM% 28.5 FC% 43.8 S% 2.69 F.S.I. 4 1/2 BTU/LB 10,670

(ii) Ultimate Analysis

H_2O%	C%	H%	N%	S%	ASH%	O%
0.38	59.98	4.35	1.10	2.70	26.49	5.00

(iii) Mineral Analysis of Ash

SiO_2%	Al_2O_3 %	Fe_2O_3 %	CaO %	MgO %
42.46	27.79	12.80	7.56	0.33

Na_2O %	K_2O %	SO_3 %	P_2O_5 %	TiO_2 %
0.40	0.45	5.49	1.01	1.37

(iv) Ash Fusion Temperatures °F

Atmosphere	Initial Deformation	Spherical	Hemispherical	Fluid
Oxidizing	2480	2600	2620	2650+
Reducing	2410	2480	2500	2560

(v) Hardgrove Grindability Index 62

TABLE 18

WELDWOOD OF CANADA LIMITED

BULK WASHING DATA

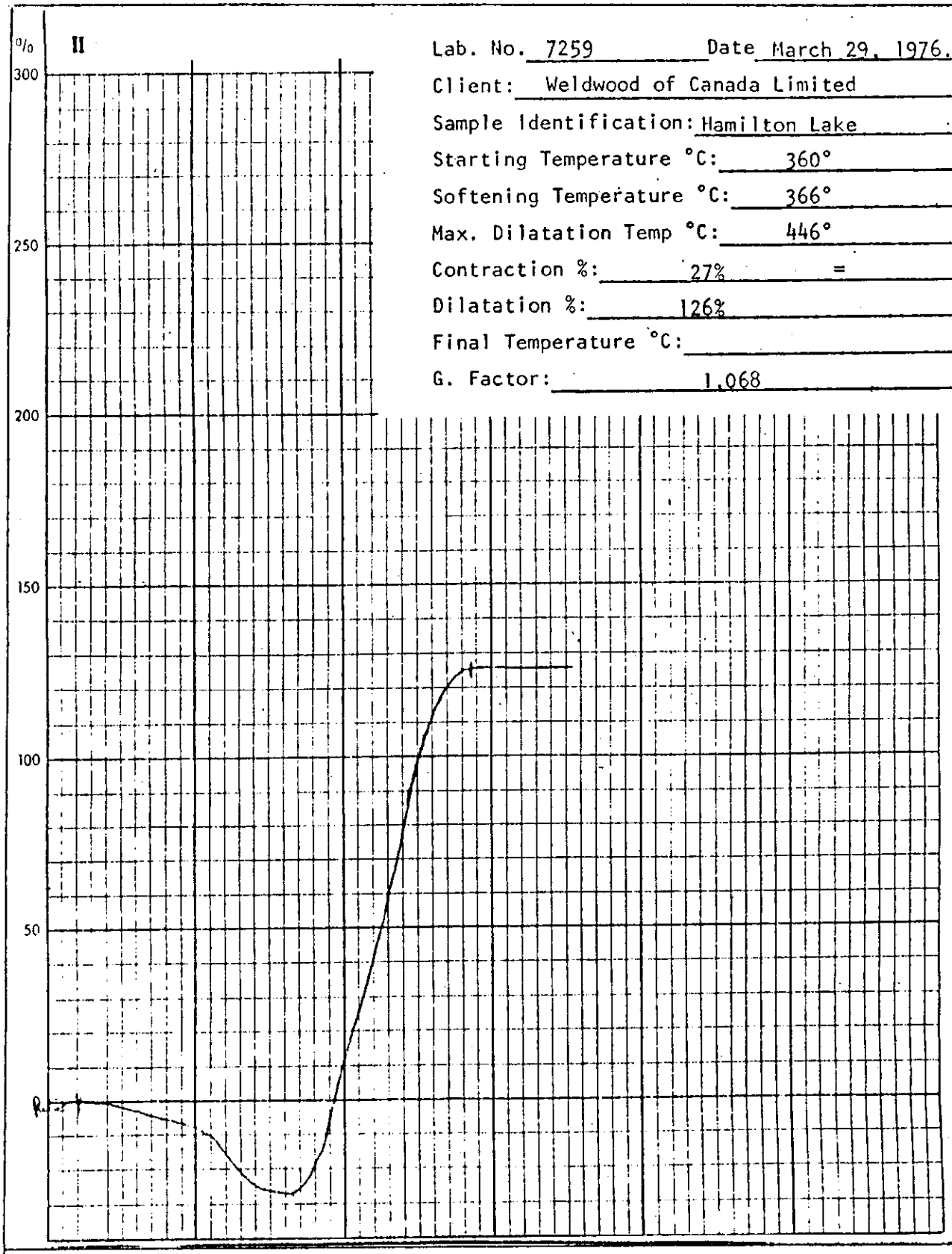
BULK WASHING SUMMARY (Cont.)

ADIT Hamilton Lake LAB. NO. 7259

(g) Clean Coal Mix Make-Up

H. M. CLEAN COAL	FINES FILTER CAKE	CLEAN COAL MIX		SHIPPED		IN STOCK	
M.T.	M.T.	BBLS.	M.T.	BBLS.	M.T.	BBLS.	M.T.
2.942	0.511	22	3.453				

FIGURE 8



Lab. No. 7259 Date March 29, 1976.

Client: Weldwood of Canada Limited

Sample Identification: Hamilton Lake

Starting Temperature °C: 360°

Softening Temperature °C: 366°

Max. Dilatation Temp °C: 446°

Contraction %: 27% =

Dilatation %: 126%

Final Temperature °C:

G. Factor: 1.068

BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	March 30, 1976

3. COMMENTS AND CONCLUSIONS

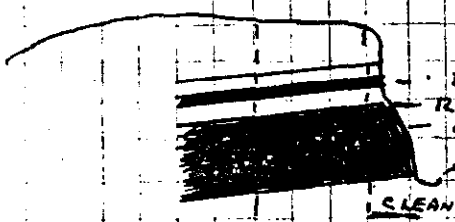
The predictable clean coal yield of 63% at 9.5% ash, as taken from the washability data of the raw coal crushed to pass 3/4", appears to be somewhat higher than what could be expected on a R.O.M. basis, which would include about 22% of shale partings. A factor of 81.7% which takes into account the partings, would bring the yield to 51.5% of R.O.M. However, the washability and plant wash figures are still valid when consideration is given to the fact that the greater part of the shale partings would likely be removed at the breaker station.

The clean coal, which places in the high volatile bituminous 'A' classification, exhibits good coking characteristics with an F.S.I. of 8 1/2 comparing with a G. Factor of 1.068 of the Rhur Dilatometer test. The sulphur content of the coal is rather high at 1.5%. Nevertheless, if this metallurgical coal could be marketed, to be blended with a low sulphur coal, the proximity to seaport could offset the low yield parameter, and high sulphur penalty to make an economic operation feasible.

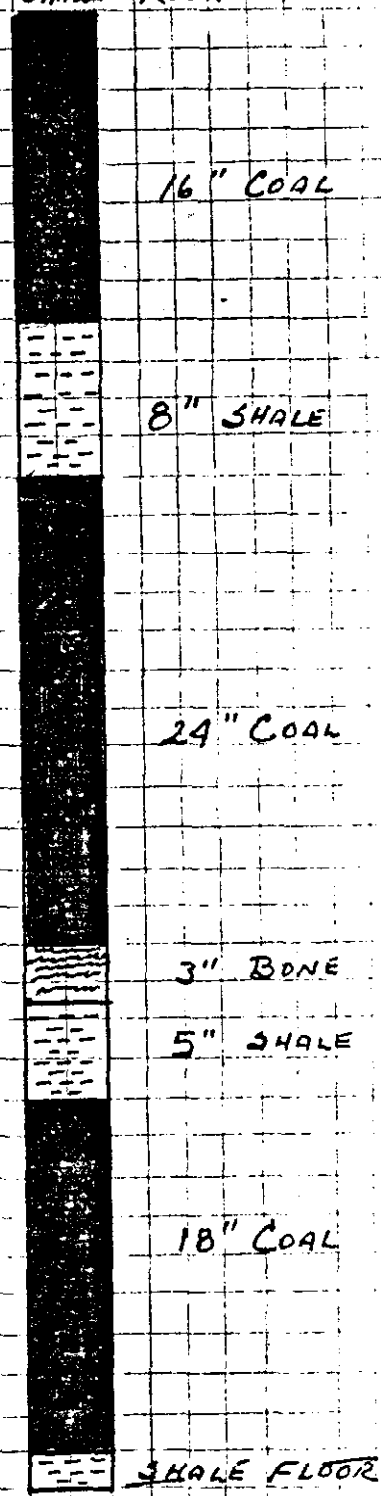
The middling coal was recovered from the rewashing of the primary heavy media shale at an overall yield of 8-10%. This product analysed on a dry basis at 27.0% ash, 28.8% volatile, and a calorific value of 10,767 BTU/lb. While these encouraging values lend optimism for thermal applications, the high sulphur level of 2.7% would almost certainly relegate the middlings to the refuse heap because of environmental restrictions.

HAMILTON LAKE

EXPLORATION TUNNEL



LENGTH OF TUNNEL - 21 feet



TOTAL SECTION SAMPLED - 74"

COAL - 60"

PARTINGS - 14"

6°

APRIL 1971

WELDWOOD OF CANADA LIMITED

May 5, 1976.

PROJECT: Hamilton Lake Clean Coal

LAB. NO.: 7259

GIESELER PLASTICITY

Start	394 °C
Fusion Temp.	409 °C
Max. Fluid Temp.	442 °C
Final Fluid Temp.	469 °C
Solidification Temp.	475 °C
Melting Range	75 °C
Max. Fluidity	2013 dd/m
Torque	40 g.in.

Birtley Engineering
Subsidiary of Great West Steel Industries

CABLE ADDRESS COMTECO
TELEX 04-352697

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

Please address all correspondence to:
147 Riverside Dr., North Vancouver, B.C. V7H 1T6

SINCE 1908

Office: Tel. (604) 929-2228
Roberts Bank Tel. (604) 946-7021

April 23, 1976

CERTIFICATE OF ANALYSIS FOR:

THE ROBERTS CONSULTING CORP. LTD.,
West Vancouver, B.C.
for
WILDWOOD OF CANADA LTD.

REPORT NO. 64 - 12010

COAL PLASTICITY

	TEMP °C
0.1 D.D.P.M. @	368
1.0 D.D.P.M. @	405
5.0 D.D.P.M.	419
Max. D.D.P.M.	447
5.0 D.D.P.M. @	477
1.0 D.D.P.M. @	480
Solidification @	487
Max. Fluidity, 2400 D.D.P.M. @	447

Respectfully Submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R.A. Houser,
District Manager

RAH/sl

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-20

HOLE NO.: DATE SAMPLED: Dec., 1978

LOCATION: DATE RECEIVED: Jan., 1979

INTERVAL: 79.7 - 83.6 (Sample 1) DATE REPORTED: Mar., 1979

RAW COAL SIZE FRACTION: 1/4" x 28 Mesh

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	957	34.8	4.45	1.71	14530	34.8	4.45	1.71	14530				
1.30	1.35	259	9.4	8.85	1.79	13960	44.2	5.39	1.73	14409				
1.35	1.40	476	17.3	13.48	2.37	13079	61.50	7.66	1.91	14035				
1.40	1.45	162	5.9	17.81	2.76	12299	67.4	8.55	1.98	13883				
1.45	1.50	136	4.9	25.24	3.49	10988	72.3	9.68	2.09	13686				
1.50	1.55	132	4.8	27.02	4.18	10637	77.1	10.76	2.22	13497				
1.55	1.60	114	4.1	29.38	4.22	10175	81.2	11.70	2.32	13329				
1.60	1.70	126	4.6	37.36	3.69	8775	85.8	13.08	2.39	13085				
1.70	1.80	99	3.6	41.97	4.99	7816	89.4	14.24	2.50	12873				
1.80	1.90	56	2.0	49.08	4.73	6570	91.4	15.00	2.55	12734				
1.90		235	8.6	60.36	7.38	3877	100.0	18.90	2.96	11973				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake
LAB NO.: 79-20
HOLE NO.:
DATE SAMPLED: Dec., 1978
LOCATION:
DATE RECEIVED: Jan., 1979
INTERVAL: 79.7-83.6 (Sample 1)
DATE REPORTED: Mar., 1979
RAW COAL SIZE FRACTION: + 1/4"
WT.% ASH% B.T.U.:
ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	283	21.3	7.87	1.94	13976	21.3	7.87	1.94	13976				
1.30	1.35	52	3.9	12.66	2.68	13147	25.2	8.61	2.05	13848				
1.35	1.40	145	10.9	16.12	2.54	12646	36.1	10.88	2.20	13485				
1.40	1.45	197	14.8	19.79	2.70	11898	50.9	13.47	2.35	13023				
1.45	1.50	92	6.9	25.09	2.81	11030	57.8	14.86	2.40	12785				
1.50	1.55	96	7.2	27.82	3.14	10450	65.0	16.29	2.48	12527				
1.55	1.60	59	4.4	32.52	3.95	9713	69.4	17.32	2.57	12348				
1.60	1.70	103	7.7	35.99	3.79	8996	77.1	19.19	2.69	12014				
1.70	1.80	52	3.9	46.27	2.98	7264	81.0	20.49	2.71	11785				
1.80	1.90	77	5.8	51.04	2.11	5806	86.8	22.53	2.67	11385				
1.90		174	13.2	61.52	9.08	4315	100.0	27.68	3.51	10452				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-20

HOLE NO.: DATE SAMPLED: Dec., 1978

LOCATION: DATE RECEIVED: Jan., 1979

INTERVAL: 79.7 - 83.6 (Sample 1) DATE REPORTED: Mar., 1979

RAW COAL SIZE FRACTION: 28 x 100 Mesh

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	116	31.8	4.02	1.47	14679	31.8	4.02	1.47	14679				
1.30	1.35	110	30.1	6.26	1.86	14297	61.9	5.11	1.66	14493				
1.35	1.40	20	5.5	12.29	2.16	13224	67.4	5.70	1.70	14389				
1.40	1.45	16	4.4	15.18	2.49	12698	71.8	6.28	1.75	14286				
1.45	1.50	17	4.7	19.78	2.41	11819	76.5	7.11	1.79	14134				
1.50	1.55	8	2.2	24.13	3.40	11070	78.7	7.58	1.83	14049				
1.55	1.60	8	2.2	30.12	5.40	10013	80.9	8.19	1.93	13939				
1.60	1.70	8	2.2	34.44	4.70	9177	83.1	8.89	2.00	13813				
1.70	1.80	7	1.9	42.84	5.40	N.S.	85.0	9.65	2.08	--				
1.80	1.90	5	1.4	49.05	4.00	N.S.	86.4	10.29	2.11	--				
1.90		50	13.6	60.60	4.20	2137	100.0	17.13	2.40	--				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-25

HOLE NO.: DATE SAMPLED: Dec., 1978

LOCATION: DATE RECEIVED: Jan., 1979

INTERVAL: 89.87 - 91.30 (Sample 6) DATE REPORTED: March, 1979

RAW COAL SIZE FRACTION: 3/4" x 28 Mesh

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	810	52.4	5.56	2.60	14334	52.4	5.56	2.60	14334				
1.30	1.35	105	6.8	8.82	2.40	13850	59.2	5.93	2.58	14278				
1.35	1.40	270	17.5	12.22	2.80	13259	76.7	7.37	2.63	14046				
1.40	1.45	151	9.8	17.51	2.68	12233	86.5	8.52	2.63	13840				
1.45	1.50	71	4.6	22.12	3.60	11572	91.1	9.20	2.68	13726				
1.50	1.55	35	2.3	26.65	3.20	10768	93.4	9.63	2.70	13653				
1.55	1.60	23	1.5	29.81	4.86	9698	94.9	9.95	2.73	13590				
1.60	1.70	17	1.1	36.03	3.86	9010	96.0	10.25	2.74	13538				
1.70	1.80	17	1.1	36.73	9.20	8665	97.1	10.55	2.82	13483				
1.80	1.90	9	0.5	52.09	3.92	6156	97.6	10.76	2.82	13445				
1.90		37	2.4	56.97	8.50	4767	100.0	11.87	2.96	13237				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-25

HOLE NO.: DATE SAMPLED: Dec., 1978

LOCATION: DATE RECEIVED: Jan., 1979

INTERVAL: 89.87 - 91.30 (Sample 6) DATE REPORTED: Mar., 1979

RAW COAL SIZE FRACTION: 28 x 100 Mesh

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	85	50.0	3.02	1.44	14780	50.0	3.02	1.44	14780				
1.30	1.35	44	25.9	6.86	2.00	14384	75.9	4.33	1.63	14645				
1.35	1.40	10	5.9	11.99	2.48	13193	81.8	4.88	1.69	14540				
1.40	1.45	4	2.4	N.S.	2.72	N.S.	84.2	N.S.	1.72	N.S.				
1.45	1.50	5	2.9	21.61	2.74	N.S.	87.1	N.S.	1.76	N.S.				
1.50	1.55	2	1.1	N.S.	N.S.	N.S.	88.2	N.S.	--	N.S.				
1.55	1.60	1	0.6	N.S.	N.S.	N.S.	88.8	N.S.	--	N.S.				
1.60	1.70	2	1.1	N.S.	N.S.	N.S.	89.9	N.S.	--	N.S.				
1.70	1.80	2	1.1	N.S.	N.S.	N.S.	90.0	N.S.	--	N.S.				
1.80	1.90	1	0.6	N.S.	N.S.	N.S.	90.6	N.S.	--	N.S.				
1.90		14	8.4	70.73	2.3	1538	100.0	N.S.	--	N.S.				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-30

HOLE NO.: DATE SAMPLED:

LOCATION: DATE RECEIVED:

INTERVAL: DATE REPORTED:

RAW COAL SIZE FRACTION: +1/4"

WT.% ASH% B.T.U.: ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	36	2.1	5.93	0.68	14122	2.1	5.93	0.68	14122				
1.30	1.35	55	3.2	13.32	0.70	12650	5.3	10.39	0.69	13233				
1.35	1.40	182	10.6	16.09	0.62	12400	15.9	14.19	0.64	12678				
1.40	1.45	244	14.2	17.98	0.42	11813	30.1	15.98	0.54	12270				
1.45	1.50	190	11.1	24.65	0.34	10994	41.2	18.31	0.48	11926				
1.50	1.55	147	8.6	28.73	0.22	9964	49.8	20.11	0.44	11587				
1.55	1.60	142	8.3	32.69	0.65	9349	58.1	21.91	0.47	11267				
1.60	1.70	177	10.3	39.06	0.69	8360	68.4	24.49	0.50	10830				
1.70	1.80	119	7.0	45.72	0.34	6919	75.4	26.46	0.49	10467				
1.80	1.90	86	5.0	52.21	0.34	6355	80.4	28.06	0.48	10211				
1.90		335	19.6	72.15	0.35	3659	100.0	36.71	0.45	8927				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-30

HOLE NO.: DATE SAMPLED:

LOCATION: DATE RECEIVED:

INTERVAL: DATE REPORTED:

RAW COAL SIZE FRACTION: 1/4" X 28 Mech

WT.% ASH% B.T.U.: ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	221	12.6	7.24	0.58	13960	12.6	7.24	0.58	13960				
1.30	1.35	142	8.1	7.33	0.26	13930	20.7	7.28	0.45	13948				
1.35	1.40	219	12.5	13 .51	0.18	12792	33.20	9.62	0.35	13513				
1.40	1.45	193	11.0	18.56	0.50	11954	44.2	11.85	0.39	13125				
1.45	1.50	81	4.6	24.00	0.39	11155	48.8	12.99	0.39	12939				
1.50	1.55	112	6.4	28.04	0.45	10237	55.2	14.74	0.40	12626				
1.55	1.60	124	7.1	33.18	0.40	9530	62.3	16.84	0.40	12273				
1.60	1.70	124	7.1	39.67	0.41	8424	69.4	19.17	0.40	11879				
1.70	1.80	88	5.0	46.36	0.71	7034	74.4	21.00	0.42	11554				
1.80	1.90	92	5.3	55.48	0.29	5352	79.7	23.29	0.41	11141				
1.90		354	20.3	65.98	0.42	2977	100 .0	31.96	0.41	9484				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-30

HOLE NO.: DATE SAMPLED:

LOCATION: DATE RECEIVED:

INTERVAL: DATE REPORTED:

RAW COAL SIZE FRACTION: 28 X 100 Mech

WT.% ASH% B.T.U.: ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	56	18.1	3.28	0.60	14484	18.1	3.28	0.60	14484				
1.30	1.35	38	12.3	6.03	0.49	13832	30.4	4.39	0.56	14220				
1.35	1.40	28	9.0	8.57	0.31	13699	39.4	5.35	0.50	14100				
1.40	1.45	34	10.9	9.65	0.52	13442	50.3	6.28	0.50	13958				
1.45	1.50	28	9.0	15.81	0.74	12325	59.3	7.73	0.54	13710				
1.50	1.55	15	4.8	22.06	0.38	11280	64.1	8.80	0.53	13528				
1.55	1.60	8	2.6	30.77	0.77	9848	66.7	9.66	0.54	13385				
1.60	1.70	14	4.5	36.53	0.70	8539	71.2	11.35	0.55	13079				
1.70	1.80	9	2.9	45.41	0.87	7075	74.1	12.69	0.56	12844				
1.80	1.90	10	3.2	51.50	1.08	6000	77.3	14.29	0.58	12560				
1.90		70	22.7	62.76	0.75	1964	100.0	25.30	0.62	10155				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-31

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECEIVED: Jan. 1979

INTERVAL: 85.1 - 89.52 (Samples 3 & 4) DATE REPORTED: March 1979

RAW COAL SIZE FRACTION: + 1/4"

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	60	3.2	N.S.	N.S.	N.S.	3.2	--	--	--				
1.30	1.35	28	1.5	13.11	1.52	13098	4.7	13.11	1.52	13098				
1.35	1.40	207	11.0	16.06	1.54	12657	15.7	15.18	1.53	12789				
1.40	1.45	276	14.7	21.48	1.64	11594	30.4	18.22	1.59	12211				
1.45	1.50	209	11.1	26.61	3.50	10500	41.5	20.47	2.10	11753				
1.50	1.55	243	12.9	28.08	3.94	10468	54.4	22.27	2.53	11448				
1.55	1.60	153	8.1	31.46	3.72	9585	62.5	23.46	2.69	11207				
1.60	1.70	243	12.9	35.10	4.65	8734	75.4	25.45	3.02	10784				
1.70	1.80	232	12.3	43.05	4.00	7379	87.7	27.92	3.16	10306				
1.80	1.90	90	4.8	47.25	5.20	6682	92.5	28.93	3.27	10118				
1.90		140	7.5	55.68	9.32	5111	100.0	30.93	3.72	9743				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake
LAB NO.: 79-31
HOLE NO.:
DATE SAMPLED: Dec. 1978
LOCATION:
DATE RECEIVED: Jan. 1979
INTERVAL: 85.1 - 89.52 (Samples 3 & 4)
DATE REPORTED: March 1979
RAW COAL SIZE FRACTION: 1/4" x 28 Mech
WT.%____ ASH%____ B.T.U.:____
ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	427	18.3	5.65	1.74	14346	18.3	5.65	1.74	14346				
1.30	1.35	193	8.3	6.76	1.36	14076	26.6	6.00	1.62	14262				
1.35	1.40	305	13.1	15.05	1.48	12690	39.7	8.98	1.57	13743				
1.40	1.45	226	9.7	19.15	1.84	11936	49.4	10.98	1.63	13388				
1.45	1.50	202	8.7	24.18	1.96	11034	58.1	12.96	1.68	13036				
1.50	1.55	213	9.1	28.83	2.30	10030	67.2	15.11	1.76	12629				
1.55	1.60	139	6.0	33.44	1.94	9074	73.2	16.61	1.78	12337				
1.60	1.70	222	9.5	40.09	2.30	8059	82.7	19.31	1.84	11846				
1.70	1.80	120	5.2	44.65	2.20	7041	87.9	20.81	1.86	11561				
1.80	1.90	103	4.4	50.20	2.06	6154	92.3	22.21	1.87	11304				
1.90		180	7.7	57.30	3.80	3670	100.0	24.91	2.02	10716				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-31

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECEIVED: Jan. 1979

INTERVAL: 85.1 - 89.52 (Samples 3 & 4) DATE REPORTED: March 1979

RAW COAL SIZE FRACTION: 28 x 100 Mech

WT.%____ ASH%____ B.T.U.:____ ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	61	14.5	3.36	2.24	14710	14.5	3.36	2.24	14710				
1.30	1.35	97	23.0	5.63	1.94	14424	37.5	4.75	2.06	14535				
1.35	1.40	58	13.8	8.49	1.88	13738	51.3	5.76	2.01	14320				
1.40	1.45	23	5.5	11.08	1.88	13220	56.8	6.27	2.00	14214				
1.45	1.50	27	6.4	18.39	2.00	12144	63.2	7.50	2.00	14004				
1.50	1.55	27	6.4	21.67	2.28	11517	69.6	8.80	2.02	13775				
1.55	1.60	11	2.6	30.43	2.12	9995	72.2	9.58	2.03	13639				
1.60	1.70	21	5.0	36.42	2.16	8697	77.2	11.32	2.03	13319				
1.70	1.80	15	3.6	43.80	2.34	7389	80.8	12.77	2.05	13055				
1.80	1.90	11	2.6	49.17	2.38	6265	83.4	13.90	2.06	12843				
1.90		70	16.6	64.20	3.60	1880	100.0	22.25	2.31	11024				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake
LAB NO.: 79-32
HOLE NO.:
DATE SAMPLED: Dec. 1978
LOCATION:
DATE RECEIVED: Jan. 1979
INTERVAL: 102.1 - 105.8 (Samples 8,9, and 10)
DATE REPORTED: March 1979
RAW COAL SIZE FRACTION: +1/4"
WT.%____ ASH%____ B.T.U.:____
ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.	Wt.%	ASH%	S%	Btu./lb.
	1.30	210	11.9	6.53	0.82	13636	11.9	6.53	0.82	13636				
1.30	1.35	125	7.1	9.83	0.72	13447	19.0	7.76	0.78	13565				
1.35	1.40	346	20.5	13.06	0.80	12855	39.5	10.51	0.79	13197				
1.40	1.45	170	9.6	17.45	0.58	11950	49.1	11.87	0.75	12953				
1.45	1.50	122	6.9	23.04	0.74	10953	56.0	13.25	0.75	12707				
1.50	1.55	47	2.7	26.37	1.04	10298	58.7	13.85	0.76	12596				
1.55	1.60	45	2.5	31.92	1.06	8542	61.2	14.59	0.77	12431				
1.60	1.70	113	6.4	36.79	1.04	7550	67.6	16.69	0.80	11969				
1.70	1.80	150	8.5	47.79	1.08	6832	76.1	20.16	0.83	11395				
1.80	1.90	52	2.9	54.68	1.12	5432	79.0	21.43	0.84	11176				
1.90		372	21.0	62.60	1.20	3482	100.0	30.08	0.92	9560				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake
LAB NO.: 79-32
HOLE NO.:
DATE SAMPLED: Dec. 1978
LOCATION:
DATE RECEIVED: Jan. 1979
INTERVAL:
DATE REPORTED: March 1979
RAW COAL SIZE FRACTION: 1/4" X 28 Mesh
WT.%____ ASH%____ B.T.U.:____
ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	532	25.3	3.74	0.58	14290	25.3	3.74	0.58	14290				
1.30	1.35	263	12.5	7.51	0.68	13607	37.8	4.99	0.61	14064				
1.35	1.40	348	16.6	10.87	0.86	13147	54.4	6.78	0.69	13784				
1.40	1.45	124	5.9	16.84	0.92	12016	60.3	7.77	0.71	13611				
1.45	1.50	95	4.5	23.43	1.00	10716	64.8	8.85	0.73	13410				
1.50	1.55	73	3.5	25.19	1.10	10578	68.3	9.69	0.75	13265				
1.55	1.60	46	2.2	29.32	1.12	9563	70.5	10.30	0.76	13150				
1.60	1.70	80	3.8	37.45	1.32	7993	74.3	11.69	0.79	12886				
1.70	1.80	105	5.0	44.40	1.22	6900	79.3	13.75	0.82	12508				
1.80	1.90	68	3.2	48.20	1.48	6082	82.5	15.09	0.84	12259				
1.90		367	17.5	62.60	1.70	3446	100.0	23.40	0.99	10717				

REMARKS:

LEXCO TESTING LTD. coal washability analysis

COAL FIELD: Hamilton Lake

HOLE NO.:

LOCATION:

INTERVAL:

RAW COAL SIZE FRACTION: 28 X 100 Mech

WT.%____ ASH%____ B.T.U.:____

LAB NO.: 79 - 32

DATE SAMPLED: Dec. 1978

DATE RECEIVED: Jan. 1979

DATE REPORTED: March 1979

ANALYST:

SPECIFIC GRAVITY		ELEMENTARY					CUMULATIVE FLOAT				CUMULATIVE SINK			
SINK	FLOAT	Wt.	Wt %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S%	Btu./lb.	Wt. %	ASH %	S %	Btu./lb.
	1.30	62	15.0	2.87	0.52	14536	15.0	2.87	0.52	14536				
1.30	1.35	89	21.6	4.79	0.52	13970	36.6	4.00	0.52	14202				
1.35	1.40	42	10.2	6.90	0.64	13860	46.8	4.63	0.55	14127				
1.40	1.45	30	7.3	8.50	0.66	13563	54.1	5.16	0.56	14050				
1.45	1.50	34	8.3	12.24	0.72	12896	62.4	6.10	0.58	13898				
1.50	1.55	18	4.4	15.93	1.08	12158	66.8	6.75	0.62	13783				
1.55	1.60	12	2.9	23.36	1.64	10908	69.7	7.44	0.66	13763				
1.60	1.70	12	2.9	32.16	1.12	10813	72.6	8.42	0.68	13550				
1.70	1.80	9	2.2	42.90	1.18	7144	74.8	9.44	0.69	13360				
1.80	1.90	8	1.9	48.84	1.36	N.S.	76.7	10.41	0.71	-				
1.90		96	23.3	63.29	2.72	1819	100.0	22.73	1.18	-				

REMARKS:

Cx- Hamilton L. 78(2)A

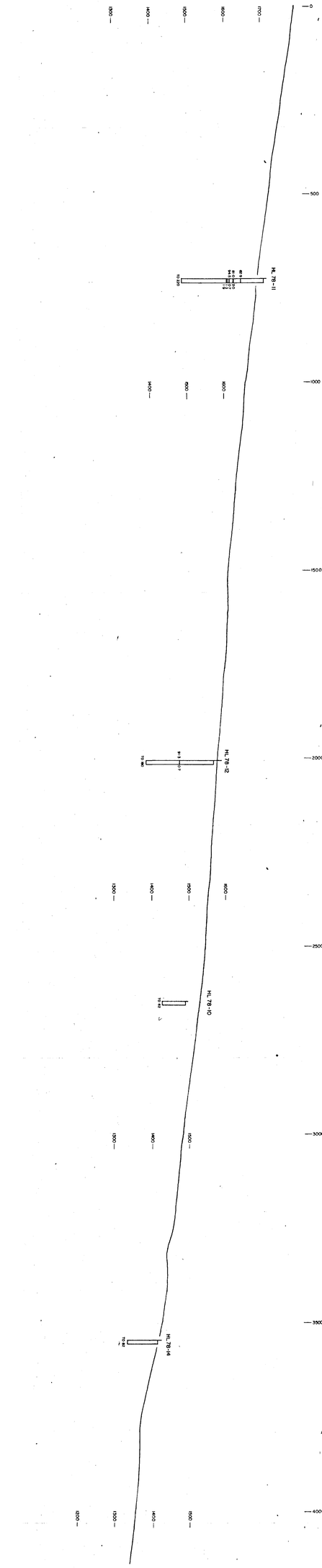
SECTIONS
AND
MAPS
by M.P CURCIO

056
(2)

SECTIONS

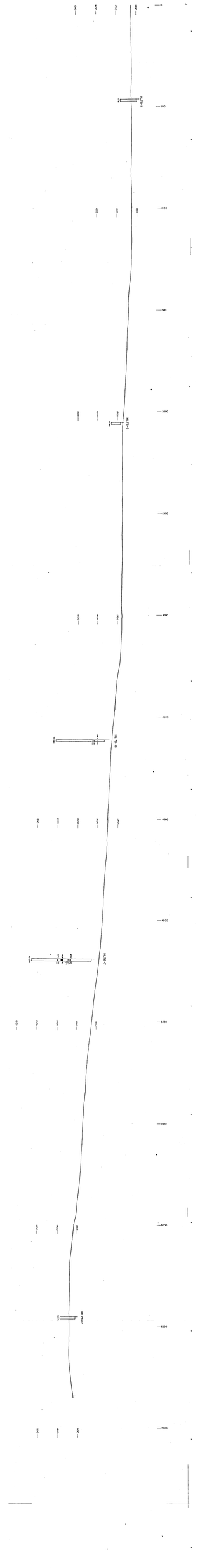
E

HAMILTON LAKE
LINE 'A'
(West → East)



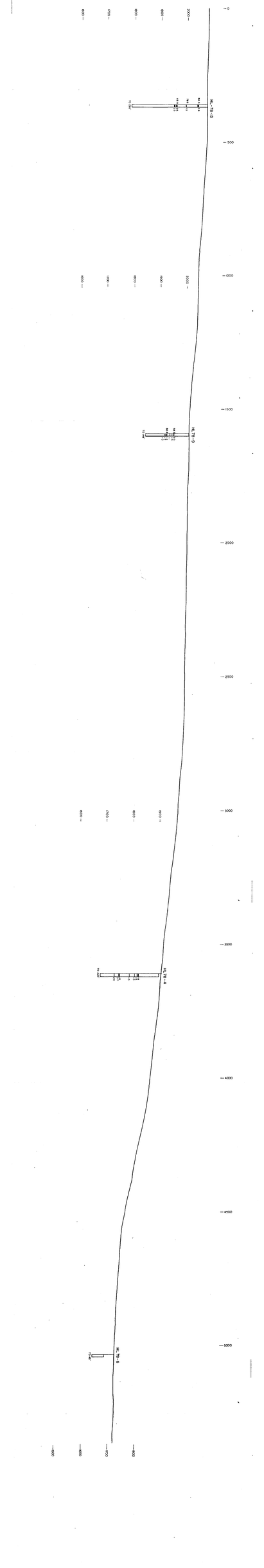
56
L.A.

HAMILTON LAKE
LINE 'B'
(North → South)



HAMILTON LAKE
LINE 'C'
(West → East)

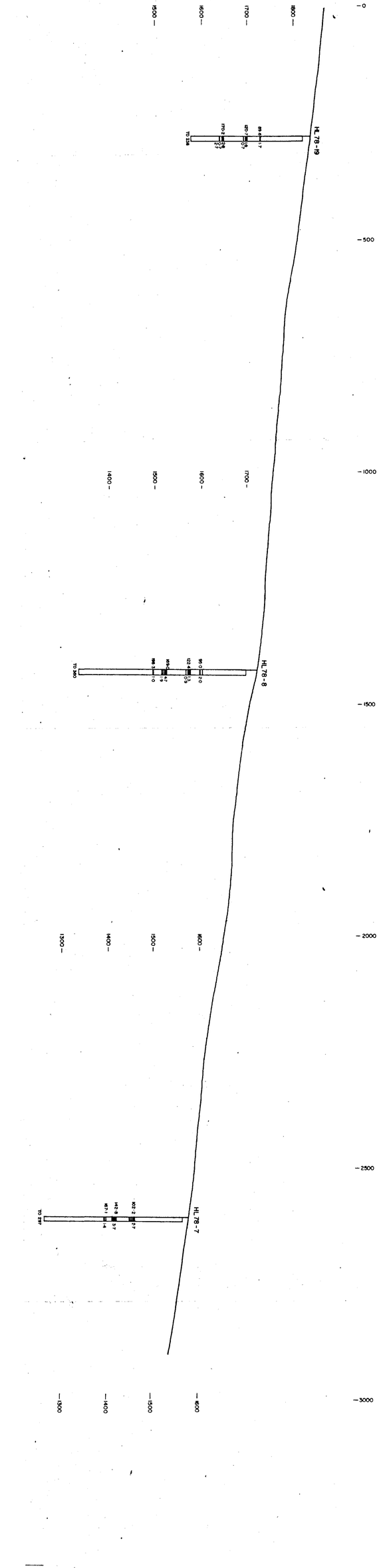
56
43



56

L4

HAMILTON LAKE
LINE 'D'
(West → East)



MAPS

CUMBERLAND AREA

COMOX LAKE

TSABLE RIVER

BEVAN

PUNTLEDGE

CUMBERLAND

PUNTLEDGE RIVER

TREMAIN CR.

TRENT RIVER

TRENT

PIGEON POND

TEAL LAKE

MAPLE LAKE

HAMILTON LAKE

BROWN'S No.2 ◎

0.9 | 79.8
1.5 | 126
0.8 | 227.6
0.3 | 235
0.6 | 266.5
0.3 | 327.6
1.0 | 382
1.1 | 395
Km | 405
T.D. | 425

BROWN'S No. 1 ◎

3 | 81
1.5 | 83
2.0 | 171.5
2.8 | 240.5
1.0 | 244
2.0 | 308
1.4 | 433
2.0 | 434.5
3.0 | 563
2.0 | 644
4.0 | 850
Km | 695
T.D. | 717

BRADLEY No.1 ◎

1.8 | 60.3
1.3 | 63
1.9 | 284
0.8 | 290
1.5 | 388.5
Tr. | 476
1.0 | 478
5.2 | 480
1.5 | 487.5
1.4 | 489.7
Km | 509
T.D. | 520

BRADLEY No.2 ◎

2.0 | 20
1.0 | 29
1.0 | 36.5
Tr. | 37
1.0 | 197
1.2 | 213
1.0 | 217
Km | 286
T.D. | 343
1.0 | 345
Km | 363
T.D. | 380

BLODEL No. 1 ◎ — N.C. — T.D. 537

TRENT — N.C. — Carb. Sh. 636 — Km 651 — T.D. 664

ALLEN ◎ — Prospect Tunnel (60') — Coal 1'-6" — Sh Coal 1'-4" — Coal 2'

SHAFT 7 — SHAFT 1

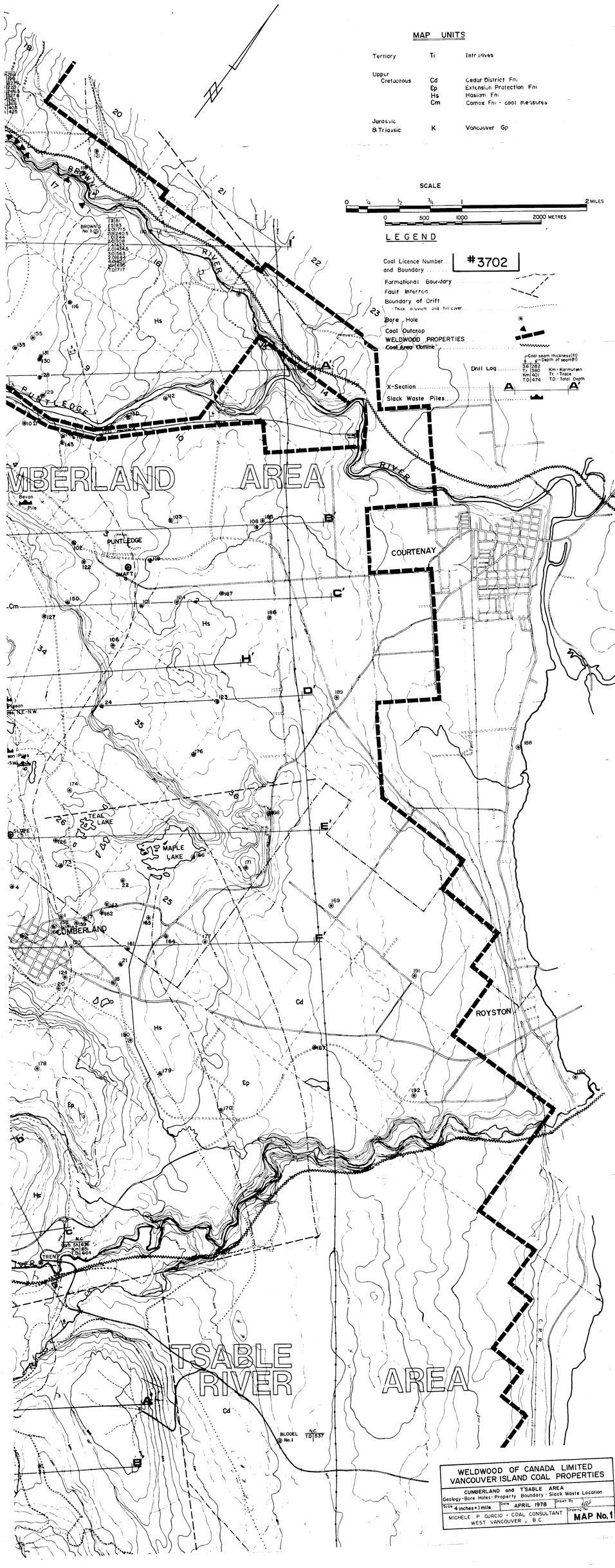
SLOPE 1 — SLOPE 2 — SLOPE 5

Bevan Pile — Comox Pile — Chinatown Pile — Pigeon Piles N.E.-N.W. — Pigeon Piles SE-SW

NC Basalt 46' — NC Basalt 266' — NC Basalt 110' — NC Basalt 320' — NC Basalt 116' — NC Basalt 92'

#3700 — #3701 — #3702 — #3703 — #3704 — #3705 — #3706 — #3707

Cm — Hs — Ti — Ep — Cd — K



WELDWOOD OF CANADA LIMITED
VANCOUVER ISLAND COAL PROPERTIES

CUMBERLAND and T'SABLE AREA
Geology - Bore Holes - Property Boundary - Slack Waste Location

Scale 4 inches = 1 mile | Date APRIL 1978 | Drawn By

MICHELE P. CURCIO - COAL CONSULTANT
WEST VANCOUVER, B.C.

Drawing No. MAP No. 1

56
m1 56(1)

A B C D E F G H J

1 2 3 4 5 6 7 8

348,000m 350,000m 352,000m 354,000m

5,496,000m 5,494,000m 5,492,000m

HAMILTON LAKE

HL78-1
Till 23.0
Km 43.8
Td 81.0

HL78-3
Till 0
4.5 70.0
6.5 85.0
4.3 101.5
Td 2990

HL78-4
Till
1.8 77.4
1.5 80.4
1.0 92.8
1.5 113.0
2.5 148.2
2.0 167.3
1.7 173.7
Td 218.0

HL78-5
Till 66.0
Km 68.0
Td 75.0

HL78-6
Till 5.0
Km 28.0
Td 43.0

HL78-7
Till 0.0
2.7 102.2
1.0 108.2
1.8 142.8
3.5 167.1
Td 297.0

HL78-8
Till 4.0
2.0 58.0
3.2 49.7
7.6 169.0
2.1 195.0
Td 358.0

HL78-9
Till 4.0
2.0 58.3
1.9 63.8
1.1 73.3
1.2 86.0
1.7 88.5
1.0 92.1
Td 189

HL78-10
Till 54.0
Km 54.0
Td 62.0

HL78-11
Till 4.0
1.0 62.4
1.4 69.8
0.8 74.8
2.0 191.7
3.0 96.8
Td 215.0

HL78-12
Till 0
Km 138.0
Td 177.0

HL78-13
Till 5.0
2.4 34.3
1.3 78.4
2.5 115.9
2.5 160.0
Td 279.0

HL78-14
Till 39.0
Km 59.0
Td 82.0

HL78-15
Till 5.0
3.0 35.8
4.5 44.8
1.0 74.1
Td 134.0

HL78-16
Till 33.0
Km 132.0
Td 140.0

HL78-17
Till 39.0
Km 59.0
Td 75.0

HL78-18
Till 4.0
1.7 34.5
1.5 50.7
2.0 94.7
Km 220.0
Td 234.0

HL78-19
Till 6.0
1.7 99.6
1.9 120.2
2.8 170.2
3.4 175.5
Td 238.0

GRID NORTH

56 56(1) m2

REFERENCE DRAWINGS	ISSUE	DATE	INIT'L	REVISIONS

WELDWOOD OF CANADA LIMITED

HAMILTON LAKE AREA

SCALE 1:5,000

	BY	DATE
DRAWN		
CHECKED		
APPROVED		
1st ISSUED		

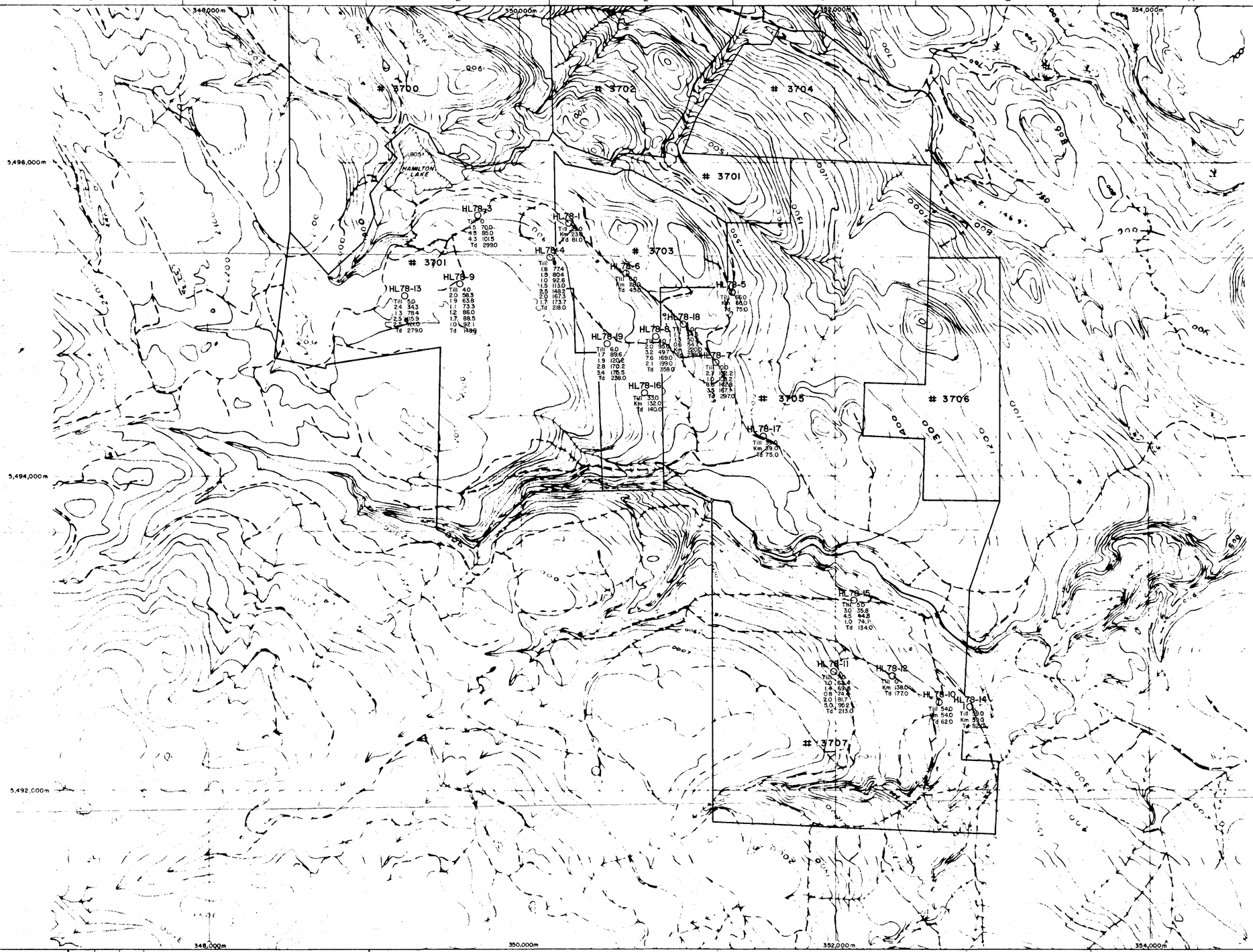
TITLE

WELDWOOD OF CANADA LIMITED
VANCOUVER ISLAND COAL PROPERTIES
HAMILTON LAKE AREA

DRILL HOLE INFORMATION MAP

DRAWING NO. 2

ISSUE



REFERENCE DRAWINGS	ISSUE	DATE	INIT'L	REVISIONS

WELDWOOD OF CANADA LIMITED

HAMILTON LAKE AREA

SCALE 1:25,000 (0 100 200 300 400 500 metres)

	BY	DATE
DRAWN		
CHECKED		
APPROVED		
1st ISSUED		

TITLE

WELDWOOD OF CANADA LIMITED
VANCOUVER ISLAND COAL PROPERTIES
HAMILTON LAKE AREA

COAL LICENCE BOUNDARIES

DRAWING NO. 3

ISSUE

56
m 3 56(1)
37

A B C D E F G H J

1 2 3 4 5 6 7 8

348,000m 350,000m 352,000m 354,000m

5,496,000m 5,494,000m 5,492,000m

3700 # 3702 # 3704 # 3701 # 3703 # 3705 # 3706 # 3707

HAMILTON LAKE

BLOCK A

BLOCK B

HL78-1 Till 22.0 Km 81.0 Td 81.0

HL78-2 Till 0 4.5 70.0 Km 85.0 4.3 101.5 Td 299.0

HL78-3 Till 0 1.8 77.4 1.6 80.4 1.0 92.6 1.5 113.0 2.5 148.5 2.0 167.3 1.7 173.7 Td 218.0

HL78-4 Till 4.0 2.0 58.3 1.9 63.8 1.1 73.3 1.2 86.0 1.9 88.5 1.0 92.1 Td 148.0

HL78-5 Till 5.0 Km 382.0 Td 453.0

HL78-6 Till 58.0 Km 680.0 Td 750.0

HL78-7 Till 10.0 2.7 100.2 1.0 [illegible] 1.8 [illegible] 3.5 167.1 Td 287.0

HL78-8 Till 10.0 1.5 40.5 2.0 58.0 3.2 [illegible] 7.6 169.0 2.1 195.0 Td 358.0

HL78-9 Till 6.0 1.7 69.6 1.9 [illegible] 2.8 176.2 3.4 [illegible] Td 238.0

HL78-10 Till 540 Km 540 Td 620

HL78-11 Till 10.0 1.0 68.4 1.4 [illegible] 0.8 [illegible] 2.0 181.7 3.0 [illegible] Td 213.0

HL78-12 Till Km 380.0 Td 1770

HL78-13 Till 30.0 2.4 [illegible] 1.3 78.4 2.5 [illegible] 2.5 [illegible] Td 279.0

HL78-14 Till 390 Km 930 Td 820.0

HL78-15 Till 60.0 3.0 [illegible] 4.5 [illegible] 1.0 [illegible] Td 134.0

HL78-16 Till 330 Km 132.0 Td 140.0

HL78-17 Till 39.0 Km 39.0 Td 75.0

HL78-18 Till 10.0 1.5 40.5 2.0 58.0 3.2 [illegible] 7.6 169.0 2.1 195.0 Td 358.0

GRID NORTH

56 (56(1) mH)

REFERENCE DRAWINGS	ISSUE	DATE	INIT'L	REVISIONS

WELDWOOD OF CANADA LIMITED

HAMILTON LAKE AREA

SCALE 1:5,000 (0 50 0 100 200 300 400 500 metres)

	BY	DATE
DRAWN		
CHECKED		
APPROVED		
1st ISSUED		

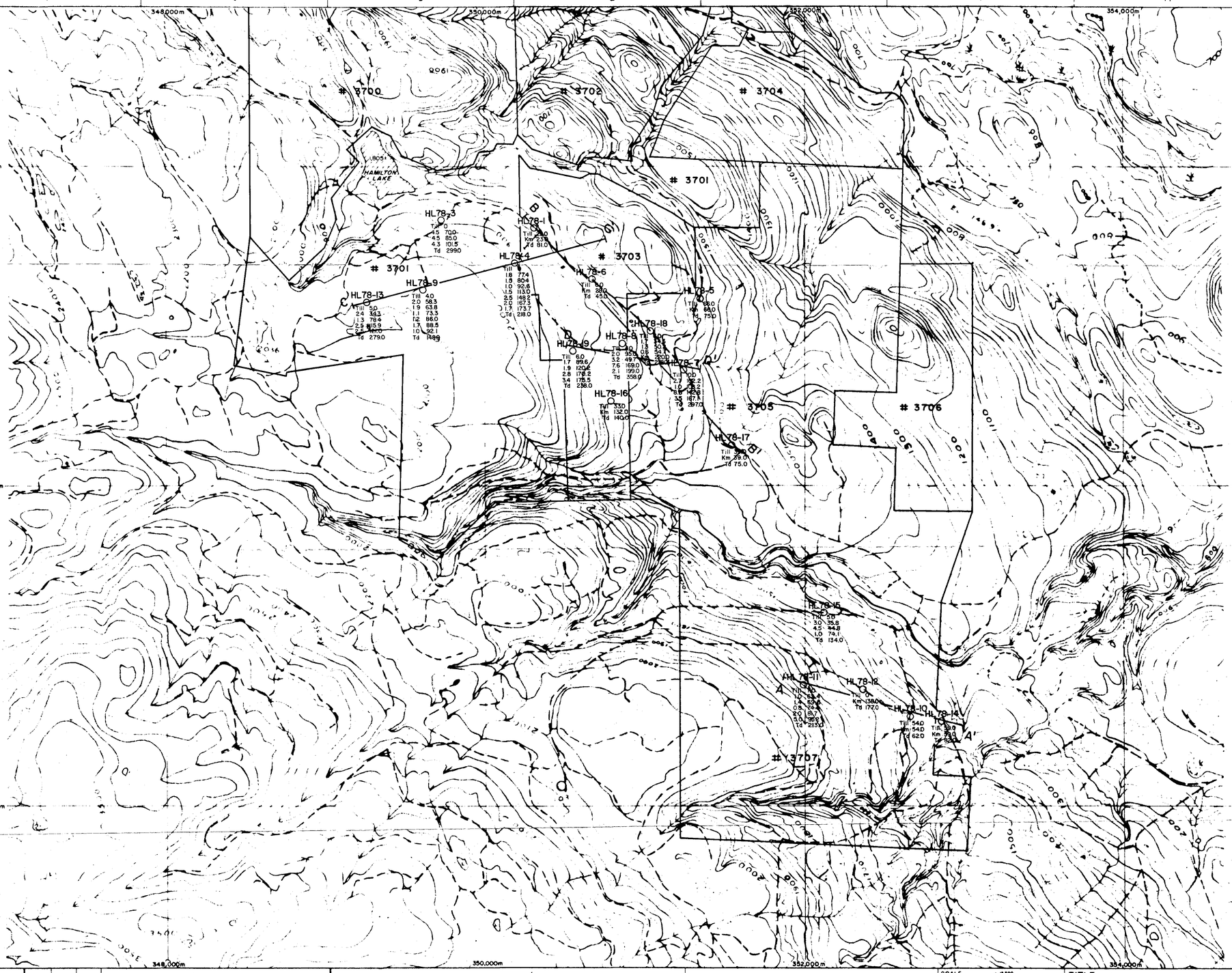
TITLE

WELDWOOD OF CANADA LIMITED
VANCOUVER ISLAND COAL PROPERTIES
HAMILTON LAKE AREA

COAL OUTLINE BOUNDARY
RESERVE MAP

DRAWING NO. 4

ISSUE



REFERENCE DRAWINGS	ISSUE	DATE	INIT.	REVISIONS

WELDWOOD OF CANADA LIMITED

HAMILTON LAKE AREA

SCALE 1:5,000

	BY	DATE
DRAWN		
CHECKED		
APPROVED		
1st ISSUED		

TITLE

WELDWOOD OF CANADA LIMITED
VANCOUVER ISLAND COAL PROPERTIES
HAMILTON LAKE AREA

SECTION LOCATION

DRAWING NO. 5

56 56(1) ms

ISSUE

DRILL LOGS

GEOPHYSICAL LOGS

CORE INTERPRETATION

D

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 12/78

COMPANY: Lexco Testing

HOLE No.: HL-78-1

APPROX. LOCATION: SEC. TWP. RGE. W.

SURVEYED LOCATION: 18030271 N - 1149295

ELEVATION: 1803'

DRILLER: J. Bly

FROM	TO	LOG	REMARKS
0	22	Till	
22	45	Gray Shale	
45	85	Besalt	

COMMENTS:

WAT[illegible] HORIZON: FT

HAMILTON LAKE

DATE Bk	Pg	C=CORED HOLE NO.	GRID LINE N	LOCATION E	ELEV.	TILL DEPTH	NO. 3 SEAM DEPTH/THICK	NO. 2 SEAM DEPTH/THICK	NO. 1 RIDER DEPTH/THICK	NO. 1 SEAM DEPTH/THICK	BASE DEPTH	LOG-GER FEET	REMARKS
21	27	HL-78-1	18,030,271'	1,149,295'	1803'								
			5495623.05M	350304.89M	'								
Scaled		HL-78-2	18029768.8'	1145729.1'	1980'								
			5495470M	349218M	'								
Scaled		HL-78-3	18030401.9'	1147435.12'	1888'								
			5495663.72M	349738M	'								
21	31	HL-78-4	18029520'	1148027'	1815'								
			5495394.17M	350192.72M	'								
Scaled		HL-78-5	18028797.7'	1152723.8	1678'								
			5495174M	351350m	'								
21	26	HL-78-6	18029208'	1150476'	1717'								
			5495299.07M	350664.86M	'								
21	33	HL-78-7	18027302'	1152353'	1580'								
			5494718.12M	351236.97M	'								
21	32	HL-78-8	18027865'	1151128'	1706'								
			5494889.73M	350863.59M	'								
Scaled		HL-78-9	18029024'	1147041'	2016'								
			5495242M	349618M									
Scaled		HL-78-10	18020267'	1157061'	1480'								
			5492574M	352672M									
Scaled		HL-78-11	18020848'	1154823'	1705'								
			5492751M	351990M									
Scaled		HL-78-12	18020877.7	1156004.68	1560'								
			5492760m	352350m									
Scaled		HL-78-13	18028718'	1145866'	2076'								
			5495150M	349260M									
Scaled		HL-78-14	18020152'	1157651'	1490'								
			5492539M	352852M									
Scaled		HL-78-15	18022380'	1155243'	1460'								
			5493218M	352118M									
Scaled		HL-78-16	18026711'	1150899'	1715'								
			5494532M	350794M									
21	33	HL-78-17	18025798.9	1153380	1501'								
			5494260m	351550m									
21	26	HL-78-18	18028123'	1151684'	1638'								
			5494968.37M	351033.06M									
21	32	HL-78-19	18027660'	1150106'	1823'								
			5494827.24M	350852.08M									

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-1

LOCATION ____ SEC. ____ TP. ____ RGE. ____ W.

AREA HAMILTON LAKE

PROVINCE B.C.

SURVEYED DATA

ELEV. 1803

LOC. 18030271 N

1149295 E

RUN No.	1	2	3
DATE	DEC 12, 1978		
DEPTH-DRILLER	80'		
DEPTH-LOGGER	80'		
FLUID LEVEL	Full		
LOGGING TIME	3 hr. [illegible]		
DRILLED BY	J. BLY		
RECORDED BY	D. DUNBAR		
WITNESSED BY	K. Monaghan		

BORE-HOLE RECORD

BIT	FROM	TO
5 5/8"	SURF	T.D.

CASING RECORD

SIZE	FROM	TO
6 1/2"	SURF	24'

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE	100Ω/div.		
TRUCK No.	2	SOURCE MODEL		HOVP	
LOCATION	COURTENAY	ISOTOPE		CS-137	
		STRENGTH		125 m C	

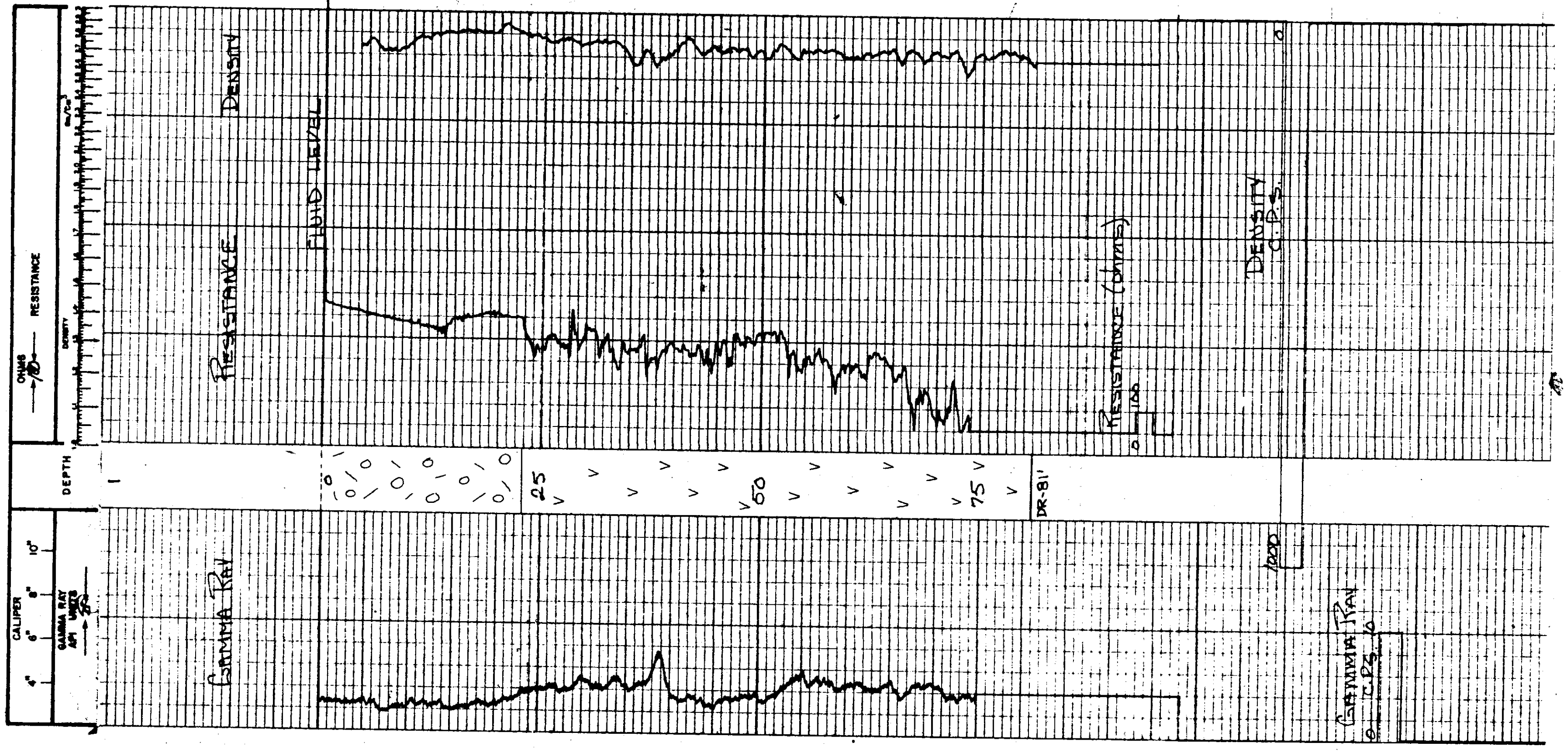
LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	GAMMA RAY T C SEC	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
1	81'	0	12	4	100		5	1	1K	

REMARKS:

56

(L1)



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 14/78

COMPANY: Lexco Testing

HOLE No.: HL-78-3

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18030401.9 - 1147435.12 E

ELEVATION: 1888'

DRILLER: J. Bly

FROM	TO	LOG	REMARKS
0	3	Till	
3	20	Gray Shale	
20	68	Gray Sandstone	
68	74	Brown Shale	
74	77	Coal	
77	104	Brown Shale	
104	112	Brown Shale with Carbonaceous Shale and	Coal traces
112	227	Gray Shale	
112	147	Gray Sandstone	
147	288	Gray Sandstone	
288	305	Red Shale	

COMMENTS: _____

WATER HORIZON: _____ FT. _____

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 15/78

COMPANY: Lexco Testing

HOLE No.: HL-78-3- Core

APPROX. LOCATION: SEC. TWP. RGE. W.

SURVEYED LOCATION: 18030401.9 N - 1147435.12 E

ELEVATION: 1888'

DRILLER: J. Bly

FROM	TO	LOG	REMARKS
0	2	Till	
2	20	Gray Shale	
20	68	Gray Sandstone	
68	74	Brown Shale	
74	77	Coal	
77	104	Gray Shale	
104	112	Gray Shale with Coal throughout	
112	114	Gray Shale	
114	115	Gray Sandstone	

COMMENTS:

WATER HORIZON: FT.

LUSCAR LTD. corehole log

Hamilton Lake - Weldwood Project
18030401.9 N - 1147435.12E 1888'

HOLE NO. HL-78-3
PAGE 1 OF 3

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
1	69	77	7.8	0.2		COAL: bright, massive, hard, possible tube mix up, not apparent on E Log	
				2.5		SILTSTONE: Medium to dark brown at lower contact, lower contact crushed, abdt. slicks, some calcite, minor coal stringers	
ample #1				3.9		COAL: bright, blocky, upper and lower contacts crushed, minor calcite on cleats, numerous slicks in crushed zones, minor visible pyrite, amber.	
ample #2				0.3		CARB. SHALE: dark brown black, crushed, up to 40% carbon	
				1.0		SILTSTONE: Medium brown, upper contact crushed, massive	
2	77	85	8.5	8.5		SILTSTONE: medium brown, massive, medium hard minor coaly fragments, some calcite on joints	
3	85	93	7.3	0.1		SILTSTONE: as above	
				1.42		COAL: bright, blocky, hard, massive,	
ample #3						calcite stringers and calcite on cleats, abdt. calcite, some slicks.	
				0.55		SILTSTONE: light brown grey, massive, medium hard.	
	TOTALS			÷	X 100 =	% REC.	SEAM
				÷	X 100 =	% TOT. REC.	SEAM(S)

LUSCAR LTD. corehole log

HOLE NO. HL-78-3
PAGE 2 OF 3

	CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
					2.45		COAL: bright, black, hard, massive,	
Sample #4							abundent calcite, minor slicks	
Sample #5					0.35		BONEY COAL: dark brown black, massive,	
							hard	
					1.53		COAL: bright, blocky, massive, hard,	
Sample #6							abundent calcite, light	
					0.5		SILTSTONE: grey brown, medium hard,	
							massive	
					0.2		BONEY COAL: as above	
Sample #7								
					0.3		COAL: as above	
	4	93	101	9.0	9.0		SILTSTONE: light grey, medium hard, massive	
	5	101	109	8.45	1.1		SILTSTONE: as above	
Sample #8					1.0		COAL: bright, blocky, massive, hard,	
							abundent calcite, some pyrite	
Sample #9					0.75		BONEY COAL: dark brown black, hard,	
							massive, layered up to 40% carbon,	
							blotchy pyrite	
Sa e #10					2.0		COAL: bright, blocky, hard, massive,	
							calcite, pyrite	
		TOTALS					÷ X 100 = % REC. SEAM	
							÷ X 100 = % TOT. REC. SEAM(S)	

LUSCAR LTD. corehole log

HOLE NO. HL-78-3

PAGE 3 OF 3

mple #11

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
6	109	115	6.45	1.75		COAL: as above	
				1.0		SILTSTONE: dark brown, massive, medium hard	
				1.3		BONEY COAL: dark brown, massive, medium hard, occasional band coal	
				0.2		COAL: bright black, hard, some calcite, some pyrite, broken	
				0.9		SILTSTONE: brown, massive, hard	
				1.25		SANDSTONE: grey brown, massive, hard, medium grained	

TOTALS		÷	X 100 =	% REC.	SEAM
		÷	X 100 =	% TOT. REC.	SEAM(S)

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL HL-78-3 | SEC. | TP. | RGE. | W | SURVEYED DATA

LOCATION | ELEV. 1868

AREA HAMILTON LAKE | LOC. 60°30'40"N 123°45'12"W

PROVINCE B.C.

RUN No. 3 | DATE 19 JUL 78

DEPTH-DRILLER 2301

DEPTH-LOGGER 2301

BTM. LOG INTER. 2301

TOP LOG INTER. SURF.

CASING-DRILLER 10¾ @ 2301

CASING-LOGGER 2301

BIT SIZE 9" | TYPE RR | FROM SURF. | TO 2301

BORE-HOLE RECORD | CASING RECORD

EQUIPMENT DATA

RESISTANCE | DENSITY | CALIPER

TOOL NO. & MODEL NO. | GAMMA RAY

DETECTOR SERIES No. 2P-516 | TOOL TYPE 3.375 | SERIAL NO. 2

SPACING 16" | LENGTH 8'

OPERATING PROCEDURE

TRUCK No. | OPERATOR COULTER MAN | RECORDED BY

LOCATION | WITNESSED BY

GENERAL

RUN | BORE-HOLE | CASING | DEPTH-DRILLER | DEPTH-LOGGER | BTM. LOG INTER. | TOP LOG INTER. | CASING-DRILLER | CASING-LOGGER | BIT SIZE | TYPE FLUID IN HOLE | DENSITY | VISCOSITY | PH | FLUID LOSS | SOURCE OF SAMPLE | RM @ MEAS. TEMP. | RMF @ MEAS. TEMP. | RMC @ MEAS. TEMP. | SOURCE OF RMF & RMC | RM @ BHT | TIME SINCE CIRC. | MAX. REC. TEMP. | EQUIP. LOCATION | RECORDED BY | WITNESSED BY

1 | 2301 | 0 | 2301 | 2301 | SURF. | 10¾ @ 2301 | 2301 | 9" | RR | 9.2 | 42 | 11 | 8.4 | 2.2 | MUD PIT | 1.2 @ 68°F | 1.0 @ 68°F | 1.6 @ 68°F | MEAS. | 0.6 @ 120°F | 12 HRS | 120°F | 2270 | JK

REMARKS

CALIPER 6" 8" 8" 10"

GAMMA RAY API UNITS 0 100

DEPTH

OHMS 1/100 RESISTANCE

DENSITY gm/cc 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

3

25

50

100

125

150

175

200

225

250

275

OR-299

RESISTANCE (OHMS) 0 100

DENSITY ORS

1000

GAMMA RAY 0 CPS 10

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 13/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-4

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 1&029520 N - 1148927 E

ELEVATION: 1915'

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	35	Sandstone	
35	45	Shale	
45	77	Sandstone	
77	80	Coal	
80	92	Brown shale	
92	96	Coal	
96	112	Brown shale	
112	116	Coal	
116	137	Shale	
137	147	Sandstone	
147	151	Coal	
151	168	Shale	
168	172	Coal	
172	175	Shale	
175	215	Sandstone	
215	220	Shale	

COMMENTS: _____

W' HORIZON: FT

EXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

1900 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

WELL AL-78-4 — SURVEYED DATA

LOCATION — SEC. TP. RGE. W — ELEV. 1815

AREA HAMILTON LAKE — LOC. 1802925.0 N 1148927 E

PROVINCE B.C.

RUN No. 2

DATE Dec 13, 1978

DEPTH-DRILLER 418'

DEPTH-LOGGER 418'

FLUID LEVEL 75' Surface

LOGGING TIME 1 HR

RECORDED BY M. VINCETT

WITNESSED BY R. CHAMBERLAIN

BIT — FROM Surface — TO T.D.

CASING RECORD — SIZE 5½" Surface — TO 10'

EQUIPMENT DATA

	GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	GP-1516			
LENGTH	36"	SPACING 16"	ME 13"	
TRUCK No.	3	GENERAL 1		
LOCATION	EDMONTON	NOR. SCALE 100 Ω/div		
		BOTTOM MODEL CSI-137		
		STRENGTH 125 m.C.		

LOGGING DATA

	RUN No.	SPEED FT/Min	T.C. SECS SETTING	ZERO API UNITS PER DIV.	T.C. SECS SETTING	ZERO
GAMMA RAY	1	12	1	5	1	0
RESISTANCE	1	12	1	100	1	0
DENSITY	1	12	1	2	1	0

REMARKS:

L3

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS → 5

DEPTH

OHMS ×100 RESISTANCE

DENSITY gm/cm³ 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

0 25 50 75 100 125 200

DR-218'

RESISTANCE (ohms) 0 100

DENSITY 2.8 0

1000

GAMMA RAY 0 C.P.S. 10

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 13/78

COMPANY: Lexco Testing Ltd.

HOLE No: HL-78-5

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18028 798.N - 1153016 E

ELEVATION: 1678

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	66	T111	
66	75	Basalt	

COMMENTS: _____

HORIZON: FT. _____

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 13/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-6

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18029208N - 1150476E

ELEVATION: 1717

DRILLER: J. bly

FROM	TO	LOG	REMARKS
0	10	till	
10	28	Grey shale	
28	45	Basalt	

COMMENTS: _____

WATER HORIZON: _____ FT. _____

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: December 12/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-7

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18027302 N ~ 1152353 E.

ELEVATION: 1580'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	10	Till	
10	38	Sandstone	
38	68	Brown Shale	
68	73	Sandstone	
73	101	Brown Shale	
101	106	Coal	
106	120	Brown Shale	
120	128	Sandstone	
128	145	Shale	
145	152	Coal	
152	170	Shale	
170	175	Coal	
175	190	Shale	
190	193	Coal	
193	245	Shale	
245	268	Sandstone	
268	300	Grey Shale.	

COMMENTS:

WATER HORIZON: ____ FT. ____

LEDCO TESTING LTD.

GAMMA - DENSITY - RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-1 SURVEYED DATA

LOCATION SEC. TP. RGE. W. E.P.

AREA Hamilton Lake LOC.

PROVINCE B.C.

DRILLED 1978

CASING RECORD

SIZE 10¾" 7⅝" 5½" 5½"

FROM 0 0 0 250'

TO 25' 250' 250' 500'

WT. LBS/FT. 40.5 29.7 17 17

GRADE J-55 J-55 J-55 J-55

CONDITION NEW NEW NEW NEW

DRILLING RECORD

BIT SIZE 7⅞"

TOP ROCK RECORD

BOTTOM HOLE RECORD

RIG

DRILLED BY

RECORDED BY

WITNESSED BY

GAMMA RAY CALIBRATION

TOOL NO. 3-1-15

DATE 3-7-78

TIME

LENGTH 3'

EQUIPMENT DATA

TOOL NO. 3-1-10

DATE 3-7-78

TIME

LENGTH 3'

DENSITY CALIBRATION

TOOL NO. 3-1-10

DATE 3-7-78

TIME

LENGTH 3'

SOURCE STRENGTH 50 mc

DENSITY CALIBRATION

DENSITY CALIBRATION

CALIPER CALIBRATION

TRUCK NO.

OPERATOR

LOGGING UNIT

GENERAL

RUN 1 2 3

DATE 3-7-78 3-7-78

DEPTH DRILLER 250' 500'

DEPTH LOGGER 250' 500'

BOTTOM LOGGED INTERVAL 250' 500'

TOP LOGGED INTERVAL 0 0

CASING DRILLER 250' 500'

CASING LOGGER 250' 500'

BIT SIZE 7⅞" 7⅞"

TYPE FLUID IN HOLE WATER WATER

DENSITY 1.00 1.00

VISCOSITY

PH

FLUID LOSS

SOURCE OF SAMPLE

RM @ MEAS. TEMP.

RMF @ MEAS. TEMP.

RMC @ MEAS. TEMP.

SOURCE RMF RMC

RM @ BHT

TIME SINCE CIRC.

MAX. REC. TEMP.

EQUIP. LOCATION

RECORDED BY

WITNESSED BY

REMARKS

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS 0 100

DEPTH

OHMS 0 100 RESISTANCE

DENSITY 2 2.5 3 3.5 Gm/Cc

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

DR-277

RESISTANCE (ohms)

0 100

DENSITY g.p.c.

2000 3

GAMMA RAY

0 API UNITS 100

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE:

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-8

APPROX. LOCATION: Hamilton Lake SEC. TWP. RGE. W.

SURVEYED LOCATION: 18027865.0 N - 1151128 E.

ELEVATION: 1706'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	4	Till	
4	95	Sandstone	
95	98	Coal	
98	117	Shale	
117	123	Coal	
123	142	Shale	
142	144	Coal	
144	168	Shale	
168	178	Coal Shale Partings	
178	205	Grey Shale	
205	237	Sandstone	
237	360	Shale	

COMMENTS:

HORIZON: FT.

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL HI-78-8 SURVEYED DATA

LOCATION AREA HAMILTON LAKE SEC. TP. RGE. W. ELEV. 3262

PROVINCE B.C. LOC. 60°12'56.5" 117°09'56.5"

RUN NO. 1 | DEPTH—DRILLER 3300 | DEPTH—LOGGER 3300 | BTM. LOG INTERVAL 3300 | TOP LOG INTERVAL 0 | CASING—DRILLER 375 @ 0 | CASING—LOGGER 375 @ 0 | TYPE FLUID IN HOLE WATER | DENS. 8.7 | VISC. 50 | PH 10 | FLUID LOSS 10 | SOURCE OF SAMPLE PIT | RM @ MEAS. TEMP. 1.70 @ 70°F | RMF @ MEAS. TEMP. 1.50 @ 70°F | RMC @ MEAS. TEMP. 1.90 @ 70°F | SOURCE OF RMF & RMC MEASURED | RM @ BHT 1.10 @ 120°F | TIME SINCE CIRC. 12 HRS | MAX. REC. TEMP. 120°F | EQUIP. LOCATION 1K | RECORDED BY C. CLAY | WITNESSED BY

RUN NO. 1 | BIT SIZE 8 3/4" | TYPE 1 | FROM 0 | TO 375' | WEIGHT 30 | GRADE J | TYPE JOINT | CASING SIZE 7" | WEIGHT 20 | GRADE J | TYPE JOINT | TOP 0 | BOTTOM 375' | CEMENT DATA 150 SKS | TOP OF CEMENT SURFACE | CASING SIZE 5 1/2" | WEIGHT 15.5 | GRADE J | TYPE JOINT | TOP 0 | BOTTOM 3300' | CEMENT DATA 200 SKS | TOP OF CEMENT 2000' | CASING SIZE 4 1/2" | WEIGHT 10.5 | GRADE J | TYPE JOINT | TOP 0 | BOTTOM 3300' | CEMENT DATA 200 SKS | TOP OF CEMENT 2000' | CASING SIZE 3 1/2" | WEIGHT 9.2 | GRADE J | TYPE JOINT | TOP 0 | BOTTOM 3300' | CEMENT DATA 200 SKS | TOP OF CEMENT 2000' | CASING SIZE 2 3/8" | WEIGHT 4.7 | GRADE J | TYPE JOINT | TOP 0 | BOTTOM 3300' | CEMENT DATA 200 SKS | TOP OF CEMENT 2000'

REMARKS

CALIPER 6" 8" 10"

GAMMA RAY API UNITS 0 100

DEPTH

OHMS RESISTANCE

DENSITY

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

8

25

50

75

100

125

150

175

200

225

250

275

300

325

350

DR-368

RESISTANCE (OHMS)

0 100

DENSITY c/cc

2000 0

GAMMA RAY

0 600 API

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 17/78.

COMPANY: Lexco Testing Ltd.

DHOLE No.: HL-78-9

APPROX. LOCATION: SEC. TWP. RGE. W.

SURVEYED LOCATION: 18029024 N - 1147041 E.

ELEVATION: 2016'

DRILLER: J. Bly.

FROM	TO	LOG	REMARKS
0	7	Till	
7	21	Grey Shale	
21	60	Grey Sandstone	
60	68	Carbonaceous Shale	
68	74.5	Grey Shale	
74.5	76	Coal	
76	87	Grey Shale	
87	89	Coal	
89	101	Grey Shale	
101	102	Coal	
102	125	Grey Shale	
125	165	Grey Sandstone	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-9 — SURVEYED DATA

LOCATION ____ SEC. TP. RGE. W. — ELEV. 2016

AREA HAMILTON LAKE — LOC. 1B029024 N

PROVINCE B.C. — 1147041 E

RUN No.	1	2	3
DATE	DEC. 17, 1978		
DEPTH-DRILLER	163'		
DEPTH-LOGGER	148'		
FLUID LEVEL	55'		
LOGGING TIME	.75 hr. total		
DRILLED BY	J. BLY		
RECORDED BY	R. RUMBAR		
WITNESSED BY	R. Konoghan		

BORE-HOLE RECORD

BIT	FROM	TO
5 7/8"	surf	T.D.

CASING RECORD

SIZE	FROM	TO
6 1/2"	surf	11'

EQUIPMENT DATA

GAMMA RAY		RESISTANCE		DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
TRUCK No.	2	HOR. SCALE	100	HOVP	
LOCATION	COURTENAY	ISOTOPE		CS-137	
		STRENGTH		125 m C	

GENERAL

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED FV/min.	T C SEC.	SENS SETTING
1	148'	0	12	4	100

LOGGING DATA

GAMMA RAY

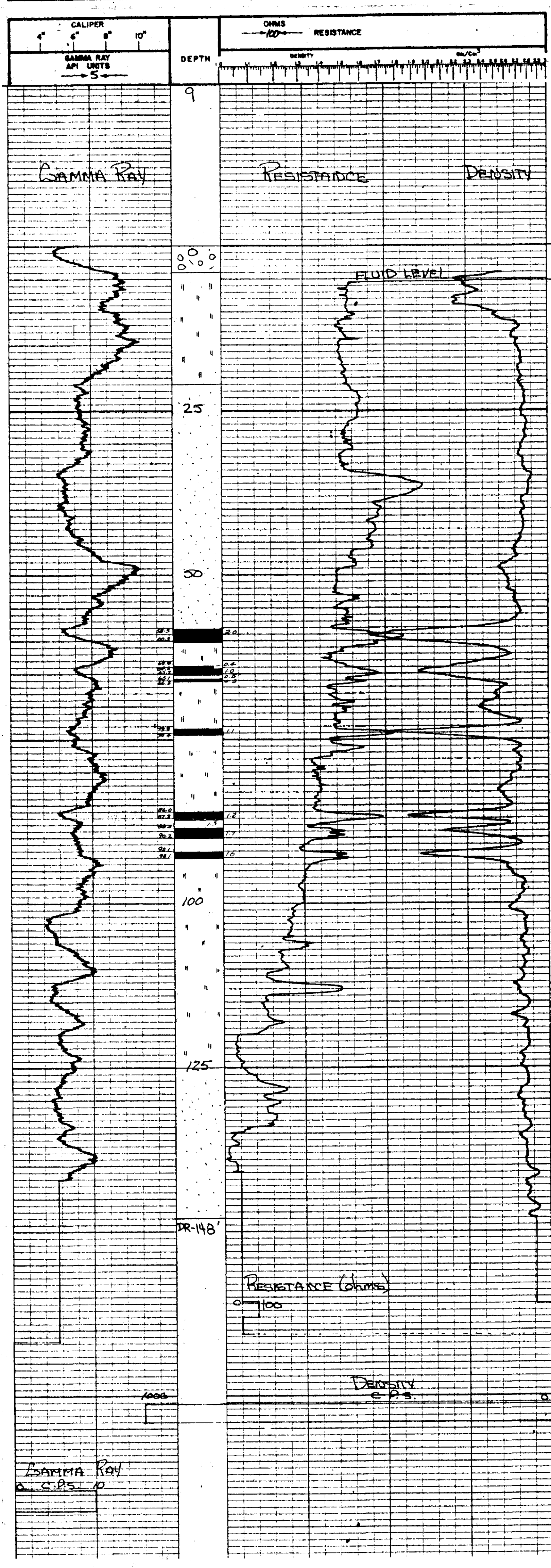
ZERO	API UNITS PER DIV.	T C SEC.	SENS SETTINGS
	5	1	1K

DENSITY

ZERO

REMARKS: # bridged at 148 feet

L6



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 11/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-10

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18,020,267 N - 1157,061 E

ELEVATION: 1480

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	54	Till	
54	62	Basalt	

COMMENTS: _____

WATER HORIZON: _____ FT. _____

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: December 10, 19u8

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-11

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18020848 N - 1154823 E.

ELEVATION: 1705'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	8	Till	
8	35	Sandstone	
35	62	Shale	
62	64	Coal	
64	94	Shale Coal Partings	
94	205	Shale	
205	220	Sandstone	

COMMENTS:

WATER HORIZON: ____ FT. ____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-11

LOCATION SEC TP RGE W

AREA Hamilton Lake

PROVINCE B.C.

SURVEYED DATA

ELEV. 1705

LOC. 6802048.8 N

1554223 E

RUN No. 2

DATE Dec. 19 1978

DEPTH-DRILLER 2496'

DEPTH-LOGGER 2495'

CASING TYPE 7" WT. 23 #

CASING DRILLER 7" @ 2496'

RECORDED BY R. Vanstone

WITNESSED BY R. Bonham

BORE-HOLE RECORD

BIT 4½" FROM Surf TO T.D.

CASING RECORD

SIZE 5½" FROM Surf TO 20'

EQUIPMENT DATA

	GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL SERIAL No.	101	1001	1001	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	1"	1"	
TYPE	SCINT	TYPE		
LENGTH	3'	SPACING	13"	
GENERAL		MONITOR		
TRUCK No. 2		SOURCE MODEL		
LOCATION Courtenay		ISOTOPE		
		STRENGTH		
		CALIBRATION DATA		
		GAMMA RAY		
		API UNITS PER DIV. 5		
		SECS SETTING 1		
		T.C. SECS ZERO 1K		

GENERAL DEPTHS

RUN No. 2 FROM 0 TO 2496

SPEED FT/MIN 12

T.C. SECS SETTING 10

REMARKS

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS → 5

OHMS ×100 → RESISTANCE

DENSITY gm/cc

DEPTH

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

WASH OUT

11

25

50

125

150

175

200

DR-215

RESISTANCE (ohms)

0 100

DENSITY c.p.s.

1000 0

GAMMA RAY c.p.s. 10

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: December 11, 1978

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-12

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18021281 N - 1156201 E

ELEVATION: 1560'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	72	Till	
72	82	Sandstone	
82	90	Shale	
90	91	Coal	
91	115	Shale	
115	134	Sandstone	
134	180	Basalt	

COMMENTS:

WATER HORIZON: ____ FT. ____

LEXCO TESTING LTD.

GAMMA-DENSITY - RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-12 — SURVEYED DATA

LOCATION SEC. TP. RGE. W — ELEV. 1560

AREA HAMILTON LAKE — LOC. 1802181 N

PROVINCE B.C. — 1156201 E

RUN No.	1	2	3
DATE	78-11-19		
DEPTH - DRILLER	180'		
DEPTH - LOGGER	177'		
BTM. LOG INTERVAL	175'		
LOGGING TIME	11:00		
DRILLED BY	H. VANCE II		
RECORDED BY	D. DAVIDSON		
WITNESSED BY			

BORE-HOLE RECORD

	FROM	TO
BIT	SURF	T.D.
SIZE	5½"	SURF

CASING RECORD

	FROM	TO
SIZE	SURF	80

EQUIPMENT DATA

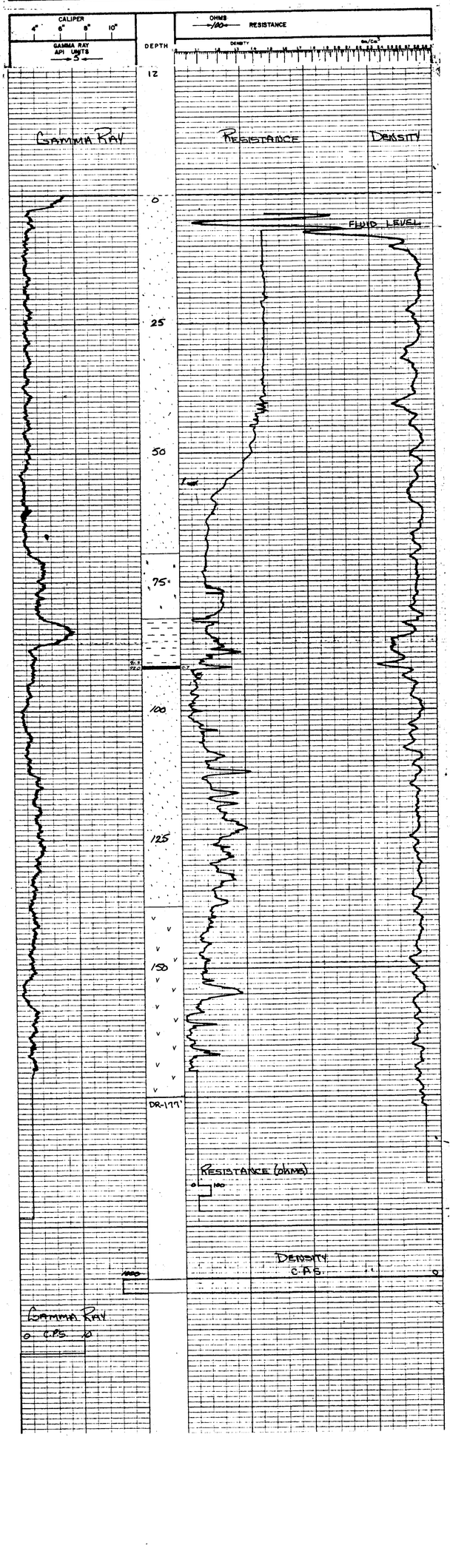
	GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-105	L-105	L-105	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	GP-516			
SHIELDING	1¼" Pb	MC	13"	
LENGTH	3'			
GENERAL				
TRUCK No.	2			
LOCATION	CALGARY			
SOURCE MODEL			CS-137	
SOURCE STRENGTH			125 mC	

LOGGING DATA

	GENERAL	GAMMA RAY	DENSITY
RUN No.	1		
FROM	177'		
TO	0		
SPEED FT/min	12		
T.C. SECS SETTING	4		
ZERO SETTING	100		
API UNITS PER DIV.		100	
T.C. SECS SETTING		1	
ZERO SETTING		1K	

REMARKS

78



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Hamilton Lake DATE: December 16/78.

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-13

APPROX. LOCATION: SEC. TWP. RGE. W.

SURVEYED LOCATION: 18028718 N - 1145866 E.

ELEVATION: 2076'

DRILLER: J. Bly.

FROM	TO	LOG	REMARKS
0	6	Till	
6	70	Grey Sandstone	
70	84	Grey Shale	
84	107	Grey Sandstone	
107	117	Grey Shale	
117	120	Coal	
120	124	Brown Shale with Coal throughout	
124	280	Grey Shale	
280	285	Basalt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-28-WB

LOCATION SEC. TP. RGE. W

AREA HAMILTON LAKE

PROVINCE B.C.

SURVEYED DATA

ELEV. 2276

LOC. 6628718 N. 1465644 E.

DATE RECORDED: Dec. 14 1978

DEPTH—DRILLER 2485'

DEPTH—LOGGER 2485'

BTM. LOGGED INTERVAL 2485'

TOP LOGGED INTERVAL 2300'

TYPE FLUID IN HOLE KCL

SALINITY PPM CL

DENSITY 9.7 LB/GAL

LEVEL FULL

MAX. REC. TEMP. 80°C

EQUIP. LOCATION 3386

RECORDED BY D. DUNDAS

WITNESSED BY

BIT	CASING RECORD		
	SIZE	FROM	TO
RUN NO. 2			
BORE-HOLE RECORD			
BIT SIZE 7 7/8"	CASING SIZE 4 1/2"	SURF.	2485'
T.D. 2485'			

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No. CDS	TOOL MODEL No.			
DIAMETER 2 1/8	DIAMETER 2 1/8			
DETECTOR MODEL No. CD-516	TYPE ME			
TYPE SCINT				
LENGTH 30"	LENGTH			

GENERAL

TRUCK No. 1

LOCATION EDMONTON

RUN NO. 1

DEPTH—DRILLER 2485'

DEPTH—LOGGER 2485'

BTM. LOGGED INTERVAL 2485'

TOP LOGGED INTERVAL 2300'

CASING—DRILLER 4 1/2" @ SURF.

CASING—LOGGER SURF.

BIT SIZE 7 7/8"

TYPE FLUID IN HOLE KCL

DENSITY 9.7 LB/GAL

MAX. REC. TEMP. 80°C

EQUIP. LOCATION 3386

RECORDED BY D. DUNDAS

WITNESSED BY

LOGGING DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
RUN NO. 1	TOOL MODEL No. CDS	TOOL MODEL No.		
RECORDED BY D. DUNDAS	DIAMETER 2 1/8	DIAMETER 2 1/8		
WITNESSED BY	DETECTOR MODEL No. CD-516	TYPE ME		
	TYPE SCINT			
	LENGTH 30"	LENGTH		
	SOURCE STRENGTH & TYPE			
	BOREHOLE CORR.			
	CASING CORR.			
	LOGGING SPEED 30 FPM			
	TIME CONSTANT 3 SEC			
	CALIBRATION DATE			
	CALIBRATION BY			

GENERAL

RUN NO. 1

RECORDED BY D. DUNDAS

WITNESSED BY

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No. CDS	TOOL MODEL No.			
DIAMETER 2 1/8	DIAMETER 2 1/8			
DETECTOR MODEL No. CD-516	TYPE ME			
TYPE SCINT				
LENGTH 30"	LENGTH			
SOURCE STRENGTH & TYPE 100 mCi Cs				
BOREHOLE CORR.				
CASING CORR.				
LOGGING SPEED 30 FPM				
TIME CONSTANT 3 SEC				
CALIBRATION DATE				
CALIBRATION BY				

GAMMA RAY

RUN NO.	DEPTH—DRILLER	DEPTH—LOGGER	BTM. LOGGED INTERVAL	TOP LOGGED INTERVAL	CASING—DRILLER	CASING—LOGGER	BIT SIZE	TYPE FLUID IN HOLE	DENSITY	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY	WITNESSED BY
1	2485'	2485'	2485'	2300'	4 1/2" @ SURF.	SURF.	7 7/8"	KCL	9.7 LB/GAL	80°C	3386	D. DUNDAS	

DENSITY

RUN NO.	DEPTH—DRILLER	DEPTH—LOGGER	BTM. LOGGED INTERVAL	TOP LOGGED INTERVAL	CASING—DRILLER	CASING—LOGGER	BIT SIZE	TYPE FLUID IN HOLE	DENSITY	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY	WITNESSED BY
1	2485'	2485'	2485'	2300'	4 1/2" @ SURF.	SURF.	7 7/8"	KCL	9.7 LB/GAL	80°C	3386	D. DUNDAS	

REMARKS

L-9

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS 0 5

OHMS 100 RESISTANCE

DENSITY gm/cc

DEPTH

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

9

25

50

75

100

125

150

175

200

225

250

DR-279'

RESISTANCE (ohms) 0 100

DENSITY C.P.S. 0

1000

GAMMA RAY C.P.S. 0

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 9/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-14

APPROX. LOCATION: Hamilton Lake SEC. TWP RGE. W.

SURVEYED LOCATION: 18020152 N - 1157651 E

ELEVATION: 1400'

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	59	Till	
59	82	Basalt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: December 17/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-15

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18022380 N - 1155243 E.

ELEVATION: 1460'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	3	Till	
3	16	Brown Shale	
16	32	Grey Shale	Shattered formation at 32'.
32	46	Brown Shale	
46	49	Coal	
49	125	Grey Brown Shale	
125	130	Red Shale	
130	167	Grey Green Shale	
167	170	Basalt	

COMMENTS: ____

WATER HORIZON: ____ FT. ____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-15

LOCATION ____ SEC ____ TP ____ RGE ____ W

AREA HAMILTON LAKE

PROVINCE B.C.

SURVEYED DATA

ELEV. 1460

LOC. 18022380 N

1155243 E

RUN No.	1	2	3
DATE	Dec. 17, 1978		
DEPTH-DRILLER	170'		
DEPTH-LOGGER	134'		
FLUID LEVEL	11.5'		
LOGGING TIME	.75 hr. (est.)		
DRILLED BY	H. Vincent		
RECORDED BY	R. Dumaine		
WITNESSED BY	R. Monaghan		

BORE-HOLE RECORD

BIT	FROM	TO
4½"	Surf	T.D.

CASING RECORD

SIZE	FROM	TO
5½"	Surf	20'

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	ME	F	
TYPE	SCINT	SPACING	13"	
LENGTH	3"	1"		

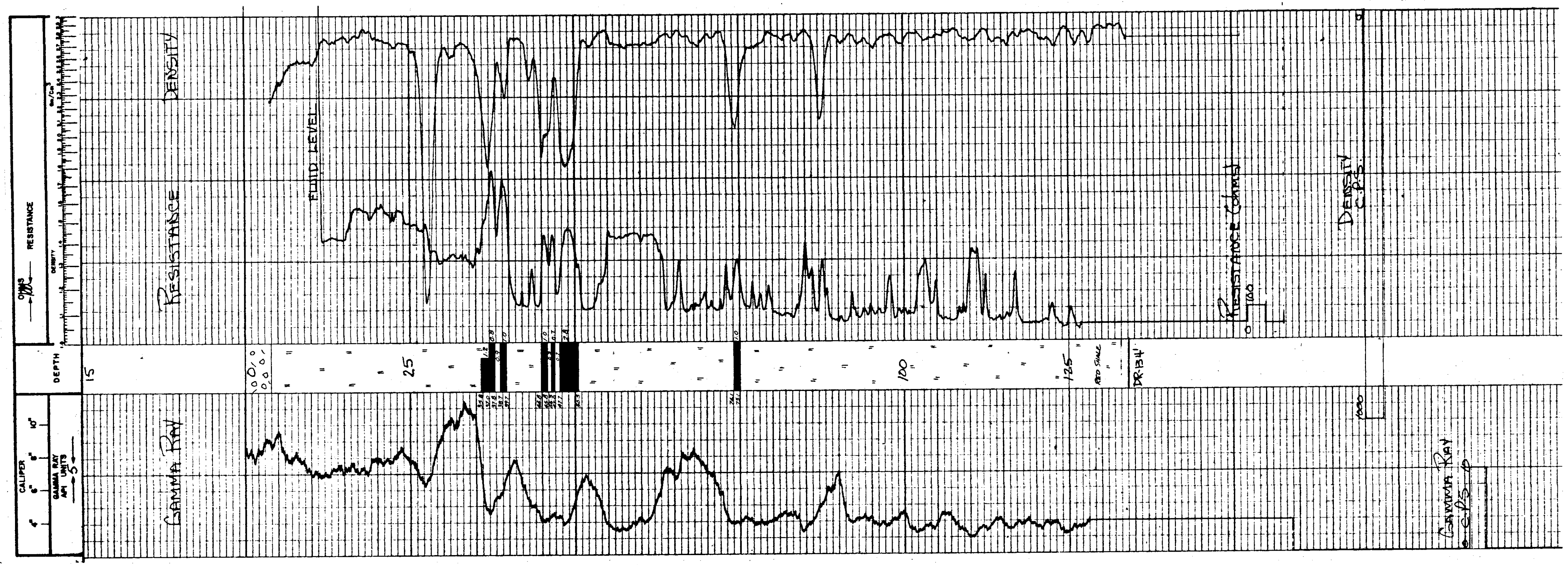
GENERAL			
TRUCK No.	2	HOR SCALE	100 ft/in.
LOCATION	Courtenay	ISOTOPE	CS-137
		STRENGTH	125 mC

LOGGING DATA

GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
1	134'	0	12	@	100		5	1	1K	

REMARKS: - wash out between 27-29 feet
- bridged at 134 feet

L10



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: December 15/78.

COMPANY: Lexco Testing Ltd.

HOLE No: HL-78-16

APPROX. LOCATION: Hamilton Lake SEC. TWP. RGE. W.

SURVEYED LOCATION: 18026711 N - 1150899 E.

ELEVATION: 1715'

DRILLER: H. Vincett.

FROM	TO	LOG	REMARKS
0	33	Till	
33	35	Sandstone	
35	132	Shale	
132	140	Basalt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE HL-78-16

LOCATION _____ SEC _____ TP _____ RGE _____ W

AREA HAMILTON LAKE

PROVINCE B.C.

SURVEYED DATA

ELEV. 1715

LOC. 18026711 N

1150899 E

RUN No.	1	2	3
DATE	Dec 15, 1978		
DEPTH-DRILLER	140'		
DEPTH-LOGGER	138'		
FLUID LEVEL	17'		
LOGGING TIME	.5 hr. tot.		
DRILLED BY	H. VINCETT		
RECORDED BY	D. DUNSMORE		
WITNESSED BY	R. KOSTACHUK		

BORE-HOLE RECORD

BIT	FROM	TO
4½"	Surf	T.D.

CASING RECORD

SIZE	FROM	TO
3½"	Surf	40'

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		

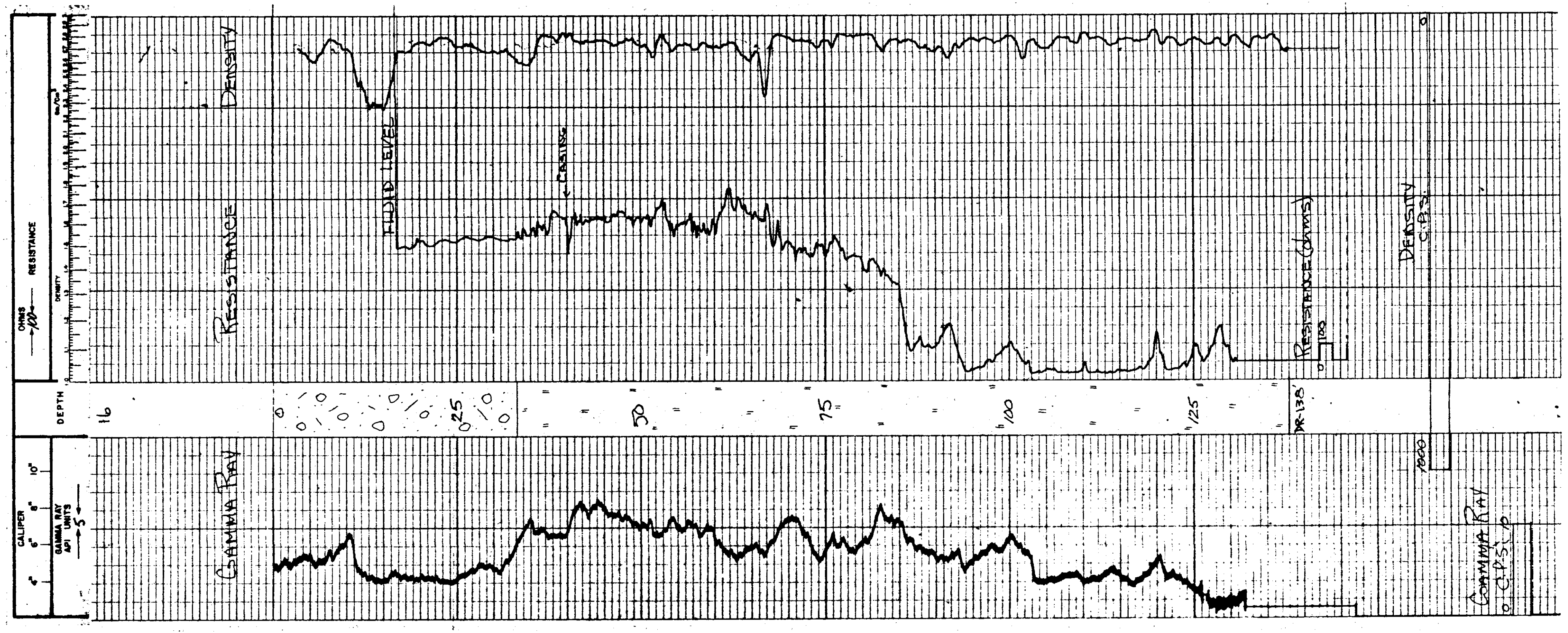
GENERAL		GENERAL		
TRUCK No.	6	HOR. SCALE	100'/in	
LOCATION	Courtenay	SOURCE MODEL		HOVP
		ISOTOPE		CS-137
		STRENGTH		125 m C

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC	DENSITY SENS SETTINGS	DENSITY ZERO
1	138	0	12	4	100		5	1	1K	

REMARKS:

L11



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 13/78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-17

APPROX. LOCATION: Hamilton Lake SEC. TWP. RGE. W.

SURVEYED LOCATION: 18025924N - 1153415

ELEVATION: 1501

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	39	Till	
39	75	Basalt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 16./78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-18

APPROX. LOCATION: Hamilton Lake SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 18028123N - 1151684E

ELEVATION: 1638'

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	6	Till	
6	34	Sandstone	
34	37	Shale	
37	39	Coal	
39	51	Shale	
51	53	Coal	
53	55	Shale	
55	57	Coal	
57	72	Shale	
72	76	Sandstone	
76	125	Shale	
125	222	Sandstone	
222	240	Basalt	

COMMENTS: ____

WATER HORIZON: ____ FT. ____

LEXCO TESTING LTD.

GAMMA - DENSITY - RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE HL-78-18

LOCATION SEC. TP. RGE. W

AREA Hamilton Lake

PROVINCE B.C.

SURVEYED DATA

ELEV. 1858

LOC. 6826123 N / 1151484 E

DATE Dec 14-1978

DEPTH - DRILLER 240'

DEPTH - LOGGER 238'

FLUID LEVEL 75' Jan 7/79

CASING RECORD 5" @ 238'

RECORDED BY D. Dunbar

WITNESSED BY D. Douglas

RUN	BIT	FROM	TO	CASING RECORD	FROM	TO
1	5"	Surf	T.D.	5"	Surf	10'

GENERAL

RUN No. 1

DATE Jan 7/79

DEPTH DRILLER 238'

DEPTH LOGGER 0

TOP LOGGED INTERVAL 12'

BTM LOGGED INTERVAL 120'

TYPE FLUID IN HOLE

SALINITY PPM

DENSITY

LEVEL

SOURCE OF SAMPLE

RM @ MEAS. TEMP.

RMF @ MEAS. TEMP.

RMC @ MEAS. TEMP.

SOURCE RMF RMC

RM @ BHT

TIME SINCE CIRC.

MAX. REC. TEMP.

EQUIP. LOCATION

RECORDED BY

WITNESSED BY

TOOL MODEL No.

GAMMA RAY

DETECTOR MODEL No.

TYPE

LENGTH

HOR. SCALE MODEL

CONSTANT

CALIBRATION

DATE

GAMMA RAY SOURCE STRENGTH

RESISTANCE

TOOL MODEL No.

ELECTRODE SPACING

DIAMETER

TYPE

LENGTH

DENSITY

TOOL MODEL No.

DIAMETER

TYPE

LENGTH

CALIPER

REMARKS

RUN	DATE	DEPTH DRILLER	DEPTH LOGGER	BOTTOM LOGGED INTERVAL	TOP LOGGED INTERVAL	TYPE FLUID IN HOLE	SALINITY PPM	DENSITY	LEVEL
1	Jan 7/79	238'	0	12'	120'				

RUN	SOURCE OF SAMPLE	RM @ MEAS. TEMP.	RMF @ MEAS. TEMP.	RMC @ MEAS. TEMP.	SOURCE RMF RMC	RM @ BHT	TIME SINCE CIRC.	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY	WITNESSED BY
1											

RUN	GAMMA RAY TOOL MODEL No.	GAMMA RAY DETECTOR MODEL No.	GAMMA RAY TYPE	GAMMA RAY LENGTH	GAMMA RAY HOR. SCALE MODEL	GAMMA RAY CONSTANT	GAMMA RAY CALIBRATION DATE	GAMMA RAY SOURCE STRENGTH	RESISTANCE TOOL MODEL No.	RESISTANCE ELECTRODE SPACING	RESISTANCE DIAMETER	RESISTANCE TYPE	RESISTANCE LENGTH	DENSITY TOOL MODEL No.	DENSITY DIAMETER	DENSITY TYPE	DENSITY LENGTH	CALIPER
1			3 1/8"	CP-38-6	20'						2 1/8"		15'					

RUN	GAMMA RAY SENSITIVITY	GAMMA RAY ZERO	RESISTANCE SENSITIVITY	RESISTANCE ZERO	DENSITY SENSITIVITY	DENSITY ZERO
1	3 PER DIV	1 DIV	1 K	3 DIVISIONS	1 K	3 DIVISIONS

RUN	REMARKS
1	123 mC

L/B

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS → 3

DEPTH

OHMS ←20 RESISTANCE

DENSITY gm/cc 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9

18

GAMMA RAY

RESISTANCE

DENSITY

FLUID LEVEL

25

75

100

125

150

175

200

225

RESISTANCE (OHMS)

100

DR-238'

DENSITY C.P.S.

1000

0

GAMMA RAY

0 C.P.S. 0

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: Courtenay DATE: Dec. 16./78

COMPANY: Lexco Testing Ltd.

HOLE No.: HL-78-19

APPROX. LOCATION: Hamilton Lake SEC. TWP. RGE. W.

SURVEYED LOCATION: 18027660N-1150106E

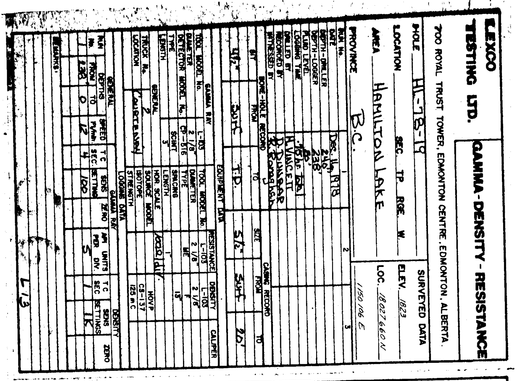
ELEVATION: 1823'

DRILLER: H. Vincett

FROM	TO	LOG	REMARKS
0	6	Till	
6	87	Sandstone	
87	89	Shale	
89	94	Coal	
94	120	Shale	
120	123	Coal	
123	126	Shale	
126	128	Coal	
128	170	Shale	
170	173	Coal	
173	176	Shale	
176	179	Coal	
179	225	Sandstone	
225	238	Basalt	

COMMENTS:

WATER HORIZON: FT.


LEXCO
TESTING LTD.
GAMMA-DENSITY-RESISTANCE
700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.
WELL HL-78-19
LOCATION
AREA HAMILTON LAKE
SEC. TP. RGE. W
SURVEYED DATA
ELEV. 1823
LOC. 1180.04 E 1180.04 E
PROVINCE B.C.
RUN No. 1
DEPTH-DRILLER 2345
DEPTH-LOGGER 2340
BTM. LOG INTERVAL 2340
TOP LOG INTERVAL SURFACE
CASING-DRILLER 10 3/4" @ 10
CASING-LOGGER 10
BOTTOM HOLE TEMP. 80°F
RECORDED BY D. DAMAGER
WITNESSED BY MR. CONNOLLY
RUN No. 2
DEPTH-DRILLER 2345
DEPTH-LOGGER 2340
BTM. LOG INTERVAL 2340
TOP LOG INTERVAL SURFACE
CASING-DRILLER 10 3/4" @ 10
CASING-LOGGER 10
BOTTOM HOLE TEMP. 80°F
RECORDED BY D. DAMAGER
WITNESSED BY MR. CONNOLLY
RUN No. 3
DEPTH-DRILLER
DEPTH-LOGGER
BTM. LOG INTERVAL
TOP LOG INTERVAL
CASING-DRILLER
CASING-LOGGER
BOTTOM HOLE TEMP.
RECORDED BY
WITNESSED BY
GAMMA RAY
TOOL MODEL No. C-170
DETECTOR MODEL No. SP-516
TYPE
LENGTH 8'6"
RUN 1
SCALE 200
RUN 2
SCALE 200
RUN 3
SCALE
EQUIPMENT DATA
RESISTANCE
TOOL MODEL No. 2 1/8"
TYPE MF
LENGTH 13'
RUN 1
SCALE 20
RUN 2
SCALE 20
RUN 3
SCALE
DENSITY
TOOL MODEL No. 2 1/8"
TYPE
LENGTH
RUN 1
SCALE
RUN 2
SCALE
RUN 3
SCALE
CALIPER
TOOL MODEL No. CB-1137
RUN 1
RUN 2
RUN 3
GENERAL
LOGGING UNIT No. 5
OPERATOR R. MACKENZIE
TRUCK No. 1K
DEPTH FT. 0 TO 2340
SPEED F.P.M. 30
TIME CONSTANT SEC. 1
STRENGTH MUD RESIST. OHMS @ 70°F 2.2
MUD WT. LBS/GAL 9.1
VISCOSITY SEC. 45
FLUID LOSS CC. 15
SOURCE STRENGTH GAMMA RAY 10 MC
DENSITY SOURCE STRENGTH 225 MC
ZERO SET GAMMA RAY 10
RESISTANCE 5
DENSITY 10
CALIPER 10
REMARKS
RUN No. 1
DEPTH TO 2340
BIT SIZE 9 7/8"
CASING SIZE 10 3/4" @ 10
WEIGHT 32.75
GRADE K-55
TYPE JOINT ST&C
CASING FLUID
TOP OF CEMENT SURFACE
BOTTOM OF CEMENT 10
CALIPER
4" 6" 8" 10"
GAMMA RAY API UNITS 0
DEPTH
OHMS RESISTANCE
DENSITY
GAMMA RAY
RESISTANCE
DENSITY
FLUID LEVEL
19
25
50
75
100
125'
150
175'
200
225
DR-238'
RESISTANCE (ohms)
0
100
DENSITY C.P.S.
1000
0
GAMMA RAY C.P.S.
0

COAL QUALITY

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 056 (4)

III. Corehole #3

HAMILTON LAKE

Lab #	Sample	Interval	Basis	Moist.	Ash	Vol. Matter	Fixed Carbon	Sulfur	Btu/lb
79-21	2	(83.6-83.9)	A.D.	0.48	64.89	17.04	17.59	1.10	3516
79-22	3	(85.1-86.52)	A.D.	0.44	34.94	27.00	37.62	1.60	8489
79-23	4	(87.07-89.52)	A.D.	0.36	24.12	31.13	44.39	1.76	10909
79-24	5	(89.52-89.87)	A.D.	0.49	59.82	19.79	19.90	2.28	4829
79-26	7	(91.8-92.3)	A.D.	0.59	49.97	23.28	26.16	0.46	6593
79-27	8	(102.1-103.1)	A.D.	0.44	13.43	31.30	54.83	0.60	12884
79-28	9	(103.1-103.85)	A.D.	0.54	53.35	21.80	24.31	0.92	5444
79-29	10	(103.85-105.85)	A.D.	0.47	18.84	29.56	51.13	0.72	12040

LEXCO TESTING LTD. screen size analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-25

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECIEVED: Jan. 1979

INTERVAL: 89.87-91.30 (sample 6) DATE REPORTED: March 1979

TYPE: CORE: X CHANNEL: CHIP:

ANALYST:

RAW COAL	MOISTURE%	ASH%	VOLATILE MATTER	FIXED CARBON	TOTAL SULPHUR	CALORIFIC VALUE	F.S.I.
	0.32	12.58	32.80	54.30	1.78	13320	7½

SIZE	Wt.(grams)	Wt.%	ASH%	
+2"				
2"x1"	0	0.0		
1"x3/4"	0	0.0		
3/4"x1/2"	60	3.0		
1/2"x1/4"	402	20.1		
1/4"x8 MESH	680	34.0		
8 x28MESH	578	28.9		
28x100 MESH	235	11.7		
100xOMESH	45	2.3		

COMMENTS:

LEXCO TESTING LTD. screen size analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-30

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECIEVED: Jan. 1979

INTERVAL: 107.10-109.1 (Sample 11) DATE REPORTED: March 1979

TYPE: CORE: X CHANNEL: CHIP:

ANALYST:

RAW COAL	MOISTURE%	ASH%	VOLATILE MATTER	FIXED CARBON	TOTAL SULPHUR	CALORIFIC VALUE	F.S.I.
	0.46	34.47	26.00	39.07	0.36	9318	4½

SIZE	Wt.(grams)	Wt.%	ASH%	
+2"				
2"x1"	8	0.2		
1"x3/4"	106	2.5		
3/4"x1/2"	518	12.3		
1/2"x1/4"	1196	28.5		
1/4"x8 MESH	1098	26.1		
8 x28MESH	781	18.6		
28x100 MESH	383	9.1		
100 x0 MESH	114	2.7		

COMMENTS:

LEXCO TESTING LTD. screen size analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-31

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECIEVED: Jan. 1979

INTERVAL: 85.1-89.52(Sample 3 & 4) DATE REPORTED: Mar. 1979

TYPE: CORE: X CHANNEL: CHIP:

ANALYST:

RAW COAL	MOISTURE%	ASH%	VOLATILE MATTER	FIXED CARBON	TOTAL SULPHUR	CALORIFIC VALUE	F.S.I.
	0.43	27.20	30.31	42.06	1.50	10585	6½

SIZE	Wt.(grams)	Wt.%	ASH%	
+2"				
2"x1"	0	0.0		
1"x3/4"	89	1.7		
3/4"x1/2"	507	9.8		
1/2"x1/4"	1413	27.4		
1/4"x8 MESH	1430	27.8		
8 x28MESH	1069	20.8		
28x100 MESH	515	10.0		
100xO MESH	129	2.5		

COMMENTS:

LEXCO TESTING LTD. screen size analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-32

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECIEVED: Jan. 1979

INTERVAL: 102.1-105.8(Samples 8,9,10) DATE REPORTED: March 1979

TYPE: CORE: X CHANNEL: CHIP:

ANALYST:

RAW COAL	MOISTURE%	ASH%	VOLATILE MATTER	FIXED CARBON	TOTAL SULPHUR	CALORIFIC VALUE	F.S.I.
	0.46	27.41	27.22	44.91	0.90	10166	5½

SIZE	Wt.(grams)	Wt.%	ASH%	
+2"				
2"x1"	42	0.9		
1"x3/4"	261	5.4		
3/4"x1/2"	501	10.3		
1/2"x1/4"	1106	23.9		
1/4"x8 MESH	1311	27.0		
8 x28MESH	939	19.4		
28x100 MESH	500	10.3		
100xOMESH	138	2.8		

COMMENTS:

LEXCO TESTING LTD. screen size analysis

COAL FIELD: Hamilton Lake LAB NO.: 79-20

HOLE NO.: DATE SAMPLED: Dec. 1978

LOCATION: DATE RECIEVED: Jan. 1979

INTERVAL: 79.7 - 83.6 (Sample 1) DATE REPORTED: March 1979

TYPE: CORE: X CHANNEL: CHIP:

ANALYST:

RAW COAL	MOISTURE%	ASH%	VOLATILE MATTER	FIXED CARBON	TOTAL SULPHUR	CALORIFIC VALUE	F.S.I.
	0.45	20.49	31.48	47.58	2.38	11690	7.0

SIZE	Wt.(grams)	Wt.%	ASH%	
+2"				
2"x1"	0	0.0		
1"x3/4"	48	0.9		
3/4"x1/2"	267	5.3		
1/2"x1/4"	1118	22.3		
1/4"x8 MESH	1670	33.2		
8 x28MESH	1244	24.8		
28x100 MESH	560	11.2		
100xO MESH	117	2.3		

COMMENTS:

GEOLOGY & COAL RESERVES
HAMILTON LAKE AREA
CUMBERLAND, B.C.

SUBMITTED BY: MICHELE P. CURCIO

DATE: MAY, 1979.

HAMILTON LAKE

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HAMILTON LAKE

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HAMILTON LAKE

INTRODUCTION - LOCATION

TOPOGRAPHY & DRAINAGE

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GROUNDWATER REGIME

SURFICIAL GEOLOGY

GEOLOGY

HAMILTON LAKE

INTRODUCTION

During 1978, exploration work was conducted on Coal Licenses 3699 to 3708 inclusive. Nineteen drill holes were constructed within the Comox Group to compliment the work carried out in 1975, contained in the report entitled "Coal Resource Study of Comox Basin - Nanaimo Series, Vancouver Island, British Columbia" (Curcio) and the coal quality adit of 1976-1977. The results of the latter are contained in this report, and constitute the quality of the coal in the area.

Two areas, Block "A" and Block "B" were defined as having mineable coal seams by open cut mining methods.

The average seam thickness throughout both Blocks was calculated to be 10.2 feet of clean coal, and this could be extracted within an average overburden ratio of 7.38:1.

LOCATION

The coal bearing Comox Group of Hamilton Lake is located south and east of Hamilton Lake, which is the water supply for the Village of Cumberland.

The Coal Licenses are located on Blocks 625, 354, 409, 546, 703, 523, 337, 1026 and on Lot 25; all in the Nelson District. Hamilton Lake is 1.5 miles south of Comox Lake. Access to the site is by gravel road, eight miles west of Royston.

TOPOGRAPHY & DRAINAGE

All of the exploration was conducted on the Comox Basin sediments at elevations of 1000' to 1800' A.S.L.

Drainage of the area is to the north and east into the natural watercourse, which discharges Hamilton Lake.

The topography rises rapidly to the west from the roadway, which is the commencement of the Comox Sediments until it abuts the older volcanic series, a distance of approximately one-half mile.

TECHNICAL INVESTIGATION

All aspects of the exploration program including drilling, coring, survey and laboratory services were under contract to Lexco Testing Ltd., a subsidiary of Luscar Ltd. of Edmonton, Alberta.

Drilling equipment consisted of two rotary drills, using downhole hammers for subsurface penetration, and in the case of coring, employed a Christiensen core barrel.

GROUNDWATER REGIME

The absence of clay sustained depths of overburden, resulted in no significant amount of groundwater in the area explored. There were no flowing holes and the most groundwater encountered was in the deeper glacial till of holes 78-5 and 78-14, where flows of less than one-half of one imperial gallons per minute were recorded.

SURFICIAL GEOLOGY

Glacial overburden over the mining Blocks "A" & "B" is very thin, ranging from 3 feet to 10 feet in thickness and consisting of sandy clay till.

Between the two Blocks, the coal has been eroded and Glacio-fluvial action in this area has resulted in sand layers and fine gravelly layers through the till section. (Holes 78-16, 78-17)

GEOLOGY

All of the coal occurs within the Comox Group, located on Blocks 523, 703 and 1026, as well as Lot 25. The Comox beds are down thrown against Karmutsen lavas.

Two outliers and fault sectors on the higher ground near Hamilton Lake and the Trent River are the sediments explored and found to contain coal seams of economic importance. Totally surrounding these two ouliers are Karmutsen Basalt.

The details of the structure and stratigraphy are outlined in the "Coal Resource Study" - 1975 (Curcio). Thickness of the Comox in both areas would average 300 feet. Directly along the east boundary of the Basalt, in the Comox Basin there is a major north-south fault, extending from Brown's River through the east boundary of Comox Lake, thence south through Allen Lake to the Trent River. A major down through of 200 feet occurs beyond. There are four seams of improtance throughout both outliers, with some of the seams being split, as a result of faulting and stress.

GEOLOGY, cont'd.

In Hamilton Lake, there are four main cycles of coal deposition. The coal seams are confined to a stratigraphic sequence of shales and interbedded coals. Though the direction of sedimentation between the coal seams will differ slightly, the overall direction appears to be to the southeast. This is indicated by individual seams splaying and thinning in the direction of sedimentation.

B

RESERVE AND OVERBURDEN CALCULATIONS

HAMILTON LAKE

RESERVE CALCULATION

BASIS OF CALCULATION:

1. Area calculated by Planimeter -
   1.494 = 1 sq. mile = 27,878,400 ÷ 1.494 = 18,660,240 sq. ft. (1x)
2. Only coal seams greater than 1 foot in thickness calculated.
3. Only coal seams and overburden to 200 foot depth used in calculation.

BLOCK "A"

Average Seam Thickness - Clean Coal = 11.9 feet
Average Overburden Thickness = 112 feet
Area - (1x) 18,660,240 x 0.952 (Planimeter) = 17.764 million sq.ft.

Seam Volume

17.764 million sq. feet x 11.9 feet ÷ 27 cubic feet
= 7.829 million cubic yards x 1.2 tons per cubic yard
= 9.395 million tons

Overburden Volume

17.764 million sq. feet x 112 feet ÷ 27 cubic feet (7.84:1)
= 73.688 million cubic yards

BLOCK "B"

Average Seam Thickness - Clean Coal = 8.5 feet
Average Overburden Thickness = 60 feet
Area - (1x) 18,660,240 x 0.407 (Planimeter) = 7.595 million sq. feet.

Seam Volume

7.595 million sq. feet x 8.5 feet ÷ 27 cubic feet
= 2.391 million cubic yards x 1.2 tons per cubic yard
= 2.869 million tons

Overburden Volume

7.595 million sq.ft. x 60 feet ÷ 27 cubic feet (5.88:1)
= 16.878 million cubic yards.

RATIO:

BLOCK "A"	9.395 million tons coal	73.688 million cubic yds Overburden	7.84:1
BLOCK "B"	2.869 million tons coal	16.878 million cubic yds Overburden	5.88:1
TOTAL	12.264 million tons coal	90.566 million cubic yds Overburden	7.38:1

MPC/aey
2/5/79