

ROTARY HOLE NO. TW 111

<u>Sample Depth (m)</u>	<u>LITHOLOGY</u>
126.492	sltst. - med.gy. - green to brown
128.016	sltst. - a/a
129.540	ss. - v.f.g., green-gray w. blk. flecks, mn. Fe-stone
131.064	ss. - a/a, Fe-stone
132.588	ss. - a/a, Fe-stone
134.112	sltst. - green - gray, mn. Fe-stone
135.636	sltst. - a/a
137.160	sltst. - a/a, mn. Fe-stone
138.684	ss. - v.f.g., green-gray to brown
140.208	ss. - f.g., lt.gy., Fe-stone
141.732	ss. - v.f.g., green-gray, mn. Fe-stone
143.256	sltst. - med.gy. w. blk. specks, mn. Fe-stone
144.780	sltst. - a/a, mn. Fe-stone
146.304	sltst. - a/a, Fe-stone
147.828	sltst. - a/a, Fe-stone
149.352	sltst. - a/a, Fe-stone
150.876	sltst. - a/a
152.400	sltst. - a/a
153.300	sltst. - a/a, mn. Fe-stone
155.448	sltst. - a/a
156.992	sltst. - a/a



233

DIRECTIONAL SURVEYROKE OIL ENTERPRISES LIMITED

COMPANY: CROWNEST RESOURCES      GRID: \_\_\_\_\_      DATE SURVEYED: 28 JUNE 1981  
 DRILL HOLE: TW - 81R - 111      LATITUDE: \_\_\_\_\_      SURVEY BY: RINCKER  
 LOCATION: TELKWA PROPERTY      DEPARTURE: \_\_\_\_\_      WITNESSED BY: HANDY  
 FIELD: SMITHERS PROJECT      ELEVATION: \_\_\_\_\_      CALCULATIONS BY: \_\_\_\_\_  
 MAGNETIC DECLINATION: \_\_\_\_\_      CORRECTION OF: \_\_\_\_\_      FOR: \_\_\_\_\_      GRID: \_\_\_\_\_

Number	Cable Depth M	Slant Angle	Slant Angle Bearing	Number	Cable Depth M	Slant Angle	Slant Angle Bearing	Number	Cable Depth	Slant Angle	Slant Angle Bearing
0	0	0.11	-	11	165	6.42	65.4	22			
1	15	0.18	241.3	12				23			
2	30	0.13	243	13	REPEATS			24			
3	45	0.17	280.8	14	30	0.11	235.1	25			
4	60	0.17	293.1	15	105	1.55	28.8	26			
5	75	0.44	349.6	16	150	5.11	49.9	27			
6	90	0.62	16.1	17				28			
7	105	1.52	25.2	18				29			
8	120	1.93	26.7	19				30			
9	135	3.35	44.2	20				31			
10	150	5.09	54.9	21				32			

T-50, H-405 81(3)A

# ROKE

SIDEWALL DENSLOG  
CALIBER  
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY: OIL ENTERPRISES LTD.  
WELL: TW-81R 111  
LOCATION: TELIMA PROBERT  
FIELD: STITERS PROBERT  
PRODUCER: BRITISH COLUMBIA  
OPERATOR: OIL ENTERPRISES LTD.

## 233

15

DATE: 21/28 JUNE 1981  
DEPTH: 177 M  
DEPTH FROM: 0  
DEPTH TO: 177 M  
CIRCUIT: 132.9 M  
CIRCUIT TO: 31.25 M  
CIRCUIT FROM: 31.8 M  
FLUID TYPE: WATER  
LIQUID LEVEL: 16.5 CM  
MUD DRAIN: 73 M

LOG MEASURED FROM: GROUND LEVEL  
LOG MEASURED FROM: GROUND LEVEL  
K.B. USER: J.B.R. 591  
C.S. USER: J.B.R. 591  
C.L. USER: J.B.R. 591

RECORDED BY: R. KROGER  
MIXED BY: J. ADY

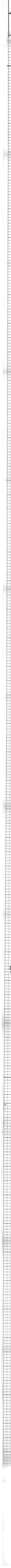
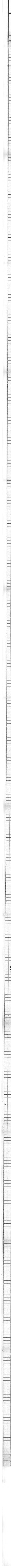
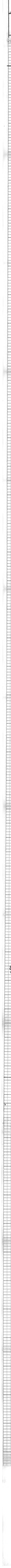
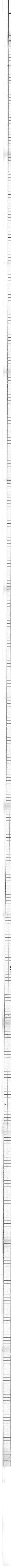
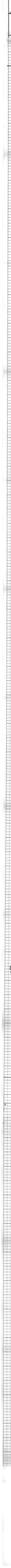
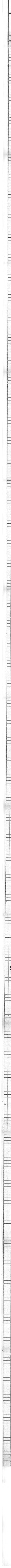
OPERATING TIME: 21.80 HRS  
TRUCK NO.: 315

GENERAL

DEPTH TO	DEPTH FROM	DEPTH TO	DEPTH FROM
0	1.77	0	1.77

GENERAL	GAMMA RAY	ZERO	API G.R. UNITS	T.C. SENS	SIDEWALL DENSLOG	CPS/ DIV
DEPTH TO	DEPTH FROM	DEPTH TO	DEPTH FROM	DEPTH TO	DEPTH FROM	DEPTH TO
0	1.77	0	100	0.5	5000	64.02

REMARKS: DEN 100L #554AS  
CAL 100L #587







76-Son-Hours 81(2)9

# ROKE

FOCUSED BEAM LOG  
5 CM  
20 CM

OIL ENTERPRISES LTD. CALGARY ALBERTA

FILE NO. COMPANY CHOKSI RESOURCES LTD.  
 LSO SEC WELL TY - 81R - 111  
 TWP N10E LOCATION TELKWA PROPERTY  
 RGE M FIELD SITHERS PROJECT

PROVINCE BRITISH COLUMBIA  
 PRESENT DAY BRITISH COLUMBIA  
 GEOLOGICAL LEVEL FIVE  
 LOG MEASURED FROM GROUND LEVEL ABOVE FROM DATUM  
 WELL DEPTH MEASURED FROM GROUND LEVEL ABOVE FROM DATUM

OTHER SERVICES:  
 K.B. BRIDGES LTD.  
 G.L.

# 233

PROVINCE BRITISH COLUMBIA  
 PRESENT DAY BRITISH COLUMBIA  
 GEOLOGICAL LEVEL FIVE  
 LOG MEASURED FROM GROUND LEVEL ABOVE FROM DATUM  
 WELL DEPTH MEASURED FROM GROUND LEVEL ABOVE FROM DATUM

Run No. ONE  
 Date 28 JUNE 1981  
 First Reading 11.1 M  
 Last Reading 54 M  
 Footage Logged 117 M  
 Depth Borehole 111.5 M  
 Depth Drilled 182.9 M

Casing Driller 31.25 M  
 Fluid Type WATER  
 Liquid Level 54 M  
 Min. Dam. 16.5 CM  
 Pm @ 0 C 6.25 Oct @ 8.5°C

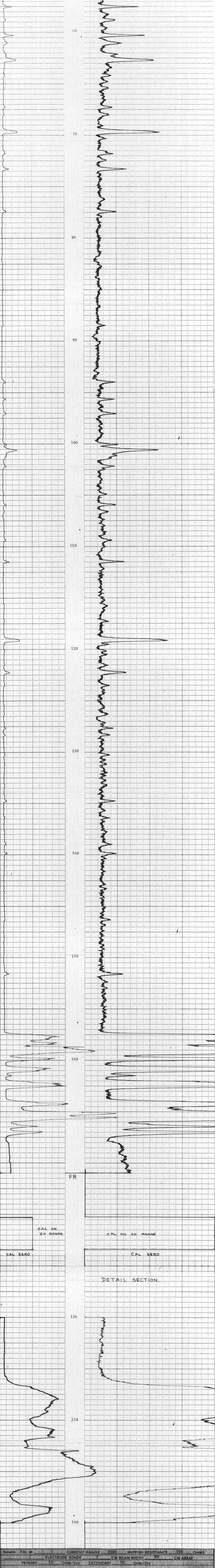
Operating Time 40 MIN  
 Truck No. 36

Recorded By: R. LANGRISH  
 Witnessed By: HAWDY

Remarks FBL # 7

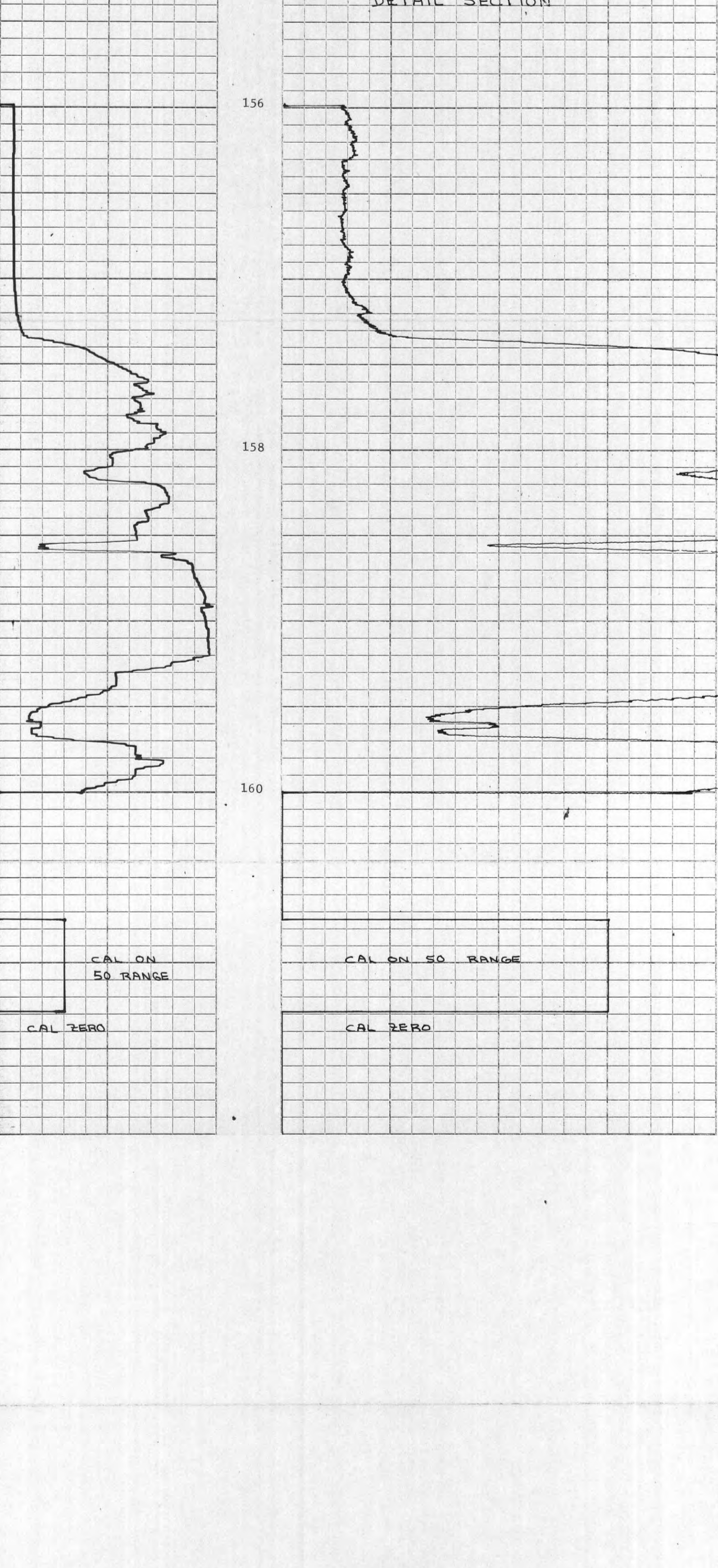
CURRENT RANGE	HIGH	MUDFISH RESISTANCE	350	OHMS
ELECTRODE SONDE	20	CM BEAM WIDTH	100	CM ARRAY
PRIMARY	10	OHM/DIV	SECONDARY	40
RESISTIVITY (OHM-METERS)		DEPTH		

RESISTIVITY (OHM-METERS)	DEPTH	RESISTIVITY (OHM-METERS)
SECONDARY SCALE	0	PRIMARY SCALE
0	520	100
400		200
		920
		1320



Remarks FBL # 7	CURRENT RANGE	HIGH	MUDFISH RESISTANCE	350	OHMS
ELECTRODE SONDE	5	CM BEAM WIDTH	60	CM ARRAY	
PRIMARY	10	OHM/DIV	SECONDARY	50	
RESISTIVITY (OHM-METERS)		DEPTH			

RESISTIVITY (OHM-METERS)	DEPTH	RESISTIVITY (OHM-METERS)
SECONDARY SCALE	0	PRIMARY SCALE
0	650	100
500		200
		1150
		1650



ENCL 6-7



# CORE & COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

DATE	BEGIN	06/21/81
	END	06/25/81

**HOLE No.** TW-81D-112

**HOLE PARTICULARS**

LOCATION	6052883.17 NORTH		
	621814.88	EAST	
ELEVATION	888.34	HOLE BEARING (AZ°)	-
TOTAL DEPTH	235.00	HOLE ANGLE (°)*	- 90°

**LOGGING**

LOGS RUN	DEN, DIR, GRN, FBL, CAL
LOGGED BY	ROKE
OTHER TESTS	

**COAL CORING PERFORMANCE**

TOTAL	CORE DIAMETER	N Q
	CORE RECOVERED	20.6m
	LENGTH CORED	20.6m
	CORE RECOVERY	100 %

**EXAMINATION**

LOG USED	Density
No. OF SEAMS SAMPLED	14
EXAMINER (S)	Patenaude Hartmann
DATE	07/07/31

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC. FREQ.	RQD		MOIST % ar.b. residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.		
1	11	8.99	10.59	1.6	SHALE	- Weathered shale. Very broken up. Calcite throughout.			S5	1.25										
						MARKERS	% RECOVERY													
						11 - 14	2.76m - 92%													
						14 - 17	3.12m - 104%													
						17 - 20	3.07m - 102%													
		10.59		.38		- Very weathered carbonaceous shale. Broken surfaces, smooth and shiny with calcite at bottom of interval.			S5											
		10.97																		
		10.97		.29		- Medium to light grey limestone calcite filled fracture.			R3											
		11.26																		
		11.26		.36		- Very weathered broken up pebble band with many calcite infillings. Some coal fragments.			R2											
		11.62		1.66	SLST	- Lightly to deeply weathered broken up siltstone with a green sandstone band (10cm) calcite throughout. Several fractures. Some pyrite.			R1											
	14	13.28							S5	2.17	5									
		13.28		1.50		- Broken up, fractured, weathered, dark grey silty shale. Calcite slickensided, signs of shearing.			R1											
		14.78																		
2		14.78		.25		- Greenish, fine to medium grained sandstone, weathered calcite.			R2											
		15.03																		
		15.03		1.28		- Medium to deeply weathered silty shale. Becoming less weathered at bottom of interval.			R1											
	17	16.31				Broken sticks to rubble.			R2	3.2	0									
		16.31		3.07		- Broken stick to rubble. Same rock type as above. Calcite. Broken surfaces are slickensided and shiny. Fracture plane undulating.			R2		3.25	3								
	20	19.38																		

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : R &/OR S — GOLDR ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

**HOLE No.** TW 112

TW Smithers S1(S)A

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA									
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ.	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.			
													ar.b.	residual								
2						MARKERS																
						20 - 23	2.9m - 96%															
						23 - 26	3.02m - 100%															
	19.38			2.9	SLST	- Broken sticks to rubble, slightly weathered siltstone. Fracture zone at 22.90			R2	2.06												
3	23		22.28																			
		22.28		3.02		- Broken up and cracked siltstone as described above. Broken surfaces, smooth and dull.			R2	1.65												
	26		25.3																			
						MARKERS	% RECOVERY															
						26 - 29	3.25m - 108%															
						29 - 32	3.02m - 100%															
4	25.3			1.43		- Grey siltstone as above. Tiny fracture all throughout.			R2													
			26.73																			
		26.73	27.39	.66		- Light greenish grey, fine grained sandstone.			R3													
		27.39		1.15		- Top is weathered rubbly siltstone, calcite in places.			R2	.92												
	29		28.54																			
		28.54	28.66	.12		- As above.																
		28.66		.09		- Very fine grained sandstone. Medium to light grey calcite.			R2													
			28.75																			
		28.75		1.44		- Broken up siltstone as described previously, with frequent fractures, slickensided calcite.																
			30.19																			
		30.19		.30		- Very green sandstone, fine to medium grained. Rehealed fracturing, coal fragments, brown mudstone. Inclusions, calcite.			R3													
			30.49																			
		30.49	30.99	.50		- Weathered siltstone as previously described.																
		30.99		.55		- Green sandstone, as described above. Pyrite calcite coal threads becoming grey sandstone at the bottom of interval.			R3	2.98												
	32		31.54																			
						MARKERS	% RECOVERY															
						32 - 35	3.05m - 101%															
						35 - 38	3.04m - 101%															

ALL LINEAR UNITS IN METRES

■ : MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % ar.b. residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.		
5		31.54		3.05	SST	- Light grey, fine grained sandstone interbedded with dark siltstone, many calcite veins. Very weathered along fracture planes.			R3											
			34.59						R2	2.33	16.7									
	35	34.59		3.04		- Same as previous interval		68°												
			37.63					67°	R3	1.66	32.1									
6						MARKERS	% RECOVERY													
						38 - 41	3.94m - 98%													
						41 - 44	3.03m - 102%													
	38	37.63		2.94		- Same sandstone, becoming muddy at end of interval, more weathered. Calcite throughout. Broken surfaces, black and shiny.		71°	R2											
			40.57							2.0	5.1									
	41	40.57		3.03		- Same as previous interval, but not as deeply weathered.		79°	R3											
7			43.60			MARKERS	% RECOVERY													
						44 - 47	2.92m - 97%													
						47 - 50	3.00m - 100%													
	44	43.60		2.92		- Same sandstone, calcite bands, broken stick, broken surfaces, carbonaceous and calcite covered. Weathered in places. Many small fractures throughout.			R2											
			46.52							1.66	18.5									
	47	46.52		3.00		- Predominantly light grey sandstone with few siltstone bands. Round calcite nodules occasionally.			R2											
8			49.52			MARKERS	% RECOVERY													
						50 - 53	3.06m - 102%													
						53 - 56	3.05m - 102%													
						56 - 59	2.95m - 98%													
	50	49.52		3.06		- Sandstone as described previously. Non-carbonaceous. Tiny fractures throughout. Joint at 50.97, angle at 20° with core axis. Unweathered.			R2											
			52.58						R2											
									R3	1.0	37.6									
	53	52.58		3.05		- Sandstone as above. More calcite rich. 1.05m long joint at 54.61, angle of 10° with core axis.			R3											
9			55.63							1.0	25.2									

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
9	56	55.63		2.95	SST	- Same sandstone as described above. Calcite in veins. Unweathered. No siltstone bands. Joint at 57.90, angle 10°.			R3											
	59		58.58						R3											
									R4	1.0	70.5									
						MARKERS														
							% RECOVERY													
						59 - 62	3.05m - 102%													
						62 - 65	2.88m - 96%													
10		58.58	61.63	3.05		- Same as previous interval			R3	.66	64.9									
	62	61.63		2.88		- Same as previous interval. Reappearance of siltstone bands. Joint at 64.02, angle of 20° with core axis, filled with calcite. Weathered fracture, zone at 62.51, 9cm long; 63.36, 26cm long.		70°	R2											
			64.51						R3											
						MARKERS														
							% RECOVERY													
						65 - 68	3.22m - 107%													
						68 - 71	2.99m - 99%													
		64.51		3.22		- Interbedded siltstone and fine grained sandstone. Mainly sandstone beds are wavy, sometimes mixing flow features. Occasional thin carbonaceous band, one at 66.78. At 67.16 calcite bed, broken sticks. Broken surfaces rough but planar.			R2											
	68		67.73						R3	.62	17.									
		67.73		2.99		- Same as above. More fractured. Generally light coloured appearance. Fracture along bedding plane.		70°												
	71		70.72						R3	1.67	16									
						MARKERS														
							% RECOVERY													
						71 - 74	3.04m - 101%													
						74 - 77	3.07m - 102%													
12		70.72		3.04		- Same as above. Broken sticks, most broken surfaces irregular. Some smooth and shiny. Occasional calcite.			R3											
	74		73.76								2.30									
		73.76		3.07	SST/ SLST	- Same as above, becoming more silty at bottom with occasional sandstone.		67°	R2 R3											
			76.83							1.95	9									

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112

FILE No BA-267  
REVISED Feb. 1981  
FORMERLY FILE No. BA-212A







## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M.%	F.C.%	F.S.I.	C.V.	
						MARKERS														
						% RECOVERY														
20							122 - 125													
							125 - 128													
		121.77	122.68	.91			- Interbedded sandstone and siltstone as above.													
		122.68		.23			- Coal quickly becoming coaly mudstone - carbonaceous siltstone.			R2										
			122.91																	
		122.91		1.80			- Greyish green, medium grained sandstone with thin carbonaceous bands. Mudstone band at 123.76. Re-healed fractures. Calcite filled fractures, wavy bedding. Bioturbation.													
21			124.71								.66	28								
	125	124.71		.46			- Same green sandstone as above. Fracture zone with calcite at bottom. Coal threads.													
			125.17																	
		125.17		2.53			- Predominantly dark grey siltstone. Occasionally wavy, sandstone lenses. Pyrite becoming very carbonaceous towards bottom (especially bottom 38cm). Bottom 6cm very dirty coal with calcite filling.			R2										
			127.70							R3	1	19								
							MARKERS													
							129 - 131													
		127.70		1.00	COAL		- Dirty shaley in places, calcite rich, alternating dull and shiny, broken surfaces moderately well cleated. At bottom 2cm sandstone and pyrite band.						07-08							
			128.70																	
		128.70		1.97	SST/		- Interbedded black and light grey siltstone and sandstone as described previously. Fracture re-healed, wavy bedding (flow disturbance). Some mud bands throughout.			R3										
22									65°											
	131		130.67								.33	40								
							MARKERS													
							131 - 134													
		130.67		3.01			- Interbedded siltstone and sandstone as described above. Each bed is well defined. Some mud bands throughout. Broken surfaces are covered with calcite film. Calcite filled fractures in some places. Some small coal lenses.			78°										
									85°	R3										
			133.68								1.66	28								

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112



## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	VM %	FC %	F.S.I.	C.V.	
													ar.b.	residual						
22						MARKERS														
						134 - 137														
		133.68		.62	SLST/	- As above with a 10cm band of green, clean sandstone at 133.88		71°												
		134.30			SST															
		134.30		2.48	COAL	- Dirty to clean coal. Contains a certain amount of shale. Pyrite and calcite. Some broken pieces are extremely shiny and soapy to the touch.					09-									
23	137	136.78										10								
		136.78	136.90	.12	COAL	- End of above seam.														
						MARKERS														
						137 - 140														
						140 - 143														
		136.90		2.82	SLST/	- Mostly dark carbonaceous siltstone, becoming interbedded with occasional light fine grained sandstone beds. Calcite veins throughout. Small sections weathered. Occasional light brown beds. Re-healed fractures (faults). Load coasts and wavy bedding (flow disturbances).		65°		R2										
	140	139.72									1.36	17								
		139.72	140.19	.47		- As above														
		140.19		.96		- Dark carbonaceous siltstone with a 15cm coal bed at 140.56m. Occasional mud concretion.				R2										
			141.15																	
		141.15		1.54		- Interbedded siltstone and sandstone as described previously. Disturbed bedding. Calcite veins.		64°												
24		142.69						68°		.66	46									
	143					MARKERS				R3										
						143 - 146														
						146 - 149														
		142.69		2.41		- Interbedded siltstone and sandstone as described above. Becoming more predominant in sandstone in middle of interval.		68°												
			145.10					67°		R3										

ALL LINEAR UNITS IN METRES

\* : MEASURED FROM THE HORIZONTAL PLANE  
 † : R &/OR S — GOLDR ASSOCIATES HARDNESS CODE  
 • RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TW 112

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
24		145.10		.57	COAL	- Coal, quite clean with dull and shiny surface. Occasional calcite. Poorly to moderate cleating.					0	65								
	146		145.67																	
		145.67	147.60	1.93	COAL	- End of coal seam described above.			R3			11-12								
		147.60		1.15	SLST	- Light grey carbonaceous siltstone with occasional coal lenses. Broken surfaces are shiny, coapy to touch. Might indicate			R3		.66	35								
25	149		148.75																	
						MARKERS	% RECOVERY													
						149 - 152	3.00m - 100%													
						152 - 155	3.15m - 105%													
						155 - 158	3.04m - 101.3%													
		148.75		3.00	SLST	- Medium to light grey very muddy siltstone. Slightly weathered overall. Some coal lenses throughout. Calcite veins throughout. Broken stick, becoming very dark carbonaceous siltstone at bottom of interval.			R2 R3		1.66	32								
	152	151.75		1.45	COAL	- COAL - slightly dirty coal. Calcite rich broken surfaces, slickensided. Mostly dull with bright bands occasionally. Moderately well cleated in places.						13-14								
26		153.20																		
		153.20		1.70	SLST	- Interbedded siltstone and sandstone, medium grey. Slightly weathered overall. Carbonaceous at top of interval.		69°	R3		.66	26								
		154.90																		
	155	154.90		3.04		- First 82cm same as previous interval, grading into fine grained light grey sandstone. Bioturbation, disturbed bedding. Slightly weathered overall. Bottom is rubble with broken surfaces covered in calcite. Some calcite veins throughout.		68°	R3		2.33	30.6								
		157.94																		
						MARKERS	% RECOVERY													
						158 - 161	2.71m - 90.3%													
						161 - 164	3.36m - 112%													

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

\* R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

\* RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112



## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
28		167.08		1.32		- Same as above becoming very carbonaceous at bottom. With a 74cm joint becoming at 167.72. Parallel to core axis. Surface is shiny, slickensided. All broken surface in interval are shiny and slickensided. Pyrite at bottom of interval. Broken sticks.			R3										
			168.40																
		168.40		1.70	COAL	- Predominantly dull with shiny bands, well cleated in places. Somewhat dirty in places, some surfaces smooth, shiny and striated.						17-18							
	170	170.10								3.3	8								
					MARKERS	% RECOVERY													
					170 - 173	2.92m - 97%													
					173 - 176	2.95m - 98%													
					176 - 179	3.01m - 100%													
29		170.10		.38	SLST/SST	- Mixed medium grey carbonaceous interbedded sandstone/siltstone, with a 5cm wide fracture zone filled with siltstone pebbles and weathered matrix. Joint at 170.24, angle 45° with core axis.			R3										
			170.48																
		170.48		2.54		- Mostly medium grained sandstone with grey siltstone bands and lenses throughout. Some places very mixed up. No grading or bedding angle. Calcite. Broken surfaces are rough.			R4										
	173	173.02								.68	66								
		173.02		2.95		- Same as above with 40cm weathered zone at 173.72. Fractures are planar and smooth and calcite filled, major fracture at 174.78 and weathered. Several large joints, grading into a medium to coarse grained sandstone at very bottom of interval. Bedding angle not reliable because too disturbed. Load casts throughout.			R2										
30	176	175.97							R3	2.37	43.6								
		175.97		.88		- Medium to coarse grained well sorted sandstone grading into a poorly sorted brown sandstone with black pebbles scattered throughout. At 176.16 numerous calcite filled fractures. Very thin coaly bands throughout, broken sticks to sticks, siltstone bands at bottom.													
			176.85																

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	TW 112
----------	--------

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION	SEAM DESIGN	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA								
		FROM	TO					HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	FC. %	F.S.I.	C.V.		
					MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)						a.r.b.	residual							
30		176.85		2.13		- Interbedded medium grained sandstone with medium to dark grey siltstone. Bedding is displaced occasionally. Occasional fine grained, well cemented sandstone 5cm thick. Several large calcite filled fractures. Siltstone bands very carbonaceous. Some broken surfaces, calcite covered. Small coalified fragments throughout interval. Broken sticks.														
	179		178.98			MARKERS														
						% RECOVERY														
						179 - 182														
						182 - 185														
		178.98		2.98		- Interbedded light sandstone and dark siltstone, as described above. 1cm calcite band at 180.58. Carbonaceous fragments throughout interval. Broken sticks.														
31	182		181.96			MARKERS														
		181.96		3.16	SLST/SST	- Interbedded siltstone/sandstone as above. Occasional bands of clean, uniform medium grained sandstone, load casts. Carbonaceous threads throughout. Calcite filled fracture at 184.71 in hard very well cemented siltstone														
	185		185.12			% RECOVERY														
						185 - 188														
						188 - 191														
		185.12		1.71		- Light coloured carbonaceous medium grained sandstone. Calcite infilling, bands of siltstone towards bottom. Broken surfaces rough.														
		186.83																		
		186.83		.33		- Weathered siltstone with occasional sandstone bands.														
		187.16																		
		187.16		.17		- Muddy coal with several thin sandstone bands and calcite. Becomes shiny and blocky at bottom.														
		187.33																		
		187.33		.32		- Dark grey carbonaceous mudstone with coal fragments throughout.														
		187.65																		

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE  
 † R &/OR S — GOLDER ASSOCIATES HARDNESS CODE  
 • RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TW 112

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
		187.65		.19		- Extremely carbonaceous mudstone. Shiny broken surfaces.				1.33	44								
32			187.84																
	188	187.84	188.07	.23		- Weathered carbonaceous mudstone.													
		188.07		2.97		- Somewhat broken up carbonaceous in place mudstone. Broken surfaces, slickensided, glassy, calcite throughout. Occasional silty mudstone area.			R2										
	191		191.04							3.36	12								
						MARKERS													
						191 - 194					3.06m								
		191.04		.51		- Carbonaceous mudstone with calcite band 191.30 becoming sandy at bottom.													
			191.55																
		191.55		.46		- Beginning with carbonaceous mudstone and calcite concretion, some pyrite. Rest of interval is shiny coal with slickensided broken surfaces.													
			192.01																
		192.01		.49		- Interbedded carbonaceous sandstone and siltstone. Pyrite band at bottom, followed by a coarse sandstone band.													
			192.50																
		192.50		1.6	COAL	- First 1m is coal. Shiny, well cleated, occasional calcite vein. 1cm pyrite vein at 192.90. Occasional pyrite throughout. Then 35cm split at 193.50 of weathered coaly shaly, 25 of dirty coal, slickensided, broken surfaces.						19							
33										R3									
										3.26									
	194		194.10																
						MARKERS													
						194 - 197					2.86m - 95%								
		194.10	194.40	.30		- Carbonaceous shale split.													
		194.40		.40		- Dirty coal with calcite and pyrite throughout. Some shiny broken surfaces.						20							
			194.80																
		194.80		2.16		- Carbonaceous shale, interbedded with light coloured sandstone. Calcite filled joint at 196.70, parallel to core axis.													
	197		196.96							R3	1.39	37							

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE  
 † R &/OR S — GOLDER ASSOCIATES HARDNESS CODE  
 • RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TW 112



## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M.%	F.C.%	F.S.I.	C.V.	
												a.b.		residual						
35	207	207.13		1.81	SLST	- Interbedded siltstone and light grey sandstone, becoming only siltstone in last 16cm. Slightly weathered throughout. Broken surfaces, calcite covered. Bedding is disturbed in most places. Rehealed fractures.		73	R3											
			208.94								2.33	11								
	209	208.94		.16	SHALE	- Very carbonaceous shale, broken up. Broken surfaces calcite covered and striated.			R3											
			209.10																	
		209.10		.70	COAL	- Dirty coal. Mostly dull, small, bright bands throughout. Calcite veins throughout.			R3			23-								
			209.80									24								
		209.80		.60	SHALE	- Very carbonaceous shale with small coal threads throughout. SPLIT.			R3											
36			210.40																	
		210.40		1.85	COAL	- .70m COAL - very dirty, dull with striated broken surfaces. .40m SPLIT - dirty shale .75m COAL - as above.			R3			25-								
												26								
	212		212.25																	
						MARKERS	% RECOVERY													
						212 - 215	2.69m - 90%													
						215 - 218	3.08m - 102%													
		212.25		2.69	SHALE	- Very carbonaceous shale with coal fragments throughout and 15cm of dirty coal at 212.93 5cm of dirty coal at 213.03 24cm of dirty coal at 213.70 Broken surface, smooth, shiny, slickensided, calcite covered and calcite throughout interval, core broken up. Several joints throughout.			R3											
											4.83	25								
37	215		214.94																	
			214.94																	
				2.71		- Dark grey shale. Numerous fractures, some broken surfaces, glassy, some calcite throughout. Occasional silty bands, well cemented. At 215.40, 18cm of broken up dirty coal with lots of stress features and calcite infillings. At 216.79 sharp contact with what is possibly a light coloured sill (volcanic). Sill is 13cm in length.			R2- R4											
			217.65																	

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

! R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112

FILE No BA-267  
REVISED Feb. 1981  
FORMERLY FILE No. BA-212A



## CORE &amp; COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION				SUMMARY GEOTECH			ANALYTICAL DATA										
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			SEAM DESIGN	BEDDING ANGLE (°)	HARDNESS	FRAC FREQ	RQD	SAMPLE NO.	MOIST % a.r.b. residual		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
37	217.65			.37	COAL	- Shiny well cleated coal, dirty in places.							27-									
	218		218.02			Top of interval have lot of calcite fillings.					R3	4.87	31	28								
		218.02	218.55	.53	COAL	- End of above seam. Dirty coal in places.																
					MARKERS		% RECOVERY															
						218 - 221		2.87m - 96%														
						221 - 224		3.22m - 107%														
	218.55			.93	SHALE	- Very carbonaceous shale, broken surface, slickensided.					R3											
		219.48																				
	219.48			.30		- Interbedded coal and shale, numerous calcite infillings.																
		219.78																				
	219.78			.39		- Muddy carbonaceous shale. Occasional thin lenses of sandstone.																
		220.17																				
	220.17			.67		- Dirty (stick) coal with occasional calcite bands.						3.48	13									
38		220.84																				
		220.84		3.22		- Predominantly carbonaceous shale with coal fragments. Broken sticks to rubble. At 222.14 a well cemented brown siltstone. At 222.64, 15cm of dirty coal with calcite filled fractures. Weathered, broken surfaces very shiny.					R2											
											R3											
												1.55	11									
					MARKERS		% RECOVERY															
						224 - 227		2.96m - 99%														
						227 - 230		3.09m - 103%														
						230 - 233		3.11m - 103%														
	224.06			2.96		- Dark grey shale with occasional thin brown siltstone and sandstone bands, broken sticks calcite in some places.					R2											
39		227.02									R3	2.02	47									
	227.02	228.60	1.58			- Dark grey uniform shale. Broken up					R2											
	228.60	228.73	.13			- Brown, hard, well cemented siltstone					R3											
	228.73		1.36			- Dark grey uniform shale. Broken surfaces, smooth and dull						1.33	10									
230		230.09																				

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TW 112

CORE & COAL CORE DESCRIPTION

PROJECT	TELKWA
AREA	SMITHERS, B.C.

HOLE No.	TW 112
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA									
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % a.b. residual		ASH %	V.M. %	F.C. %	F.S.I.	C.V.			
39		230.09		1.35		- Dary grey shale as above, with occasional sandstone beds and coaly bands. Broken up towards bottom.																
			231.44																			
40		231.44		1.78		- Interbedded light coloured sandstone and siltstone. Occasional coal fragments and calcite veins. Disturbed bedding and re-healing.			R3													
	233		233.22							1.33	22											

ALL LINEAR UNITS IN METRES

- \* MEASURED FROM THE HORIZONTAL PLANE
- ▲ ANGLE MEASURED FROM CORE AXIS
- 1, 2, 3, 4, 5 — GOLDR ASSOCIATES HARDNESS CODE
- RQD — ROCK QUALITY DESIGNATION (%)
- FF — FRACTURE FREQUENCY

HOLE No.	TW 112
----------	--------

233<sup>a</sup>DIRECTIONAL SURVEYROKE OIL ENTERPRISES LIMITEDCOMPANY: CROWSNEST RESOURCES

GRID: \_\_\_\_\_

DATE SURVEYED: JUNE 25, 1981.DRILL HOLE: TW - 81D - 112

LATITUDE: \_\_\_\_\_

SURVEY BY: RINCKERLOCATION: TELKWA PROPERTY

DEPARTURE: \_\_\_\_\_

WITNESSED BY: HANDYFIELD: SMITHERS PROJECT

ELEVATION: \_\_\_\_\_

CALCULATIONS BY: \_\_\_\_\_

MAGNETIC DECLINATION: \_\_\_\_\_

CORRECTION OF: \_\_\_\_\_

FOR: \_\_\_\_\_ GRID: \_\_\_\_\_

Number	Cable Depth M	Slant Angle	Slant Angle Bearing	Number	Cable Depth M	Slant Angle	Slant Angle Bearing	Number	Cable Depth	Slant Angle	Slant Angle Bearing
0	0	0.12	348.4	11	165	0.43	108.2	22			
1	15	0.18	202.7	12	180	0.62	100.8	23			
2	30	0.20	288.4	13	195	0.63	94.4	24			
3	45	0.25	305.9	14	210	0.65	95.7	25			
4	60	0.44	313.4	15	225	0.61	106.0	26			
5	75	0.25	289.0	16				27			
6	90	0.17	335.8	17	REPEATS			28			
7	105	0.12	346.8	18	30	0.22	271.4	29			
8	120	0.16	87.5	19	90	0.11	336.9	30			
9	135	0.21	92.4	20	195	0.60	104.4	31			
10	150	0.48	116.6	21				32			

TLS-101-1145 8/1(3)9

# ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

GAMMA RAY NEUTRON LOG

FILE NO. \_\_\_\_\_ COMPANY \_\_\_\_\_ GROSSER'S RESOURCES LTD.

WELL \_\_\_\_\_ TM - 810 - 112

LOCATION TELUM PROPERTY

FIELD SUTHERS PROJECT

PROVINCE BRITISH COLUMBIA

LOG MANUFACTURED FROM: GROUND LEVEL, AIR-DRY-CELL, OTHER SERVICES: DIR., FUEL, GR., PERM., QUAL.

Log Manufactured from: GROUND LEVEL, AIR-DRY-CELL, OTHER SERVICES: DIR., FUEL, GR., PERM., QUAL.

Log Depth: Manufactured from: GROUND LEVEL

Run No. \_\_\_\_\_ Date \_\_\_\_\_

File Reading \_\_\_\_\_

Log Reading \_\_\_\_\_

Forecast Logged \_\_\_\_\_

Depth Reached \_\_\_\_\_ 233 M

Depth Driller \_\_\_\_\_ 233 M

Coring Hole \_\_\_\_\_ 17.7 M

Coring Drive \_\_\_\_\_

Coring Type \_\_\_\_\_ WATER

Fluid Level \_\_\_\_\_ 13 M

Fluid Density \_\_\_\_\_ 992

Run @ \_\_\_\_\_ 1.2 M @ 8 L @

Operating Time \_\_\_\_\_ 1.1 HOURS

Truck No. \_\_\_\_\_ 36

Recorded By: SANDGER

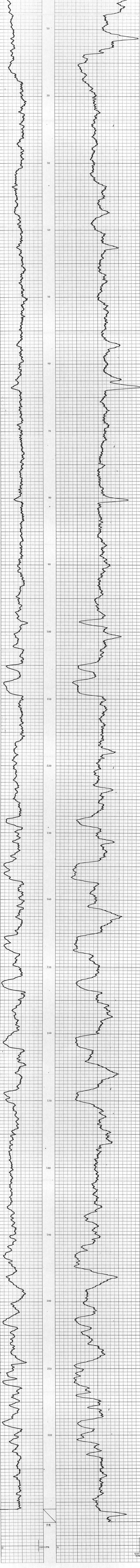
Witnessed By: HARVEY

# 233

EQUIPMENT DATA			
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125 A	TOOL MODEL NO.	NEUTRON/NEUTRON
DIAMETER	3.2 CM	DIAMETER	3.2 CM
DETECTOR MODEL NO.		DETECTOR MODEL NO.	
TYPE	SCINTILLATION	TYPE	PROPORTIONAL
LENGTH	10 CM	LENGTH	15 CM
DISTANCE TO N. SOURCE	2 M	SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		GENERAL	
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	36	SPACING	43 CM
TOOL SERIAL NO.	008	TYPE	AmBe
		STRENGTH	3 CURTES

LOGGING DATA											
GENERAL			GAMMA RAY				NEUTRON				
RUN NO.	DEPTH	SPEED	T.C.	SENS.	ZERO	API G. R. UNITS	T.C.	SENS.	ZERO	API N. UNITS	
1	FROM TO	M/MIN	SEC.	SETTINGS	DIV. L OR R	PER LOG DIV.	SEC.	SETTINGS	DIV. L OR R	PER LOG DIV.	
	0 233	4	3	100		12	3	1000	0	50	

REMARKS: LOGGED THROUGH THIN DRILL STEM



FR

500 CPS

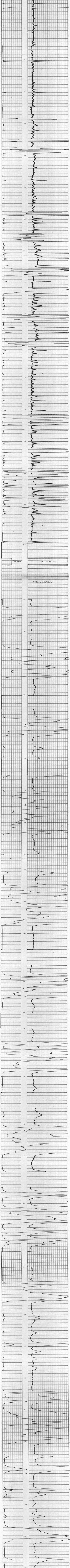
# ROKE

FOURTEEN BEAM LOG - 20 CM  
OIL ENTERPRISES LTD. CALGARY ALBERTA

LOG NO.	118 900	COMPANY	CONCRETE INDUSTRIES LTD.
SIC CODE	13	WELL	7-811-113
WELL NAME	118 900	LOCATION	STILLMAN, ALBERTA
DATE	25 10 61	FIELD	STILLMAN, ALBERTA
PRODUCED THROUGH OPERATED BY DESIGNED BY CHECKED BY APPROVED BY		WELL NO. DEPTH (M) DEPTH (FT)	
OPERATOR LOGGERS		WIRELINE NO. WIRELINE LOG NO.	
DATE TIME		TIME TIME	
LOGGERS		LOGGERS	

# 233

RESISTIVITY (OHM-METERS)	PRIMARY SCALE	0	100	200
SECONDARY SCALE	0	500	900	1300



Remarks: F.B.L. # 7  
 ELECTRODE SPACING: 20 CM  
 PRIMARY: 10 OHM/CM  
 SECONDARY: 60 OHM/CM









## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
3		34.63		1.0		Sltst. - carbonaceous, CaCO <sub>3</sub> rich 32.83 - 33.08 - weathered and soft 33.08 - 33.83 - hard and clean pebble lens at 33.53m			R1											
			35.63								0.99	13.2								
33		35.63		2.02		Sltst. - 33.83 - 34.18 - rubble 34.18 - 35.85 - broken stick CaCO <sub>3</sub> filled fractures		70°	R1											
			37.65																	
		37.65		0.97		Sltst. - Carbonaceous and CaCO <sub>3</sub> present interbedded with f.g. ss. numerous flow features CaCO <sub>3</sub> vein - 36.53m		89°	S5											
			38.62								1.3	26.9								
36		38.62	40.32	1.70		Sltst. - as above, rubble to broken stick		78°	R1											
4		40.32		1.50		Sltst. - as above: At 39.13m pebble bed 1.5m thick		80°	R1		0	8.4								
			41.82			broken stick														
		41.82		3.00		Sltst. - very dark gray, criss-crossed by CaCO <sub>3</sub> filled fractures (1mm thick)			R1	0.33	28.4									
42		44.82																		
		44.82		0.47		Sltst. - as above, 1 fracture along core axis at base - very carbonaceous		79°	R1											
			45.29																	
						MARKER														
						33 - 36														
						36 - 39														
						39 - 42														
						(2.86/3.00) = 95.3%														
						(3.10/3.00) = 103%														
						(2.99/3.00) = 99.7%														
5		45.29		1.36		Sltst. - gray, 43.47 - 43.50 - very carbonaceous unit crossed by small CaCO <sub>3</sub> lenses and small f.g. ss. beds		89°	R1		0.35	24.8								
			46.65																	
		46.65		1.52		Sltst. - as above, getting gradually more coal rich			R1											
			48.17																	
		48.17		1.38	COAL	Coal - clean, black dull with bright at 46.49m - coarse grained ss. bed 7cm thick with CaCO <sub>3</sub>			S5											
			49.55			COULD CONTAIN PYRITE, SLICKENSIDED ON SOME SURFACES.							01- 02							

ALL LINEAR UNITS IN METRES

M — MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

H — R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	DC - 101
----------	----------

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG	DIPPING ANGLE (°)	SUMMARY GEOTECH			ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD	SAMPLE NO	MOIST % arb. residual	ASH %	V M %	F.C %	F.S.I.	C.V.	
5		49.55		0.57	SLST	Sltst. - light gray			R3										
	48		50.12			47.73 - 47.92 - broken & weathered 47.97 - carbonaceous		87°		0.33	42.5								
		50.12	50.99	0.87		Sltst. - as above, many flow features			R3										
						MARKERS													
							% RECOVERY												
						42 - 45	(2.82/3.00) = 94%												
						45 - 48	(3.03/3.00) = 101%												
						48 - 51	(3.00/3.00) = 100%												
6		50.99		2.16		SS. - Very fine grained, silty, some CaCO <sub>3</sub>		75°	R3	0	40.3								
	51		53.15			filled fractures													
		53.15		3.06		Sltst. - Light gray		78°	R3	0.34	89.6								
	54		56.21			lcm CaCO <sub>3</sub> bed at 52.31m													
		56.21		0.69		Sltst. - as above, numerous cross-bedding			R3										
			56.98			bedding angle varies													
						MARKERS													
							% RECOVERY												
						51 - 54	(2.98/3.00) = 99.3%												
						54 - 57	(3.03/3.00) = 101%												
						57 - 60	(2.98/3.00) = 99.3%												
7		56.9		2.37		Sltst. - dark gray, lenses of SS. - fine		86°	R1										
						grained, CaCO <sub>3</sub> filled fractures, SS													
	57		59.27			lenses show flow features. Fractures				0.33	19.1								
		59.27		3.03		Sltst. - as above, not as many SS lenses			R1	0.34	0								
	60		62.3			CaCO <sub>3</sub> present													
		62.3		0.46		Sltst. - dark gray, no SS., only a few CaCO <sub>3</sub>			R1										
			62.76			filled fractures													
						MARKERS													
							% RECOVERY												
						60 - 63	(3/3) = 100%												
						63 - 66	(3.04/3) = 101%												
						66 - 69	(3.07/3) = 102%												
						69 - 72	(2.86/3) = 95%												

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

• R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	81D-
	DC - 101

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, D.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DES.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
8		62.76		5.9		- Siltst. Dark Grey - Shaley. CaCO <sub>3</sub> filled		70°	R1	1.33	3								
	63					Fractures .63 markers approx. 2 meter from top. Rubble. Possibly Pyrite powder.		65°	R1										
	66		68.66					70°	R1	.98	8								
		68.66		5.83		- Siltstone, interbedded with very fined grained sandstone beds.			R1	.98	4								
9						shaley, Siltst. The sandstone is brown Siltst. is dark. Mostly rubble and CaCO <sub>3</sub> filled fracture. At 71.27 joint 10° from core axis. No bedding angle available.			R1										
	69								R1										
									R1										
	72								R1	2.44	0								
			74.49																
						MARKER													
						72 - 75													
						75 - 78													
						78 - 81													
						81 - 84													
						% RECOVERY													
						(3.13/3) = 104%													
						(2.93/3) = 97%													
						(3.11/3) = 103%													
						(2.79/3) = 93%													
10		74.49		3.13		- Siltst. Dark grey - very shaley CaCO <sub>3</sub> filled fracture, very rubbly. Core gain		70°	R1										
						JOINTS - 60° From Core Axis at 72.81			R1	3.5	11								
	75					30° From Core Axis at 73.37			R1										
			77.62			35° From Core Axis at 73.82			R1										
		77.62		2.93		- SLTS as above.			R1										
						JOINT 40° 75.93			R1	1.7	9								
11	78	80.55				JOINT 73° 76.28			R1										
		80.55		3.11		- AS ABOVE		65°	R1										
						JOINT - 50° From Core Axis at 79.74			R1										
						50° From Core Axis at 79.83			R1	4.18	22								
	81					50° From Core Axis at 80.02			R1										
			83.66			45° From Core Axis at 80.29			R1										
		83.66		2.79		- SLTS As Above			R1										
12						The bottom 50cm have been subject to weathering			R1	2.5	10								
	84					At 86.06 JOINT 70°													
						MARKERS													
						84 - 87													
						(3.1/3) = 103%													
						87 - 90													
						(3.02/3) = 100%													
						90 - 93													
						(2.6/3) = 86%													
						93 - 96													
						(3.14/3) = 104%													
		86.45		3.1	SILTY SHALE	- Silty shale (and vice-versa). Dark grey Dirty, rich in mud. At 87.33			R1	.96	30								
	87					Joint 10°			R1										
			89.55						R1										

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. DC - 81D - 101

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-101
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG	DIPPING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M %	F.C %	F.S.I.	C.V.	
12		89.55		3.02	SLST	- SLTS As Above			R1											
						From 88.13 to 89.13. The SLTS is weathered. Broken sticks to rubble.			R1											
	90		92.57			at 88.50 Joint 40° from core Axis			R1	3.31	12									
						at 89.05 Joint 43° from core Axis			R1											
13		92.57		2.6		- SLTS as above. Broken sticks			R1	4.2	31									
						at 91.23 Joint Angle 20°														
	93		95.17			at 91.45 Joint Angle 20°														
14		95.17		3.14		Dark grey SLST, numerous calcite - filled fractures. Shaley throughout. Broken stick to rubble. Calcite fractures at 93.98 (30°)			R1											
										1.27	9.7									
		98.31		3.0		As previous interval			R1	1.67	8.7									
	99		101.31																	
15						RECOVERY MARKERS														
						3.0m 100% 96 - 99														
						2.96 98.7% 99 - 102														
						2.98 99.3% 102 - 105														
						2.75 91.7% 105 - 108														
		101.31		2.96		As previous interval. Fracture at 101.61, 10° angle			R1	1.67	15									
102		104.27		2.98		As previous interval. Rubble throughout. Bottom 13cm. light grey, very silty			R1											
		104.27																		
16		107.25		2.75	SHALE	Shale, very dark grey. Slightly silty. Many calcite filled fractures throughout. Rubbly			R1	1.33	3.7									
	105	107.25																		
	108		110-			RECOVERY MARKERS														
						2.97 99% 108 - 111														
						2.99 100% 111 - 114														

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &/OR S — GOLDR ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	DC - 101
----------	----------

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-101
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
		110-		2.27		Shale as above, also very weathered. Very rubbly throughout			R1											
			112.27																	
17		112.27		.70	SLST	SLST, Dark grey, shaly. Calcite filled fractures: at 110.79 (39°). Some Coal fragments.			R2											
			112.97																	
		112.97		0.37		Slstst - medium to dark gray - shaley - predominant thin, short, horizontal yellowish mud layers throughout - at 111.29 calcite filled fracture			R2											
			113.34																	
		113.34		2.72		Slstst. - medium to dark gray - coal fragments at 112.05 and 112.37m - calcite filled fracture at 114.21 - broken stick			R2	1.34	25.1									
114			116.06																	
						MARKER														
						114 - 117	(3.02/3.00) = 101%													
						117 - 120	(3.00/3.00) = 100%													
18		116.06		3.02		Slstst. - medium gray, broken stick to rubble at base - calcite filled fracture at 114.41 - coal fragments throughout, major ones at 114.63 and 115.12			R2	1.66	13.9									
			119.08																	
		119.08		3.00		Slstst. - as above, dark gray with frequent calcite filled fracture large fracture at 118.36			R1	1.33	18.0									
120			122.08						R2											
						MARKER														
						120 - 123	(2.65/3.00) = 88.3%													
						123 - 126	(3.33/3.00) = 111%													
						126 - 129	(2.90/3.00) = 96.5%													
						129 - 132	(2.93/3.00) = 97.7%													
			122.08		2.65	Slstst. - dark brown, muddy - calcite filled fracture throughout - no bedding - occasional mud clasts - calcite fossil remains - pyrite concretions toward base			R3											
19									R2											

ALL LINEAR UNITS IN METRES

- ▲ MEASURED FROM THE HORIZONTAL PLANE
- ▲ ANGLE MEASURED FROM CORE AXIS
- † R &/OR S — GOLDR ASSOCIATES HARDNESS CODE
- \*RQD — ROCK QUALITY DESIGNATION (%)
- FF — FRACTURE FREQUENCY

HOLE No.	DC - 81D - 101
----------	----------------

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION	SEAM DESIGN	DIPPING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA								
		FROM	TO					HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.		
					At 122.63 - area (10cm) of calcite rimmed mud clasts, very hard			R3												
123		124.73			Pyrite flecks throughout				0.67	18.3										
		124.73		3.33	MDST Mudstone - very dark grey - coal fragments dispersed - pyrite clouds (approx. 1cm in size) throughout - several calcite filled fractures			S5												
126		128.06			- entire unit is cracked and blocky				0.90	3.3										
		128.06		2.90	SLST Sltst. - dark gray, shaley - numerous calcite filled fractures - large fracture at 126.55 - extends vertically upward - At 126.90 coal fragments, calcite filled fractures and clouds of pyrite - this is characteristic of coal in this unit - some curved calcite wisps could be shell fragments - At 127.68m large calcite vein - At 128.12m - coal fragment - numerous, thick contorted calcite infills, white to blue mud bands - 128.54 to 128.79m - contorted calcite bands in siltstone, lots of pyrite. Some medium grained SS.			R2												
					At base very concentrated pyrite bands			R1												
129		130.96							0.34	7.2										
		130.96		0.17	SLST - Medium gray, small calcite pebbles and infilled cracks			R2												
		131.13		0.71	SLST - Medium gray with multicoloured SS sized pebbles throughout. Increase in number to 130.80 where unit becomes SS with silty bands - Coal fragments near bottom - Contorted calcite bands in first half of interval			R3												

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

\* RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	DC - 101
----------	----------

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No	DC -81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD	SAMPLE NO	MOIST %		ASH %	V.M.%	F.C.%	F.S.I	C.V.
													arb.	residual					
20						- alternating in colour - gray to brown in middle of interval													
		131.84				- mudstone clasts surrounded by calcite													
	131.84		0.49		Sltst.	- Dark gray, carbonaceous, muddy			R2										
						- thread-like calcite filled fractures at top													
		132.33				- 130.29m - band of blue pebbles													
						- sand size grains increase towards base													
	132.33		0.27		Sltst.	- Dark gray			R3										
						- grades into medium to coarse grained SS, light gray													
		132.6				- coal and calcite filled fractures throughout													
	132.6		1.38	S.S.	SS.	- medium to coarse grained, light gray alternating with mudstone bands.			R3										
						- band of coal fragments and pyrite at 131.95m													
						- Sltst. bands are pyritic													
						- Pyrite through the SS.													
						- SS. becomes silty near base													
						- Tiny threads of yellow calcite near base													
						- Fractures offset beds in places			R3	1.37	61.1								
132		133.98				- Apparent disturbed bedding													
					MARKER	% RECOVERY													
					132 - 135	(3.05/3.00) = 102%													
	133.98		0.29		SS.	- medium grained to coarse grained light gray think sltst. bands throughout			R3										
						almost vertical fractures filled with calcite appears to be faulted													
						SS. between sltst. layers is medium to fined grained.													
		134.27				thin threads of yellow mudstone thru-out													
	134.27		0.24		SS.	- poorly sorted, medium grained			R3										
						- dark gray mudstone matrix													

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	DC - 101
	81D-





## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % arb. residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
21		137.07		0.15	S.S.	SS. - medium to c.g., bluish, silty throughout coal fragments throughout, calcite wisps dispersed.			R3										
			137.22																
		137.22		0.77	SLST	Sltst. - medium to dark gray; at top - coal and pyrite present. Large coal fragments and calcite infilling at 135.56m. Thin coal bands gradually disappear toward base. At 135.76m clay pebble - light gray surrounded by brownish halo then siltst. Thin calcite band at bottom of unit.			R3										
			137.99																
		137.99		2.02		At top: SS. - calcite rich, m.g., calcite filled fracture at 136.33m. Interbedded SS - light gray and siltst.; some coaly bands. At 137.04m - SS lens - enclosed by silt; 4cm across in size. At 138.41 two mudstone clasts - enclosed 3cm in size, rimmed by coal. Frequent vertical fractures, bedding displaced, some sharp contacts between sand and siltst. bottom 30cm predominantly dark gray siltst.		88°	R3										
	138		140.01			Broken surfaces slickensided, broken stick			R3										
		140.01		1.15		Siltst. - Sandy, dark gray, grades to SS. - medium grained. Siltst. bed at 138.30m with SS load casts. Rest of unit - SS, medium to coarse grained with siltst. bands			R3										
22			141.16																
		141.16		1.76	MDST	Mudstone - Very dark gray - Large coal fragment at 139.46m - Small calcite filled cavities (Fossils?) throughout - Calcite filled fractures			R2										
	141		142.92																
		142.92		3.10		- very dark grey, with contorted calcite veins throughout. Large band of calcite at 141.33, 9cm thick			R3										
	144		146.02																

ALL LINEAR UNITS IN METRES

■ MEASURED FROM THE HORIZONTAL PLANE  
 † R &/OR S — GOLDER ASSOCIATES HARDNESS CODE  
 • RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. DC-81D-101

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-BID-101
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION			SEAM BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	HARDNESS		FRAC FREQ	RQD	MOIST % a.r.b. residual		ASH %	V.M. %	F.C. %	F.S.I.	C.V.			
						MARKERS	% RECOVERY													
						144 - 147	2.90	97%												
						147 - 150	3.00	100%												
						150 - 153	2.75	92%												
		146.02		.18	SHALE	Shale, dark grey to black, very carbonaceous, with dispersed coal fragments.			R3											
			146.2																	
		146.2		1.03	SLST	SLST, light grey with coal fragments throughout		80	R3											
			147.23																	
23		147.23		.60		Interbedded SLST. and shale.		85	R3											
			147.83			Unit is carbonaceous in places. Bioturbated in places.		88												
		147.83		.34		Shale, dark grey to black, very carbonaceous with minor calcite bands.			R3											
147			148.17																	
		148.17		2.20		Basic shale, dark grey, funny little yellow-brownish mud wisps? throughout. Contorted calcite bands at 147.12, possibly infilled bioturbated channelling.			R3											
			150.37																	
		150.37		.22		Calcite, soft at top and bottom, possible fault gouge. Bentonite? Middle hard definitely calcite.			R3											
			150.59																	
		150.59		1.36	SHALE	Shale medium grey, with small coal fragments dispersed through the interval. Mxd clast surrounded by calcite at 149.74.			R3											
150			151.95																	
		151.95		2.75		Shale, medium grey, coal fragments and calcite throughout. Occasional coarse sand size grains in small bands within the shale.			R3											
			154.7																	
153		154.7																		

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE  
 † R &/OR S — GOLDER ASSOCIATES HARDNESS CODE  
 • RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No.	DC - 101
	BID-

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-101
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM BEDDING DESIG.	▲ ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % a.b. residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
	154.7		155.33	.63		As previous interval			R3										
	155.33		155.68	.35		Shale which is brown to dark grey, intensely bioturbated with channels infilled with calcite. At top, thick pyrite - filled channels.			R3										
	155.68		156.18	.50		Shale, dark grey, possibly shell fragments replaced by calcite. Mud clast surrounded by calcite.			R3										
	156.18		157.71	1.53		Shale, medium grey, uniform. Broken stick.			R3		.33	54.7							
156	157.71					MARKERS													
						% RECOVERY													
						153 - 156													
						156 - 159													
						159 - 162													
	157.71		160.61	2.90		Shale, as in previous interval			R3		.33	31.7							
159	160.61		163.31	2.70	SLST/ MDST	Silty mudstone, dark grey, occasional small threads of pyrite and calcite bands but mostly uniform			R3	0	42								
162	163.31					MARKERS													
						% RECOVERY													
						162 - 165													
						165 - 168													
						168 - 171													
	163.31		166.19	2.88		As previous interval Without pyrite or calcite			R3	.34	76.								
165	166.19		169.03	2.84		As previous interval. At 166.55 becomes very rich in coal and contains thin pyrite and calcite veins. Coal looks bright and shiny.			R3										
168	169.03								R2	.70	68								

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	DC-81D-101
----------	------------





CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	DIPPING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
		185.62		1.45	VOLC.	white volcanic rock, probably andesite, with green porphontic crystals throughout. Pyrite filled fractures.			R4										
			187.07																
30	186 189	187.07	190.79	3.72		Same as previous interval				.35 0	52.3 83								
		190.79		2.10		Green volcanic as described before just previous. White coloured unit.			R3										
			192.89																
31		192.89		.69		Same green volcanic rock with a few red clasts, and iron staining.			R3										
	192		193.58							99	74.3								
						MARKERS													
							% RECOVERY												
						180 - 183	3.01m	100.3%											
						183 - 186	2.84	94.7%											
						186 - 189	3.05	102%											
						189 - 192	3.02	100.7%											
						T.D.	193.58m												

ALL LINEAR UNITS IN METRES

- \* MEASURED FROM THE HORIZONTAL PLANE
- ▲ ANGLE MEASURED FROM CORE AXIS
- 1 - R &/OR S — GOLDR ASSOCIATES HARDNESS CODE
- RQD — ROCK QUALITY DESIGNATION (%)
- FF — FRACTURE FREQUENCY

HOLE No.	DC - 101
----------	----------

REC

233b

DIRECTIONAL SURVEY

ROKE OIL ENTERPRISES LIMITED

COMPANY: CROWS NEST RESOURCES GRID: \_\_\_\_\_ DATE SURVEYED: June 16, 1981  
 DRILL HOLE: DC - 81D - 101 LATITUDE: \_\_\_\_\_ SURVEY BY: FAGERNESS  
 LOCATION: DENY'S CREEK DEPARTURE: \_\_\_\_\_ WITNESSED BY: HANDY  
 FIELD: SMITHERS PROJECT ELEVATION: \_\_\_\_\_ CALCULATIONS BY: \_\_\_\_\_  
 MAGNETIC DECLINATION: \_\_\_\_\_ CORRECTION OF: \_\_\_\_\_ FOR: \_\_\_\_\_ GRID: \_\_\_\_\_

SLANT ANGLE FROM VERTICAL, BEARING FROM MAGNETIC NORTH

Num- ber	Cable Depth M	Slant Angle °	Slant Angle Bearing °	Num- ber	Cable Depth	Slant Angle	Slant Angle Bearing	Num- ber	Cable Depth	Slant Angle	Slant Angle Bearing
0	0	0.1	106	11	165	0.5	93	22			
1	15	0.2	194	12	180	0.8	96	23			
2	30	0.2	165	13	191	0.4	275°	24			
3	45	0.3	12	14				25			
4	60	0.2	265	15				26			
5	75	0.2	181	16				27			
6	90	0.2	140	17				28			
7	105	0.3	77	18				29			
8	120	0.3	302	19				30			
9	135	0.2	204	20				31			
10	150	0.1	140	21				32			

# ROKE

OIL ENTERPRISES LTD. CALGARY ALBERTA

FOCUSED BEAM LOG 5 CM 20 CM

Tk-Sm-74-55 8/13/84

FILE NO.	COMPANY	CHARLESTON ASSURANCE LTD.
WELL	DC - 01 D - 101	
LOCATION	HENRY'S CREEK	
FIELD	SALTWATER RESERVOIR	
PROGRAM	RESISTIVE CURRENT LOG	
LOG Measured from	GROUND LEVEL	
Log Measured from	GROUND LEVEL	
Other Services	CSN, RES, DENIS, K. GILL, J.M.	
CSN		
CL	HST/STC	
Bar. No.	008	
Date	19 JUN 1981	
First Reading	19.70	
Second Reading	26.70	
Forage Logged	163.3	
Depth Reached	193.0	
Depth Below	193.0	
Chasing Bit	24.5	
Formation	24.5	
Formation	26.7	
Min. Diam.	30	
Min. @ C	22 @ 275' C	
Operator	15 BURNS	
Truck No.	FW-53	
Recorded By	MALDENSON	Witnessed By

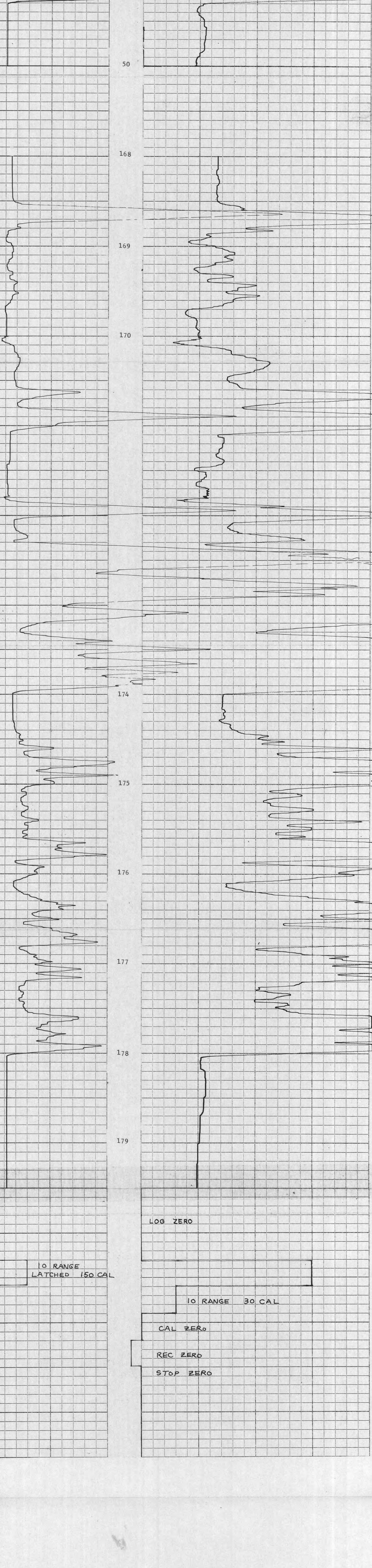
Remarks	FBL # 4	CURRENT RANGE HI	MUDFISH RESISTANCE 1500 OHMS
		ELECTRODE SONDE 10	CM BEAM WIDTH 100 CM ARRAY
		PRIMARY 10 OHM/DIV	SECONDARY 50 OHM/DIV

RESISTIVITY (OHM-METERS)	Depth	RESISTIVITY (OHM-METERS)
		PRIMARY SCALE
		0 100 200
SECONDARY SCALE		0 500 650 1150 1650



Remarks	FBL # 4	CURRENT RANGE LOW	MUDFISH RESISTANCE 1500 OHMS
		ELECTRODE SONDE 7	CM BEAM WIDTH 60 CM ARRAY
		PRIMARY 10 OHM/DIV	SECONDARY 50 OHM/DIV

RESISTIVITY (OHM-METERS)	Depth	RESISTIVITY (OHM-METERS)
		PRIMARY SCALE
		0 100 200
SECONDARY SCALE		0 500 650 1150 1750





7-594-405 8/12/81

# ROKE

SIDWALL CALIPER  
 OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY: CROSSBERRY RESOURCES LTD.  
 WELL: PC - 81 D - 101  
 LOCATION: HORN'S CREEK  
 FIELD: SUTTERS ROBOCO

**233**  
 (84)

PROVINCIAL: SUTTERS CONSULTANTS  
 GEOLOGICAL: GROUND LEVEL  
 LOG Measured From: GROUND LEVEL  
 Well Depth Measured From: GROUND LEVEL

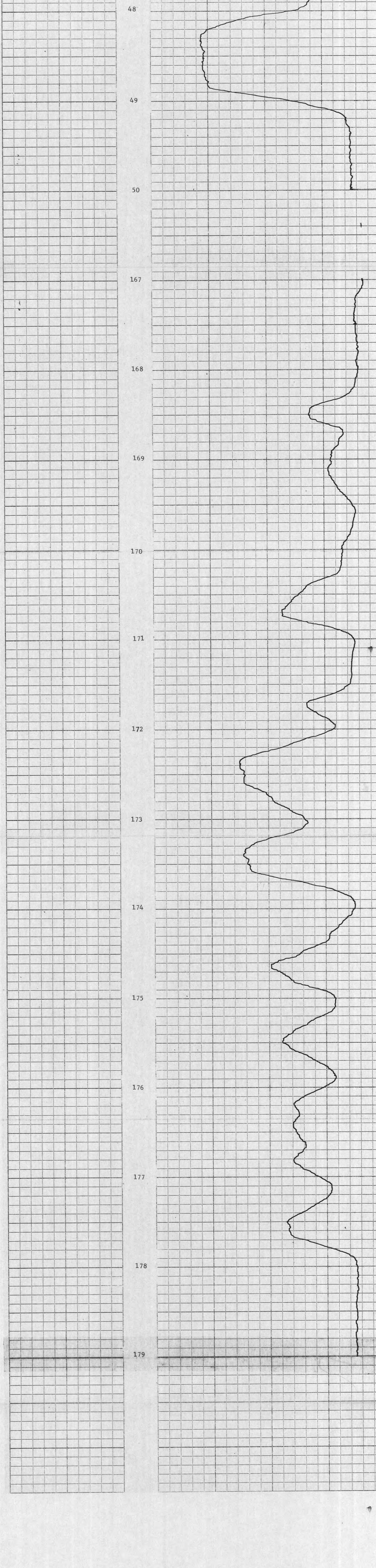
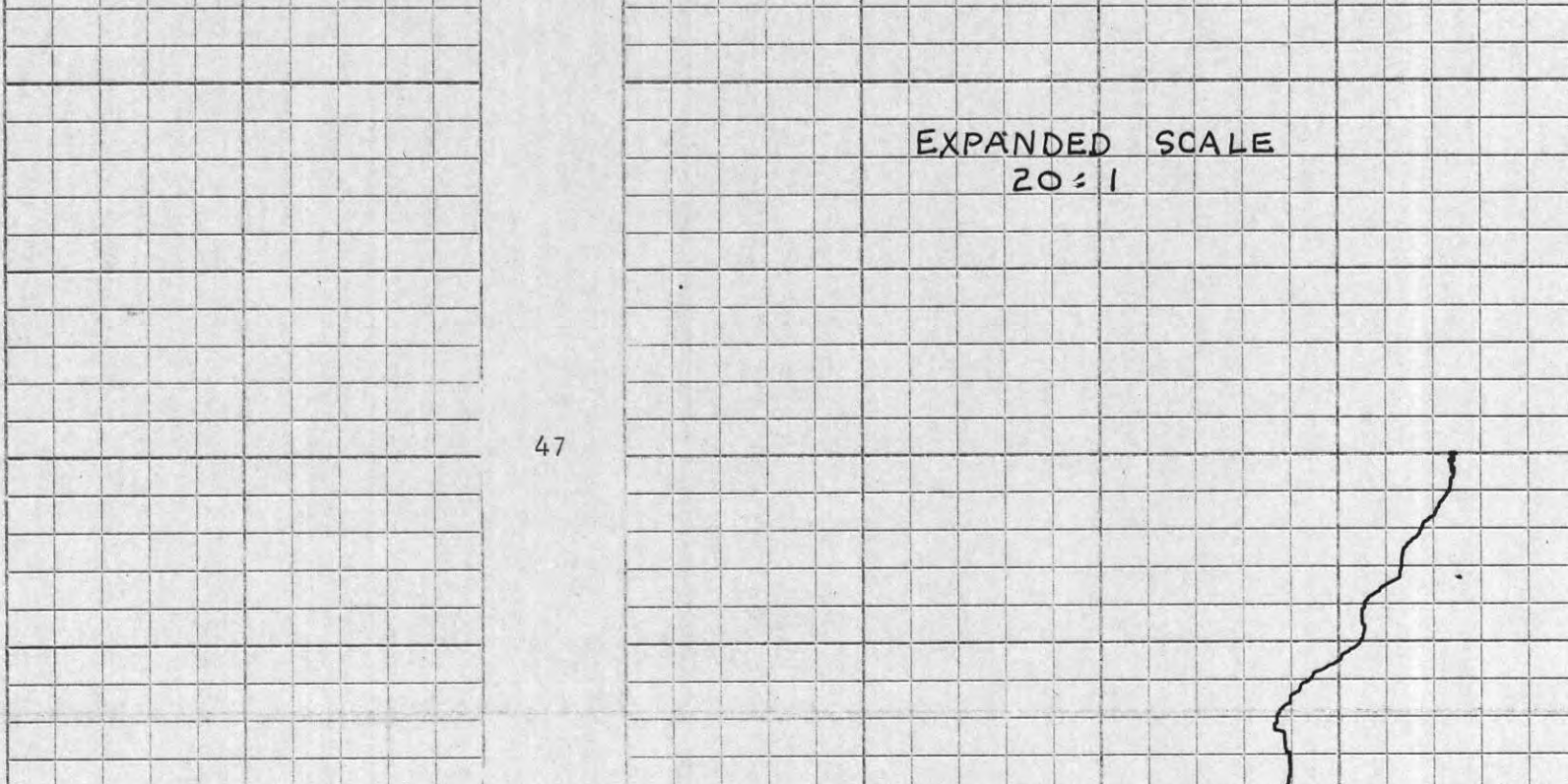
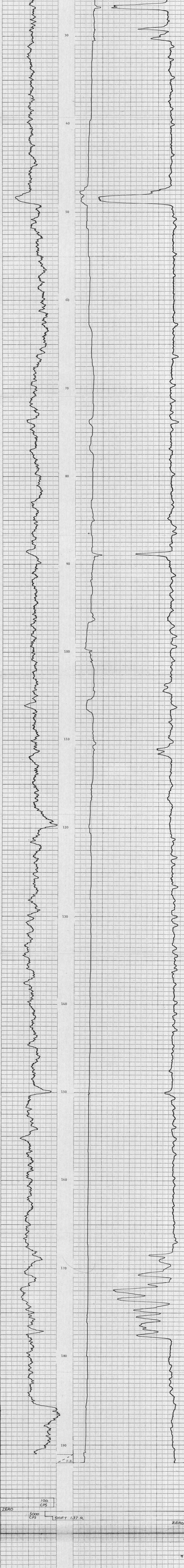
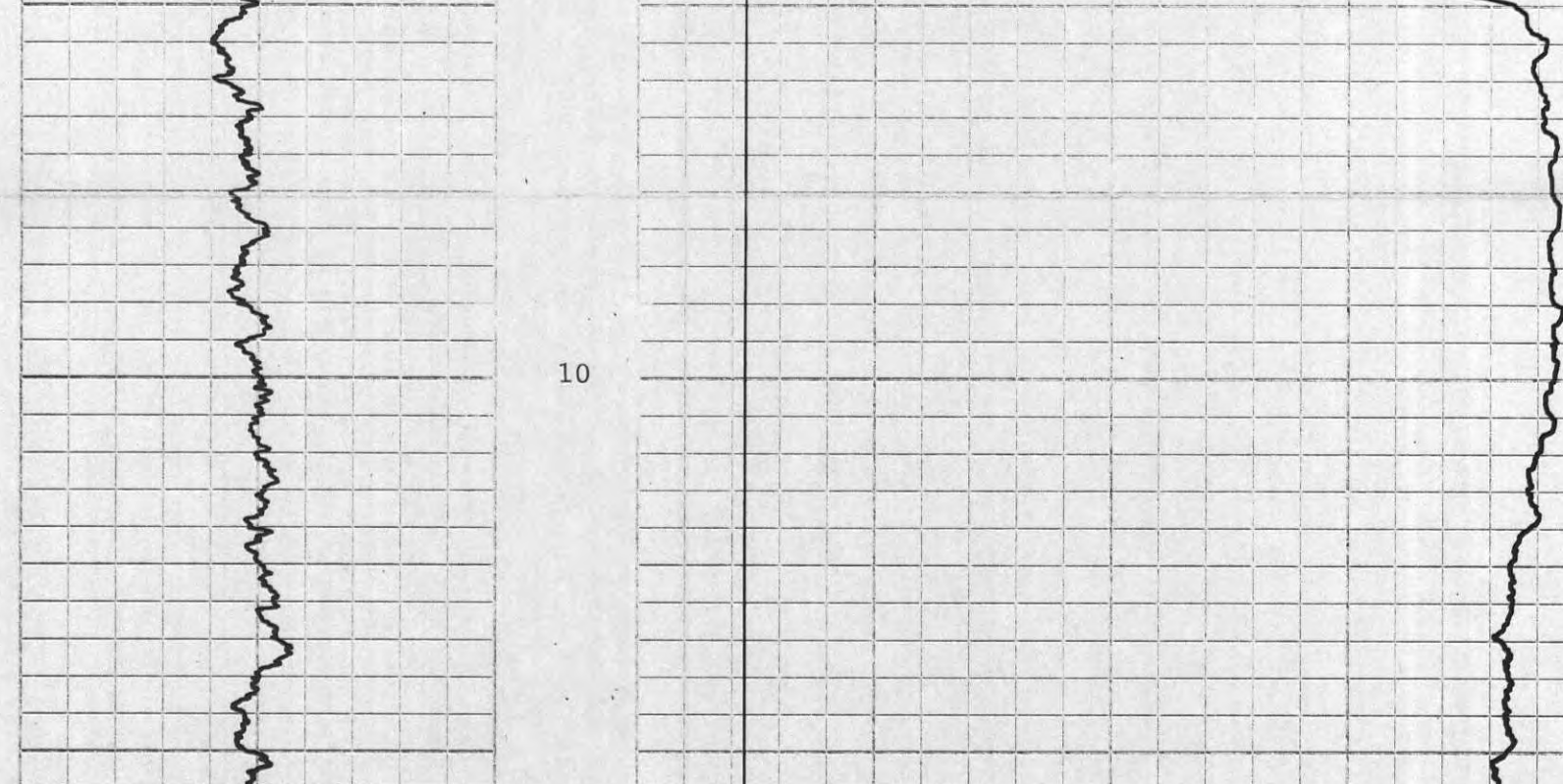
Run No. 16  
 Fluid Reading 0  
 Foilage Logged 191.0

Depth Interval 191.0 - 192.0  
 Depth Interval 192.0 - 193.0

Operating Time: 1 HOUR  
 Fluid Type: WATER/MDM  
 Mud: MUD

RUN NO.	DEPTH - M		SPEED - M/ MIN	GAMMA RAY		SIDWALL DENSLOG	
	FROM	TO		SEC	API	SEC	CPG/ DIV
1	0	191.0	4	120	1.37 R	199.61	
2	0	192.0	8		1.37 R	199.61	
3	0	192.0	8		1.37 R	199.61	
2	47.0	50.0	4		1.37 R	199.61	
2	168.0	179.0	4		1.37 R	199.61	

REMARKS: DENSITY TOOL #241 AS  
 CALIPER TOOL #857



# ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

GAMMA RAY NEUTRON LOG

FILE NO. COMPANY GRASSMERE RESOURCES LTD.  
 WELLS 100 - 81 D - 101  
 LOCATION DENY'S CREEK  
 FIELD SUTHERS PROJECT

PROVINCE BRITISH COLUMBIA  
 PERMIT NO. GROUND LEVEL  
 Log Measured from GROUND LEVEL  
 Well Depth Measured from GROUND LEVEL

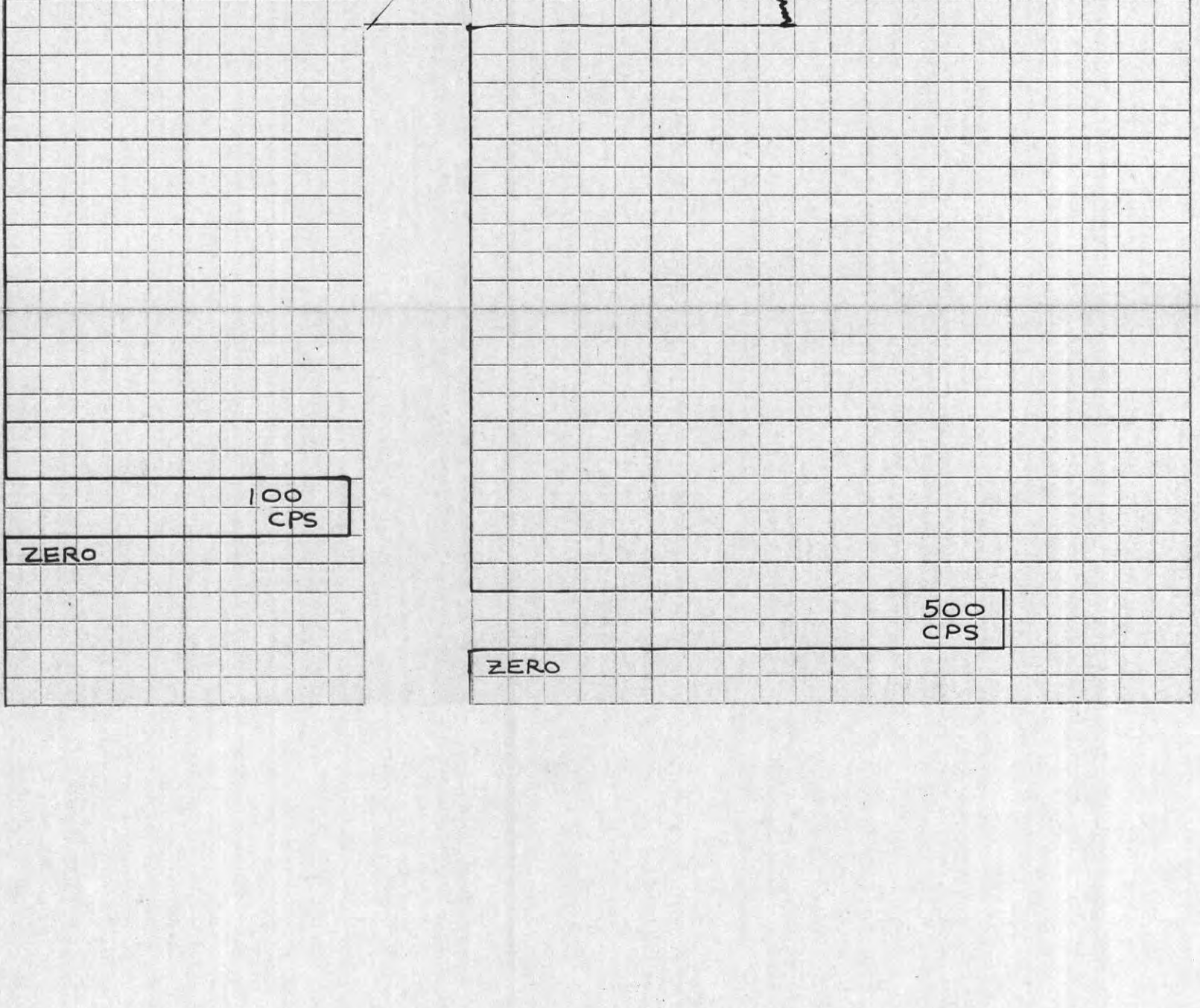
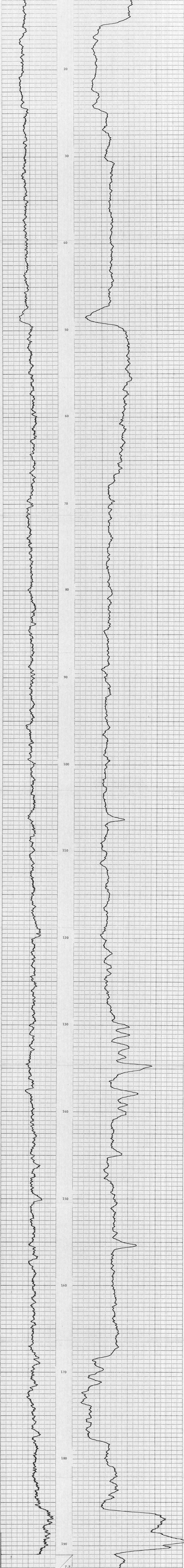
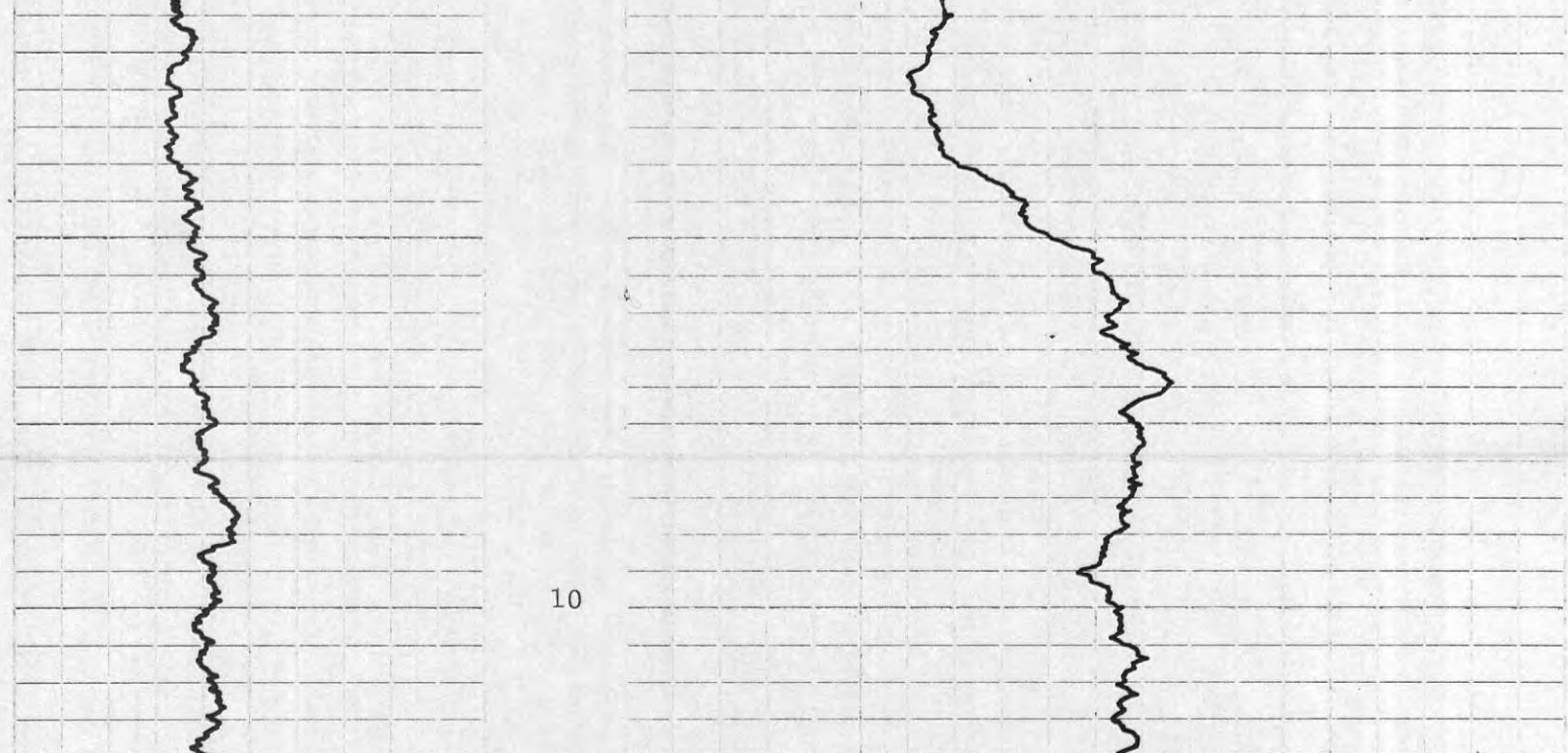
DATE 16 JUNE 1984  
 TIME 08:00  
 LOGGERS J. J. JONES, G.L.,  
 J. J. JONES, G.L.,  
 G.L. METZNER

233

Run No.	ONE	Run No.	ONE
Date	16 JUNE 1984	LOG TYPE	NEUTRON/NEUTRON
Fast Reading	193.0 m	TOOL MODEL NO.	
Frontage Logged	0	DIAMETER	3.18 cm
Depth Reader	193.2	DETECTOR MODEL NO.	15 24 cm
Depth Driver	193	TYPE	PROPORTIONAL
Casing Hole	24.5	LENGTH	MRC-NSS-W
Casing Driver	24.0	SOURCE MODEL NO.	127
Fluid Type	WATER/MUD	SERIAL NO.	
Mud Weight	NO	SPACING	38.1 cm
Mud Depth	NO	TYPE	AmBe
Run @		STRENGTH	3 CURIES
Operation Time	1 HOUR		
Truck No.	FU - 3		
Recorded By	FALGHERNESS	Witnessed By	JAYD

EQUIPMENT DATA			
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.18 cm	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	3.18 cm
TYPE	SCINTILLATION	DETECTOR MODEL NO.	15 24 cm
LENGTH	10.16 cm	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.0 m	LENGTH	MRC-NSS-W
GENERAL		SOURCE MODEL NO.	127
HOIST TRUCK NO.	FU - 3	SERIAL NO.	
INSTRUMENT TRUCK NO.	FU - 3	SPACING	38.1 cm
TOOL SERIAL NO.	RGRN 125 A 006	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA										
GENERAL		GAMMA RAY			NEUTRON					
RUN NO.	DEPTH	SPEED	T.C.	SENS	ZERO	API G. R. UNITS	T. C.	SENS	ZERO	API N. UNITS
1	FROM 0 TO 193.0	M/MIN 4	SEC 3	SETTINGS 500	DIV. L OR R 0	PER LOG DIV. 12	SEC 3	SETTINGS 500	DIV. L OR R 0	PER LOG DIV. 50
REMARKS LOGGED THROUGH NO DRILL RODS										



ENCL 6-9

# CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

DATE	BEGIN	06/19/81
	END	06/23/81

HOLE No.	DC-81D-102
----------	------------

### HOLE PARTICULARS

LOCATION	N - 6031723.93		
	E - 611604.50		
ELEVATION	1214.89	HOLE BEARING (AZ°)	-
TOTAL DEPTH	207.10m	HOLE ANGLE (°)*	-90°

### LOGGING

LOGS RUN	GRN, CAL, DEN
LOGGED BY	ROKE
OTHER TESTS	

### COAL CORING PERFORMANCE

CORE DIAMETER	NO- 1 7/8"
CORE RECOVERED	-
LENGTH CORED	-
CORE RECOVERY	- %

### EXAMINATION

LOG USED	GRN
No. OF SEAMS SAMPLED	NONE
EXAMINER (S)	Patenaude Hartmann
DATE	07/01/81

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA													
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC. FREQ.	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.							
1	16.46			.54	MDST	- Top 4cm weathered mudstone, rest of interval dark grey, cracked, somewhat silty mudstone, rubbly.																				
			17.00							R2	1.85	0														
						MARKERS	% RECOVERY																			
						17 - 20	2.99m - 99.9%																			
						20 - 23	2.96m - 98.7%																			
						23 - 26	3.10m - 103%																			
17	17.00			2.99		- Dark grey silty mudstone with brown mudstone bands occasionally. Broken up, cracked, broken surfaces, irregular and rough.				R2																
			19.99								1.67	0														
20	19.99			2.96		- Same as previous interval except for 12cm of light coloured, fine to medium grained, cross-bedded sandstone at 20.79. Last .5m interval very rubbly.				R2																
									50°	R5																
2			22.95							R2	1.35	3.78														
23	22.95			3.10		- Dark grey muddy siltstone, almost all rubble, with several brown coloured siltstone clasts throughout.				R2																
			26.05																							
						MARKERS	% RECOVERY																			
						26 - 29	2.96m - 98.7%																			
						29 - 32	2.88m - 96%																			
						32 - 35	3.04m - 101%																			
26	26.05			2.96		- Entire interval dark grey mudstone with some slickensided, broken surfaces and several calcite filled fractures, cracked, broken stick.				R2																
3			29.01								1.0															
29	29.01			2.88		- Dark grey silty mudstone with some weathered areas at fracture points and bands of thinly bedded, lighter coloured, fine grained sandstone.				R2																
			31.89								1															

7K-Sm-HAWES Q1(3)A

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R & / OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	81D-102
----------	---------

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-102
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % a.r.b. residual		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
3	32	31.89		3.04	MDST	- Predominantly silty mudstone, with occasional brown siltstone and lighter coloured sandstone bands. Broken up		52°	R2										
4			34.93								.66	3.78							
					MARKERS	% RECOVERY													
					35 - 38	2.83m - 94%													
					38 - 41	3.16m - 105%													
					41 - 44	2.79m - 93%													
	35	34.93	37.76	2.83		- Same as previous interval													
5	38	37.76	40.92	3.16		- Same as previous interval													
	41	40.92		2.79		- Same as previous interval. 4cm, brown siltstone band at 42.94, cracked, broken stick		48°	R2										
			43.71								.33	4.74							
					MARKERS	% RECOVERY													
					44 - 47	2.98m - 99%													
					47 - 50	3.06m - 102%													
					50 - 53	3.01m - 101%													
	44	43.71		2.98		- Same as previous, dark grey silty mudstone, with sandstone bands. Broken stick.		50°	R2										
6		46.69									.33	5.37							
	47	46.69	49.85	3.16		- Same as previous interval			R3	.66	32								
	50	49.85	52.86	3.01		- Same as previous interval			R3		20.5								
7					MARKERS	% RECOVERY													
					53 - 56	3.00m - 100%													
					56 - 59	2.96m - 98.7%													
					59 - 62	3.07m - 102%													
	53	52.86	55.86	3.0		- Same as previous interval		55°	R2	.33	10								
	56	55.86		2.96		- Same as previous interval. Broken surfaces stepped, or irregular.		55°	R2										
8		58.82							R3	.66	8.4								
	59	58.82	61.89	3.07		- Same as previous interval.													

ALL LINEAR UNITS IN METRES

■ MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDR ASSOCIATES HARDNESS CODE

\* RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. DC 102

FILE No BA-267  
REVISED Feb. 1981  
FORMERLY FILE No. BA-212A

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC -81D-102
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION			SEAM DESIGN	BEDDING ANGLE (°)	SUMMARY GEOTECH			ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	% RECOVERY			HARDNESS	FRAC FREQ	RQD	SAMPLE NO.	MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
												arb.	residual							
8					MDST	MARKERS	% RECOVERY													
						62 - 65	2.84m - 94.7%													
						65 - 58	3.11m - 109.7%													
						68 - 71	3.03m - 101%													
9	62	61.89	64.73	2.84		- Same as previous interval			48°	R2	.33	14.4								
	65	64.73	67.84	3.11		- Same as previous interval			60°	R2	.66	4.2								
	68	67.84		3.03		- Same as previous interval, with several beds of light grey to brown very hard, calcite cemented siltstone. Average bed thickness approximately 4cm. Breakage planes are along beds.				R2										
10										R4										
												1.0	3.63							
						MARKERS	% RECOVERY													
						71 - 74	2.94m - 98%													
						74 - 77	3.02m - 101%													
						77 - 80	3.00m - 100%													
	71	70.87	73.81	2.94		- Same as previous interval, very broken up.			48°	R2										
11	74	73.81		3.02	SLST	- Same as previous interval, becoming a lighter coloured siltstone with sandstone bands throughout.			48°	R2										
											.66	27.8								
	77	76.83		3.00		- Same as previous interval. Sandstone is grey-greenish in colour. A 4cm brown, very hard siltstone with pyrite nodules.				R2										
12												2	10							
						MARKERS	% RECOVERY													
						80 - 83	2.90m - 96.7%													
						83 - 86	3.06m - 102%													
						86 - 89	3.01m - 100.3%													
	80	79.83		2.90		- Same as previous interval, with a weathered fracture zone with calcite infills at 82.33			55°	R2										
											4	4.48								
	83	82.73		3.06		- Same as previous interval, muddy siltstone with sandstone lenses.				R2										
											2.33									
13	86	85.79	88.80	3.01		- Same as previous interval. Broken stick.			55°	R3	2	12.6								

ALL LINEAR UNITS IN METRES

■ MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. DC 81D-102

# CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-102
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH.			ANALYTICAL DATA								
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD	SAMPLE NO.	MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.	
					MARKERS	% RECOVERY														
					89 - 92	3.13m - 104%														
					92 - 95	2.95m - 98.3%														
					95 - 98	2.99m - 99.7%														
14	89	88.80	91.93	3.13	SIST	- Same as previous interval. Rubbly in places			R2	1	13.1									
	92	91.93	94.88	2.95		- Same as previous interval. Very broken up.			R2	.66										
	95	94.88		2.99		- Same as previous interval. Increasingly sandy. Broken stick to rubble.		56°	R2											
15			97.87						R3	.66	9.03									
					MARKERS	% RECOVERY														
					98 - 101	2.82m - 94%														
					101 - 104	2.96m - 98.7%														
					104 - 107	3.14m - 105%														
	98	97.87		2.82		- Same as previous interval. Dark grey siltstone with sandstone beds throughout.			R2											
			100.69						R3	1	9.22									
	101	100.69	103.65	2.96		- Same as previous interval			R2	1	6.75									
16	104	103.65	106.79	3.14		- Same as previous interval			R2	.66	9.55									
					MARKERS	% RECOVERY														
					107 - 110	3.11m - 104%														
					110 - 113	3.05m - 101.6%														
					113 - 116	3.04m - 101.3%														
	107	106.79	109.90	3.11		- Same as previous interval			R2		3.53									
17	110	109.90	112.95	3.05		- Same as previous interval		70°	R2	.66	21.3									
	113	112.95		3.04		- Same as previous interval. Fractured across bedding planes.			R2											
18			115.99						R3	2.33	7.23									
					MARKERS	% RECOVERY														
					116 - 119	3.10m - 103%														
					119 - 122	2.94m - 98%														
					122 - 125	2.93m - 97.7%														
	116	115.99	119.09	3.10		- Same as previous interval		63°	R2	1.0	3.87									

ALL LINEAR UNITS IN METRES

★ MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† • R &/OR S — GOLDIER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	81D-DC 102
----------	------------

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC -81D-102
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIG	BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA									
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.			
19	119	119.09	122.03	2.94	SLST	- Same as previous interval. Many fractured areas throughout. Calcite vein at 121.15. Rehealed fault at 120.15		66° 74°	R2													
	122	122.03	124.96	2.93		- Same as previous interval. Very fractured. Some broken surfaces are carbonaceous and shiny. Joint at 123.16, angle 11°. Two fracture types, parallel to bedding, and perpendicular to bedding.		71° 60°	R2													
						MARKERS	% RECOVERY															
						125 - 128	2.97m - 98%															
						128 - 131	2.96m - 96.7%															
20	125	124.96	127.93	2.97		- Same rock type. A low calcite band at 126.03. Same fracture pattern as above. Mostly rubble, weathered in places. Broken surfaces, shiny and slickensided.		69° 75°	R1 R2													
	128	127.93	130.89	2.96		- Same siltstone, less fractures, weathered in places.		70°	R2	.33	20.9											
21						MARKERS	% RECOVERY															
						131 - 134	2.94 - 98%															
						134 - 137	3.06 - 102%															
						137 - 140	2.97 - 99%															
	131	130.89	133.83	2.94		- Same as previous interval. At 133.44, 14cm of very hard, light brown, very fine grained sandstone, broken up throughout.			R2 R3		2.39	.04										
	134	133.83	136.89	3.06		- Same rock type as previous intervals. (interbedded siltstone and sandstone), quite broken up.			R2		1.63											
22	137	136.89	139.86	2.97		- Same as above. Fracture zone at 138.52 (Weathered calcite filled fracture). Fracture surface slickensided. Joints show displaced bedding. Last 12cm are very weathered with lots of calcite throughout. Broken surface dark and shiny. Broken sticks		65°	R2													
	140	139.86									2.02	.073										

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† R &amp;/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No.	81D-102
----------	---------



## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-102
CONTINUED	

PAGE 6  
OF 9

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION			SEAM DESIG	DIPPING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA						
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	% RECOVERY			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M. %	F.C. %	F.S.I.	C.V.
22					SLST/	MARKERS	% RECOVERY													
					SS	140 - 143	2.81m - 93%													
						143 - 146	2.82m - 94%													
23	139.86	142.67	2.81	2.81	SLST/	- Same as previous interval, .06cm of sandstone at 141.84, broken sticks to rubble					R2									
					S.S.						R3	1.42								
	142.67		2.82	2.82		- Same as previous interval. Fracture zone near bottom of interval. Large calcite vein at 145.03. Broken surfaces, smooth and shiny				75°	R2									
	146	145.49										3.91								
						MARKERS	% RECOVERY													
						146 - 149	3.03m - 101%													
						149 - 152	3.05m - 101%													
	145.49		3.03	3.03		- Same as previous interval, broken throughout last half more broken up. Very weathered filled with calcite, broken surfaces, shiny and black.					R2									
	149	148.52									R1									
24	148.52		3.05	3.05		- Medium grained siltstone interbedded with greenish grey sandstone and occasional brown mudstone bands. Broken surfaces, usually broken and shiny, sometimes smooth and dull.					R2									
	152	151.57								62°		1.96	.04							
						MARKERS	% RECOVERY													
						152 - 155	2.94m - 98%													
						155 - 158	3.1m - 103%													
25	155	154.51	2.94	2.94		- Same as above					R2	.68	.04							
		154.51	3.1	3.1		- Same as above with 10cm of light coloured, hard, limestone calcite veins throughout, becoming more siltstone then sandstone above and below limestone carbonaceous shale.					R2									
	158	157.61										.64								
						MARKERS	% RECOVERY													
						158 - 161	2.94m - 98%													
						161 - 164	2.95m - 98%													

ALL LINEAR UNITS IN METRES

■ MEASURED FROM THE HORIZONTAL PLANE  
 \* R &/OR S — GOLDER ASSOCIATES HARDNESS CODE  
 \* RQD — ROCK QUALITY DESIGNATION (%)  
 FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No.	DC-81D-102
----------	------------

FILE No BA-267  
 REVISED Feb. 1981  
 FORMERLY FILE No. BA-212A

## CORE &amp; COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No.	DC-81D-
CONTINUED	102

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO.	ANALYTICAL DATA							
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST %		ASH %	V.M.%	F.C.%	F.S.I.	C.V.	
													or.b.	residue						
26		157.61		2.94	SLST/SS	Very dark carbonaceous siltstone, occasional light brown mudstone bands, very broken up. Tiny fractures throughout. Last 2cm of interval, a very shiny, pyritic, fractured coal bed.			R2											
			160.55								1.33									
	161	160.55		2.95		- Same as previous interval. Band of medium grained weathered sandstone 2cm wide at 161.62. Very uniform siltstone, occasional fossils throughout. Very brittle, tiny fractures, no sandstone.			R2											
			163.50								.33									
						MARKERS					% RECOVERY									
						164 - 167					3.00m - 100%									
						167 - 170					3.05m - 102%									
27	164	163.50		3.00		Same as previous interval. Occasional mud nodules.			R1											
			166.50								1									
	167	166.50		3.05		- Same as previous interval. Very carbonaceous dark grey.			R1											
			169.55								3									
						MARKERS					% RECOVERY									
						170 - 173					2.92m - 97.3%									
						173 - 176					3.11m - 103%									
						176 - 179					3.20m - 107%									
						179 - 182					3.08m - 102%									
28	170	169.55		2.92		- Same as previous interval, becoming less fractured.			R2											
			172.47								.66									
	173	172.47		3.11		- Same as previous interval, coal at 173.72, 1cm in a fracture. Another at 174.30. Last 2cm is a weathered sandstone bed. Coal is shiny, conchoidal fracturing.			R2											
			175.58								.66	25.1								
29	176	175.58		3.20	SLST/SHALE	- Black siltstone to shale. Calcite blebs. (Muddy siltstone). No sandstone.			R2											
			178.78								.31									
	179	178.78		3.08		- Same as above, undulating fracture, slickenside, occasional calcite infiltration.			R2	1.62										
	182		181.86			Pyrite.			R3											

ALL LINEAR UNITS IN METRES

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : R &amp; / OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. 81D-  
DC 102FILE No BA-267  
REVISED Feb. 1981  
FORMERLY FILE No. BA-212A



CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No	DC-81D-
CONTINUED	102

BOX No.	DEPTH AT TOP OF BOX	DEPTH		TH.	LITHO DESCRIPTION		SEAM DESIGN	DIPPING ANGLE (°)	SUMMARY GEOTECH			SAMPLE NO	ANALYTICAL DATA									
		FROM	TO		MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)			HARDNESS	FRAC FREQ	RQD		MOIST % arb. (residual)		ASH %	V.M. %	F.C. %	F.S.I.	C.V.			
33	200	199.58		2.92		- As previous. Last 23 cm of interval is light coloured, very calcite rich shale (limestone?). Fracture zone at 202.12, broken surfaces slickensided, evidence of shearing, weathered.			R3													
			202.50						R4													
									R2													
											1.0	41.8										
	203	202.50		3.08		- Same as previous interval. 3cm fine grained, light coloured sandstone at 203.77.			R2													
34			205.58			Weathered zone at 205.07. Reappearance of tiny fractures throughout whole interval.																
	206	205.58		1.52		- Same as previous interval.			R2													
			207.10																			
	207																					
						T.D. 207.10m																

ALL LINEAR UNITS IN METRES

- \* MEASURED FROM THE HORIZONTAL PLANE
- ! R &/OR S — GOLDR ASSOCIATES HARDNESS CODE
- RQD — ROCK QUALITY DESIGNATION (%)
- FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No.	81D-DC 102
----------	------------

233c

DIRECTIONAL SURVEY

ROKE OIL ENTERPRISES LIMITED

COMPANY: CROWS NEST RESOURCES LTD. GRID: \_\_\_\_\_ DATE SURVEYED: 23 JUNE 1981  
 DRILL HOLE: DC - 81D - 102 LATITUDE: \_\_\_\_\_ SURVEY BY: FAGERNESS  
 LOCATION: DENYIS CREEK DEPARTURE: \_\_\_\_\_ WITNESSED BY: HANDY  
 FIELD: SMITHERS PROJECT ELEVATION: \_\_\_\_\_ CALCULATIONS BY: \_\_\_\_\_  
 MAGNETIC DECLINATION: \_\_\_\_\_ CORRECTION OF: \_\_\_\_\_ FOR: \_\_\_\_\_ GRID: \_\_\_\_\_

SLANT ANGLE ° FROM VERTICAL, BEARING ° FROM MAGNETIC NORTH

Number	Cable Depth	Slant Angle	Slant Angle Bearing	Number	Cable Depth	Slant Angle	Slant Angle Bearing	Number	Cable Depth	Slant Angle	Slant Angle Bearing
0	0	0.8	4	11	165	3.8	162	22			
1	15	0.4	211	12	180	5.2	147	23			
2	30	0.2	223	13	195	6.5	160	24			
3	45	2.0	215	14	206	7.0	166	25			
4	60	2.1	247	15				26			
5	75	2.0	7	16				27			
6	90	2.0	190	17				28			
7	105	2.2	193	18				29			
8	120	2.8	203	19				30			
9	135	2.6	197	20				31			
10	150	3.0	66	21				32			

7-57445 8133A

# ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.	COMPANY	CROSSBEE RESOURCES LTD.
LSD	WELL	DC - 81 D - 102
SEC	TRF	
AGE	LOCATION	DEW'S CREEK
VI	FIELD	SUTHERS PROJECT
PROVINCE	PROVINCE	BRITISH COLUMBIA
PERMIT NO.	ISSUED DATE	Exp. Date
LOG MEASURED FROM	CASINO LEVEL	ANOM FROM DATUM
LOG MEASURED TO	CASINO LEVEL	9.7
LOG MEASURED BY	CASINO LEVEL	METRIC
DATE	DATE	DATE
29 JUNE 1981		
0		
204.0		
0		
204.0		
207		
44.5		
44.5		
44.5		
WATER/NUD		
TI/UL		
NO		
NO		
1 HOUR		
FU - 3		
RGRN 125 A 002		
Witnessed By	Witnessed By	
FARMERSS	NAVDS	

# 233

26

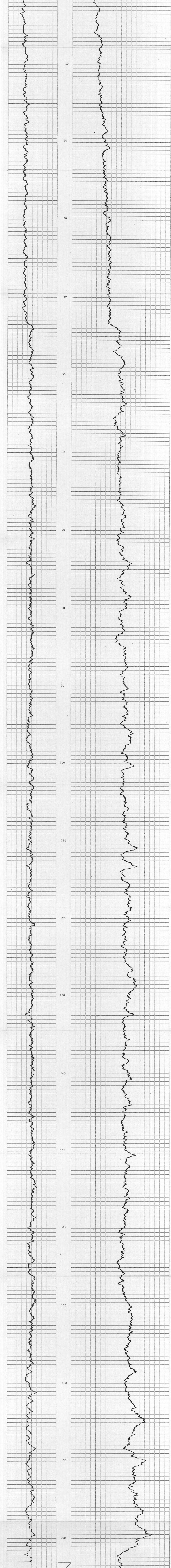
### EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.18 cm	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	3.18 cm
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10.16 cm	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.0 m	LENGTH	15.24 cm
		SOURCE MODEL NO.	MRC-N-SS-W
		SERIAL NO.	127
		SPACING	38.1 cm
		TYPE	AmBe
		STRENGTH	3 curies
GENERAL		GENERAL	
HOIST TRUCK NO.	FU - 3		
INSTRUMENT TRUCK NO.	FU - 3		
TOOL SERIAL NO.	RGRN 125 A 002		

### LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	FROM	TO	SPEED	T.C.	SENS	ZERO	API G. R. UNITS	T.C.	SENS	ZERO	API N. UNITS
1	0	204.0	4	3	500	0	12	3	500	0	50

REMARKS: LOGGED THROUGH NO DRILL RODS



100  
CPS  
ZERO

100  
CPS  
ZERO

7-Smithers 81(3)9

# ROKE

GAMMA RAY  
SIDEWALL DENSITOG  
CALIPER

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY GEOSYSTEM RESOURCES LTD.

WELL DC - 81 D - 102

LOCATION DENY'S CREEK

FIELD SMITHERS PROJECT

PROVINCE ALBERTA

LOG MEASURED FROM GROUND LEVEL

WELL DEPTHS MEASURED FROM GROUND LEVEL

DATE 23 JUNE 1981

TIME 09:00

LOGGERS J. H. ...

DEPTH REACHED 206.5

DEPTH DRIFFER 207.0

CHANGING DIAPER 44.5

FLUID TYPE WATER/KMD

LIQUID LEVEL NO

MINI DRAIN NO

OPERATING TIME 2 HOURS

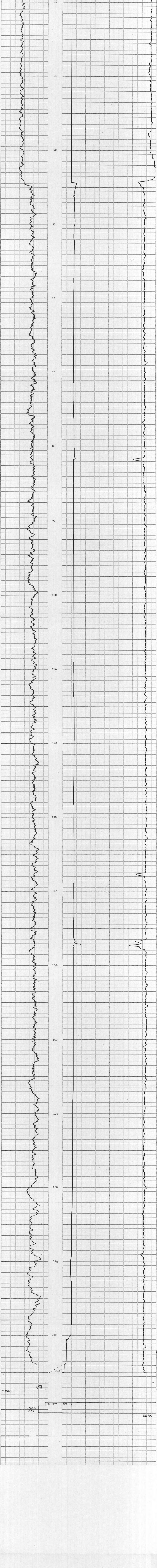
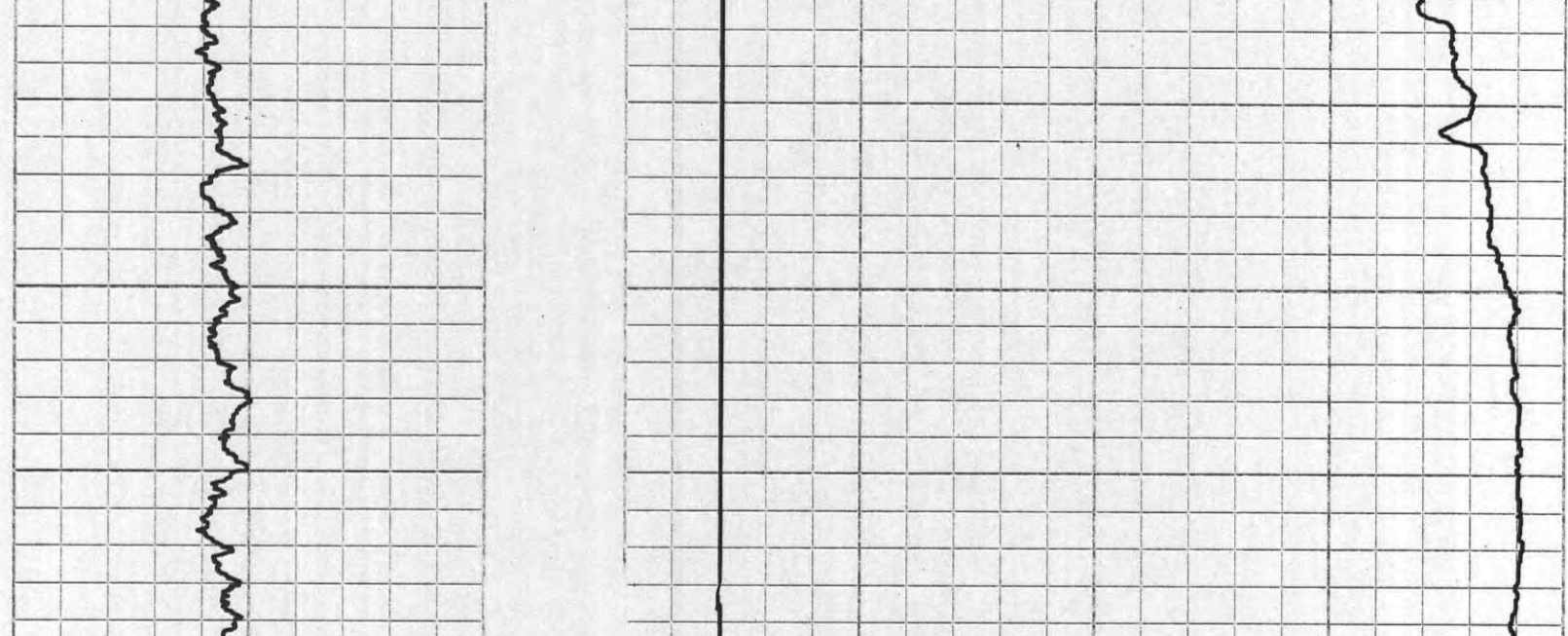
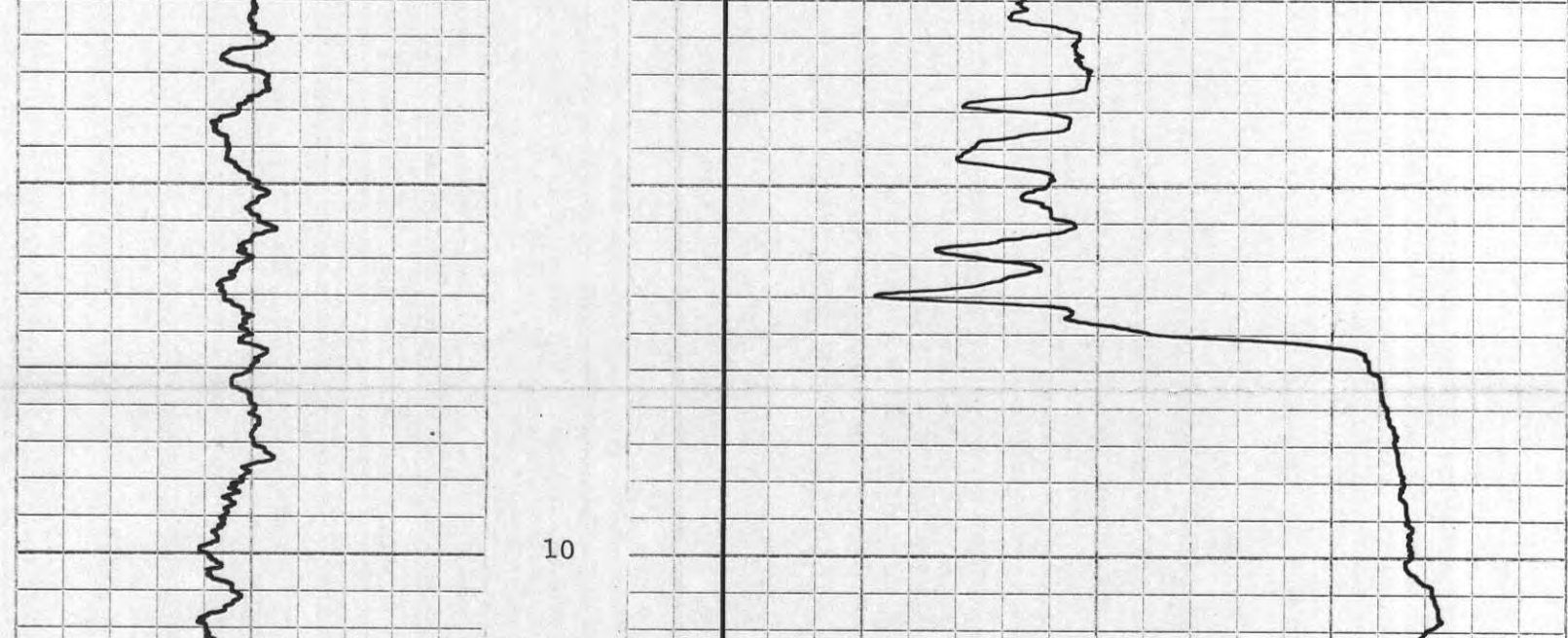
TRUCK NO. FU - 3

233

21

GENERAL			GAMMA RAY			SIDEWALL DENSITOG		
RUN NO.	DEPTHS FROM	TO	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R
1	0	204.0	4	500	0			
2	0	205.0	8			0.5	5000	1.37 R
3	0	205.0						

REMARKS DENSITY TOOL # 241 AS  
CALIPER TOOL # 857



SHIFT 1.37 R

100 CPS  
5000 CPS  
ZERO

Recorded By: JAGREBESS Witnessed By: HANBY