111

GR-MT KLAPPAN 83(3)

MOUNT KLAPPAN COAL PROJECT

GEOLOGICAL REPORT

1983

APPENDIX IV

COAL TRENCH DATA

VOLUME I

GULF CANADA RESOURCES INC.

COAL DIVISION

CONFIDENTIAL

APPENDIX IV
VOLUME I
COAL TRENCH DATA

CONFIDENTIAL COAL QUALITY DATA HAS BEEN REMOVED

APPENDIX IV
Coal Trench Data
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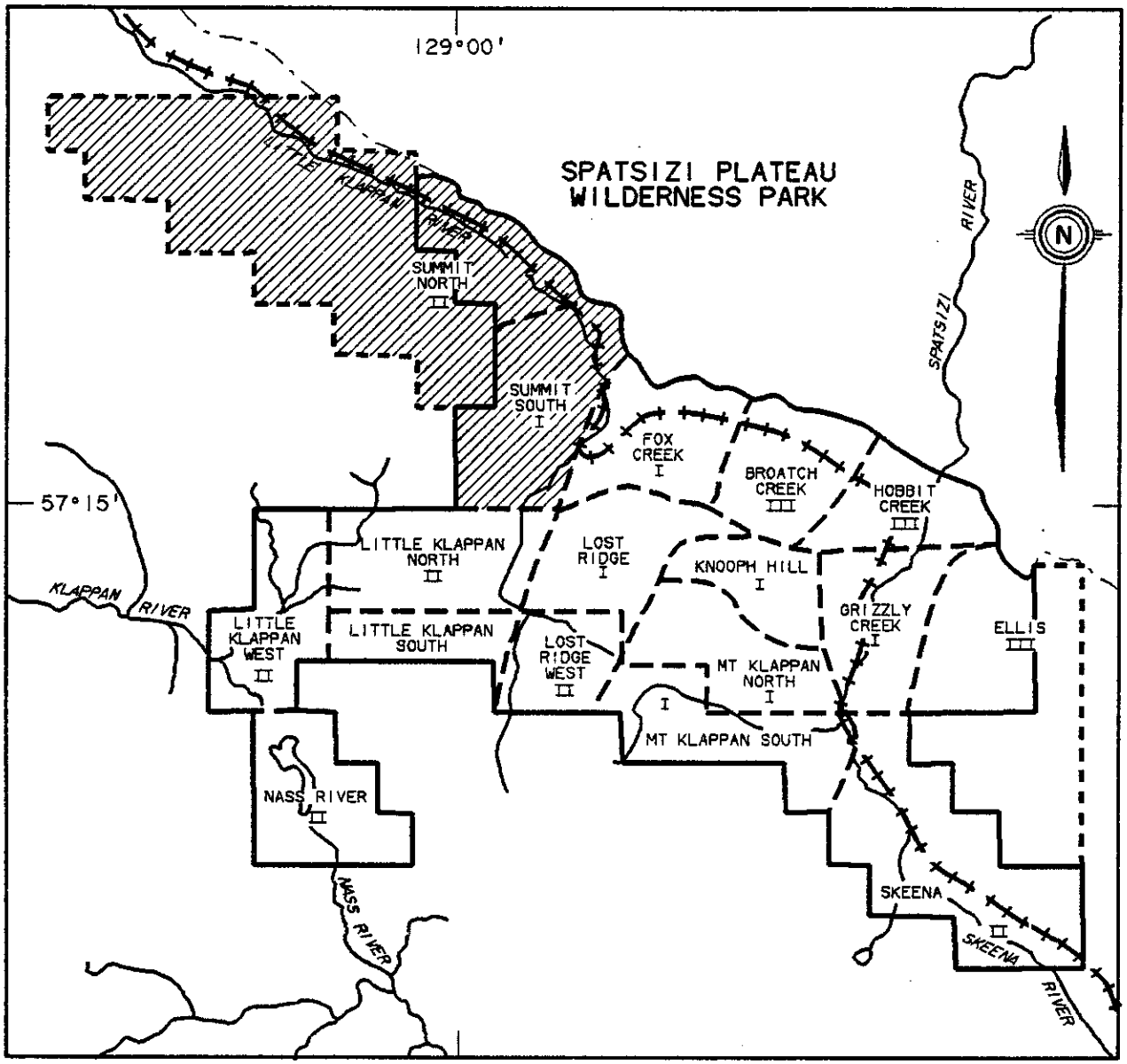
MT. KLAPPAN COAL PROPERTY

SUMMIT AREA



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- LICENCE AREA
- LICENCES UNDER APPLICATION
- I FIRST PRIORITY
- II SECOND PRIORITY
- III THIRD PRIORITY

SCALE

0 1 2 3 km

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION S.N.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNSNTRC83048	6349990.0	498290.0	2011.0	6.9	30.0	175.0	
KPNSNTRC83049	6350170.0	498310.0	2042.0	8.8	2.0	340.0	
KPNSNTRC83051	6350265.0	498225.0	2026.0	8.2	13.0	164.0	
KPNSNTRC83055	6350250.0	498285.0	2026.0	5.9	16.0	143.0	
KPNSNTRC83056	6350210.0	498490.0	2042.0	7.7	2.0	171.0	
KPNSNTRC83057	6350335.0	498150.0	2028.0	7.1	17.0	164.0	
KPNSNTRC83058	6350116.0	501355.0	1783.0	6.2	7.0	21.0	
KPNSNTRC83059	6349920.0	501250.0	1900.0	11.0	34.0	36.0	
KPNSNTRC83061	6350175.0	501406.0	1763.0	6.0	7.0	35.0	
KPNSNTRC83062	6349780.0	501525.0	1845.0	7.7	25.0	60.0	
KPNSNTRC83064	6350870.0	500420.0	1700.0	3.5	45.0	90.0	
KPNSNTRC83065	6351327.0	500458.0	1680.0	4.0	20.0	160.0	
KPNSNTRC83066	6349995.0	501600.0	1738.0	9.4	0.0	40.0	
KPNSNTRC83074	6351420.0	499670.0	1649.0	9.0	20.5	138.0	
KPNSNTRC83075	6351730.0	499610.0	1622.0	6.0	12.0	20.0	
KPNSNTRC83078	6356810.0	490220.0	2011.0	3.2	10.0	5.0	

GULF CANADA RESOURCES INC. - COAL DIVISION SN.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 2

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNSNTRC83079	6357820.0	490240.0	1981.0	2.2	15.0	165.0	
KPNSNTRC83080	6357800.0	490240.0	1981.0	2.0	9.0	175.0	
KPNSNTRC83081	6357790.0	490230.0	2011.0	2.2	10.0	0.0	
KPNSNTRC83089	6356590.0	490200.0	2073.0	4.5	26.0	165.0	
KPNSNTRC83090	6358300.0	490050.0	1943.0	13.0	4.0	10.0	

GULF CANADA RESOURCES INC. - COAL DIVISION S.S.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNSSTRC83052	6349810.0	501960.0	1738.0	15.7	5.0	193.0	
KPNSSTRC83054	6349845.0	505560.0	1747.0	7.8	30.0	50.0	
KPNSSTRC83060	6349116.0	500911.0	1733.0	21.0	5.0	358.0	
KPNSSTRC83063	6349555.0	502560.0	1649.0	4.7	15.0	50.0	
KPNSSTRC83067	6351075.0	501372.0	1607.0	5.0	0.0	125.0	

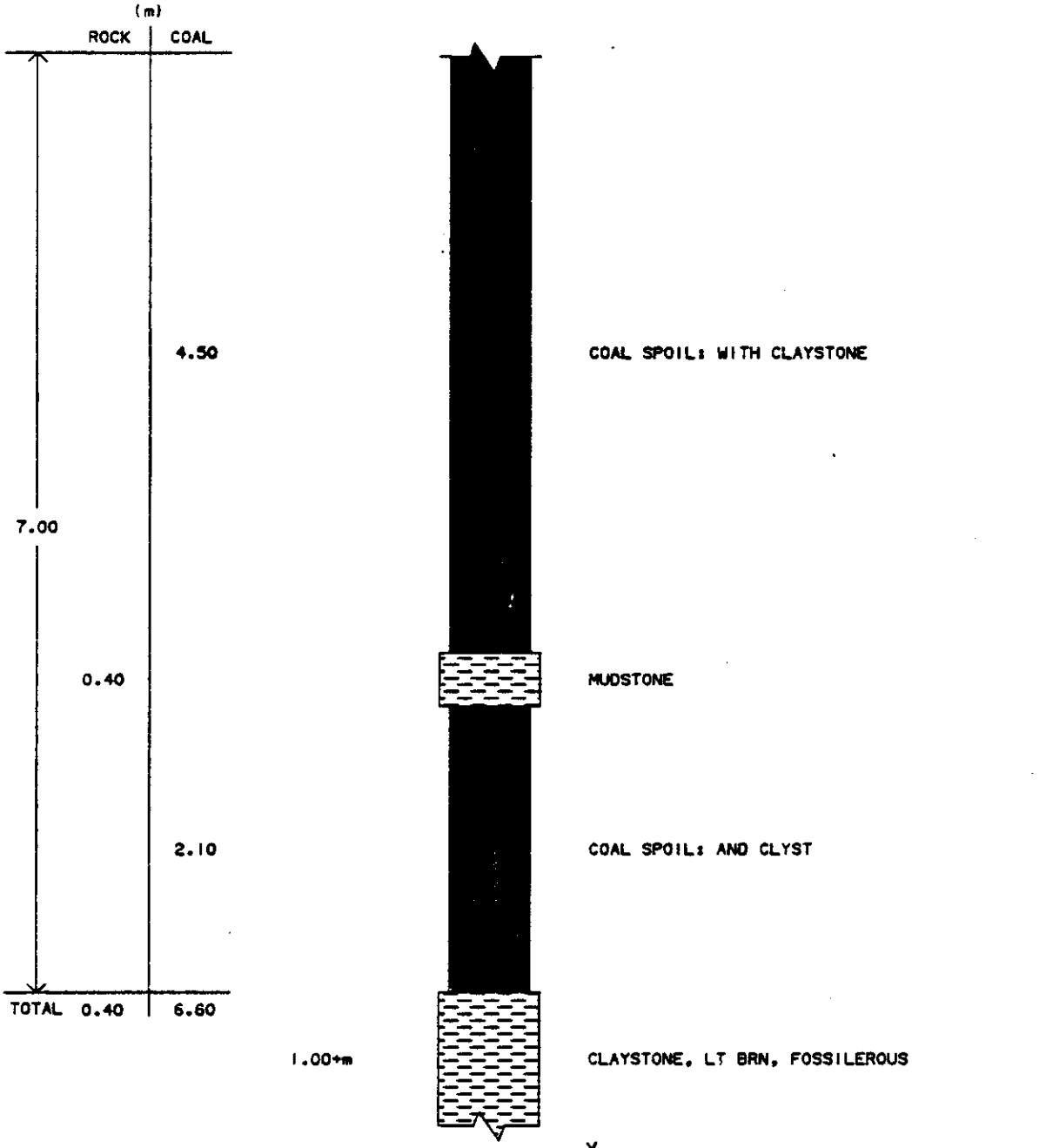
GULF CANADA RESOURCES INC. - COAL DIVISION 5.N

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83051										
		6760	0.30	2.00	100.00	0.42	1.28	0.00	0.00	0.42- 1.28
		6761	2.00	3.22	100.00	1.22	0.00	0.00	0.00	1.22- 0.00
TRC83055										
		6757	0.53	2.63	100.00	2.10	0.00	0.00	0.00	2.10- 0.00
		6758	2.63	3.27	100.00	0.22	0.42	0.00	0.00	0.22- 0.42
TRC83056										
		6754	0.51	1.00	100.00	0.49	0.00	0.00	0.00	0.49- 0.00
		6755	1.00	1.20	100.00	0.00	0.20	0.00	0.00	0.00- 0.20
		6756	1.20	2.83	100.00	1.43	0.20	0.00	0.00	1.43- 0.20
TRC83057										
		6759	0.49	3.03	100.00	1.93	0.61	0.00	0.00	1.93- 0.61
TRC83058										
		6768	0.58	6.26	100.00	5.33	0.35	0.00	0.00	5.33- 0.35
TRC83059										
		6765	1.19	1.94	100.00	0.70	0.05	0.00	0.00	0.70- 0.05
		6766	1.94	2.63	100.00	0.00	0.69	0.00	0.00	0.00- 0.69
		6767	2.63	4.57	100.00	1.77	0.17	0.00	0.00	1.77- 0.17
TRC83061										
		3577	0.90	2.80	100.00	1.40	0.50	0.00	0.00	1.40- 0.50
TRC83066										
		3578	0.00	5.90	100.00	5.03	0.87	0.00	0.00	5.03- 0.87
		3579	5.90	7.65	100.00	1.65	0.10	0.00	0.00	1.65- 0.10



* DETAILED LOG UNATTAINABLE - GROUND FROZEN

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6349990mN, 498290mE
ELEVATION	:	2011m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.50m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	6.90m
TRENCH BEARING	:	175°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83048

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 02/08/83
APPROVED BY: C.W.	

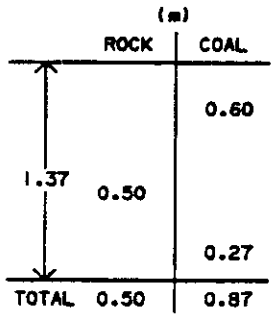
090:[209,571831024009.LOG: 28/10/83

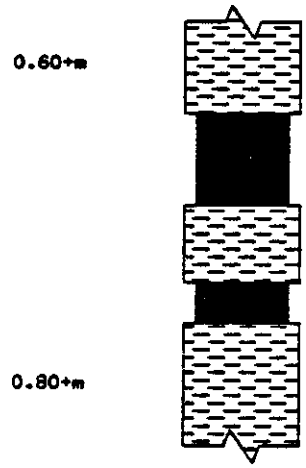
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83048

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	4.50	4.50			COAL	COAL SPOIL
	4.50	9.00	4.50			COAL	WEATHERED; INTERBEDDED WITH CLAYSTONE; FROZEN, NO APPARENT ORIENTATION.
	9.00	11.10	2.10			COAL	WEATHERED; INTERBEDDED WITH CLAYSTONE.
	11.10	15.60	4.50			COAL	

* DENOTES MEASURED BCA
NEWPAGE





0.60+m — CLAYSTONE, LIGHT BROWN

COAL: UNCONSOLIDATED

MUD

COAL: UNCONSOLIDATED, MINOR CLAYSTONE

0.80+m — MUD, MEDIUM BROWN

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	050/35S
UTM COORDINATES	:	6350170mN, 498310mE
ELEVATION	:	2042m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.80
TRENCH WIDTH	:	0.54
TRENCH LENGTH	:	8.8
TRENCH BEARING	:	340°
TRENCH SLOPE	:	02°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83049

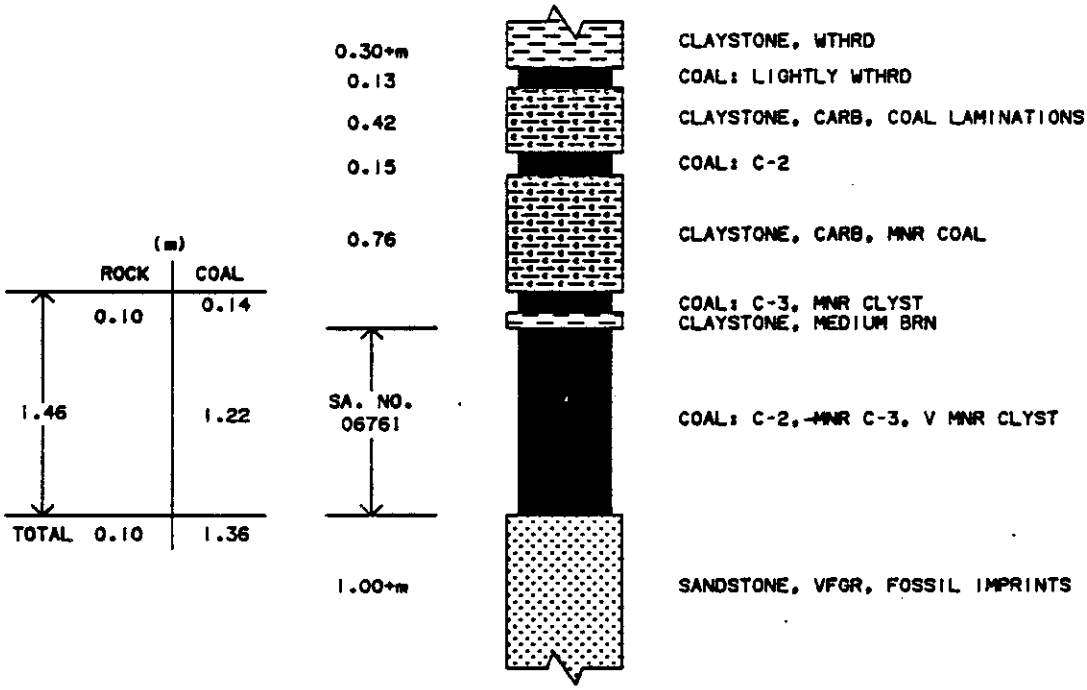
DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 31/07/83
APPROVED BY: C.W.	

GBD:(205,571831084010.LOG: 28/10/83

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83049

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.60	0.60			CLAYSTONE	LT.BN ROOF
	0.60	1.20	0.60			COAL	UNCONSOLIDATED
	1.20	1.70	0.50			MUDSTONE	
	1.70	1.97	0.27			COAL	UNCONSOLIDATED, MINOR CLAYSTONE.
	1.97	2.77	0.80			MUDSTONE	M.BN FLOOR

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	069/34S
ATTITUDE OF FLOOR	:	061/31S
UTM COORDINATES	:	6350265mN, 498225mE
ELEVATION	:	2026m
MAP CARD NUMBER	:	104 H/7 D; 104 H/A,G,H
TRENCH DEPTH	:	1.10m
TRENCH WIDTH	:	0.71m
TRENCH LENGTH	:	8.20m
TRENCH BEARING	:	164°
TRENCH SLOPE	:	13°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83051

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: SCOTT FAWCETT	DATE: 02/08/83
APPROVED BY: C.W.	

GSD:(206,5718310240101.LOG: 28/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SW DATA SOURCE: TRC83051

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLYST	WEATHERED ROOF
	0.30	0.43	0.13			COAL	HIGHLY WEATHERED
	0.43	0.85	0.42			CLYST	CARB COAL LAMINATIONS
	0.85	1.00	0.15			COAL	C-2
	1.00	1.76	0.76			CLYST	CARB MINOR COAL
	1.76	1.90	0.14			COAL	C-3 MINOR CLYST
	1.90	2.00	0.10			CLYST	
	2.00	3.22	1.22	06761		COAL	C-2 MINOR C-3, VERY MINOR CLYST
	3.22	4.22	1.00			SST	FG FOSSIL IMPRINTS - FLOOR

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

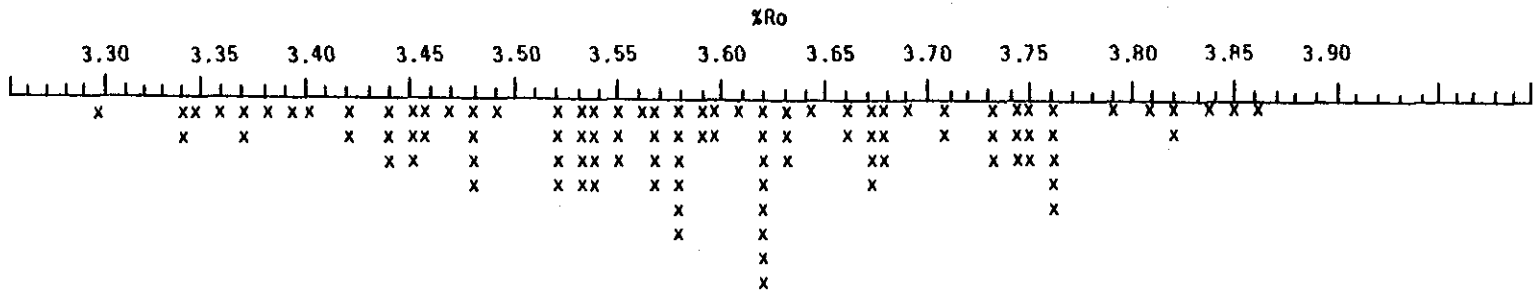
DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83051											
	HD1		6760	5.85	53.28	25.72	15.15	0.40	11.00		
	HD1		6761	5.98	28.77	55.29	9.96	0.43	20.65		

IAD Batch # 97-N263-662-57
Report of Analysis on Sample: 06760

REFLECTANCE ANALYSIS

Mean-Maximum Vitrinite Ro- 3.58

Distribution of Vitrinite Reflectance Readings:



Because this sample is extremely oxidized, it could not be analyzed according to ASTM procedure. Only relatively unoxidized particles were selected and measured, thus biasing the analysis.

Number of Counts (Total= 106)

V-Type Table for Vitrinites (=100%)

V-33	V-34	V-35	V-36
8.5	16.0	26.4	27.4

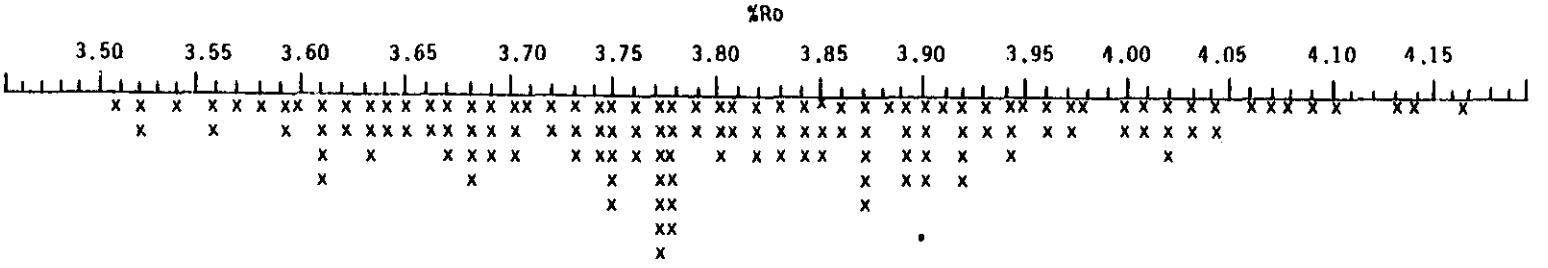
V-37	V-38
16.0	5.7

IAD Batch # 97-N263-662-57
Report of Analysis on Sample: 06761

REFLECTANCE ANALYSIS

Mean-Maximum Vitrinite Ro- 3.81

Distribution of Vitrinite Reflectance Readings:

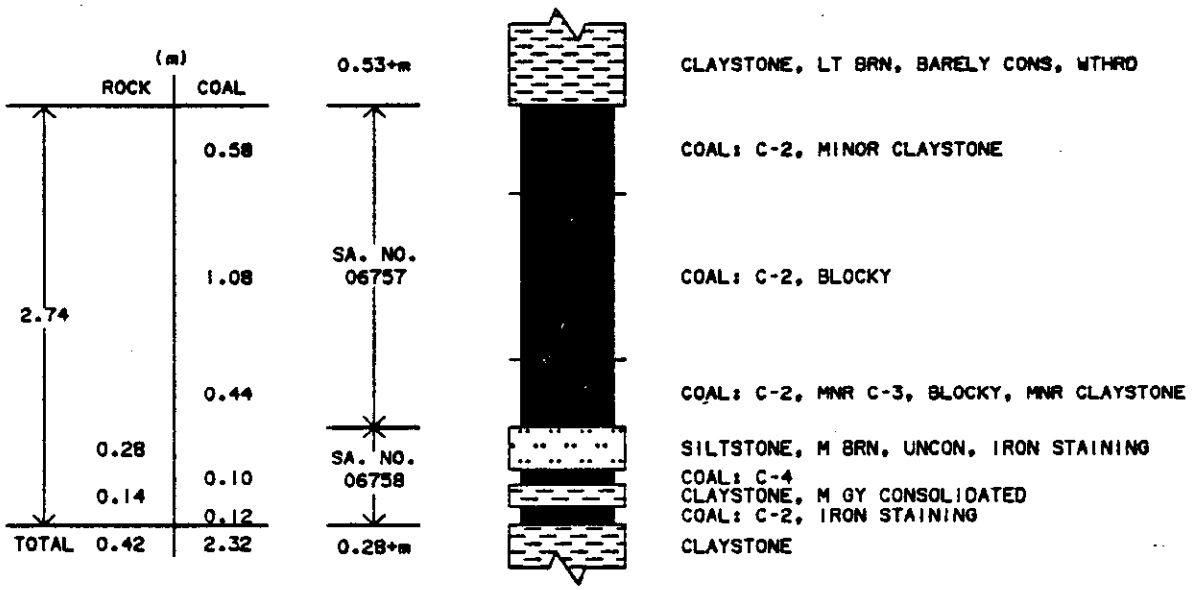


This sample is heavily oxidized.

Number of Counts (Total= 139)

V-Type Table for Vitrinites (=100%)

V- 35	V- 36	V-37	V-38
7.2	18.7	25.1	20.9
V- 39	V-40	V-41	
14.4	10.8	2.9	



ATTITUDE OF ROOF	:	049/54S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6350250mN, 498285mE
ELEVATION	:	2026m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.66m
TRENCH WIDTH	:	0.62m
TRENCH LENGTH	:	5.92m
TRENCH BEARING	:	143°
TRENCH SLOPE	:	16°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83055

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 01/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83055

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.53	0.53			CLYST	LT.BN BARELY CONSOLIDATED - WEATH. ROOF
	0.53	1.11	0.58	06757		COAL	C-2 MINOR CLYST
	1.11	2.19	1.08	06757		COAL	C-2 BLOCKY
	2.19	2.63	0.44	06757		COAL	C-2 MINOR C-3, BLOCKY,MINOR CLYST
	2.63	2.91	0.28	06758		SLTST	M.BN FE STAINED; UNCONSOLIDATED
	2.91	3.01	0.10	06758		COAL	C-4
	3.01	3.15	0.14	06758		CLYST	M.GY CONSOL.
	3.15	3.27	0.12	06758		COAL	C-2 FE STAIN
	3.27	3.55	0.28			CLYST	FLOOR

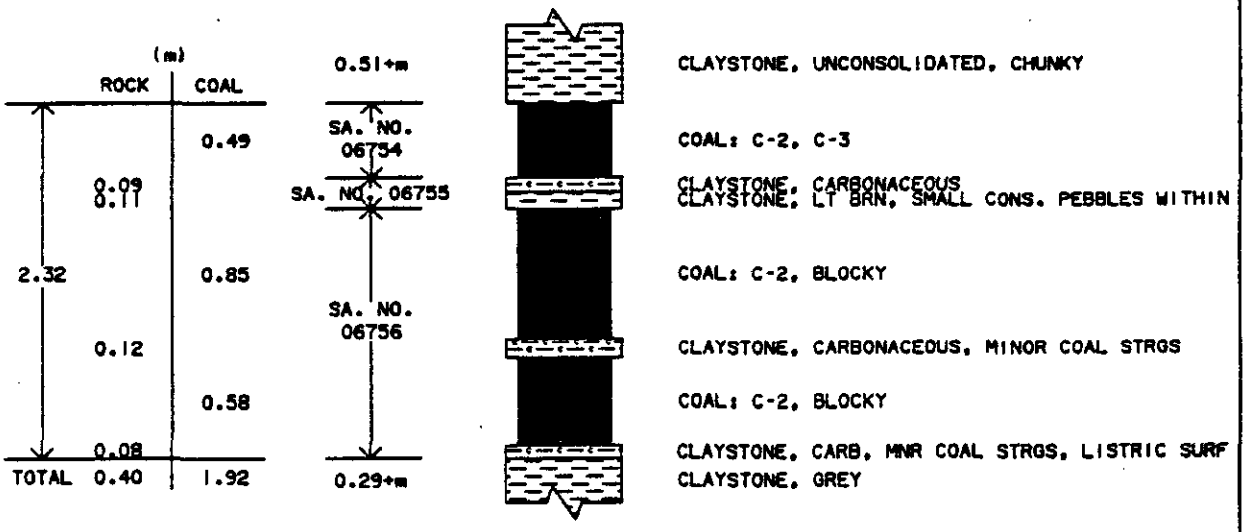
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83055											
	HD1		6757	5.89	25.56	54.40	14.15	0.34	20.05		
	HD1		6758	3.44	75.23	9.29	12.04	0.08	4.31		



ATTITUDE OF ROOF	:	087/13S
ATTITUDE OF FLOOR	:	086/23S
UTM COORDINATES	:	6350210mN, 498490mE
ELEVATION	:	2042m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.83m
TRENCH WIDTH	:	0.55m
TRENCH LENGTH	:	7.65m
TRENCH BEARING	:	171°
TRENCH SLOPE	:	002°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83056

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 01/08/83
APPROVED BY: C.W.	

QBG:(206,5718310240111.LOG: 04/11/83

84/03/14 . GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83056

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.51	0.51			CLAYSTONE	UNCONSOLIDATED; BLOCKY, ROOF
	0.51	1.00	0.49	06754		COAL	C-2 MINOR C-3
	1.00	1.09	0.09	06755		CLAYSTONE	CARB
	1.09	1.20	0.11	06755		CLAYSTONE	LT.BN SMALL CONCOLIDATED, PEBBLES
	1.20	2.05	0.85	06756		COAL	C-2 BLOCKY
	2.05	2.17	0.12	06756		CLAYSTONE	CARB.GY MINOR COAL STRINGERS.
	2.17	2.75	0.58	06756		COAL	C-2 BLOCKY
	2.75	2.83	0.08	06756		CLAYSTONE	CARB MINOR COAL STRINGERS.
	2.83	3.12	0.29			CLAYSTONE	GY LISTRIC SURFACE FLOOR

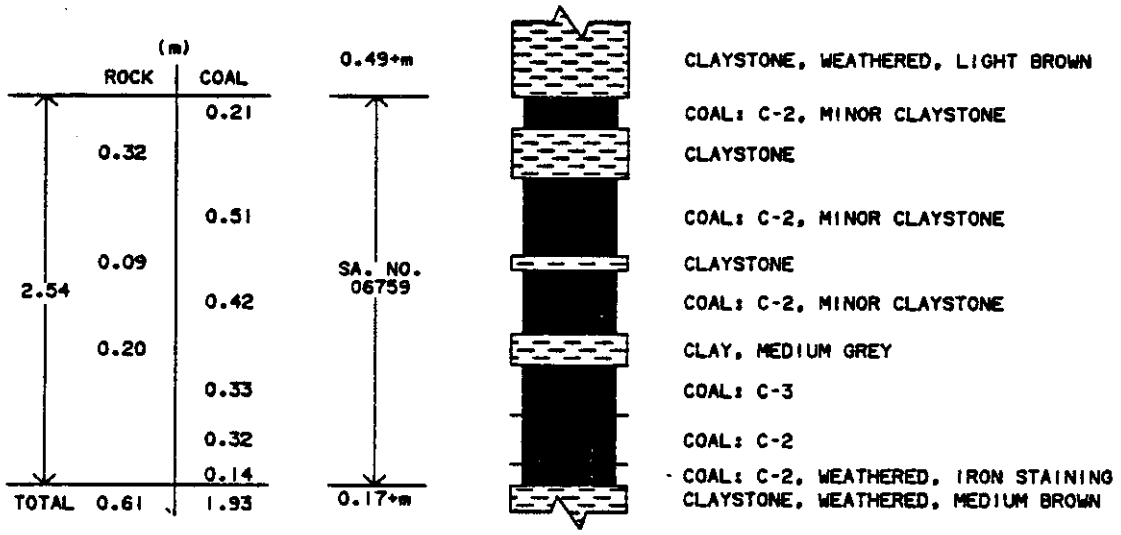
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83056											
	HD1		6754	7.30	29.53	45.03	18.14	0.31	17.58		
	HD1		6755	4.41	78.23	6.50	10.86	0.07	3.09		
	HD1		6756	5.19	38.60	43.56	12.65	0.21	15.51		



ATTITUDE OF ROOF	:	088/14S
ATTITUDE OF FLOOR	:	N/O *DUE TO POOR BEDDING
UTM COORDINATES	:	6350335mN, 498150mE
ELEVATION	:	2028m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.87m
TRENCH WIDTH	:	0.58m
TRENCH LENGTH	:	7.10m
TRENCH BEARING	:	164°
TRENCH SLOPE	:	017°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83057

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 01/08/83
APPROVED BY: C.M.	

090:(206,5718310240011.LOG: 04/11/83

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83057

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.49	0.49			CLAYSTONE	LT.BN WEATHERED ROOF
	0.49	0.70	0.21	06759		COAL	C-2 MINOR CLAYSTONE
	0.70	1.02	0.32	06759		CLAYSTONE	
	1.02	1.53	0.51	06759		COAL	C-2 MINOR CLAYSTONE
	1.53	1.62	0.09	06759		CLAYSTONE	
	1.62	2.04	0.42	06759		COAL	C-2 MINOR CLAYSTONE
	2.04	2.24	0.20	06759		CLAY	M.GY
	2.24	2.57	0.33	06759		COAL	C-3
	2.57	2.89	0.32	06759		COAL	C-2
	2.89	3.03	0.14	06759		COAL	C-2 WEATHERED; IRON STAIN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83057

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.03	3.20	0.17			CLAYSTONE	M.BN WEATHERED FLOOR

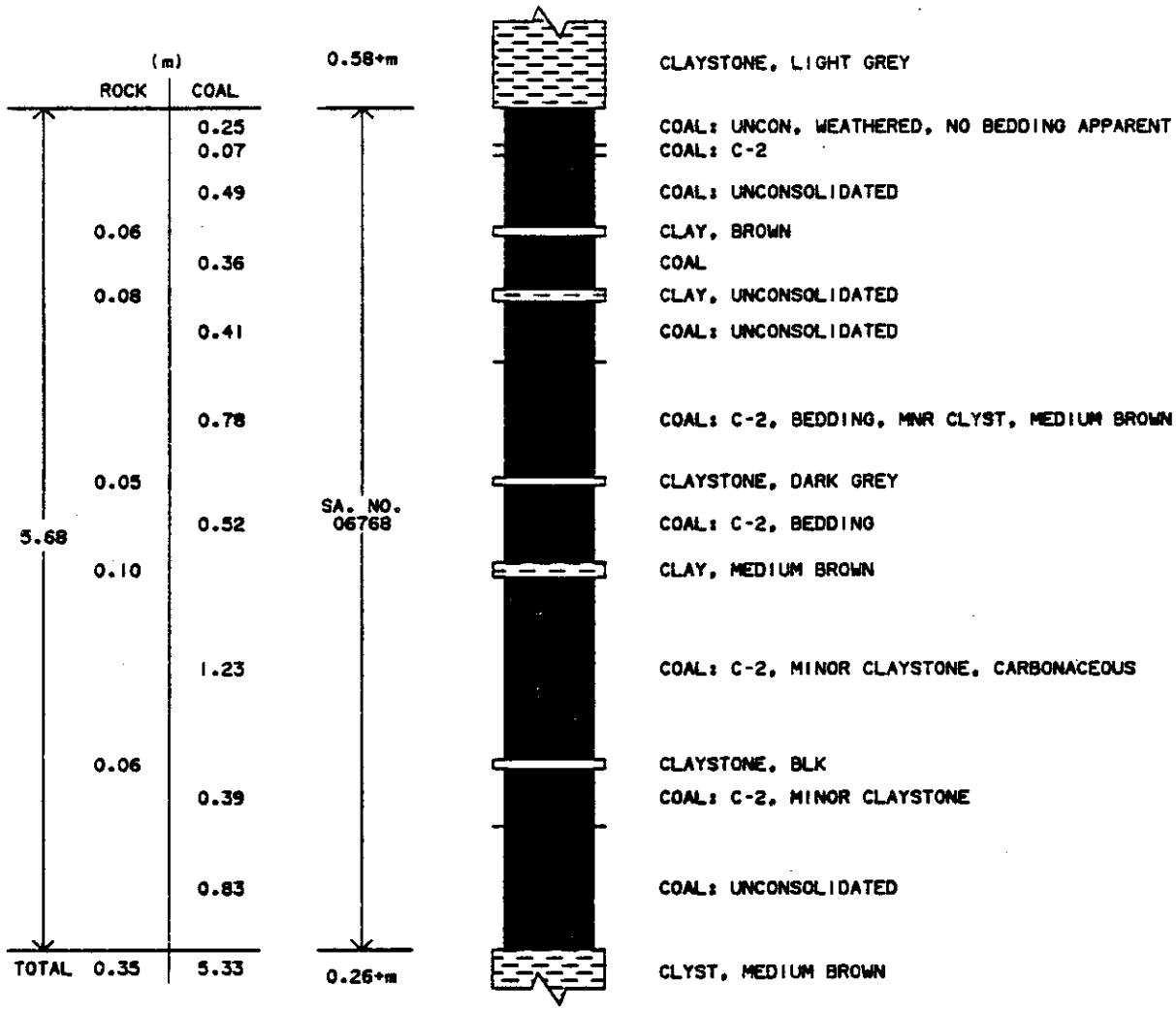
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83057											
	HD1		6759	6.03	45.70	35.36	12.91	0.26	13.73		



ATTITUDE OF ROOF	:	116/90
ATTITUDE OF FLOOR	:	116/90
UTM COORDINATES	:	6350116mN, 501355mE
ELEVATION	:	1783m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.01m
TRENCH WIDTH	:	0.58m
TRENCH LENGTH	:	6.22m
TRENCH BEARING	:	021°
TRENCH SLOPE	:	07°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83058

DRAWN BY: C NOGAS	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 05/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83058

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.58	0.58			CLAYSTONE	LT.GY ROOF
	0.58	0.83	0.25	06768		COAL	UNCONSOLIDATED; WEATHERED
	0.83	0.90	0.07	06768		COAL	C-2
	0.90	1.39	0.49	06768		COAL	UNCONSOLIDATED;
	1.39	1.45	0.06	06768		CLAY	M.BN
	1.45	1.81	0.36	06768		COAL	UNCONSOLIDATED;
	1.81	1.89	0.08	06768		CLAYSTONE	UNCONSOLIDATED;
	1.89	2.30	0.41	06768		COAL	UNCONSOLIDATED;
	2.30	3.08	0.78	06768		COAL	C-2 BDG; MINOR. CLAYSTONE. MED.BROWN
	3.08	3.13	0.05	06768		CLAYSTONE	DK.GY
	3.13	3.65	0.52	06768		COAL	C-2 GOOD;

* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83058

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.65	3.75	0.10	06768		CLAY	M.BN
	3.75	4.98	1.23	06768		COAL	C-2 MINOR. CLAYSTONE IRON STAIN BROWN
	4.98	5.04	0.06	06768		CLAYSTONE	BLK.VTHNB
	5.04	5.43	0.39	06768		COALC-2	MINOR CLAYSTONE BLACK IRON STAIN
	5.43	6.26	0.83	06768		COAL	UNCONSOLIDATED;
	6.26	6.52	0.26			CLAYSTONE	M.BN FLOOR

* DENOTES MEASURED BCA

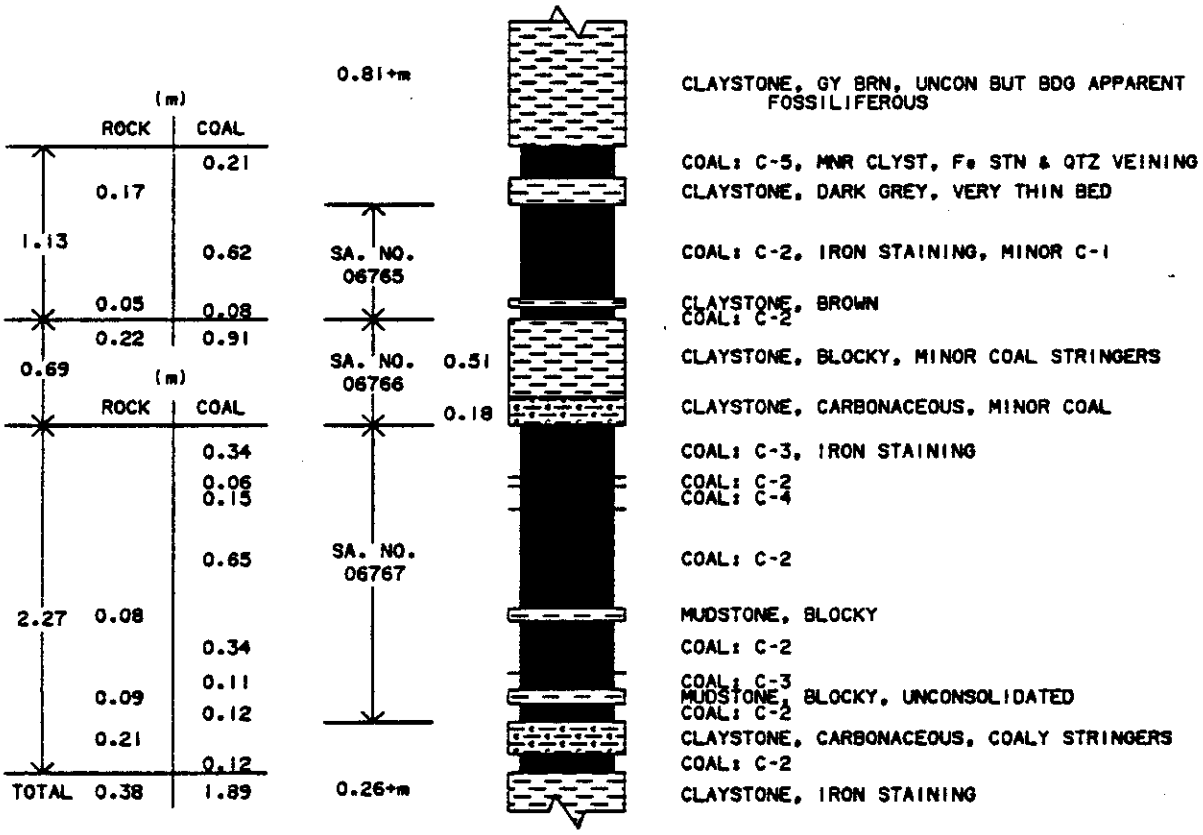
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83058											
	HD1		6768	11.47	29.57	38.67	20.29	0.28	15.26		



ATTITUDE OF ROOF	:	103/09N
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6349920mN, 501250mE
ELEVATION	:	1900m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	0.92m
TRENCH WIDTH	:	0.73m
TRENCH LENGTH	:	11.04m
TRENCH BEARING	:	036°
TRENCH SLOPE	:	34°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83059

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 05/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83059

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.81	0.81			CLAYSTONE	GY BEDDING APPARENT; UNCONSOLIDATED.
	0.81	1.02	0.21			COAL	C-5 MINOR CLAYSTONE. IRON STAIN AND QUARTZ VIENS; FOSSILIFEROUS; ROOF
	1.02	1.19	0.17			CLAYSTONE	GY.VTHNB
	1.19	1.81	0.62	06765		COAL	C-2 MINOR C-1, IRON STAIN
	1.81	1.86	0.05	06765		CLAYSTONE	BN
	1.86	1.94	0.08	06765		COAL	C-2
	1.94	2.45	0.51	06766		CLAYSTONE	BLK MINOR COAL STRINGERS
	2.45	2.63	0.18	06766		CLAYSTONE	CARB MINOR COAL
	2.63	2.97	0.34	06767		COAL	C-3 IRON STAIN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83059

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.97	3.03	0.06	06767		COAL	C-2
	3.03	3.18	0.15	06767		COAL	C-4
	3.18	3.83	0.65	06767		COAL	C-2
	3.83	3.91	0.08	06767		MUDSTONE	BLK
	3.91	4.25	0.34	06767		COAL	C-2
	4.25	4.36	0.11	06767		COAL	C-3
	4.36	4.45	0.09	06767		MUDSTONE	BLK UNCONSOLIDATED
	4.45	4.57	0.12	06767		COAL	C-2
	4.57	4.78	0.21			CLAYSTONE	CARB COAL STRINGERS FLOOR
	4.78	4.90	0.12			COAL	C-2

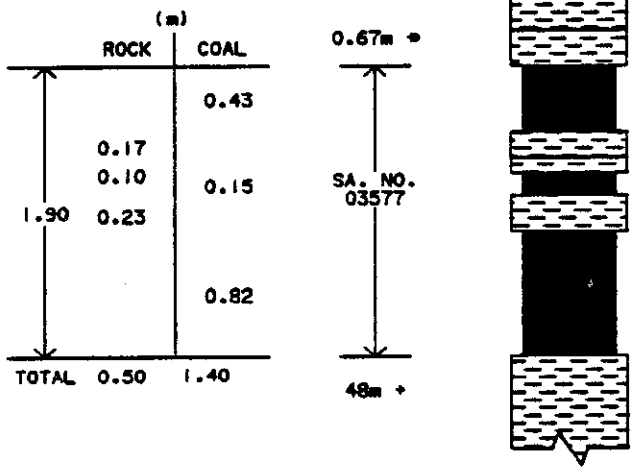
* DENOTES MEASURED BCA

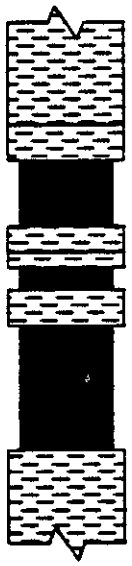
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83059											
	HD1		6765	6.49	37.93	42.84	12.74	0.27	16.09		
	HD1		6766	4.73	68.97	14.60	11.70	0.30	5.61		
	HD1		6767	5.53	46.00	36.88	11.59	0.32	12.42		





CLAYSTONE, SILTY, MEDIUM BROWN

CLYST, CARB, UNCONS, MNR C, MNR MUD, LT TAN

COAL AND CLYST, UNCONS, MNR MUD, LT TAN

CLYST, MNR C, UNCONS, MNR MUD
CLYST, CARB, MNR C STRINGERS
COAL: CLAYSTONE, UNCONSOLIDATED

CLYST, MNR CARB, IRON STAINING

COALAND CLYST, UNCONS, PETRIFIED WD REMAINS

CLYST, CARB NEAR TOP, M GY NEAR BOTTOM

ATTITUDE OF ROOF	:	105/25S
ATTITUDE OF FLOOR	:	110/45S
UTM COORDINATES	:	6350175mN, 501406mE
ELEVATION	:	1763m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	0.89m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	6.00m
TRENCH BEARING	:	035°
TRENCH SLOPE	:	07°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83061

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: S. MAYLOR	DATE: 06/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83061

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.67	0.67			CLAYSTONE	SLTY.M.BN
	0.67	0.90	0.23			CLAYSTONE	CARB UNCONSOLIDATED; MINOR MUD TAN ROOF
	0.90	1.33	0.43	03577		COAL	UNCONSOLIDATED; MINOR CLAYSTONE AND MUD TAN
	1.33	1.50	0.17	03577		CLAYSTONE	UNCONSOLIDATED; MINOR COAL AND MUD
	1.50	1.60	0.10	03577		CLAYSTONE	CARB MINOR COAL STRINGERS
	1.60	1.75	0.15	03577		COAL	UNCONSOLIDATED; MINOR CLAYSTONE
	1.75	1.98	0.23	03577		CLAYSTONE	CARB IRON STAIN
	1.98	2.80	0.82	03577		COAL	UNCONSOLIDATED; MINOR CLAYSTONE, PETRIF IED WOOD
	2.80	3.28	0.48			CLAYSTONE	CARBONACEOUS NEAR TOP, MED GREY AT BOTT OM, FLOOR

* DENOTES MEASURED BCA

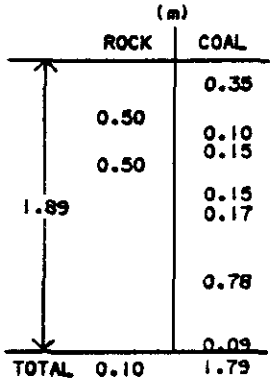
NEWPAGE

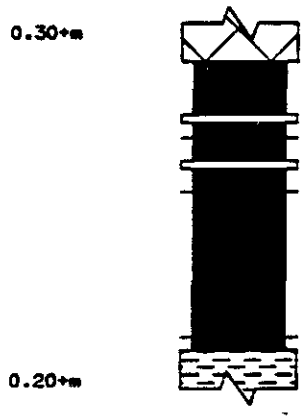
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83061											
	HD1		3577	7.69	53.07	17.12	22.12	* 0.16	7.86		





OVERBURDEN

COAL: UNCONS, ABUNDANT CLYST, CARB
CLYST, MOSTLY UNCONS, YELLOW STAIN
COAL: UNCONSOLIDATED
COAL:: C-1
CLAYSTONE CARBONACEOUS WEATHERED
COAL:: C-2, MNR CARB, CLAYSTONE
COAL:: C-1, MNR CLYST, CARB, UNCONS

COAL C-2, MNR CARB, CLYST & YELLOW STAIN

COAL:: C-1, WTHRD, YELLOW & FE STAIN
CLYST, TAN, FE & YELLOW STAIN QTZ VEIN

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	178/32E
UTM COORDINATES	:	6349780mN, 501525mE
ELEVATION	:	1845m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	7.7m
TRENCH BEARING	:	060°
TRENCH SLOPE	:	25°N
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83062

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 11/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83062

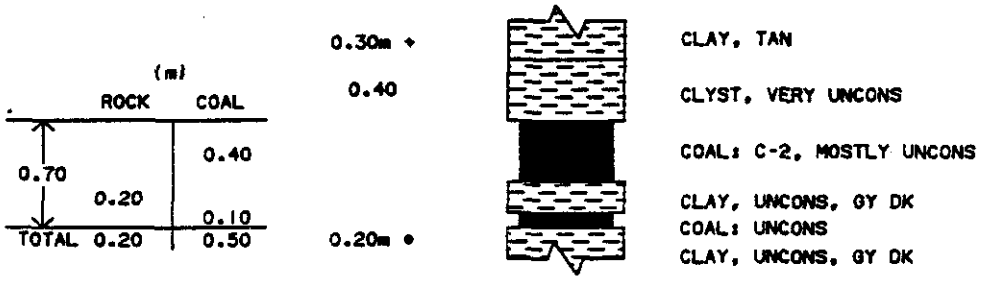
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			OVRBN	
	0.30	0.65	0.35			COAL	UNCONSOLIDATED, ABUNDANT, CLAYSTONE, CARB.
	0.65	0.70	0.05			CLAYSTONE	MOSTLY UNCONSOLIDATED YELLOW STAIN
	0.70	0.80	0.10			COAL	UNCONSOLIDATED,
	0.80	0.95	0.15			COAL	C-1
	0.95	1.00	0.05			CLAYSTONEQ	CARB WEATHERED;
	1.00	1.15	0.15			COAL	C-2 MINOR CARB CLAYSTONE
	1.15	1.32	0.17			COAL	C-1 MINOR CARBONACEOUS CLAYSTONE UNCONSOLIDATED
	1.32	2.10	0.78			COAL	C-2 MINOR CLAYSTONE CARBONACEOUS AND YELLOW STAIN
	2.10	2.19	0.09			COAL	C-1 WEATHERED YELLOW AND IRON STAIN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83062

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.19	2.39	0.20			CLAYSTONE	TAN IRON AND YELLOW STAIN QUARTZ VIEN FLOOR

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6350870mN, 500420mE
ELEVATION	:	1700m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	0.90m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	3.5m
TRENCH BEARING	:	090°
TRENCH SLOPE	:	45°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83064

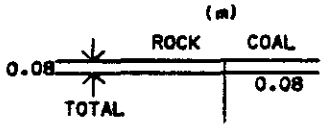
DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 14/06/83
APPROVED BY: C.M.	

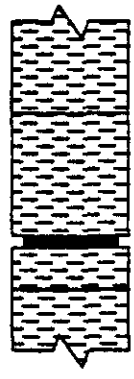
050:(205,5718S):024012.LOG: 31/10/83

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83064

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLAY	TAN
	0.30	0.70	0.40			CLAYSTONE	V. UNCONSOLIDATED ROOF
	0.70	1.10	0.40			COAL	C-2 MOSTLY UNCONSOLIDATED
	1.10	1.30	0.20			CLAY	DK.GY UNCONSOLIDATED
	1.30	1.40	0.10			COAL	UNCONSOLIDATED
	1.40	1.60	0.20			CLAY	DK.GY UNCONSOLIDATED FLOOR

* DENOTES MEASURED BCA
NEWPAGE





0.90+m		CLYST, CARB, UNCONS
0.80		CLYST, V. CARB, MNR COAL
0.27		COAL: C-2
		CLYST, CARB, MNR COAL STRINGERS
0.60+m		CLYST, MOSTLY UNCONS, TAN

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	050/73W
UTM COORDINATES	:	6351327mN, 500458mE
ELEVATION	:	1680m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	4.00m
TRENCH BEARING	:	160°
TRENCH SLOPE	:	20°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83065

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 14/08/83
APPROVED BY: C.W.	

G80:(208,5718310240(2.LOG: 31/10/83

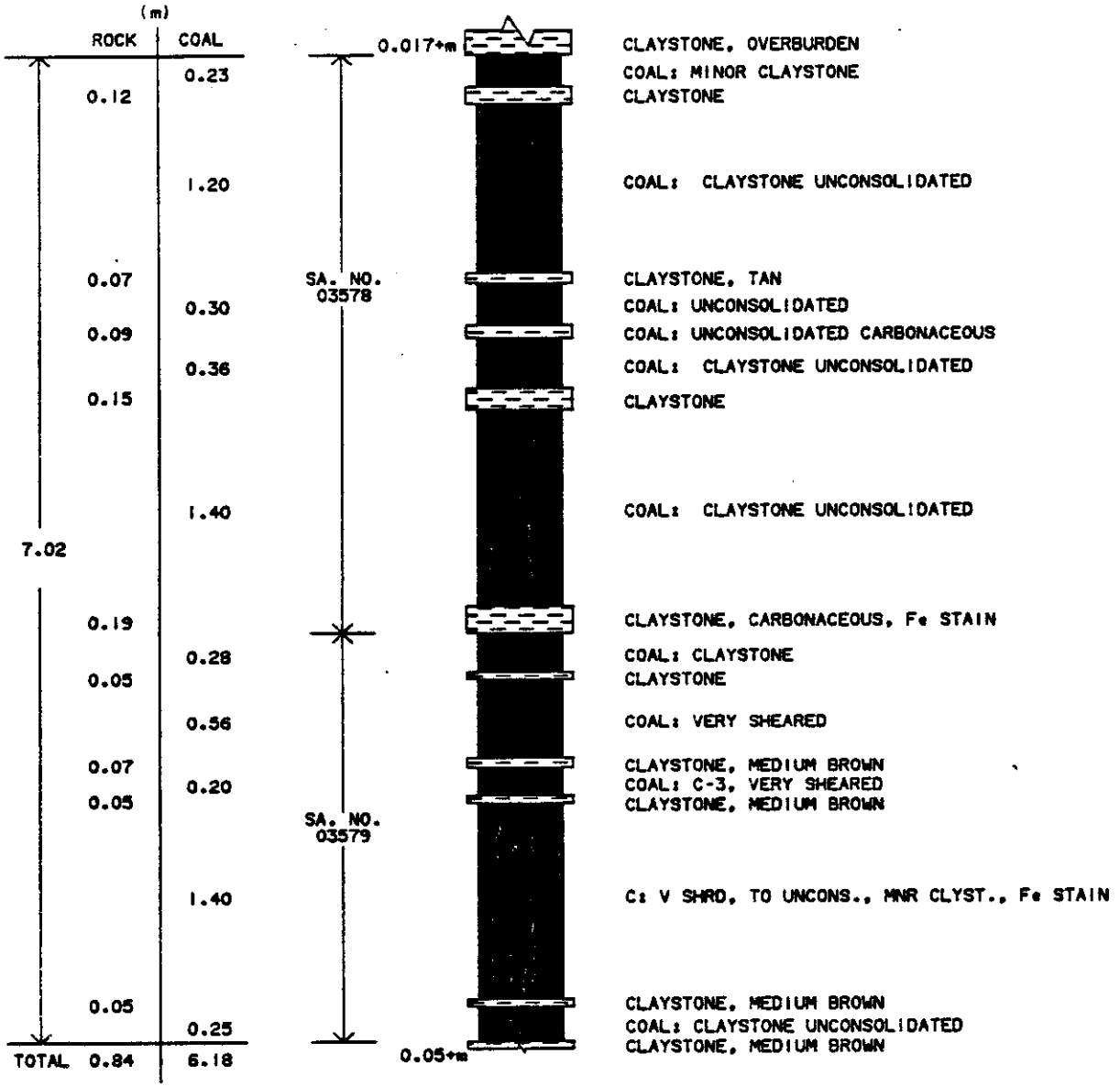
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83065

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.90	0.90			CLAYSTONE	CARB UNCONSOLIDATED
	0.90	1.70	0.80			CLAYSTONE	CARB MINOR COAL
	1.70	1.78	0.08			COAL	C-2
	1.78	2.05	0.27			CLAYSTONE	CARB MINOR COAL STRINGERS
	2.05	2.65	0.60			CLAYSTONE	MOSTLY UNCONSOLIDATED TAN

* DENOTES MEASURED BCA

NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	145/50N
UTM COORDINATES	:	6349995mN, 501600mE
ELEVATION	:	1738m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	9.4m
TRENCH BEARING	:	040°
TRENCH SLOPE	:	0°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG

KPN-TRC-83066

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 07/08/83
APPROVED BY: C.M.	

GSD:(208,5716310240I2.LOG: 31/10/83

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83066

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.18	0.18	03578		CLAYSTONE	SLTY.BN PLUS OVERBURDEN ROOF
	0.18	0.41	0.23	03578		COAL	MINOR CLAYSTONE, UNCONSOLIDATED
	0.41	0.53	0.12	03578		CLAYSTONE	M.GY
	0.53	1.73	1.20	03578		COAL	PLUS CLAYSTONE UNCONSOLIDATED
	1.73	1.80	0.07	03578		CLAYSTONE	TAN
	1.80	2.10	0.30	03578		COAL	UNCONSOLIDATED
	2.10	2.19	0.09	03578		CLAYSTONE	CARB UNCONSOLIDATED
	2.19	2.55	0.36	03578		COAL	PLUS CLAYSTONE, UNCONSOLIDATED
	2.55	2.70	0.15	03578		CLAYSTONE	
	2.70	4.10	1.40	03578		COAL	PLUS CLAYSTONE, UNCONSOLIDATED
	4.10	4.29	0.19	03578		CLAYSTONE	CARB.M.BN IRON STAIN, MINOR SILT
	4.29	4.57	0.28	03578		COAL	PLUS CLAYSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83066

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.57	5.13	0.56	03578		COAL	VERY SHEARED, MINOR CLAYSTONE
	5.13	5.20	0.07	03578		CLAYSTONE	M.BN
	5.20	5.90	0.70	03578		COAL	C-3 VERY SHEARED
	5.90	5.95	0.05	03579		CLAYSTONE	M.BN
	5.95	7.35	1.40	03579		COAL	VERY SHEARED TO UNCONSOLIDATED MINOR CL AYSTONE, IRON STAIN
	7.35	7.40	0.05	03579		CLAYSTONE	M.BN
	7.40	7.65	0.25	03579		COAL	PLUS CLAYSTONE, UNCONSOLIDATED
	7.65	7.70	0.05			CLAYSTONE	M.BN FLOOR

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

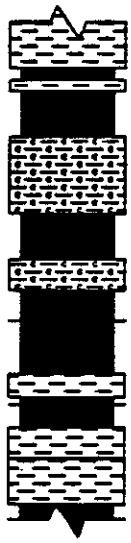
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83066											
	HD1		3578	13.43	22.70	37.38	26.49	0.24	15.28		
	HD1		3579	15.91	20.47	39.54	24.08	0.25	16.23		

(m)	ROCK	COAL
		0.80
	0.07	
		0.30
	0.50	
		0.30
2.95	0.20	
		0.20
		0.35
	0.15	
		0.05
		0.15
	0.20	
	0.30	
		0.10
TOTAL	1.42	1.53

0.30+m



CLAYSTONE
COAL: C-2
CLAYSTONE
COAL: C-2, ABUNDANT CLYST, CARB, UNCON, WTHRD
CLYST., CARB, MNR COAL STRINGERS
COAL: MOSTLY UNCONSOLIDATED
CLAYSTONE, CARBONACEOUS
COAL: C-1
COAL: C-2, MINOR CLAYSTONE, CARBONACEOUS
CLAYSTONE
COAL: C-2
COAL: UNCONSOLIDATED
CLAYSTONE
CLAY
COAL: UNCONSOLIDATED

ATTITUDE OF ROOF : 070/45S
ATTITUDE OF FLOOR: NOT OBTAINED
UTM COORDINATES : 6351420mN, 499670mE
ELEVATION : 1649m
MAP CARD NUMBER : 104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH : 1.20m
TRENCH WIDTH : 0.70m
TRENCH LENGTH : 9.00m
TRENCH BEARING : 138°
TRENCH SLOPE : 20°S
TRENCH BLOCK : S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83074

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 20/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83074

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLAYSTONE	ROOF
	0.30	0.38	0.08			COAL	C-2
	0.38	0.45	0.07			CLAYSTONE	
	0.45	0.75	0.30			COAL	C-2 ABUNDANT CLAYSTONE, CARBONACEOUS, UNCONSOLIDATED., WEATHERED
	0.75	1.25	0.50			CLAYSTONE	CARB MINOR COAL STRINGERS
	1.25	1.55	0.30			COAL	MOSTLY UNCONSOLIDATED.
	1.55	1.75	0.20			CLAYSTONE	CARB
	1.75	1.95	0.20			COAL	C-1
	1.95	2.30	0.35			COAL	C-2 MINOR CLAYSTONE, CARBONACEOUS.
	2.30	2.45	0.15			CLAYSTONE	
	2.45	2.50	0.05			COAL	C-2

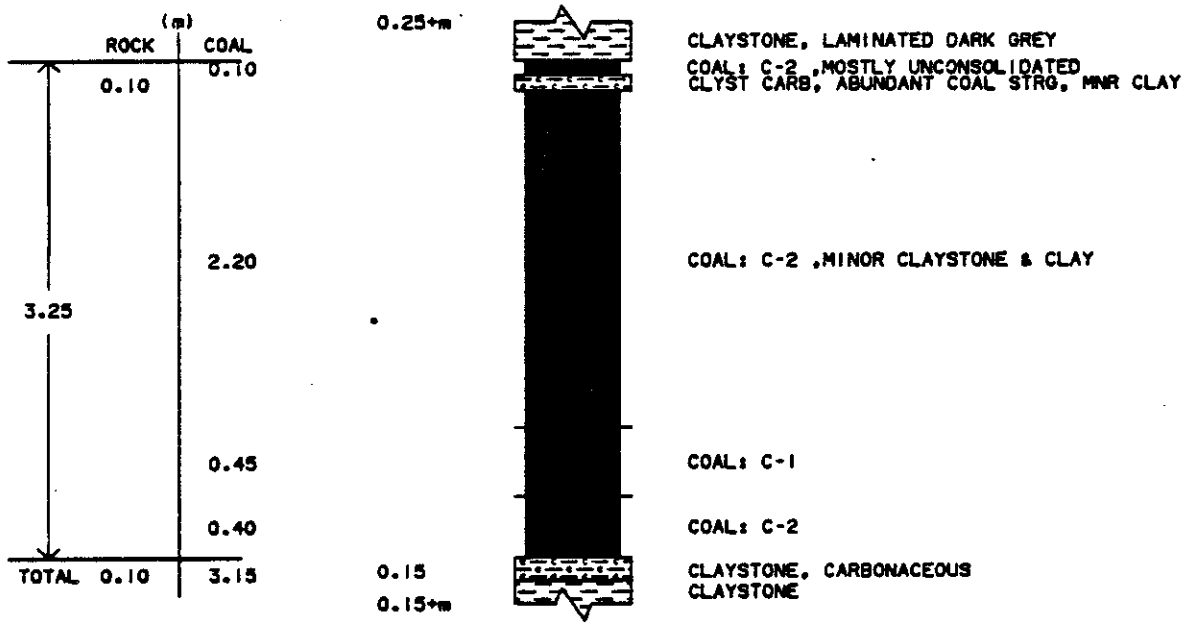
* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83074

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.50	2.65	0.15			COAL	UNCONSOLIDATED
	2.65	2.85	0.20			CLAYSTONE	
	2.85	3.15	0.30			CLAY	
	3.15	3.25	0.10			COAL	UNCONSOLIDATED

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	080/32S
ATTITUDE OF FLOOR	:	080/42S
UTM COORDINATES	:	6351730mN, 499610mE
ELEVATION	:	1622m
MAP CARD NUMBER	:	104 H/7 D; 104 H/6 A,G,H
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	6.00m
TRENCH BEARING	:	020°
TRENCH SLOPE	:	12°
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83075

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 20/08/83
APPROVED BY: C.M.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83075

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.25	0.25			CLAYSTONE	DK.GY LAM. ROOF
	0.25	0.35	0.10			COAL	C-2 MOSTLY UNCONSOLIDATED
	0.35	0.45	0.10			CLAYSTONE	CARB ABUNDANT COAL STRINGERS MINOR CLAY.
	0.45	2.65	2.20			COAL	C-2 MINOR CLAYSTONE AND CLAY
	2.65	3.10	0.45			COAL	C-1
	3.10	3.50	0.40			COAL	C-2
	3.50	3.65	0.15			CLAYSTONE	CARB FLOOR
	3.65	3.80	0.15			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE

(m)

	ROCK	COAL
0.60		0.60
TOTAL	0.00	0.60

COAL: BLOOM, COAL, CLYST CARB, CLAY, UNCON

ATTITUDE OF ROOF	:	FLOOR IS FROZEN, NEAREST
ATTITUDE OF FLOOR	:	ATTITUDE 005/15W (200m)
UTM COORDINATES	:	6356810mN, 490220mE
ELEVATION	:	2011m
MAP CARD NUMBER	:	104 H/6 B,G
TRENCH DEPTH	:	0.90m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	3.20m
TRENCH BEARING	:	005°
TRENCH SLOPE	:	10°S
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83078

DRAWN BY: C. NOBAS	SCALE: 1:50
LOGGED BY: C. NOBAS	DATE: 21/08/83
APPROVED BY: C.M.	

090:(206,5718S1024014.LOG; 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SW DATA SOURCE: TRC83078

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.60	0.60			COAL BLOOM	COAL, CLAYSTONE, CARBONACEOUS, CLAY UN CONSOLIDATED.

* DENOTES MEASURED BCA
NEWPAGE

(m)

	ROCK	COAL
0.70+m		0.70
TOTAL	0.00	0.70

COAL: BLOOM,CLYST, CARB, CLAY, COAL C-2
MOSTLY UNCON

ATTITUDE OF ROOF	:	NEAREST ATTITUDE 005/15W
ATTITUDE OF FLOOR	:	FLOOR IS FROZEN
UTM COORDINATES	:	6356820mN, 490240mE
ELEVATION	:	1981m
MAP CARD NUMBER	:	104 H/6 B,G
TRENCH DEPTH	:	1.20m
TRENCH WIDTH	:	1.10m
TRENCH LENGTH	:	2.20m
TRENCH BEARING	:	165°
TRENCH SLOPE	:	15°S
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83079

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 21/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83079

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.70	0.70			COAL BLOOM	CLAYSTONE CARBONACEOUS ,, CLAY COAL C-2 UNCONSOLIDATED.

* DENOTES MEASURED BCA
NEWPAGE

(m)

	ROCK	COAL
↑ 0.50+m ↓		0.50
TOTAL	0.00	0.50

COAL: BLOOM, CLYST, CARB COAL C-2
UNCON

ATTITUDE OF ROOF	:	NEAREST ATTITUDE 005/15W
ATTITUDE OF FLOOR	:	FLOOR FROZEN
UTM COORDINATES	:	6356800mN, 490240mE
ELEVATION	:	1981m
MAP CARD NUMBER	:	104 H/6 B,G
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.90m
TRENCH LENGTH	:	2.00m
TRENCH BEARING	:	175°
TRENCH SLOPE	:	09°S
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83080

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 21/06/83
APPROVED BY: C.W.	

080:1206,57183:024015.LOG: 31/10/83

PROJECT: KPN BLOCK: SW DATA SOURCE: TRC83080

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			COAL BLOOM	CLAYSTONE, CARBONACEOUS, COAL C-2, UNCONSOLIDATED.

* DENOTES MEASURED BCA
NEWPAGE

(m)

ROCK	COAL
0.80+m	0.80
TOTAL 0.00	0.80

COAL: BLOOM, CLYST, CARB, UNCON

ATTITUDE OF ROOF	:	NEAREST ATTITUDE 005/15W
ATTITUDE OF FLOOR	:	FLOOR FROZEN
UTM COORDINATES	:	6356780mN, 490230mE
ELEVATION	:	2011m
MAP CARD NUMBER	:	104 H/6 B,G
TRENCH DEPTH	:	1.36m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	2.20m
TRENCH BEARING	:	000°
TRENCH SLOPE	:	10°S
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83081

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 21/08/83
APPROVED BY: C.W.	

G80:(206,5718310240I5.LOG: 31/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

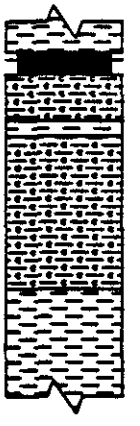
PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83081

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.80	0.80			COAL BLOOM	CLAYSTONE, CARBONACEOUS, CLAY, UNCONSOLIDATED

* DENOTES MEASURED BCA
NEWPAGE

(m)

	ROCK	COAL
		0.05
0.15		0.10
TOTAL	0.00	0.15



0.20+m	CLAYSTONE, UNCONSOLIDATED COAL: UNCON, ABNT CLST, CARB COAL: UNCONSOLIDATED
0.30	CLAYSTONE, CARB, COAL C-2 40%
0.10	CLAYSTONE
1.00	CLYST, CARB, ABNT C STRGS UP TO 1 CM, UNCON
0.70+m	CLAYSTONE

ATTITUDE OF ROOF : 005/28E
ATTITUDE OF FLOOR: 170/20E
UTM COORDINATES : 6356590mN, 490200mE
ELEVATION : 2073m
MAP CARD NUMBER : 104 H/6 B,G
TRENCH DEPTH : 1.50m
TRENCH WIDTH : 0.50m
TRENCH LENGTH : 4.50m
TRENCH BEARING : 165°
TRENCH SLOPE : 26°N
TRENCH BLOCK : S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

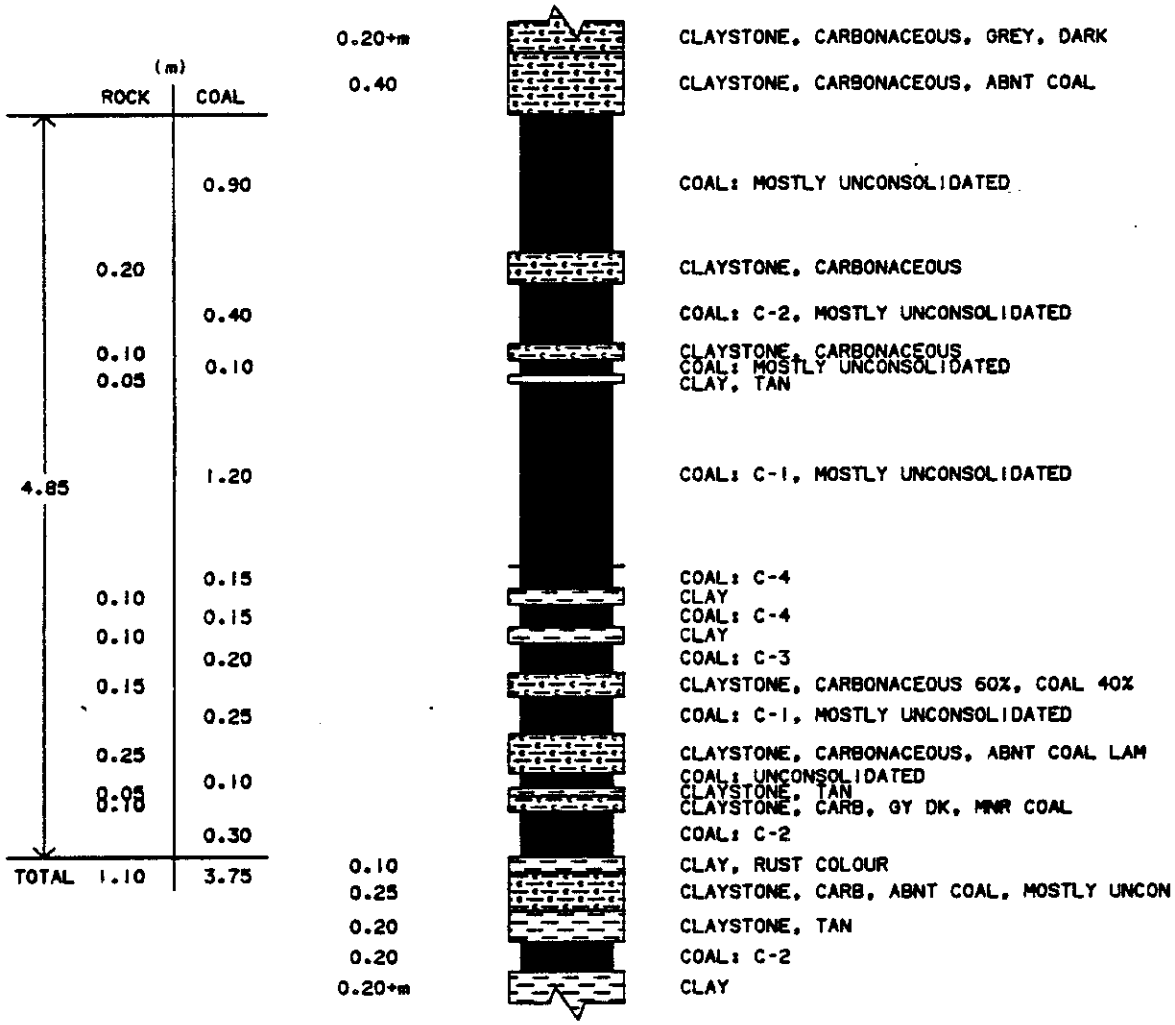
TRENCH LOG
KPN-TRC-83089

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 23/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83089

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			CLAYSTONE	UNCONSOLIDATED ROOF
	0.20	0.25	0.05			COAL	UNCONSOLIDATED, ABUNDANT CLAYSTONE. CARBONACEOUS.
	0.25	0.35	0.10			COAL	UNCONSOLIDATED
	0.35	0.65	0.30			CLAYSTONE	CARB 40% COAL C-2 FLOOR
	0.65	0.75	0.10			CLAYSTONE	
	0.75	1.75	1.00			CLAYSTONE	CARB ABUNDANT COAL STRINGERS UP TO ONE CM, UNCONSOLIDATED MOSTLY.
	1.75	2.45	0.70			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	110/35S
ATTITUDE OF FLOOR	:	120/20S
UTM COORDINATES	:	6358300mN, 490050mE
ELEVATION	:	1943m
MAP CARD NUMBER	:	104 H/6 B,G
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	1.30m
TRENCH LENGTH	:	13.00m
TRENCH BEARING	:	010°
TRENCH SLOPE	:	04°N
TRENCH BLOCK	:	S.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83090

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 23/08/83
APPROVED BY: C.W.	

090:(209,571851024016.LOG: 04/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83090

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			CLAYSTONE	CARB.DK.GY
	0.20	0.60	0.40			CLAYSTONE	CARB ABUNDANT COAL ROOF
	0.60	1.50	0.90			COAL	MOSTLY UNCONSOLIDATED
	1.50	1.70	0.20			CLAYSTONE	CARB
	1.70	2.10	0.40			COAL	C-2 MOSTLY UNCONSOLIDATED.
	2.10	2.20	0.10			CLAYSTONE	CARB
	2.20	2.30	0.10			COAL	MOSTLY UNCONSOLIDATED.
	2.30	2.35	0.05			CLAY	TAN
	2.35	3.55	1.20			COAL	C-1 MOSTLY UNCONSOLIDATED
	3.55	3.70	0.15			COAL	C-4

* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: SN DATA SOURCE: TRC83090

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.70	3.80	0.10			CLAY	
	3.80	3.95	0.15			COAL	C-4
	3.95	4.05	0.10			CLAY	
	4.05	4.25	0.20			COAL	C-3
	4.25	4.40	0.15			CLAYSTONE	CARB 40% COAL LAM
	4.40	4.65	0.25			COAL	C-1 MOSTLY UNCONSOLIDATED
	4.65	4.90	0.25			CLAYSTONE	CARB ABUNDANT COAL LAM
	4.90	5.00	0.10			COAL	UNCONSOLIDATED
	5.00	5.05	0.05			CLAYSTONE	LT.BN
	5.05	5.15	0.10			CLAYSTONE	CARB.DK.GY MINOR COAL
	5.15	5.45	0.30			COAL	C-2

* DENOTES MEASURED BCA

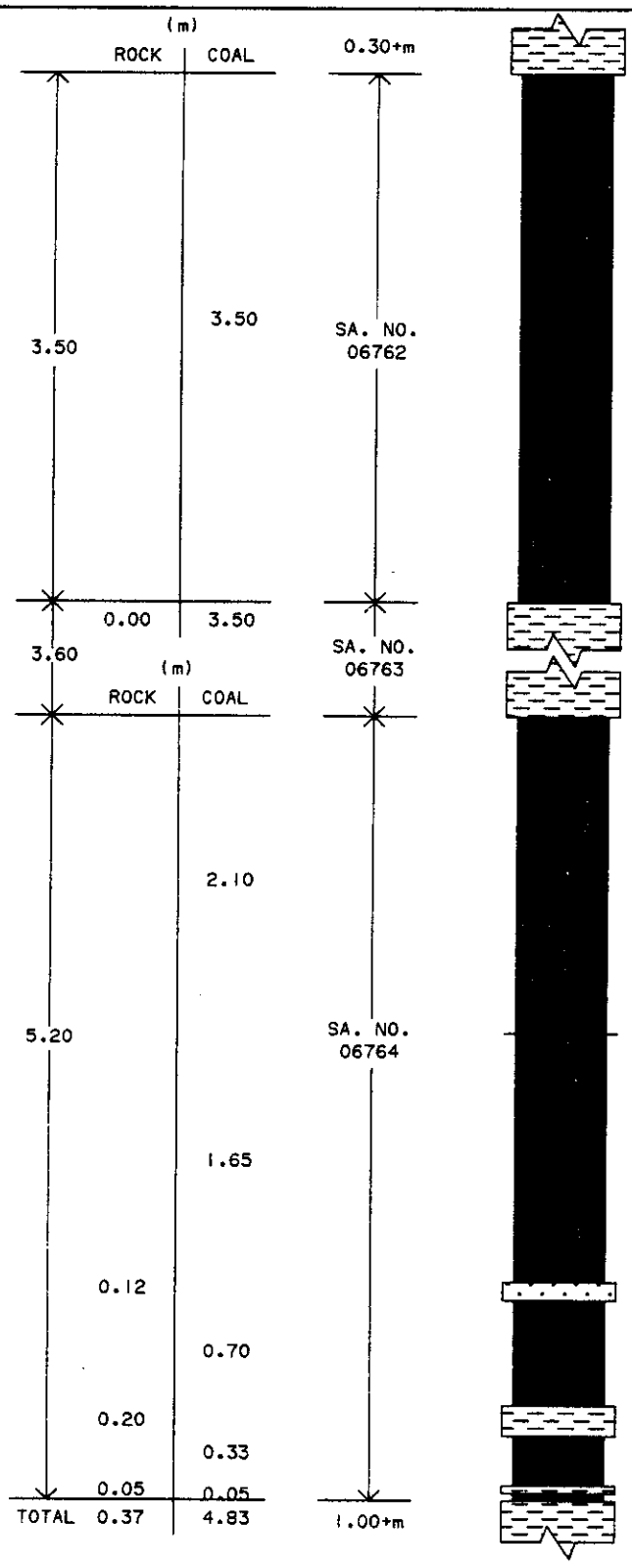
GULF CANADA RESOURCES INC. - COAL DIVISION S.S.

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83052										
		6762	0.30	3.80	100.00	3.50	0.00	0.00	0.00	3.50- 0.00
		6763	3.80	7.40	100.00	0.00	3.60	0.00	0.00	0.00- 3.60
		6764	7.40	12.60	100.00	4.83	0.37	0.00	0.00	4.83- 0.37
TRC83054										
		3572	2.34	3.90	100.00	1.36	0.20	0.00	0.00	1.36- 0.20
TRC83060										
		3573	1.94	5.24	100.00	2.90	0.40	0.00	0.00	2.90- 0.40
		3574	5.24	8.77	100.00	2.93	0.60	0.00	0.00	2.93- 0.60
		3575	8.77	11.18	100.00	1.85	0.56	0.00	0.00	1.85- 0.56
		3576	12.98	13.88	100.00	0.90	0.00	0.00	0.00	0.90- 0.00



ATTITUDE OF ROOF : 131/64S
ATTITUDE OF FLOOR: 131/64S
UTM COORDINATES : 6349810mN, 501960mE
ELEVATION : 1738m
MAP CARD NUMBER : K 11
TRENCH DEPTH : 1.04
TRENCH WIDTH : 0.60
TRENCH LENGTH : 15.70
TRENCH BEARING : 193°
TRENCH SLOPE : 05°
TRENCH BLOCK : S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83052

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: SCOTT FAWCETT	DATE: 02/08/83
APPROVED BY: C.W.	

QSO:[205,57]831024010.LOG; 28/10/83

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83052

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLYST	WEATHERED ROOF - BEDDING INDISTINCT; UNCONSOLIDATED
	0.30	3.80	3.50	06762		COAL	BLOOM ONLY - MINOR CLYST BANDS - C-2,C-3 FRAGS
	3.80	7.40	3.60	06763		CLYST	WEATHERED - FE STAIN - BEDDING INDISTINCT; UNCONSOLIDATED
	7.40	9.50	2.10	06764		COAL	WEATHERED - PARTIALLY CONSOLIDATED - MINOR CLYST BANDS
	9.50	11.15	1.65	06764		COAL	C-3 MINOR C-2, C-3, MINOR CLAYSTONE
	11.15	11.27	0.12	06764		SILST	FE STAIN
	11.27	11.97	0.70	06764		COAL	C-2 OXIDIZED - MINOR CLYST
	11.97	12.17	0.20	06764		CLYST	
	12.17	12.50	0.33	06764		COAL	C-2
	12.50	12.55	0.05	06764		CLYST	
	12.55	12.60	0.05	06764		COAL	C-3

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83052

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	12.60	13.60	1.00			CLYST	M.BN FLOOR

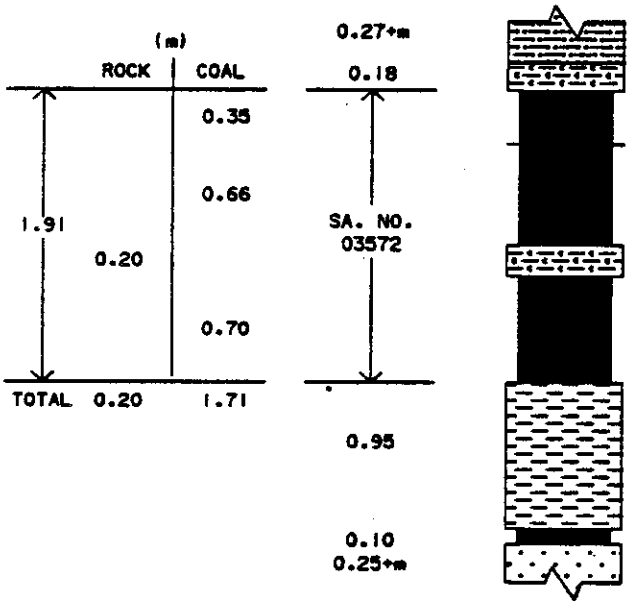
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83052											
	HD1		6762	12.01	36.87	30.49	20.63	0.19	12.11		
	HD1		6763	3.19	88.81	0.67	7.33	0.03	0.00		
	HD1		6764	6.39	42.45	38.19	12.97	0.46	14.18		



ATTITUDE OF ROOF	:	140/20S * ROOF SLUMPED
ATTITUDE OF FLOOR	:	150/80N
UTM COORDINATES	:	6349845mN, 505560mE
ELEVATION	:	1747m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.80m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	7.80m
TRENCH BEARING	:	050°
TRENCH SLOPE	:	030°
TRENCH BLOCK	:	S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83054

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 04/08/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83054

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			CLAYSTONE	LT.BN IRON STAIN
	1.00	1.54	0.54			CLAYSTONE	CARB MINOR COAL STRINGERS, IRON STAIN
	1.54	1.81	0.27			MUDSTONE	LT.BN UNCONSOLIDATED;
	1.81	1.99	0.18			CLAYSTONE	CARB MINOR COAL STRINGER, IRON STAIN ROOF
	1.99	2.34	0.35			COAL	C-3 UNCONSOLIDATED; MINOR MUD.
	2.34	3.00	0.66	03572		COAL	UNCONSOLIDATED; SLAYSTONE BEDS, ABUNDAN T QUARTZ FRAGS
	3.00	3.20	0.20	03572		CLAYSTONE	CARB IRON STAIN QIARTZ FRAGS
	3.20	3.90	0.70	03572		COAL	C-2 OXIDIZED MINOR CLAYSTONE
	3.90	4.85	0.95			CLAYSTONE	SLTY.BN
	4.85	4.95	0.10			COAL	C-2 CLAYSTONE BEDS, IRON STAINED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83054

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.95	5.95	1.00			SANDSTONE	GY.MAS BROWN ON WEATHERED SURFACE FLOOR

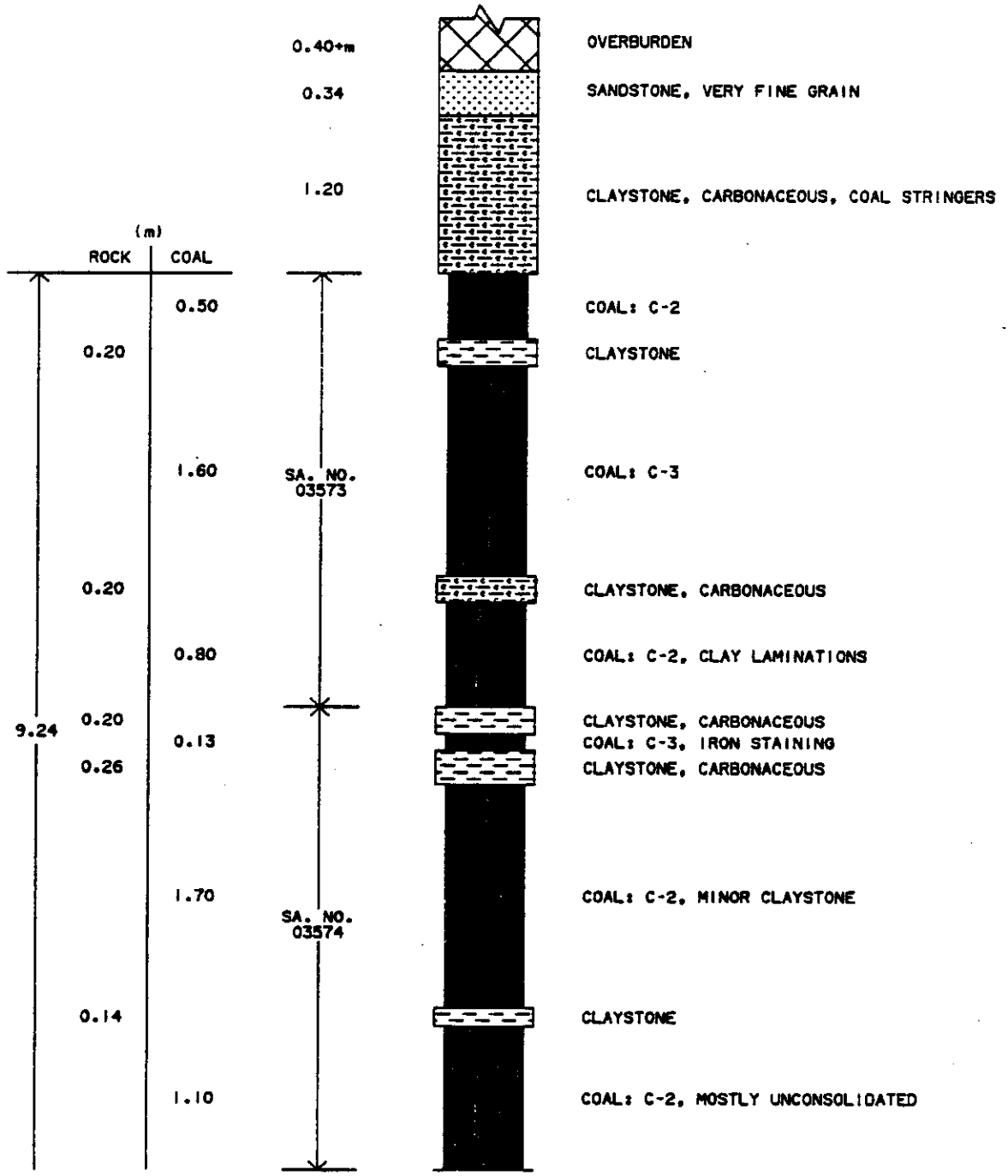
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83054											
	HD1		3572	8.83	38.75	33.87	18.55	0.27	13.02		



TO BE CONTINUED ON PAGE 2

* THIS IS THE GQ SEAM

ATTITUDE OF ROOF : 120/25N
ATTITUDE OF FLOOR: 120/55N
UTM COORDINATES : 6349116mN, 500911mE
ELEVATION : 1733m
MAP CARD NUMBER : K 11
TRENCH DEPTH : 0.80m
TRENCH WIDTH : 0.65m
TRENCH LENGTH : 21.00m
TRENCH BEARING : 358°
TRENCH SLOPE : 05°
TRENCH BLOCK : S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83060a

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 06/06/83
APPROVED BY: C.W.	PAGE 1 OF 2

GSD:[206.57183]024011.LOG; 04/11/83

CONTINUED FROM PAGE 1

0.26			MUDSTONE, LIGHT GREY
	0.85		COAL: C-2, MINOR CLAYSTONE
		SA. NO. 03575	
0.30			CLYST, SILTY, MINOR COAL, QUARTZ VEINING
	1.00		COAL: CLAYSTONE, UNCONSOLIDATED -
TOTAL 1.56	7.68		
		0.80	CLAYSTONE, UNCONSOLIDATED
		1.00	CLAYSTONE, CARBONACEOUS, COAL STRINGERS

(m)

ROCK	COAL		
0.90	0.90	SA. NO. 03576	COAL: C-3, MINOR CLAYSTONE
TOTAL 0.00	0.90		
		1.00+m	CLAYSTONE

*THIS IS THE GQ SEAM

ATTITUDE OF ROOF : 120/25N
ATTITUDE OF FLOOR: 120/55N
UTM COORDINATES : 6349116mN, 500911mE
ELEVATION : 1733m
MAP CARD NUMBER : K 11
TRENCH DEPTH : 0.80m
TRENCH WIDTH : 0.65m
TRENCH LENGTH : 21.00m
TRENCH BEARING : 358°
TRENCH SLOPE : 05°
TRENCH BLOCK : S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83060b

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 06/08/83
APPROVED BY: C.W.	PAGE 2 OF 2

GSD:(206.5718S1024011.LOG: 04/11/83

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83060

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.40	0.40			OVRBDN	
	0.40	0.74	0.34			SANDSTONE	VFG
	0.74	1.94	1.20			CLAYSTONE	CARB (ROOF) COAL STRINGERS
	1.94	2.44	0.50	03573		COAL	C-2
	2.44	2.64	0.20	03573		CLAYSTONE	
	2.64	4.24	1.60	03573		COAL	C-3
	4.24	4.44	0.20	03573		CLAYSTONE	CARB
	4.44	5.24	0.80	03573		COAL	C-2 CLAY LAMINATIONS
	5.24	5.44	0.20	03574		CLAYSTONE	CARB
	5.44	5.57	0.13	03574		COAL	C-3 IRON STAIN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83060

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	5.57	5.83	0.26	03574		CLAYSTONE	CARB
	5.83	7.53	1.70	03574		COAL	C-2 MINOR CLAYSTONE
	7.53	7.67	0.14	03574		CLAYSTONE	
	7.67	8.77	1.10	03574		COAL	C-2 MOSTLY UNCONSOLIDATED
	8.77	9.03	0.26	03575		MUDSTONE	LT.GY
	9.03	9.88	0.85	03575		COAL	C-2 MINOR CLAYSTONE
	9.88	10.18	0.30	03575		CLAYSTONE	SLTY MINOR COAL QUARTZ VIENING
	10.18	11.18	1.00	03575		COAL	MINOR CLAYSTONE, UNCONSOLIDATED
	11.18	11.98	0.80			CLAYSTONE	UNCONSOLIDATED;
	11.98	12.98	1.00			CLAYSTONE	CARB COAL STRINGERS
	12.98	13.88	0.90	03576		COAL	C-3 MINOR CLAYSTONE

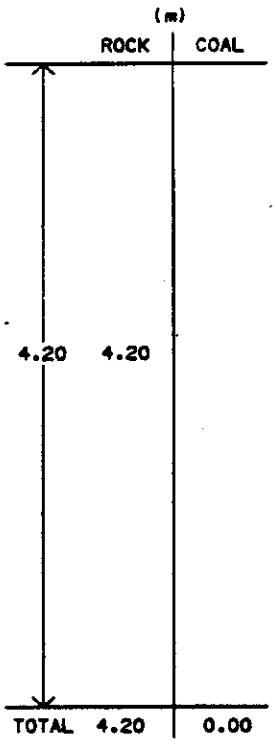
* DENOTES MEASURED BCA

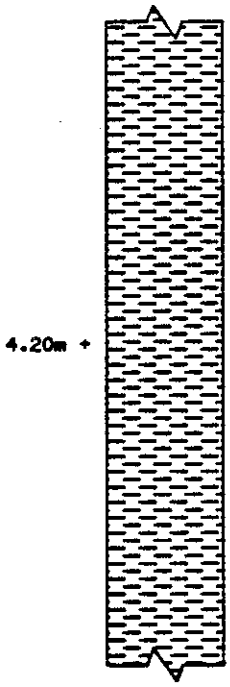
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83060											
	HD1		3573	2.36	35.25	56.56	5.83	1.78	20.04		
	HD1		3574	4.89	42.27	41.57	11.27	0.28	16.11		
	HD1		3575	5.75	39.37	41.69	13.19	0.31	15.97		
	HD1		3576	3.22	34.63	55.34	6.81	0.36	20.19		





CLYST, CARB, MNR COAL CLYST & CLAY

ATTITUDE OF ROOF	:	130/80N
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6349555mN, 502560mE
ELEVATION	:	1649m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	4.7m
TRENCH BEARING	:	050°
TRENCH SLOPE	:	15°N
TRENCH BLOCK	:	S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83063

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 11/08/83
APPROVED BY: C.W.	

GEO:(205,5718S1024012.LOG: 31/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83063

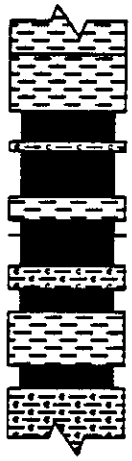
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	4.20	4.20			CLAYSTONE	MINOR COAL CLAYSTONE AND CLAY

* DENOTES MEASURED BCA

NEWPAGE

(m)

ROCK	COAL	
	0.20	0.37+m
0.06		
	0.30	
0.15		
	0.10	
1.81	0.20	
0.15		
	0.15	
0.35		
	0.15	
TOTAL 0.71	1.10	1.30+m



CLAYSTONE, MOSTLY UNCONSOLIDATED, DARK GREY

CLAYSTONE, ABUNDANT COAL STRINGERS

COAL: C-2, ABUNDANT CLAYSTONE, CLAYSTONE CARB
CLAYSTONE, CARBONACEOUS, MINOR COAL STRINGERS

COAL: C-2, CLAYSTONE, INTERBEDS UP TO 1cm

CLAYSTONE, WITH ABUNDANT COAL STRINGERS
COAL: C-1

COAL: UNCONSOLIDATED

CLAYSTONE 60%, 40% COAL INTERBEDS
COAL: MOSTLY UNCONSOLIDATED

CLAYSTONE, ABUNDANT COAL, UNCONSOLIDATED

COAL: C-2, MINOR C-1

CLAYSTONE, MINOR COAL, MOSTLY UNCONSOLIDATED

ATTITUDE OF ROOF	:	60/68E
ATTITUDE OF FLOOR	:	40/45E
UTM COORDINATES	:	6351075mN, 501372mE
ELEVATION	:	1607m
MAP CARD NUMBER	:	K 11
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	5.00m
TRENCH BEARING	:	125°
TRENCH SLOPE	:	00°
TRENCH BLOCK	:	S.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83067

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: C. NOGAS	DATE: 18/08/83
APPROVED BY: C.W.	

090:[208,57183102A013.LOG]: 03/11/83

PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83067

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.12	0.12			CLAYSTONE	DK.GY MOSTLY UNCONSOLIDATED
	0.12	0.37	0.25			CLAYSTONE	ABUNDANT COAL STRINGERS ROOF
	0.37	0.57	0.20			COAL	C-2 ABUNDANT CLAYSTONE CARBUNDANT AND CLAYS TONE
	0.57	0.63	0.06			CLAYSTONE	CARB MINOR COAL STRINGERS
	0.63	0.93	0.30			COAL	C-2 CLAYSTONE INTERBEDS UP TO 1CM.
	0.93	1.08	0.15			CLAYSTONE	ABUNDANT COAL STRINGERS
	1.08	1.18	0.10			COAL	C-1
	1.18	1.38	0.20			COAL	UNCONSOLIDATED
	1.38	1.53	0.15			CLAYSTONE	40% COAL INTERBED
	1.53	1.68	0.15			COAL	MOSTLY UNCONSOLIDATED
	1.68	2.03	0.35			CLAYSTONE	ABUNDANT COAL, UNCONSOLIDATED.

* DENOTES MEASURED BCA

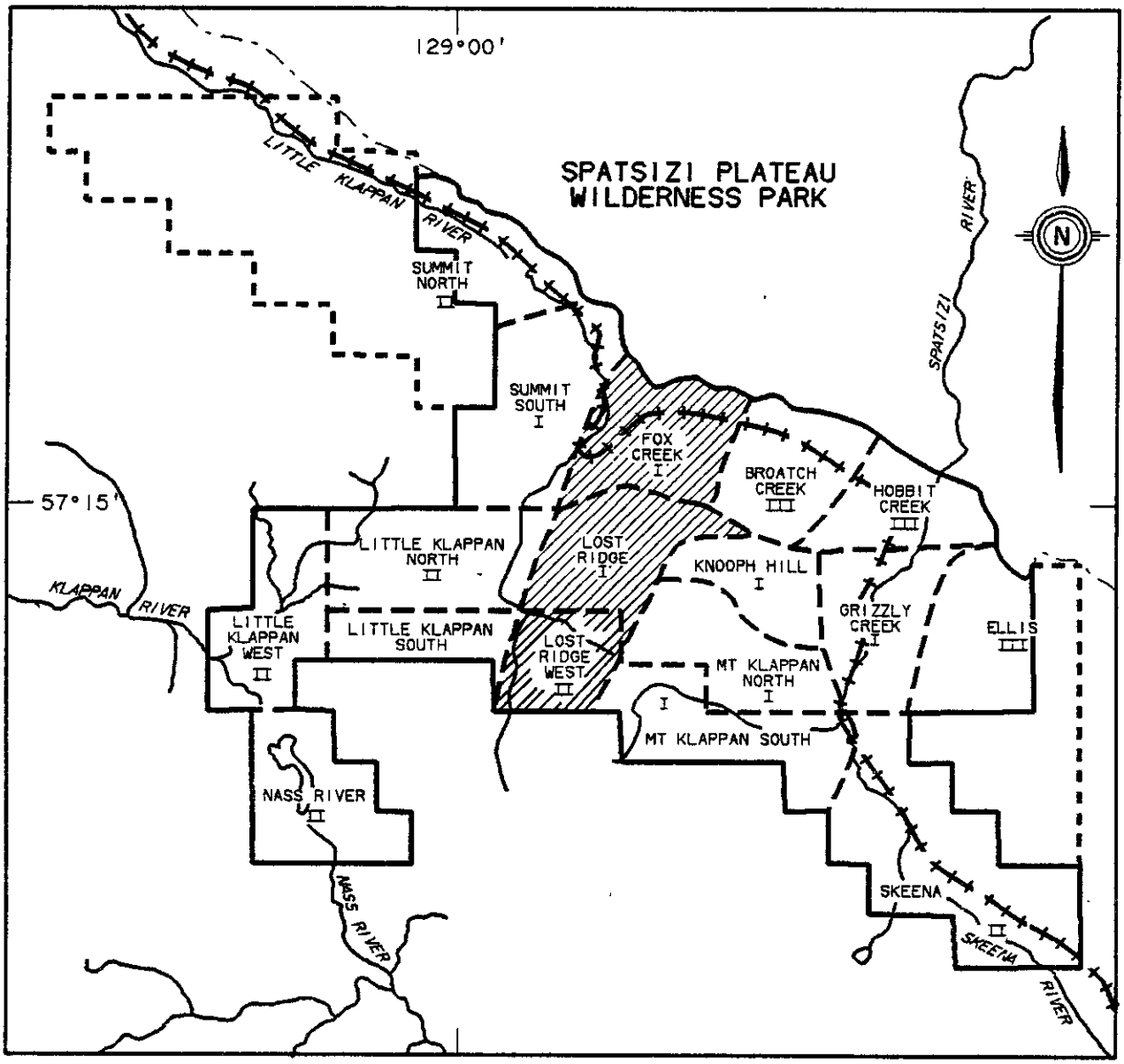
PROJECT: KPN BLOCK: SS DATA SOURCE: TRC83067

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.03	2.18	0.15			COAL	C-2 MINOR C-1
	2.18	2.98	0.80			CLAYSTONE	MINOR COAL, MOSTLY UNCONSOLIDATED FLOOR
	2.98	3.48	0.50			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE

MT. KLAPPAN COAL PROPERTY

LOST FOX AREA



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- LICENCE AREA
- LICENCES UNDER APPLICATION
- I FIRST PRIORITY
- II SECOND PRIORITY
- III THIRD PRIORITY

SCALE

0 1 2 3 km

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION L.R

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNLRTRC83001	6344700.0	505544.0	1654.0	3.2	32.0	193.0	
KPNLRTRC83002	6344727.0	505600.0	1649.0	4.8	7.0	39.0	
KPNLRTRC83003	6343343.0	507949.0	1570.0	7.7	24.0	140.0	
KPNLRTRC83004	6343630.0	508158.0	1570.0	5.5	22.0	15.0	
KPNLRTRC83005	6343905.0	508195.0	1545.0	3.1	32.0	81.0	
KPNLRTRC83006	6343877.0	508210.0	1540.0	4.6	28.0	70.0	
KPNLRTRC83007	6344075.0	508365.0	1530.0	12.4	4.0	26.0	
KPNLRTRC83028	6344416.0	507503.0	1580.0	7.0	0.0	78.0	
KPNLRTRC83029	6344635.0	507490.0	1575.0	2.4	19.0	65.0	
KPNLRTRC83039	6345328.0	505588.0	1517.0	4.8	15.0	107.0	
KPNLRTRC83041	6345320.0	506685.0	1540.0	6.4	30.0	10.0	
KPNLRTRC83042	6344610.0	507080.0	1690.0	4.9	20.0	55.0	
KPNLRTRC83044	6345400.0	506515.0	1510.0	6.4	25.0	140.0	
KPNLRTRC83047	6344375.0	505506.0	1715.0	3.9	30.0	110.0	
KPNLRTRC83050	6344390.0	505435.0	1693.0	6.7	35.0	115.0	
KPNLRTRC83053	6344515.0	505390.0	1670.0	5.1	35.0	90.0	

FORM 9999

GULF CANADA RESOURCES INC. - COAL DIVISION L.R.

16/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 2

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNLRTRC83092	6344396.0	506160.0	1820.0	5.1	17.0	55.0	
KPNLRTRC83093	6344355.0	505716.0	1825.0	7.2	24.0	147.0	

FORM 9999

GULF CANADA RESOURCES INC. - COAL DIVISION LR

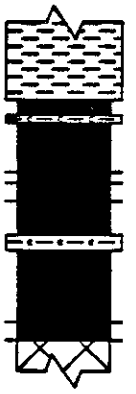
16/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83039		3562	1.24	3.24	100.00	1.93	0.07	0.00	0.00	1.93- 0.07
TRC83047		3567	1.00	2.49	100.00	1.32	0.17	0.00	0.00	1.32- 0.17
TRC83050		3565	1.18	3.80	100.00	1.61	1.01	0.00	0.00	1.61- 1.01

(m)	ROCK	COAL
		0.10
	0.05	
		0.32
		0.07
		0.12
1.57		0.22
	0.10	
		0.47
		0.12
TOTAL	0.15	1.42



CLAYSTONE

COAL: WEATHERED
CLAYSTONE, CARBONACEOUS

COAL: C-4 WEATHERED

COAL: C-4

COAL: WEATHERED, MINOR C-4 BANDS

COAL: C-2

CLAYSTONE, CARBONACEOUS, MINOR C-4 BANDS

COAL: C-4

COAL: WEATHERED

OVERBURDEN

* OVERTURNED SEAM

ATTITUDE OF ROOF	:	130/60S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344700mN, 505544mE
ELEVATION	:	1654m
MAP CARD NUMBER	:	1 10
TRENCH DEPTH	:	1.30m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	3.20m
TRENCH BEARING	:	193°
TRENCH SLOPE	:	32°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83001

DRAWN BY: J. ELDER	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 05/07/83
APPROVED BY: C.M.	

GSD:(205,5718)1024008.LOG: 25/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83001

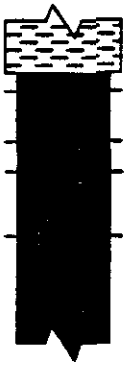
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
00	0.00	0.50	0.50			OVERBURDEN	
00	0.50	0.62	0.12			COAL	WEATHERED
00	0.62	1.09	0.47			COAL	C-4.BLK
00	1.09	1.19	0.10			CLAYSTONE	CARB MINOR C-4 BANDS
00	1.19	1.41	0.22			COAL	C-2.BLK
00	1.41	1.53	0.12			COAL	BLK WEATHERED;MINOR C-4 BANDS
00	1.53	1.60	0.07			COAL	C-4.BLK
00	1.60	1.92	0.32			COAL	C-4.BLK WEATHERED
00	1.92	1.97	0.05			CLAYSTONE	CARB
00	1.97	2.07	0.10			COAL	WEATHERED, FLOOR NOT REACHED

* DENOTES MEASURED BCA
NEWPAGE

(m)

ROCK	COAL	
	0.12	
	0.33	
	0.20	
1.59	0.42	
	0.52	
TOTAL 0.00	1.59	

0.34+m



CLAYSTONE, MINOR PLANT FOSSILS
COAL: C-2
COAL: C-2, MINOR IRON STAINING
COAL: C-2
COAL: C-2, MINOR CLAYSTONE BANDS, WTHRD, CARB
COAL: C-2, WEATHERED, UNCONSOLIDATED

* OVERTURNED SEAM

ATTITUDE OF ROOF	:	122/36S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344727mN, 505600mE
ELEVATION	:	1649m
MAP CARD NUMBER	:	I 10
TRENCH DEPTH	:	0.98m
TRENCH WIDTH	:	1.01m
TRENCH LENGTH	:	4.79m
TRENCH BEARING	:	039°
TRENCH SLOPE	:	07°S
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

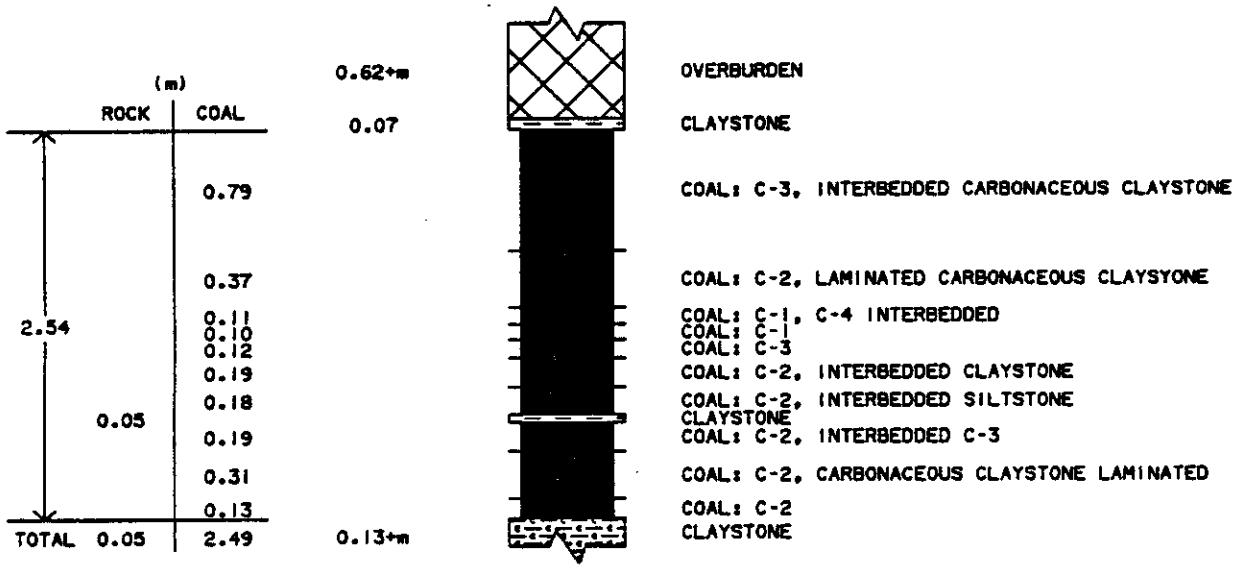
TRENCH LOG
KPN-TRC-83002

DRAWN BY: S. FANCETT	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 05/07/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.34	0.34			CLAYSTONE	DK.GY MINOR PLANT FOSSILS
	0.34	0.46	0.12			COAL	C-2.BLK
	0.46	0.79	0.33			COAL	C-2.BLK MINOR IRON STAINING
	0.79	0.99	0.20			COAL	C-2.WEATH.BLK MINOR CLAYSTONE
	0.99	1.41	0.42			COAL	C-2.BLK UNCONSOLIDATED; WEATHERED
	1.41	1.93	0.52			COAL	C-2.BLK
	1.93	2.11	0.18			OVERBURDEN	FLOOR NOT REACHED

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF : 030/12S
ATTITUDE OF FLOOR: NOT OBTAINED
UTM COORDINATES : 6343343mN, 507949mE
ELEVATION : 1570m
MAP CARD NUMBER : 1 9
TRENCH DEPTH : 1.16m
TRENCH WIDTH : 0.90m
TRENCH LENGTH : 7.73m
TRENCH BEARING : 140°
TRENCH SLOPE : 24°
TRENCH BLOCK : L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83003

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 13/07/83
APPROVED BY: C.N.	

050:(205,57)831024002.LOG: 27/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83003

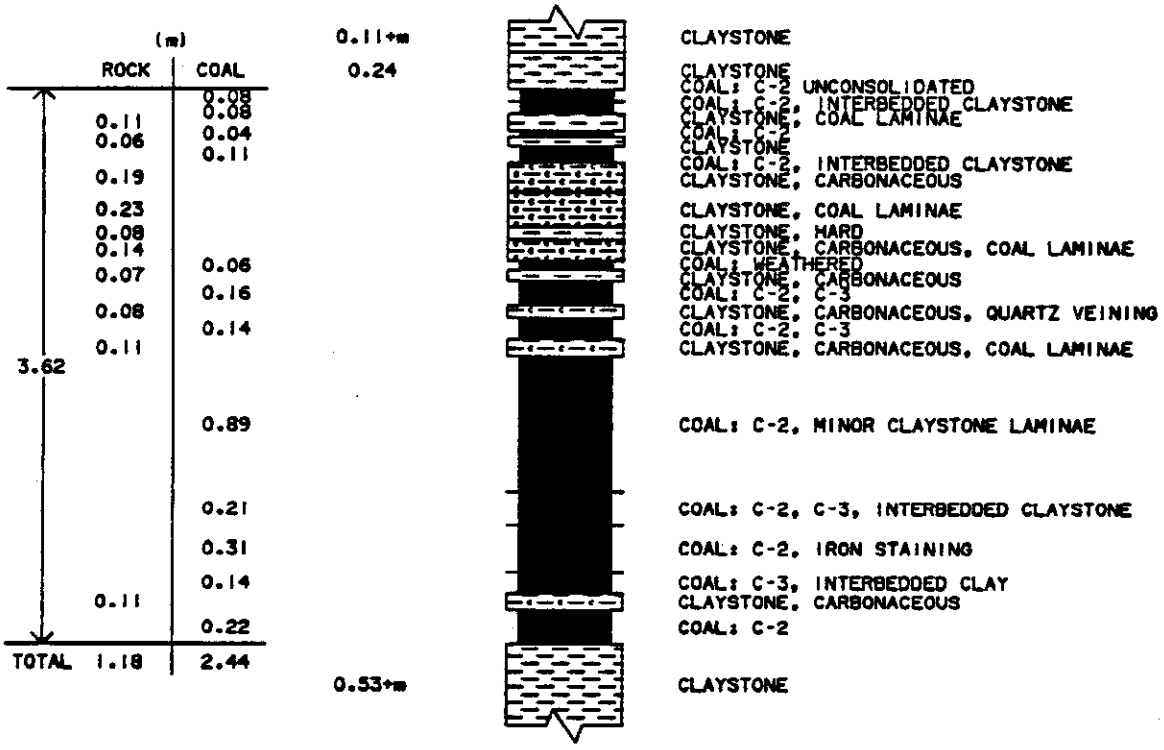
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.62	0.62			OVERBURDEN	SLUMPED;ROOF NOT ATTAINED
	0.62	0.69	0.07			CLAYSTONE	
	0.69	1.48	0.79			COAL	C-3.BLK INTERBEDDED CARB CLAYSTONE
	1.48	1.85	0.37			COAL	C-2.BLK LAMINATED CARB CLAYSTONE
	1.85	1.96	0.11			COAL	C-1 INTERBEDDED COAL C-1 & C-4
	1.96	2.06	0.10			COAL	C-1
	2.06	2.18	0.12			COAL	C-3.BLK
	2.18	2.37	0.19			COAL	C-2.BLK INTERBEDDED CLAYSTONE
	2.37	2.55	0.18			COAL	C-2.BLK
	2.55	2.60	0.05			CLAYSTONE	
	2.60	2.79	0.19			COAL	C-2.BLK INTERBEDDED COAL C-3

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.79	3.10	0.31			COAL	C-2.BLK LAMINATED CARB CLAYSTONE
	3.10	3.23	0.13			COAL	C-2
	3.23	3.36	0.13			CLAYSTONE	CARB FLOOR

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF : 100/59S
ATTITUDE OF FLOOR: 101/54S
UTM COORDINATES : 6343630mN, 508158mE
ELEVATION : 1570m
MAP CARD NUMBER : 1 9
TRENCH DEPTH : 1.15m
TRENCH WIDTH : 1.08m
TRENCH LENGTH : 5.49m
TRENCH BEARING : 015°
TRENCH SLOPE : 22°
TRENCH BLOCK : L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83004

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 14/07/83
APPROVED BY: C.W.	

050:[208,57]831024002.LOG: 27/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.11	0.11			CLAYSTONE	BROWNISH-GRAY COLOUR ROOF
	0.11	0.35	0.24			CLAYSTONE	GY
	0.35	0.43	0.08			COAL	C-2.BLK UNCONSOLIDATED
	0.43	0.51	0.08			COAL	C-2.BLK INTERBEDDED CLAYSTONE
	0.51	0.62	0.11			CLAYSTONE	COAL LAMINATIONS
	0.62	0.66	0.04			COAL	C-2
	0.66	0.72	0.06			CLAYSTONE	
	0.72	0.83	0.11			COAL	C-2.BLK INTERBEDDED CLAYSTONE
	0.83	1.02	0.19			CLAYSTONE	CARB
	1.02	1.25	0.23			CLAYSTONE	COAL LAMINATONS
	1.25	1.33	0.08			CLAYSTONE	CONSOLIDATED

* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.33	1.47	0.14			CLAYSTONE	CARB COAL LAMINATIONS
	1.47	1.53	0.06			COAL	BLK.HEATH
	1.53	1.60	0.07			CLAYSTONE	CARB
	1.60	1.76	0.16			COAL	C-3 COAL C-2 & C-3
	1.76	1.84	0.08			CLAYSTONE	CARB QTZ VEINED
	1.84	1.98	0.14			COAL	C-3.BLK COAL
	1.98	2.09	0.11			CLAYSTONE	CARB COAL LAMINATONS
	2.09	2.98	0.89			COAL	C-2.BLK MINOR CLAYSTONE LAMINATONS
	2.98	3.19	0.21			COAL	C-3.BLK COAL C-2 & C-3;INTERBEDDED CLAYSTONE
	3.19	3.50	0.31			COAL	C-2.BLK IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.50	3.64	0.14			COAL	C-3.BLK INTERBEDDED CLAY
	3.64	3.75	0.11			CLAYSTONE	CARB
	3.75	3.97	0.22			COAL	C-2.BLK
	3.97	4.50	0.53			CLAYSTONE	GY FLOOR

* DENOTES MEASURED BCA
NEWPAGE

(m) ROCK	(m) COAL		
		0.36+m	CLAYSTONE, WEATHERED
		0.18	CLAYSTONE, CARBONACEOUS
	0.05		COAL: WEATHERED UNCONSOLIDATED
0.12	0.09		CLAY, UNCONSOLIDATED, HARD
0.05			COAL: C-3
	0.21		CLAYSTONE, CARBONACEOUS
	0.14		COAL: C-4, IRON STAINING
0.09			COAL: C-3, UNCONSOLIDATED
	0.15		CLAY
0.14			COAL: C-3, WEATHERED
	0.12		REPLACED TREE, QUARTZ VEINING
0.05			COAL: C-4, LISTRIC SURFACES
	0.22		CLAYSTONE, CARBONACEOUS
			COAL: C-3
	0.27		COAL: C-2, UNCONSOLIDATED
TOTAL 0.45	1.25	0.22+m	CLAYSTONE, IRON STAINING

1.70

ATTITUDE OF ROOF : NOT OBTAINED
ATTITUDE OF FLOOR: 180/34E
UTM COORDINATES : 6343905mN, 508195mE
ELEVATION : 1545m
MAP CARD NUMBER : 1 9
TRENCH DEPTH : 1.58m
TRENCH WIDTH : 1.09m
TRENCH LENGTH : 3.08m
TRENCH BEARING : 081°
TRENCH SLOPE : 32°
TRENCH BLOCK : L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83005

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: K.JENNER	DATE: 15/07/83
APPROVED BY: C.M.	

QSD:(205,5718310240002.LOG: 27/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.54	0.54			CLAYSTONE	CARB.WEATH
	0.54	0.59	0.05			COAL	WEATHERED;UNCONSOLIDATED
	0.59	0.65	0.06			CLAY	UNCONSOLIDATED
	0.65	0.71	0.06			CLAYSTONE	
	0.71	0.80	0.09			COAL	C-3
	0.80	0.85	0.05			CLAYSTONE	MINOR CLAYSTONE
	0.85	1.06	0.21			COAL	C-4 IRON STAINING
	1.06	1.20	0.14			COAL	C-3 UNCONSOLIDATED
	1.20	1.29	0.09			CLAY	M.BN
	1.29	1.35	0.06			COAL	
	1.35	1.44	0.09			COAL	HIGHLY WEATHERED
	1.44	1.58	0.14			CLAYSTONE	REPLACED TREE;QUARTZ VEIN

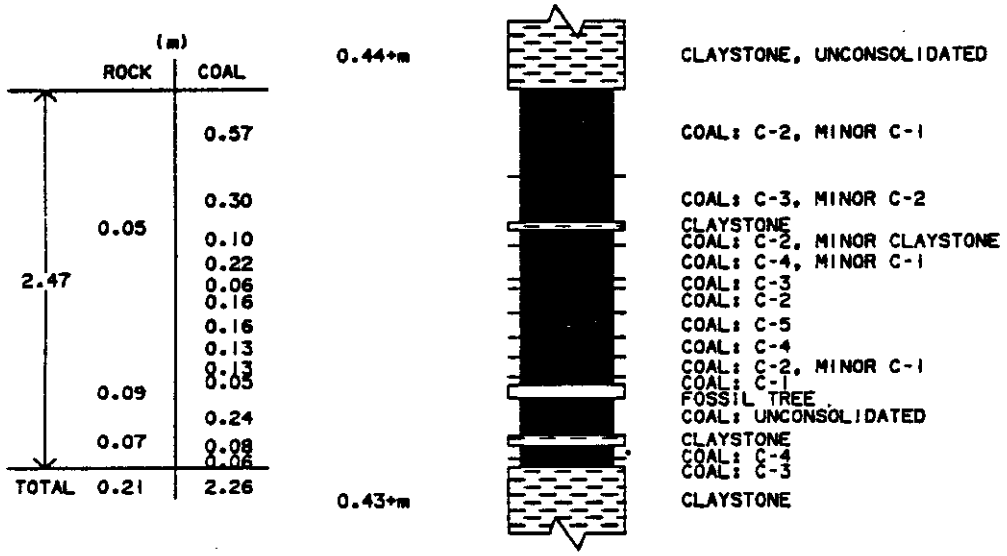
* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.58	1.70	0.12			COAL	C-4
	1.70	1.75	0.05			CLAYSTONE	CARB
	1.75	1.97	0.22			COAL	C-3
	1.97	2.24	0.27			COAL	C-2 WEATHERED
	2.24	2.46	0.22			CLAYSTONE	IRON STAINING

* DENOTES MEASURED BCA

NEWPAGE



ATTITUDE OF ROOF	:	116/26S
ATTITUDE OF FLOOR	:	118/15S
UTM COORDINATES	:	6343877mN, 508210mE
ELEVATION	:	1540m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	1.23m
TRENCH WIDTH	:	1.22m
TRENCH LENGTH	:	4.60m
TRENCH BEARING	:	070°
TRENCH SLOPE	:	28°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83006

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 15/07/83
APPROVED BY: C.M.	

050:(205,57)831024002.LOG: 27/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83006

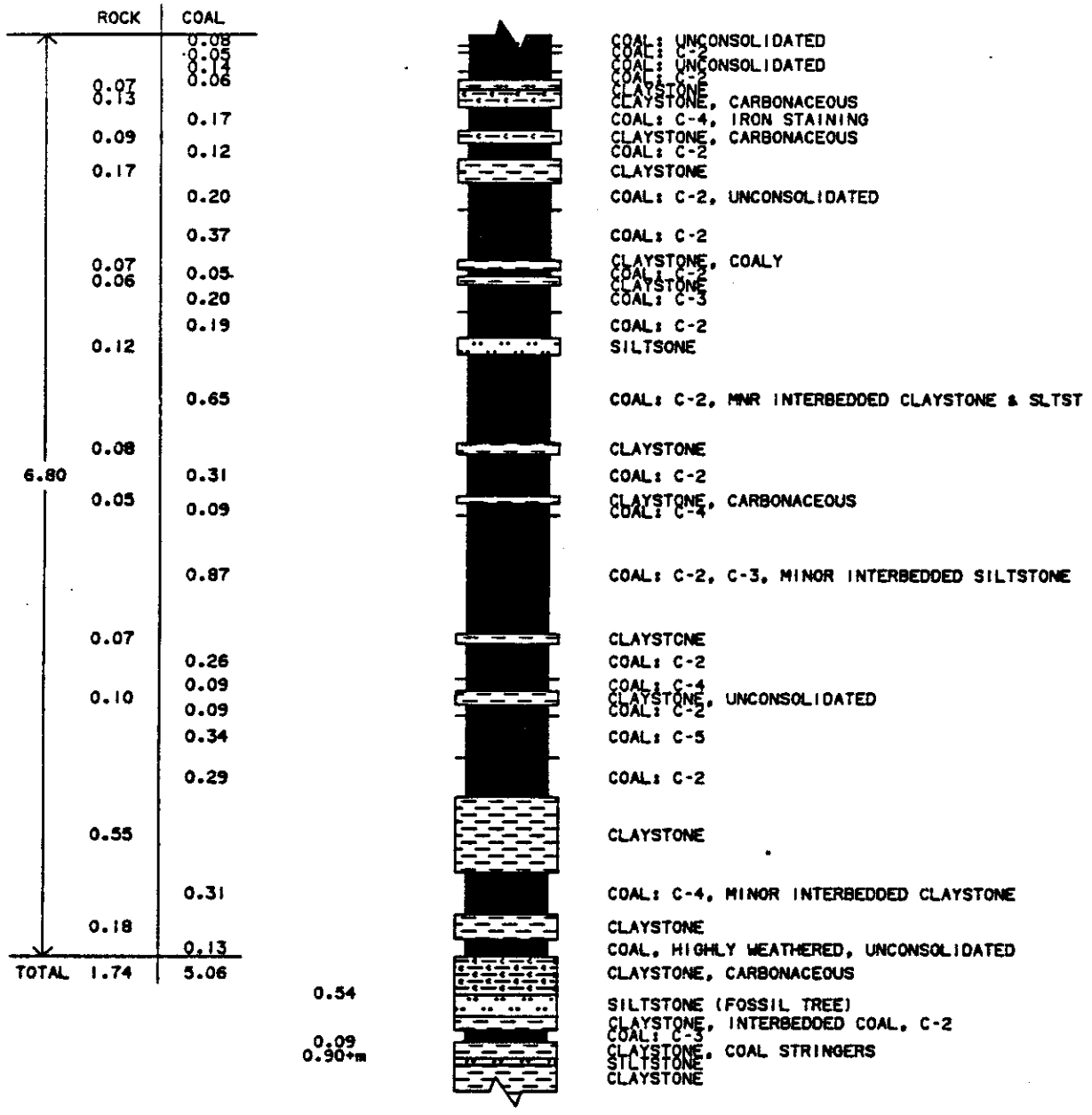
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.44	0.44			CLAYSTONE	UNCONSOLIDATED ROOF
	0.44	1.01	0.57			COAL	C-2
	1.01	1.31	0.30			COAL	C-3 MINOR COAL C-2
	1.31	1.36	0.05			CLAYSTONE	UNCONSOLIDATED
	1.36	1.46	0.10			COAL	C-2 MINOR CLAYSTONE
	1.46	1.68	0.22			COAL	C-4 MINOR COAL C-1
	1.68	1.74	0.06			COAL	C-3
	1.74	1.90	0.16			COAL	C-2
	1.90	2.06	0.16			COAL	C-5 COAL INTERBEDDED CLAYSTONE
	2.06	2.19	0.13			COAL	C-4

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.19	2.32	0.13			COAL	C-2 MINOR COAL C-1
	2.32	2.37	0.05			COAL	C-1
	2.37	2.46	0.09			CLAYSTONE	CARB FOSSIL TREE
	2.46	2.70	0.24			COAL	UNCONSOLIDATED
	2.70	2.77	0.07			CLAYSTONE	M.BN
	2.77	2.85	0.08			COAL	C-4
	2.85	2.91	0.06			COAL	C-3
	2.91	3.34	0.43			CLAYSTONE	FLOOR

* DENOTES MEASURED BCA



*FOLDING WITHIN TRENCH

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	128/79N
UTM COORDINATES	:	6344075mN, 508365mE
ELEVATION	:	1530m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	0.93m
TRENCH WIDTH	:	0.84m
TRENCH LENGTH	:	12.36m
TRENCH BEARING	:	026°
TRENCH SLOPE	:	04°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83007

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 16/07/83
APPROVED BY: C.W.	

080:(205,5718310240003.LOG: 26/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83007

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.08	0.08			COAL	UNCONSOLIDATED
	0.08	0.13	0.05			COAL	C-2.BLK
	0.13	0.27	0.14			COAL	
	0.27	0.33	0.06			COAL	C-2.BLK
	0.33	0.40	0.07			CLAYSTONE	M.BN
	0.40	0.48	0.08			CLAYSTONE	COAL STRINGERS
	0.48	0.53	0.05			CLAYSTONE	CARB
	0.53	0.70	0.17			COAL	C-4.BLK IRON STAINING
	0.70	0.79	0.09			CLAYSTONE	CARB
	0.79	0.91	0.12			COAL	C-2.BLK
	0.91	1.08	0.17			CLAYSTONE	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83007

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.08	1.28	0.20			COAL	C-2.BLK UNCONSOLIDATED
	1.28	1.65	0.37			COAL	
	1.65	1.72	0.07			CLAYSTONE	
	1.72	1.77	0.05			COAL	
	1.77	1.83	0.06			CLAYSTONE	
	1.83	2.03	0.20			COAL	
	2.03	2.22	0.19			COAL	C-2.BLK
	2.22	2.34	0.12			SILTSTONE	
	2.34	2.99	0.65			COAL	C-2.BLK INTERBEDDED CLAYSTONE AND SILTSTONE
	2.99	3.07	0.08			CLAYSTONE	M.BN
	3.07	3.38	0.31			COAL	C-2.BLK
	3.38	3.43	0.05			CLAYSTONE	CARB

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83007

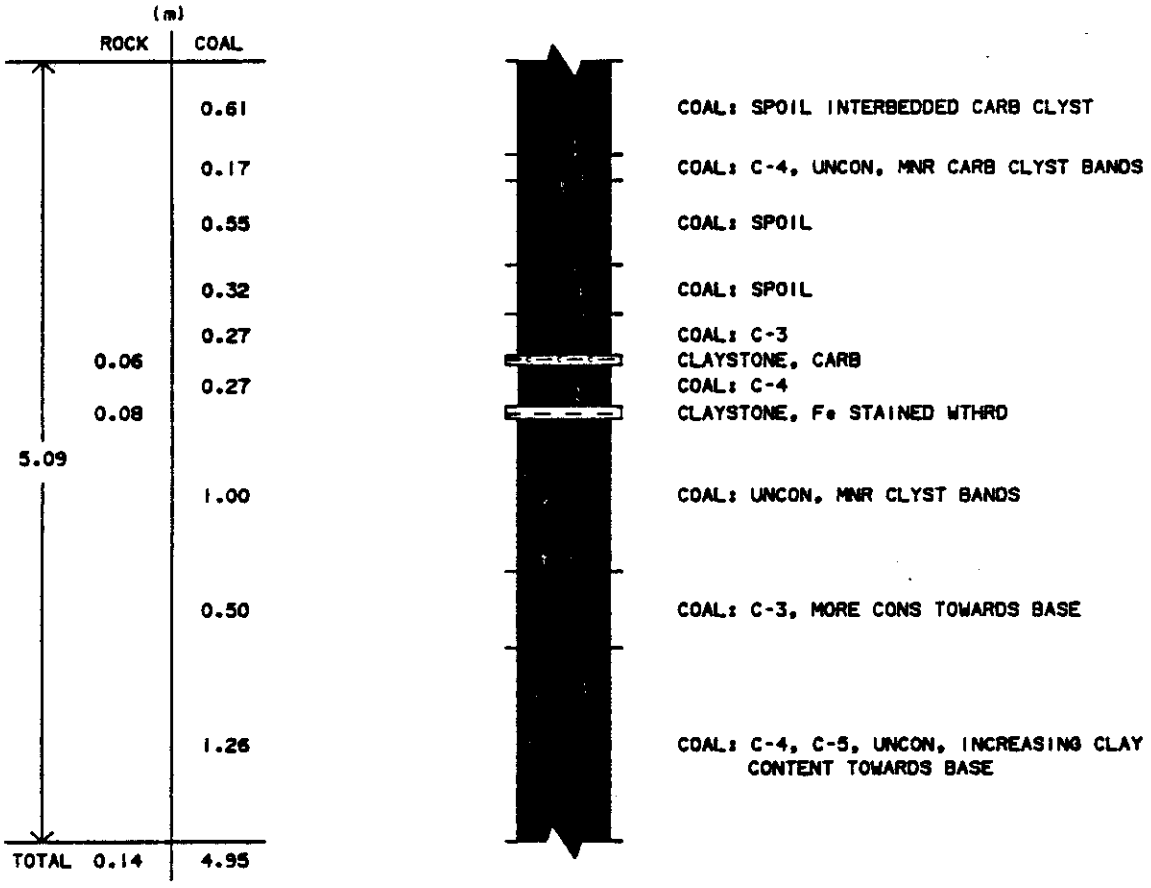
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.43	3.52	0.09			COAL	C-4.BLK
	3.52	4.39	0.87			COAL	BLK COAL C-2 & C-3;MINOR INTERBEDDED SILTST ONE
	4.39	4.46	0.07			CLAYSTONE	M.BN
	4.46	4.72	0.26			COAL	C-2.BLK
	4.72	4.81	0.09			COAL	C-4.BLK
	4.81	4.91	0.10			CLAYSTONE	UNCONSOLIDATED
	4.91	5.00	0.09			COAL	C-2.BLK
	5.00	5.34	0.34			COAL	C-5.BLK
	5.34	5.63	0.29			COAL	C-2.BLK

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83007

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	5.63	6.18	0.55			CLAYSTONE	M.GY
	6.18	6.49	0.31			COAL	C-4.BLK MINOR CLAYSTONE INTERBEDS
	6.49	6.67	0.18			CLAYSTONE	
	6.67	6.80	0.13			COAL	BLK HIGHLY WEATHERED;UNCONSOLIDATED
	6.80	7.08	0.28			CLAYSTONE	CARB
	7.08	7.24	0.16			SILTSTONE	FOSSIL TREE
	7.24	7.34	0.10			CLAYSTONE	COAL INTERBEDS
	7.34	7.43	0.09			COAL	C-3.BLK
	7.43	7.55	0.12			CLAYSTONE	COAL STRINGERS
	7.55	7.60	0.05			SILTSTONE	
	7.60	8.33	0.73			CLAYSTONE	FLOOR

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	169/45SW
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344416mN, 507503mE
ELEVATION	:	1580m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	1.3m
TRENCH WIDTH	:	0.7m
TRENCH LENGTH	:	7.0m
TRENCH BEARING	:	078°
TRENCH SLOPE	:	0°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83028

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: G. SEVE	DATE: 23/06/83
APPROVED BY: C.M.	

GSD:(206,5718)(024006.LOG: 27/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83028

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.61	0.61			COAL	BLK SPOIL;INTERBEDDED CARB CLAYSTONE;ROOF N OT OBTAINED
	0.61	0.78	0.17			COAL	C-4.BLK UNCONSOLIDATED;MINOR CARB CLAYSTONE BAN DS
	0.78	1.33	0.55			COAL	BLK UNCONSOLIDATED COAL SPOIL
	1.33	1.65	0.32			COAL	BLK UNCONSOLIDATED COAL SPOIL
	1.65	1.92	0.27			COAL	C-3.BLK
	1.92	1.98	0.06			CLAYSTONE	CARB.DK.GY
	1.98	2.25	0.27			COAL	C-4.BLK UNCONSOLIDATED
	2.25	2.33	0.08			CLAYSTONE	HEATH IRON STAINING
	2.33	3.33	1.00			COAL	BLK UNCONSOLIDATED;MINOR CLAYSTONE BANDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83028

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.33	3.83	0.50			COAL	C-3.BLK MORE CONSOLIDATED TOWARDS BASE
	3.83	5.09	1.26			COAL	BLK COAL C-4 & C-3;UNCONSOLIDATED;INCREASIN G CLAY CONTENT TOWARD BASE

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
0.80		0.80
TOTAL	0.00	0.80

0.40+M

OVERBURDEN

COAL: BLOOM, UNCON, INTBD CARB CLAY

CLAY, UNCONSOLIDATED

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	APPROX 145/40N
UTM COORDINATES	:	6344635mN, 507490mE
ELEVATION	:	1575m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	2.40m
TRENCH BEARING	:	065°
TRENCH SLOPE	:	19°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83029

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: G. SEVE	DATE: 23/07/83
APPROVED BY: C.M.	

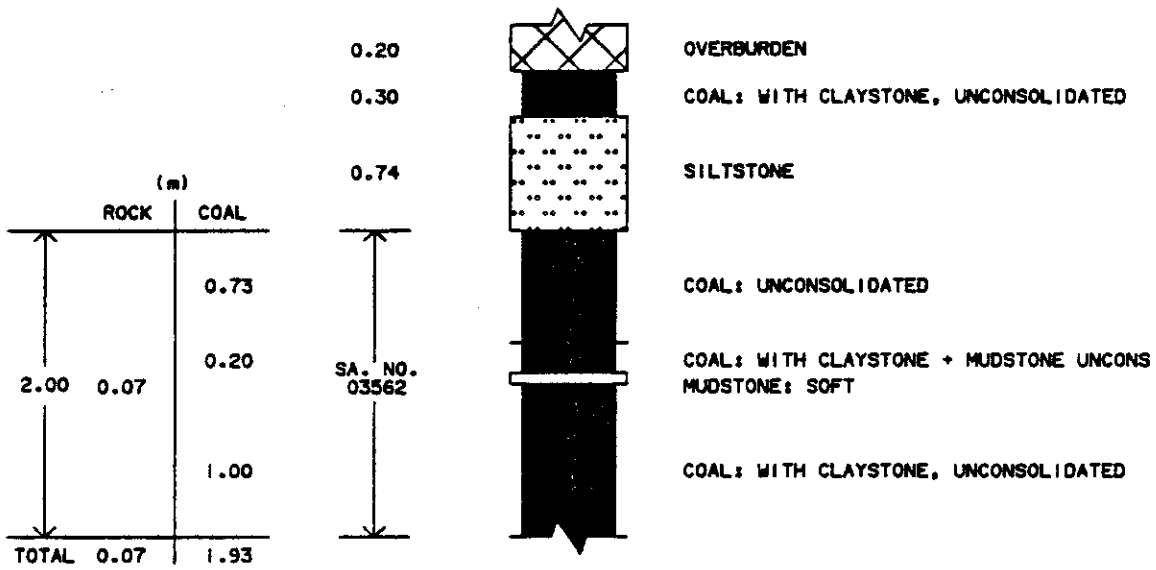
GSO:(205,5718310240O6.LOG: 27/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83029

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.80	0.80			COAL	UNCONSOLIDATED;CARB CLAYSTONE INTERBEDS
	0.80	1.20	0.40			CLAY	UNCONSOLIDATED

● DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	020/46S
ATTITUDE OF FLOOR	:	N/A
UTM COORDINATES	:	6345328mN 505588mE
ELEVATION	:	1517m
MAP CARD NUMBER	:	J 10
TRENCH DEPTH	:	1.70m
TRENCH WIDTH	:	0.90m
TRENCH LENGTH	:	4.80m
TRENCH BEARING	:	107°
TRENCH SLOPE	:	15°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83039

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 25/07/83
APPROVED BY: C.M.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83039

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			OVERBURDEN	
	0.20	0.50	0.30			COAL	BLK COAL INTERBEDDED CLAYSTONE;UNCONSOLIDATED
	0.50	1.24	0.74			SILTSTONE	
	1.24	1.97	0.73	03562		COAL	UNCONSOLIDATED
	1.97	2.17	0.20	03562		COAL	COAL INTERBEDDED WITH CLAYSTONE AND MUDSTONE;UNCONSOLIDATED
	2.17	2.24	0.07	03562		MUDSTONE	SOFT
	2.24	3.24	1.00	03562		COAL	BLK COAL INTERBEDDED CLAYSTONE;UNCONSOLIDATED

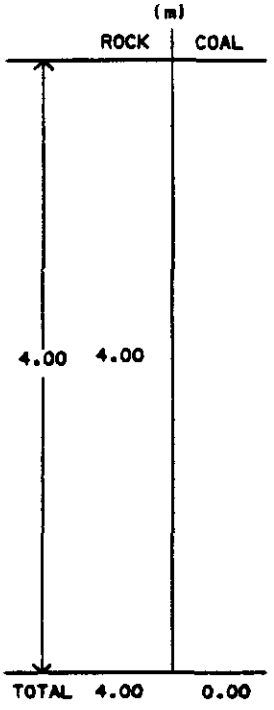
* DENOTES MEASURED BCA
NEWPAGE

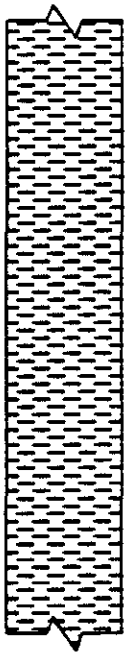
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83039											
	HD1		3562	11.58	20.37	44.00	24.05	0.22	16.96		





CLAYSTONE AND MUDSTONE INTERBEDS
-CLAYSTONE CARBONACEOUS
-MINOR NODULE SILTSTONE
-WEATHERED AND UNCONSOLIDATED

ATTITUDE OF ROOF	:	105/30S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6345320mN, 506685mE
ELEVATION	:	1540m
MAP CARD NUMBER	:	J 9
TRENCH DEPTH	:	0.80m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	6.40m
TRENCH BEARING	:	010°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83041

DRAWN BY: R. NAYLOR	SCALE: 1:50
LOGGED BY: R. NAYLOR	DATE: 23/07/83
APPROVED BY: C.W.	

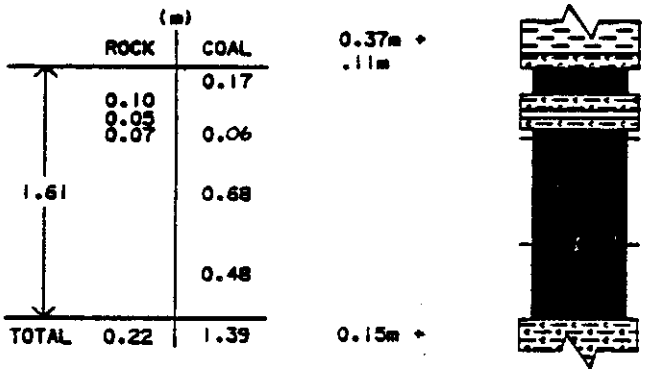
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83041

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	4.00	4.00			CLAYSTONE	CARB MUDSTONE INTERBEDS;MINOR NODULAR SILTSTONE;WEATHERED;UNCONSOLIDATED

* DENOTES MEASURED BCA

NEWPAGE



ATTITUDE OF ROOF	:	068/05S
ATTITUDE OF FLOOR	:	054/18S
UTM COORDINATES	:	6344610mN, 507080mE
ELEVATION	:	1690m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	1.28m
TRENCH WIDTH	:	0.51m
TRENCH LENGTH	:	4.94m
TRENCH BEARING	:	055°
TRENCH SLOPE	:	20°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83042

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 25/07/83
APPROVED BY: C.W.	

050:(205.57168|084008.LOG: 02/11/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83042

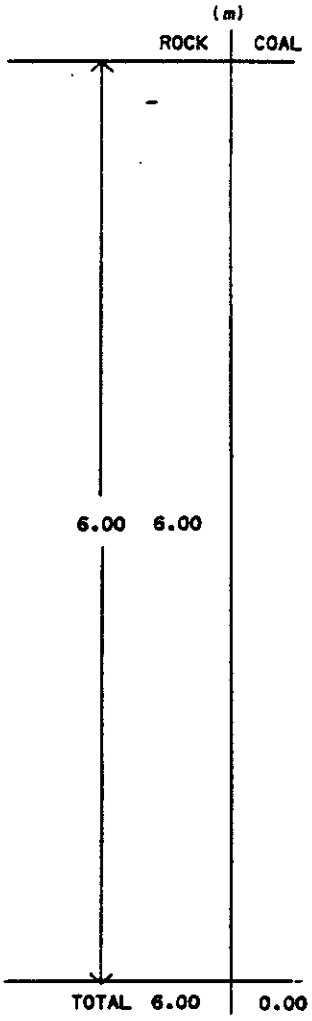
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.11	0.11			CLAYSTONE	CARB MINOR IRON STAINING;WEATHERED; ROOF
	0.11	0.28	0.17			COAL	C-2.BLK WEATHERED;IRON STAINING;COAL INTERMIXED WITH CARB CLAYSTONE
	0.28	0.38	0.10			CLAYSTONE	CARB
	0.38	0.43	0.05			CLAY	TAN
	0.43	0.50	0.07			CLAYSTONE	CARB
	0.50	0.56	0.06			COAL	C-3.BLK
	0.56	1.24	0.68			COAL	C-2.BLK MINOR CLAYSTONE;IRON STAINING
	1.24	1.72	0.48			COAL	C-3.BLK

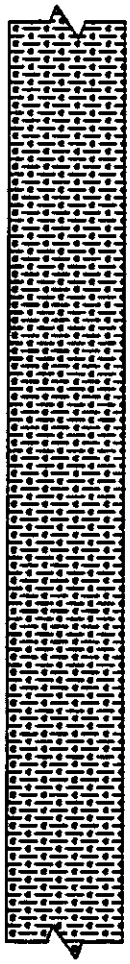
* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83042

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.72	1.87	0.15			CLAYSTONE	CARB.GY COAL STRINGERS COAL STRINGERS

* DENOTES MEASURED BCA
NEWPAGE





CLYST ● COAL, UNCON, WTHRD, FROZEN CLYST
CARB DETAILED LOG NOT
OBTAINABLE

ATTITUDE OF ROOF	:	NEAREST ALTITUDE 070/17S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6345400mN, 506515mE
ELEVATION	:	1510m
MAP CARD NUMBER	:	J 9
TRENCH DEPTH	:	1.10m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	6.40m
TRENCH BEARING	:	140°
TRENCH SLOPE	:	25°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

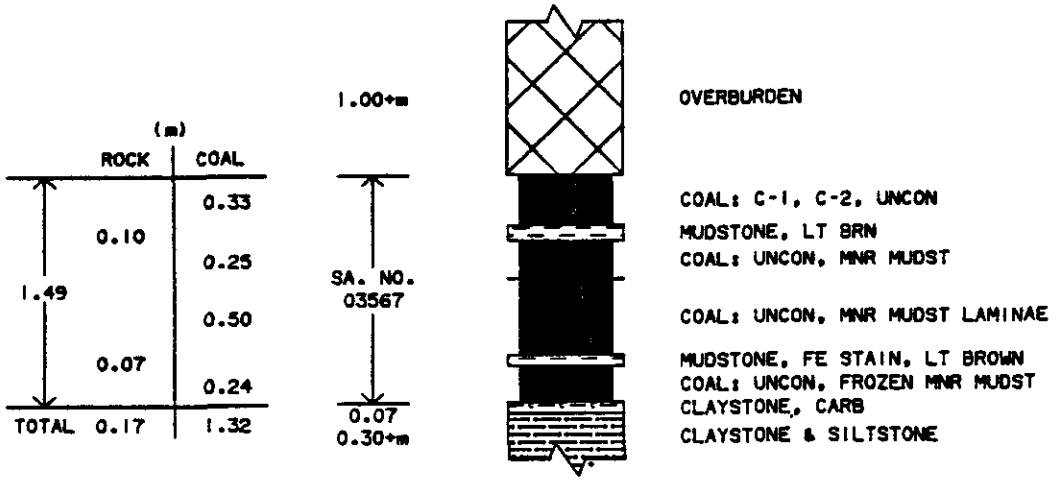
TRENCH LOG
KPN-TRC-83044

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 24/07/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: LR DATA SOURCE: TRCB3044

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	6.00	6.00			CLAYSTONE	CARB COAL BLOOM AND CARB CLAYSTONE INTERMIXED;DETAILED LOG NOT OBTAINED DUE TO COMPLETELY UNCONSOLIDATED NATURE OF THE COAL AND ROCK UNCONSOLIDATED, WEATHERED, FROZEN

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344375mN, 505506mE
ELEVATION	:	1715m
MAP CARD NUMBER	:	1 10
TRENCH DEPTH	:	1.60m
TRENCH WIDTH	:	0.80m
TRENCH LENGTH	:	3.94m
TRENCH BEARING	:	110°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83047

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 29/07/83
APPROVED BY: C.W.	

090:(205,571831024009.LOG: 28/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83047

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			OVERBURDEN	
	1.00	1.33	0.33	03567		COAL	C-1.BLK COAL C-1 & C-2 INTERMIXED;UNCONSOLIDATE D
	1.33	1.43	0.10	03567		MUDSTONE	LT.BN
	1.43	1.68	0.25	03567		COAL	BLK UNCONSOLIDATED;MINOR MUD
	1.68	2.18	0.50	03567		COAL	BLK UNCONSOLIDATED;MINOR MUDSTONE LAMINATIO NS
	2.18	2.25	0.07	03567		MUDSTONE	LT.BN IRON STAINING
	2.25	2.49	0.24	03567		COAL	BLK UNCONSOLIDATED;FROZEN;MINOR MUDSTONE LA MINATIONS
	2.49	2.56	0.07			CLAYSTONE	CARB FLOOR

* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83047

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.56	2.86	0.30			CLAYSTONE	LT.BN CLAYSTONE GRADING TO SILTSTONE TOWARDS BASE OF MEASUREMENT

* DENOTES MEASURED BCA

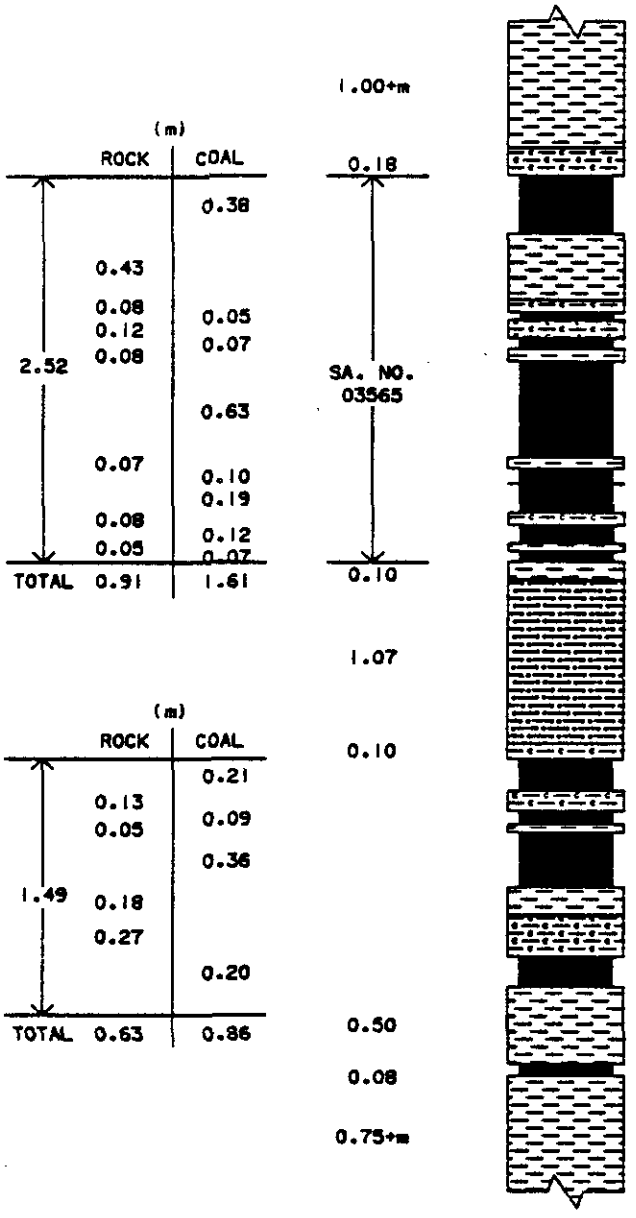
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83047											
	HD1		3567	7.26	33.32	43.64	15.78	0.26	17.05		



ATTITUDE OF ROOF : 175/55E
ATTITUDE OF FLOOR: 175/35E
UTM COORDINATES : 6344390mN, 505435mE
ELEVATION : 1693m
MAP CARD NUMBER : 1 10
TRENCH DEPTH : 0.70m
TRENCH WIDTH : 0.60m
TRENCH LENGTH : 6.70m
TRENCH BEARING : 115°
TRENCH SLOPE : 35°
TRENCH BLOCK : L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83050

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 01/08/83
APPROVED BY: C.M.	

080:(205,5716310240010.LOG: 28/10/83

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83050

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			CLYST	GY MINOR SLTST BEDS; CLAYSTONE GRAY IN COL OUR; SILSTONE NODULAR AND ORANGE IN COL OUR; MINOR MUDSTONE; ROOF
	1.00	1.18	0.18			CLYST	CARB MINOR MUD; ROOF
	1.18	1.56	0.38	03565		COAL	C-2 MINOR CLYST
	1.56	1.99	0.43	03565		CLYST	SLTY.M.GY WEATHERS ORANGE
	1.99	2.07	0.08	03565		CLYST	CARB ABUNDANT COAL STRINGERS
	2.07	2.12	0.05	03565		COAL	C-3
	2.12	2.24	0.12	03565		CLYST	CARB COAL STRINGERS ABUNDANT AT BASE
	2.24	2.31	0.07	03565		COAL	C-1 MINOR SLTST
	2.31	2.39	0.08	03565		MUDSTONE	M.GY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83050

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.39	3.02	0.63	03565		COAL	C-2
	3.02	3.09	0.07	03565		CLYST	COAL STRINGERS TOWARDS BASE
	3.09	3.19	0.10	03565		COAL	C-2
	3.19	3.38	0.19	03565		COAL	C-3
	3.38	3.46	0.08	03565		CLYST	COAL STRINGERS
	3.46	3.58	0.12	03565		COAL	C-2
	3.58	3.63	0.05	03565		CLYST	FE STAIN
	3.63	3.70	0.07	03565		COAL	C-2
	3.70	3.80	0.10	03565		CLYST	MINOR COAL
	3.80	4.87	1.07			CLYST	NODULAR ORANGE WEATHERING AND SILTSTONE INTERBEDS
	4.87	4.97	0.10			CLYST	CARB

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83050

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.97	5.18	0.21			COAL	C-3 MINOR CLYST
	5.18	5.31	0.13			CLYST	MINOR COAL
	5.31	5.40	0.09			COAL	C-2
	5.40	5.45	0.05			CLYST	SLTY.M.BN
	5.45	5.81	0.36			COAL	C-2 MINOR CLYST AND SILTSTONE LT 1 CM THICK
	5.81	5.99	0.18			CLYST	LT.BN
	5.99	6.26	0.27			CLYST	CARB MINOR COAL STINGERS
	6.26	6.46	0.20			COAL	CLYST BEDS FE STAINS
	6.46	6.96	0.50			CLYST	M.GY FOSSILIFEROUS
	6.96	7.04	0.08			COAL	FE STAIN
	7.04	7.79	0.75			CLYST	LT.BN FLOOR

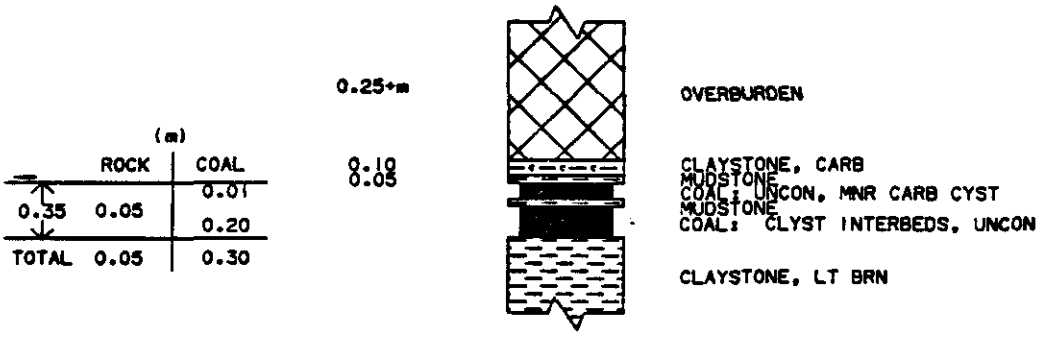
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83050											
	HD1		3565	5.13	30.74	52.75	11.38	0.35	19.46		



ATTITUDE OF ROOF	:	145/20S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344515mN, 505390mE
ELEVATION	:	1670m
MAP CARD NUMBER	:	1 10
TRENCH DEPTH	:	0.6m
TRENCH WIDTH	:	0.5m
TRENCH LENGTH	:	5.1m
TRENCH BEARING	:	090°
TRENCH SLOPE	:	35°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83053

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 02/08/83
APPROVED BY: C.W.	

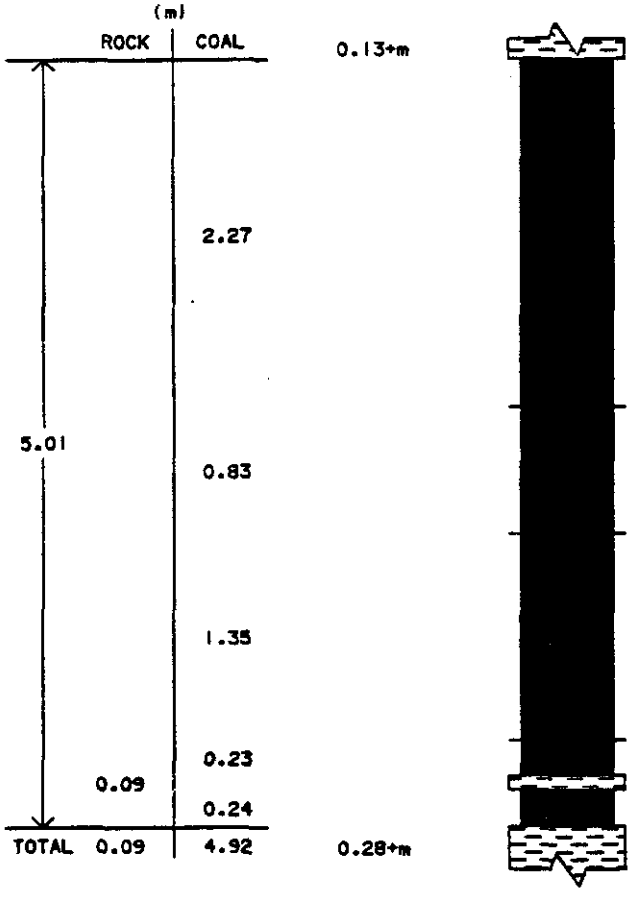
390:(205,5718310240101.LOG: 28/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83053

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.60	1.60			OVERBURDEN	
	1.60	1.70	0.10			CLYST	CARB
	1.70	1.75	0.05			MUDSTONE	ROOF
	1.75	1.85	0.10			COAL	UNCONSOLIDATED - MINOR CARB CLYST
	1.85	1.90	0.05			MUDSTONE	FLOOR
	1.90	2.16	0.26			CLYST	CARB UNCONSOL
	2.16	2.66	0.50			CLYST	LT.BN

* DENOTES MEASURED BCA
NEWPAGE



* OVERTURNED SEAM

ATTITUDE OF ROOF	:	141/63SW
ATTITUDE OF FLOOR	:	137/40SW
UTM COORDINATES	:	6344396mN, 506160mE
ELEVATION	:	1820m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	1.32m
TRENCH WIDTH	:	1.48m
TRENCH LENGTH	:	5.10m
TRENCH BEARING	:	055°
TRENCH SLOPE	:	17°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83092

DRAWN BY:	SCALE: 1:50
LOGGED BY: K. JENNER	DATE:
APPROVED BY: C.W.	

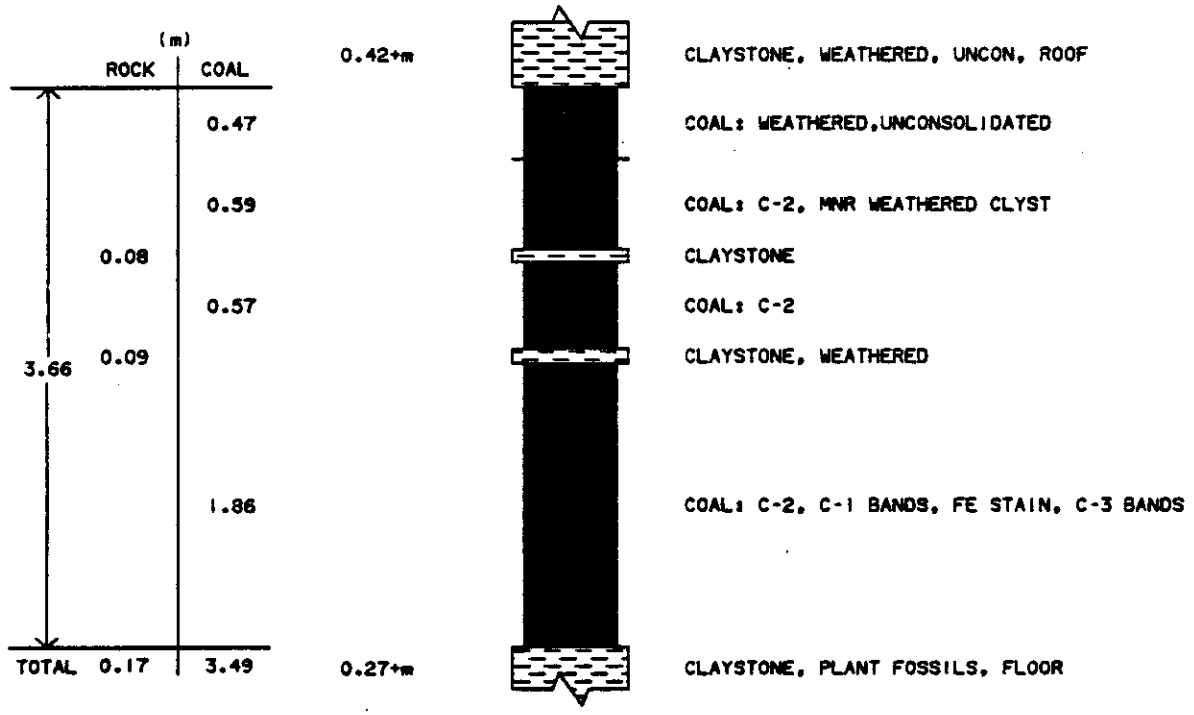
GSD:[205,571831024017.LOG] 10/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83092

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.28	0.28			CLAYSTONE	INTERBED. SILISTONE (ROOF)
	0.28	0.52	0.24			COAL	
	0.52	0.61	0.09			CLAYSTONE	UNCONSOLIDATED.
	0.61	0.84	0.23			COAL	WEATHERED; UNCONSOLIDAIED
	0.84	2.19	1.35			COAL	C-2
	2.19	3.02	0.83			COAL	WEATHERED; UNCONSOLIDATED MINOR CARBONA CEOUS CLAYSTONE
	3.02	5.29	2.27			COAL	C-2 C-1 BANDS, MINOR IRON STAIN
	5.29	5.42	0.13			CLAYSTONE	WEATHERED; (FLOOR) OVERTURNED

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	049/11SE
ATTITUDE OF FLOOR	:	050/10SE
UTM COORDINATES	:	6344355mN, 505716mE
ELEVATION	:	1825m
MAP CARD NUMBER	:	1 10
TRENCH DEPTH	:	1.59m
TRENCH WIDTH	:	2.40m
TRENCH LENGTH	:	7.20m
TRENCH BEARING	:	147°
TRENCH SLOPE	:	24°
TRENCH BLOCK	:	L.R.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83093

DRAWN BY:	SCALE: 1:50
LOGGED BY: K. JENNER	DATE:
APPROVED BY: C.W.	

090:(205,5716)1024017.LOG: 10/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

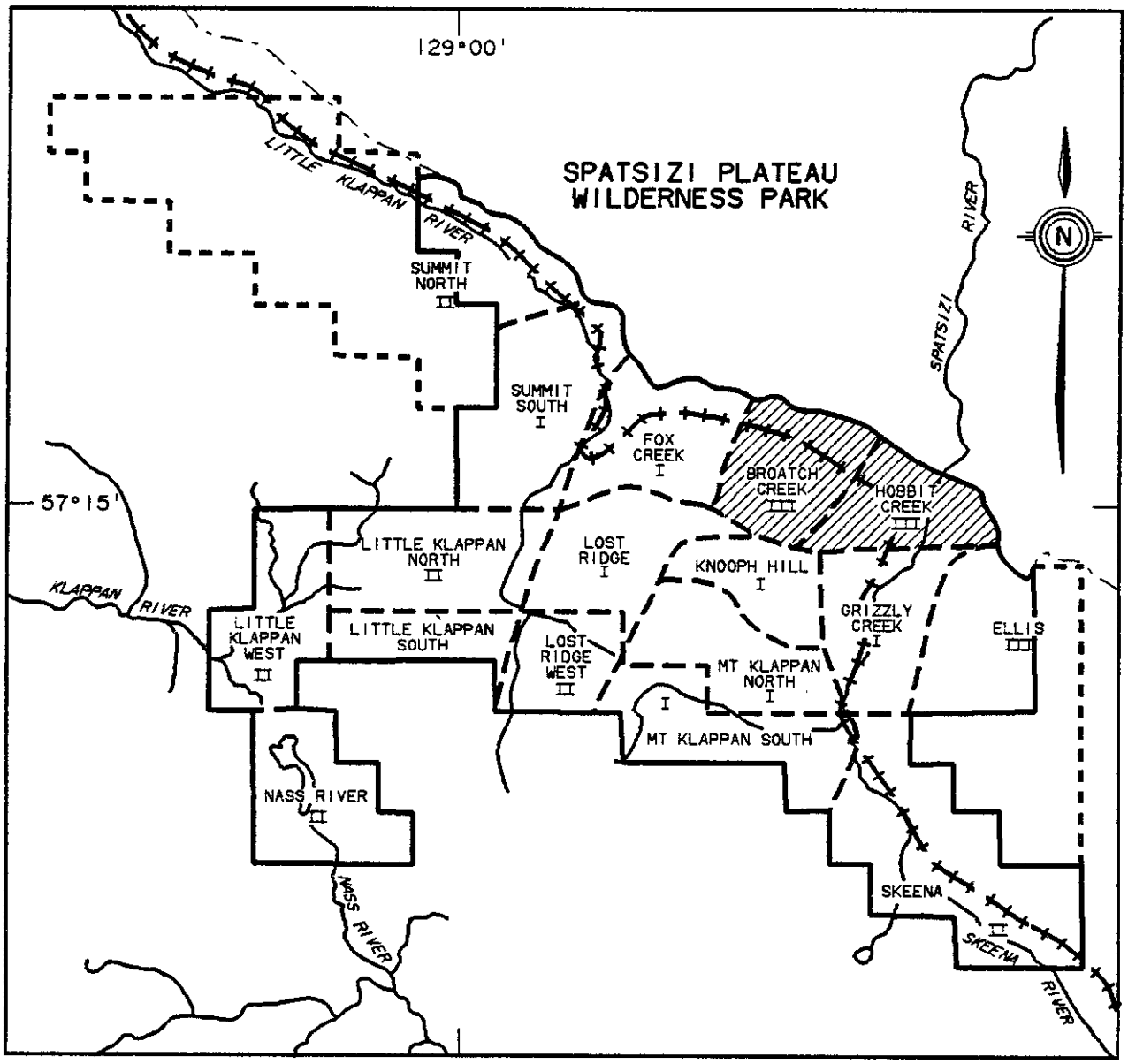
PROJECT: KPN BLOCK: LR DATA SOURCE: TRC83093

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.42	0.42			CLAYSTONE	WEATHERED; UNCONSOLIDATED ROOF
	0.42	0.89	0.47			COAL	WEATHERED; UNCONSOLIDATED
	0.89	1.48	0.59			COAL	C-2 MINOR WEATHERED CLAYSTONE
	1.48	1.56	0.08			CLAYSTONE	
	1.56	2.13	0.57			COAL	C-2
	2.13	2.22	0.09			CLAYSTONE	WEATHERED;
	2.22	4.08	1.86			COAL	C-2 C-1 BANDS, IRON STAIN, C-3 BANDS
	4.08	4.35	0.27			CLAYSTONE	PLANT FOSSILS FLOOR

-854- NOW IN CONTACT WITH SYSTEM 2000 -
***** GEX - 03.01 - COCC.COAL/21 ALLOCATED.
-855- NO LONGER IN CONTACT WITH SYSTEM 2000 -

MT. KLAPPAN COAL PROPERTY

HOBBIT - BROATCH AREA



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- LICENCE AREA
- LICENCES UNDER APPLICATION
- I FIRST PRIORITY
- II SECOND PRIORITY
- III THIRD PRIORITY

SCALE

0 1 2 3 km

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION BC

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNBCTRC83025	6345210.0	510255.0	1510.0	2.5	30.0	160.0	
KPNBCTRC83026	6344905.0	510477.0	1538.0	4.0	40.0	20.0	
KPNBCTRC83027	6343505.0	516680.0	1680.0	5.5	17.0	15.0	
KPNBCTRC83030	6344770.0	510505.0	1547.0	2.6	30.0	15.0	
KPNBCTRC83031	6344420.0	510292.0	1612.0	5.5	25.0	5.0	
KPNBCTRC83032	6344135.0	509987.0	1612.0	5.2	10.0	95.0	
KPNBCTRC83033	6344266.0	509910.0	1596.0	5.0	20.0	20.0	
KPNBCTRC83034	6344755.0	510450.0	1550.0	9.4	32.0	147.0	
KPNBCTRC83035	6344325.0	510365.0	1627.0	3.5	9.0	164.0	
KPNBCTRC83036	6344505.0	510680.0	1587.0	3.2	5.0	90.0	
KPNBCTRC83037	6344935.0	510305.0	1537.0	3.5	5.0	165.0	
KPNBCTRC83038	6344915.0	510615.0	1530.0	5.0	25.0	25.0	
KPNBCTRC83040	6345105.0	510725.0	1517.0	3.9	4.0	270.0	
KPNBCTRC83043	6345145.0	510255.0	1523.0	3.5	5.0	50.0	
KPNBCTRC83046	6345605.0	513425.0	1795.0	11.6	41.0	185.0	

FORM 9999

GULF CANADA RESOURCES INC. - COAL DIVISION B.C.

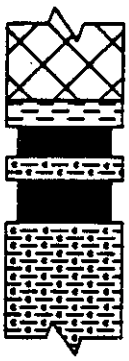
15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83032		4802	0.22	2.39	100.00	1.88	0.29	0.00	0.00	1.88- 0.29
TRC83033		4801	0.40	1.41	100.00	1.01	0.00	0.00	0.00	1.01- 0.00
TRC83040		3561	0.50	1.99	100.00	1.41	0.08	0.00	0.00	1.41- 0.08
TRC83046		3564	1.50	3.34	100.00	1.74	0.10	0.00	0.00	1.74- 0.10

(m)	ROCK	COAL
		0.20
0.63	0.15	
		0.28
TOTAL	0.15	0.48



0.50+m	OVERBURDEN
0.17	CLAYSTONE
	COAL: C-5, MINOR LAMINAE
	CLAYSTONE, CARBONACEOUS
	COAL: C-5, WEATHERED, MINOR CLAYSTONE LAMINAE
0.75+m	CLAYSTONE, CARBONACEOUS

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	110/30S
UTM COORDINATES	:	6345210mN, 510255mE
ELEVATION	:	1510m
MAP CARD NUMBER	:	J 8
TRENCH DEPTH	:	0.75m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	2.50m
TRENCH BEARING	:	160°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83025

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 22/07/83
APPROVED BY: C.W.	

GSD:[205,571831024006.LOG] 27/10/83

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83025

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			OVERBURDEN	
	0.50	0.67	0.17			CLAYSTONE	GRAY-BROWN; ROOF
	0.67	0.87	0.20			COAL	C-5.BLK MINOR CLAYSTONE
	0.87	1.02	0.15			CLAYSTONE	CARB IRON STAINING
	1.02	1.30	0.28			COAL	C-5.BLK MINOR CLAYSTONE;HEATHERED
	1.30	2.05	0.75			CLAYSTONE	CARB.BN FLOOR

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
	1.04	1.04
TOTAL	0.00	1.04

0.60+m	OVERBURDEN
0.17	CLAYSTONE, CARBONACEOUS
	COAL: WEATHERED, MINOR CLAYSTONE LAMINAE
0.60+m	CLAYSTONE

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	065/35S
UTM COORDINATES	:	6344905mN, 510477mE
ELEVATION	:	1538m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	1.50m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	4.00m
TRENCH BEARING	:	020°
TRENCH SLOPE	:	40°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83026

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: ROSS MAYLOR	DATE: 22/07/83
APPROVED BY: C.W.	

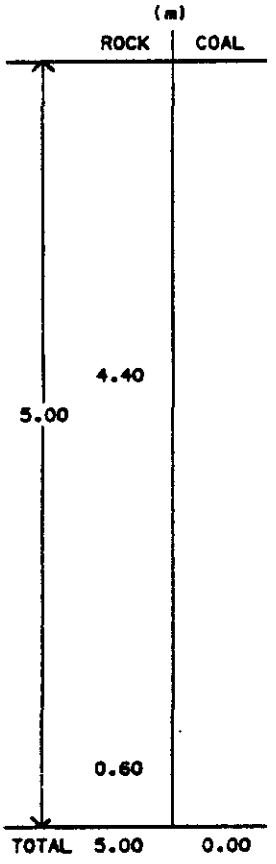
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

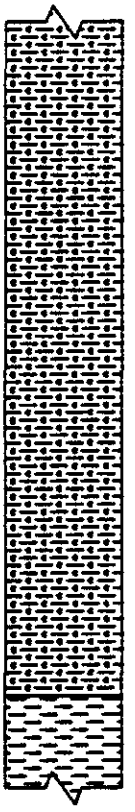
PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83026

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.60	0.60			OVERBURDEN	
	0.60	0.77	0.17			CLAYSTONE	CARB.GY ROOF
	0.77	1.81	1.04			COAL	WEATHERED;MINOR CLAYSTONE;MINOR IRONSTONE
	1.81	2.41	0.60			CLAYSTONE	GY FLOOR

* DENOTES MEASURED BCA

NEWPAGE





CLYST, CARB, WTHRD, SOME COAL: Fe STAINED

CLYST.

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	110/43S
UTM COORDINATES	:	6343505mN, 510680mE
ELEVATION	:	1680m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	1.07m
TRENCH WIDTH	:	0.45m
TRENCH LENGTH	:	5.50m
TRENCH BEARING	:	015°
TRENCH SLOPE	:	17°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83027

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 23/06/83
APPROVED BY: C.M.	

GSD:(206,5716310240006.LOG: 27/10/83

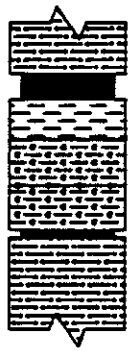
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83027

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
00	0.00	4.40	4.40			CLAYSTONE	CARB WEATHERED;SOME COAL;IRON STAINING; ROOF NOT OBTAINED
00	4.40	5.00	0.60			CLAYSTONE	FLOOR

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
0.17	0.00	0.17
TOTAL	0.00	0.17



0.33+m	MUDSTONE, MED. GREY HEMATITE STAINED MUDSTONE, WEATHERED COAL: C-3, WEATHERED
0.26	MUDSTONE, WEATHERED
0.30	MUDSTONE, CARBONACEOUS
0.29	MUDSTONE, CARBONACEOUS
0.05	COAL: C-3, WEATHERED
0.60+m	MUDSTONE, MED. GREY

ATTITUDE OF ROOF	:	102/53S
ATTITUDE OF FLOOR	:	107/42S
UTM COORDINATES	:	6344770mN, 510505mE
ELEVATION	:	1547m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	0.49
TRENCH WIDTH	:	0.51
TRENCH LENGTH	:	2.63
TRENCH BEARING	:	015°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83030

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. McKENZIE	DATE: 23/07/83
APPROVED BY: C.W.	

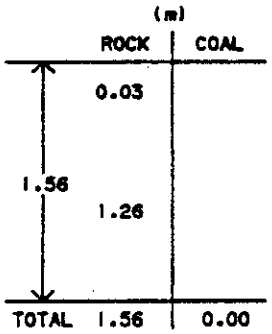
G80:[208,57]83102400G.LOG; 27/10/83

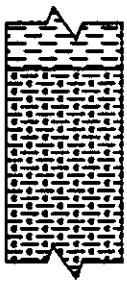
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83030

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.33	0.33			MUDSTONE	GY IRON STAINING;WEATHERED; ROOF
	0.33	0.50	0.17			COAL	C-3.BLK.WEATH
	0.50	0.76	0.26			MUDSTONE	WEATH
	0.76	1.06	0.30			MUDSTONE	CARB
	1.06	1.35	0.29			MUDSTONE	CARB
	1.35	1.40	0.05			COAL	C-3.BLK.WEATH
	1.40	2.00	0.60			MUDSTONE	GY FLOOR

* DENOTES MEASURED BCA
NEWPAGE





CLAYSTONE

CLAYSTONE, CARB, WEATHERED, ABUNDANT COAL

ATTITUDE OF ROOF	:	120/15S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344420mN, 510292mE
ELEVATION	:	1612m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	0.67m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	5.50m
TRENCH BEARING	:	005°
TRENCH SLOPE	:	25°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83031

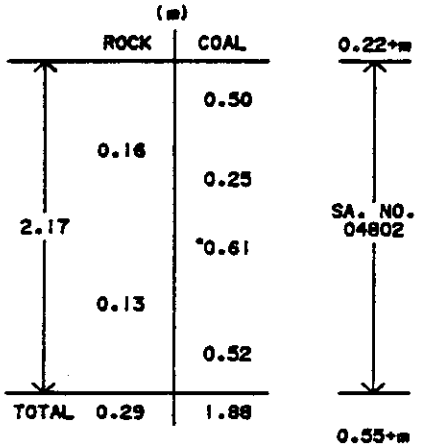
DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 23/07/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83031

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLAYSTONE	
	0.30	1.56	1.26			CLAYSTONE	CARB ABUNDANT COAL;WEATHERED

* DENOTES MEASURED BCA
NEWPAGE



CLAYSTONE, CARBONACEOUS, MINOR COAL, ROOF

COAL: C-4, IRON STAINING

CLAYSTONE, CARBONACEOUS

COAL: WEATHERED

COAL: C-4, IRON STAINING

CLAYSTONE, OXIDIZED, IRON STAINING

COAL: C-4, C-3, WEATHERED

CLAYSTONE, IRON STAINING, FLOOR

* NO ATTITUDE ON ROOF OR FLOOR

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344135mN, 509987mE
ELEVATION	:	1612m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	0.84m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	5.20m
TRENCH BEARING	:	095°
TRENCH SLOPE	:	10°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83032

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 24/07/83
APPROVED BY: C.M.	

GBG:(208,5718S102400T.LOG: 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83032

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.22	0.22			CLAYSTONE	CARB MINOR COAL
	0.22	0.72	0.50	04802		COAL	C-4.BLK IRON STAINING
	0.72	0.88	0.16	04802		CLAYSTONE	CARB
	0.88	1.13	0.25	04802		COAL	HEATH
	1.13	1.74	0.61	04802		COAL	C-4.BLK IRON STAINING
	1.74	1.87	0.13	04802		CLAYSTONE	OXIDIZED
	1.87	2.39	0.52	04802		COAL	BLK.HEATH COAL C-3 & C-4
	2.39	2.89	0.50			CLAYSTONE	IRON STAINING;FLOOR

* DENOTES MEASURED BCA
NEWPAGE

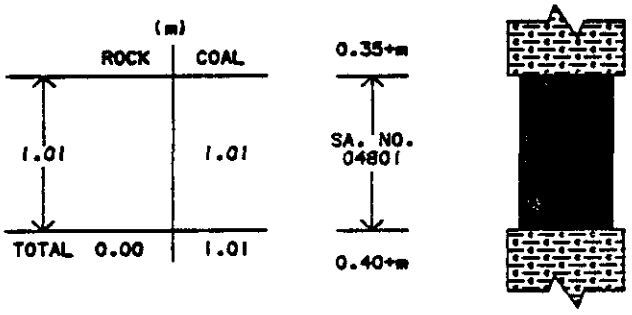
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83032											
	HD1		4802	9.78	25.25	45.37	19.60	0.33	18.32		

FORM 9999



CLAYSTONE, CARBONACEOUS, IRON STAINING, ROOF

COAL: C-4, UNCON, DULL, WEATHERED, Fe STN

CLAYSTONE, CARBONACEOUS

• NO ATTITUDE ON ROOF OR FLOOR

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344266mN, 509910mE
ELEVATION	:	1596m
MAP CARD NUMBER	:	I 8
TRENCH DEPTH	:	0.80m
TRENCH WIDTH	:	0.63m
TRENCH LENGTH	:	5.00m
TRENCH BEARING	:	020°
TRENCH SLOPE	:	20°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83033

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 24/07/83
APPROVED BY: C.W.	

080:(208,5718310240O7.LOG: 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83033

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.35	0.35			CLAYSTONE	CARB IRON STAINING; ROOF
	0.35	1.36	1.01	04801		COAL	C-4 UNCONSOLIDATED;DULL;WEATHERED;IRON STAINING
	1.36	1.46	0.10			CLAYSTONE	CARB
	1.46	1.76	0.30			CLAYSTONE	CARB IRON STAINING; FLOOR

* DENOTES MEASURED BCA

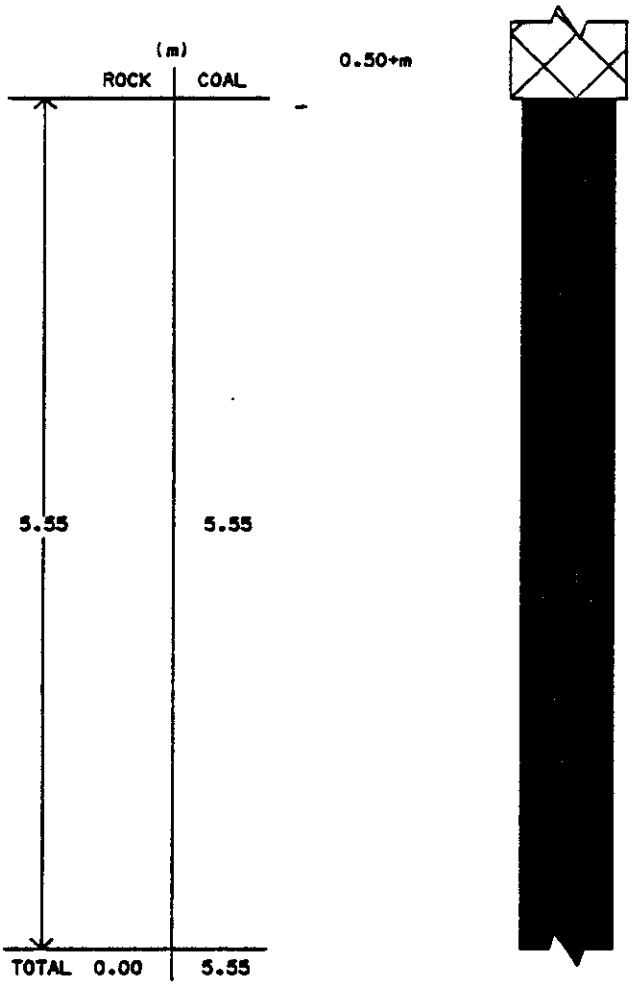
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83033											
	HD1		4801	5.82	37.28	43.70	13.20	0.34	16.08		



OVERBURDEN: WEATHERED

COAL: SPOIL, MUDST AND MUD INTERBEDS, WTHRD, COAL SPOIL AND BLOOM, PEBBLES, M GREY

• NO ATTITUDES ON ROOF AND FLOOR, BEDDING UNDETERMINED

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344755mN, 510450mE
ELEVATION	:	1550m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	0.79m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	9.35m
TRENCH BEARING	:	147°
TRENCH SLOPE	:	032°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83034

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: S. MCKENZIE	DATE: 24/07/83
APPROVED BY: C.W.	

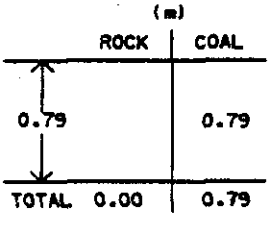
CDD:(208,5716310E4007.LOG: 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

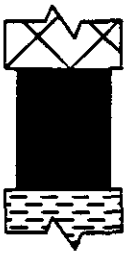
PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83034

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			OVERBURDEN	HEATH
	0.50	6.05	5.55			COAL SPOIL	MUDSTONE & MUD INTERBEDS;ALL COAL IS COAL BLOOM

* DENOTES MEASURED BCA
NEWPAGE



0.31+m



OVERBURDEN

COAL: BLOOM, UNCONSOLIDATED AND WEATHERED

0.28+m

CLAY, ROCK FRAGMENTS

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	APPROX. 073/19S
UTM COORDINATES	:	6344325mN, 510365mE
ELEVATION	:	1627m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	1.04m
TRENCH WIDTH	:	0.42m
TRENCH LENGTH	:	3.52m
TRENCH BEARING	:	164°
TRENCH SLOPE	:	09°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83035

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. MCKENZIE	DATE: 24/07/83
APPROVED BY: C.W.	

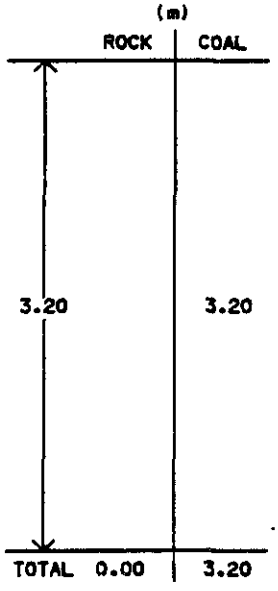
290:(208,571831024007.LOG: 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83035

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.31	0.31			OVERBURDEN	CLAY
	0.31	1.10	0.79			COAL SPOIL	COAL SPOIL;UNCONSOLIDATED;WEATHERED
	1.10	1.38	0.28			OVERBURDEN	CLAY & ROCK FRAGMENTS

* DENOTES MEASURED BCA
NEWPAGE



COAL: BLOOM, WEATHERED, INTBD CARB CLAYSTONE

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	APPROX. 150/64N
UTM COORDINATES	:	6344505mN, 510680mE
ELEVATION	:	1587m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	0.90m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	3.20m
TRENCH BEARING	:	090°
TRENCH SLOPE	:	05°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83036

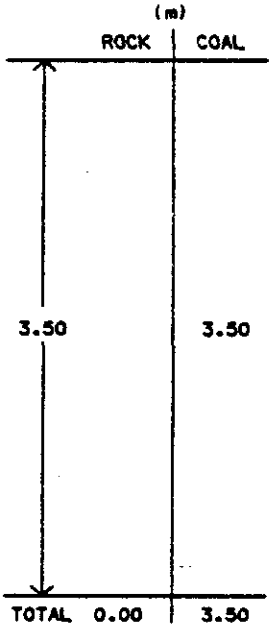
DRAWN BY:	R. MAYLOR	SCALE:	1:50
LOGGED BY:	R. MAYLOR	DATE:	23/07/83
APPROVED BY:	C.M.		

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83036

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	3.20	3.20			COAL	COAL BLOOM AND CARB CLYST INTERMIXED;DETAILED LOG NOT ATTAINABLE DUE TO COMPLETELY UNCONSOLIDATED NATURE OF COAL AND ROCK

* DENOTES MEASURED BCA
NEWPAGE



COAL + CLAYSTONE: CARBONACEOUS, COAL BLOOM, CARBONACEOUS CLAYSTONE INTERBEDS, DETAILED LOG NOT OBTAINABLE DUE TO UNCONSOLIDATED NATURE OF COAL AND ROCK

ATTITUDE OF ROOF	:	093/34S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6344935mN 510305mE
ELEVATION	:	1537m
MAP CARD NUMBER	:	I 8
TRENCH DEPTH	:	0.90m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	3.50m
TRENCH BEARING	:	165°
TRENCH SLOPE	:	05°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83037

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 23/07/83
APPROVED BY: C.W.	

090:(205,571)83:024008.LOG: 01/11/83

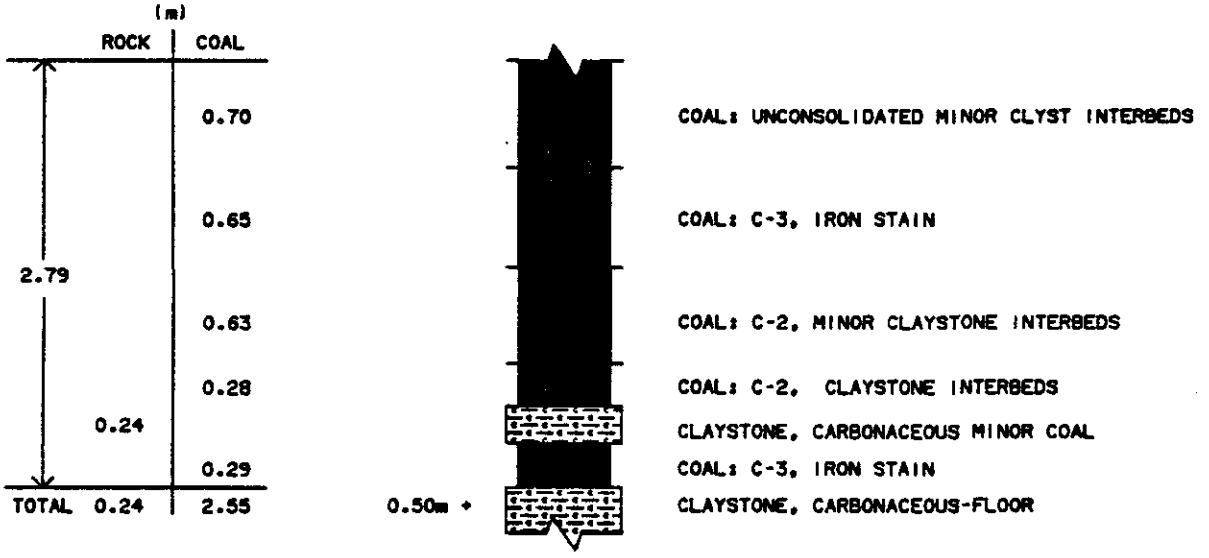
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83037

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.00	3.50			COAL	COAL AND CARB CLYST INTERMIXED; DETAILED LOG NOT ATTAINABLE DUE TO COMPLETELY UNCONSOLIDATED COAL AND ROCK

* DENOTES MEASURED BCA

NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	115/85N
UTM COORDINATES	:	6344915mN 510615mE
ELEVATION	:	1530m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	1.20m
TRENCH WIDTH	:	0.90m
TRENCH LENGTH	:	5.00m
TRENCH BEARING	:	025°
TRENCH SLOPE	:	25°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83038

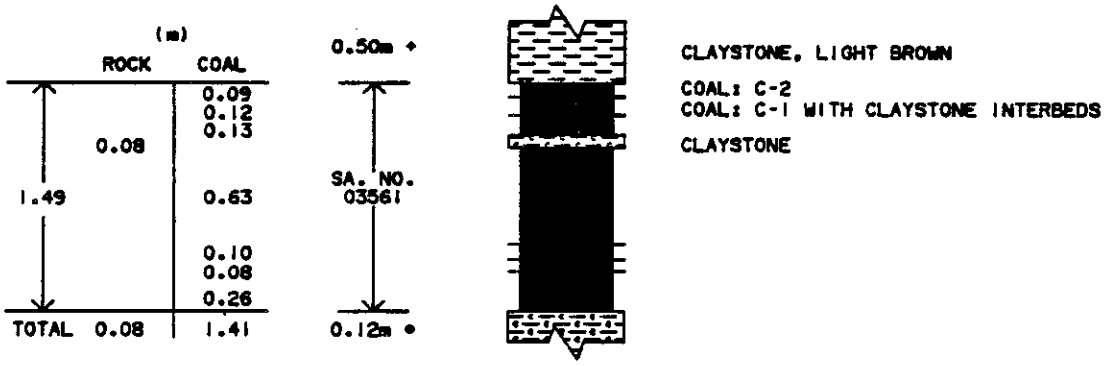
DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R.MAYLOR	DATE: 07/07/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83038

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.70	0.70			COAL	UNCONSOLIDATED MINOR CLAYSTON
	0.70	1.35	0.65			COAL	IRON STAINING
	1.35	1.98	0.63			COAL	C-2 MINOR CLAYSTONE
	1.98	2.26	0.28			COAL	C-2 INTERBEDED COAL AND CLAYSTONE
	2.26	2.50	0.24			CLAYSTONE	CARB MINOR COAL
	2.50	2.79	0.29			COAL	C-3 IRON STAINING
	2.79	3.29	0.50			CLAYSTONE	CARB
	3.29	4.29	1.00			CLAYSTONE	CLAYSTONE GRADING TO SILTSTONE TOWARDS BASE OF MEASUREMENT

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	130/65
UTM COORDINATES	:	6345105mN 510725mE
ELEVATION	:	1517m
MAP CARD NUMBER	:	J 8
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	3.90m
TRENCH BEARING	:	270°
TRENCH SLOPE	:	04°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83040

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 22/07/83
APPROVED BY: C.W.	

090:(206,5718310240008.LOG: 02/11/83

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83040

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			CLAYSTONE	LT.BN ROOF
	0.50	0.59	0.09	03561		COAL	C-2.BLK
	0.59	0.71	0.12	03561		COAL	C-1.BLK
	0.71	0.84	0.13	03561		COAL	BLK UNCONSOLIDATED
	0.84	0.92	0.08	03561		CLAYSTONE	CARB MINOR COAL
	0.92	1.55	0.63	03561		COAL	C-2.BLK MINOR IRON STAINING
	1.55	1.65	0.10	03561		COAL	C-6.BLK MINOR CLAYSTONE
	1.65	1.73	0.08	03561		COAL	C-3.BLK
	1.73	1.99	0.26	03561		COAL	C-5.BLK WEATHERED
	1.99	2.11	0.12			CLAYSTONE	CARB MINOR COAL; FLOOR

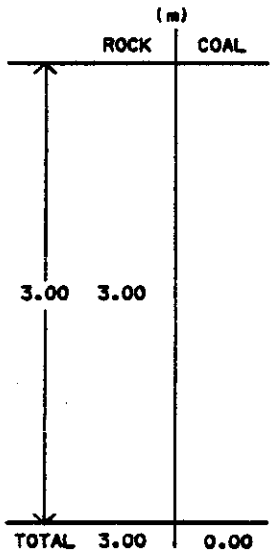
* DENOTES MEASURED BCA
NEWPAGE

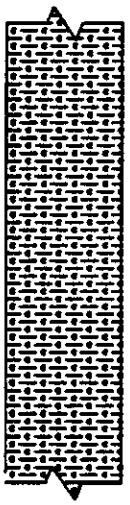
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83040											
	HD1		3561	3.98	33.63	53.08	9.31	0.41	20.33		





CLAYSTONE, CARB & COAL

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6345145mN, 510255mE
ELEVATION	:	1523m
MAP CARD NUMBER	:	J 8
TRENCH DEPTH	:	0.80m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	3.50m
TRENCH BEARING	:	050°
TRENCH SLOPE	:	05°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83043

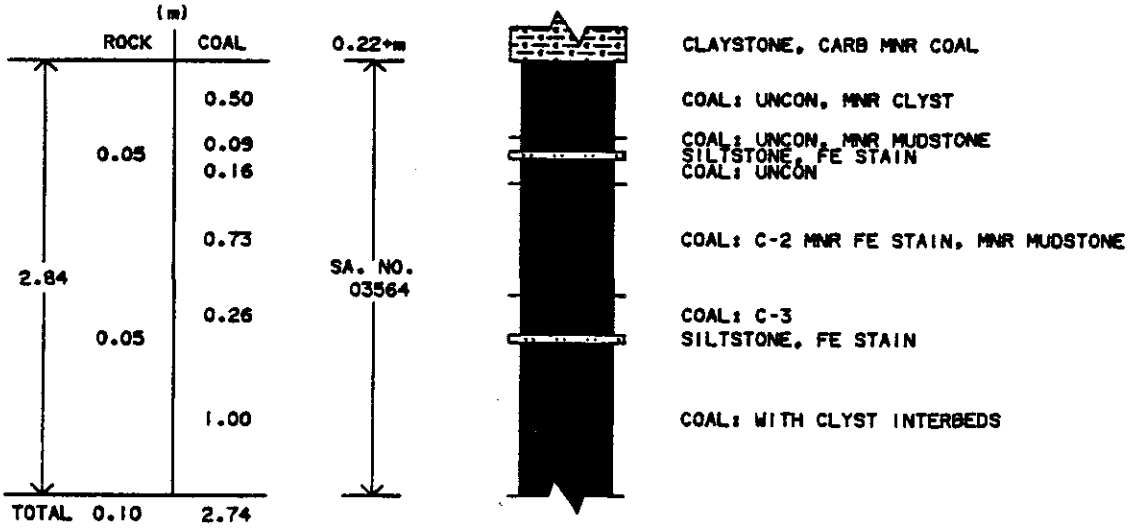
DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 23/07/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRCB3043

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	3.00	3.00			CLAYSTONE	CARB COAL BLOOM AND CLAYSTONE CARB INTERMIXED;DETAILED LOG NOT OBTAINED DUE TO COMPLETELY UNCONSOLIDATED NATURE OF COAL AND ROCK

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	165/25
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6345605mN, 513425mE
ELEVATION	:	1795m
MAP CARD NUMBER	:	J 7
TRENCH DEPTH	:	1.50m
TRENCH WIDTH	:	0.90m
TRENCH LENGTH	:	11.60m
TRENCH BEARING	:	185°
TRENCH SLOPE	:	41°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83046

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 29/07/83
APPROVED BY: C.M.	

GEO:(208,5718S1024009.LOG: 27/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: BC DATA SOURCE: TRC83046

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.28	1.35	0.07			CLAYSTONE	CARB
	1.35	1.50	0.15			CLAYSTONE	CARB MINOR COAL; ROOF
	1.50	2.00	0.50	03564		COAL	BLK UNCONSOLIDATED;MINOR CLAYSTONE
	2.00	2.09	0.09	03564		COAL	BLK UNCONSOLIDATED;MINOR MUDSTONE
	2.09	2.14	0.05	03564		SILTSTONE	IRON STAINING
	2.14	2.30	0.16	03564		COAL	BLK UNCONSOLIDATED
	2.30	3.03	0.73	03564		COAL	C-2.BLK MINOR IRON STAINING;MINOR MUDSTONE
	3.03	3.29	0.26	03564		COAL	C-3.BLK
	3.29	3.34	0.05	03564		SILTSTONE	IRON STAINING
	3.34	4.34	1.00	03564		COAL	INTERBEDDED CLAYSTONE

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

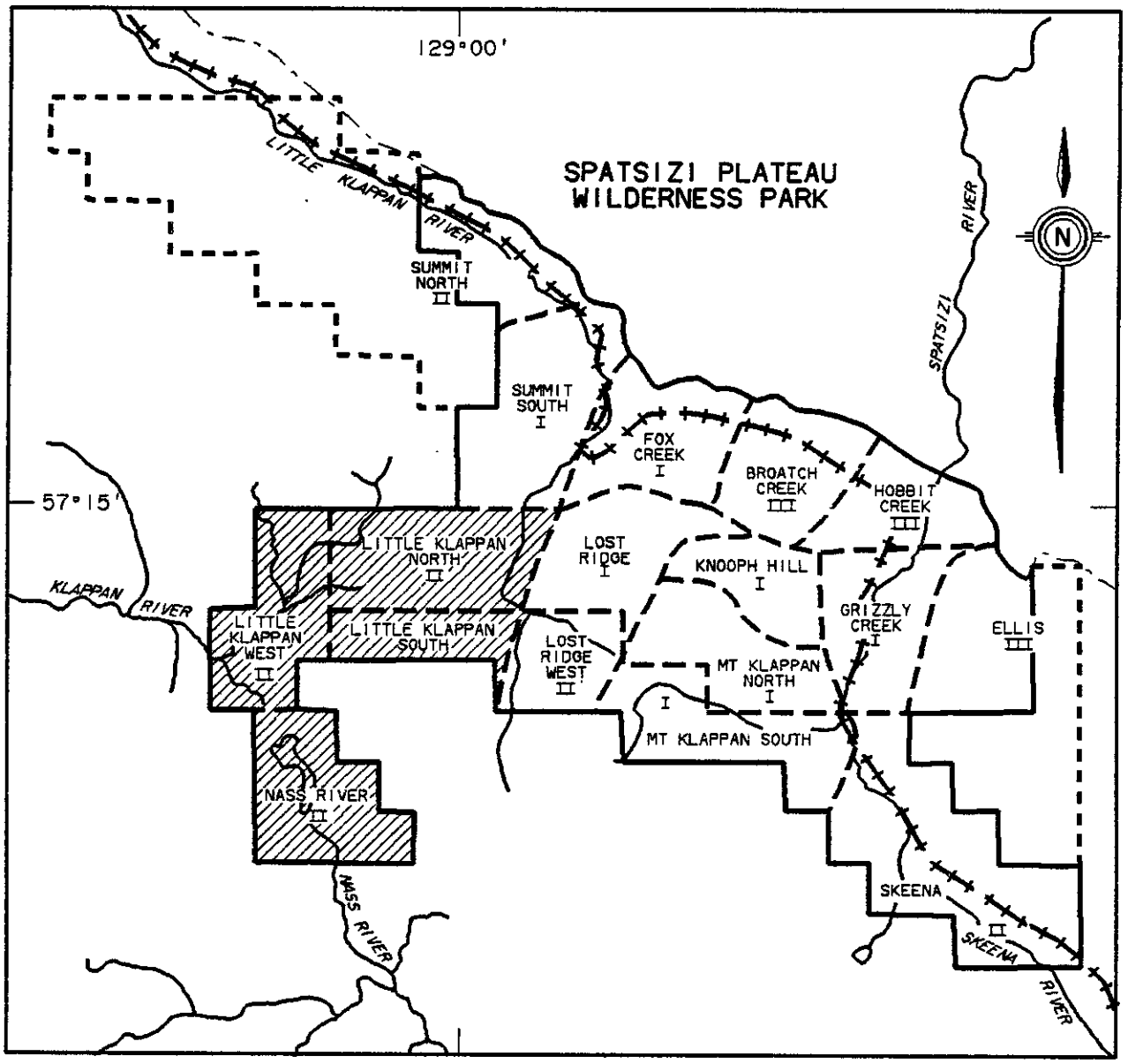
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83046											
	HD1		3564	8.80	14.51	57.92	18.77	0.48	22.47		

MT. KLAPPAN COAL PROPERTY

LITTLE KLAPPAN - NASS AREA



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- LICENCE AREA
- LICENCES UNDER APPLICATION
- I FIRST PRIORITY
- II SECOND PRIORITY
- III THIRD PRIORITY

SCALE

0 1 2 3 km

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION K. N.

16/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNKNTRC83082	6341535.0	497625.0	1435.0	2.2	30.0	175.0	
KPNKNTRC83083	6341455.0	497145.0	1417.0	3.0	30.0	65.0	
KPNKNTRC83084	6341510.0	496800.0	1395.0	3.0	30.0	65.0	
KPNKNTRC83085	6341590.0	496415.0	1340.0	2.0	65.0	60.0	
KPNKNTRC83086	6341860.0	496330.0	1325.0	3.1	45.0	45.0	
KPNKNTRC83091	6343110.0	502611.0	1415.0	4.7	15.0	8.0	

GULF CANADA RESOURCES INC. - COAL DIVISION K.W.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNKWTRC83068	6342280.0	493230.0	1215.0	1.4	65.0	45.0	
KPNKWTRC83069	6342210.0	493180.0	1205.0	2.9	5.0	40.0	
KPNKWTRC83070	6342095.0	493180.0	1190.0	2.5	25.0	60.0	
KPNKWTRC83071	6341765.0	493150.0	1200.0	5.3	8.0	150.0	
KPNKWTRC83072	6341750.0	493160.0	1200.0	6.0	30.0	175.0	
KPNKWTRC83073	6340465.0	492455.0	1110.0	4.2	0.0	15.0	
KPNKWTRC83076	6339880.0	494830.0	1590.0	3.3	0.0	55.0	
KPNKWTRC83087	6344480.0	492595.0	1370.0	5.0	15.0	150.0	
KPNKWTRC83088	6344335.0	492700.0	1340.0	4.5	0.0	140.0	

GULF CANADA RESOURCES INC. - COAL DIVISION K.S.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNKSTRC83077	6339935.0	496400.0	1575.0	3.0	0.0	15.0	

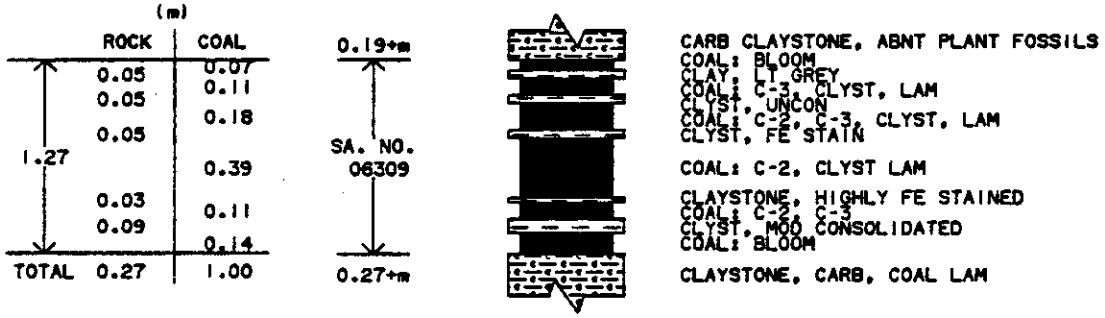
GULF CANADA RESOURCES INC. - COAL DIVISION K.N.

16/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83082										
		6309	0.19	1.46	100.00	1.00	0.27	0.00	0.00	1.00- 0.27
TRC83083										
		6310	0.40	1.90	100.00	1.13	0.37	0.00	0.00	1.13- 0.37
TRC83084										
		6311	0.45	2.04	100.00	0.90	0.69	0.00	0.00	0.90- 0.69
TRC83085										
		6312	0.20	1.22	100.00	0.80	0.22	0.00	0.00	0.80- 0.22
TRC83086										
		6313	0.45	2.41	100.00	1.51	0.45	0.00	0.00	1.51- 0.45
TRC83091										
		3568	0.56	0.94	100.00	0.18	0.20	0.00	0.00	0.18- 0.20
		3569	0.94	1.28	100.00	0.34	0.00	0.00	0.00	0.34- 0.00
		3570	1.28	3.57	100.00	2.29	0.00	0.00	0.00	2.29- 0.00
		3571	3.57	4.13	100.00	0.45	0.11	0.00	0.00	0.45- 0.11



ATTITUDE OF ROOF	:	077/25S
ATTITUDE OF FLOOR	:	085/30S
UTM COORDINATES	:	6341535mN, 497625mE
ELEVATION	:	1435m
MAP CARD NUMBER	:	1 12
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	2.20m
TRENCH BEARING	:	175°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	K.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83082

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 22/08/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83082

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.19	0.19			CLAYSTONE	CARB ABUNDANT PLANT FOSSILS ROOF
	0.19	0.26	0.07	06309		COAL BLOOM	
	0.26	0.31	0.05	06309		CLAY	LT.GY
	0.31	0.42	0.11	06309		COAL	C-3 CLAYSTONE LAM
	0.42	0.47	0.05	06309		CLAYSTONE	UNCONSOLIDATED
	0.47	0.65	0.18	06309		COAL	C-2 C-3 CLAYSTONE LAM
	0.65	0.70	0.05	06309		CLAYSTONE	IRON STAIN
	0.70	1.09	0.39	06309		COAL	C-2 CLAYSTONE LAM
	1.09	1.12	0.03	06309		CLAYSTONE	HIGHLY IRON STAIN
	1.12	1.23	0.11	06309		COAL	C-2 C-3
	1.23	1.32	0.09	06309		CLAYSTONE	MOSTLY CONSOLIDATED
	1.32	1.46	0.14	06309		COAL BLOOM	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83082

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.46	1.73	0.27			CLAYSTONE	CARB COAL LAM , FLOOR

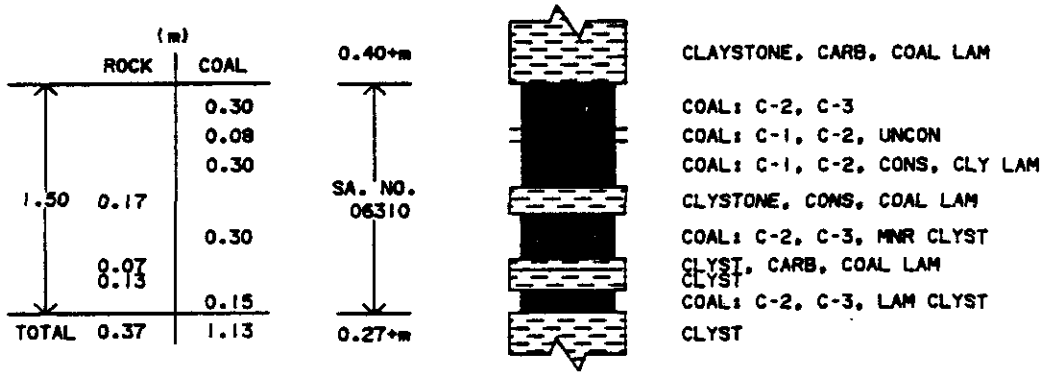
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83082											
	HD1		6309	6.30	37.83	41.39	14.48	0.32	16.12		



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	155/75N
UTM COORDINATES	:	6341455mN, 497145mE
ELEVATION	:	1417m
MAP CARD NUMBER	:	I 12
TRENCH DEPTH	:	0.30m
TRENCH WIDTH	:	1.00m
TRENCH LENGTH	:	3.00m
TRENCH BEARING	:	065°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	K.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83083

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 22/08/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83083

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.40	0.40			CLAYSTONE	CARB ROOF COAL LAM
	0.40	0.70	0.30	06310		COAL	C-2 MINOR C-3
	0.70	0.78	0.08	06310		COAL	C-1 MINOR C-2, UNCONSOLIDATED
	0.78	1.08	0.30	06310		COAL	C-1 MINOR C-2, CONSOLIDATED CLAY LAM
	1.08	1.25	0.17	06310		CLAYSTONE	CONSOLIDATED, MINOR COAL
	1.25	1.55	0.30	06310		COAL	C-2 MINOR C-3, MINOR CLAYSTONE
	1.55	1.62	0.07	06310		CLAYSTONE	CARB MINOR COAL LAM
	1.62	1.75	0.13	06310		CLAYSTONE	
	1.75	1.90	0.15	06310		COAL	C-2 MINOR C-3, CLAYSTONE LAM
	1.90	2.17	0.27			CLAYSTONE	FLOOR

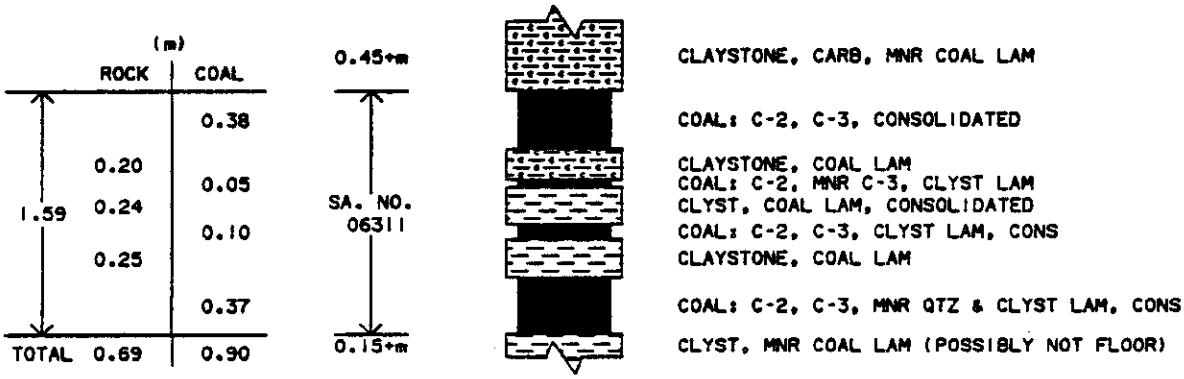
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83083											
	HD1		6310	3.55	33.89	47.84	14.72	0.36	20.24		



ATTITUDE OF ROOF	:	155/75N
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6341510mN, 496800mE
ELEVATION	:	1395m
MAP CARD NUMBER	:	1 13
TRENCH DEPTH	:	0.30m
TRENCH WIDTH	:	1.00m
TRENCH LENGTH	:	3.00m
TRENCH BEARING	:	065°
TRENCH SLOPE	:	30°E
TRENCH BLOCK	:	K.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83084

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 22/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83084

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.45	0.45			CLAYSTONE	CARB ROOF, MINOR COAL LAM
	0.45	0.83	0.38	06311		COAL	C-2 MINOR C-3 CONSOLIDATED
	0.83	1.03	0.20	06311		CLAYSTONE	COAL LAM
	1.03	1.08	0.05	06311		COAL	C-2 MINOR C-3 AND CLAYSTONE LAM
	1.08	1.32	0.24	06311		CLAYSTONE	COAL LAM CONSOLIDATED
	1.32	1.42	0.10	06311		COAL	C-2 MINOR C-3, CLAYSTONE LAM CONSOLIDATED
	1.42	1.67	0.25	06311		CLAYSTONE	MINOR COAL LAM
	1.67	2.04	0.37	06311		COAL	C-2 C-3, MINOR QUARTZ AND CLAYSTONE LAM CON SOLIDATED
	2.04	2.19	0.15			CLAYSTONE	MINOR COAL LAM, POSSIBLE NOT FLOOR

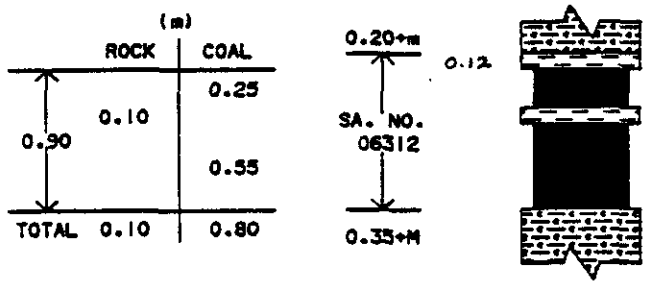
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83084											
	HD1		6311	3.54	39.18	49.75	7.53	0.34	17.39		



ATTITUDE OF ROOF	:	105/30S
ATTITUDE OF FLOOR	:	105/30S
UTM COORDINATES	:	6341590mN, 496415mE
ELEVATION	:	1340m
MAP CARD NUMBER	:	1 13
TRENCH DEPTH	:	0.30m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	2.00m
TRENCH BEARING	:	060°
TRENCH SLOPE	:	65°S
TRENCH BLOCK	:	K.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83085

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 22/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83085

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			CLAYSTONE	CARB ROOF COAL LAM, MINOR QUARTZ AND CALCITE
	0.20	0.32	0.12	06312		CLAYSTONE	
	0.32	0.57	0.25	06312		COAL	C-2 C-3, CLAYSTONE LAM.
	0.57	0.67	0.10	06312		CLAYSTONE	DK.GY CONSOLIDATED
	0.67	1.22	0.55	06312		COAL	C-3 ABUNDANT CLAYSTONE LAM
	1.22	1.57	0.35			CLAYSTONE	CARB COAL LAM, MOSTLY CONSOLIDATED FLOOR

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83085											
	HD1		6312	2.06	38.28	53.03	6.63	0.37	19.31		

(m) ROCK	COAL		
	0.30	0.45+m	CLYST, CARB, MNR C LAM, FE STN, MOSTLY CON
	0.35		COAL: C-3 C-4, MNR CLYST, LAM, FE STN
0.05			COAL: C-2 C-3, MNR CLYST, LAM, FE STN, CON
	0.30		CLAYSTONE, CARBONACEOUS
1.96		SA. NO. 06313	COAL: C-2 C-3, FE STN, MNR CLYST, LAM, CON
0.10			CLAYSTONE, CARB, COAL LAM
	0.10		COAL: C-2, FE STAIN, MNR CLYST
0.05	0.05		CLYST, MNR COAL, LAM
0.15			COAL: C-2, MNR C-5
	0.10		CLYST, FE STAIN, COAL LAM
0.10			COAL: MNR CLAY STONE, UN CON
	0.12		CLAYSTONE
	0.19		COAL: C-3 C-4, MNR CLAYSTONE LAM
			COAL: CLAYSTONE LAM, UN CONSOLIDATED
TOTAL 0.45	1.51	.30+m	CLYST, MNR COAL LAM, FE STN, MOSTLY CON

ATTITUDE OF ROOF : 172/22W
ATTITUDE OF FLOOR: 172/22W
UTM COORDINATES : 6341860mN, 496330mE
ELEVATION : 1325m
MAP CARD NUMBER : I 13
TRENCH DEPTH : 0.30m
TRENCH WIDTH : 0.70m
TRENCH LENGTH : 3.10m
TRENCH BEARING : 045°
TRENCH SLOPE : 45°S
TRENCH BLOCK : K.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG

KPN-TRC-83086

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 22/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83086

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.45	0.45			CLAYSTONE	CARB MINOR COAL LAM, IRON STAIN MOSTLY CONSO LIDATED ROOF
	0.45	0.75	0.30	06313		COAL	C-3 C-4, MINOR CLAYSTONE LAM, IRON STAIN
	0.75	1.10	0.35	06313		COAL	C-2 C-3, MINOR CLAYSTONE LAM, IRON STAIN
	1.10	1.15	0.05	06313		CLAYSTONE	CARB
	1.15	1.45	0.30	06313		COAL	C-2 C-3, IRON STAIN MINOR CLAYSTONE LAM.
	1.45	1.55	0.10	06313		CLAYSTONE	CARB COAL LAM
	1.55	1.65	0.10	06313		COAL	C-2 IRON STAIN, MINOR CLAYSTONE
	1.65	1.70	0.05	06313		CLAYSTONE	MINOR COAL LAM
	1.70	1.75	0.05	06313		COAL	C-2 MINOR C-5
	1.75	1.90	0.15	06313		CLAYSTONE	IRON STAIN, COAL LAM

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83086

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.90	2.00	0.10	06313		COAL	MINOR CLAYSTONE UNCONSOLIDATED
	2.00	2.10	0.10	06313		CLAYSTONE	
	2.10	2.22	0.12	06313		COAL	C-3 C-4 MINOR CLAYSTONE LAM
	2.22	2.41	0.19	06313		COAL	CLAYSTONE LAM, UNCONSOLIDATED
	2.41	2.71	0.30			CLAYSTONE	MINOR COAL LAM, IRON SIAIN, MOSTLY CONS OLIDATED FLOOR

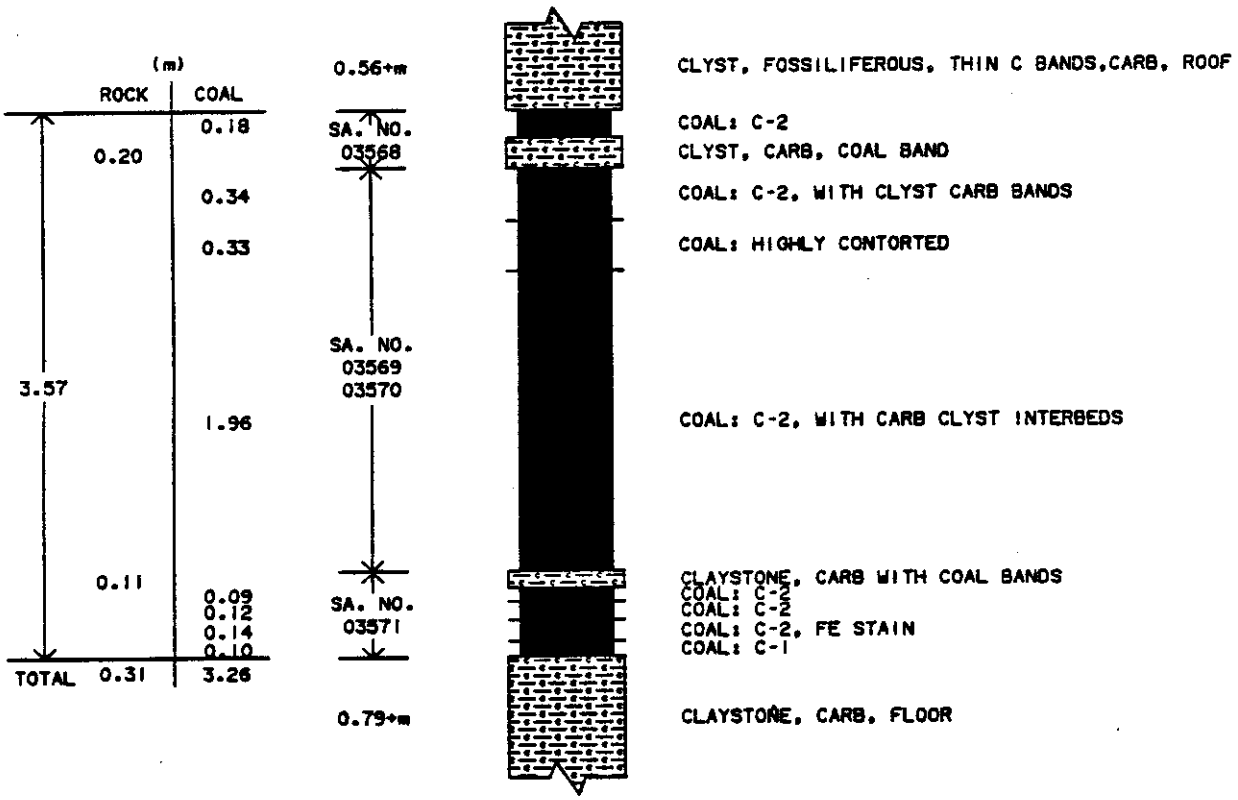
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83086											
	HD1		6313	4.96	34.11	47.74	13.19	0.39	18.92		



ATTITUDE OF ROOF	:	130/90
ATTITUDE OF FLOOR	:	115/83N
UTM COORDINATES	:	6343110mN, 502611mE
ELEVATION	:	1415m
MAP CARD NUMBER	:	1 11
TRENCH DEPTH	:	0.89m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	4.70m
TRENCH BEARING	:	008°
TRENCH SLOPE	:	15°
TRENCH BLOCK	:	K.W

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83091

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: J. ELDER	DATE:
APPROVED BY: C.W.	

GSD:(205,5718)1024017.LOG: 10/11/83

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83091

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.56	0.56			CLAYSTONE	CARB COAL FRAGS. FOSSILFEROUS, THIN COAL BAN DS ROOF
	0.56	0.74	0.18	03568		COAL	C-2
	0.74	0.94	0.20	03568		CLAYSTONE	CARB COAL BAND
	0.94	1.28	0.34	03569		COAL	C-2 WITH CLAYSTONE CARBONACEOUS BANDS
	1.28	1.61	0.33	03570		COAL	HIGHLY CONTORTED
	1.61	3.57	1.96	03570		COAL	C-2 WITH CARBONACEOUS CLAYSTONE INTERBEDS
	3.57	3.68	0.11	03571		CLAYSTONE	CARB WITH COAL BANDS
	3.68	3.77	0.09	03571		COAL	C-2
	3.77	3.89	0.12	03571		COAL	
	3.89	4.03	0.14	03571		COAL	C-2 IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83091

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.03	4.13	0.10	03571		COAL	C-1
	4.13	4.92	0.79			CLAYSTONE	CARB FLOOR

GULF CANADA RESOURCES INC. - COAL DIVISION K.W

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83071		6301	1.00	5.99	100.00	3.76	1.23	0.00	0.00	3.76- 1.23
TRC83072		6302	0.50	2.30	100.00	1.42	0.38	0.00	0.00	1.42- 0.38
		6303	2.30	4.01	100.00	1.71	0.00	0.00	0.00	1.71- 0.00
TRC83073		6304	1.08	4.44	100.00	3.01	0.35	0.00	0.00	3.01- 0.35
TRC83076		6305	0.33	1.87	100.00	1.20	0.34	0.00	0.00	1.20- 0.34
TRC83087		6307	1.85	2.65	100.00	0.70	0.10	0.00	0.00	0.70- 0.10
TRC83088		6308	2.45	3.95	100.00	1.15	0.35	0.00	0.00	1.15- 0.35

(m)	ROCK	COAL
	0.06	0.07
		0.06
		0.08
0.86	0.17	
		0.42
TOTAL	0.23	0.63

1.00+m

0.17

0.40+m

SANDSTONE

CLAYSTONE, CARBONACEOUS, CONSOLIDATED

COAL: C-1, C-2, INTERBEDDED CLAYSTONE

CLAYSTONE

COAL: C-2, CONSOLIDATED

COAL: C-3

CLAYSTONE, INTERBEDDED COAL (MINOR)

COAL: C-5, PARTLY CONSOLIDATED

CLAYSTONE, MINOR SILT, CONSOLIDATED

ATTITUDE OF ROOF : 100/30S
ATTITUDE OF FLOOR: 135/50S
UTM COORDINATES : 6342280mN, 493230mE
ELEVATION : 1215m
MAP CARD NUMBER : 1 14
TRENCH DEPTH : 0.85m
TRENCH WIDTH : 0.57m
TRENCH LENGTH : 1.35m
TRENCH BEARING : 045°
TRENCH SLOPE : 65°
TRENCH BLOCK : K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83068

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

C90:(205,571831024013.L06) 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KH DATA SOURCE: TRC83068

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			SANDSTONE	FG CONSOLIDATED
	1.00	1.17	0.17			CLAYSTONE	CARB CONSOLIDATED; MINOR IRON STAIN ROOF
	1.17	1.24	0.07			COAL	C-1 C-2, INTERBEDDED CLAYSTONE, MINOR CALCI TE
	1.24	1.30	0.06			CLAYSTONE	INT. COAL, CONSOLIDATED
	1.30	1.36	0.06			COAL	C-2 CONSOLIDATED
	1.36	1.44	0.08			COAL	C-3 INT. CLAYSTONE, UNCONSOLIDATED
	1.44	1.61	0.17			CLAYSTONE	INT. MINOR COAL
	1.61	2.03	0.42			COAL	C-5 PARTLY CONSOLIDATED SCRATCHES BLACK, MI NOR CLAYSTONE
	2.03	2.43	0.40			CLAYSTONE	SILT CONSOLIDATED FLOOR

* DENOTES MEASURED BCA

NEWPAGE

(m) ROCK	COAL			
		1.10+m		SILTSTONE, CONSOLIDATED
0.91	0.91			COAL: BLOOM
TOTAL 0.00	0.91	1.00+m		CLAYSTONE, CARBONACEOUS, CONSOLIDATED

ATTITUDE OF ROOF : 130/60S
ATTITUDE OF FLOOR: 130/55S
UTM COORDINATES : 6342210mN, 493180mE
ELEVATION : 1205m
MAP CARD NUMBER : I 14
TRENCH DEPTH : 0.65m
TRENCH WIDTH : 0.54m
TRENCH LENGTH : 2.88m
TRENCH BEARING : 040°
TRENCH SLOPE : 05°
TRENCH BLOCK : K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83069

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

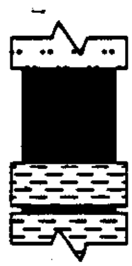
PROJECT: KPN BLOCK: KW DATA SOURCE: TRC83069

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			CLAYSTONE	CARB CONSOLIDATED, MINOR IRON STAIN
	1.00	1.08	0.08			CLAYSTONE	CARB COAL LAM, UNCONSOLIDATED
	1.08	1.11	0.03			CLAYSTONE	BN UNCONSOLIDATED
	1.11	2.02	0.91			COAL	C-5 BLOCM, CLAYSTONE, MINOR CALCITE UNCONSO LIDATED SOME C-3
	2.02	3.02	1.00			SILTSTONE	M.GY CONSOLIDATED

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
		0.62
0.95		
	0.28	
		0.05
TOTAL	0.28	0.67

1.00+m



0.31+m

SILTSTONE, CONSOLIDATED, MASSIVE

COAL: C-5, C-6

CLAYSTONE, CARBONACEOUS

COAL: C-3, C-5

CLAYSTONE, VERY CARBONACEOUS, COAL LAMINAE

ATTITUDE OF ROOF : 140/35S
ATTITUDE OF FLOOR: 125/55S
UTM COORDINATES : 6342095mN, 493180mE
ELEVATION : 1190m
MAP CARD NUMBER : I 14
TRENCH DEPTH : 0.56m
TRENCH WIDTH : 0.49m
TRENCH LENGTH : 2.50m
TRENCH BEARING : 060°
TRENCH SLOPE : 25°
TRENCH BLOCK : K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83070

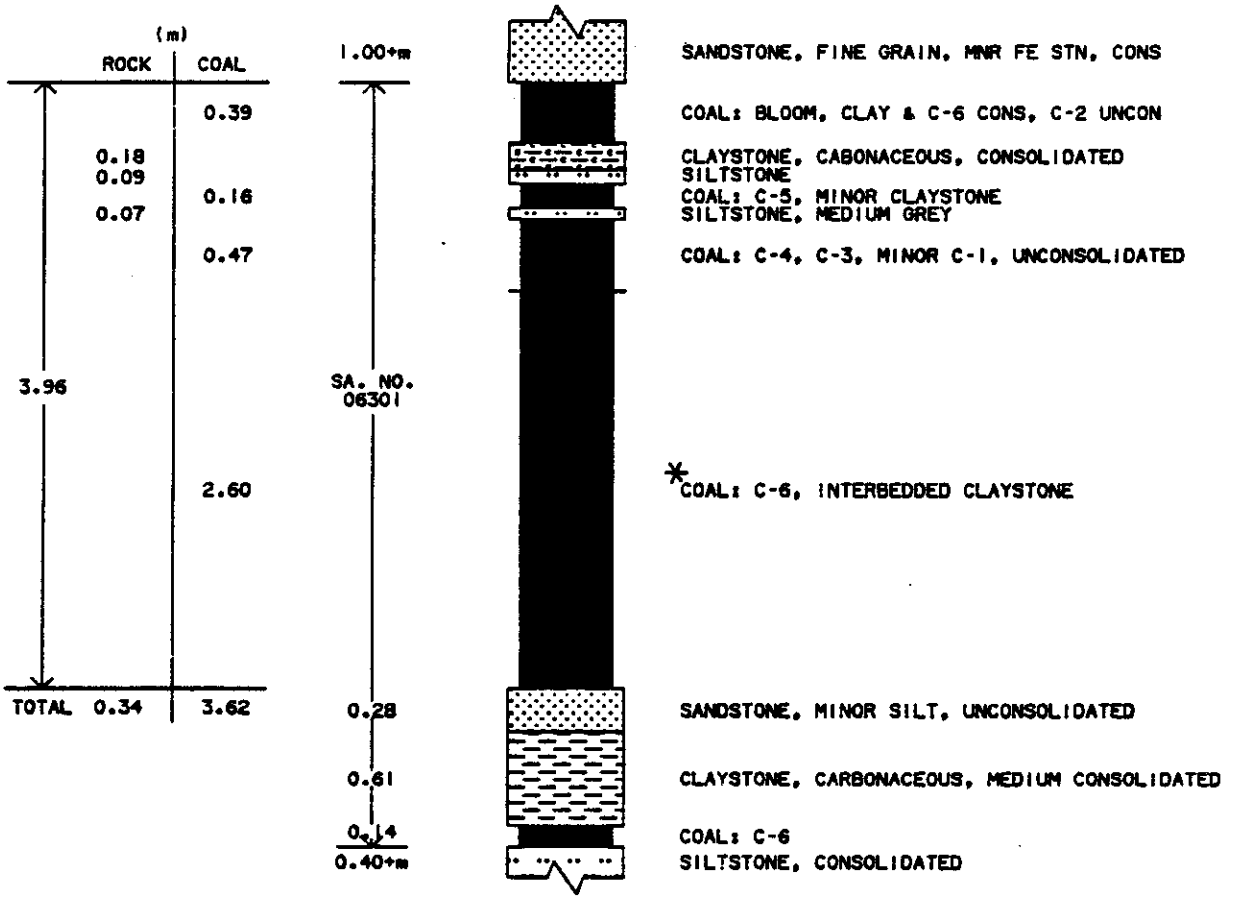
DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

G80:[206,57]831024013.LOG; 03/11/83

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83070

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			SILTSTONE	LAM, CONSOLIDATED, MASSIVE, IRON STAINED AT BASE ROOF
	1.00	1.62	0.62			COAL	C-5 C-6, MINOR C-2, C-1 BANDS, PARTLY CONSOLIDATED. INTERBEDDED CLAYSTONE, MINOR QUARTZ.
	1.62	1.90	0.28			CLAYSTONE	CARB MINOR C-6, IRON STAIN
	1.90	1.95	0.05			COAL	C-3 C-5, UNCONSOLIDATED
	1.95	2.26	0.31			CLAYSTONE	CARB MINOR IRON STAIN, CONSOLIDATED COAL LAM, MINOR QUARTZ FLOOR
	2.26	2.66	0.40			MUDSTONE	

* DENOTES MEASURED BCA
NEWPAGE



*ALMOST ALL COAL IS LOW C GRADE(C-6)

ATTITUDE OF ROOF	:	85/65S
ATTITUDE OF FLOOR	:	65/55S
UTM COORDINATES	:	6341765mN, 493150mE
ELEVATION	:	1200m
MAP CARD NUMBER	:	1 14
TRENCH DEPTH	:	0.67m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	5.30m
TRENCH BEARING	:	150°
TRENCH SLOPE	:	08°
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83071

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

080:(205,5716310Z4013.LOG; 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KW DATA SOURCE: TRC83071

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			SANDSTONE	FG MINOR IRON STAIN, CONSOLIDATED ROOF
	1.00	1.39	0.39	06301		COAL	C-6 BLOOM, CLAY AND C-6 AND C-2 UNCONSOLIDATED
	1.39	1.57	0.18	06301		CLAYSTONE	CARB CONSOLIDATED
	1.57	1.66	0.09	06301		SANDSTONE	FG UNCONSOLIDATED
	1.66	1.82	0.16	06301		COAL	C-5 LAM C-1, MINOR
	1.82	1.89	0.07	06301		SHST	M.GY CLAYSTONE UNCONSOLIDATED
	1.89	2.36	0.47	06301		COAL	C-4 C-3, MINOR C-1, UNCONSOLIDATED, MINOR CLAYSTONE LAM
	2.36	4.96	2.60	06301		COAL	C-6 MINOR CLAYSTONE, MINOR QUARTZ, CONSOLIDATED, MINOR C-2 LAM.
	4.96	5.00	0.04	06301		SILTSTONE	M.GY CONSOLIDATED

* DENOTES MEASURED BCA

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 2

PROJECT: KPN BLOCK: KW DATA SOURCE: TRC83071

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	5.00	5.24	0.24	06301		SANDSTONE	FG UNSONSOLIDATED
	5.24	5.85	0.61	06301		CLAYSTONE	CARB MINOR QUARTZ VEIN 2-CM, CONSOLIDATED
	5.85	5.99	0.14	06301		COAL	C-6 POORLY CONSOLIDATED, MINOR CLAYSTONE
	5.99	6.43	0.44			SILTSTONE	GY CONSOLIDATED FLOOR

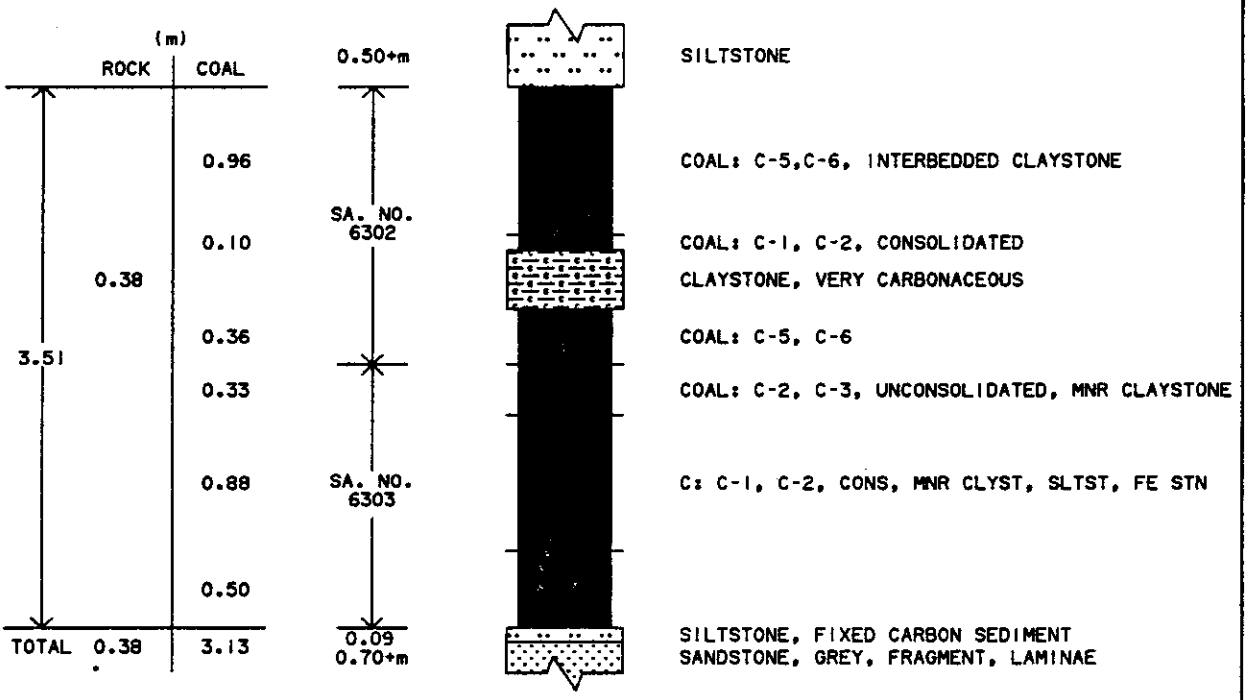
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83071											
	HD1		6301	3.82	38.79	47.67	9.72	0.26	17.69		



ATTITUDE OF ROOF	:	105/80N
ATTITUDE OF FLOOR	:	95/30S
UTM COORDINATES	:	6341750mN, 493160mE
ELEVATION	:	1200m
MAP CARD NUMBER	:	1 14
TRENCH DEPTH	:	0.63m
TRENCH WIDTH	:	0.40m
TRENCH LENGTH	:	6.00m
TRENCH BEARING	:	175°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83072

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

GSO:[205,57]83102401 3.LOG; 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KW DATA SOURCE: TRC83072

RCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			SILTSTONE	ROOF
	0.50	1.46	0.96	06302		COAL	C-5 C-6, INTERBEDDED CLAYSTONE, UNCONSOLIDATED
	1.46	1.56	0.10	06302		COAL	C-1 C-2 CONSOLIDATED
	1.56	1.94	0.38	06302		CLAYSTONE	CARB INTERBEDDED C-1 2 CM, UNCONSOLIDATED
	1.94	2.30	0.36	06302		COAL	C-5 C-6 INTERBEDDED C-1, C-2 CONSOLIDATED
	2.30	2.63	0.33	06303		COAL	C-2 C-3, MINOR CLAYSTONE UNCONSOLIDATED
	2.63	3.51	0.88	06303		COAL	C-2 C-3, C-1 LAM, MINOR CLAYSTONE.
	3.51	4.01	0.50	06303		COAL	C-1 C-2, CONSOLIDATED, MINOR CLAYSTONE
	4.01	4.10	0.09			SILTSTONE	IRON STAIN, FLOOR
	4.10	4.80	0.70			SANDSTONE	FG.GY LAM

* DENOTES MEASURED RCA
NEWPAGE

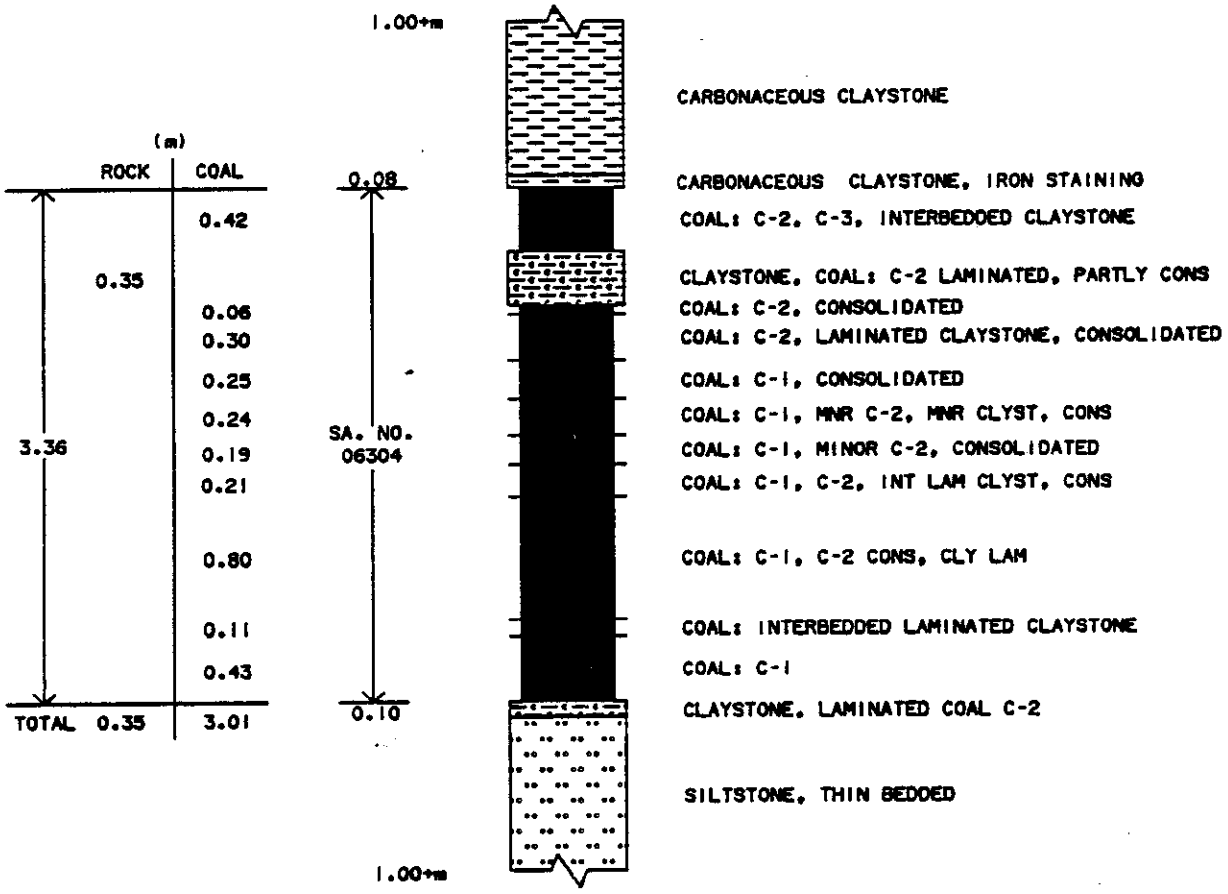
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83072											
	HD1		6302	3.63	10.01	80.31	6.05	0.61	29.76		
	HD1		6303	5.08	14.55	74.47	5.90	0.53	27.77		

FORM 9999



ATTITUDE OF ROOF	:	104/68S
ATTITUDE OF FLOOR	:	104/68S
UTM COORDINATES	:	6340465mN, 492455mE
ELEVATION	:	1110m
MAP CARD NUMBER	:	H 14
TRENCH DEPTH	:	1.00m
TRENCH WIDTH	:	1.00m
TRENCH LENGTH	:	4.20m
TRENCH BEARING	:	015°
TRENCH SLOPE	:	00°
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83073

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 20/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: KH DATA SOURCE: TRC83073

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			CLYST	CARB MINOR CLAY, FE STAINING
	1.00	1.08	0.08			CLYST	CARB UNCONSOL.,MINOR COAL, ROOF
	1.08	1.50	0.42	06304		COAL	C-2 C-4, CONSOL., MINOR CLAY, C-3 MINOR QTZ , UNCONSOL.
	1.50	1.85	0.35	06304		CLYST	MINOR COAL C-2 LAMS. PARTLY CONSOL.
	1.85	1.91	0.06	06304		COAL	C-2 CONSOLIDATED
	1.91	2.21	0.30	06304		COAL	C-2 CLYST. LAMS.
	2.21	2.46	0.25	06304		COAL	C-1 CONSOL.
	2.46	2.70	0.24	06304		COAL	C-1 MINOR C-2 AND CLYST
	2.70	2.89	0.19	06304		COAL	C-1 UNCONSOL. MINOR C-2
	2.89	3.10	0.21	06304		COAL	C-1 C-2, CLYST LAMS.

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: KH DATA SOURCE: TRC83073

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.10	3.90	0.80	06304		COAL	C-1 C-2 CONSOL.
	3.90	4.01	0.11	06304		COAL	CLYST LAMS., MINOR QUARTZ
	4.01	4.44	0.43	06304		COAL	C-1
	4.44	4.54	0.10			CLYST	COAL LAMS., C-1 AND C-2
	4.54	5.54	1.00			SLTST	CARB CLYST CONSOL. - THINLY BEDDED

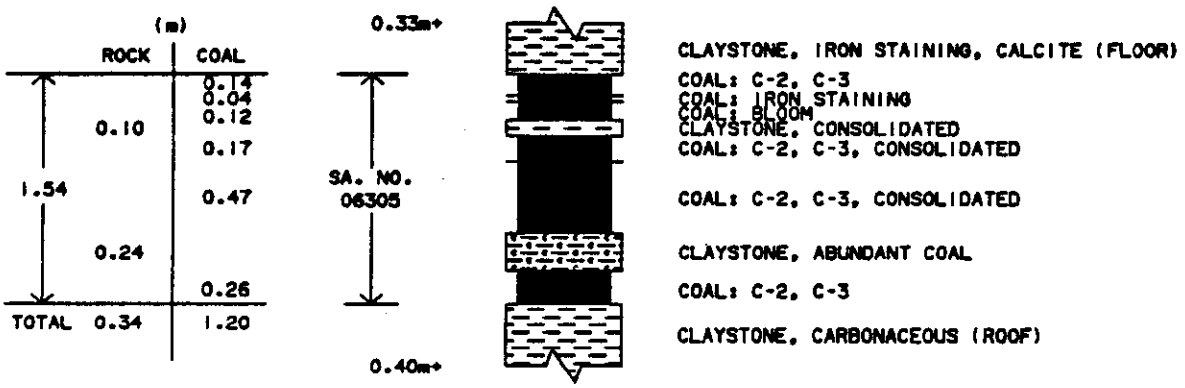
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83073											
	HD1		6304	4.48	16.96	73.33	5.23	0.51	26.67		



ATTITUDE OF ROOF	:	137/74NE
ATTITUDE OF FLOOR	:	135/70NE
UTM COORDINATES	:	6339880mN, 494830mE
ELEVATION	:	1590m
MAP CARD NUMBER	:	H 13
TRENCH DEPTH	:	1.10m
TRENCH WIDTH	:	0.60m
TRENCH LENGTH	:	3.30m
TRENCH BEARING	:	055°
TRENCH SLOPE	:	0°
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83076

DRAWN BY: S.FAWCETT	SCALE: 1:50
LOGGED BY: S.FAWCETT	DATE: 21/06/83
APPROVED BY: C.W.	

GBS:[206,ST183]024814.LOG; 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KN DATA SOURCE: TRC83076

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.33	0.33			CLAYSTONE	CARB.DK.BN CONSOLIDATED, IRON-STAIN, CALC. LAM ROO F
	0.33	0.47	0.14	06305		COAL	C-2 C-3, CLAYSTONE LAM
	0.47	0.51	0.04	06305		COAL	C-2 IRON STAIN
	0.51	0.63	0.12	06305		COAL	BLOOM
	0.63	0.73	0.10	06305		CLAYSTONE	CONSOLIDATED. MINOR IRON-STAIN
	0.73	0.90	0.17	06305		COAL	C-2 C-3, CLAYSTONE LAM CONSOLIDATED.
	0.90	1.37	0.47	06305		COAL	C-2 C-3, CONSOLIDATED. CLAYSTONE LAM.
	1.37	1.61	0.24	06305		CLAYSTONE	ABUNDANT COAL LAM
	1.61	1.87	0.26	06305		COAL	C-2 C-3 CLAYSTONE LAM
	1.87	2.27	0.40			CLAYSTONE	CARB MINOR COAL LAM CALC LAM FLOOR

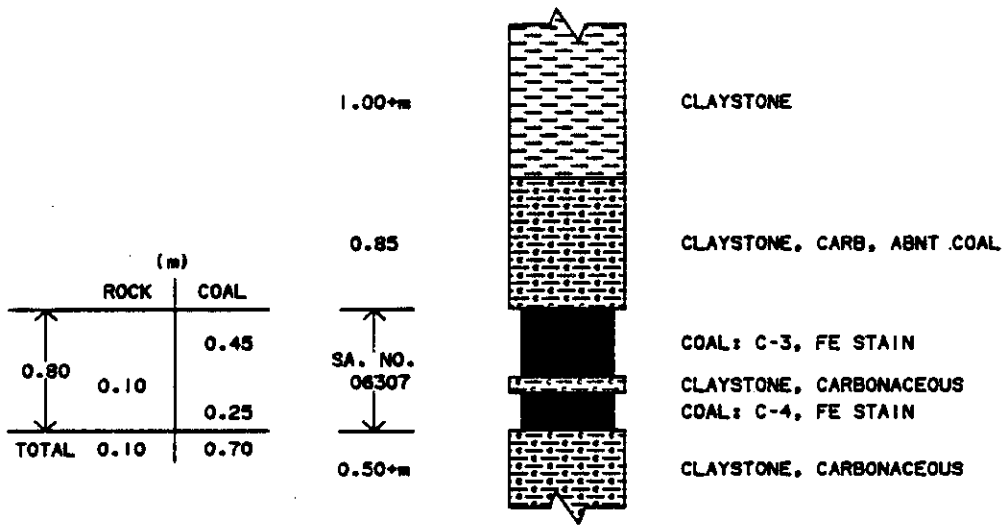
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83076											
	HD1		6305	8.48	17.48	55.11	18.93	0.40	21.30		



ATTITUDE OF ROOF	:	060/45S
ATTITUDE OF FLOOR	:	065/45S
UTM COORDINATES	:	6344480mN, 492595mE
ELEVATION	:	1370m
MAP CARD NUMBER	:	I 14
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	1.00m
TRENCH LENGTH	:	5.00m
TRENCH BEARING	:	150°
TRENCH SLOPE	:	15°W
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83087

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 22/08/83
APPROVED BY: C.W.	

090:(206,5718310240016.LOG: 02/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KH DATA SOURCE: TRC83087

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00			CLAYSTONE	
	1.00	1.85	0.85			CLAYSTONE	CARB ABUNDANT COAL ROOF
	1.85	2.30	0.45	06307		COAL	C-3 IRON STAIN
	2.30	2.40	0.10	06307		CLAYSTONE	CARB
	2.40	2.65	0.25	06307		COAL	C-4 IRON STAIN
	2.65	3.15	0.50			CLAYSTONE	CARB FLOOR

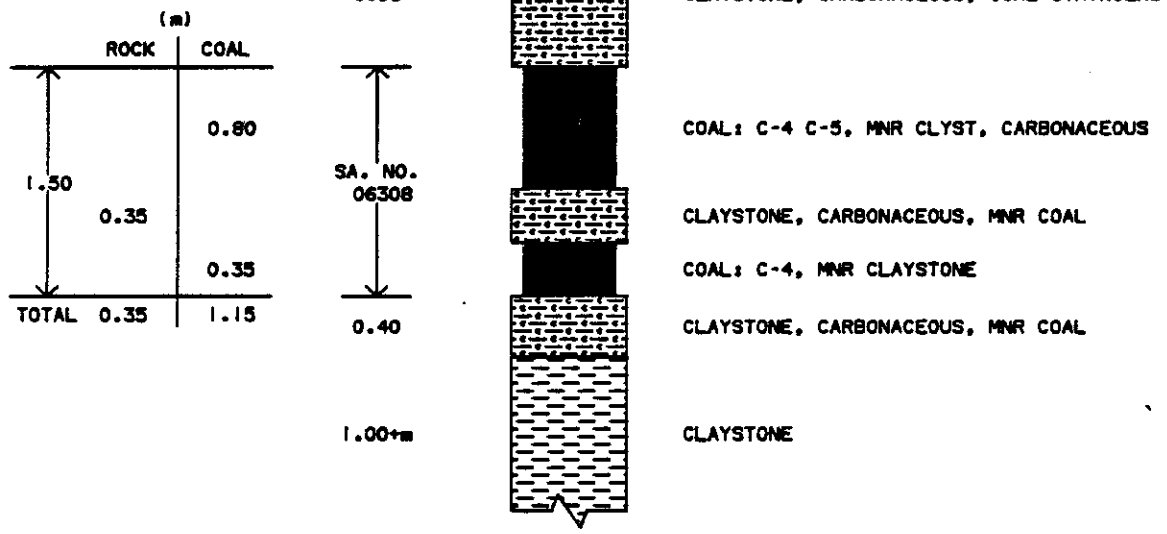
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83087											
	HD1		6307	3.89	19.46	72.33	4.32	0.50	25.58		



ATTITUDE OF ROOF	:	050/60S
ATTITUDE OF FLOOR	:	050/60S
UTM COORDINATES	:	6344335mN, 492700mE
ELEVATION	:	1340m
MAP CARD NUMBER	:	1 14
TRENCH DEPTH	:	0.50m
TRENCH WIDTH	:	2.00m
TRENCH LENGTH	:	4.50m
TRENCH BEARING	:	140°
TRENCH SLOPE	:	00°S
TRENCH BLOCK	:	K.W.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83088

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 22/08/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: KH DATA SOURCE: TRC83088

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.50	1.50			CLAYSTONE	
	1.50	2.45	0.95			CLAYSTONE	CARB COAL STRINGERS ROOF
	2.45	3.25	0.80	06308		COAL	C-4 C-5, MINOR CLAYSTONE, CARBONACEOUS.
	3.25	3.60	0.35	06308		CLAYSTONE	CARB MINOR COAL
	3.60	3.95	0.35	06308		COAL	C-4 MINOR CLAYSTONE
	3.95	4.35	0.40			CLAYSTONE	CARB MINOR COAL FLOOR
	4.35	5.35	1.00			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83088											
	HD1		6308	3.65	38.63	52.07	5.65	0.29	17.83		

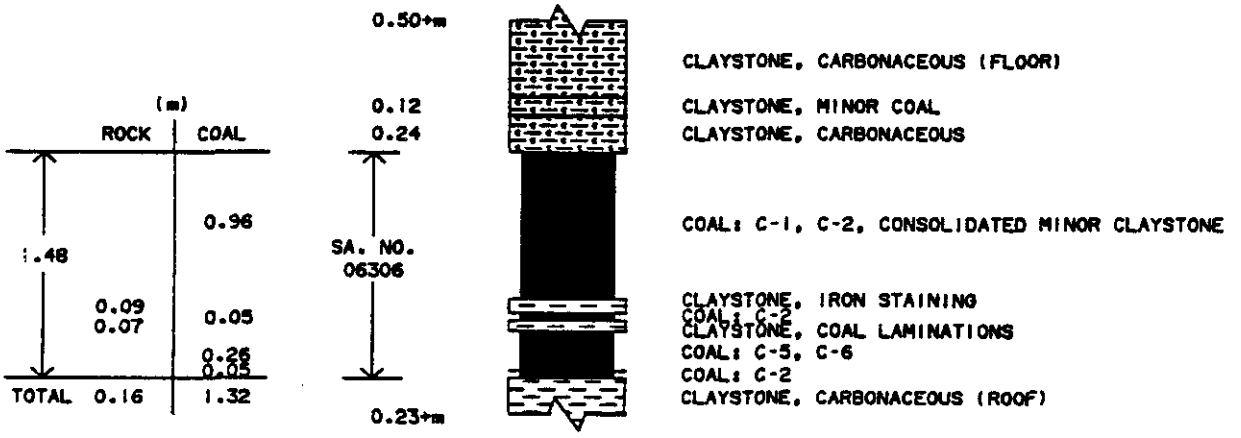
GULF CANADA RESOURCES INC. - COAL DIVISION K.S

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83077		6306	0.86	2.34	100.00	1.32	0.16	0.00	0.00	1.32- 0.16



ATTITUDE OF ROOF	:	110/65S
ATTITUDE OF FLOOR	:	95/65S
UTM COORDINATES	:	6339935mN, 496400mE
ELEVATION	:	1575m
MAP CARD NUMBER	:	H 13
TRENCH DEPTH	:	0.50m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	3.00m
TRENCH BEARING	:	015°
TRENCH SLOPE	:	0°
TRENCH BLOCK	:	K.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83077

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: S. FAWCETT	DATE: 21/06/83
APPROVED BY: C.M.	

088:(288,5718510240014.LOG) 03/11/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KS DATA SOURCE: TRC83077

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			CLAYSTONE	M.GY CONSOLIDATED
	0.50	0.62	0.12			CLAYSTONE	LAM, MINOR COAL CONSOLIDATED
	0.62	0.86	0.24			CLAYSTONE	CARB CONSOLIDATED, IRON STAIN
	0.86	1.82	0.96	06306		COAL	C-1 COAL LAM FLOOR C-2 CONSOLIDATED, MINOR CLAYSTONE LAM, MINOR IRON STAIN
	1.82	1.91	0.09	06306		CLAYSTONE	IRON-STAIN COAL LAM
	1.91	1.96	0.05	06306		COAL	C-2 CONSOLIDATED
	1.96	2.03	0.07	06306		CLAYSTONE	COAL LAM
	2.03	2.29	0.26	06306		COAL	C-5 C-6, C-2, LAM, POORLY CONSOLIDATED
	2.29	2.34	0.05	06306		COAL	C-2 CONSOLIDATED
	2.34	2.57	0.23			CLAYSTONE	CARB IRON STAIN, CONSOLIDATED, MINOR COAL LAM ROOF

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

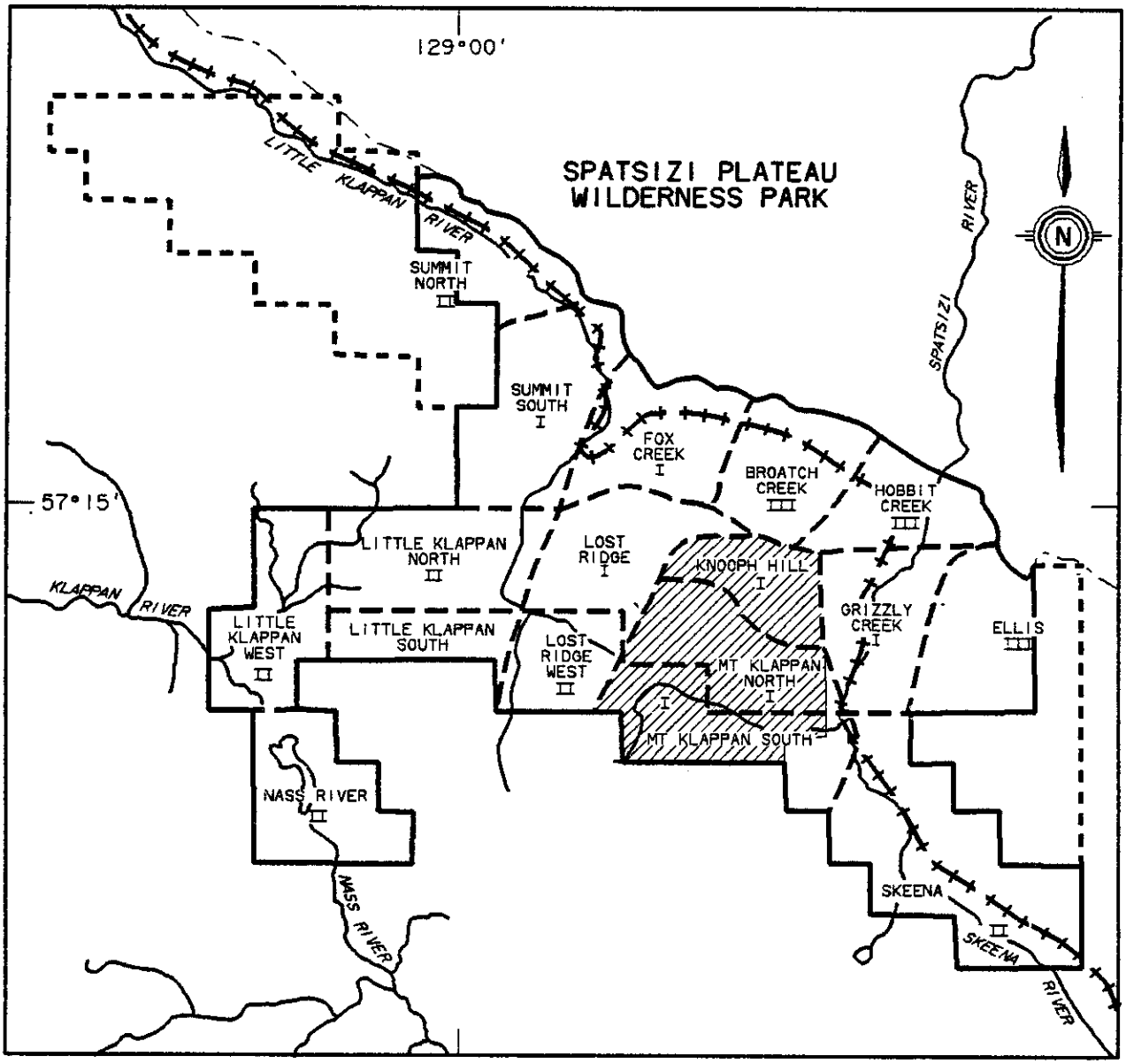
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83077											
	HD1		6306	2.79	31.29	56.90	9.02	0.44	21.72		

MT. KLAPPAN COAL PROPERTY

KLAPPAN MOUNTAIN AREA



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- LICENCE AREA
- LICENCES UNDER APPLICATION
- I FIRST PRIORITY
- II SECOND PRIORITY
- III THIRD PRIORITY

SCALE

0 1 2 3 km

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION M.N.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNMNTRC83008	6340985.0	507905.0	1955.0	26.0	6.0	15.0	
KPNMNTRC83009	6340955.0	507920.0	1960.0	5.2	31.0	54.0	
KPNMNTRC83010	6341035.0	507925.0	1945.0	5.8	11.0	26.0	
KPNMNTRC83011	6341309.0	507884.0	1924.0	6.6	19.0	14.0	
KPNMNTRC83012	6341455.0	507858.0	1900.0	7.4	21.0	22.0	
KPNMNTRC83013	6341575.0	507905.0	1860.0	7.0	30.0	42.0	
KPNMNTRC83014	6340505.0	507585.0	1950.0	4.1	29.0	174.0	
KPNMNTRC83015	6338470.0	510635.0	1715.0	3.1	35.0	55.0	
KPNMNTRC83016	6338420.0	510635.0	1695.0	3.5	40.0	57.0	
KPNMNTRC83017	6338390.0	510625.0	1685.0	4.3	25.0	50.0	
KPNMNTRC83018	6338355.0	510635.0	1675.0	3.4	30.0	30.0	
KPNMNTRC83019	6338335.0	510620.0	1665.0	4.0	40.0	65.0	
KPNMNTRC83020	6338320.0	510610.0	1650.0	4.5	45.0	75.0	
KPNMNTRC83021	6339520.0	509545.0	1848.0	6.0	20.0	55.0	
KPNMNTRC83022	6339445.0	509505.0	1828.0	3.5	45.0	42.0	

GULF CANADA RESOURCES INC. - COAL DIVISION M.S.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNMSTRC83023	6339275.0	509445.0	1775.0	4.9	20.0	75.0	
KPNMSTRC83024	6339130.0	509395.0	1690.0	4.0	40.0	70.0	

FORM 9999

GULF CANADA RESOURCES INC. - COAL DIVISION K.H.

14/MAR/84 PROJECT DATA SOURCE SUMMARY PAGE 1

DATA SOURCE	LOCATION NORTHING	LOCATION EASTING	ELEVATION	LENGTH	ANGLE	AZIMUTH	LOG TYPE
KPNKHTRC83045	6342385.0	510220.0	1925.0	3.9	15.0	60.0	

FORM 9999

GULF CANADA RESOURCES INC. - COAL DIVISION M.N.

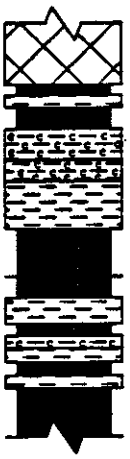
15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83015										
		3551	0.63	1.16	100.00	0.53	0.00	0.00	0.00	0.53- 0.00
TRC83017										
		3552	0.95	1.31	100.00	0.36	0.00	0.00	0.00	0.36- 0.00
		3553	1.71	2.20	100.00	0.49	0.00	0.00	0.00	0.49- 0.00
TRC83019										
		3554	0.64	1.31	100.00	0.67	0.00	0.00	0.00	0.67- 0.00
		3555	1.73	2.12	100.00	0.39	0.00	0.00	0.00	0.39- 0.00
TRC83020										
		3556	1.10	3.51	100.00	1.37	1.04	0.00	0.00	1.37- 1.04
TRC83021										
		3557	0.40	2.76	100.00	0.39	1.97	0.00	0.00	0.39- 1.97
TRC83022										
		3558	0.80	1.89	100.00	0.33	0.76	0.00	0.00	0.33- 0.76

(m)	ROCK	COAL
	0.08	0.07
		0.14
	0.20	
	0.14	
	0.31	
2.30		0.31
		0.14
	0.17	
	0.08	0.08
	0.09	
	0.08	0.09
		0.24
	0.08	
TOTAL	1.23	1.07



OVERBURDEN

COAL: C-2
CLAYSTONE, INTERBEDDED SAND
COAL: C-2, C-4
CLAYSTONE, MINOR CARBONACEOUS
CLAYSTONE, FOSSIL TREE, CARBONACEOUS
CLAYSTONE, INTERBEDDED COAL, C-2

COAL: C-3, C-4, MINOR CARBONACEOUS CLAYSTONE

COAL: C-1, C-2
CLAYSTONE, HARD
COAL: C-4
CLAYSTONE, CARBONACEOUS
CLAYSTONE, COAL STRINGERS
COAL: C-3
UNCONSOLIDATED CLAY
COAL: C-2

*WARPING WITHIN TRENCH

ATTITUDE OF ROOF : NOT OBTAINED
ATTITUDE OF FLOOR: NOT OBTAINED
UTM COORDINATES : 6340985mN, 507905mE
ELEVATION : 1955m
MAP CARD NUMBER : H 9
TRENCH DEPTH : 0.76m
TRENCH WIDTH : 0.76m
TRENCH LENGTH : 25.99m
TRENCH BEARING : 015°
TRENCH SLOPE : 06°
TRENCH BLOCK : M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83008

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 17/07/83
APPROVED BY: C.W.	

090:(208,5718310240003.LOG: 26/10/83

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83008

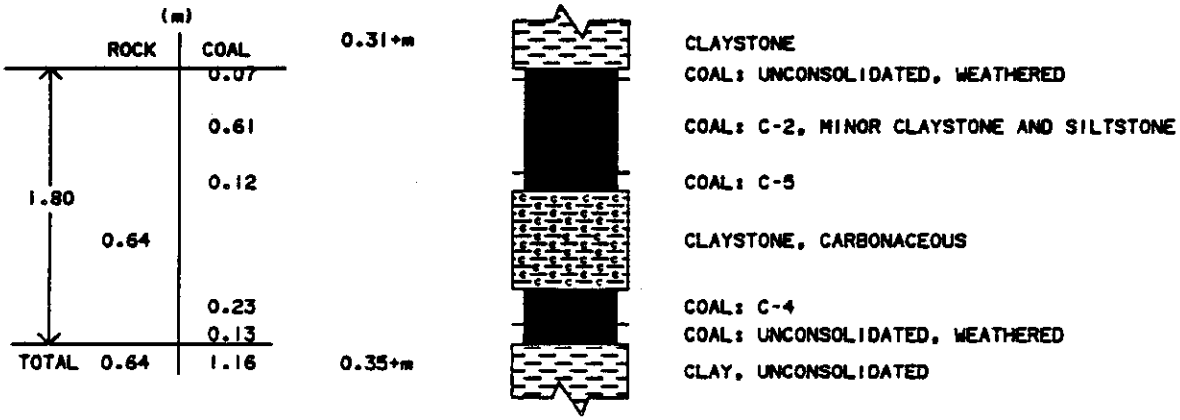
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.43	0.43			CLAYSTONE	UNCONSOLIDATED;ROOF OVERBURDEN
	0.43	0.50	0.07			COAL	C-2.BLK
	0.50	0.58	0.08			CLAYSTONE	INTERBEDDED WITH SAND
	0.58	0.72	0.14			COAL	C-4.BLK COAL C-2 & C-4
	0.72	0.92	0.20			CLAYSTONE	SLIGHTLY CARB
	0.92	1.06	0.14			CLAYSTONE	CARB FOSSIL TREE
	1.06	1.37	0.31			CLAYSTONE	CARB INTERBEDDED WITH COAL C-2
	1.37	1.68	0.31			COAL	C-4.BLK COAL C-3 & C-4;MINOR CLAYSTONE
	1.68	1.82	0.14			COAL	C-2.BLK COAL C-1 & C-2
	1.82	1.99	0.17			CLAYSTONE	HARD
	1.99	2.07	0.08			COAL	C-4.BLK

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83008

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.07	2.15	0.08			CLAYSTONE	CARB
	2.15	2.24	0.09			CLAYSTONE	COAL STRINGERS
	2.24	2.33	0.09			COAL	C-3.BLK
	2.33	2.41	0.08			CLAY	UNCONSOLIDATED
	2.41	2.65	0.24			COAL	C-2.BLK
	2.65	2.73	0.08			CLAYSTONE	CARB
	2.73	3.02	0.29			OVERBURDEN	FLOOR NOT OBTAINED

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	119/036S
UTM COORDINATES	:	6340955mN, 507920mE
ELEVATION	:	1960m
MAP CARD NUMBER	:	H 9
TRENCH DEPTH	:	0.53m
TRENCH WIDTH	:	0.57m
TRENCH LENGTH	:	5.20m
TRENCH BEARING	:	054°
TRENCH SLOPE	:	31°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83009

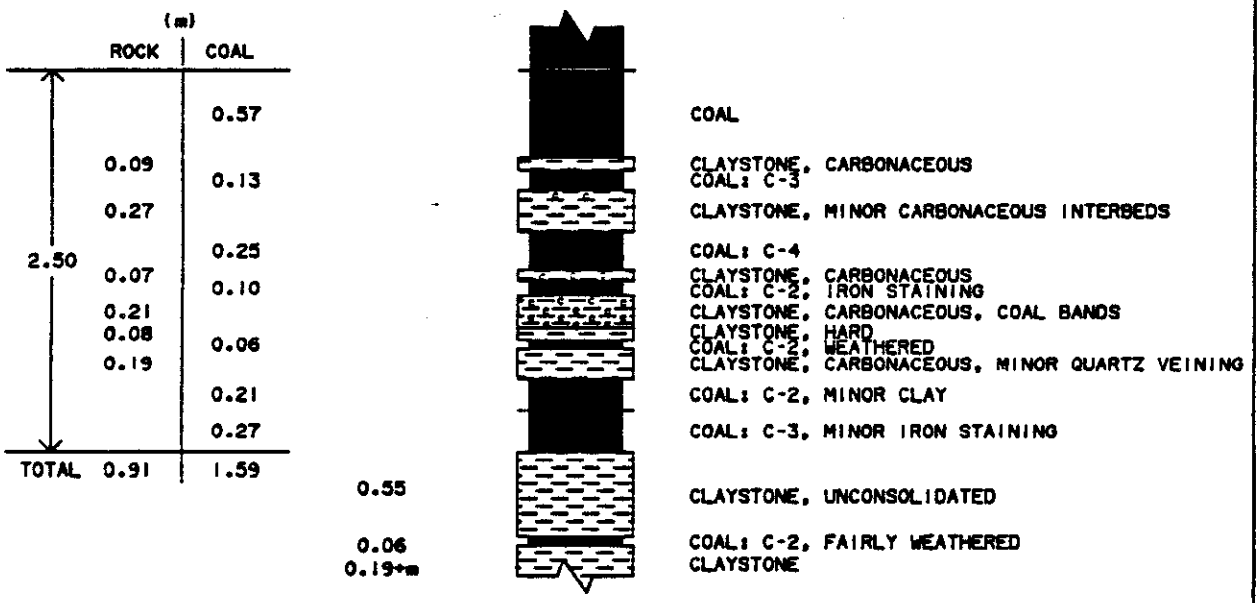
DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 17/07/83
APPROVED BY: C.M.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRCB3009

RCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.31	0.31			CLAYSTONE	ROOF ROCK
	0.31	0.38	0.07			COAL	BLK UNCONSOLIDATED;WEATHERED
	0.38	0.99	0.61			COAL	C-2.BLK MINOR CLAYSTONE
	0.99	1.11	0.12			COAL	C-5.BLK
	1.11	1.42	0.31			CLAYSTONE	CARB
	1.42	1.75	0.33			CLAYSTONE	CARB LISTRIC SURFACES
	1.75	1.98	0.23			COAL	C-4.BLK
	1.98	2.11	0.13			COAL	BLK UNCONSOLIDATED;WEATHERED

* DENOTES MEASURED RCA
NEWPAGE



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	123/26N
UTM COORDINATES	:	6341035mN, 507925mE
ELEVATION	:	1945m
MAP CARD NUMBER	:	H 9
TRENCH DEPTH	:	0.85m
TRENCH WIDTH	:	0.55m
TRENCH LENGTH	:	5.75m
TRENCH BEARING	:	026°
TRENCH SLOPE	:	11°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83010

DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 17/07/83
APPROVED BY: C.W.	

090:[205,57]831024003.LOG: 26/10/83

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83010

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.59	0.59			OVERBURDEN	ROOF NOT REACHED
	0.59	1.16	0.57			COAL	COAL SPOIL
	1.16	1.25	0.09			CLAYSTONE	CARB
	1.25	1.38	0.13			COAL	C-3.BLK
	1.38	1.65	0.27			CLAYSTONE	M.GY
	1.65	1.90	0.25			COAL	C-4.BLK
	1.90	1.97	0.07			CLAYSTONE	CARB
	1.97	2.07	0.10			COAL	C-2.BLK IRON STAINING
	2.07	2.28	0.21			CLAYSTONE	CARB COAL BANDS
	2.28	2.36	0.08			CLAYSTONE	HARD
	2.36	2.42	0.06			COAL	C-2.BLK WEATHERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83010

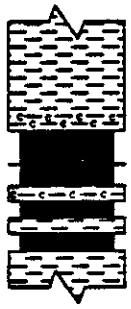
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.42	2.61	0.19			CLAYSTONE	CARB MINOR QTZ VEINING
	2.61	2.82	0.21			COAL	C-2.BLK MINOR CLAY
	2.82	3.09	0.27			COAL	C-3.BLK MINOR IRON STAINING
	3.09	3.64	0.55			CLAYSTONE	CONSOLIDATED TO UNCONSOLIDATED
	3.64	3.70	0.06			COAL	C-2.BLK FAIRLY WEATHERED
	3.70	3.89	0.19			CLAYSTONE	FLOOR ROCK

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
		0.22
		0.14
0.79	0.10	0.11
	0.10	0.12
TOTAL	0.20	0.59

0.71+m

0.23+m



CLAYSTONE: HARD, MINOR CARBONACEOUS INTERBEDS

COAL: C-2, MNR CLAYSTONE AND SLTST INTERBEDS

COAL: C-3
CLAYSTONE, CARBONACEOUS, MINOR QUARTZ VEINING
COAL: C-2, C-3
CLAY, IRON STAINING, FOSSIL TREE
COAL: C-3

CLAYSTONE

ATTITUDE OF ROOF : NOT OBTAINED
ATTITUDE OF FLOOR: 097/05S
UTM COORDINATES : 6341309mN, 507884mE
ELEVATION : 1924m
MAP CARD NUMBER : 1 9
TRENCH DEPTH : 0.87m
TRENCH WIDTH : 0.65m
TRENCH LENGTH : 6.55m
TRENCH BEARING : 014°
TRENCH SLOPE : 19°
TRENCH BLOCK : M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83011

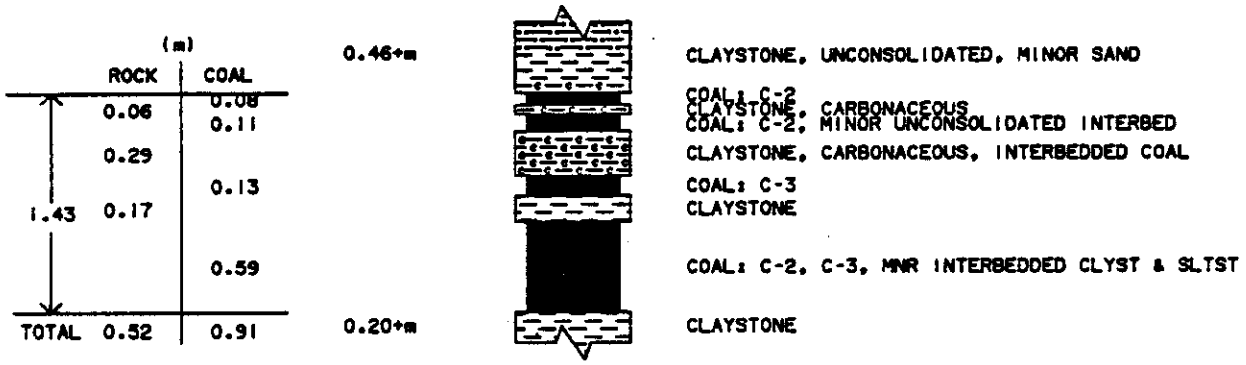
DRAWN BY: SCOTT FAWCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 17/07/83
APPROVED BY: C.M.	

G30:(205,5718310240003.L09) 26/10/83

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83011

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.71	0.71			CLAYSTONE	HARD;MINOR CARB ROOF
	0.71	0.93	0.22			COAL	C-2.BLK MINOR CLAY AND SILT
	0.93	1.07	0.14			COAL	C-3.BLK
	1.07	1.17	0.10			CLAYSTONE	HARD;MINOR CARB;QTZ VEINING
	1.17	1.28	0.11			COAL	C-3.BLK COAL C-2 & C-3
	1.28	1.38	0.10			CLAY	IRON STAINING;FOSSIL TREE
	1.38	1.50	0.12			COAL	C-3.BLK
	1.50	1.73	0.23			CLAYSTONE	HARD FLOOR

• DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	100/05S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6341455mN, 507858mE
ELEVATION	:	1900m
MAP CARD NUMBER	:	I 9
TRENCH DEPTH	:	0.76m
TRENCH WIDTH	:	0.59m
TRENCH LENGTH	:	7.38m
TRENCH BEARING	:	022°
TRENCH SLOPE	:	21°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG

KPN-TRC-83012

DRAWN BY: SCOTT FANCETT	SCALE: 1:50
LOGGED BY: KIM JENNER	DATE: 17/07/83
APPROVED BY: C.M.	

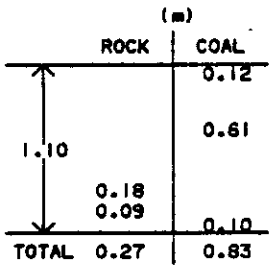
QSO:[205,571831024003.LOG; 26/10/83

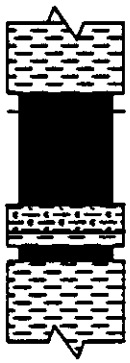
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83012

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.46	0.46			CLAYSTONE	UNCONSOLIDATED ROOF
	0.46	0.54	0.08			COAL	C-2.BLK
	0.54	0.60	0.06			CLAYSTONE	CARBONACEOUS
	0.60	0.71	0.11			COAL	C-2 UNCONSOLIDATED
	0.71	1.00	0.29			CLAYSTONE	CARB INTERBEDDED COAL
	1.00	1.13	0.13			COAL	C-3.BLK
	1.13	1.30	0.17			CLAYSTONE	HARD
	1.30	1.89	0.59			COAL	C-3.BLK COAL C-2 & C-3;INTERBEDDED CLAY AND SIL T
	1.89	2.09	0.20			CLAYSTONE	M.BN FLOOR

* DENOTES MEASURED BCA
NEWPAGE





0.44+m

CLAYSTONE, WEATHERED

COAL: C-2, MINOR UNCONSOLIDATED CLAY

COAL: C-2, UNCONSOLIDATED

CLAYSTONE, CARBONACEOUS, COAL STRINGERS
CLAYSTONE, UNCONSOLIDATED
COAL: C-3

0.54+m

CLAYSTONE

ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	134/15NE
UTM COORDINATES	:	6341575mN, 507905mE
ELEVATION	:	1860m
MAP CARD NUMBER	:	1 9
TRENCH DEPTH	:	0.79m
TRENCH WIDTH	:	0.52m
TRENCH LENGTH	:	6.97m
TRENCH BEARING	:	042°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83013

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 18/07/83
APPROVED BY: C.M.	

QBG:1206.5718310240004.LOG: 26/10/83

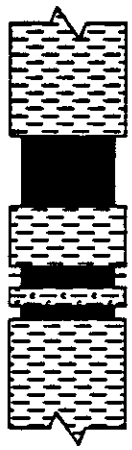
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83013

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.44	0.44			CLAYSTONE	POSSIBLE ROOF;WEATHERED LIGHT BROWN
	0.44	0.56	0.12			COAL	C-2.BLK MINOR CLAY
	0.56	1.17	0.61			COAL	C-2.BLK UNCONSOLIDATED
	1.17	1.35	0.18			CLAYSTONE	CARB COAL STRINGERS CARBONACEOUS
	1.35	1.44	0.09			CLAYSTONE	UNCONSOLIDATED
	1.44	1.54	0.10			COAL	C-3.BLK
	1.54	2.08	0.54			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
		0.46
1.20	0.39	
		0.06
		0.08
	0.12	
		0.09
TOTAL	0.51	0.69



0.59+m — CLAYSTONE

COAL: C-2

CLAYSTONE

COAL: C-2, C-3, MINOR CLAYSTONE
COAL: C-2, C-4
CLAYSTONE, CARBONACEOUS
COAL: C-2, C-4

0.36+m — CLAYSTONE

ATTITUDE OF ROOF : NOT OBTAINED
ATTITUDE OF FLOOR: 084/12S
UTM COORDINATES : 6340505mN, 507585mE
ELEVATION : 1950m
MAP CARD NUMBER : H 9
TRENCH DEPTH : 1.13m
TRENCH WIDTH : 0.78m
TRENCH LENGTH : 4.10m
TRENCH BEARING : 174°
TRENCH SLOPE : 29°
TRENCH BLOCK : M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83014

DRAWN BY: S. FAWCETT	SCALE: 1:50
LOGGED BY: K. JENNER	DATE: 18/07/83
APPROVED BY: C.W.	

080:(205,5718310240004.LOG: 26/10/83

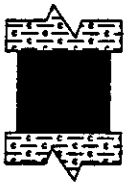
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: NN DATA SOURCE: TRC83014

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.59	0.59			CLAYSTONE	ROOF
	0.59	1.05	0.46			COAL	C-2.BLK
	1.05	1.44	0.39			CLAYSTONE	
	1.44	1.50	0.06			COAL	C-3.BLK COAL C-2 & C-3;MINOR CLAYSTONE
	1.50	1.58	0.08			COAL	C-3.BLK
	1.58	1.70	0.12			CLAYSTONE	CARB CARBONACEOUS
	1.70	1.79	0.09			COAL	C-4.BLK COAL C-2 & C-4
	1.79	2.15	0.36			CLAYSTONE	FLOOR

* DENOTES MEASURED BCA
NEWPAGE

(m) ROCK	COAL		
		0.58+m	CLAYSTONE, CARBONACEOUS, MINOR IRON STAINING
0.53	0.53	SA.NO. 03551	COAL: C-4, WEATHERED, IRON STAINING
TOTAL 0.00	0.53	0.25+m	CLAYSTONE, CARBONACEOUS



ATTITUDE OF ROOF	:	135/35N
ATTITUDE OF FLOOR	:	120/30N
UTM COORDINATES	:	6338470mN, 510635mE
ELEVATION	:	1715m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	1.43m
TRENCH WIDTH	:	0.47m
TRENCH LENGTH	:	3.13m
TRENCH BEARING	:	055°
TRENCH SLOPE	:	35°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83015

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 19/07/83
APPROVED BY: C.W.	

QSO:[205,57]831024004.LOG; 26/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: NN DATA SOURCE: TRC83015

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			CLAYSTONE	CARB ROOF
	0.20	0.58	0.38			CLAYSTONE	CARB MINOR OXIDIZED COAL
	0.58	1.11	0.53	03551		COAL	C-4,BLK WEATHERED AND OXIDIZED
	1.11	1.36	0.25			CLAYSTONE	CARB FLOOR

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

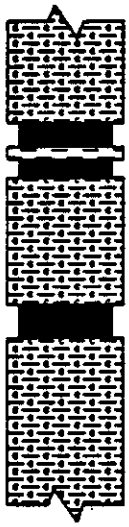
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83015											
	HD1		3551	10.85	11.43	52.80	24.92	0.36	20.69		

FORM 9999

(m)	ROCK	COAL
		0.16
0.36	0.08	
		0.12
TOTAL	0.08	0.28



0.66+m	CLYST, CARB, FOSSILIFEROUS, INTBD COAL LAM
	COAL: C-4, MINOR CLAYSTONE INTERBEDS CLAYSTONE, IRON STAINING COAL: C-4
0.83	CLAYSTONE, CARBONACEOUS, MINOR COAL INTERBEDS
0.22	COAL: C-4, MINOR CARBONACEOUS CLAYSTONE
1.27+m	CLAYSTONE, CARBONACEOUS, MINOR COAL INTERBEDS

ATTITUDE OF ROOF	: NOT OBTAINED
ATTITUDE OF FLOOR	: 125/40N
UTM COORDINATES	: 6338420mN, 510635mE
ELEVATION	: 1695m
MAP CARD NUMBER	: H 8
TRENCH DEPTH	: 0.87m
TRENCH WIDTH	: 0.50m
TRENCH LENGTH	: 3.45m
TRENCH BEARING	: 057°
TRENCH SLOPE	: 40°
TRENCH BLOCK	: M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83016

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 19/07/83
APPROVED BY: C.M.	

080:(205,5718310240004.LOG: 26/10/83

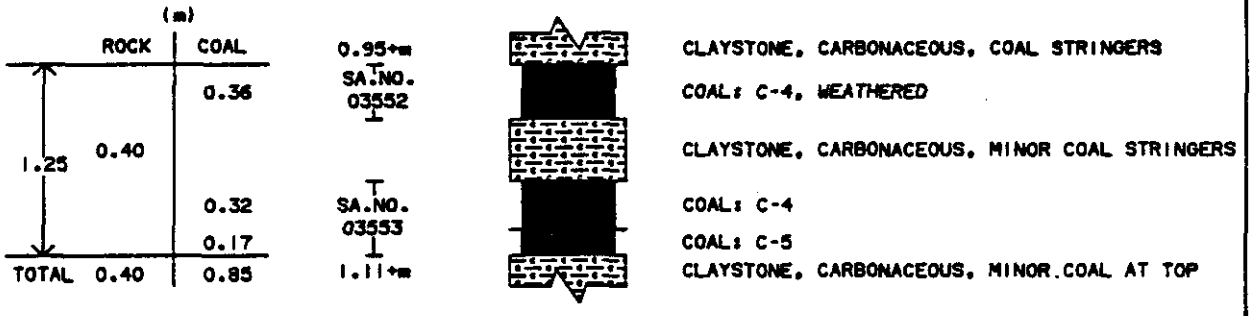
84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83016

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.20	0.20			CLAYSTONE	CARB FOSSILIFEROUS;ROOF ROCK
	0.20	0.66	0.46			CLAYSTONE	CARB MINOR COAL;IRON STAINING
	0.66	0.82	0.16			COAL	C-4.BLK MINOR CLAYSTONE
	0.82	0.90	0.08			CLAYSTONE	IRON STAINING
	0.90	1.02	0.12			COAL	C-4.BLK
	1.02	1.85	0.83			CLAYSTONE	CARB MINOR COAL
	1.85	2.07	0.22			COAL	C-4.BLK MINOR CARB CLAYSTONE
	2.07	2.84	0.77			CLAYSTONE	CARB MINOR COAL
	2.84	3.34	0.50			CLAYSTONE	CARB MINOR COAL INTERBEDDED

* DENOTES MEASURED BCA

NEWPAGE



ATTITUDE OF ROOF	:	125/20N
ATTITUDE OF FLOOR	:	115/20N
UTM COORDINATES	:	6338390mN, 510625mE
ELEVATION	:	1685m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	0.76m
TRENCH WIDTH	:	0.86m
TRENCH LENGTH	:	4.30m
TRENCH BEARING	:	050°
TRENCH SLOPE	:	25°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83017

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 19/07/83
APPROVED BY: C.M.	

090:1206,5718310240004.LOG: 26/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83017

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			CLAYSTONE	ROOF ROCK
	0.50	0.95	0.45			CLAYSTONE	CARB COAL STRINGERS
	0.95	1.31	0.36	03552		COAL	C-4.BLK HIGHLY OXIDIZED
	1.31	1.71	0.40			CLAYSTONE	CARB MINOR COAL
	1.71	2.03	0.32	03553		COAL	C-4.BLK
	2.03	2.20	0.17	03553		COAL	C-5.BLK
	2.20	3.31	1.11			CLAYSTONE	CARB MINOR COAL NEAR TOP;FLOOR ROCK

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

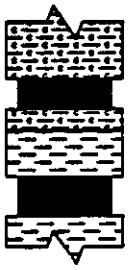
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83017											
	HD1		3552	5.78	22.65	61.78	9.79	0.55	22.69		
	HD1		3553	7.28	11.62	65.80	15.30	0.51	25.07		

(m)	ROCK	COAL
		0.20
0.90	0.14	
	0.30	
		0.26
TOTAL	0.44	0.46

0.92+m



0.30+m

CLAYSTONE, CARBONACEOUS, COAL STRINGERS

COAL: C-4, WEATHERED

CLAYSTONE, CARBONACEOUS, MINOR COAL STRINGERS

CLAYSTONE

COAL: C-4, WEATHERED, MINOR CLAYSTONE LAMINAE

CLAYSTONE

ATTITUDE OF ROOF	:	110/25N
ATTITUDE OF FLOOR	:	115/25N
UTM COORDINATES	:	6338355mN, 510635mE
ELEVATION	:	1675m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	0.84m
TRENCH WIDTH	:	0.53m
TRENCH LENGTH	:	3.40m
TRENCH BEARING	:	030°
TRENCH SLOPE	:	30°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

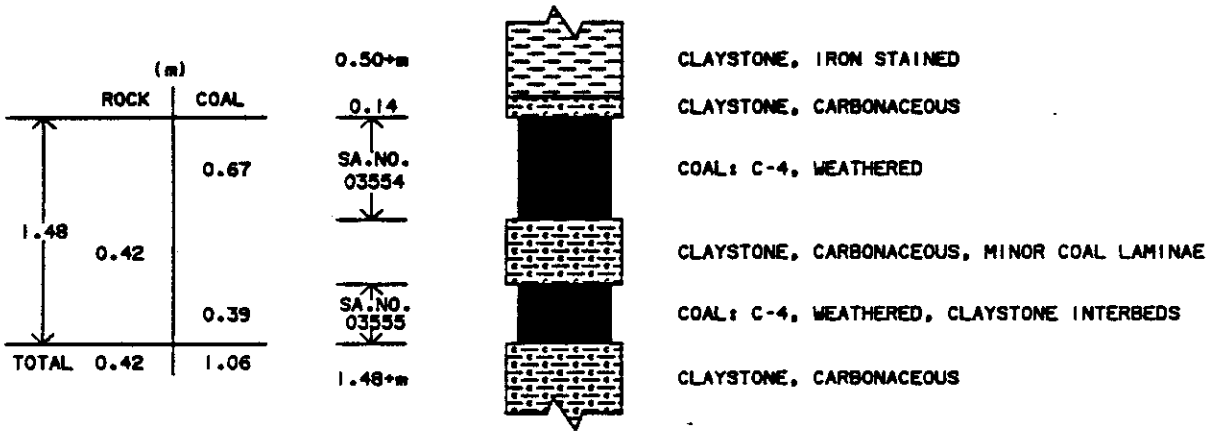
TRENCH LOG
KPN-TRC-83018

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 20/07/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83018

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.30	0.30			CLAYSTONE	
	0.30	0.92	0.62			CLAYSTONE	CARB COAL STRINGERS ROOF ROCK
	0.92	1.12	0.20			COAL	C-4.8LK WEATHERED
	1.12	1.26	0.14			CLAYSTONE	CARB MINOR COAL
	1.26	1.56	0.30			CLAYSTONE	M.GY WEATHERED TAN-ORANGE;HARD
	1.56	1.82	0.26			COAL	C-4.8LK WEATHERED;MINOR CLAYSTONE
	1.82	2.12	0.30			CLAYSTONE	FLOOR ROCK

* DENOTES MEASURED BCA
NEWPAGE



ATTITUDE OF ROOF	:	135/30N
ATTITUDE OF FLOOR	:	130/25N
UTM COORDINATES	:	6338335mN, 510620mE
ELEVATION	:	1665m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.41m
TRENCH LENGTH	:	4.00m
TRENCH BEARING	:	065°
TRENCH SLOPE	:	40°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83019

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 20/07/83
APPROVED BY: C.M.	

090:[206,57]831024006.LOG: 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83019

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.50	0.50			CLAYSTONE	IRON STAINING
	0.50	0.64	0.14			CLATSYONE	CARB ROOF
	0.64	1.31	0.67	03554		COAL	C-4.BLK WEATHERED
	1.31	1.73	0.42			CLAYSTONE	CARB MINOR COAL
	1.73	2.12	0.39	03555		COAL	C-4 WEATHERED;OXIDIZED;CLAYSTONE INTERBEDS
	2.12	3.10	0.98			CLAYSTONE	CARB FLOOR
	3.10	3.60	0.50			CLAYSTONE	

• DENOTES MEASURED BCA

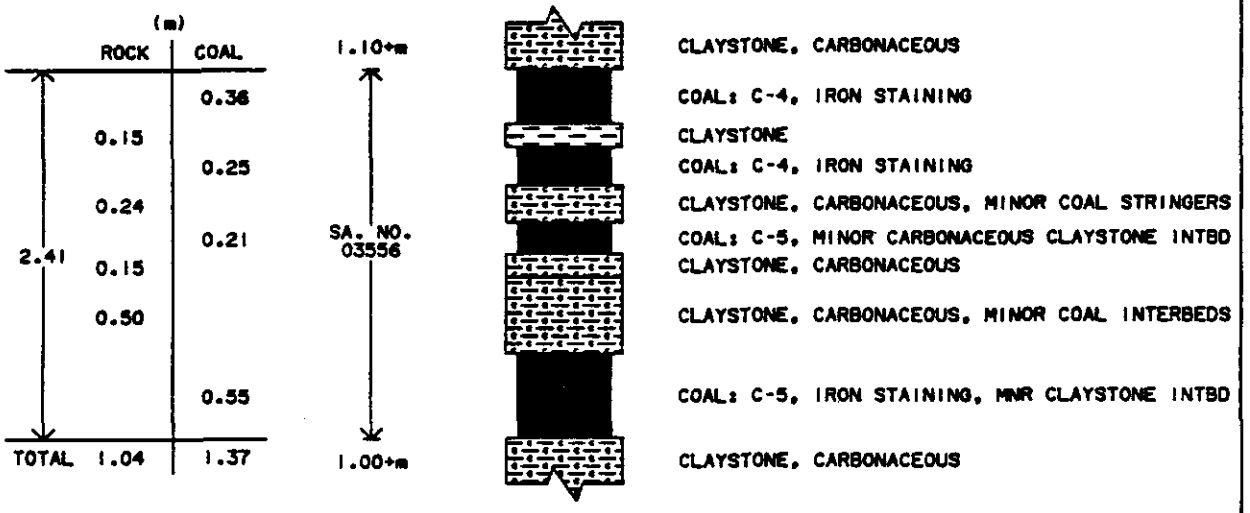
MEMPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83019											
	HD1		3554	11.06	28.10	38.95	21.89	0.31	15.26		
	HD1		3555	9.70	23.57	45.37	21.36	0.36	17.61		



ATTITUDE OF ROOF : 110/30N
ATTITUDE OF FLOOR: 130/30N
UTM COORDINATES : 6338320mN, 510610mE
ELEVATION : 1650m
MAP CARD NUMBER : H 8
TRENCH DEPTH : 0.66m
TRENCH WIDTH : 0.43m
TRENCH LENGTH : 4.50m
TRENCH BEARING : 075°
TRENCH SLOPE : 45°
TRENCH BLOCK : M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83020

DRAWN BY: R. MAYLOR	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 20/07/83
APPROVED BY: C.M.	

GSD:[206,571831084006.LOG] 25/10/83

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83020

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.70	0.70			CLAYSTONE	
	0.70	1.10	0.40			CLAYSTONE	CARB ROOF ROCK
	1.10	1.46	0.36	03556		COAL	C-4.BLK OXIDIZED
	1.46	1.61	0.15	03556		CLAYSTONE	BN
	1.61	1.86	0.25	03556		COAL	C-4.BLK OXIDIZED
	1.86	2.10	0.24	03556		CLAYSTONE	CARB MINOR COAL
	2.10	2.31	0.21	03556		COAL	C-5.BLK MINOR CARB CLAYSTONE;WEATHERED
	2.31	2.46	0.15	03556		CLAYSTONE	CARB
	2.46	2.96	0.50	03556		CLAYSTONE	CARB NUMEROUS THIN COAL STRINGERS
	2.96	3.51	0.55	03556		COAL	C-5.BLK IRON STAINING;OXIDIZED;MINOR CLAY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83020

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.51	3.77	0.26			CLAYSTONE	CARB FLOOR

* DENOTES MEASURED BCA
NEWPAGE

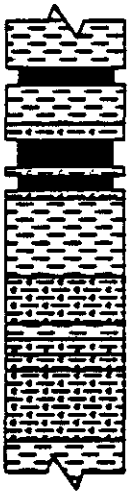
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83020											
	HD1		3556	9.53	37.17	34.32	18.98	0.29	13.52		

(m)	ROCK	COAL
		0.11
	0.25	
0.79	0.10	
		0.18
	0.05	0.10
TOTAL	0.40	0.39



0.40+m	CLAYSTONE
	COAL
	CLAYSTONE
	CLAYSTONE, CARBONACEOUS
	COAL: C-3
	CLAYSTONE, CARBONACEOUS
0.05	COAL: C-2 CLAYSTONE, CARBONACEOUS
0.48	CLAYSTONE
0.30	CLAYSTONE, CARBONACEOUS, MINOR COAL LAMINAE
0.11	CLAYSTONE
0.06	CLAYSTONE, CARBONACEOUS
	CLAYSTONE
0.45	CLAYSTONE, CARBONACEOUS
0.30+m	CLAYSTONE

ATTITUDE OF ROOF : 110/40N
ATTITUDE OF FLOOR: 130/30N
UTM COORDINATES : 6339520mN, 509545mE
ELEVATION : 1848m
MAP CARD NUMBER : H 8
TRENCH DEPTH : 1.43m
TRENCH WIDTH : 0.75m
TRENCH LENGTH : 6.00m
TRENCH BEARING : 055°
TRENCH SLOPE : 20°
TRENCH BLOCK : M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83021

DRAWN BY: D .MA.	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 20/07/83
APPROVED BY: C.W.	

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83021

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.40	0.40			CLAYSTONE	GRAY-BROWN; ROOF
	0.40	0.51	0.11			COAL	LT.BN WEATHERED GRAY BROWN; UNCONSOLIDATED; I RON STAINING
	0.51	0.76	0.25			CLAYSTONE	
	0.76	0.86	0.10			CLAYSTONE	CARB
	0.86	1.04	0.18			COAL	C-3.BLK DULL TO BRIGHT BANDED; MINOR CLAYSTONE; IRON STAINING
	1.04	1.09	0.05			CLAYSTONE	CARB FLOOR
	1.09	1.19	0.10			COAL	C-4.BLK DULL BANDED;MINOR CLAYSTONE;OXIDIZED
	1.19	1.25	0.06			CLAYSTONE	CARB
	1.25	1.73	0.48			CLAYSTONE	GRAY-BROWN

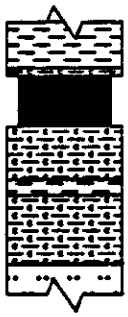
* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83021

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.73	2.03	0.30			CLAYSTONE	CARB MINOR COAL
	2.03	2.14	0.11			CLAYSTONE	GRAY-BROWN
	2.14	2.25	0.11			CLAYSTONE	CARB
	2.25	2.31	0.06			CLAYSTONE	
	2.31	2.76	0.45			CLAYSTONE	CARB
	2.76	3.06	0.30			CLAYSTONE	IRON STAINING;GRAY-BROWN

* DENOTES MEASURED BCA
NEWPAGE

(m)	ROCK	COAL
0.33		0.33
TOTAL	0.00	0.33



0.35+m	CLAYSTONE, WEATHERED
0.05	CLAYSTONE, CARBONACEOUS
	COAL
0.31	CLAYSTONE, CARBONACEOUS, IRON STAINING
0.06	CLAYSTONE, IRON STAINING
0.39	CLAYSTONE, CARB, WTHRD, MNR COAL FRAGMENTS
0.20+m	SILTSTONE, IRON STAINING

ATTITUDE OF ROOF	:	185/15E
ATTITUDE OF FLOOR	:	150/20E
UTM COORDINATES	:	6339445mN, 509505mE
ELEVATION	:	1828m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	0.70m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	3.50m
TRENCH BEARING	:	042°
TRENCH SLOPE	:	45°
TRENCH BLOCK	:	M.N.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83022

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 20/07/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MN DATA SOURCE: TRC83022

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.75	0.75			CLAYSTONE	GY OXIDIZED
	0.75	0.80	0.05			CLAYSTONE	CARB ROOF
	0.80	1.13	0.33			COAL	C-4,BLK,HEATH IRON STAINING
	1.13	1.44	0.31			CLAYSTONE	CARB IRON STAINING
	1.44	1.50	0.06			CLAYSTONE	IRON STAINING
	1.50	1.89	0.39			CLAYSTONE	CARB,HEATH IRON STAINING;COAL FRAGMENTS
	1.89	2.89	1.00			SILTSTONE	GRAY-BROWN;IRON STAINING

* DENOTES MEASURED BCA

NEWPAGE

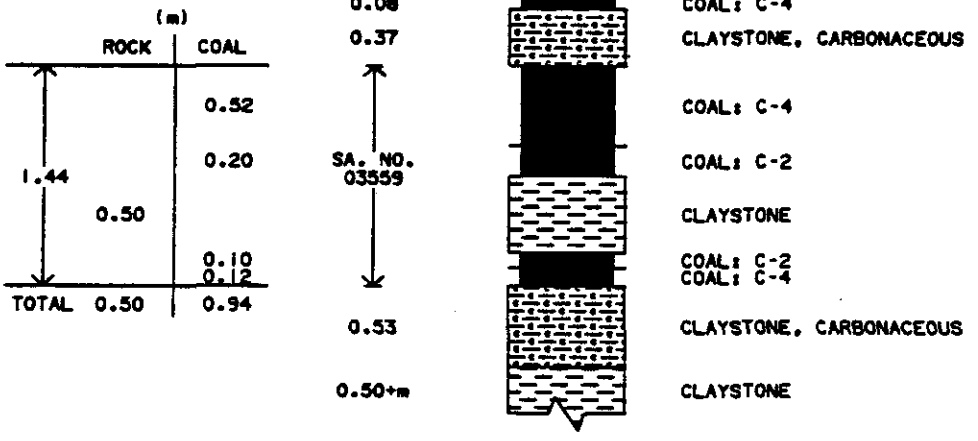
GULF CANADA RESOURCES INC. - COAL DIVISION M.S.

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83023		3559	1.24	2.68	100.00	0.94	0.50	0.00	0.00	0.94- 0.50
TRC83024		3560	0.50	1.12	100.00	0.28	0.34	0.00	0.00	0.28- 0.34



ATTITUDE OF ROOF	:	170/30E
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6339275mN, 509445mE
ELEVATION	:	1775m
MAP CARD NUMBER	:	H 8
TRENCH DEPTH	:	0.83m
TRENCH WIDTH	:	0.50m
TRENCH LENGTH	:	4.90m
TRENCH BEARING	:	075°
TRENCH SLOPE	:	20°
TRENCH BLOCK	:	M.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83023

DRAWN BY: D. MAY	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 07/07/83
APPROVED BY: C.M.	

080:(208,5718310240005.L08) 29/10/83

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: MS DATA SOURCE: TRC83023

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.60	0.60			CLAYSTONE	GRAY-BROWN
	0.60	0.79	0.19			CLAYSTONE	CARB ROOF
	0.79	0.87	0.08			COAL	C-4.BLK QTZ VEINING;IRON STAINING
	0.87	1.24	0.37			CLAYSTONE	CARB MINOR COAL
	1.24	1.76	0.52	03559		COAL	C-4.BLK IRON STAINING;MINOR CARB CLAYSTONE
	1.76	1.96	0.20	03559		COAL	C-2.BLK
	1.96	2.46	0.50	03559		CLAYSTONE	IRON STAINING
	2.46	2.56	0.10	03559		COAL	C-2.BLK
	2.56	2.68	0.12	03559		COAL	C-4.BLK
	2.68	3.21	0.53			CLAYSTONE	CARB MINOR COAL;OXIDIZED, FLOOR
	3.21	3.71	0.50			CLAYSTONE	

* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

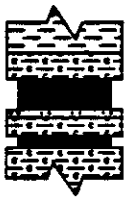
15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83023											
	HD1		3559	8.93	26.64	45.18	19.25	0.31	17.49		

(m)	ROCK	COAL
		0.20
0.45	0.05	
	0.12	
		0.08
TOTAL	0.17	0.28

0.25+m
0.17
SA. NO. 03560
0.30+m



CLAYSTONE
CLAYSTONE, CARBONACEOUS, IRON STAINING
COAL: WTHRD, MNR CARB CLYST, LAMINAE, FE STN
SILTSTONE, UNCONSOLIDATED
CLAYSTONE, CARBONACEOUS, MINOR COAL STRINGERS
COAL: WEATHERED
CLYST, CARB, MNR COAL LAMINAE, IRON STAINING

ATTITUDE OF ROOF : NOT OBTAINED
ATTITUDE OF FLOOR: NOT OBTAINED
UTM COORDINATES : 6339135mN, 509395mE
ELEVATION : 1690m
MAP CARD NUMBER : H 8
TRENCH DEPTH : 0.77m
TRENCH WIDTH : 0.24m
TRENCH LENGTH : 4.00m
TRENCH BEARING : 070°
TRENCH SLOPE : 40°
TRENCH BLOCK : M.S.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83024

DRAWN BY: C. NOGAS	SCALE: 1:50
LOGGED BY: J. ELDER	DATE: 22/07/83
APPROVED BY: C.M.	

PROJECT: KPN BLOCK: MS DATA SOURCE: TRC83024

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.25	0.25			CLAYSTONE	
	0.25	0.42	0.17	03560		CLAYSTONE	CARB OXIDIZED ROOF
	0.42	0.62	0.20	03560		COAL	BLK MINOR CARB CLAYSTONE;WEATHERED;IRON STAINING
	0.62	0.67	0.05	03560		SILTSTONE	UNCONSOLIDATED
	0.67	0.79	0.12	03560		CLAYSTONE	CARB MINOR COAL
	0.79	0.87	0.08	03560		COAL	WEATHERED
	0.87	1.17	0.30			CLAYSTONE	CARB MINOR COAL;IRON STAINING;OXIDIZED, FLOOR

* DENOTES MEASURED BCA

NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83024											
	HD1		3560	4.93	43.95	40.35	10.77	0.28	15.10		

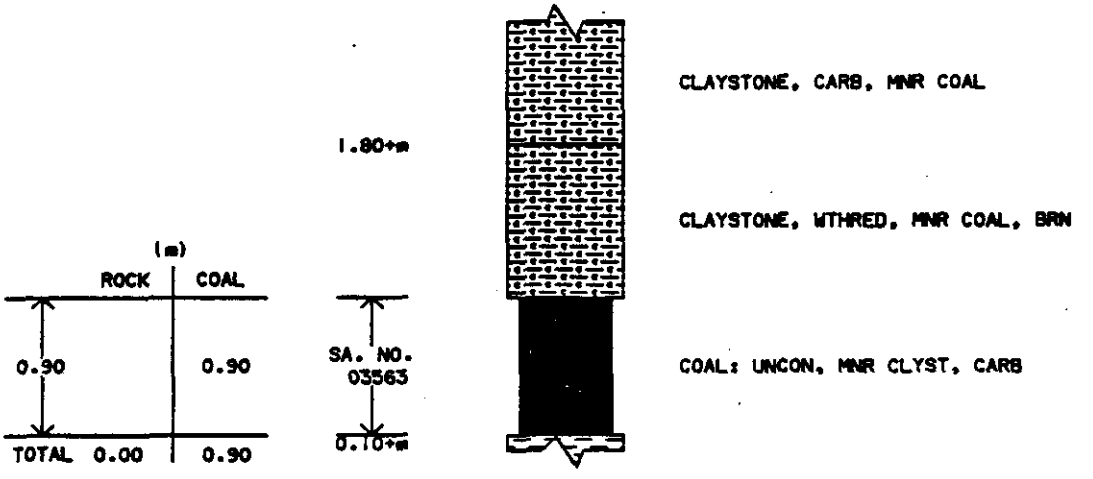
GULF CANADA RESOURCES INC. - COAL DIVISION K.H.

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
TRC83045		3563	1.80	2.70	100.00	0.90	0.00	0.00	0.00	0.90- 0.00



ATTITUDE OF ROOF	:	145/85S
ATTITUDE OF FLOOR	:	NOT OBTAINED
UTM COORDINATES	:	6342385mN, 510220mE
ELEVATION	:	1925m
MAP CARD NUMBER	:	1 8
TRENCH DEPTH	:	1.60m
TRENCH WIDTH	:	0.70m
TRENCH LENGTH	:	3.90m
TRENCH BEARING	:	060°
TRENCH SLOPE	:	15°
TRENCH BLOCK	:	K.H.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

TRENCH LOG
KPN-TRC-83045

DRAWN BY: C. LOUIE	SCALE: 1:50
LOGGED BY: R. MAYLOR	DATE: 26/07/83
APPROVED BY: C.W.	

84/03/14 GULF CANADA RESOURCES INC. - COAL DIVISION - DESCRIPTIVE LOG PAGE 1

PROJECT: KPN BLOCK: KH DATA SOURCE: TRCB3045

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	0.80	0.80			CLAYSTONE	CARB MINOR COAL;
	0.80	1.80	1.00			CLAYSTONE	BN MINOR COAL ROOF; WEATHERED
	1.80	2.70	0.90	03563		COAL	C-1.BLK UNCONSOLIDATED;MINOR CARB CLAYSTONE
	2.70	2.80	0.10			CLAYSTONE	FLOOR

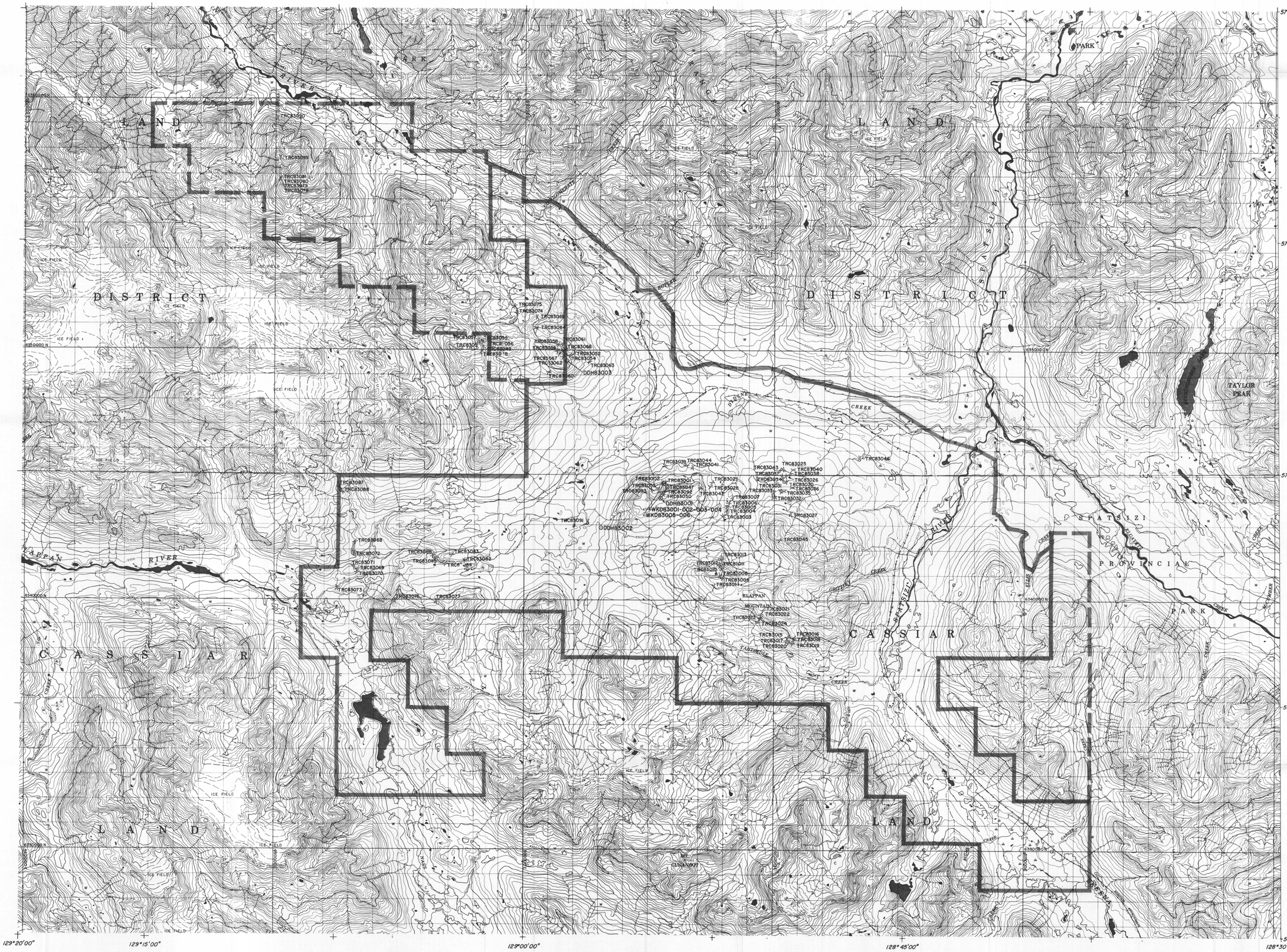
* DENOTES MEASURED BCA
NEWPAGE

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 HEAD ANALYSIS SUMMARY

PROJ - KPN ANALYSIS BASIS TYPE - AD NAME OF STANDARD - ASTM

DATA SOURCE	SSID	SEAM	SAMPLE ID	RESIDUAL MOISTURE%	ASH%	FIXED CARBON%	VOLATILE MATTER%	TOTAL SULPHUR%	GROSS CALORIFIC VALUE (MJ-KG)	SPG	FSI
TRC83045											
	HD1		3563	3.92	19.27	63.15	13.66	0.48	24.97		



LEGEND

ROADS AND RELATED FEATURES

- HARD SURFACE, ALL WEATHER
- LOOSE SURFACE
- CART TRACK, WINTER ROAD, UNDER CONSTRUCTION
- TRAIL, CUTLINE, PORTAGE
- BUILT UP AREA
- RAILWAY, SIDING, STATION, STOP
- BRIDGE
- SEAPLANE BASE, ANCHORAGE

LANDMARK FEATURES

- HOUSE, BARN
- CHURCH, SCHOOL
- POST OFFICE
- HISTORICAL SITE
- TOWERS: FIRE, RADIO
- WELL: OIL, GAS
- TANK: OIL, GASOLINE, WATER
- TELEPHONE LINE
- POWER TRANSMISSION LINE
- MINE
- CUTTING, EMBANKMENT
- GRAVEL PIT

BOUNDARIES AND CONTROL

- INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
- COUNTY, DISTRICT
- TOWNSHIP, PARISH — SURVEYED / UNSURVEYED (UNSURVEYED)
- TOWNSHIP, DLS — SURVEYED / UNSURVEYED — SECTION CORNERS
- MUNICIPALITY
- INDIAN RESERVE, PARK, ETC.
- HORIZONTAL CONTROL POINT
- BENCH MARK (BM 985)
- SPOT ELEVATION, ELEVATION APPROXIMATE (390 / 1211)

DRAINAGE AND RELATED FEATURES

- STREAM, SHORELINE: INDEFINITE
- DIRECTION OF FLOW
- LAKE: INTERMITTENT
- INUNDATED, FLOODED LAND
- MARSH OR SWAMP (WOODED)
- DRY RIVER BED WITH CHANNELS
- SAND, ABOVE, IN WATER
- STRING BOG (SB)
- TUNDRA PONDS, POLYGONS (TP / PG)
- RAPIDS
- FORESHORE FLATS (FF)
- ROCK
- DAM
- WHARF
- DITCH

RELIEF FEATURES

- CONTOURS (500 / 250)
- APPROXIMATE CONTOUR (125 / 75)
- DEPRESSION (125)
- ESKER
- PINGO
- SAND, SAND DUNES (SAND)
- PALSA BOG (PB)
- WOODED AREA (W)
- LICENCE BOUNDARY
- LICENCE UNDER APPLICATION

SCALE 1:50,000

0 1 2 3 MILES
0 1 2 3 4 5 KILOMETERS

104H/11	104H/10	104H/9	57°45'
104H/6	104H/7	104H/8	
104H/3	104H/2	104H/1	
104A/14	104A/15	104A/16	56°45'

129°30' 128°00'

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

MT. KLAPPAN COAL PROPERTY

1983 TRENCH AND DRILL HOLE LOCATION MAP

PREPARED BY: C. LOUIE
APPROVED BY: C. WILLIAMS DATE: JAN., 1984
DRAWING No. KPN83A03

111

Ga-Mt Klappan 83(

MOUNT KLAPPAN COAL PROJECT

GEOLOGICAL REPORT

1983

APPENDIX IV

DIAMOND DRILL HOLE DATA

VOLUME II

GULF CANADA RESOURCES INC.

COAL DIVISION

APPENDIX IV
VOLUME II
Diamond Drill Hole Data

FOREWORD

The data contained within Volumes I and II represent the results of the diamond drilling program. Appendix II is arranged sequentially by drill hole, with header, core logs and geophysical logs contained in each section.

APPENDIX II
Diamond Drill Holes
and
Geophysical Logs
VOLUME I

Foreword

Loging Form - Descriptions, Input Procedures and Abbreviations

DDH83001
- -Location Map
- -Header Data
- -Generalized Strip Log
- -Apparent and True Thickness Coal Seam Data
- -Sample Summary
- -Lithologic Description
- -Drill Hole Strip Log 1:200
- -Geophysical Logs (Deviation printout, Deviation plot, 1:40 expanded, 1:200)

DDH83002
- -Location Map
- -Header Data
- -Generalized Strip Log
- -Lithologic Description
- -Drill Hole Strip Log 1:200
- -Geophysical Logs (Deviation printout, Deviation plot, 1:40 expanded, 1:200)

DDH83003
- -Location Map
- -Header Data
- -Generalized Strip Log
- -Apparent and True Thickness Coal Seam Data
- -Sample Summary
- -Lithologic Description
- -Drill Hole Strip Log 1:200
- -Geogpysical Logs (Deviation printout, Deviation plot, 1:40 expanded, 1:200)

IN POCKET
- -1:50 000 Drill Hole Location Map

APPENDIX II
Diamond Drill Holes
and
Geophysical Logs
VOLUME II

WKD83001 -Location Map
-Header Data
-Generalized Strip Log
-Lithologic Description

WKD83002 -Location Map
-Header Data
-Generalized Strip Log
-Apparent and True Thickness Coal Seam Data
-Sample Summary
-Lithologic Description

WKD83003 -Location Map
-Header Data
-Generalized Strip Log
-Apparent and True Thickness Coal Seam Data
-Lithologic Description

WKD83004 -Location Map
-Header Data
-Generalized Strip Log
-Apparent and True Thickness Coal Seam Data
-Sample Summary
-Lithologic Description .

WKD83005 -Location Map
-Header Data
-Generalized Strip Log
-Apparent and True Thickness Coal Seam Data
-Lithologic Description

WKD83006 -Location Map
-Header Data
-Generalized Strip Log
-Apparent and True Thickness Coal Seam Data
-Lithologic Description

IN POCKET
-1:50 000 Drill Hole Location Map

LOGGING FORM
DESCRIPTIONS AND INPUT PROCEDURES

AND ABBREVIATIONS

PROJECT, BLOCK

DESCRIPTION - The project denotes the exploration program to which the data source belongs. The block is a sub-division of the project and can be an arbitrary or geopraphical division.

INPUT PROCEDURE - Each project has a three character code which is validated on data entry. The exact same code must be used for each data source on a project. Two characters are allowed for block designation. If there is no block designation required enter an "XX" for this field.

DATA SOURCE

DESCRIPTION - All drill holes, adits, trenches and if desired outcrops are data sources. Any location from which data is obtained is a data source.

INPUT PROCEDURE - Eight characters are allowed for the hole number. The first three are for drill hole or data source type (RDH, DDH, ADT, TRC, OTC). The next two characters record the year and the last three characters are for sequence number (e.g., the first hole is 001). This must be completed for every page.

SHEET NUMBER

DESCRIPTION - This item essentially a page number should the various pages become disordered.

INPUT PROCEDURE - The Sheet number is not actually entered into the computer. Enough space is provided to include the page number and total number of pages (e.g., 2 of 31).

GROUP, FORMATION, MEMBER

DESCRIPTION - These data items help to describe the stratigraphic position of the components on the sheet.

INPUT PROCEDURE - Completion of these spaces in not necessary during the core logging procedure and may not even be possible at that time. Later, the spaces need to be completed only when one of the items changes since any previous entry is carried along. Should one of these items change, a new page must be started insuring that all components on any page belong to the same group, formation or member.

SEAM

DESCRIPTION - The name applied to a stratigraphic interval containing coal. The stratigraphic interval may be composed of one or any number of components.

INPUT PROCEDURE - This space may or may not be completed during core logging, but should if possible, be completed before data entry. Seam splits can be labelled using letters.

NOTE: A new page must be started for each seam so that all components on the sheet apply to that seam designation.

STRATIGRAPHIC UNIT

DESCRIPTION - An arbitrary informal sub-division of a member or formation to facilitate correlation in any particular area.

INPUT PROCEDURE - Indicating the stratigraphic unit is completely optional. If a new or different stratigraphic unit is added, a new page must be started since the stratigraphic unit applies to all components on the page and is carried on to succeeding pages unless changed.

BCA

DESCRITPION - The bedding to core angle is the ange between the longitudinal core axis and the bedding. A vertical hole intersecting horizontal strata would produce a BCA of 90°.

INPUT PROCEDURE - The BCA applies to a component or interval of core. It should be recorded to the nearest degree.

BOX/MARK

DESCRIPTION - These are two separate items entered into same column. The box is the number assigned to a box of core by the drillers and since all core is placed in a box, each component will have an associated box number. The mark or marker, is the drillers footage or "meterage" values found on tags with the box.

INPUT PROCEDURE - Since the box pertains to a series of components rather than just one, an arrow down the edge of the column is necessary to illustrate this to the data entry personnel (see examples). The box number can be entered on a line to itself. In order to help distinguish drillers depth markers from box numbers, the markers must be labelled according to the units used. The drillers marker should be entered on the same line as the next component, therefore, where a marker exists, it immediately preceeded the component described on the same line.

INTERVAL THICKNESS

DESCRIPTION - The length of a component as measured along the length of the drill core.

INPUT PROCEDURE - Values should be entered in metres to the nearest centimetre.
Enough space should be left between interval lines to enter lost core at a latter time.

DEPTH FROM, DEPTH TO

DESCRIPTION - These are the depths of the start and end of each component. The difference between the two equals the interval thickness.

INPUT PROCEDURE - The computer only needs the "depth from" of the first component to start with and will calculate all others if necessary. If a depth from is not provided for the first component, zero will be assumed. These columns can be used when adjusting the logs and determining lithology thickness.

LITHOLOGY THICKNESS

DESCRIPTION - The thickness of a lithologic unit which may be the sum of several components.

INPUT PROCEDURE - The lighology thickness must be entered on the same line as the last component which comprises it. Completion of this column is not necessary, as are not part of the formal report.

SAMPLE I.D.

DESCRIPTION - Identification of the sample collected over one or serveral components.

INPUT PROCEDURE - The sample ID must be entered on the line with the first component that comprises it and an arrow down that column to the last component that comprises the sample.

ROCK TYPE

DESCRIPTION - The dominant type of lithology which comprises the component and generally is determined megascopically.

INPUT PROCEDURE - Rock type can be written out in full or abbreviated; however, consistency is important. Should two successive components have the same rock type, an arrow can be drawn down the column indicating that the same lithology applies to those components as well.

MODIFIER

DESCRIPTION - A desriptive adjective which further defines the rock type.

INPUT PROCEDURE - Only the following codes are allowed in this column:

For Rock		For Coal
PBLY	(Pebbly)	C-1
SSY	(Sandy)	C-2
SLTY	(Silty)	C-3
CLYY	(Clayey)	C-4
CARB	(Carbonaceous)	C-5
GYP	(Gypsiferous)	C-6
FER	(Ferruginous)	
PYR	(Pyritic)	

GRAIN SIZE

DESCRIPTION - A term categorizing the size of mineral particles that comprise a rock or sediment.

INPUT PROCEDURE - Only the following codes are allowed in the grain size column.

CBL	(Cobble)
PBL	(Pebble)
GRAN	(Granular)
VCG	(Very Coarse Grained)
CG	(Coarse Grained)
MG	(Medium Grained)
FG	(Fine Grained)
VFG	(Very Fine Grained)

NOTE: If one needs to state a range between two grain sizes (e.g., medium to coarse grained) then record a minus sign after the code to express the presence of the next coarsest grain size. (e.g., MG-).

SORTING

DESCRIPTION - Indicates the degree of similarity in grain size.

INPUT PROCEDURE - Only the following codes are allowed in the sorting column:

VPR	(Very Poor)
PR	(Poor)
MOD	(Moderate)
WEL	(Well)
VWEL	(Very Well)

COLOR

DESCRIPTION - The color of the component.

INPUT PROCEDURE - Only the following codes are allowed in the color column:

BLK	(Black)
BN	(Brown)
BF	(Buff)
GN	(Green)
GY	(Grey)
MAR	(Maroon)
ORNG	(Orange)
PURP	(Purple)
YEL	(Yellow)
TAN	(Tan)
BLU	(Blue)
WH	(White)

COLOR MODIFIER

DESCRIPTION - Modifies or further defines the color of a component.

INPUT PROCEDURE - Only the following codes are allowed in the color modifier column:

DK	(Dark)
M	(Medium)
LT	(Light)
LT-M	(Light to Medium)
M-DK	(Medium to Dark)
LT-DK	(Light to Dark)
S-P	(Salt and Pepper)
WEATH	(Weathered)

BEDDING

DESCRIPTION - Planes dividing sedimentary rocks of the same of different lithology.

INPUT PROCEDURE - Only the following codes are allowed in the bedding column:

MAS	(Massive)
VTHKB	(Very Thick Bedded)
THKB	(Thick Bedded)
MB	(Medium Bedded)
VTHNB	(Very Thin Bedded)
THNB	(Thin Bedded)
LAM	(Laminated)

NOTE: See page 55 of Field Manual for criteria.

SEDIMENTARY STRUCTURES

DESCRIPTION - Any structure is a sedimentary rock.

INPUT PROCEDURE - Only the following codes are allowed in the sedimentary structure column. (The column can only accommodate one of the codes, additional structures should be mentioned in the notes).

XBDG	(Cross Bedding)
WRMBUR	(Worm Burrow)
RIPMK	(Ripple Marks)
BIOTRB	(Bioturbated)
RTB	(Rootlet Bed)
SSD	(Soft Sediment Deformation)

CORE STATE

DESCRIPTION - The condition or quality of the core for a given component.

INPUT PROCEDURE - Only the following codes are allowed in the core state column:

PWRD	(Powdered)
VSHRD	(Very Sheared)
SHRD	(Sheared)
VBRKN	(Very Broken)
BRKN	(Broken)
SLD	(Solid)

NOTES

DESCRIPTION - Relevant additional comments on a particular component which add to the description.

INPUT PROCEDURE - Abbreviations can be used but this is not necessary. A maximum of 250 characters is allowed for in the notes for each component. This should not limit the literary talent of most geologists.

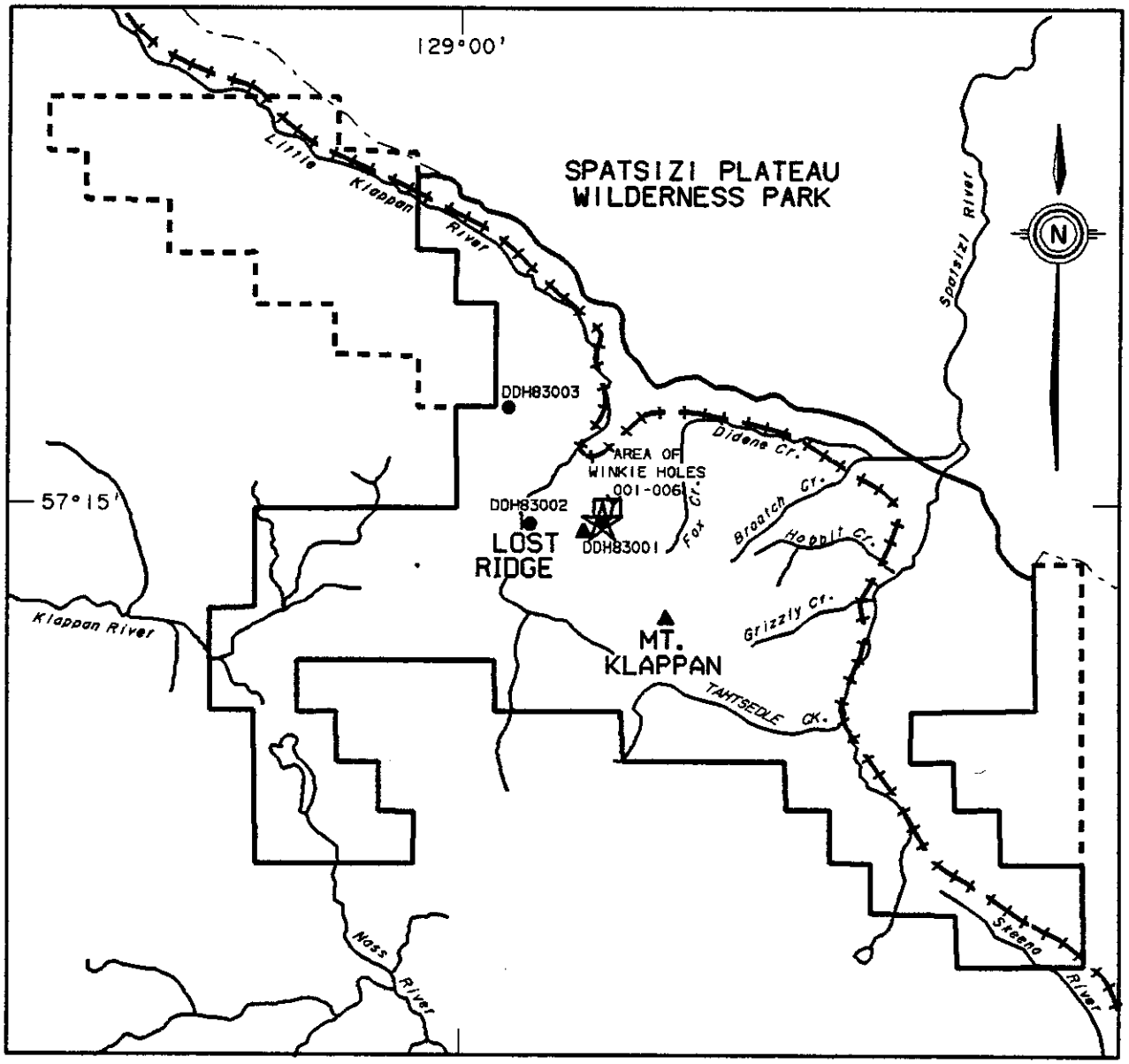
KEY BED

DESCRIPTION - An identifiable bed occurring at a particular stratigraphic position.

INPUT PROCEDURE - Enter Y if it is a Key Bed.

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83001



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

"CRI COAL DIVISION HISTORY PROJ KPN BLK LR DS DDH83001

	DY MO YR
START DATE	01/08/83
END DATE	08/08/83

CONTRACTOR J.T. THOMAS OPERATOR GCRI
GEOLOGIST K. JENNER SURVEYOR

REMARKS 410 LITRES OF DIESEL INTRODUCED INTO DRILLING FLUI
D AT A DEPTH OF 45 METERS

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS DDH83001

PROVINCE BC ELEVATION (M) 1841.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344261.00		EASTING 505704.00	
2	LAT-LONG:	LAT 571436	LONG 1285420			

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS DDH83001

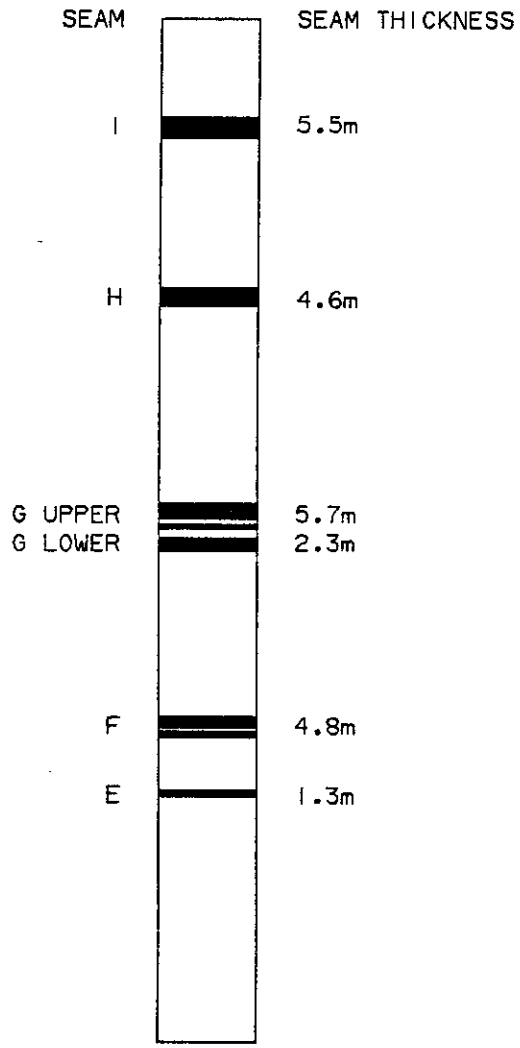
DIMENSIONS AND ORIENTATION:

LENGTH (M) 299.40 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 3.66 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) 37.45 42.60

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83001



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM 1 APPARENT THICKNESS
SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 26.90 m - 32.68 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	26.90			0.20										
			0.03	0.16										
			0.02	0.44										
			0.01	0.78										
			0.07		92.1	06358	1	2.54	25.98	6.67	64.81	0.39	23.98	
			0.07	0.09										
			(0.12)	(0.13)										
				0.65										
			0.05											
			0.02	0.12										
			0.01	0.16										
	30.07		0.03	0.01										
			0.01	0.13										
				2.26	100	06359	2	4.17	16.66	10.73	68.44	0.41	26.20	
			0.14											
	32.68			0.07										

[205,57]831024020.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

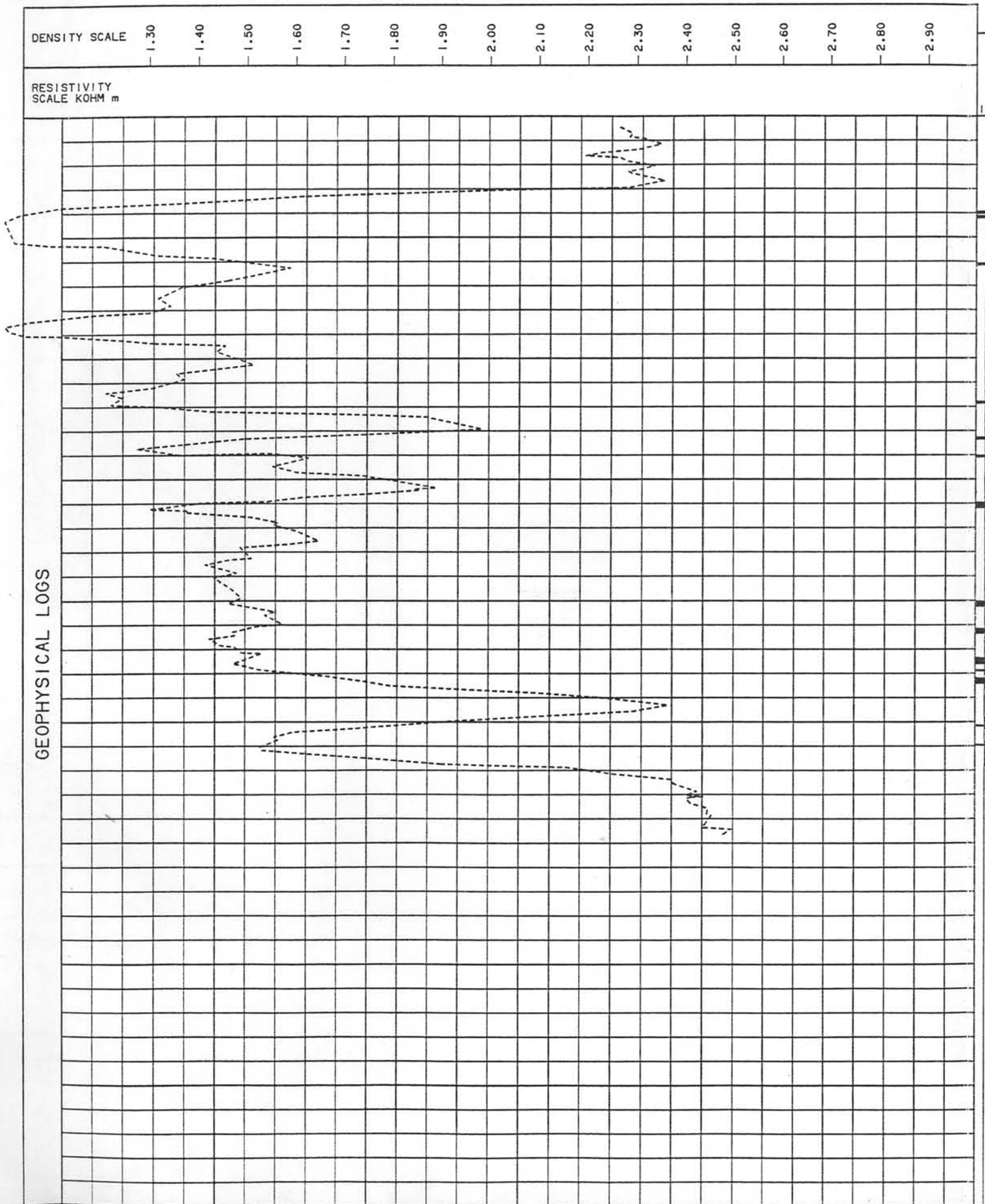
COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM H

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 74.73 m - 79.38 m



SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	74.73			(0.05)										
			0.05	0.09										
				0.20										
			0.02	0.13										
			0.01	0.09										
			0.01	0.13										
				(0.05)										
			0.08	0.19										
			0.01	0.11	92.8	06360	3	1.58	38.58	6.20	53.64	0.42	19.63	
			0.01	0.12										
			0.01	0.07										
				(0.07)										
				0.09										
			0.01	0.13										
			0.10	0.02										
			0.09											
				0.29										
	77.10		0.04	0.08										
			0.02	0.24										
			0.01	0.66	100	06361	4	1.47	16.74	5.39	76.40	0.43	28.45	
			0.01	0.72										
	78.74		0.24											
				0.40	100	06362	5	1.69	49.94	9.68	38.69	0.28	14.75	
	79.38													

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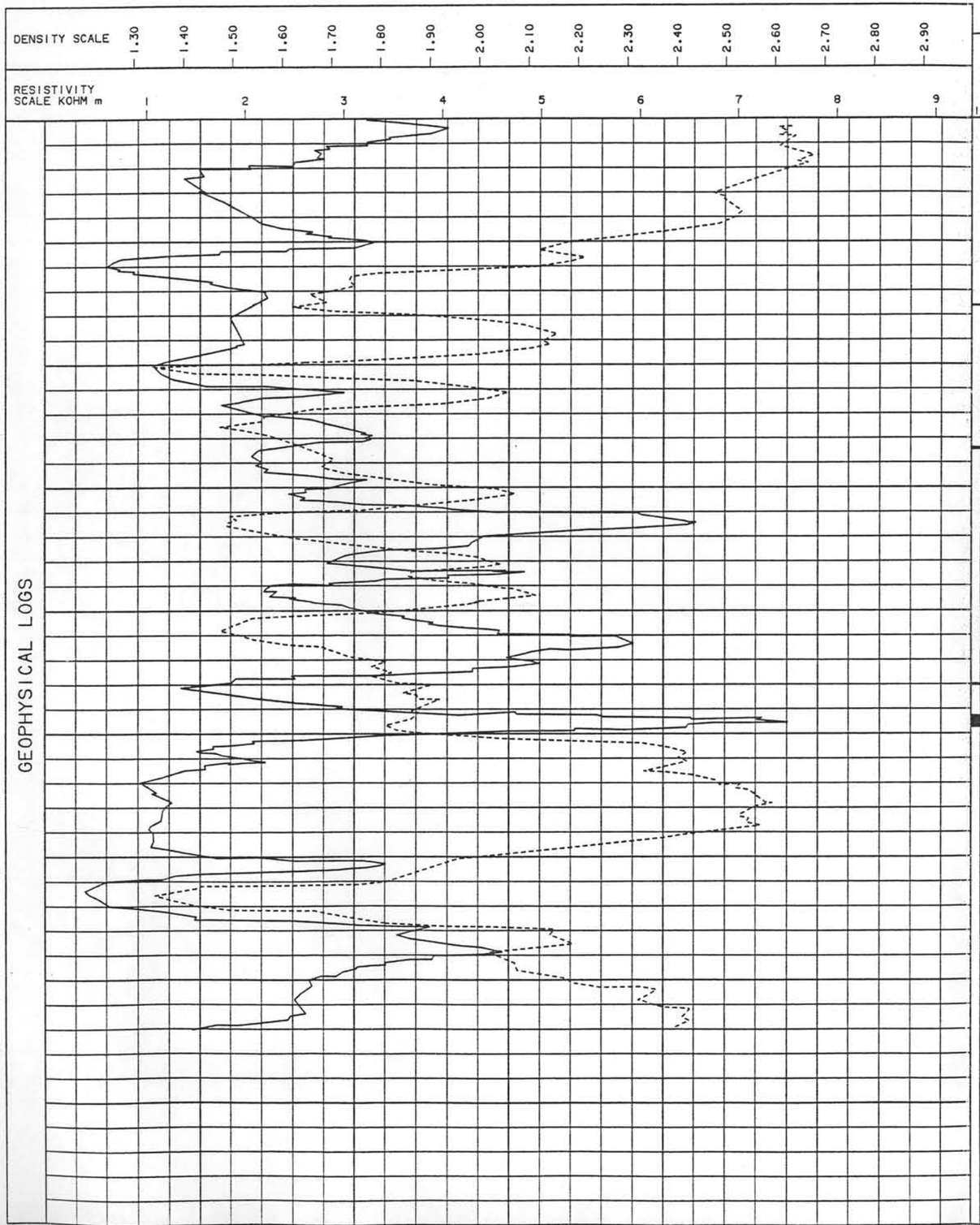
GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM G UPPER
SCALE 1:40 FORMATION KLAPPAN SEQUENCE
APPARENT THICKNESS
SEAM INTERVAL 133.42 m - 139.19 m



SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6	133.42			(0.28)										
				0.09										
			0.18											
				0.02										
			0.07											
				0.07										
			0.04											
				0.81										
				0.04										
			0.09											
				0.46	92.0	06363	6	1.33	42.75	7.21	48.71	0.51	17.88	
			0.07											
				0.03										
			0.09											
				0.05										
			0.14											
				0.10										
			0.05											
				0.63										
			0.06											
				0.04										
			0.05											
				0.08										
			0.01											
				0.24										
			0.04											
				0.05										
	137.43		0.06											
				0.07										
			0.12											
			0.67		100	06364			89.44					
	138.22			0.21										
			0.05											
				0.11										
				(0.11)										
			0.19		88.7	06365			64.03				10.08	
				0.15										
			0.10											
	139.19			0.05										
	139.32			0.01										

[205,5718310240 20.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM G LOWER

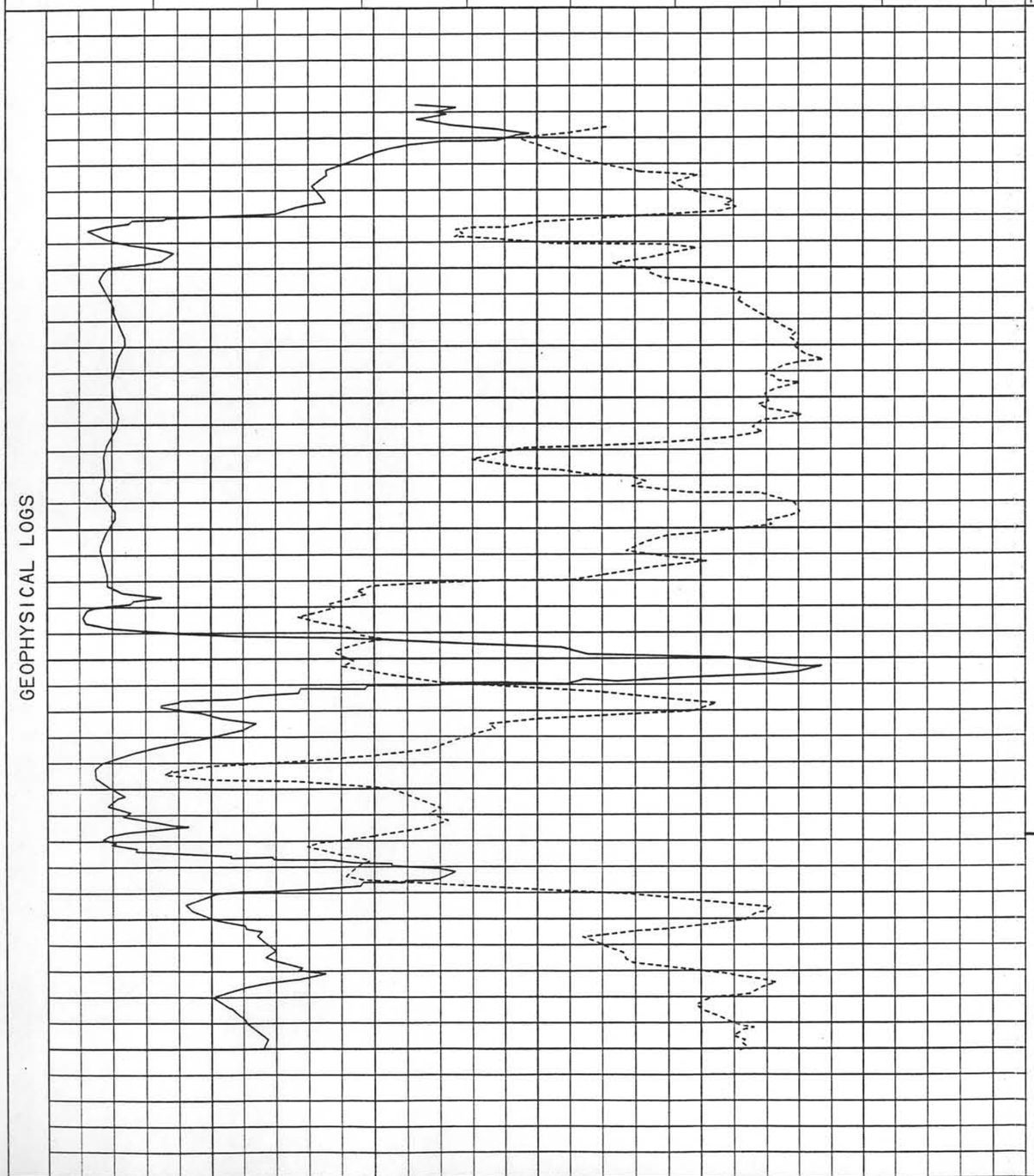
SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 142.45 m - 144.75 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS



SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6	139.32													
	142.45			0.02 (0.02)										
			0.14	0.25										
			0.01	0.25										
			0.03	0.03										
			0.13	0.13										
			(0.04) 0.18	0.02	96.5	06367	7	1.43	53.80	6.12	38.65	0.26	13.81	
			0.16	0.12										
			0.26	0.13										
			0.09	0.26										
	144.75		0.04	(0.02) 0.01										
			0.27	0.01										
	145.26		0.18	0.01										

[205,57]831024020.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

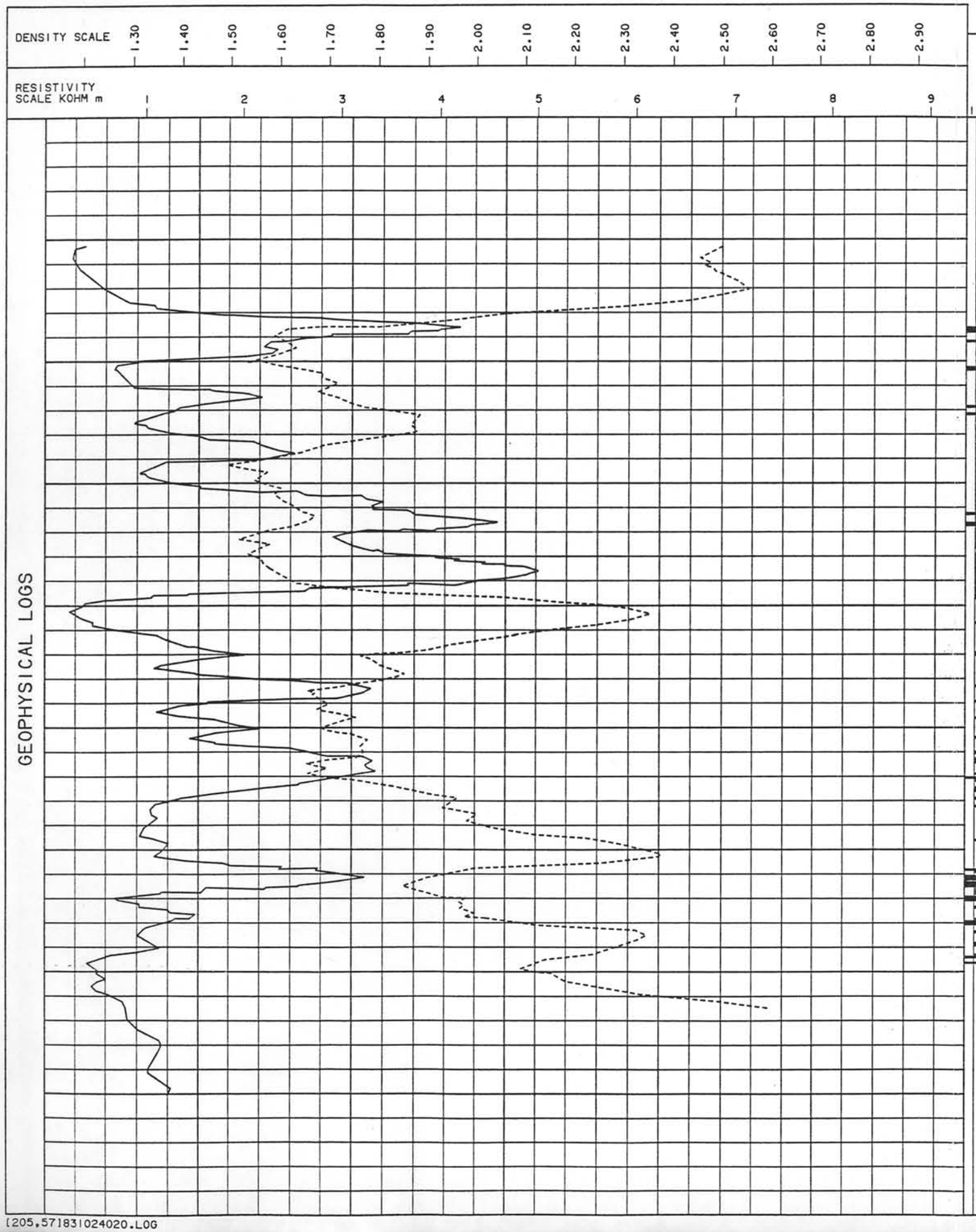
COAL SEAM DATA SHEET

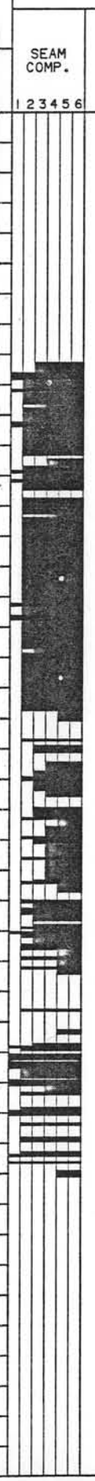
APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM F

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 180.62 m - 185.52 m





DEPTH (m)	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
180.62												
		0.62										
	0.01											
		0.21										
	0.05											
			100	06368								
		1.47										
182.98												
	0.12											
	0.03	0.01										
	0.06	0.05	100	06369	8	1.42	36.68	6.30	55.60	0.86	20.74	
183.25												
		0.23										
	0.07											
		0.56										
	0.05		100	06370								
		0.14										
	0.02											
		0.33										
184.65												
	0.23											
		0.01										
	0.12											
	0.06	0.03										
	0.02	0.05										
	0.01	0.04	100	06371								
		0.11										
	0.01											
		0.10										
185.52	0.08											
	0.05	0.05										
	0.11											
	0.09	0.03										
	0.04	0.03										
	0.04	0.01										
186.01	0.07	0.06										

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COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM E
SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 209.60 m - 210.94 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS

SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6														
	209.60													
				1.31	97.8	06372	9	1.41	17.43	6.32	74.84	0.45	28.11	
	210.94			(0.03)										

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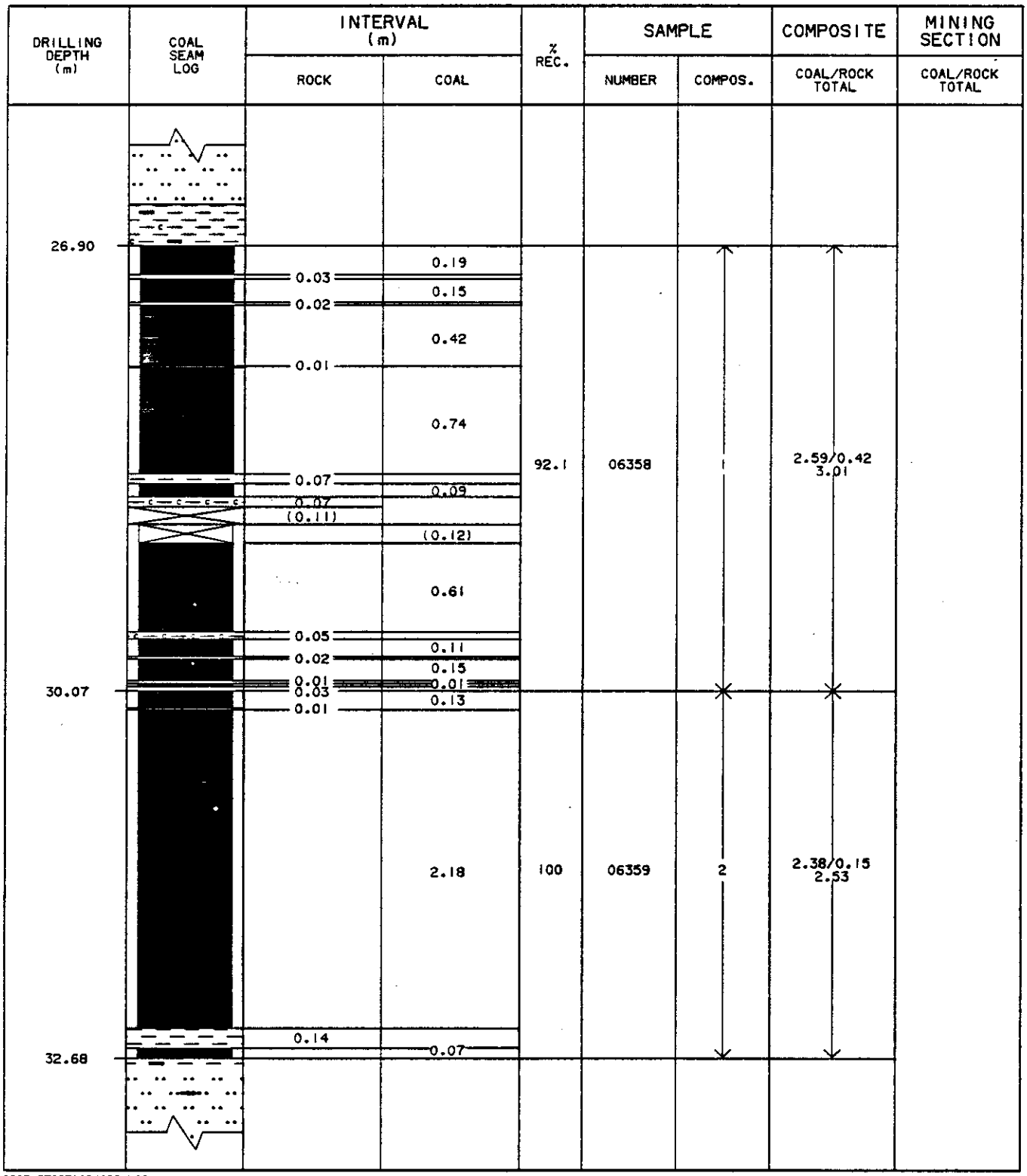

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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

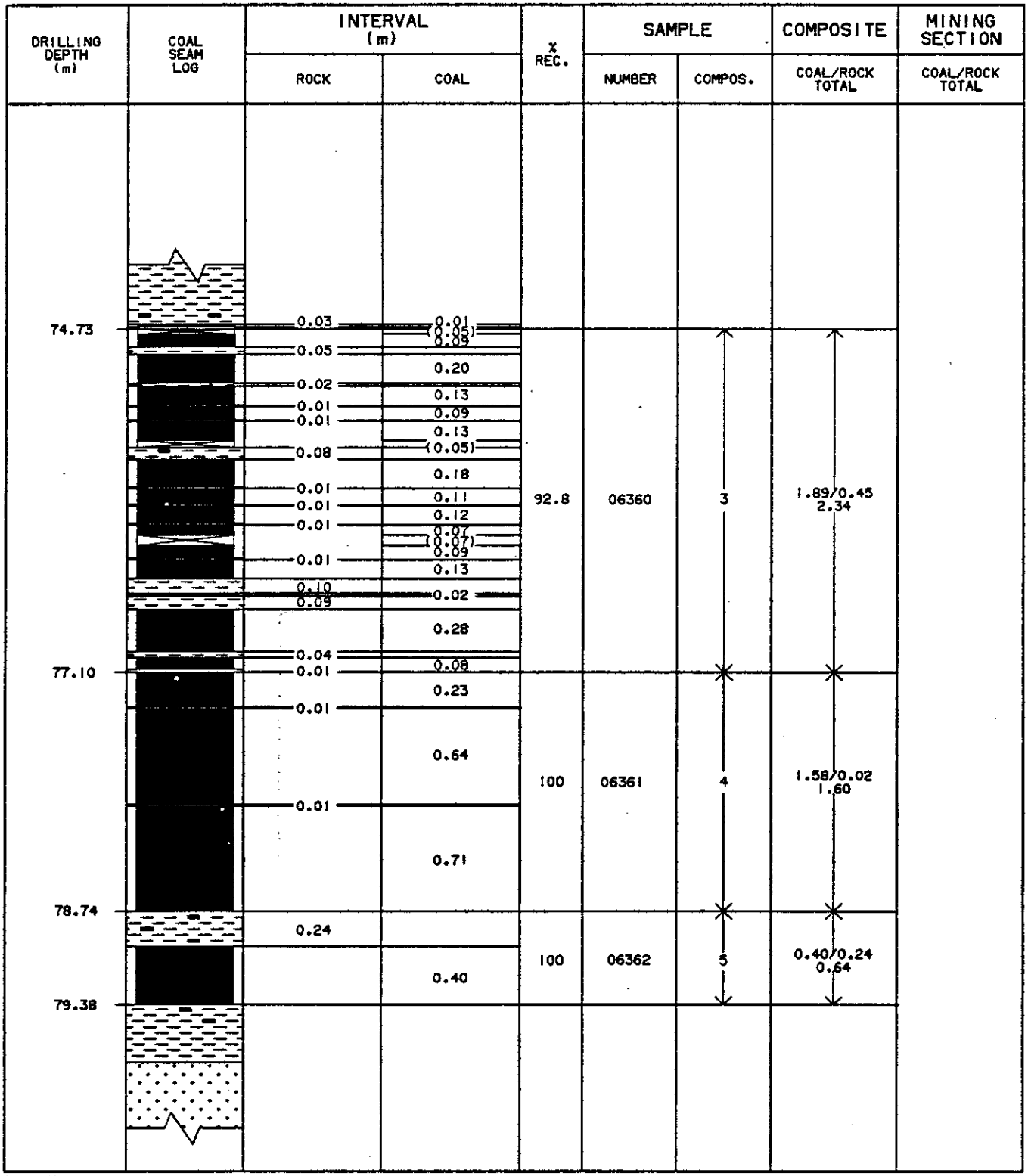
SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

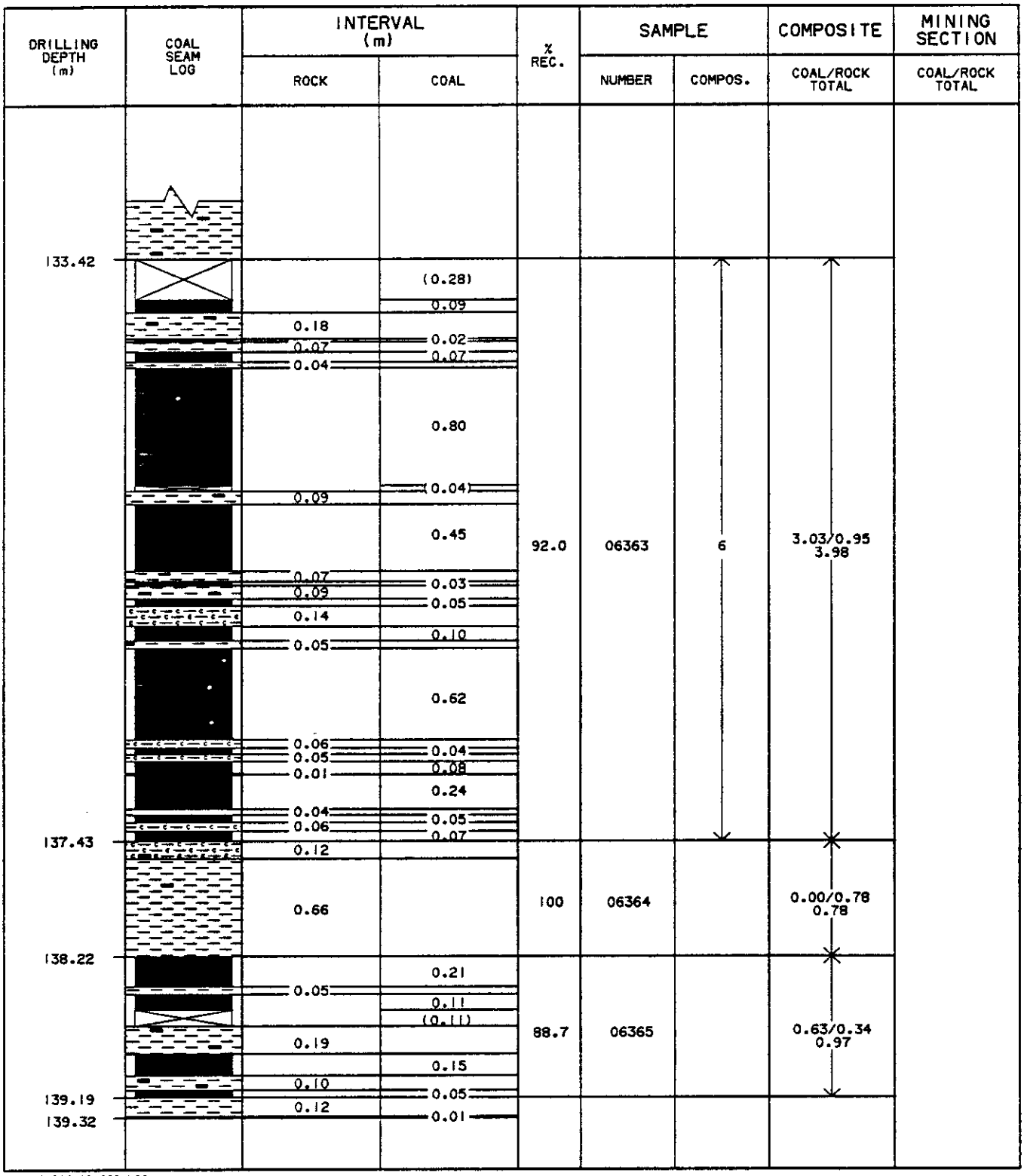
SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM H

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

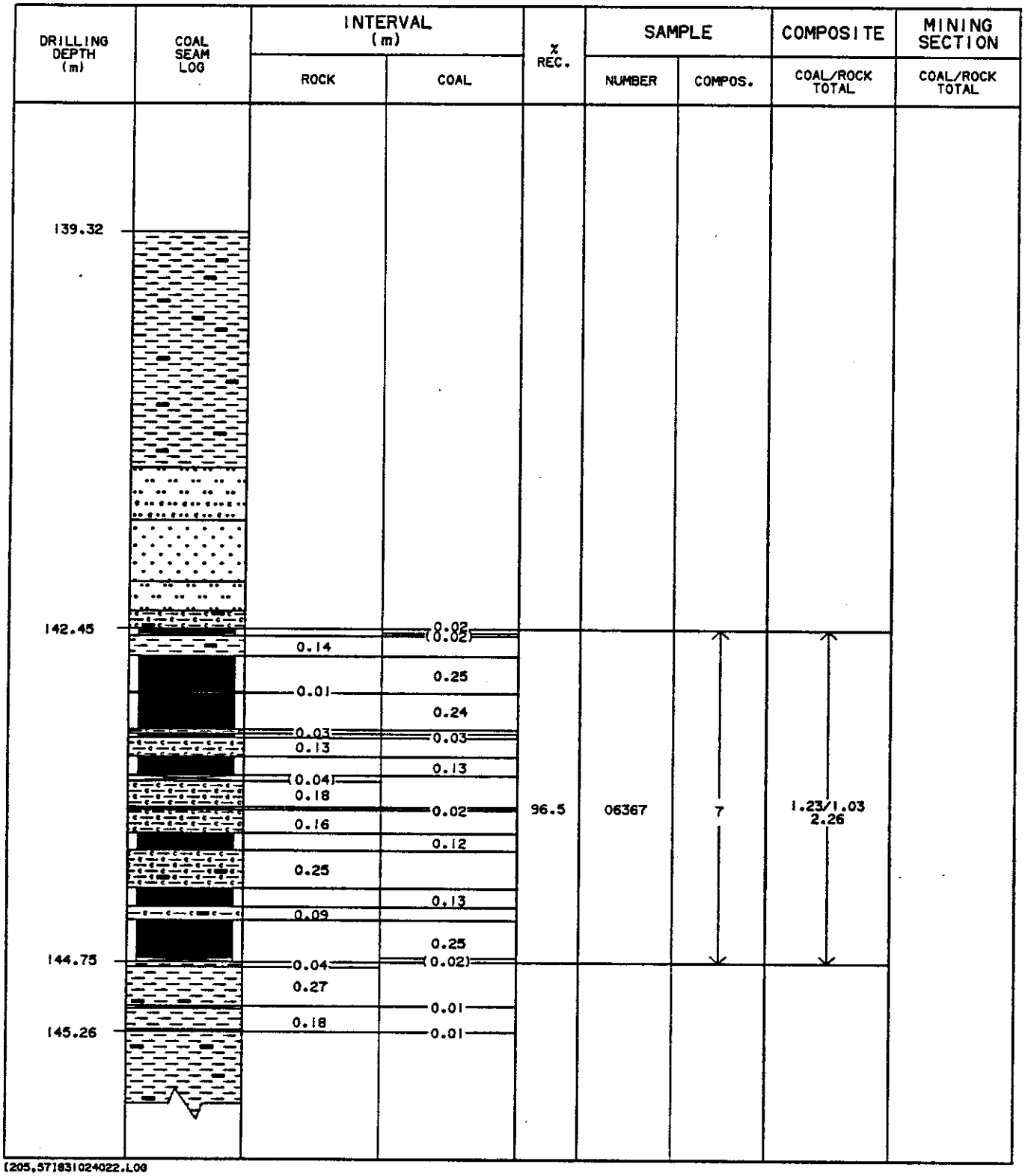
SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM G UPPER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



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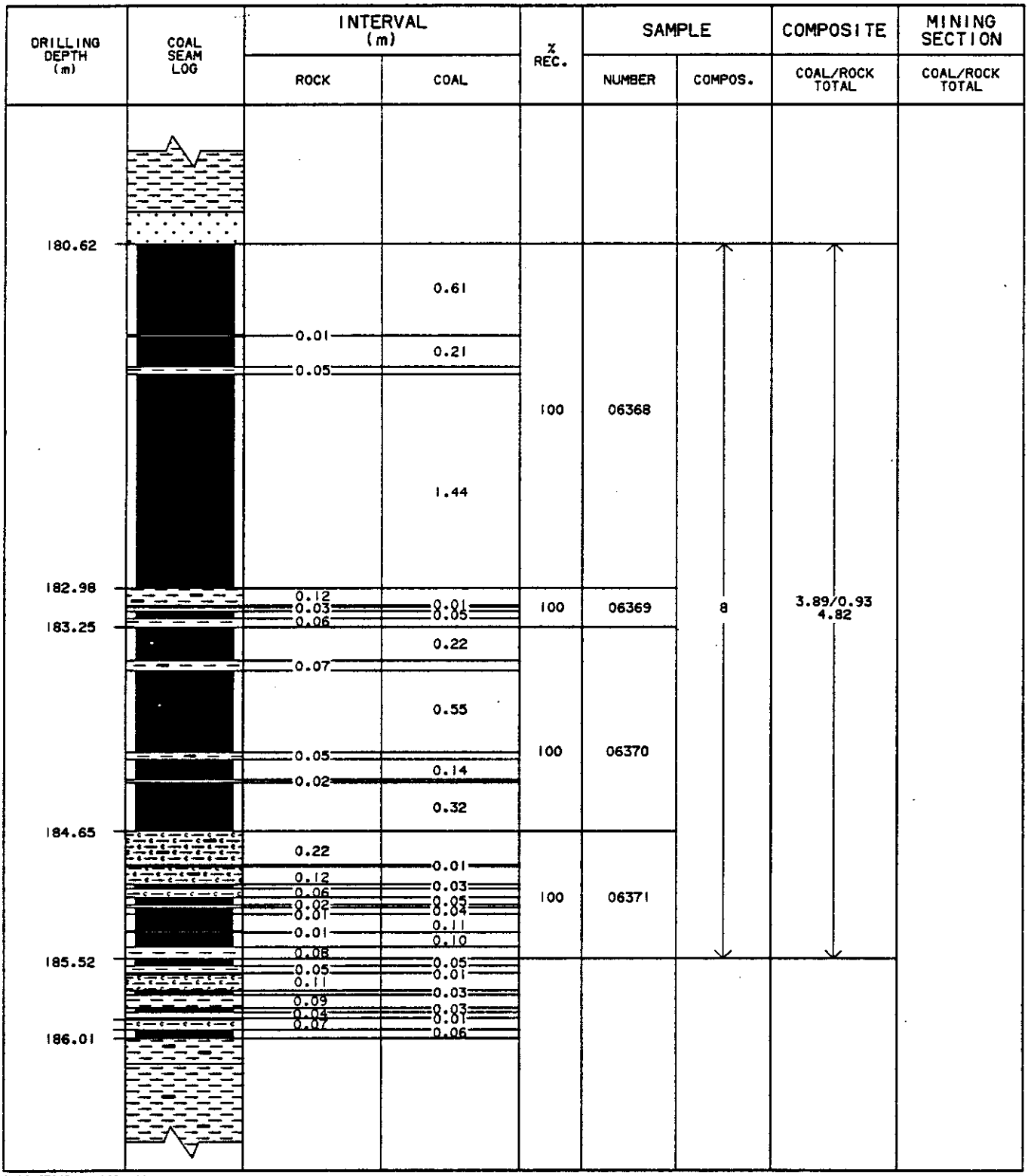
GULF CANADA RESOURCES INC.	Gulf
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS DDH83001 SEAM G LOWER	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

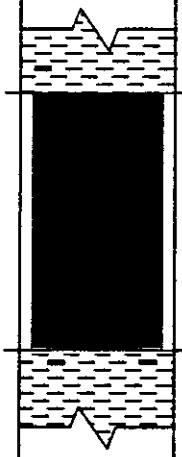
TRUE THICKNESS

DDH83001

SEAM F

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m)		% REC.	SAMPLE		COMPOSITE	MINING SECTION
		ROCK	COAL		NUMBER	COMPOS.	COAL/ROCK TOTAL	COAL/ROCK TOTAL
209.60								
			1.29	97.8	06372	9	1.32/0.00 1.32	
210.94			(0.03)					



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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM E

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84

SIMPLE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83001										
	I	6358	26.90	30.07	92.11	2.61	0.31	0.13	0.12	2.74- 0.43
	I	6359	30.07	32.68	100.00	2.46	0.15	0.00	0.00	2.46- 0.15
	H	6360	74.73	77.10	92.82	1.74	0.46	0.17	0.00	1.91- 0.46
	H	6361	77.10	78.74	100.00	1.62	0.02	0.00	0.00	1.62- 0.02
	H	6362	78.74	79.38	100.00	0.40	0.24	0.00	0.00	0.40- 0.24
	G	6363	133.42	137.43	92.01	2.74	0.95	0.32	0.00	3.06- 0.95
	G	6364	137.43	138.22	100.00	0.00	0.79	0.00	0.00	0.00- 0.79
	G	6365	138.22	139.19	88.65	0.52	0.34	0.11	0.00	0.63- 0.34
	G	6367	142.45	144.75	96.52	1.22	1.00	0.04	0.04	1.26- 1.04
	F	6368	180.62	182.98	100.00	2.30	0.06	0.00	0.00	2.30- 0.06
	F	6369	182.98	183.25	100.00	0.06	0.21	0.00	0.00	0.06- 0.21
	F	6370	183.25	184.65	100.00	1.26	0.14	0.00	0.00	1.26- 0.14
	F	6371	184.65	185.52	100.00	0.34	0.53	0.00	0.00	0.34- 0.53
	E	6372	209.60	210.94	97.76	1.31	0.00	0.03	0.00	1.34- 0.00

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 COMPOSITE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	COMP ID	SAMPLE FROM	SAMPLE TO	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83001												
	SEAM I	1	6358	6358	26.90	30.07	92.11	2.61	0.31	0.13	0.12	2.74- 0.43
	SEAM I	2	6359	6359	30.07	32.68	100.00	2.46	0.15	0.00	0.00	2.46- 0.15
	SEAM H	3	6360	6360	74.73	77.10	92.82	1.74	0.46	0.17	0.00	1.91- 0.46
	SEAM H	4	6361	6361	77.10	78.74	100.00	1.62	0.02	0.00	0.00	1.62- 0.02
	SEAM H	5	6362	6362	78.74	79.38	100.00	0.40	0.24	0.00	0.00	0.40- 0.24
	SEAM G	6	6363	6363	133.42	137.43	92.01	2.74	0.95	0.32	0.00	3.06- 0.95
	SEAM G	7	6367	6367	142.45	144.75	96.52	1.22	1.00	0.04	0.04	1.26- 1.04
	SEAM F	8	6368	6371	180.62	185.52	100.00	3.96	0.94	0.00	0.00	3.96- 0.94
	SEAM E	9	6372	6372	209.60	210.94	97.76	1.31	0.00	0.03	0.00	1.34- 0.00

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	0.00	1.75	1.75			OVERBURDEN	MG.MOD.LT.GY.THNB.VBRKN CASING SET TO 3.66M MINOR QUARTZ STRINGERS
74	1.75	1.92	0.17			SANDSTONE	MG.MOD.LT.GY.THNB.VBRKN SPIN OFF IN CORE OCCURRING JUST BELOW CASING;CALCITE VEINING ALONG FRACTURES; MINOR QUARTZ STRINGERS
74	1.92	1.98	0.06			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.BRKN M-DK GREY SILTSTONE INTERBEDS
* 74	1.98	3.22	1.24			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.SSD.BRKN CUT AND FILL INDICATE TOPS UPRIGHT;DK GREY SILTSTONE INTERBEDS;CALCITE VEINING ALONG FRACTURES
71	3.22	3.29	0.07			SANDSTONE	FG.MOD.LT.GY.THNB.SSD.SLD IRON STAINING WITHIN SANDSTONE;CALCITE VEINING ALONG FRACTURES
* 70	3.29	3.52	0.23			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.SSD.BRKN DK GREY SILTSTONE INTERBEDS
76	3.52	3.57	0.05			SANDSTONE	FG.MOD.LT.GY.THNB.BRKN MINOR DK GREY SILTSTONE LAMINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 78	3.57	3.64	0.07			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.SSD.SLD MINOR SSD;DK GREY SILTSTONE INTERBEDS
* 73	3.64	3.78	0.14			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.SSD.SLD SSD MORE FREQUENT TOWARDS BASE;DK GREY SILTSTONE INTERBEDS
73	3.78	3.82	0.04			SILTSTONE	SSY.VFG.M.BN.VTHNB.SLD BROWN COLOUR POSSIBLY DUE TO OXIDATION (IRON STAINING);INTERBEDDED MEDIUM GREY LAMINAE
* 74	3.82	5.70	1.88			SILTSTONE	SSY.VFG.M.BN.VTHNB.SSD.BRKN SSD INDICATES UNIT UPRIGHT;CALCITE VEINING ALONG FRACTURES
* 74	5.70	6.08	0.38			SILTSTONE	SSY.VFG.M.GY.VTHNB.BRKN MINOR MEDIUM BROWN BEDS-POSSIBLY DUE TO OXIDATION
* 60	6.08	6.42	0.34			SANDSTONE	VFG.WEL.LT.GY.THNB.BRKN SANDSTONE HAS SLIGHT BROWNISH TINGE
* 70	6.42	6.76	0.34			SILTSTONE	VFG.WEL.M.GY.VTHNB.SSD.VBRKN HIGHLY OXIDIZED PIECES;SOME PIECES CONSIST OF FINE GRAIN SANDSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 78	6.76	7.62	0.86			SILTSTONE	VFG.M.BN.VTHNB.SSD.BRKN THIN INTERBEDS OF DK GREY SILTSTONE;MRM BURS IN A 0.08M BAND
74	7.62	7.69	0.07			SILTSTONE	VFG.M.BN.VTHNB.BRKN MINOR INTERBEDDED DK GREY SILTSTONE
* 71	7.69	8.29	0.60			SANDSTONE	SLTY.VFG.WEL.M.GY.THNB.XBDG MINOR BLACK SILTSTONE LAMINAE;CALCITE FRACTURE INFILLING;PARTIALLY IRON STAINED;SANDSTONE FAIRLY FRIABLE
72	8.29	8.74	0.45			SILTSTONE	SSY.M.GY.VTHNB.SSD.VBRKN FRIABLE FINE GRAIN SANDSTONE CEMENTED BY CLAY WITHIN BRKN CORE;IRON STAINING ALONG FRACTURES
* 72	8.74	9.06	0.32			SILTSTONE	SSY.M.GY.VTHNB.BRKN RUST COLOUR ON PART OF CORE
73	9.06	9.60	0.54			SANDSTONE	FG.WEL.BN.THNB.BRKN COLOUR ORANGE-BROWN;SANDSTONE FAIRLY FRIABLE;MINOR BLACK LAMINATIONS THROUGHOUT
* 75	9.60	10.52	0.92			SANDSTONE	FG.WEL.BN.THNB.XBDG.BRKN COLOUR ORANGE-BROWN;SLICKENSIDES ALONG FRACTURE SURFACES;BLACK LAMINAE THROUGHOUT;FRIABLE;XBDG INDICATES TOPS UPRIGHT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	10.52	10.82	0.30			SANDSTONE	FG.MOD.GY.THNB.SLD COLOUR ORANGE-GREY;UNIT REACTS TO HCL (MARL?);MORE CALCITE TOWARDS TOP
75	10.82	11.05	0.23			SANDSTONE	MG.MOD.BN.THNB.BRKN COLOUR ORANGE-BROWN;VERY FRIABLE WHEN SCRATCHED
75	11.05	11.67	0.62			SANDSTONE	FG.WEL.GY.THNB.VBRKN COLOUR ORANGE-GREY;PYROLUSITE AND CALCITE ALONG FRACTURES;BLACK LAMINAE THROUGHOUT
75	11.67	11.82	0.15			SANDSTONE	MOD.M.BN.VTHNB.VBRKN
75	11.82	11.88	0.06			CLAYSTONE	LT.BN.SLD VERY SMOOTH;PYROLUSITE ALONG FRACTURES
75	11.88	11.97	0.09			BENTONITE	LT.GY.PWRD SOAPY TEXTURE;UNCONSOLIDATED CLAY
75	11.97	12.06	0.09			SANDSTONE	VFG.MOD.M.GY.THNB.SLD IRON STAINING;CALCITE ALONG FRACTURES
75	12.06	12.14	0.08			CLAYSTONE	LT-M.GY.VBRKN SOAPY TEXTURE;UNCONSOLIDATED CLAY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 75	12.14	13.68	1.54			SANDSTONE	SLTY.VFG.MOD.M.GY.THNB.WRMBU.BRKN SSD;IRON STAINING ALONG FRACTURES
* 72	13.68	14.97	1.29			SILTSTONE	SSY.M.GY.VTHNB.SSD.BRKN XBDG:RUSTY COLOUR TO SOME OF THE INTERB EDS;IRON STAINING;CALCITE VEINING ALONG FRACTURE SURFACES;SILTSTONE RIP UP CLA STS CONFINED TO 0.03M BED
72	14.97	15.52	0.55			SILTSTONE	SSY.M.GY.VTHNB.VBRKN IRON STAINING;CALCITE VEINING ALONG FRA CTURE SURFACES;RUSTY COLOURED INTERBEDS
72	15.52	15.75	0.23			SILTSTONE	SSY.M.GY.VBRKN HIGHLY OXIDIZED ALONG FRACTURE SURFACES
72	15.75	15.83	0.08			SILTSTONE	CLYY.M.GY.VBRKN UNCONSOLIDATED CLAY ACTING AS CEMENT;IR ON STAINING
72	15.83	16.84	1.01			SILTSTONE	SSY.M.GY.VTHNB.VBRKN IRON STAINING ALONG FRACTURES;SAND CONT ENT DECREASES TOWARDS BASE OF MEASUREME NT
72	16.84	17.20	0.36			SILTSTONE	M.GY.VTHNB.BRKN IRON STAINING ALONG FRACTURES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
72	17.20	17.26	0.06			SILTSTONE	CLYY.M.GY.PWRD UNCONSOLIDATED;CEMENTED WITH CLAY (NOT BENTONITE)
72	17.26	17.38	0.12			SILTSTONE	M.GY.VTHNB.BRKN IRON STAINING
* 72	17.38	19.25	1.87			SILTSTONE	M.GY.VTHNB.BRKN CALCITE VEINING AND IRON STAINING;FRACT URING ABUNDANT;MINOR SANDY INTERBEDS
76	19.25	19.48	0.23			SILTSTONE	M.GY.VTHNB.BRKN CALCITE VEINING AND IRON STAINING;FRACT URING ABUN DANT;MINOR SANDY INTERBEDS
77	19.48	19.68	0.20			SILTSTONE	GY.VTHNB.VBRKN IRON STAINING;SILTSTONE BECOMING CLAYEY DUE TO UNCONSOLIDATION
* 81	19.68	21.19	1.51			SILTSTONE	GY.VTHNB.SSD.BRKN IRON STAINING;DOMINANT FRACTURING;DRILL SPIN OFF;SSD INDICATES TOPS UPRIGHT
* 73	21.19	22.62	1.43			SILTSTONE	M.GY.VTHNB.BRKN HIGHLY FRACTURED;IRON STAINING ALONG FR ACTURES;CONTAINS VERY FINE GRAINED SAND STONE INTERBEDS TOWARDS BASE OF MEASURE MENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	22.62	23.16	0.54			SILISTONE	SSY.M.GY.VTHNB.SSD.BRKN HIGHLY FRACTURED WITH IRON STAINING;SSD INDICATES TOPS UPRIGHT
* 74	23.16	25.38	2.22			SILTSTONE	M.GY.VTHNB.SSD.BRKN HIGHLY FRACTURED WITH IRON STAINING;MIN OR LIGHTER GREY LAMINAE OF VFG SANDSTON E
71	25.38	25.83	0.45			SILTSTONE	SSY.M.GY.VTHNB.BRKN OXIDIZED FRACTURE SURFACES
* 70	25.83	26.18	0.35			SILTSTONE	SSY.M.GY.VTHNB.SLD LT GREY SANDY LAMINAE;REPETITOUS BANDIN G
72	26.18	26.56	0.38			SILTSTONE	M.GY.VTHNB.BRKN IRON STAINING AND CALCITE VEINING ALONG FRACTURED SURFACES
* 74	26.56	26.90	0.34			MUDSTONE	DK.GY.BRKN MINOR COAL STRINGERS (1MM) TOWARDS BASE ;MODERATELY CARBONACEOUS
* 73	26.90	27.10	0.20	06358	I	COAL	C-2.BLK.BRKN ANKERITE VEINING ALONG FRACTURES;IRON S TAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	27.10	27.13	0.03	06358	I	CLAYSTONE	BLK.VTHNB.SLD EASILY BRKN
71	27.13	27.14	0.01	06358	I	COAL	C-3.BLK.SLD MINOR CLAYSTONE INTERBEDS
71	27.14	27.15	0.01	06358	I	COAL	C-2.BLK.SLD
71	27.15	27.16	0.01	06358	I	COAL	C-2.BLK.SLD LISTRIC SURFACES ON MINOR CARB CLAYSTON E LAMINAE
* 70	27.16	27.29	0.13	06358	I	COAL	C-2.BLK.BRKN LISTRIC SURFACES ON MINOR CARB CLAYSTON E LAMINAE
70	27.29	27.31	0.02	06358	I	CLAYSTONE	BLK.PWRD VERY SOFT
71	27.31	27.53	0.22	06358	I	COAL	C-2.BLK.SLD IRON STAINING ALONG CLEAT SURFACES
72	27.53	27.59	0.06	06358	I	COAL	C-2.BLK.SLD
72	27.59	27.62	0.03	06358	I	COAL	C-4.BLK.SLD CARB CLAYSTONE INTERBEDS;LISTRIC SURFAC ES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
72	27.62	27.75	0.13	06358	I	COAL	C-2.BLK.SLD
73	27.75	27.76	0.01	06358	I	CLAYSTONE	CARB.BLK.SLD MINOR COAL STRINGERS
* 73	27.76	27.93	0.17	06358	I	COAL	C-2.BLK.SLD MINOR QUARTZ ALONG CLEAT SURFACES
72	27.93	27.94	0.01	06358	I	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURE; MINOR IRON STAI NING
72	27.94	27.98	0.04	06358	I	COAL	C-2.BLK.SLD WHITE SUBSTANCE ALONG CLEAT SURFACE (A NKERITE ?)
72	27.98	27.99	0.01	06358	I	COAL	C-3.BLK.SLD CARB CLAYSTONE LAMINAE
72	27.99	28.01	0.02	06358	I	COAL	C-2.BLK.SLD
72	28.01	28.02	0.01	06358	I	COAL	C-2.BLK.SLD
72	28.02	28.04	0.02	06358	I	COAL	C-3.BLK.SLD CARB CLAYSTONE INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	28.04	28.05	0.01	06358	I	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURE
* 70	28.05	28.42	0.37	06358	I	COAL	C-2.BLK.BRKN SLICKENSIDES ALONG FRACTURE SURFACES;MI NOR IRON STAINING
70	28.42	28.44	0.02	06358	I	COAL	C-1.BLK.SLD
70	28.44	28.54	0.10	06358	I	COAL	C-2.BLK.BRKN LISTRIC SURFACES IN CARB CLAYSTONE LAMI NAE
70	28.54	28.61	0.07	06358	I	CLAYSTONE	BLK.PWRD VERY SOFT
70	28.61	28.65	0.04	06358	I	COAL	C-4.BLK.BRKN CARB CLAYSTONE INTERBEDS
70	28.65	28.67	0.02	06358	I	COAL	C-3.BLK.SLD
70	28.67	28.70	0.03	06358	I	COAL	C-2.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
70	28.70	28.77	0.07	06358	I	CLAYSTONE	CARB.BLK.SLD MINOR (APPROX 1MM) COALY STRINGERS THRO UGHOUT
70	28.77	28.89	0.12	06358	I	ROCK LOSS	
69	28.89	29.02	0.13	06358	I	COAL LOSS	
69	29.02	29.29	0.27	06358	I	COAL	C-2.BLK.PWRD COAL UNCONSOLIDATED AND EASILY CRUMBLED ;LISTRIC SURFACES ON MINOR CARB CLAYSTO NE LAMINAE
69	29.29	29.33	0.04	06358	I	COAL	C-2.BLK.SLD
69	29.33	29.34	0.01	06358	I	COAL	C-1.BLK.SLD
69	29.34	29.46	0.12	06358	I	COAL	C-2.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
69	29.46	29.51	0.05	06358	I	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURE
69	29.51	29.57	0.06	06358	I	COAL	C-3.BLK.VBRKN CARB CLAYSTONE LAMINAE
* 69	29.57	29.67	0.10	06358	I	COAL	C-2.BLK.VBRKN LISTRIC SURFACES;EASILY BRKN;SOFT
70	29.67	29.72	0.05	06358	I	CLAYSTONE	CARB.BLK.VTHNB.BRKN IRON STAINING;SOFT
70	29.72	29.84	0.12	06358	I	COAL	C-2.BLK.BRKN MINOR CALCITE,ANKERITE? VEINING;IRON ST AINING
71	29.84	29.86	0.02	06358	I	CLAYSTONE	CARB.BLK.SLD MINOR COAL STRINGERS
71	29.86	29.94	0.08	06358	I	COAL	C-2.BLK.VBRKN SOFT;EASILY BRKN
72	29.94	30.02	0.08	06358	I	COAL	C-2.BLK.VBRKN SOFT
72	30.02	30.03	0.01	06358	I	CLAYSTONE	CARB.BLK.SLD IRON STAINING

• DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
72	30.03	30.04	0.01	06358	I	COAL	C-2.BLK.SLD IRON STAINING
73	30.04	30.07	0.03	06358	I	CLAYSTONE	BLK.YTHNB.SLD EASILY BRKN
73	30.07	30.08	0.01	06359	I	COAL	C-1.BLK.SLD
73	30.08	30.20	0.12	06359	I	COAL	C-2.BLK.SLD IRON STAINING (MINOR) ALONG CLEAT SURFA CES
74	30.20	30.21	0.01	06359	I	CLAYSTONE	CARB.BLK.SLD IRON STAINING
* 76	30.21	30.75	0.54	06359	I	COAL	C-2.BLK.BRKN OXIDATION WITHIN COAL RESULTS IN IRON S TAINING AND BLUISH-PURPLE TINGE
74	30.75	30.79	0.04	06359	I	COAL	C-1.BLK.SLD CONCHOIDAL FRACTURE
* 73	30.79	31.15	0.36	06359	I	COAL	C-2.BLK.BRKN WHITE DEPOSIT ALONG CLEAT SURFACES, (A NKERITE ?);IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	31.15	31.22	0.07	06359	I	COAL	C-1.BLK.SLD
73	31.22	31.27	0.05	06359	I	COAL	C-3.BLK.PWRD UNCONSOLIDATED
74	31.27	31.28	0.01	06359	I	COAL	C-1.BLK.SLD IRON STAINING
74	31.28	31.33	0.05	06359	I	COAL	C-2.BLK.SLD IRON STAINING
74	31.33	31.36	0.03	06359	I	COAL	C-1.BLK.SLD IRON STAINING
74	31.36	31.50	0.14	06359	I	COAL	C-2.BLK.SLD WHITE DEPOSIT ALONG CLEAT SURFACES;IRON STAINING
* 74	31.50	31.65	0.15	06359	I	COAL	C-1.BLK.SLD MINOR IRON STAINING
74	31.65	31.76	0.11	06359	I	COAL	C-2.BLK.SLD
75	31.76	31.78	0.02	06359	I	COAL	C-1.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	31.78	31.80	0.02	06359	I	COAL	C-4.BLK.BRKN SOFT;CARB CLAYSTONE INTERBEDS
75	31.80	31.86	0.06	06359	I	COAL	C-1.BLK.SLD IRON STAINING
75	31.86	31.96	0.10	06359	I	COAL	C-2.BLK.BRKN IRON STAINING
75	31.96	31.99	0.03	06359	I	COAL	C-1.BLK.SLD
75	31.99	32.07	0.08	06359	I	COAL	C-2.BLK.BRKN VERY EASILY BRKN;IRON STAINING DOMINANT
* 76	32.07	32.33	0.26	06359	I	COAL	C-2.BLK MINOR ANKERITE(?) VEINING ALONG BEDDING ;IRON STAINING; MINOR CARBONACEOUS CLAY STONE (1MM) IN INTERBEDS
76	32.33	32.38	0.05	06359	I	COAL	C-2.BLK.VBRKN IRON STAINING; ANKERITE (?) VEINING PRE DOMINANT
76	32.38	32.42	0.04	06359	I	COAL	C-4.BLK.PWRD IRON STAINING;EASILY BRKN;SOFT;CARB CLA YSTONE INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	32.42	32.47	0.05	06359	I	COAL	C-2.BLK.VBRKN IRON STAINING; ANKERITE (?) VEINING; SO FT
76	32.47	32.61	0.14	06359	I	CLAYSTONE	CARB.DK.GY.BRKN LISTRIC SURFACES;IRON STAINING;COALY ST RINGERS
76	32.61	32.68	0.07	06359	I	COAL	C-3.BLK.VBRKN ANKERITE (?) VEINING; IRON STAINING; CA RBONACEOUS CLAYSTONE INTERBEDS; SOFT
76	32.68	32.75	0.07			CLAYSTONE	DK.GY.BRKN IRON STAINING;MINOR COAL STRINGERS AND SILTY INTERBEDS;MINOR ANKERITE (?) VEIN ING ALONG BEDDING
76	32.75	33.38	0.63			SILTSTONE	M.GY.VTHNB.BRKN COALY BANDS AND FOSSILS TOWARDS TOP OF MEASUREMENT;IRON STAINING
* 76	33.38	33.95	0.57			SILTSTONE	SSY.M.GY.VTHNB.SSD.BRKN ANKERITE (?) VEINING NORMAL TO BEDDING; IRON STAINED FRACTURES
75	33.95	34.08	0.13			SILTSTONE	SSY.M.GY.VTHNB.SLD ANKERITE (?) VEINING ON FRACTURES; IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 74	34.08	34.82	0.74			SANDSTONE	SLTY.FG.MOD.M.GY.VTHNB.SSD.BRKN DK GREY SILTSTONE LAMINAE;FREQUENT CALC ITE VEINING ALONG FRACTURES:IRON STAINI NG;SSD INDICATES TOPS UPRIGHT
* 74	34.82	35.70	0.88			SANDSTONE	SLTY.FG.MOD.M.GY.THNB.SSD.BRKN MINOR CALCITE VEINING IN FRACTURE;XBDG; IRON STAINING ALONG FRACTURES
73	35.70	35.94	0.24			SANDSTONE	FG.MOD.M.GY.THNB.SSD.BRKN SILTSTONE INTERBEDS
* 72	35.94	36.87	0.93			SANDSTONE	FG.MOD.M.GY.THNB.BRKN MINOR BEDDING PLANE FAULT (0.01M);ANKER ITE (?) VEINING (1MM)
74	36.87	37.17	0.30			SANDSTONE	FG.MOD.M.GY.THNB.VBRKN IRON STAINING;CALCITE VEINING (0.01M);L OST CIRCULATION WHEN DRILLING
75	37.17	37.20	0.03			ROCK LOSS	
75	37.20	37.38	0.18			SANDSTONE	FG.WEL.M.GY.SLD CALCITE (1-3 MM) VEINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	37.38	39.01	1.63			SANDSTONE	MG.WEL.M.GY.THKB.SLD SILTSTONE RIP UP CLASTS TOWARDS TOP-CON FINED TO 0.15M; ANKERITE(?) VEINING IN FRACTURES
* 81	39.01	39.38	0.37			SANDSTONE	SLTY.FG.WEL.M.GY.THNB.SSD.BRKN IRON STAINING;DK GREY SILTSTONE INTERBE DS;SSD INDICATES TOPS UPRIGHT
* 71	39.38	40.42	1.04			SILTSTONE	DK.GY.VTHNB.SSD.BRKN CALCITE VEINING (1MM);VFG SANDSTONE LAM INAE;SSD INDICATES TOPS UPRIGHT
72	40.42	41.28	0.86			MUDSTONE	DK.GY.VTHNB.BRKN WEATHERING CAUSES MUDSTONE TO BE VERY F RIABLE
73	41.28	41.78	0.50			MUDSTONE	DK.GY.BRKN CALCITE VEINING (1MM)
74	41.78	42.11	0.33			SANDSTONE	MG.MOD.LT.BN.VBRKN VERY FRIABLE;IRON STAINING; LOST CIRCUL ATION
74	42.11	42.34	0.23			CLAY	LT.BN.PMRD UNCONSOLIDATED;SANDSTONE FRAGMENTS WITH IN CLAY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	42.34	43.01	0.67			SANDSTONE	FG.WEL.LT.GY.THKB.BRKN SILTSTONE RIP UP CLASTS CONFINED TO 0.1 OM;MINOR IRON STAINING
75	43.01	43.10	0.09			SANDSTONE	FG.WEL.LT.GY.THKB.SLD SILTSTONE RIP UP CLASTS CONFINED TO 0.1 OM;MINOR IRON STAINING
* 76	43.10	44.17	1.07			SANDSTONE	MG.MOD.LT.GY.THKB.BRKN DK GREY SILTSTONE RIP UP CLASTS CONFINE D TO 0.01M;IRON STAINING ALONG FRACTURE S
77	44.17	44.26	0.09			SANDSTONE	FG.WEL.LT.GY.THKB.BRKN DK GREY SILTSTONE RIP UP CLASTS CONFINE D TO 0.04M;IRON STAINING;CALCITE VEININ G (0.01M) ALONG FRACTURES
78	44.26	44.71	0.45			SILTSTONE	SSY.M.GY.VTHNB.BRKN SILTSTONE RIP UP CLASTS;LT-M GREY SANDS TONE LAMINATIONS
* 79	44.71	45.14	0.43			SANDSTONE	MG.MOD.LT.GY.THKB.BRKN DK GREY SUBROUNDED SILTSTONE RIP UP CLA STS;IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 76	45.14	45.40	0.26			SANDSTONE	SLTY.MG.MOD.M.GY.THNB.BRKN DK GREY SUBROUNDED SILTSTONE RIP UP CLA STS;CALCITE AND ANKERITE(?) VEIN (0.01M M) PARALLEL TO BEDDING
75	45.40	45.45	0.05			SILTSTONE	SSY.M.GY.THNB.SLD DK GREY SILTSTONE LAMINATIONS
74	45.45	45.85	0.40			SILTSTONE	CLYY.M.GY.VBRKN SILTSTONE CEMENTED BY CLAY;FAIRLY UNCON SOLIDATED
* 71	45.85	46.96	1.11			SILTSTONE	SSY.M.GY.THNB.SSD.BRKN SSD INDICATES TOPS UPRIGHT;QUARTZ VEIN (0.01M) PARALLEL TO BEDDING;CALCITE VEI NING (1.0MM);IRON STAINING
72	46.96	47.69	0.73			SILTSTONE	DK.GY.VTHNB.WRMBU.BRKN WRMBUR AND SSD INDICATES TOPS UPRIGHT;V FG SANDY LAMINATIONS THROUGHOUT;CALCITE VEINING (1MM)
* 72	47.69	48.17	0.48			SILTSTONE	DK.GY.VTHNB.BRKN IRON STAINING ALONG FRACTURES
74	48.17	48.87	0.70			SILTSTONE	GY.VBRKN CALCITE VEINING (1MM);SANDY FRAGMENTS;U NCONSOLIDATED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	48.87	49.27	0.40			SILTSTONE	GY.YBRKN SOLIDIFIED CLAYEY MATERIAL;CALCITE VEIN ING (1MM)
* 77	49.27	50.48	1.21			SILTSTONE	DK.GY.VTHNB.BRKN CALCITE AND ANKERITE(?) VEINING (1MM-CR OSS CUTTING EACH OTHER); LIGHT SANDY LA MINATIONS THROUGHOUT; IRON STAINING
* 75	50.48	52.30	1.82			SILTSTONE	SSY.M.GY.VTHNB.XBDG.BRKN SSD:SANDY LAMINATIONS THROUGHOUT;SED ST RUCTURES INDICATE TOPS UPRIGHT;IRON STA INING WITHIN SANDSTONE LAMINATIONS GIVE S RUSTY COLOUR;CALCITE VEINING (1MM); S ANDSTONE IS LT GREY
* 77	52.30	53.14	0.84			SILTSTONE	SSY.M.GY.VTHNB.BRKN IRON STAINING;LT GREY SANDSTONE LAMINAT IONS;CALCITE VEINING (1MM)
76	53.14	53.56	0.42			SILTSTONE	DK.GY.BRKN WEATHERED CRUMBLY FORMING SMALL SHARDS (1MM)
76	53.56	53.90	0.34			SILTSTONE	DK.GY.BRKN VERY WEATHERED FORMING SMALL SHARDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	53.90	54.43	0.53			SANDSTONE	VFG.WEL.M.GY.BRKN VERY WEATHERED FORMING SMALL SHARDS;DRI LLERS MARKED 2 BOX #27'S
75	54.43	55.31	0.88			SILTSTONE	DK.GY.VTHNB.BRKN VERY WEATHERED FORMING SMALL SHARDS
75	55.31	55.73	0.42			SILTSTONE	CLYY.DK.GY.PWRD VERY WEATHERED FORMING CLAYEY TEXTURE
74	55.73	56.57	0.84			SANDSTONE	FG.MOD.S-P.GY.THNB.SLD WEATHERED TO ALMOST CLAYEY TEXTURE;VERY FRIABLE
74	56.57	56.70	0.13			SANDSTONE	FG.MOD.S-P.GY.VTHNB.BRKN WEATHERED TO FRIABLE TEXTURE
* 73	56.70	57.71	1.01			SANDSTONE	FG.MOD.LT.GY.THNB.SSD.BRKN VERY EASILY WEATHERED; ANKERITE(?) VEIN ING ON FRACTURE (1MM); SILTSTONE LAMINA TIONS THROUGHOUT
72	57.71	57.92	0.21			SANDSTONE	MOD.S-P.GY.THNB.BRKN SANDSTONE RESISTANT CONTAINING SUBROUND ED CLASTS ANKERITE(?) VEINS PARALLEL TO BEDDING (5MM); MORE DARK GREY AND SILT Y AT TOP AND BOTTOM OF MEASUREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 71	57.92	58.33	0.41			SANDSTONE	FG.MOD.LT.GY.THNB.BRKN VERY EASILY WEATHERED;DK GREY SILTSTONE LAMINATIONS THROUGHOUT
* 76	58.33	59.75	1.42			SANDSTONE	FG.WEL.LT.GY.THNB.WRMBU.BRKN SSD;SILTSTONE LAMINATIONS THROUGHOUT;CLAM BURROW;VERY FRIABLE
* 72	59.75	60.12	0.37			SANDSTONE	SLTY.VFG.MOD.M.GY.VTHNB.BRKN DK GREY SILTSTONE LAMINATIONS;EASILY WEATHERED
72	60.12	60.48	0.36			SANDSTONE	FG.MOD.LT.GY.THNB.BRKN SILTSTONE LAMINATIONS;MORE EASILY WEATHERED
73	60.48	60.81	0.33			SANDSTONE	FG.MOD.LT.GY.THNB.BRKN LT GREY MINOR SILTSTONE LAMINATIONS
73	60.81	61.13	0.32			SANDSTONE	FG.WEL.M.GY.VTHNB.BRKN DK GREY SILTSTONE INTERBEDS FREQUENT;VERY EASILY WEATHERED
73	61.13	61.40	0.27			SANDSTONE	FG.MOD.LT.GY.THNB.SSD.BRKN MINOR COAL STRINGER AT BASE (1MM);MINOR SILTSTONE LAMINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 74	61.40	62.51	1.11			SANDSTONE	FG.WEL.M.GY.VTHNB.SSD.BRKN FREQUENT DK GREY SILTSTONE LAMINATIONS; WEATHERED TO SHARDS WITH SOME CLAYEY TEXTURE
75	62.51	62.57	0.06			SANDSTONE	FG.WEL.M.GY.VTHNB.BRKN EASILY WEATHERED;DK GREY SILTSTONE LAMINATIONS
75	62.57	62.65	0.08			SANDSTONE	FG.WEL.M.GY.VTHNB.BRKN DK GREY SILTSTONE LAMINATIONS;EASILY WEATHERED
75	62.65	62.77	0.12			SANDSTONE	VFG.MOD.M.GY.THNB.WRMBU.SLD CLAM BURROW;SILTSTONE LAMINATIONS
76	62.77	63.29	0.52			SILTSTONE	DK.GY.VTHNB.BRKN WEATHERED
76	63.29	63.38	0.09			SILTSTONE	SSY.M.GY.VTHNB.SLD LT GREY SILTSTONE LAMINATIONS THROUGHOUT
77	63.38	64.17	0.79			SILTSTONE	SSY.DK.GY.VTHNB.BRKN LT GREY SANDY LAMINATIONS;WEATHERED TO SHARDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 78	64.17	64.32	0.15			SANDSTONE	FG.MOD.LT.GY.WRMBU.SLD MINOR DK GREY SILTSTONE LAMINATIONS TOW ARDS BASE
76	64.32	64.52	0.20			SILTSTONE	DK.GY.VTHNB.BRKN WEATHERED TO SHARDS
* 69	64.52	65.25	0.73			SILTSTONE	DK.GY.VTHNB.SLD WEATHERED TO SHARDS;LT GREY SANDSTONE L AMINATIONS TOWARDS BASE
71	65.25	65.58	0.33			SANDSTONE	VFG.MOD.M.GY.THNB.BRKN WEATHERED TO ALMOST CLAYEY TEXTURE; INF REQUENT DK GREY SILSTONE LAMINATIONS
* 74	65.58	66.61	1.03			SILTSTONE	SSY.DK.GY.VTHNB.BRKN WEATHERS VERY EASILY;MINOR COAL STRINGE RS (1MM) IN MIDDLE SECTION OF MEASUREME NT
70	66.61	68.80	2.19			MUDSTONE	DK.GY.BRKN WEATHERED;QUARTZ VEIN (0.02M) PARALLEL TO BEDDING;CLAYEY FROM WEATHERING
67	68.80	68.97	0.17			MUDSTONE	DK.GY.VTHNB.BRKN VERY EASILY WEATHERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 65	68.97	70.82	1.85			MUDSTONE	SLTY.DK.GY.VTHNB.SLD VERY EASILY WEATHERED;PYRITE INCLUSIONS (0.03M)
72	70.82	72.20	1.38			MUDSTONE	DK.GY.VTHNB.BRKN VERY EASILY WEATHERED TO SHARDS
* 76	72.20	72.95	0.75			MUDSTONE	DK.GY.BRKN VERY EASILY WEATHERED TO SHARDS
79	72.95	74.69	1.74			MUDSTONE	DK.GY.VTHNB.BRKN ANKERITE (?) VEINING PARALLEL TO BEDDIN G; COAL STRINGERS (1MM) TOWARDS BASE
81	74.69	74.70	0.01			COAL	C-3.BLK.SLD
81	74.70	74.73	0.03			CLAYSTONE	CARB.BLK MINOR COALY STRINGERS
81	74.73	74.78	0.05	06360 H		COAL LOSS	
* 81	74.78	74.80	0.02	06360 H		COAL	C-3.BLK.SLD 1MM ANKERITE(?) VEINING ALONG CLEAT SUR FACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	74.80	74.82	0.02	06360	H	COAL	C-1.BLK.SLD WHITE DEPOSIT ALONG CLEAT SURFACE;SUBCONCHOIDAL FRACTURE; ANKERITE(?) VEIN (1MM)
81	74.82	74.84	0.02	06360	H	COAL	C-3.DK.BLK.SLD 1MM ANKERITE(?) VEINS
81	74.84	74.86	0.02	06360	H	COAL	C-1.BLK.SLD ANKERITE(?) VEIN (1MM) ALONG CLEAT SURFACES
80	74.86	74.87	0.01	06360	H	COAL	C-3.BLK.SLD
80	74.87	74.92	0.05	06360	H	CLAYSTONE	BLK.SLD COAL STRINGERS;LISTRIC SURFACES;EASILY WEATHERED
79	74.92	75.12	0.20	06360	H	COAL	C-2.BLK.VBRKN CALCITE VEINS (1MM);MINOR CARBONACEOUS CLAYSTONE LAMINATIONS
78	75.12	75.14	0.02	06360	H	MUDSTONE	DK.GY.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	75.14	75.22	0.08	06360	H	COAL	C-2.BLK.SLD ANKERITE(?) VEINS (0.01M) ALONG CLEAT SURFACES
77	75.22	75.23	0.01	06360	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURES; CALCITE, ANKERITE(?) VEINING ALONG CLEAT SURFACES
77	75.23	75.27	0.04	06360	H	COAL	C-3.BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) ON CLEAT SURFACES
* 77	75.27	75.28	0.01	06360	H	CLAYSTONE	CARB.BLK.SLD COALY STRINGERS
77	75.28	75.37	0.09	06360	H	COAL	C-2.BLK.BRKN SUBCONCHOIDAL FRACTURE
77	75.37	75.38	0.01	06360	H	CLAYSTONE	SLD COALY STRINGERS
77	75.38	75.40	0.02	06360	H	COAL	C-3.BLK.SLD
77	75.40	75.51	0.11	06360	H	COAL	C-2.BLK.SLD SUBCONCHOIDAL FRACTURE
76	75.51	75.56	0.05	06360	H	COAL LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	75.56	75.64	0.08	06360	H	CLAYSTONE	SLD CALCITE, ANKERITE(?) VEINING (1MM) ALON G FRACTURES
76	75.64	75.73	0.09	06360	H	COAL	C-3.BLK.SLD MINOR CARB CLAYSTONE LAMINATIONS
76	75.73	75.81	0.08	06360	H	COAL	C-2.BLK.SLD
76	75.81	75.83	0.02	06360	H	COAL	C-3.BLK.SLD
76	75.83	75.84	0.01	06360	H	CLAYSTONE	SLD
76	75.84	75.90	0.06	06360	H	COAL	C-4.BLK.BRKN CARB CLAYSTONE ON LISTRIC SURFACES
76	75.90	75.93	0.03	06360	H	COAL	C-3.BLK.SLD
76	75.93	75.95	0.02	06360	H	COAL	C-2.BLK.SLD CARB CLAYSTONE LAMINATIONS
76	75.95	75.96	0.01	06360	H	CLAYSTONE	CARB.BLK.SLD

• DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	75.96	76.08	0.12	06360	H	COAL	C-4.BLK.BRKN CARB CLAYSTONE LAMINATIONS;LISTRIC SURF ACES
75	76.08	76.09	0.01	06360	H	CLAYSTONE	BLK.SLD CALCITE AND ANKERITE(?) BANDING ALONG F RACTURE (1MM)
75	76.09	76.10	0.01	06360	H	COAL	C-3.BLK.SLD
75	76.10	76.16	0.06	06360	H	COAL	C-2.BLK.BRKN
75	76.16	76.23	0.07	06360	H	COAL LOSS	
75	76.23	76.25	0.02	06360	H	COAL	C-2.BLK.SLD CONCHOIDAL FRACTURE:ANKERITE(?) VEINING 1MM
* 75	76.25	76.32	0.07	06360	H	COAL	C-3.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	76.32	76.33	0.01	06360	H	CLAYSTONE	DK.GY.VTHNB.SLD
75	76.33	76.34	0.01	06360	H	COAL	C-2.BLK.SLD
75	76.34	76.35	0.01	06360	H	COAL	C-5.BLK.SLD
75	76.35	76.36	0.01	06360	H	COAL	C-1.BLK.SLD WHITE DEPOSIT;SUBCONCHOIDAL FRACTURING
75	76.36	76.38	0.02	06360	H	COAL	C-3.BLK.SLD
75	76.38	76.39	0.01	06360	H	COAL	C-2.BLK.SLD WHITE DEPOSIT ON CLEAT SURFACES;CALCITE , ANKERITE(?) ON CLEAT SURFACES
75	76.39	76.46	0.07	06360	H	COAL	C-3.BLK.SLD CALCITE,ANKERITE(?) BANDING ON CLEAT SURFACES
75	76.46	76.56	0.10	06360	H	CLAYSTONE	BLK.VTHNB.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	76.56	76.58	0.02	06360	H	COAL	C-2.BLK.SLD
75	76.58	76.67	0.09	06360	H	CLAYSTONE	BLK.SLD
75	76.67	76.68	0.01	06360	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING
75	76.68	76.72	0.04	06360	H	COAL	C-2.BLK.SLD
75	76.72	76.73	0.01	06360	H	COAL	C-3.BLK.SLD MINOR CALCITE, ANKERITE(?) VEINS (1MM) ON CLEAT SURFACES
75	76.73	76.80	0.07	06360	H	COAL	C-2.BLK.SLD
* 75	76.80	76.81	0.01	06360	H	COAL	C-3.BLK.SLD
75	76.81	76.82	0.01	06360	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING;CALCITE, ANKERITE(?) VEINS ON CLEAT SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	76.82	76.83	0.01	06360	H	COAL	C-3.BLK.SLD CALCITE, ANKERITE(?) VEINS ON CLEAT SUR FACES
75	76.83	76.91	0.08	06360	H	COAL	C-2.BLK.SLD
75	76.91	76.92	0.01	06360	H	COAL	C-5.BLK.SLD
75	76.92	76.96	0.04	06360	H	COAL	C-2.BLK.SLD
75	76.96	77.00	0.04	06360	H	MUDSTONE	BLK.SLD VERY HARD; CALCITE, ANKERITE(?) VEINING (1MM)
75	77.00	77.08	0.08	06360	H	COAL	C-4.SLD CALCITE, ANKERITE(?) VEINING (1MM) ON C LEAT SURFACES
75	77.08	77.10	0.02	06360	H	CLAYSTONE	CARB.BLK.BRKN HARD;COAL STRINGERS TOWARD BASE OF MEAS UREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	77.10	77.13	0.03	06361	H	COAL	C-3.BLK.SLD
75	77.13	77.15	0.02	06361	H	COAL	C-2.BLK.SLD
75	77.15	77.18	0.03	06361	H	COAL	C-3.BLK.SLD
75	77.18	77.19	0.01	06361	H	COAL	C-5.BLK.SLD
75	77.19	77.24	0.05	06361	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING;CALCITE, ANKER ITE(?) VEINING (1MM) ON CLEAT SURFACES
74	77.24	77.27	0.03	06361	H	COAL	C-5.BLK.SLD DULL
74	77.27	77.29	0.02	06361	H	COAL	C-2.BLK.SLD
74	77.29	77.34	0.05	06361	H	COAL	C-5.BLK

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	77.34	77.35	0.01	06361	H	CLAYSTONE	CARB.BLK.SLD
* 74	77.35	78.00	0.65	06361	H	COAL	C-2.BLK.BRKN MINOR 1MM CALCITE, ANKERITE(?) STRINGERS
76	78.00	78.01	0.01	06361	H	COAL	C-1.BLK.SLD
76	78.01	78.02	0.01	06361	H	CLAYSTONE	CARB.BLK.SLD COAL STRINGERS
76	78.02	78.07	0.05	06361	H	COAL	C-1.BLK.SLD
77	78.07	78.17	0.10	06361	H	COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) ON CLEAT SURFACES
78	78.17	78.23	0.06	06361	H	COAL	C-2.BLK.BRKN
78	78.23	78.25	0.02	06361	H	COAL	C-1.BLK.BRKN SUBCONCHOIDAL FRACTURING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	78.25	78.47	0.22	06361	H	COAL	C-2.BLK.BRKN
80	78.47	78.53	0.06	06361	H	COAL	C-1.BLK.BRKN CONCHOIDAL FRACTURING;CALCITE, ANKERITE (?) (1MM)ON CLEAT SURFACES
80	78.53	78.55	0.02	06361	H	COAL	C-2.BLK.SLD
80	78.55	78.56	0.01	06361	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING
80	78.56	78.62	0.06	06361	H	COAL	C-2.BLK.SLD
80	78.62	78.64	0.02	06361	H	COAL	C-3.BLK.SLD
81	78.64	78.70	0.06	06361	H	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING;CALCITE, ANKERITE(?) VEINING ON CLEAT SURFACES
81	78.70	78.74	0.04	06361	H	COAL	C-2.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 82	78.74	78.98	0.24	06362 H		CLAYSTONE	BLK.VTHNB.SLD VERY HARD;MINOR COAL STRINGERS (1MM) TH ROUGHOUT;LISTRIC SURFACES;CALCITE, ANKE RITE(?) VEINING ON FRACTURE SURFACES
81	78.98	79.05	0.07	06362 H		COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) ON C LEAT SURFACES
81	79.05	79.06	0.01	06362 H		COAL	C-1.BLK.SLD CALCITE, ANKERITE(?) ON CLEAT SURFACES
81	79.06	79.11	0.05	06362 H		COAL	C-2.BLK.BRKN CALCITE, ANKERITE(?) ON CLEAT SURFACES (1MM)
81	79.11	79.18	0.07	06362 H		COAL	C-3.BLK.SLD
81	79.18	79.20	0.02	06362 H		COAL	C-2.BLK.SLD
81	79.20	79.21	0.01	06362 H		COAL	C-1.BLK.SLD CALCITE, ANKERITE(?) VEINING (2MM) ON C LEAT SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	79.21	79.31	0.10	06362 H		COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) (3MM) ON CLEAT SUR FACES
80	79.31	79.38	0.07	06362 H		COAL	C-2.BLK.SLD FREQUENT CALCITE, ANKERITE(?) VEINS ON CLEAT SURFACES
* 77	79.38	80.79	1.41			MUDSTONE	DK.GY.VTHNB.SLD CALCITE, ANKERITE(?) VEINS ON BEDDING; MORE FREQUENT TOWARDS TOP OF MEASUREMEN T; BECOMING MORE SILTY TOWARDS THE BASE ; COALY INCLUSIONS TOWARDS TOP
77	80.79	81.29	0.50			SANDSTONE	SLTY.VFG.WEL.M.GY.SLD
77	81.29	81.43	0.14			SANDSTONE	VFG.WEL.M.GY.BRKN
* 77	81.43	82.65	1.22			SILTSTONE	SSY.M.GY.THNB.SSD.BRKN LT GREY SANDY UNITS TOWARDS TOP;DISSEMI NATED PYRITE AT BASE IN SILTSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	82.65	82.72	0.07			MUDSTONE	PYR.DK.GY.THNB.BRKN CALCITE, ANKERITE(?) VEINS ON FRACTURE SURFACES; 5MM PYRITE BLEBS; MINOR COAL STRINGERS AT TOP
76	82.72	83.63	0.91			MUDSTONE	DK.GY.SLD WEATHERED FAIRLY EASILY
75	83.63	84.25	0.62			MUDSTONE	DK.GY.SLD WEATHERED FAIRLY EASILY
74	84.25	84.81	0.56			MUDSTONE	DK.GY.SLD WEATHERED FAIRLY EASILY
* 73	84.81	85.66	0.85			SANDSTONE	SLTY.FG.WEL.M.GY.THNB.SSD.BRKN DK.GREY SILTSTONE INTERBEDS;SSD FREQUENT AND INDICATES TOPS UPRIGHT
* 73	85.66	85.83	0.17			SILTSTONE	SSY.M.GY.VTHNB.BRKN LT GREY SANDY LAMINATIONS
72	85.83	86.87	1.04			SANDSTONE	SSY.FG.MOD.LT.GY.THKB.SLD MINOR ANKERITE(?) VEINING (1MM) ALONG BEDDING; MINOR COAL WITHIN VEINS; MINOR SILTY INTERBEDS TOWARDS TOP OF MEASUREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	86.87	87.19	0.32			SANDSTONE	MG.MOD.LT.GY.THKB.BRKN S-P COLOUR;SILTY RIP UP CLASTS CONFINED TO 0.01M BEDS
* 71	87.19	87.51	0.32			SANDSTONE	MG.MOD.LT.GY.THKB.SLD MINOR 1MM QUARTZ, ANKERITE(?) VEINING ALONG BEDDING.SILTY RIP UP CLASTS ALONG BEDDING
* 60	87.51	88.89	1.38			SANDSTONE	MG.MOD.LT.GY.THKB.BRKN SILTSTONE RIP UP CLASTS ALONG BEDDING (THROUGHOUT);CALCITE, ANKERITE(?) NORMAL TO BEDDING; MINOR SLICK SURFACE TOWARDS THE TOP; SILTY INTERBEDS TOWARDS TOP AND BOTTOM OF MEASUREMENT
66	88.89	89.44	0.55			SANDSTONE	SLTY.FG.WEL.M.GY.THNB.SSD.SLD SILTSTONE RIP UP CLASTS (0.06M);DARKER GREY SILTSTONE INTERBEDS
68	89.44	89.64	0.20			SANDSTONE	FG.MOD.LT.GY.THNB.SLD SILTIER TOWARDS TOP OF MEASUREMENT;MINOR SILTSTONE RIP UP CLASTS TOWARDS TOP
* 70	89.64	90.06	0.42			SANDSTONE	FG.MOD.LT.GY.THKB.SLD MINOR CALCITE,ANKERITE(?) STRINGERS (1MM) NORMAL TO BEDDING; MINOR SILTSTONE INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	90.06	90.12	0.06			SANDSTONE	FG.MEL.M.GY.SLD VERY EASILY WEATHERED;CALCITE,ANKERITE(?) (0.02) PARALLEL TO BEDDING
72	90.12	90.30	0.18			SANDSTONE	FG.MOD.LT.GY.THKB.SLD SOME SILTSTONE INTERBEDS
* 73	90.30	90.74	0.44			SANDSTONE	FG.MOD.LT.GY.THKB.SSD.SLD MINOR SILTSTONE INTERBEDS;TOWARDS BASE OF MEASUREMENT SANDSTONE IS CALCAREOUS; SILTSTONE RIP UP CLASTS;POSSIBLE FOSSI L ZONE (0.04M);POSSIBLE MINOR FAULTING
75	90.74	91.50	0.76			SANDSTONE	FG.MOD.LT.GY.THKB.BRKN CALCITE, ANKERITE(?) VEINING (0.01M) JU ST BELOW CALCAREOUS ZONE; MINOR SLICKEN SIDES AND RIP UP CLASTS; SANDSTONE SLIG HTLY CALCAREOUS IN REMAINING SECTION
77	91.50	91.64	0.14			SILTSTONE	DK.GY.VTHNB.SLD EASILY WEATHERED
* 78	91.64	92.38	0.74			SILTSTONE	SSY.DK.GY.VTHNB.SSD.BRKN SANDY INTERBEDS MORE FREQUENT TOWARDS T OP OF MEASUREMENT;EASLIY WEATHERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	92.38	93.52	1.14			SILTSTONE	DK.GY.VTHNB.BRKN VERY EASILY WEATHERED;CALCITE BED (5MM) AT BASE;MINOR SANDSTONE LAMINATIONS TH ROUGHOUT
* 80	93.52	93.86	0.34			SILTSTONE	DK.GY.VTHNB.BRKN
* 76	93.86	95.72	1.86			SANDSTONE	SLTY.VFG.M.GY.VTHNB.SSD.SLD XBDG;FRIABLE; WEATHERED; DARK GREY SILT STONE LAMINATIONS
78	95.72	96.39	0.67			SILTSTONE	SSY.DK.GY.VTHNB.XBDG.SLD SSD;EASILY WEATHERED;SANDSTONE LAMINATI ONS MORE FREQUENT TOWARDS TOP OF MEASUR EMENT
* 79	96.39	97.28	0.89			SILTSTONE	SSY.DK.GY.VTHNB.SLD MOTTLED TEXTURE WITHIN SOME SANDSTONE L AMINATIONS;EASILY WEATHERED
79	97.28	97.90	0.62			MUDSTONE	DK.GY.VTHNB.SSD.SLD MINOR SSD;SOME VFG LT GREY SANDSTONE LA MINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 80	97.90	99.30	1.40			MUDSTONE	DK.GY.VTHNB.SLD FEW LT GREY SANDSTONE LAMINATIONS;WEATH ERS FAIRLY EASILY;MORE FRIABLE TOWARDS BASE OF MEASUREMENT
79	99.30	100.04	0.74			MUDSTONE	DK.GY.SLD FAIRLY EASILY WEATHERED
78	100.04	102.23	2.19			MUDSTONE	SLTY.DK.GY.BRKN FAIRLY EASILY WEATHERED TO SMALL PIECES ;ABUNDANT COALY STRINGERS (1MM) PARALLE L TO BEDDING;QUARTZ, ANKERITE(?) BED TO WARDS TOP OF MEASUREMENT (0.01M)
78	102.23	102.35	0.12			MUDSTONE	DK.GY.BRKN MINOR CALCITE, ANKERITE(?) VEINING AND COAL MATERIAL (5MM)
78	102.35	102.37	0.02			COAL	C-2.BLK.BRKN CALCITE VEINING, ANKERITE(?) VEINING
78	102.37	102.46	0.09			MUDSTONE	DK.GY.VBRKN MODERATELY CARB;SOME COALY STRINGERS
78	102.46	102.53	0.07			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 77	102.53	104.35	1.82			SANDSTONE	FG-.MOD.M.GY.THNB.BRKN MINOR COALY BAND AT TOP (2MM);CALCITE V EINING NORMAL TO BEDDING (1MM); DK GREY SILTSTONE INTERBEDS THROUGHOUT;IRON ST AINING ON FRACTURE NEAR TOP OF MEASUREM ENT
* 63	104.35	105.34	0.99			SANDSTONE	FG.MOD.LT.GY.THNB.BRKN MINOR CALCITE, ANKERITE(?) VEINING AT B OTTOM (1MM);IRON STAINING ALONG FRACTUR E SURFACES
67	105.34	105.95	0.61			SANDSTONE	FG.MEL.LT.GY.BRKN IRON STAINING ON FRACTURE SURFACES
70	105.95	106.36	0.41			SANDSTONE	FG.MOD.LT.GY.SLD IRON STAINING ON FRACTURE SURFACES;SILT STONE BEDS TOWARDS TOP OF MEASUREMENT
72	106.36	106.69	0.33			SILTSTONE	M.GY.SLD COALY INCLUSIONS (0.01M);CALCITE, ANKER ITE(?) VEINING SURROUNDING INCLUSIONS
* 76	106.69	107.65	0.96			SANDSTONE	FG.MOD.M.GY.THNB.SSD.BRKN SILTSTONE INTERBEDS TOWARDS MIDDLE SECT ION OF MEASUREMENT;CORE SPIN OUT;SLIGHT LY CALCAREOUS IN MIDDLE SECTION

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	107.65	108.62	0.97			SILTSTONE	DK.GY.VTHNB.SSD.BRKN MUDDY;MOTTLED IN SOME LAMINATIONS;MINOR COAL INCLUSIONS;CALCITE, ANKERITE(?) V EINING SURROUNDING INCLUSIONS
* 73	108.62	110.11	1.49			SILTSTONE	M-DK.GY.VTHNB.BRKN 1MM MINOR CALCITE, ANKERITE(?) STRINGER S; MINOR COALY INCLUSIONS AROUND CALCIT E; PLANT FOSSILS
72	110.11	110.57	0.46			SILTSTONE	M-DK.GY.SLD CALCITE,ANKERITE(?) ALONG FRACTURES; SI LTSTONE BECOMING SANDY TOWARDS BASE OF MEASUREMENT
* 72	110.57	111.51	0.94			SANDSTONE	FG.MEL.M.GY.VTHNB.SSD.SLD IRON STAINING ON FRACTURE SURFACES;MINO R DK GREY SILTSTONE LAMINATIONS
72	111.51	111.68	0.17			SILTSTONE	SSY.M.GY.SLD LT GREY SANDY LAMINATIONS THROUGHOUT;IR ON STAINING ALONG FRACTURES
* 72	111.68	112.78	1.10			SANDSTONE	SLTY.FG.MEL.M.GY.VTHNB.SSD.SLD DK GREY SILTSTONE LAMINATIONS THROUGHOU T

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	112.78	112.93	0.15			SANDSTONE	FG.MEL.M.GY.THNB.SLD
* 73	112.93	113.79	0.86			SANDSTONE	FG.MOD.M.GY.THNB.WRMBU.SLD SSD;IRON STAINING ALONG FRACTURE SURFAC ES;DK GREY SILTSTONE INTERBEDS THROUGHO UT
74	113.79	113.93	0.14			SILTSTONE	SSY.M-DK.GY.VTHNB.SLD LT GREY SANDY LAMINATIONS TOWARDS BASE OF MEASUREMENT
* 75	113.93	114.87	0.94			SANDSTONE	SLTY.MOD.M.GY.VTHNB.SSD.BRKN WRMBUR;2 CALCITE VEINS NORMAL TO BEDDIN G (0.01M);IRON STAINING ALONG FRACTURE SURFACES
* 73	114.87	115.49	0.62			SANDSTONE	SLTY.FG.MOD.M.GY.VTHNB.SSD.SLD WRMBUR;CALCITE VEIN (0.01M) NORMAL TO B EDDING; DARK GREY SILTSTONE LAMINATIONS THROUGHOUT
71	115.49	116.88	1.39			SANDSTONE	SLTY.FG.MOD.M.GY.VTHNB.SSD.BRKN CALCITE VEINS (5MM) NORMAL TO BEDDING T HROUGHOUT;IRON STAINING ALONG FRACTURE SURFACES;LAST 0.03M CONTAIN SILTSTONE B RECCIA IN CALCITE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 68	116.88	118.31	1.43			SANDSTONE	FG.MOD.M.GY.VTHNB.SSD.BRKN IRON STAINING ALONG FRACTURE SURFACES;M INOR 1MM CALCITE STRINGERS;DK GREY SILT STONE LAMINATIONS
69	118.31	118.39	0.08			SILTSTONE	DK.GY.VTHNB.BRKN CALCITE,ANKERITE(?) VEINING NORMAL TO B EDDING
* 69	118.39	118.60	0.21			SANDSTONE	FG.M.GY.VTHNB.SLD INTERBEDDED SILTSTONE LAMINATIONS
69	118.60	118.69	0.09			CLAY	LT-M.GY.BRKN CONSOLIDATED
70	118.69	118.92	0.23			SANDSTONE	FG.M.GY.VTHNB.BRKN SILTSTONE LAMINATIONS THROUGHOUT
* 73	118.92	120.60	1.68			SANDSTONE	FG.MOD.M.GY.THNB.BRKN SILTSTONE INTERBEDS MORE FREQUENT TOWAR DS TOP OF MEASUREMENT;IRON STAINING; CA LCITE,ANKERITE(?) VEINING
73	120.60	120.80	0.20			SANDSTONE	FG.M.GY.THNB.BRKN DK GREY SILTSTONE INTERBEDS;CALCITE VEI NING (0.01M) AT TOP OF MEASUREMENT
73	120.80	120.86	0.06			CLAY	M.GY.SLD CONSOLIDATED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
72	120.86	120.94	0.08			SANDSTONE	MOD.M.GY.THNB.BRKN MINOR SILTSTONE INTERBEDS
* 72	120.94	123.05	2.11			SANDSTONE	FG.WEL.M.GY.THNB.XBDG.BRKN XBDG INDICATES TOPS UPRIGHT;CALCITE,ANK ERITE(?) VEINING AND IRON STAINING ON F RACTURE SURFACES; SOME DK GREY SILTSTONE LAMINATIONS
* 73	123.05	123.49	0.44			SANDSTONE	FG.WEL.M.GY.THNB.SLD MINOR SILTSTONE LAMINATIONS IN MIDDLE S ECTION OF MEASUREMENT
59	123.49	125.02	1.53			SANDSTONE	FG.WEL.M.GY.THNB.BRKN CALCITE VEIN (5MM) NORMAL TO BEDDING IN MIDDLE SECTION; MINOR CALCITE, ANKERIT E(?) VEINING (1MM) TOWARDS BASE; SOME S ILTSTONE LAMINATIONS THROUGHOUT
* 47	125.02	125.16	0.14			SANDSTONE	FG.WEL.M.GY.THNB.BRKN NUMEROUS CALCITE,ANKERITE(?) STRINGERS (1MM) NORMAL TO BEDDING; NOTICEABLE CHA NGE IN BCA WITHIN THIS UNIT
* 66	125.16	126.07	0.91			SANDSTONE	FG.WEL.M.GY.THNB.VBRKN CALCITE VEINING (5MM) AT BASE OF MEASUR EMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	126.07	126.31	0.24			SANDSTONE	FG.MEL.M.GY.THNB.SLD LARGE CALCITE VEINING (30% OF MEASURED INTERVAL);MINOR ISOLATION OF SANDSTONE TO FORM BRECCIA;MICRO BEDDING FAULTS (0.01M DISPLACEMENT)
* 80	126.31	126.94	0.63			SANDSTONE	FG.MEL.M.GY.VTHNB.SSD.BRKN SILTSTONE LAMINATIONS TOWARDS TOP OF MEASUREMENT
* 80	126.94	127.58	0.64			SANDSTONE	VFG.MEL.M-DK.GY.VTHNB.BRKN SANDSTONE WITHIN CALCITE BRECCIA FORMING 0.04M BAND;MINOR CALCITE VEINING (0.02M) THROUGHOUT;MINOR DK GREY SILTSTONE LAMINATIONS
* 79	127.58	128.70	1.12			SILTSTONE	SSY.DK.GY.VTHNB.XBDG.BRKN SED STRUCTURES INDICATE TOPS UPRIGHT; HEAVILY CALCITE VEINED FORMING BRECCIA; LT GREY SILTSTONE LAMINATIONS THROUGHOUT
77	128.70	128.74	0.04			SILTSTONE	SSY.DK.GY.VTHNB.SLD MAJOR CALCITE, ANKERITE(?) VEINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 73	128.74	130.70	1.96			SILTSTONE	SSY.DK.GY.VTHNB.VBRKN CALCITE, ANKERITE(?) VEINING (1MM) THROUGHOUT; 0.04M BAND OF CALCITE BRECCIA; LT GREY SILTSTONE LAMINATIONS THROUGHOUT
68	130.70	130.81	0.11			ROCK LOSS	
67	130.81	131.05	0.24			SILTSTONE	DK.GY.VTHNB.VBRKN
* 64	131.05	132.12	1.07			SILTSTONE	DK.GY.VTHNB.BRKN MINOR LISTRIC SURFACES ALONG BEDDING
* 68	132.12	132.72	0.60			SANDSTONE	SLTY.VFG.MEL.LT-M.GY.VTHNB.SLD SLIGHTLY CALCAREOUS;DK GREY SILTSTONE LAMINATIONS THROUGHOUT
71	132.72	132.86	0.14			SANDSTONE	FG.MEL.M.GY.THKB.SLD CALCAREOUS;MINOR CALCITE, ANKERITE(?) VEINING (1MM) THROUGHOUT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 72	132.86	133.03	0.17			SILTSTONE	DK.GY.VTHNB.SLD
73	133.03	133.42	0.39			MUDSTONE	DK.GY.BRKN COALY INCLUSIONS (5MM);MINOR CALCITE, A NKERITE(?) VEINING (1MM)
75	133.42	133.70	0.28	06363	G	COAL LOSS	
76	133.70	133.74	0.04	06363	G	COAL	C-4.BLK.SLD
76	133.74	133.75	0.01	06363	G	COAL	C-1.BLK.SLD CALCITE, ANKERITE(?) STRINGERS ALONG BE DDING (1MM)
76	133.75	133.79	0.04	06363	G	COAL	C-4.BLK.SLD
77	133.79	133.97	0.18	06363	G	MUDSTONE	DK.GY.SLD COAL STRINGERS THROUGHOUT
77	133.97	133.99	0.02	06363	G	COAL	C-3.BLK.SLD CALCITE, ANKERITE(?) VEINING ALONG BEDD ING (1MM)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	133.99	134.06	0.07	06363	G	MUDSTONE	DK.GY.BRKN
78	134.06	134.10	0.04	06363	G	COAL	C-3.BLK.SLD CALCITE, ANKERITE(?) VEINING ALONG BEDD ING (1MM); MINOR CLAYSTONE LAMINATIONS TOWARDS TOP
* 78	134.10	134.13	0.03	06363	G	COAL	C-2.BLK.SLD CALCITE,ANKERITE(?) STRINGERS THROUGHOU T
78	134.13	134.17	0.04	06363	G	MUDSTONE	DK.GY CALCITE, ANKERITE(?) VEINING THROUGHOUT ;MINOR COALY INCLUSIONS
78	134.17	134.24	0.07	06363	G	COAL	C-2.BLK.SLD ABUNDANT CALCITE, ANKERITE(?) VEINING T HROUGHOUT
78	134.24	134.28	0.04	06363	G	COAL	C-3.BLK.BRKN LISTRIC SURFACES ALONG SOME BEDDING;FRI ABLE
79	134.28	134.69	0.41	06363	G	COAL	C-2.BLK.VBRKN VERY EASILY WEATHERED;ALMOST POWDER WHE N BROKEN;LISTRIC SURFACES ALONG SOME BE DDING PLANES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	134.69	134.77	0.08	06363	G	COAL	C-3.BLK.SLD EASILY BRKN;CALCITE, ANKERITE(?) VEININ G (1MM)
79	134.77	134.85	0.08	06363	G	COAL	C-2.BLK.VBRKN
79	134.85	134.90	0.05	06363	G	COAL	C-3.BLK.SLD
79	134.90	134.92	0.02	06363	G	COAL	C-2.BLK.SLD
79	134.92	134.98	0.06	06363	G	COAL	C-3.BLK.VBRKN
79	134.98	135.02	0.04	06363	G	COAL LOSS	
80	135.02	135.11	0.09	06363	G	MUDSTONE	VBRKN COALY STRINGERS THROUGHOUT
80	135.11	135.19	0.08	06363	G	COAL	C-2.BLK.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 80	135.19	135.57	0.38	06363	G	COAL	C-2.BLK.VBRKN
79	135.57	135.64	0.07	06363	G	MUDSTONE	BLK.SLD COALY STRINGERS THROUGHOUT
78	135.64	135.67	0.03	06363	G	COAL	C-3.BLK.SLD
78	135.67	135.76	0.09	06363	G	MUDSTONE	SLD ABUNDANT COALY STRINGERS
78	135.76	135.81	0.05	06363	G	COAL	C-2.BLK.SLD
77	135.81	135.95	0.14	06363	G	CLAYSTONE	CARB.BLK.SLD COALY STRINGERS ABUNDANT;MINOR (1MM) CA LCITE, ANKERITE(?) VEINS
77	135.95	136.01	0.06	06363	G	COAL	C-2.BLK.SLD
76	136.01	136.05	0.04	06363	G	COAL	C-5.BLK.SLD
* 76	136.05	136.10	0.05	06363	G	MUDSTONE	BLK.SLD COAL STRINGERS THROUGHOUT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	136.10	136.12	0.02	06363	G	COAL	C-2.BLK.BRKN
76	136.12	136.15	0.03	06363	G	COAL	C-3.BLK.SLD
78	136.15	136.55	0.40	06363	G	COAL	C-2.BLK.VBRKN VERY EASILY WEATHERED TOWARDS TOP OF ME ASUREMENT
79	136.55	136.60	0.05	06363	G	COAL	C-3.BLK.SLD
* 79	136.60	136.61	0.01	06363	G	COAL	C-2.BLK.SLD
79	136.61	136.63	0.02	06363	G	COAL	C-3.BLK.SLD
79	136.63	136.73	0.10	06363	G	COAL	C-2.BLK.SLD
80	136.73	136.79	0.06	06363	G	CLAYSTONE	CARB.BLK.SLD LISTRIC SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	136.79	136.81	0.02	06363	G	COAL	C-3.BLK.BRKN
80	136.81	136.83	0.02	06363	G	COAL	C-2.BLK.BRKN
81	136.83	136.88	0.05	06363	G	CLAYSTONE	CARB.BLK.SLD COAL STRINGERS ABUNDANT;LISTRIC SURFACE S ALONG BEDDING
* 81	136.88	136.96	0.08	06363	G	COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
81	136.96	136.97	0.01	06363	G	CLAYSTONE	BLK.SLD ABUNDANT COAL STRINGERS
80	136.97	137.07	0.10	06363	G	COAL	C-2.BLK.SLD THIN CALCITE,ANKERITE(?) STRINGERS THRO UGHOUT
80	137.07	137.17	0.10	06363	G	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING
79	137.17	137.21	0.04	06363	G	COAL	C-2.BLK.SLD
79	137.21	137.25	0.04	06363	G	CLAYSTONE	CARB.BLK.SLD COAL STRINGERS ABUNDANT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	137.25	137.30	0.05	06363	G	COAL	C-2.SLD CALCITE, ANKERITE(?) STRINGERS ABUNDANT
* 78	137.30	137.36	0.06	06363	G	CLAYSTONE	CARB.DK.GY.SLD CALCITE, ANKERITE(?) STRINGERS ALONG BE DDING
78	137.36	137.41	0.05	06363	G	COAL	C-2.BLK.SLD
78	137.41	137.43	0.02	06363	G	COAL	C-3.BLK.SLD
78	137.43	137.55	0.12	06364	G	CLAYSTONE	CARB.BLK.SLD COAL STRINGERS THROUGHOUT;MINOR LISTRIC SURFACES
* 79	137.55	138.22	0.67	06364	G	MUDSTONE	DK.GY MINOR CALCITE, ANKERITE(?) TOWARDS BOTT OM OF MEASUREMENT; LISTRIC SURFACES
80	138.22	138.24	0.02	06365	G	COAL	C-3.BLK.SLD
80	138.24	138.34	0.10	06365	G	COAL	C-5.BRKN CARBONACEOUS CLAYSTONE INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	138.34	138.40	0.06	06365	G	COAL	C-3.BLK.SLD
80	138.40	138.43	0.03	06365	G	COAL	C-2.BLK.SLD
80	138.43	138.48	0.05	06365	G	MUDSTONE	BLK.SLD MINOR COAL STRINGERS
* 80	138.48	138.51	0.03	06365	G	COAL	C-4.BLK.SLD
80	138.51	138.59	0.08	06365	G	COAL	C-3.BLK.SLD
80	138.59	138.70	0.11	06365	G	COAL LOSS	
80	138.70	138.89	0.19	06365	G	MUDSTONE	BLK.VBRKN MINOR COAL STRINGERS THROUGHOUT
80	138.89	138.99	0.10	06365	G	COAL	C-2.BLK.SLD
80	138.99	139.04	0.05	06365	G	COAL	C-5.BLK.SLD CALCITE, ANKERITE VEINS ALONG BEDDING T OWARDS BOTTOM OF MEASUREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	139.04	139.14	0.10	06365	G	CLAYSTONE	BLK.SLD
80	139.14	139.15	0.01	06365	G	COAL	C-2.BLK.SLD
* 80	139.15	139.19	0.04	06365	G	COAL	C-5.BLK.SLD MINOR CALCITE, ANKERITE(?) VEINING ALON G BEDDING
79	139.19	139.31	0.12			CLAYSTONE	COAL STRINGERS THROUGHOUT
79	139.31	139.32	0.01			COAL	C-2.BLK.SLD
78	139.32	139.55	0.23			MUDSTONE	BLK.BRKN COAL STRINGERS THROUGHOUT
76	139.55	139.80	0.25			MUDSTONE	BLK.SLD
75	139.80	139.86	0.06			CLAYSTONE	CARB.BLK.VBRKN VERY EASILY WEATHERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	139.86	140.26	0.40			MUDSTONE	BLK.BRKN LISTRIC SURFACES ON BEDDING;CALCITE, AN KERITE(?) STRINGERS; COALY INCLUSIONS; MINOR PLANT FOSSILS
* 68	140.26	141.30	1.04			MUDSTONE	DK.GY.VTHNB.SSD.SLD SED STRUCTURES INDICATE TOPS UPRIGHT;3M M POSSIBLE SELENITE VEIN (LT GREEN)
74	141.30	141.71	0.41			SILISTONE	DK.GY.VBRKN CONSOLIDATED BUT POWDERS WHEN HAMMERED; BECOMES CARBONACEOUS TOWARDS BOTTOM WIT H LISTRIC SURFACES;CALCITE, ANKERITE(?) VEINS
75	141.71	141.78	0.07			SANDSTONE	FG.MOD.M.GY.BRKN LISTRIC SURFACES;EASILY WEATHERED
* 77	141.78	142.11	0.33			SANDSTONE	FG.MOD.M.GY.THNB.SLD VERY EASILY WEATHERED
78	142.11	142.32	0.21			SILISTONE	DK.GY.SLD CLAYEY WHEN BROKEN; MINOR CALCITE, ANKE RITE(?) VEINING; LISTRIC SURFACES
79	142.32	142.45	0.13			CLAYSTONE	CARB.BLK.SLD COAL STRINGERS THROUGHOUT;LISTRIC SURFA CES AND CALCITE, ANKERITE(?) VEINING TH ROUGHOUT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	142.45	142.47	0.02	06367	G	COAL	C-2.BLK.SLD
80	142.47	142.49	0.02	06367	G	COAL LOSS	
80	142.49	142.63	0.14	06367	G	CLAYSTONE	CARB.BLK.SLD COALY STRINGERS & LISTRIC SURFACES; CAL CITE, ANKERITE(?) VEINING THROUGHOUT
* 81	142.63	142.81	0.18	06367	G	COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
80	142.81	142.84	0.03	06367	G	COAL	C-3.BLK.SLD
79	142.84	142.88	0.04	06367	G	COAL	C-2.BLK.BRKN
79	142.88	142.89	0.01	06367	G	MUDSTONE	BLK.SLD
78	142.89	143.05	0.16	06367	G	COAL	C-2.BLK.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 77	143.05	143.07	0.02	06367	G	COAL	C-3.BLK.SLD
77	143.07	143.10	0.03	06367	G	COAL	C-2.BLK.SLD
77	143.10	143.14	0.04	06367	G	COAL	C-3.BLK.BRKN CALCITE STRINGERS
77	143.14	143.17	0.03	06367	G	MUDSTONE	BLK.SLD COALY INCLUSIONS;MINOR CALCITE, ANKERIT E(?) STRINGERS
77	143.17	143.20	0.03	06367	G	COAL	C-3.BLK.SLD
77	143.20	143.33	0.13	06367	G	CLAYSTONE	CARB.BLK.SLD PLANT FOSSILS;MINOR CALCITE, ANKERITE(?) ALONG LISTRIC SURFACES
77	143.33	143.46	0.13	06367	G	COAL	C-5.BLK.VBRKN MINOR CALCITE, ANKERITE(?) STRINGERS; C ARBONACEOUS CLAYSTONE LAMINATIONS
77	143.46	143.50	0.04	06367	G	ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	143.50	143.68	0.18	06367 G		CLAYSTONE	CARB.BLK.BRKN ABUNDANT LISTRIC SURFACES;COAL STRINGER S;MINOR CALCITE, ANKERITE(?) STRINGERS
77	143.68	143.70	0.02	06367 G		COAL	C-2.BLK.BRKN
77	143.70	143.76	0.06	06367 G		CLAYSTONE	CARB.BLK.VBRKN LISTRIC SURFACES
77	143.76	143.86	0.10	06367 G		CLAYSTONE	CARB.CBL.BLK FAIRLY EASILY WEATHERED;MUDSTONE LAMINA TIONS;LISTRIC SURFACES;CALCITE, ANKERIT E(?) STRINGERS
77	143.86	143.98	0.12	06367 G		COAL	C-3.BLK.BRKN ABUNDANT LISTRIC SURFACES;EASILY BROKEN ;VERY CARBONACEOUS;MINOR COAL STRINGERS
78	143.98	144.24	0.26	06367 G		CLAYSTONE	CARB.BLK.BRKN COAL STRINGERS THROUGHOUT;ABUNDANT LIST RIC SURFACES
78	144.24	144.32	0.08	06367 G		COAL	C-3.BLK.BRKN CALCITE, ANKERITE(?) VEINING ALONG CLEA T SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	144.32	144.36	0.04	06367 G		COAL	C-4.BRKN CALCITE,ANKERITE(?) VEINING ALONG CLEAT SURFACES
78	144.36	144.37	0.01	06367 G		COAL	C-2.BLK.SLD
78	144.37	144.46	0.09	06367 G		CLAYSTONE	CARB.BLK.BRKN LISTRIC SURFACES ABUNDANT;COAL STRINGER S THROUGHOUT; CALCITE ANKERITE(?) VEINI NG (1MM)
78	144.46	144.47	0.01	06367 G		COAL	C-3.BLK.SLD
78	144.47	144.56	0.09	06367 G		COAL	C-4.BLK.BRKN
78	144.56	144.59	0.03	06367 G		COAL	C-2.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	144.59	144.72	0.13	06367	G	COAL	C-5.BLK.BRKN ABUNDANT LISTRIC SURFACES
78	144.72	144.74	0.02	06367	G	COAL LOSS	
78	144.74	144.75	0.01	06367	G	COAL	C-3.BLK.BRKN
78	144.75	144.79	0.04			CLAYSTONE	CARB.BLK.BRKN ABUNDANT LISTRIC SURFACES
* 78	144.79	145.06	0.27			MUDSTONE	BLK.SLD COALY STRINGERS TOWARDS BASE
78	145.06	145.07	0.01			COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) ALON G BEDDING
78	145.07	145.25	0.18			MUDSTONE	BLK.SLD COAL STRINGERS;CALCITE VEIN (3MM) ALONG BEDDING AT BASE
78	145.25	145.26	0.01			COAL	C-2.BLK.SLD CALCITE ALONG BEDDING (4MM)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	145.26	146.05	0.79			MUDSTONE	BLK.SLD CALCITE, ANKERITE(?) VEINING (2MM) ALON G BEDDING (MINOR); 5MM COALY BEDS SCATT ERED THROUGHOUT MAINLY AT TOP OF MEASUR EMENT
* 79	146.05	146.41	0.36			MUDSTONE	BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS (1 MM);COALY INCLUSIONS (2MM) THROUGHOUT
79	146.41	146.48	0.07			CLAY	M.GY.SLD CONSOLIDATED BUT POWDERED;POSSIBLY BENT ONITE
80	146.48	146.67	0.19			CLAYSTONE	CARB.BLK.BRKN MINOR COALY INCLUSIONS;POSSIBLE CHLORII E(?) (1MM)
80	146.67	146.73	0.06			MUDSTONE	BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) THRO UGHOUT; 2MM BED OF POSSIBLE CHLORITE AT TOP
* 81	146.73	148.12	1.39			SILTSTONE	DK.GY.VTHNB.SLD MINOR SANDSTONE LAMINATIONS NEAR BASE;W EATHERS EASILY TO SMALL PIECES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 80	148.12	148.38	0.26			SILTSTONE	DK.GY.VTHNB.SLD EASILY WEATHERS TO SMALL PIECES;MINOR L T GREY SANDSTONE LAMINATIONS
80	148.38	148.42	0.04			SANDSTONE	MG.S-P.GY.BRKN SILTSTONE RIP UP CLASTS (0.02M)
* 79	148.42	148.77	0.35			SILTSTONE	DK.GY.VTHNB.BRKN SOME LT GREY SANDSTONE LAMINATIONS;EASI LY WEATHERS TO SMALL PIECES
79	148.77	149.36	0.59			SILTSTONE	SSY.M.GY.VTHNB.BRKN EASILY WEATHERS TO SMALL PIECES;LT GREY SANDSTONE LAMINATIONS THROUGHOUT;MINOR PYRITE BEDS;0.02M BED OF CALCITE & ANK ERITE(?) & CHLORITE; MINOR COALY INCLUS IONS
80	149.36	149.70	0.34			SANDSTONE	MG.MOD.S-P.GY.THNB.BRKN SILTSTONE RIP-UP CLASTS CONFINED TO 0.0 5 METER INTERVAL; SILTSTONE BED (2MM) T OWARDS TOP OF MEASUREMENT
80	149.70	149.90	0.20			CLAYSTONE	M.GY.SLD EASILY TURNED TO CLAY WHEN EXPOSED TO W ATER

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	149.90	150.07	0.17			SILTSTONE	DK.GY.VTHNB.BRKN LISTRIC SURFACES;WHITE DEPOSIT ON LISTR IC SURFACES
* 80	150.07	150.80	0.73			SANDSTONE	MG.MOD.S-P.GY.MB.SLD SILTSTONE RIP UP CLASTS TOWARDS TOP OF MEASUREMENT;CALCITE VEIN 0.01M CROSS- C UTTING BEDDING
79	150.80	150.84	0.04			CLAYSTONE	M.GY.SLD TURNS TO CLAY WHEN WET
79	150.84	150.92	0.08			SILTSTONE	SSY.DK.GY.VTHNB.BRKN
* 78	150.92	152.03	1.11			SANDSTONE	FG-.S-P.GY.THNB.BRKN BECOMES FINER GRAINED TOWARDS BASE;CALC ITE VEIN (1MM) CROSS-CUTTING BEDDING
* 77	152.03	152.40	0.37			SANDSTONE	SLTY.M.GY.VTHNB.SSD.SLD DK GREY SILTSTONE LAMINATIONS THROUGHOU T;MINOR COALY INCLUSIONS TOWARDS TOP
78	152.40	153.27	0.87			SANDSTONE	FG.WEL.LT.GY.THNB.WRMBU SSD;SILTSTONE INTERBEDS FREQUENT TOWARD S TOP
79	153.27	153.40	0.13			SANDSTONE	FG.WEL.LT.GY.THNB.BRKN MINOR SILTSTONE LAMINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	153.40	153.50	0.10			SILTSTONE	DK.GY.VTHNB.SLD MINOR LT GREY SANDY LAMINATIONS;EASILY WEATHERS TO SMALL FRAGMENTS
79	153.50	153.55	0.05			SANDSTONE	FG.MOD.LT.GY.THNB.SLD
* 80	153.55	154.15	0.60			SILTSTONE	DK.GY.VTHNB.SLD MINOR LT GREY SANDSTONE LAMINATIONS;EAS ILY WEATHERED TO FRAGMENTS
80	154.15	155.10	0.95			MUDSTONE	DK.GY.SLD EASILY WEATHERED TO SHARDS
80	155.10	155.13	0.03			CLAYSTONE	M.GY EASILY TURNED TO CLAY WHEN WET-POSSIBLY DRILLERS' MUD AS NOT FORMING BED
80	155.13	155.39	0.26			MUDSTONE	DK.GY.SLD EASILY BROKEN TO SHARDS
80	155.39	155.55	0.16			SILTSTONE	M.GY.BRKN
80	155.55	155.89	0.34			MUDSTONE	DK.GY.SLD EASILY WEATHERED TO SHARDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	155.89	156.13	0.24			SILTSTONE	M.GY.VBRKN
79	156.13	156.31	0.18			SILTSTONE	DK.GY.VBRKN POSSIBLE ANKERITE(?) AND CHLORITE VEIN (5MM)
79	156.31	156.37	0.06			SANDSTONE	VFG.M.GY.THNB
79	156.37	156.72	0.35			SANDSTONE	FG.M.GY.THNB.SLD MINOR SILTSTONE CLASTS;CALCITE, ANKERII E(?) VEINING
79	156.72	156.77	0.05			SILTSTONE	SSY.M.GY.SLD
79	156.77	158.09	1.32			SANDSTONE	FG-.S-P.GY.THKB.BRKN IN MIDDLE OF UNIT-0.38M CONTAINING ABUN DANT CALCITE, ANKERITE(?) VEINING CROSS -CUTTING BEDDING THROUGHOUT; SOME SILTS TONE BEDS (0.01M)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 79	158.09	158.94	0.85			SANDSTONE	FG.WEL.M.GY.THNB.BRKN
* 75	158.94	159.77	0.83			SANDSTONE	FG-.MOD.S-P.GY.THNB.WRMBU.BRKN CALCITE, ANKERITE(?) VEINING ALONG FRACTURES; MINOR SILTSTONE INTERBEDS TOWARDS BASE
75	159.77	159.90	0.13			SANDSTONE	VFG.WEL.LT.GY.BRKN CALCITE, ANKERITE(?) VEINING ON FRACTURE SURFACES;MEDIUM GREY SILTSTONE INTERBEDS
76	159.90	160.14	0.24			SANDSTONE	VFG.WEL.LT.GY.BRKN CALCITE,ANKERITE(?) VEINING ON FRACTURE SURFACES; MEDIUM GREY SILTSTONE INTERBEDS
* 76	160.14	160.88	0.74			SANDSTONE	FG-.WEL.M.GY.THNB.BRKN CALCITE VEINING ON FRACTURE SURFACES;SILTSTONE BEDS (5MM) TOWARDS TOP

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	160.88	161.86	0.98			SANDSTONE	FG-.WEL.M.GY.MB.BRKN FAIRLY MASSIVE;SOME SILTSTONE BEDS TOWARDS BASE (5MM);WHITE DEPOSIT (TALC?) ON FRACTURE SURFACES WITH CALCITE, ANKERITE(?)
* 79	161.86	161.99	0.13			SANDSTONE	SLTY.FG.WEL.M-DK.GY.VTHNB.WRMBU.SLD MINOR FAULT (5MM) CROSS-CUTTING BEDS;CALCITE, ANKERITE(?) VEINING(1MM) CROSS-CUTTING BEDDING
79	161.99	162.19	0.20			SANDSTONE	VFG.WEL.LT.GY.THNB.SLD CALCAREOUS;MINOR CALCITE, ANKERITE(?) VEINING (1MM) NORMAL TO BEDDING
78	162.19	163.68	1.49			SANDSTONE	FG-.MOD.S-P.GY.THKB.BRKN MASSIVE;MINOR CALCITE,ANKERITE(?)VEINING NORMAL TO BEDDING; TALC(?) ALONG BEDDING
* 77	163.68	164.33	0.65			SANDSTONE	FG.WEL.M.GY.THNB.SLD TALC(?) AND LISTRIC SURFACES ALONG BEDDING & POSSIBLY CHLORITE
* 75	164.33	164.54	0.21			SANDSTONE	SLTY.VFG.WEL.M.GY.VTHNB.WRMBU.SLD MINOR BIOTURBATION;DK GREY SILTY INTERBEDS THROUGHOUT;WRMBUR 0.09M LONG

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	164.54	164.64	0.10			SANDSTONE	FG.MEL.S-P.GY.THNB.SSD.SLD MINOR SILTSTONE LAMINATIONS
* 73	164.64	165.63	0.99			SILISTONE	SSY.M.GY.VTHNB.BIOTR.SLD LT GREY SANDSTONE LAMINATIONS THROUGHOU T;MINOR BIOTURBATION
77	165.63	165.67	0.04			SILTSTONE	M-DK.GY.VTHNB.SLD SOME LT GREY SANDY LAMINATIONS
78	165.67	165.73	0.06			SANDSTONE	FG.MEL.LT.GY.SLD
* 81	165.73	166.52	0.79			SILTSTONE	SSY.M-DK.GY.VTHNB.BIOTR.SLD WRMBURS INDICATE TOPS POSSIBLY UPRIGHT; LT GREY SANDSTONE LAMINATIONS THROUGHOU T;MINOR QUARTZ, ANKERITE(?) VEINING ALO NG FRACTURES
* 75	166.52	167.67	1.15			SILTSTONE	M-DK.GY.VTHNB.BIOTR.BRKN 0.02M INTERBED OF CALCITE & QUARTZ;SAND Y LAMINATIONS LESS FREQUENT TOWARDS BAS E
76	167.67	167.78	0.11			SILTSTONE	M-DK.GY.VTHNB.BRKN MINOR LT GREY SANDSTONE LAMINATONS
78	167.78	169.80	2.02			MUDSTONE	DK.GY.SLD VERY EASILY WEATHERED TO SHARDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	169.80	170.05	0.25			MUDSTONE	DK.GY.SLD EASILY WEATHERED TO SHARDS
81	170.05	170.41	0.36			SANDSTONE	FG.MEL.M-DK.GY.BRKN ABUNDANT 1MM WHITE SPHERES GIVING SPECK LED APPEARANCE;UNIT SEEMS TO FINGER OUT OVERLYING MUDSTONE; DK GREY CLAY FORMS CONTACT
* 83	170.41	171.86	1.45			SILISTONE	SSY.DK.GY.VTHNB.XBDG.BRKN MINOR BIOTURBATION;XBDG INDICATES TOPS UPRIGHT;MINOR 1MM CALCITE,ANKERITE(?) V EIN; MEDIUM GREY SANDY LAMINATIONS THRO UGHOUT
* 88	171.86	172.68	0.82			SILISTONE	M-DK.GY.VTHNB.SLD LT GREY SANDSTONE LAMINATIONS;VERY EASI LY WEATHERED TO SHARDS
* 78	172.68	173.93	1.25			SILTSTONE	SSY.M-DK.GY.VTHNB.BIOTR.SLD BIOTURBATION MINOR & CONFINED TO 0.01M; LT GREY SANDSTONE LAMINATIONS;EASILY WE ATHERED TO SHARDS
* 81	173.93	174.70	0.77			SANDSTONE	SLTY.MEL.M.GY.VTHNB.XBDG.BRKN SSD;XBDG INDICATES TOPS UPRIGHT;VERY EA SILY WEATHERED TO SHARDS;DK GREY SILTST ONE LAMINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 89	174.70	176.01	1.31			SILTSTONE	SSY.DK.GY.VTHNB.WRMBU.SLD LT GREY SANDY LAMINATIONS;VERY EASILY W EATHERED TO SHARDS
87	176.01	176.20	0.19			SILTSTONE	SSY.DK.GY.VTHNB.SLD EASILY WEATHERED TO SHARDS; LT GREY SAN DSTONE LAMINATIONS
87	176.20	176.52	0.32			SANDSTONE	SLTY.VFG.WEL.M.GY.THNB.SLD VERY EASILY WEATHERED TO SHARDS;SILTSTO NE INTERBEDS
86	176.52	176.56	0.04			CLAYSTONE	M.GY.SLD TURNS TO CLAY WHEN WET
86	176.56	176.98	0.42			SILTSTONE	DK.GY.VTHNB.SLD EASILY WEATHERED TO SHARDS;LT GREY SAND STONE LAMINATIONS
* 85	176.98	177.26	0.28			SANDSTONE	SLTY.VFG.WEL.M.GY.VTHNB.XBDG.SLD RYTHMIC BANDING OF SILTSTONE AND SANDST ONE LAMINATIONS (DISTINCTIVE)
78	177.26	177.94	0.68			SILTSTONE	DK.GY.VTHNB.XBDG.SLD VERY EASILY WEATHERED TO PIECES;XBDG IN DICATES TOPS UPRIGHT
73	177.94	178.03	0.09			SILTSTONE	DK.GY.VTHNB.SLD WAS FRACTURED BUT CEMENTED BY CLAY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 67	178.03	178.80	0.77			SILTSTONE	SSY.DK.GY.VTHNB.BRKN CALCITE VEINING ALONG FRACTURE SURFACES ;QUARTZ.ANKERITE(?) VEIN (0.02M) TOWARD S BASE WITH CHLORITE AND CALCITE; MICRO FAULTING (0.01M); FRACTURES INFILLED W ITH CLAY
* 73	178.80	179.21	0.41			SANDSTONE	SLTY.VFG.WEL.M.GY.VTHNB.XBDG.BRKN SSD;RYTHMIC BANDING OF SANDSTONE AND SI LTSTONE;XBDG INDICATES TOPS UPRIGHT
* 71	179.21	179.38	0.17			SILTSTONE	DK.GY.THNB.BRKN
72	179.38	180.07	0.69			SILTSTONE	SSY.DK.GY.VTHNB.SSD.SLD MINOR CALCITE, ANKERITE VEINING; LIGHT GREY SANDSTONE LAMINATIONS
73	180.07	180.39	0.32			MUDSTONE	BLK.SLD
* 74	180.39	180.62	0.23			SANDSTONE	FG.WEL.DK.GY.THNB.SLD SORTING WELL TO MODERATE;CONTAINS 1MM W HITE SPECKS TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	180.62	180.71	0.09	06368	F	COAL	C-3.BLK.SLD MINOR 1MM CALCITE, ANKERITE(?) VEINING ON CLEAT SURFACES
78	180.71	180.74	0.03	06368	F	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING, MINOR CALCITE ,ANKERITE(?) VEINING (1MM)
79	180.74	180.83	0.09	06368	F	COAL	C-2.SLD MINOR CALCITE STRINGERS;DISSEMINATED PY RITE
79	180.83	180.84	0.01	06368	F	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURUNG
80	180.84	180.92	0.08	06368	F	COAL	C-2.BLK.SLD DISSEMINATED PYRITE ON BEDDING PLANES;M INOR CALCITE, ANKERITE(?) STRINGERS
81	180.92	180.93	0.01	06368	F	COAL	C-3.BLK.SLD 1MM PYRITE ON CLEAT SURFACES
82	180.93	181.07	0.14	06368	F	COAL	C-2.BLK.SLD MINOR CALCITE,ANKERITE(?) STRINGERS; MI NOR PYRITE(1MM) ON CLEAT SURFACES
83	181.07	181.09	0.02	06368	F	COAL	C-1.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 84	181.09	181.15	0.06	06368	F	COAL	C-2.BLK.SLD 1MM MUDSTONE;DISSEMINATED PYRITE ON BED DING PLANES
83	181.15	181.24	0.09	06368	F	COAL	C-2.BLK.SLD PYRITE 1MM ON CLEAT SURFACES
83	181.24	181.25	0.01	06368	F	CLAYSTONE	CARB.BLK.SLD LISTRIC SURFACES
83	181.25	181.31	0.06	06368	F	COAL	C-4.BLK.SLD MINOR CALCITE, ANKERITE(?) ON CLEAT SUR FACES
82	181.31	181.34	0.03	06368	F	COAL	C-2.BLK.SLD PYRITE (1MM) ON CLEAT SURFACES
82	181.34	181.36	0.02	06368	F	COAL	C-1.BLK.SLD
82	181.36	181.40	0.04	06368	F	COAL	C-2.BLK.SLD
81	181.40	181.42	0.02	06368	F	COAL	C-1.BLK.SLD
81	181.42	181.46	0.04	06368	F	COAL	C-2.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	181.46	181.51	0.05	06368	F	CLAYSTONE	BLK.BRKN LISTRIC SURFACES AND QUARTZ VEINS WITHI N
80	181.51	181.55	0.04	06368	F	COAL	C-2.BLK.BRKN
80	181.55	181.62	0.07	06368	F	COAL	C-2.BLK.BRKN
80	181.62	181.63	0.01	06368	F	COAL	C-4.BLK.BRKN
* 77	181.63	182.21	0.58	06368	F	COAL	C-2.BLK.SLD EASILY BROKEN;SOME LISTRIC SURFACES
77	182.21	182.23	0.02	06368	F	COAL	C-1.BLK.SLD
77	182.23	182.25	0.02	06368	F	COAL	C-2.BLK.SLD MINOR (1MM) CALCITE, ANKERITE(?) STRING ERS
77	182.25	182.29	0.04	06368	F	COAL	C-2.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	182.29	182.32	0.03	06368	F	COAL	C-1.BLK.SLD
77	182.32	182.53	0.21	06368	F	COAL	C-2.BLK.BRKN LISTRIC SURFACES; EASILY BROKEN
77	182.53	182.56	0.03	06368	F	COAL	C-3.BLK.SLD
77	182.56	182.61	0.05	06368	F	COAL	C-2.BLK.BRKN
78	182.61	182.82	0.21	06368	F	COAL	C-2.BLK.BRKN MINOR CALCITE, ANKERITE(?) STRINGERS
78	182.82	182.93	0.11	06368	F	COAL	C-2.DK LISTRIC SURFACES
78	182.93	182.98	0.05	06368	F	COAL	C-5.BLK.BRKN
78	182.98	183.10	0.12	06369	F	CLAYSTONE	BLK.BRKN COALY STRINGER;MINOR CALCITE, ANKERITE(?) VEINING
78	183.10	183.11	0.01	06369	F	COAL	C-2.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	183.11	183.14	0.03	06369	F	CLAYSTONE	BLK.SLD COALY STRINGERS WITHIN
78	183.14	183.19	0.05	06369	F	COAL	C-3.BLK.SLD
78	183.19	183.25	0.06	06369	F	CLAYSTONE	BLK.SLD MINOR DISSEMINATED PYRITE;MINOR QUARTZ, ANKERITE(?) VEINING
78	183.25	183.32	0.07	06370	F	COAL	C-4.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
78	183.32	183.36	0.04	06370	F	COAL	C-3.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
78	183.36	183.37	0.01	06370	F	COAL	C-2.BLK.SLD
* 78	183.37	183.44	0.07	06370	F	COAL	C-3.BLK.SLD
78	183.44	183.48	0.04	06370	F	COAL	C-4.BLK.SLD
78	183.48	183.55	0.07	06370	F	CLAYSTONE	BLK.SLD ABUNDANT COAL STRINGERS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	183.55	183.60	0.05	06370	F	COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
79	183.60	183.62	0.02	06370	F	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING
79	183.62	183.67	0.05	06370	F	COAL	C-4.BLK.SLD
79	183.67	183.73	0.06	06370	F	COAL	C-3.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
79	183.73	183.74	0.01	06370	F	COAL	C-1.BLK.SLD
* 79	183.74	183.78	0.04	06370	F	COAL	C-2.BLK.SLD
79	183.78	183.88	0.10	06370	F	COAL	C-3.BLK.SLD LISTRIC SURFACES
79	183.88	183.89	0.01	06370	F	COAL	C-1.BLK.SLD
79	183.89	184.02	0.13	06370	F	COAL	C-3.BLK.SLD
79	184.02	184.04	0.02	06370	F	COAL	C-2.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	184.04	184.05	0.01	06370	F	COAL	C-1.BLK.SLD
78	184.05	184.11	0.06	06370	F	COAL	C-5.BLK.SLD
78	184.11	184.16	0.05	06370	F	MUDSTONE	BLK.SLD ABUNDANT COAL STRINGERS
78	184.16	184.18	0.02	06370	F	COAL	C-2.BLK.SLD
78	184.18	184.19	0.01	06370	F	COAL	C-2.BLK.SLD
78	184.19	184.21	0.02	06370	F	COAL	C-3.BLK.SLD
78	184.21	184.27	0.06	06370	F	COAL	C-2.BLK.SLD
78	184.27	184.30	0.03	06370	F	COAL	C-3.BLK.SLD
78	184.30	184.32	0.02	06370	F	CLAYSTONE	CARB.BLK.SLD COAL STRINGERS
* 78	184.32	184.34	0.02	06370	F	COAL	C-3.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	184.34	184.35	0.01	06370	F	COAL	C-2.BLK.SLD
78	184.35	184.39	0.04	06370	F	COAL	C-3.BLK.SLD
78	184.39	184.40	0.01	06370	F	COAL	C-1.BLK.SLD MINOR CALCITE, ANKERITE(?) ON CLEAT SUR FACES
77	184.40	184.45	0.05	06370	F	COAL	C-2.BLK.SLD
77	184.45	184.48	0.03	06370	F	COAL	C-3.BLK.SLD
77	184.48	184.51	0.03	06370	F	COAL	C-2.BLK.SLD MINOR CALCITE AND QUARTZ, ANKERITE(?) S TRINGERS
77	184.51	184.54	0.03	06370	F	COAL	C-5.BLK.SLD
77	184.54	184.56	0.02	06370	F	COAL	C-2.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	184.56	184.61	0.05	06370	F	COAL	C-5.BLK.SLD
76	184.61	184.62	0.01	06370	F	COAL	C-2.BLK.SLD
76	184.62	184.65	0.03	06370	F	COAL	C-5.BLK.SLD
76	184.65	184.88	0.23	06371	F	CLAYSTONE	CARB.BLK.SLD CONTAINING COAL STRINGERS THROUGHOUT;VERY HARD;MINOR CALCITE, ANKERITE(?) STRINGERS
75	184.88	184.89	0.01	06371	F	COAL	C-2.BLK.SLD
74	184.89	185.01	0.12	06371	F	CLAYSTONE	CARB.BLK.SLD MINOR CALCITE AND COAL STRINGERS
74	185.01	185.04	0.03	06371	F	COAL	C-5.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	185.04	185.10	0.06	06371	F	CLAYSTONE	CARB.BLK.XBDG.SLD CONTAINING COAL BEDS AND MINOR CALCITE, ANKERITE(?)
74	185.10	185.12	0.02	06371	F	COAL	C-3.BLK.SLD
74	185.12	185.13	0.01	06371	F	COAL	C-1.BLK.SLD SUBCONCHOIDAL FRACTURING
73	185.13	185.15	0.02	06371	F	COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING (2MM) ON BEDDING PLANES
73	185.15	185.17	0.02	06371	F	CLAYSTONE	CARB.BLK.SLD VERY HARD; MINOR CALCITE STRINGERS
73	185.17	185.21	0.04	06371	F	COAL	C-1.BLK.SLD CONCHOIDAL FRACTURING:1MM CALCITE,ANKERITE(?) VEINING ON CLEAT SURFACES
* 73	185.21	185.22	0.01	06371	F	CLAYSTONE	CARB.BLK.SLD
73	185.22	185.26	0.04	06371	F	COAL	C-1.BLK.SLD CALCITE, ANKERITE(?) STRINGERS (2MM) ALONG BEDDING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	185.26	185.33	0.07	06371	F	COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) VEINS ON CLE AT SURFACES
73	185.33	185.34	0.01	06371	F	CLAYSTONE	CARB.BLK.SLD
73	185.34	185.39	0.05	06371	F	COAL	C-1.BLK.SLD CALCITE, ANKERITE(?) STRINGERS ON CLEAT SURFACES; MINOR CLAYSTONE LAMINATIONS
73	185.39	185.43	0.04	06371	F	COAL	C-4.BLK.SLD CLAYSTONE STRINGERS;CALCITE, ANKERITE(?) VEINING
73	185.43	185.44	0.01	06371	F	COAL	C-2.BLK.SLD
73	185.44	185.52	0.08	06371	F	CLAYSTONE	BLK.SLD CONTAINING CALCITE, ANKERITE(?) VEINING
73	185.52	185.54	0.02			COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING
73	185.54	185.57	0.03			COAL	C-1.BLK.XBDG.SLD CALCITE, ANKERITE(?) VEINING; SUBCONCHO IDAL FRACTURING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
73	185.57	185.62	0.05			CLAYSTONE	BLK.SLD CALCITE, ANKERITE(?) VEINING THROUGHOUT
73	185.62	185.63	0.01			COAL	C-2.BLK.SLD
* 73	185.63	185.74	0.11			CLAYSTONE	CARB.BLK.SLD LISTRIC SURFACES;COAL LAMINATIONS;ABUND ANT CALCITE, ANKERITE(?) STRINGERS
73	185.74	185.77	0.03			COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS
74	185.77	185.86	0.09			CLAYSTONE	BLK.SLD SOME LISTRIC SURFACES
74	185.86	185.88	0.02			COAL	C-2.SLD
74	185.88	185.89	0.01			COAL	C-1.BLK.SLD SUNCONCHOIDAL FRACTURING
74	185.89	185.93	0.04			CLAYSTONE	BLK.SLD
74	185.93	185.94	0.01			COAL	C-1.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	185.94	186.01	0.07			CLAYSTONE	CARB.BLK.SLD MINOR COALY AND CALCITE, ANKERITE(?) ST RINGERS; POWDERED WHEN BROKEN
75	186.01	186.07	0.06			COAL	C-5.BLK.SLD CALCITE VEINING ALONG BEDDING (2MM)
76	186.07	186.35	0.28			CLAYSTONE	DK.GY.BRKN COAL INCLUSIONS;CALCITE, ANKERITE(?) VE INING
* 78	186.35	187.06	0.71			MUDSTONE	BLK.SLD CONTORTED BEDDING;ABUNDANT COAL STRINGE RS (5MM);CALCITE AND QUARTZ; ANKERITE(?) VEINING ALONG BEDDING; MINOR MICROFAU LTING (1CM DISPLACEMENT); MINOR DISSEMI NATED PYRITE IN QUARTZ, ANKERITE(?) VEI N
* 78	187.06	188.01	0.95			SILTSTONE	DK.GY.SLD MINOR COALY INCLUSIONS;QUARTZ,ANKERITE(?) VEINS;0.03M BAND OF CALCITE AND COAL (MICRO FAULTING DISPLACEMENT 3MM)
78	188.01	188.35	0.34			SILTSTONE	DK.GY.VTHNB.SLD MINOR QUARTZ, ANKERITE(?) AND CALCITE S TRINGERS; RARE COAL UNITS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 78	188.35	190.19	1.84			SILTSTONE	DK.GY.VTHNB MINOR HAIRLIKE WHITE STRINGERS
80	190.19	190.29	0.10			CLAYSTONE	M.GY.SLD
80	190.29	190.42	0.13			CLAYSTONE	DK.GY.SLD 15MM CALCITE BAND WITH SILTSTONE INCLUS IONS (BRECCIA);SOME LISTRIC SURFACES
80	190.42	190.54	0.12			CLAYSTONE	SLTY.M.GY.SLD
80	190.54	190.94	0.40			SILTSTONE	DK.GY.VTHNB.SLD
* 82	190.94	192.44	1.50			SILTSTONE	DK.GY.VTHNB.SLD MINOR WHITE MINERAL? 5MM BAND
* 76	192.44	194.13	1.69			SILTSTONE	DK.GY.VTHNB.BRKN MINOR LT GREY SANDSTONE LAMINATIONS TOW ARDS BASE
75	194.13	194.25	0.12			SILTSTONE	DK.GY.VTHNB.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	194.25	195.63	1.38			SILTSTONE	SSY.DK.GY.VTHNB.XBDG.BRKN WRMBUR;XBDG INDICATES TOPS UPRIGHT;LIGHTER GREY SANDSTONE LAMINATIONS;TALC? ON FRACTURE SURFACES
75	195.63	195.67	0.04			ROCK LOSS	
75	195.67	195.98	0.31			SILTSTONE	SSY.DK.GY.VTHNB.BRKN LIGHTER GREY SANDSTONE LAMINATIONS
74	195.98	196.48	0.50			MUDSTONE	SLTY.DK.GY.VTHNB.SLD CONTAINS 0.06M BAND OF MUDSTONE BRECCIA IN CALCITE;3 CALCITE VEINS PARALLEL TO BEDDING (5-10MM)
* 74	196.48	196.94	0.46			SILTSTONE	M.GY.VTHNB.BRKN MINOR CALCITE, ANKERITE(?) VEINING (1MM) PARALLEL TO BEDDING AT TOP OF MEASUREMENT
77	196.94	198.02	1.08			SILTSTONE	DK.GY.VTHNB.WRMBU.SLD SSD;MINOR LIGHTER GREY SANDSTONE LAMINATIONS TOWARDS BASE
* 80	198.02	198.69	0.67			SILTSTONE	SSY.DK.GY.VTHNB.BIOTR.BRKN SSD;BEDS DISTURBED THROUGHOUT;LIGHTER GREY SANDSTONE LAMINATIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 82	198.69	199.90	1.21			SILTSTONE	SSY.DK.GY.VTHNB.BIOTR.BRKN CALCITE VEIN 0.04M THICK AT BASE CONTAINING SOME SILTSTONE FRAGMENTS;LIGHTER GREY SANDSTONE LAMINATIONS
* 79	199.90	200.22	0.32			SILTSTONE	SSY.DK.GY.VTHNB.BIOTR.SLD SANDSTONE LAMINATONS BECOMING MORE FREQUENT TOWARDS BASE
81	200.22	200.63	0.41			SILTSTONE	SSY.M.GY.THNB.BIOTR.SLD WRMBUR;BEDDING DISTURBED THROUGHOUT;LT BROWN SANDSTONE INTERBEDS VERY DISTINCTIVE
* 85	200.63	201.84	1.21			SILTSTONE	SSY.DK.GY.VTHNB.BIOTR.SLD LIGHTER GREY SANDSTONE LAMINATIONS
85	201.84	201.94	0.10			SILTSTONE	SSY.DK.GY.VTHNB.SLD LIGHTER GREY SANDSTONE LAMINATIONS
* 86	201.94	203.95	2.01			SILTSTONE	SSY.DK.GY.THNB.BIOTR.SLD WRMBUR;BEDS FAIRLY WELL DISTURBED;BIOTURBATION INDICATES TOPS UPRIGHT;LT GREY TO LT BROWN SANDSTONE INTERBEDS
81	203.95	203.99	0.04			SANDSTONE	FG.WEL.S-P.GY.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	203.99	204.11	0.12			SANDSTONE	FG.WEL.M.GY.THNB.BIOTR.SLD MINOR INTERBEDS OF VFG DK GREY SANDSTON E
* 78	204.11	204.94	0.83			SANDSTONE	VFG.WEL.DK.GY.VTHNB.BIOTR.SLD XBDG INDICATES TOPS UPRIGHT;BIOTURBATIO N CONFINED TO 2 BEDS;DK GREY SILTSTONE LAMINATIONS
* 78	204.94	206.09	1.15			SANDSTONE	VFG.WEL.DK.GY.VTHNB.BIOTR.SLD BIOTURBATION MINOR-INDICATES TOPS UPRIG HT;CALCITE VEIN 3MM PARALLEL TO BEDDING ; SOME LT BROWN SANDSTONE INTERBEDS
* 78	206.09	208.23	2.14			SANDSTONE	VFG.WEL.DK.GY.VTHNB.BIOTR.SLD DK GREY SILTSTONE LAMINATIONS THROUGHOU T;CLAM BURROW INDICATES TOPS UPRIGHT; 2 -0.09M THICK BIOTURBATED ZONES
* 82	208.23	208.74	0.51			SANDSTONE	SLTY.DK.GY.VTHNB.WRMBU.SLD LIGHTER GREY SANDSTONE LAMINATIONS;MINO R BIOTURBATION
81	208.74	209.13	0.39			SILTSTONE	DK.GY.VTHNB.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	209.13	209.57	0.44			MUDSTONE	BLK.SLD HAIRLIKE CALCITE, ANKERITE(?) STRINGERS THROUGHOUT
79	209.57	209.60	0.03			MUDSTONE	BLK.SLD CALCITE, ANKERITE(?) VEINING 3MM; COALY INCLUSIONS
* 78	209.60	210.25	0.65	06372	E	COAL	C-2.BLK.SLD VERY EASILY POWDERED;LISTRIC SURFACES;M INOR CALCITE; ANKERITE(?) STRINGERS (1M M) ALONG CLEAT SURFACES
79	210.25	210.27	0.02	06372	E	COAL	C-1.BLK.SLD
79	210.27	210.33	0.06	06372	E	COAL	C-2.BLK.SLD LISTRIC SURFACES;EASILY POWDERED
79	210.33	210.36	0.03	06372	E	COAL	C-3.BLK.SLD MINOR CALCITE, ANKERITE(?) STRINGERS (1 MM); LISTRIC SURFACES; EASILY POWDERED
79	210.36	210.41	0.05	06372	E	COAL	C-2.BLK.SLD EASILY POWDERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	210.41	210.76	0.35	06372	E	COAL	C-2.BLK.SLD EASILY BROKEN;LISTRIC SURFACES;CALCITE , ANKERITE(?) VEIN (1MM)
80	210.76	210.78	0.02	06372	E	COAL	C-1.BLK.SLD CONCHOIDAL FRACTURE
80	210.78	210.86	0.08	06372	E	COAL	C-2.BLK.SLD CALCITE, ANKERITE(?) VEINING (1MM) ALON G CLEAT FACES
80	210.86	210.88	0.02	06372	E	COAL	C-1.BLK.SLD
80	210.88	210.91	0.03	06372	E	COAL	C-2.BLK.SLD MINOR CALCITE, ANKERITE(?) VEINING ALON G CLEAT SURFACES
80	210.91	210.94	0.03	06372	E	COAL LOSS	
80	210.94	211.35	0.41			MUDSTONE	BLK.SLD MINOR COALY STRINGERS (2MM) TOWARDS TOP OF MEASUREMENT
81	211.35	211.40	0.05			MUDSTONE	BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 82	211.40	212.44	1.04			SILISTONE	DK.GY.VTHNB.SLD
78	212.44	212.58	0.14			SILTSTONE	DK.GY.VTHNB.SLD
75	212.58	213.46	0.88			MUDSTONE	BLK.SLD EASILY WEATHERED INTO SHARDS;CALCITE VE IN 0.02M THICK;MINOR LISTRIC SURFACES
72	213.46	213.52	0.06			SILISTONE	DK.GY.VTHNB.SLD LISTRIC SURFACES AT BASE OF MEASUREMENT
* 70	213.52	214.03	0.51			SANDSTONE	FG.WEL.LT.GY.MB.BIOTR.SLD CALCAREOUS & FOSSILIFEROUS;SHELLS 5MM I N LENGTH;DISSEMINATED PYRITE THROUGHOUT
71	214.03	214.46	0.43			SANDSTONE	MG.MOD.M.GY.MB.SLD
71	214.46	214.60	0.14			SANDSTONE	FG.WEL.LT.GY.SLD CALCAREOUS;CALCITE, ANKERITE(?) VEIN 2M M AT BASE CONTAINING DISSEMINATED PYRIT E

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
72	214.60	215.29	0.69			SANDSTONE	FG.WEL.LT.GY.MB.SLD CALCAREOUS;CALCITE, ANKERITE(?) VEINS (2MM) AT BASE; MINOR DISSEMINATED PYRITE
73	215.29	215.45	0.16			SANDSTONE	FG.WEL.M.GY.THNB.BRKN LISTRIC SURFACES;EASILY WEATHERED
* 74	215.45	216.52	1.07			SANDSTONE	FG.MOD.M.GY.THNB.SLD SOME DK GREY SILTSTONE INTERBEDS;MINOR CALCITE VEIN 3MM
76	216.52	216.63	0.11			SANDSTONE	MG.MOD.LT.GY.SLD
* 77	216.63	217.65	1.02			SANDSTONE	MG.WEL.M.GY.MB.SLD SOME SILTSTONE INTERBEDS;CALCITE, ANKERITE(?) VEIN(1MM)
72	217.65	217.86	0.21			SANDSTONE	FG.WEL.LT.GY.THNB.BIOTR.SLD DISTINCTIVE BURROW INDICATES TOPS UPRIGHT (0.09M LONG);0.02M THICK BIVALVE HORIZON DISPLAYING SAW-TOOTHED EDGE OF SHELLS;CALCAREOUS
* 68	217.86	218.47	0.61			SANDSTONE	FG.WEL.M.GY.MB.SLD SOME SILTSTONE INTERBEDS;0.14M SECTION AT BASE CONTAINING CALCITE, ANKERITE(?) VEINS THROUGHOUT (1-4MM)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
69	218.47	218.67	0.20			SANDSTONE	FG.WEL.M.GY.MB.SLD MINOR DISTURBANCE OF BEDS;CALCITE, ANKERITE(?) VEIN 1MM PARALLEL TO BEDDING
* 71	218.67	220.84	2.17			SANDSTONE	FG.WEL.M.GY.MB.WRMBU.SLD 2 CALCITE VEINS IN MIDDLE (0.02M);SOME SILTSTONE INTERBEDS THROUGHOUT;WEATHERS FAIRLY EASILY
* 67	220.84	221.72	0.88			SANDSTONE	FG.WEL.M.GY.MB.SLD MINOR SILTSTONE LAMINATIONS
* 78	221.72	222.18	0.46			SANDSTONE	FG.WEL.M.GY.MB.SLD TALC? ALONG FRACTURE SURFACES AT BASE;SILTSTONE INTERBEDS TOWARDS BASE
76	222.18	222.51	0.33			SANDSTONE	FG.M.GY.SLD FRAGMENTED SANDSTONE CEMENTED BY CLAY;EASILY POWDERED;CALCITE, ANKERITE(?) VEINING FORMING BRECCIA AT BASE (0.06M)
75	222.51	222.87	0.36			SANDSTONE	FG.WEL.M.GY.MB.BRKN SOME SILTSTONE INTERBEDS;TALC? ALONG FRACTURE SURFACE
* 73	222.87	223.60	0.73			SANDSTONE	FG.WEL.M.GY.THNB.SLD SOME DK GREY SILTSTONE INTERBEDS;QUARTZ, ANKERITE(?) AND CALCITE VEIN (2MM) AT BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 77	223.60	224.03	0.43			SILTSTONE	DK.GY.THNB.SLD QUARTZ, ANKERITE(?) AND CALCITE VEIN IN MIDDLE SECTION(0.06M); BCA AT BASE IS 45 DEGREES
* 69	224.03	224.61	0.58			SANDSTONE	FG.WEL.M.GY.MB.SLD 1MM COAL STRINGER IN BEDDING AT TOP OF MEASUREMENT
* 74	224.61	224.96	0.37			SILTSTONE	DK.GY.THNB.SLD MINOR SANDSTONE INTERBED TOWARDS TOP
* 72	224.98	225.99	1.01			SANDSTONE	FG.WEL.M.GY.THNB.SLD MINOR COAL INCLUSIONS (1MM) TOWARDS BAS E OF MEASUREMENT
71	225.99	226.52	0.53			SANDSTONE	VFG.WEL.DK.GY.SSD.SLD MINOR SSD;CALCITE, ANKERITE(?) VEIN (2M M) AT BASE
* 71	226.52	227.16	0.64			SANDSTONE	FG.WEL.M.GY.THNB.SLD
69	227.16	227.53	0.37			SANDSTONE	VFG.DK.GY.THNB.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
69	227.53	227.62	0.09			SANDSTONE	FG.WEL.LT.GY.SLD SLIGHTLY CALCAREOUS
* 68	227.62	227.84	0.22			SANDSTONE	FG.M.GY.THNB.BRKN
* 67	227.84	229.19	1.35			SANDSTONE	FG.M.GY.MB.SLD SOME SILTSTONE INTERBEDS;SPORATIC CALCI TE, ANKERITE(?) VEINING ALONG 0.06M INT ERVAL
* 64	229.19	230.56	1.37			SANDSTONE	FG.M.GY.THNB.XBDG.BRKN MINOR BIOTURBATION INDICATES TOPS UPRIG HT;SOME SILTSTONE INTERBEDS
63	230.56	230.67	0.11			SANDSTONE	FG.WEL.LT.GY.SLD SLIGHTLY CALCAREOUS
62	230.67	230.74	0.07			SANDSTONE	FG.WEL.M.GY.SLD
62	230.74	231.12	0.38			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD
61	231.12	231.24	0.12			SANDSTONE	FG.WEL.LT.GY.SSD.SLD SLIGHTLY CALCAREOUS
* 60	231.24	232.60	1.36			SANDSTONE	FG.WEL.M.GY.THNB.SLD SILTSTONE RIP UP CLASTS IN TOP 0.04M

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
60	232.60	233.09	0.49			SANDSTONE	FG.MOD.M.GY.MB.SLD SILTSTONE RIP UP CLASTS-0.04M DIAMETER- OVER 0.05M SECTION
* 60	233.09	233.23	0.14			SANDSTONE	MG.MOD.M.GY.MB.SSD.SLD CALCITE, ANKERITE(?) VEIN (2MM) TOWARDS BASE;SSD INTERBED WITHIN SANDSTONE
59	233.23	233.72	0.49			SANDSTONE	MG.S-P.GY.THKB.SLD CALCITE, ANKERITE(?) VEIN (2MM) TOWARDS TOP
* 58	233.72	234.11	0.39			SANDSTONE	FG.WEL.M.GY.THNB.SLD POSSIBLE HORIZONTAL WORM BURROW
58	234.11	234.44	0.33			SANDSTONE	MG.MOD.S-P.GY.THKB.SLD MASSIVE
* 57	234.44	235.33	0.89			SANDSTONE	FG.MOD.M.GY.THNB.SLD SOME SILTSTONE INTERBEDS;0.03M ZONE CON TAINING HAIRLIKE CALCITE, ANKERITE(?) S TRINGERS
* 65	235.33	235.64	0.31			SANDSTONE	FG-.MOD.M.GY.THNB.SLD 0.04M INTERVAL OF QUARTZ, ANKERITE(?) A ND CALCITE;MINOR COALY INCLUSIONS TOWAR DS TOP; EASILY WEATHERED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 67	235.64	237.01	1.37			SANDSTONE	FG.WEL.M.GY.THNB.BIOTR.SLD CALCITE, ANKERITE(?) VEIN (3MM) TOWARDS TOP; SOME SILTSTONE INTERBEDS
69	237.01	237.26	0.25			SILTSTONE	M.GY.THNB.SLD
* 70	237.26	237.93	0.67			SANDSTONE	FG.DK.GY.MB.SSD.SLD SILTSTONE INTERBEDS
* 63	237.93	239.18	1.25			SILTSTONE	SSY.DK.GY.THNB.SLD CALCITE, ANKERITE(?) VEINING (3MM) NORM AL TO BEDDING; TALC(?) ALONG LISTRIC SU RFACES
* 70	239.18	239.60	0.42			SILTSTONE	DK.GY.THNB.SLD CALCITE, ANKERITE(?) VEIN TOWARDS TOP
70	239.60	239.82	0.22			SILTSTONE	DK.GY.THNB.BRKN CALCITE AND QUARTZ, ANKERITE(?) VEIN TO WARDS BASE
70	239.82	239.95	0.13			SILTSTONE	LT.GY.BRKN EXTENSIVE ANKERITE(?) AND CALCITE VEINI NG

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
70	239.95	240.37	0.42			SILTSTONE	DK.GY.THNB.SLD ANKERITE(?), CALCITE(?) BLEB CONTAINING MINOR DISSEMINATED PYRITE
70	240.37	240.45	0.08			CLAY	M.GY.SLD PLIABLE WHEN WET;QUARTZ AND CALCITE VEIN ABOVE (0.03M)
70	240.45	240.65	0.20			MUDSTONE	DK.GY.SLD CALCITE VEIN TOWARDS TOP; ANKERITE(?) AND CHLORITE?
* 70	240.65	241.23	0.58			SILTSTONE	DK.GY.THNB.SLD LISTRIC SURFACES;CALCITE VEIN TOWARDS BASE
* 65	241.23	242.66	1.43			MUDSTONE	DK.GY.SLD SPORADIC ANKERITE(?) AND CALCITE VEINING THROUGHOUT; WELL FRACTURED PARALLEL AND NORMAL TO BEDDING (FAULT ZONE); LISTRIC SURFACE CONTAINS MINOR PYRITE (1MM)
59	242.66	243.14	0.48			MUDSTONE	DK.GY.SLD ANKERITE(?), CALCITE VEIN THROUGHOUT 0.02M; LISTRIC SURFACES; MINOR 1MM PYRITIC VEIN (FAULT ZONE)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
50	243.14	245.21	2.07			MUDSTONE	DK.GY.BRKN ANKERITE AND CALCITE VEINING THROUGHOUT ;VERY EASILY WEATHERED AND FRACTURED; LISTRIC SURFACES;SOME ZONES WEATHERED TO CLAY (FAULT ZONE?)
42	245.21	245.32	0.11			MUDSTONE	BLK.VBRKN LISRTIC SURFACES;MINOR CALCITE, ANKERITE(?) VEINING
41	245.32	245.51	0.19			CLAYSTONE	M.GY.SLD CONTAINS SOME SILTSTONE CLASTS;CONSOLIDATED BUT SOFT WHEN WEATHERED;WHEN BRKN DISPLAYS BEDDING
* 35	245.51	247.20	1.69			MUDSTONE	BLK.SLD EXTREMELY FISSILE;SOME LISTRIC SURFACES
* 20	247.20	248.97	1.77			MUDSTONE	DK.GY.BIOTR.SLD FISSILE WHEN WEATHERED;MINOR TALC? ON FRACTURE SURFACES;BIOTURBATION INDICATES TOPS UPRIGHT
* 28	248.97	249.25	0.28			MUDSTONE	SLTY.DK.GY.BRKN GOING THROUGH OVERTURN?

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 31	249.25	251.38	2.13			SILTSTONE	DK.GY.YTHNB.XBDG.SLD XBDG INDICATES TOPS UPRIGHT;SOME LIGHTE R GREY VFG SANDSTONE LAMINATIONS TOWARD S BASE OF MEASUREMENT
* 32	251.38	252.10	0.72			SILTSTONE	SSY.DK.GY.THNB.BRKN LIGHTER GREY VFG SANDSTONE INTERBEDS;SO ME LISTRIC SURFACES
* 30	252.10	253.41	1.31			SILTSTONE	SSY.DK.GY.THNB.SSD.SLD AS ABOVE
* 32	253.41	254.50	1.09			SILTSTONE	DK.GY.THNB.SLD MINOR CALCITE, ANKERITE VEINING (1MM); TALC? ALONG FRACTURE SURFACES
37	254.50	254.59	0.09			SILTSTONE	DK.GY.SLD CONTAINING CALCITE, ANKERITE(?) VEINING FORMING MINOR BRECCIA AT BASE
* 40	254.59	255.25	0.66			SILTSTONE	DK.GY.MB.SLD LISTRIC FRACTURE SURFACES CONTAINING TA LC?; MINOR CALCITE VEINS (2MM); CONTAIN S SOME LIGHT BROWN SILTSTONE INTERBEDS (APPROX 0.15M THICK)
39	255.25	255.42	0.17			SILTSTONE	DK.GY.MB.SLD CALCITE VEIN 2MM

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 35	255.42	257.61	2.19			SILTSTONE	SSY.DK.GY.THNB.WRMBU.SLD MINOR BIOTURBATION;LIGHTER GREY SANDSTO NE INTERBEDS;MINOR COALY INCLUSIONS (3M M)TOWARDS TOP
* 40	257.61	258.34	0.73			SANDSTONE	VFG.WEL.M.GY.THNB.BIOTR.SLD
* 46	258.34	259.73	1.39			SANDSTONE	VFG.WEL.M.GY.THNB.SLD MINOR LISTRIC SURFACES AND CALCITE, ANK ERITE(?) VEINING (APPROX 1MM); SANDSTON E BECOMES FINE GRAINED TOWARDS BASE
* 40	259.73	261.03	1.30			SANDSTONE	FG.WEL.M.GY.THNB.BIOTR.SLD WRMBUR
40	261.03	261.40	0.37			SANDSTONE	MG.WEL.LT.GY.MB.SLD MINOR COALY INCLUSIONS;SPECKLED WITH DK SILTSTONE? THROUGHOUT
* 40	261.40	261.82	0.42			SANDSTONE	MG.MOD.M.YEL.THNB.SLD DRILL STEM OUT;YELLOWISH GREY COLOUR AN D DK GREY INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 44	261.82	263.45	1.63			SANDSTONE	MG.MOD.LT-M.GY.THKB.SLD MINOR CALCITE, ANKERITE(?) VEINING 2MM NORMAL TO BEDDING; SOME DARK GREY SILTS TONE RIP UP CLASTS PARALLEL TO BEDDING
* 43	263.45	263.82	0.37			SANDSTONE	FG.WEL.M.GY.MB.SLD VFG SANDSTONE INTERBEDS;MINOR CALCITE, ANKERITE(?)VEINING (1MM) NORMAL TO BEDD ING;TALC? ALONG LISTRIC SURFACES
* 43	263.82	264.79	0.97			SANDSTONE	FG.WEL.M.GY.THKB.SLD MINOR LISTRIC FRACTURE SURFACES WITH TA LC?;CALCITE, ANKERITE(?) WITHIN 0.02M B AND AT BASE OF MEASUREMENT
40	264.79	264.81	0.02			CLAY	M.GY.SLD PLIABLE;POSSIBLY BENTONITE
* 39	264.81	265.35	0.54			SANDSTONE	WEL.M.GY.THNB.SLD FAIRLY EASILY BROKEN;CONTAINS SOME CALC ITE VEINS 2MM;MINOR LISTRIC SURFACES
41	265.35	265.40	0.05			CLAY	M.GY.SLD SEEMS TO BE WEATHERED FROM CLAYSTONE; M USHY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 42	265.40	265.84	0.44			SANDSTONE	FG.WEL.M.GY.VTHNB.BIOTR.SLD SOME SILTSTONE LAMINATIONS AND CALCITE, ANKERITE(?) VEINING AT BASE
* 37	265.84	267.37	1.53			SANDSTONE	FG.WEL.LT-M.GY.THNB.BRKN BANDING OF MEDIUM AND DARK GREY SANDSTO NE INTERBEDS;TALC? ALONG FRACTURE SURFA CES
* 37	267.37	267.38	0.01			SANDSTONE	FG.WEL.M.GY.SLD
37	267.38	267.40	0.02			CLAY	M.GY.SLD CLAY CONTAINS SANDSTONE FRAGMENTS;BENTO NITE?
* 37	267.40	267.90	0.50			SANDSTONE	VFG.WEL.M.GY.THNB.SLD
* 36	267.90	268.75	0.85			SANDSTONE	FG.WEL.M.GY.MB.BRKN DK GREY SILTSTONE BEDS:SANDSTONE AND SI LTSTONE INTERBEDS FORM BANDING
36	268.75	269.80	1.05			SANDSTONE	FG.WEL.M-DK.GY.THKB.SLD FAIRLY MASSIVE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
36	269.80	269.97	0.17			SANDSTONE	FG.MEL.M.YEL.SLD SLIGHTLY CALCAREOUS
36	269.97	270.54	0.57			SANDSTONE	FG.MEL.M.YEL.SLD FAIRLY MASSIVE;SLIGHTLY CALCAREOUS
36	270.54	270.88	0.34			SANDSTONE	FG.MEL.DK.GY.SLD FAIRLY MASSIVE CALCITE AND QUARTZ. ANKE RITE(?) VEINING TOWARDS BASE OF MEASURE MENT
• 36	270.88	271.67	0.79			SANDSTONE	MG.MEL.M.GY.MB.BRKN MINOR FG SANDSTONE INTERBEDS;SOME SANDS TONE EASILY WEATHERED
33	271.67	271.75	0.08			SANDSTONE	FG.MEL.DK.GY.MB.SLD
* 32	271.75	271.86	0.11			SILTSTONE	SSY.DK.GY.THNB.SLD
* 33	271.86	272.46	0.60			SANDSTONE	MG.MOD.LT-M.GY.MB.SLD SOME DK GREY SANDSTONE INTERBEDS
• 33	272.46	272.88	0.42			SANDSTONE	FG.MEL.M.GY.THNB.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 35	272.88	273.67	0.79			SANDSTONE	VFG.MEL.M.GY.THNB.SLD SOME DK GREY SILTSTONE INTERBEDS
33	273.67	273.83	0.16			SANDSTONE	VFG.MEL.M.GY.BRKN
32	273.83	273.97	0.14			SANDSTONE	FG.MEL.M.GY.BRKN VERY EASILY WEATHERED AT BASE TO SAND
31	273.97	274.24	0.27			SANDSTONE	VFG.MEL.DK.GY.MB.WRMBU.SLD SOME FG SANDSTONE INTERBEDS
30	274.24	274.31	0.07			SANDSTONE	FG-.MOD.LT.GY.SLD 2 SHELLS (CALCAREOUS) 0.01M IN DIAMETER
* 29	274.31	274.90	0.59			SILTSTONE	SSY.DK.GY.VTHNB.XBDG.SLD XBDG INDICATES UNIT POSSBILY OVERTURNED ;SOME FG SANDSTONE INTERBEDS
32	274.90	275.00	0.10			SANDSTONE	FG.M.GY.VTHNB.SLD DK SANDSTONE LAMINATIONS THROUGHOUT
33	275.00	275.20	0.20			SILTSTONE	SSY.DK.GY.THNB.SLD CALCITE VEIN 3MM ALONG LISTRIC SURFACE
* 34	275.20	275.27	0.07			SANDSTONE	FG-.M.GY.THNB.SLD

• DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
35	275.27	275.66	0.39			SANDSTONE	VFG.WEL.DK.GY.VTHNB.SLD
35	275.66	276.01	0.35			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD DK GREY SANDSTONE LAMINATONS GIVE BANDE D APPEARANCE
* 37	276.01	277.03	1.02			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD FAIRLY MASSIVE
36	277.03	277.16	0.13			SANDSTONE	VFG.WEL.DK.GY.VTHNB.BRKN
36	277.16	277.66	0.50			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD CALCITE, ANKERITE(?) VEINING 2MM NORMAL TO BEDDING
* 35	277.66	277.89	0.23			MARL	VFG.WEL.LT.GN.MB.SLD BANDS DISTORTED;CALCAREOUS
34	277.89	278.05	0.16			SANDSTONE	VFG.WEL.DK.GY.THNB.SSD.SLD SOME FG SANDSTONE INTERBEDS
* 32	278.05	278.58	0.53			SANDSTONE	VFG.WEL.DK.GY.VTHNB.BRKN
33	278.58	279.23	0.65			SANDSTONE	FG.WEL.M.GY.VTHNB.XBDG.SLD XBDG INDICATES BEDS OVERTURNED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
34	279.23	279.29	0.06			SANDSTONE	FG.WEL.LT.YEL.VTHNB.SLD MODERATELY CALCAREOUS
* 34	279.29	279.75	0.46			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD
38	279.75	279.83	0.08			SANDSTONE	FG.WEL.M.GY.VTHNB.SLD
39	279.83	279.98	0.15			SANDSTONE	VFG.WEL.LT.YEL.VTHNB.SLD MODERATELY CALCAREOUS
* 42	279.98	280.24	0.26			SANDSTONE	FG.WEL.M.GY.VTHNB.XBDG.SLD XBDG INDICATES BEDS OVERTURNED
* 34	280.24	280.42	0.18			SANDSTONE	VFG.WEL.LT.YEL.THNB.XBDG.SLD XBDG INDICATES BEDS OVERTURNED;SLIGHTLY CALCAREOUS
* 43	280.42	282.32	1.90			SANDSTONE	FG.MOD.M.GY.THNB.MRMBU.BRKN VFG AND MG SANDSTONE INTERBEDS THROUGHO UT;MINOR LISTRIC SURFACES CONTAINING TA LC?
36	282.32	282.44	0.12			SANDSTONE	MG-.MOD.S-P.GY.THKB.SLD CONSISTS OF QUARTZ, MICA, DARK ORANGE M INERALS (KSP?)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
35	282.44	282.70	0.26			SILTSTONE	DK.GY.THNB.BRKN EASILY WEATHERED;CONTAINING MG LIGHT BR OWN SANDSTONE INTERBEDS
34	282.70	282.76	0.06			SILTSTONE	DK.GY.THNB.BIOTR.SLD AS ABOVE
* 33	282.76	282.94	0.18			SANDSTONE	MG-.MOD.S-P.GY.THKB.SLD
34	282.94	283.51	0.57			SILTSTONE	BLK.SLD CONTAINS MG LIGHT BROWN SANDSTONE INTER BEDS;WEATHERS EASILY
* 34	283.51	283.62	0.11			SANDSTONE	MG.MOD.S-P.GY.MB.SLD
* 32	283.62	284.11	0.49			SILTSTONE	BLK.WRMBU.SLD SSD;WRMBUR INDICATES BEDS OVERTURNED;SI LTSTONE MOTTLED WITH LIGHT BROWN SANDST ONE TOWARDS BASE;FAIRLY EASILY WEATHERE D
31	284.11	284.30	0.19			SANDSTONE	MG.MOD.S-P.GY.MB.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
31	284.30	284.40	0.10			SANDSTONE	MG.MOD.S-P.GY.MB.SSD.SLD
31	284.40	284.62	0.22			SILTSTONE	BLK.VTHNB.WRMBU.SLD MINOR LIGHT BROWN SANDSTONE LAMINATIONS ;COALY INCLUSIONS (1MM)
* 30	284.62	285.10	0.48			SANDSTONE	MG.MOD.S-P.GY.THKB.SLD SILTSTONE RIP UP CLASTS
33	285.10	285.42	0.32			SILTSTONE	BLK.BIOTR.SLD WRMBUR;EXTENSIVELY BIOTURBATED TOWARD S TRATIGRAPHIC BOTTOM (TOP OF MEASUREMENT);GRADATIONAL CONTACT INTO LIGHT BROWN SANDSTONE;COALY INCLUSIONS
34	285.42	285.52	0.10			SANDSTONE	MG.MOD.S-P.GY.MB.SLD
35	285.52	285.86	0.34			SANDSTONE	FG.WEL.DK.GY.THKB.SSD.SLD SANDSTONE SPECKLED WITH LIGHT BROWN SAN DSTONE;SSD GIVES MOTTLED APPEARANCE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	285.86	286.17	0.31			SANDSTONE	FG.MEL.DK.GY.THKB.SSD.SLD AS ABOVE
39	286.17	286.33	0.16			SANDSTONE	FG-.MEL.LT.GY.THNB.SLD CONTAINS DK GREY SILTSTONE INTERBEDS
* 41	286.33	286.73	0.40			SANDSTONE	FG.MEL.M.GY.MB.SLD
38	286.73	287.14	0.41			SANDSTONE	FG.MEL.LT.YEL.THNB.BIOTR.SLD WRMBUR;MODERATELY CALCAREOUS;WRMBUR IND ICATES BEDS OVERTURNED
* 34	287.14	287.85	0.71			SANDSTONE	FG.MEL.M.GY.THNB.SLD INTERBEDDED DK GREY SILTSTONE
* 39	287.85	288.47	0.62			SANDSTONE	SLTY.FG.MEL.M-DK.GY.VTHNB.SLD SILTSTONE INTERBEDS GIVE BANDED APPEARA NCE;FAIRLY EASILY WEATHERED
* 35	288.47	289.02	0.55			SANDSTONE	SLTY.FG.MEL.M-DK.GY.VTHNB.BIOTR.SLD BIOTURBATION INDICATES BEDS OVERTURNED
37	289.02	289.36	0.34			SANDSTONE	SLTY.FG.MEL.M-DK.GY.VTHNB.BIOTR.SLD BIOTURBATION INDICATES BEDS OVERTURNED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 38	289.36	289.66	0.30			SANDSTONE	FG.MEL.M.GY.VTHNB.BIOTR.SLD MINOR SILTSTONE INTERBEDS;BIOTURBATION INDICATES BEDS OVERTURNED;FAIRLY EASILY WEATHERED
38	289.66	289.98	0.32			SANDSTONE	FG.MEL.M.GY.THKB.SLD
39	289.98	290.04	0.06			SANDSTONE	FG.MEL.LT.YEL.THKB.BIOTR.SLD SLIGHTLY CALCAREOUS;MINOR BIOTURBATION
39	290.04	290.58	0.54			SANDSTONE	FG.MEL.M.GY.THKB.SLD FAIRLY MASSIVE;MINOR SILTSTONE INTERBED S
39	290.58	291.11	0.53			SANDSTONE	FG.MEL.M.GY.THKB.SLD BECOMING SLIGHTLY COARSER GRAINED TOWAR DS BASE
40	291.11	291.18	0.07			SANDSTONE	FG.MEL.M.GY.SLD
40	291.18	291.20	0.02			SANDSTONE	FG.MEL.LT.GY.BIOTR.SLD SLIGHTLY CALCAREOUS-GRADATIONAL CONTACT WITH SANDSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
40	291.20	291.62	0.42			SANDSTONE	M.GY.THKB.SLD CALCITE VEIN 5MM
40	291.62	291.69	0.07			SANDSTONE	FG.MEL.LT.YEL.BIOTR SLIGHTLY CALCAREOUS-GRADATIONAL CONTACT WITH SANDSTONE
40	291.69	291.90	0.21			SANDSTONE	FG.MEL.M.GY.THKB.SLD
41	291.90	292.58	0.68			SANDSTONE	FG.MEL.M.GY.THKB.SLD
41	292.58	292.62	0.04			SANDSTONE	CARB.FG.DK.GY.PWRD LISTRIC SURFACES;EASILY WEATHERED
41	292.62	292.71	0.09			SANDSTONE	FG.MEL.M.GY.THKB.SLD LISTRIC SURFACES;MINOR CALCITE, ANKERITE(?) VEIN 1MM
42	292.71	293.99	1.28			SANDSTONE	FG.MEL.M.GY.THKB.BRKN MASSIVE;MINOR SILTSTONE CLASTS;SLIGHTLY CALCAREOUS BAND (0.04M) TOWARDS TOP

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

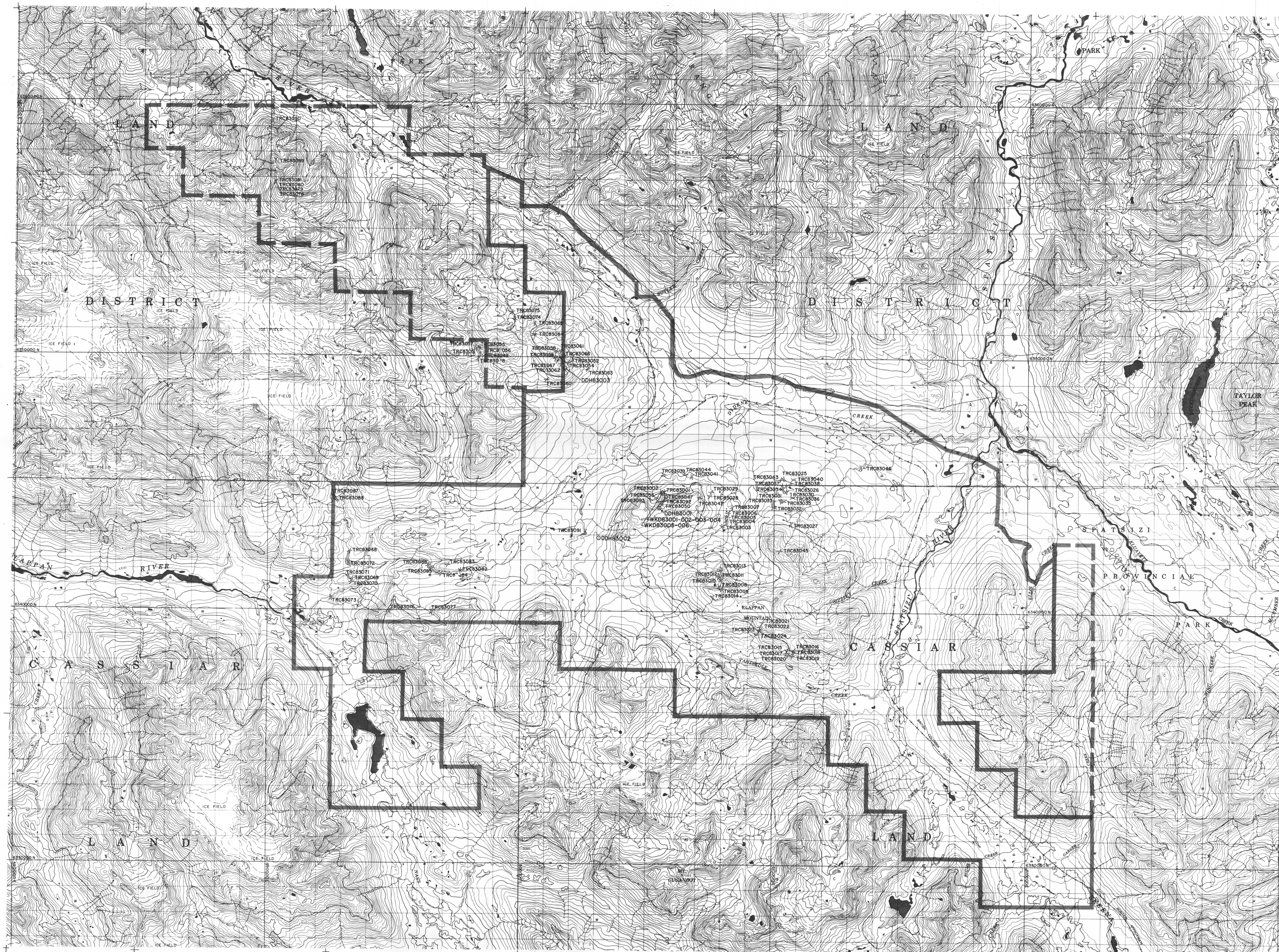
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
43	293.99	294.68	0.69			SANDSTONE	VFG.MEL.M-DK.GY.MB.SSD.BRKN CALCITE, ANKERITE(?) VEIN (3MM) AT BASE ; MINOR SLICKENSIDES; BEDS MOTTLED
44	294.68	294.81	0.13			SANDSTONE	FG.MEL.DK.GY.SSD.VBRKN CALCITE, ANKERITE(?) ALONG SLICKED SURFACE; FAIRLY EASILY WEATHERED
* 44	294.81	295.48	0.67			SANDSTONE	FG.MEL.DK.GY.SSD.BRKN MINOR CALCITE, ANKERITE(?) VEIN; SLICKENSIDE SURFACES; FAIRLY EASILY WEATHERED
42	295.48	295.83	0.35			CLAYSTONE	CARB.DK.GY.PWRD WEATHERED TO CLAY WHEN WET;ABUNDANT LISTRIC SURFACES;CALCITE, ANKERITE(?) VEINING
41	295.83	295.97	0.14			SILTSTONE	DK.GY.SLD CALCITE, ANKERITE(?) VEINING THROUGHOUT 1MM
41	295.97	296.02	0.05			SANDSTONE	MEL.DK.GY.VBRKN WEATHERS FAIRLY EASILY
39	296.02	296.74	0.72			MUDSTONE	DK.GY.SLD SOME LISTRIC SURFACES;EASILY WEATHERED INTO SHARDS;MINOR COAL INCLUSIONS AT STRATIGRAPHIC TOP (BASE OF MEASUREMENT)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
37	296.74	297.15	0.41			MUDSTONE	DK.GY.SLD LISTRIC SURFACES;COALY INCLUSIONS
* 36	297.15	297.16	0.01			COAL	C-2.BLK.SLD
35	297.16	297.48	0.32			MUDSTONE	DK.GY.BRKN CALCITE,ANKERITE(?) 2MM; LISTRIC SURFACES
* 33	297.48	298.70	1.22			SANDSTONE	PYR.FG.MEL.DK.GY.THNB.BRKN LISTRIC SURFACES;MINOR COAL INCLUSIONS; DISSEMINATED PYRITE THROUGHOUT-ESPECIALLY TOWARDS STRATIGRAPHIC BOTTOM (TOP OF MEASUREMENT);FAIRLY EASILY WEATHERED
* 20	298.70	299.36	0.66			SANDSTONE	FG.MEL.DK.GY.THNB.SLD FAIRLY EASILY WEATHERED;MINOR LISTRIC SURFACES
20	299.36	299.40	0.04			SANDSTONE	FG.MEL.DK.GY.SLD **********END OF HOLE (982.3'/299.6M)**********

* DENOTES MEASURED BCA
NEWPAGE



LEGEND

ROADS AND RELATED FEATURES
HARD SURFACE, ALL WEATHER
LOOSE SURFACE
CART TRACK, WINTER ROAD, UNDER CONSTRUCTION
TRAIL, CUTLINE, PORTAGE
BUILT UP AREA
RAILWAY, SIDING, STATION, STOP
BRIDGE
SEAPLANE BASE, ANCHORAGE

LANDMARK FEATURES
HOUSE, BARN
CHURCH, SCHOOL
POST OFFICE
HISTORICAL SITE
TOWERS: FIRE, RADIO
WELL: OIL, GAS
TANK: OIL, GASOLINE, WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING, EMBANKMENT
GRAVEL PIT

BOUNDARIES AND CONTROL
INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
COUNTY, DISTRICT
TOWNSHIP PARISH — SURVEYED — UNSURVEYED
TOWNSHIP DLS — SURVEYED — UNSURVEYED — SECTION CORNERS
MUNICIPALITY
INDIAN RESERVE, PARK, ETC.
HORIZONTAL CONTROL POINT
BENCH MARK — BM 965
SPOT ELEVATION, ELEVATION APPROXIMATE — ·390 ·721

DRAINAGE AND RELATED FEATURES
STREAM, SHORELINE: INDEFINITE
DIRECTION OF FLOW
LAKE: INTERMITTENT
INUNDATED, FLOODED LAND
MARSH OR SWAMP (WOODED)
DRY RIVER BED WITH CHANNELS
SAND, ABOVE, IN WATER
STRING BOG — SB
TUNDRA PONDS, POLYGONS — TP PG
RAPIDS
FORESHORE FLATS — FF
ROCK
DAM
WHARF
DITCH

RELIEF FEATURES
CONTOURS — 500 350
APPROXIMATE CONTOUR — 125 100
DEPRESSION — 25
ESKER
PINGO — 125
SAND, SAND DUNES — SAND
PALSA BOG — PB
WOODED AREA — W C
LICENCE BOUNDARY
LICENCE UNDER APPLICATION

SCALE 1:50,000

0 1 2 3 MILES
0 1 2 3 4 5 KILOMETERS

104H/11	104H/10	104H/9
104H/6	104H/7	104H/8
104H/3	104H/2	104H/1
104A/14	104A/15	104A/16

57°45' 56°45' 129°30' 128°00'

111

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA
Gulf

MT. KLAPPAN COAL PROPERTY

1983 TRENCH AND DRILL HOLE LOCATION MAP

PREPARED BY: C. LOUIE	DRAWING No.
APPROVED BY: C. WILLIAMS DATE: JAN., 1984	KPN83A03

CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * VERTICAL DEVIATION * * * * * * * *

COMPU-LOG V8L1 DEVIATION

CLIENT : GULF CANADA RES.

HOLE ID : DDH-83-001

LOCATION : MT. KLAPPAN

DATE OF LOG : 08-08-83

DATA FROM : V8L2*

PROBE : 9055A 0008

111

TD = TOTAL DEPTH
T = TOP OF ZONE
B = BOTTOM OF ZONE

DEPTH	TRUE DEPTH	NORTH DEV	EAST DEV	DISTANCE	AZIMUTH	SA	SAB
.00	.00	.00	.00	.00	.0	.0	.0
10.00	9.99	-.18	.06	.20	159.8	1.1	159.8
20.00	19.99	-.33	.11	.35	160.6	.8	161.6
30.00	29.99	-.41	.12	.43	163.1	.5	173.1
40.00	39.99	-.55	.15	.57	164.6	.7	169.6
50.00	49.99	-.63	.21	.66	161.3	.5	141.4
60.00	59.99	-.54	.26	.61	154.0	.5	33.9
70.00	69.98	-.62	.26	.67	157.2	.4	183.6
80.00	79.98	-.61	.35	.71	150.3	.5	85.0
90.00	89.98	-.53	.29	.60	151.3	.6	324.6
100.00	99.98	-.52	.27	.59	152.0	.0	301.9
110.00	109.98	-.35	.27	.44	142.0	.9	359.2
120.00	119.98	-.25	.05	.26	167.4	1.3	293.9
130.00	129.98	-.17	-.10	.19	210.8	1.0	297.7
140.00	139.97	-.05	-.12	.13	247.5	.6	349.5
150.00	149.97	.08	-.24	.25	288.5	1.0	318.1
160.00	159.97	.19	-.42	.46	294.7	1.2	302.3
170.00	169.97	.32	-.59	.67	298.2	1.2	305.7
180.00	179.96	.45	-.78	.90	300.1	1.3	305.8
190.00	189.96	.64	-.93	1.13	304.5	1.3	320.7
200.00	199.96	.82	-1.07	1.35	307.6	1.2	323.5
210.00	209.95	.99	-1.12	1.50	311.5	1.0	342.7
220.00	219.95	1.20	-1.06	1.60	318.5	1.2	16.9
230.00	229.95	1.40	-.98	1.71	324.9	1.2	20.1
240.00	239.95	1.63	-.89	1.86	331.2	1.3	21.6
250.00	249.94	1.83	-.83	2.01	335.5	1.1	18.3
260.00	259.94	1.99	-.88	2.18	336.1	1.0	343.0
270.00	269.94	2.16	-1.02	2.39	334.6	1.2	318.9
280.00	279.94	2.37	-1.15	2.64	334.1	1.4	329.2
290.00	289.93	2.56	-1.10	2.79	336.7	1.1	14.7
TD 297.40	297.33	2.70	-1.05	2.90	338.7	1.1	20.0

46708

111

GULF CANADA RESOURCES INC.

Coal Division

Gulf

PREPARED BY: C. LOUIE	LOGGED BY: K. JENNER	SCALE : 1:200 , 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB. 1984	DRAWING No. KPN83S01

MOUNT KLAPPAN
DRILL HOLE LOG
DDH83001

LITHOLOGIC SYMBOLS

SCALE : 1:200 1:40

NORTHING : 6344261.0 N INCLINATION : 90°
EASTING : 505704.0 E BEARING :

CONGLOMERATE	MUDSTONE, CLAYSTONE
SANDSTONE	BENTONITE
CARBONACEOUS	PYRITE
SILTSTONE	CORE LOSS
COAL	PLANT FOSSIL
COAL-THIN BEDS	SHELL FOSSIL
OVERBURDEN	MARL
QUARTZ	ANKERITE
PEBBLY SANDSTONE	

APPARENT THICKNESS 1:200 | TRUE THICKNESS 1:200 | SEAM DETAIL TRUE THICKNESS 1:40

III

GULF CANADA RESOURCES INC.
Coal Division

Gulf

PREPARED BY: C. LOUIE	LOGGED BY: K. JENNER	SCALE : 1:200 , 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB. 1984	DRAWING No. KPN83S01

MOUNT KLAPPAN
DRILL HOLE LOG
DDH83001

LITHOLOGIC SYMBOLS

SCALE : 1:200 1:40
0 0
0.5
5 (M) 1 (M)

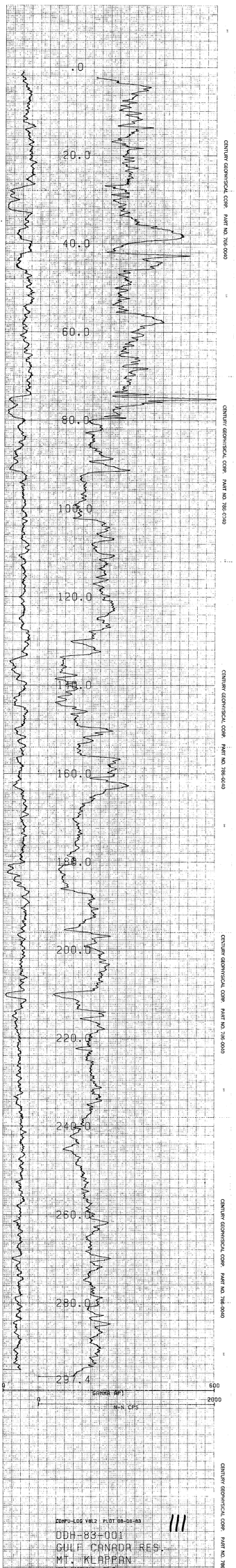
NORTHING : 6344261.0 N
EASTING : 505704.0 E
INCLINATION : 90°
BEARING :

- CONGLOMERATE
- SANDSTONE
- CARBONACEOUS
- SILTSTONE
- COAL
- COAL-THIN BEDS
- OVERBURDEN
- QUARTZ
- PEBBLY SANDSTONE
- MUDSTONE, CLAYSTONE
- BENTONITE
- PYRITE
- CORE LOSS
- PLANT FOSSIL
- SHELL FOSSIL
- MARL
- ANKERITE

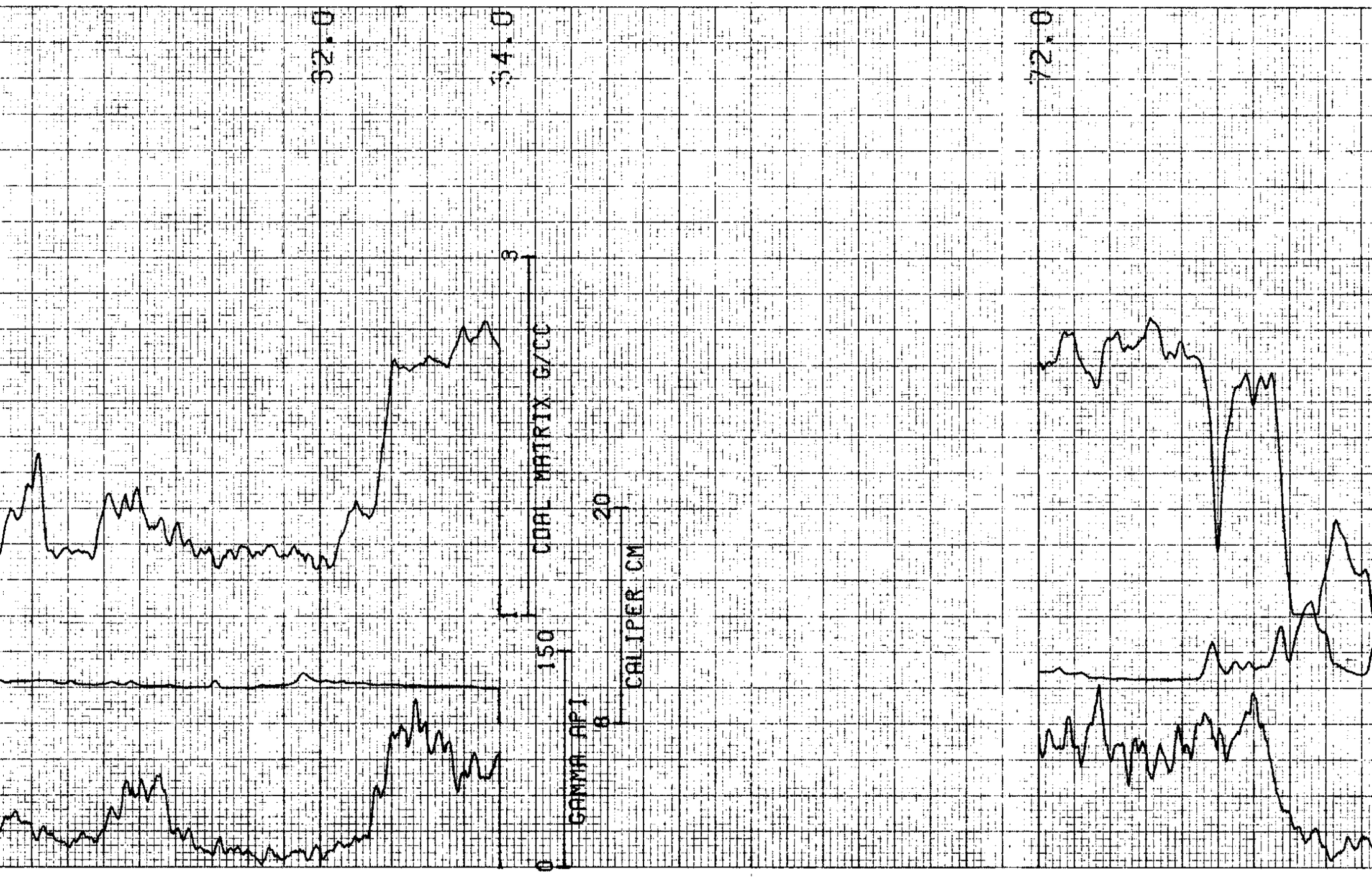
APPARENT THICKNESS 1:200

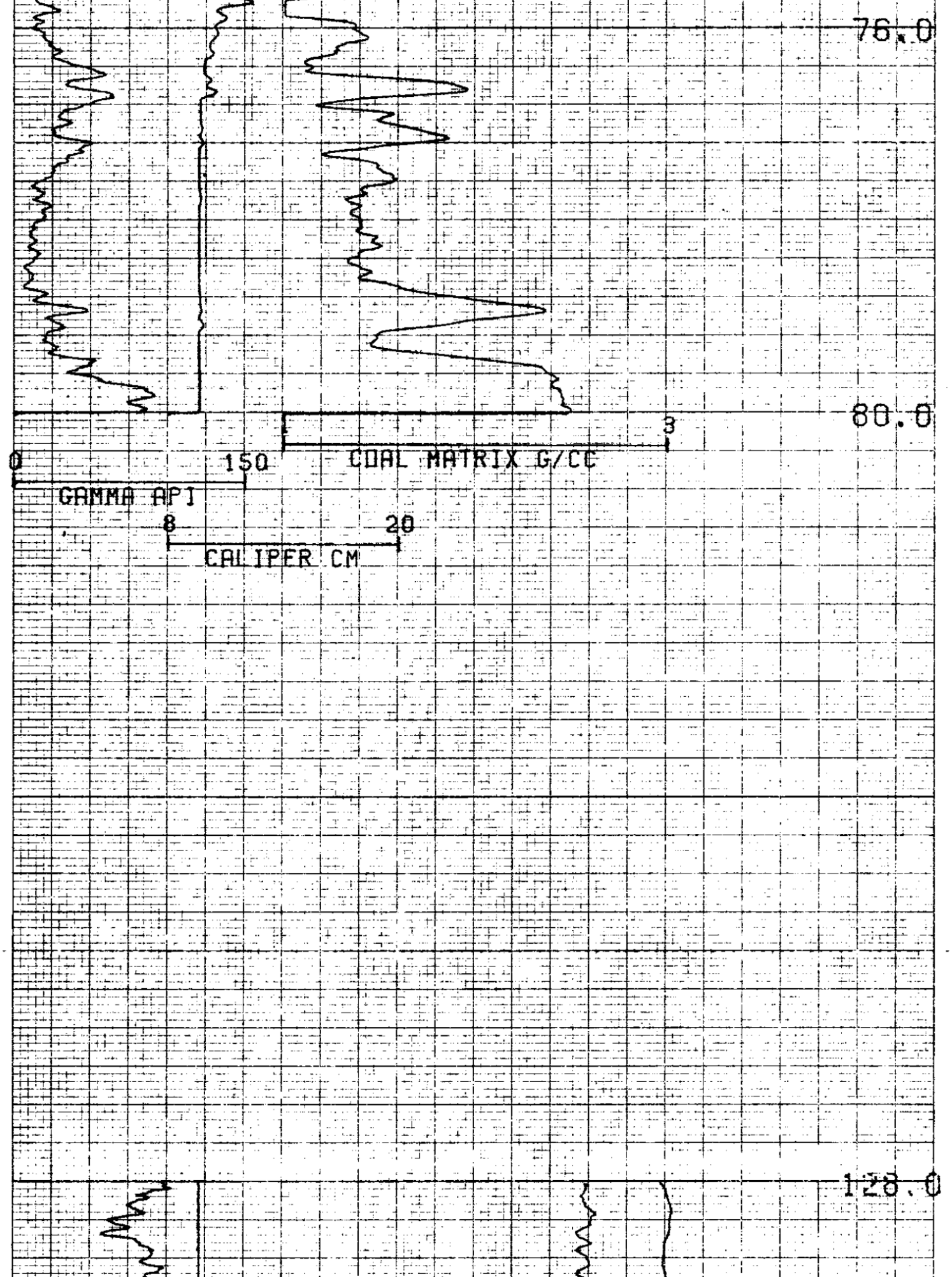
TRUE THICKNESS 1:200

SEAM DETAIL TRUE THICKNESS 1:40


.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
297.4
0
600
GAMMA API
0
2000
N-N CPS
COMPU-LOG VOL2 PLOT 08-06-83
ODH-83-001
GULF CANADA RES.
MT. KLAPPAN
HOLE DIAMETER = 04.3
PROBE # 90550 - 008
SENSOR #4 CAL STD CPS = 152
SENSOR #4 CAL NUM-CPS = 217
SENSOR #4 CAL BIAS = 0
DATA VOL2 TRUCK # 7811
K- SKARAD APPL.#1007L1
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

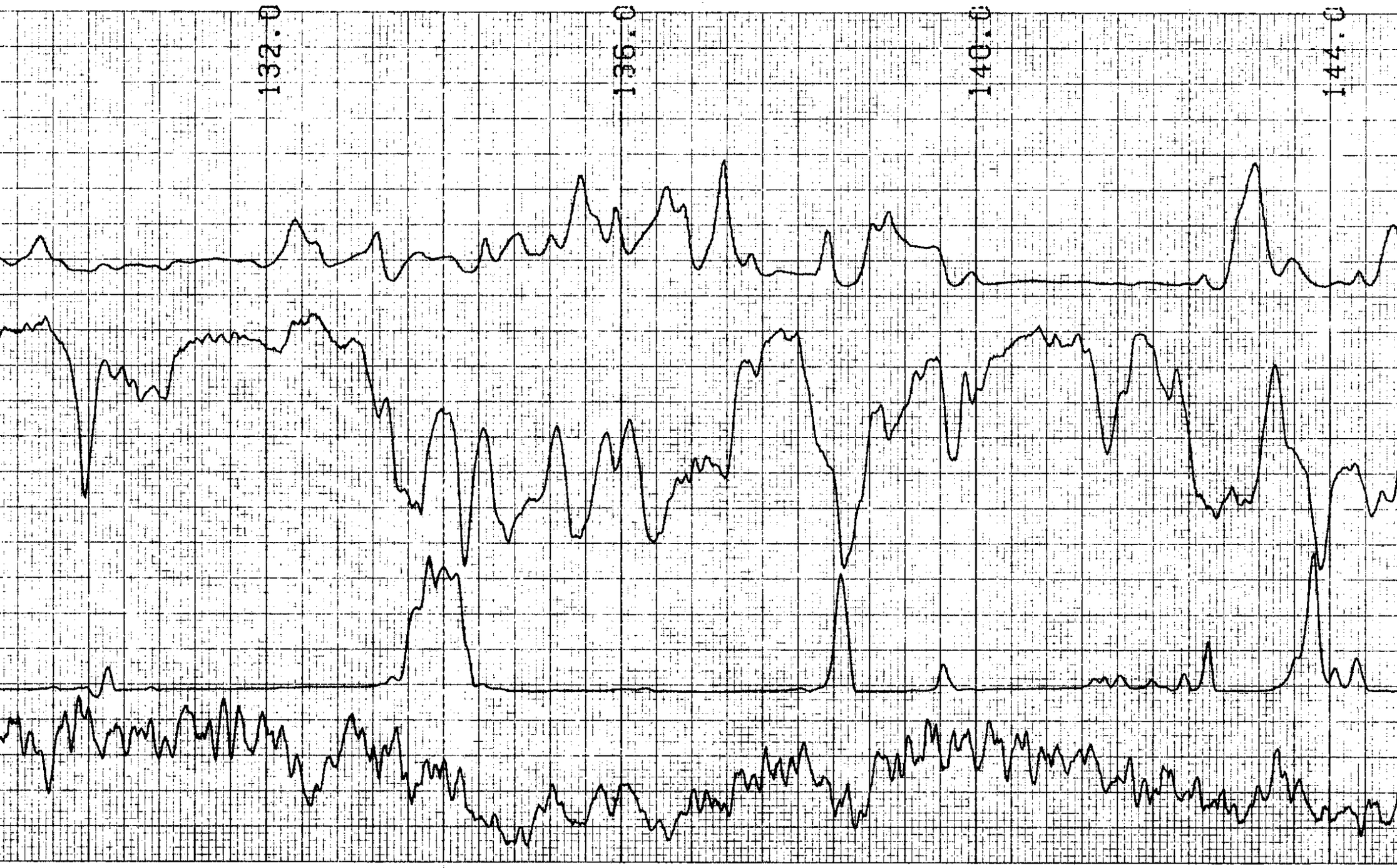

24.0
28.0


62.0
64.0
72.0
3
COAL MATRIX G/CC
20
CALIPER CM
150
0
GAMMA API
8



CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

786-0040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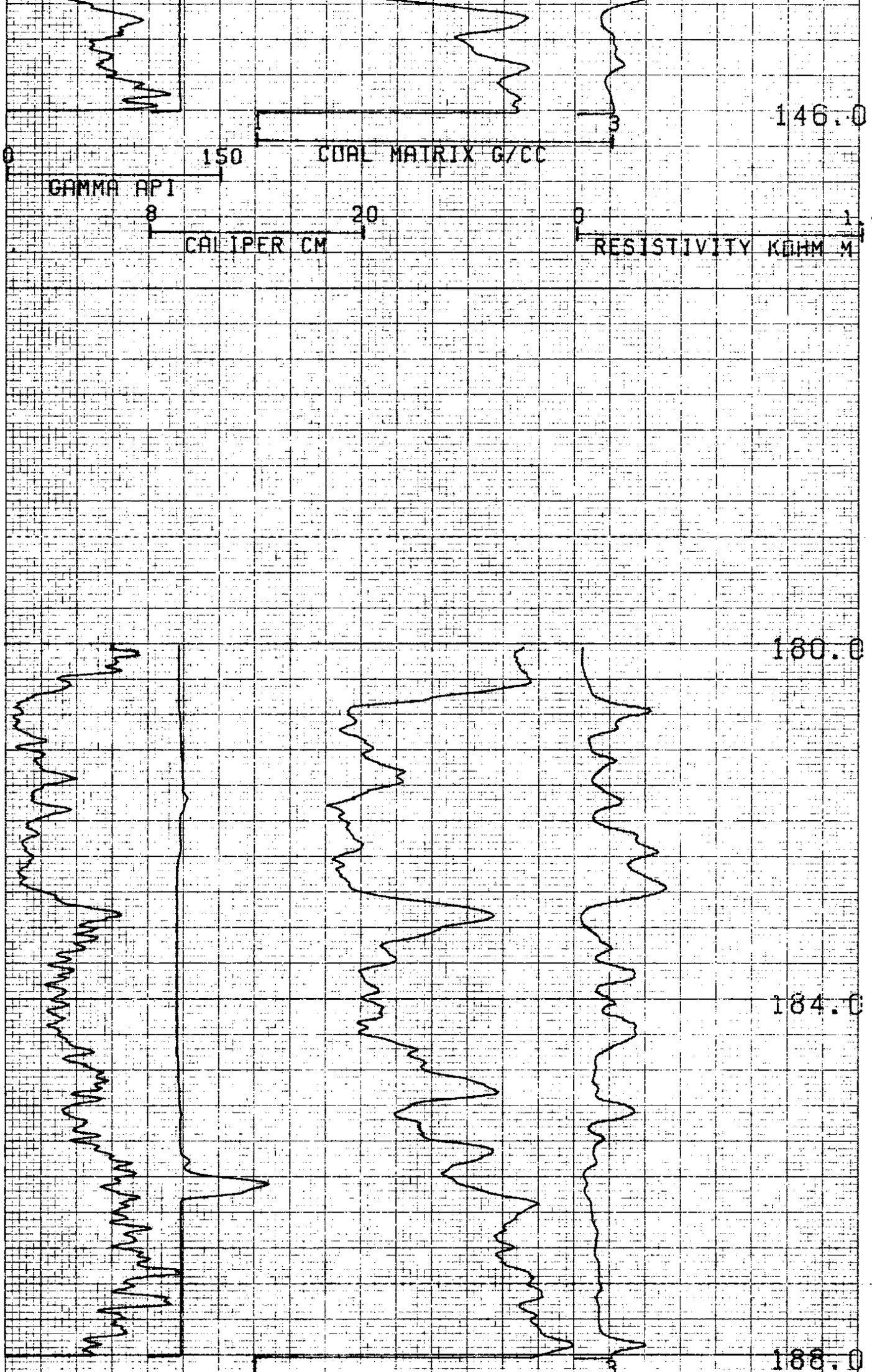
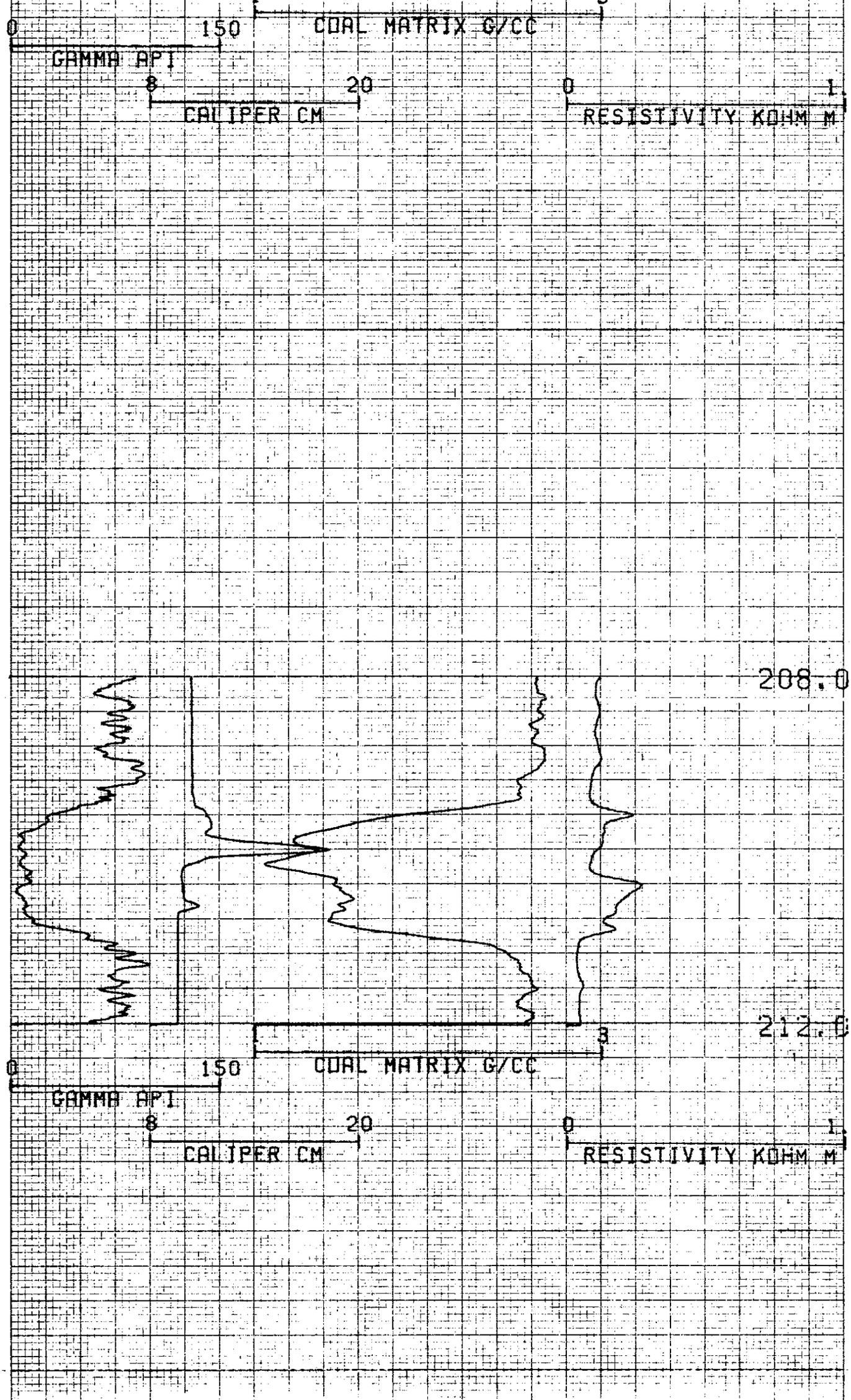
144.0



CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

CENTURY



CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

CENTURY GEOPHYSICAL CORP. PART NO. 786-0

COMPU-LOG V8L2 PLOT 08-08-83

111

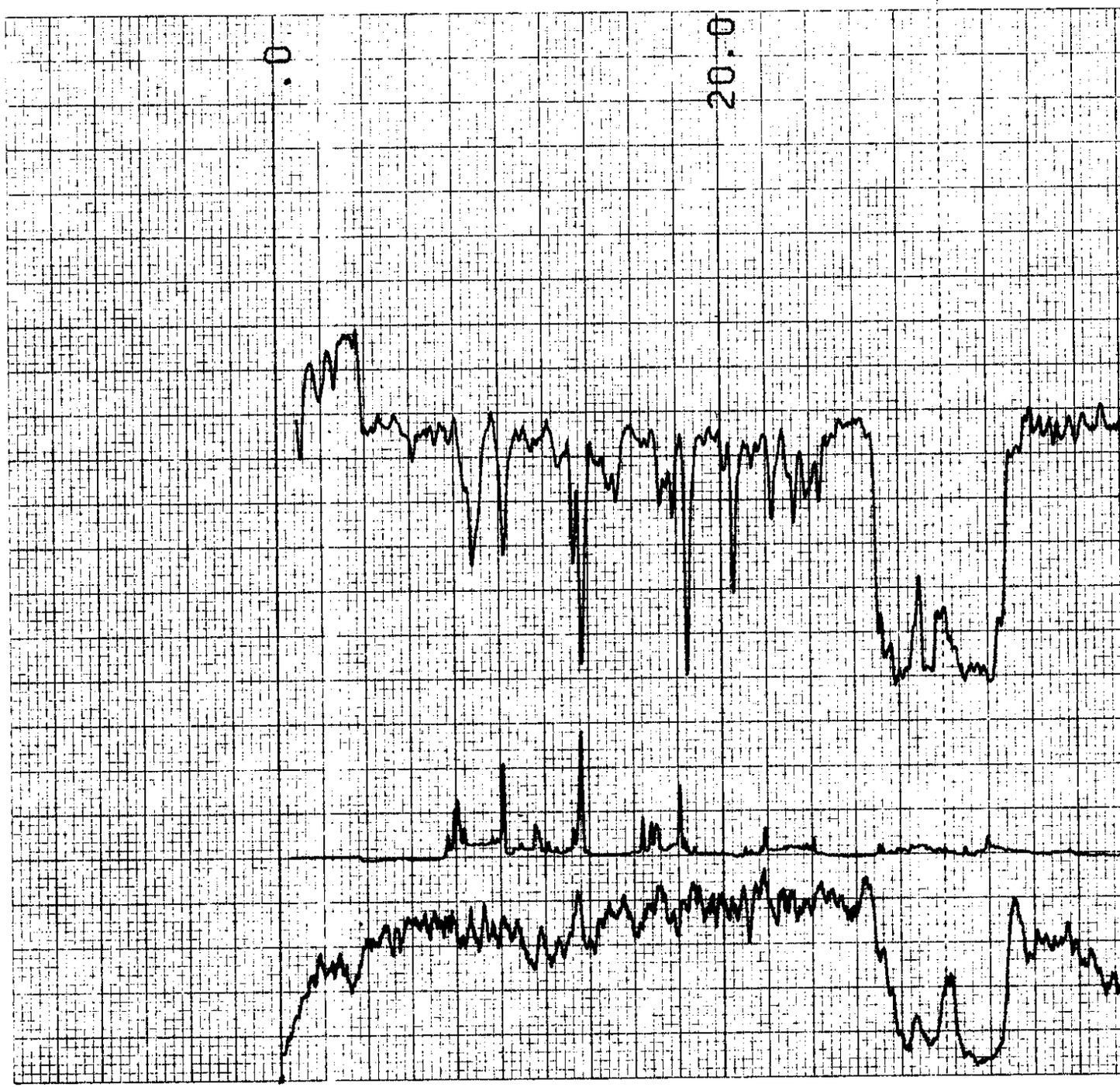
DDH-83-001
GULF CANADA RES.
MT. KLAPPAN

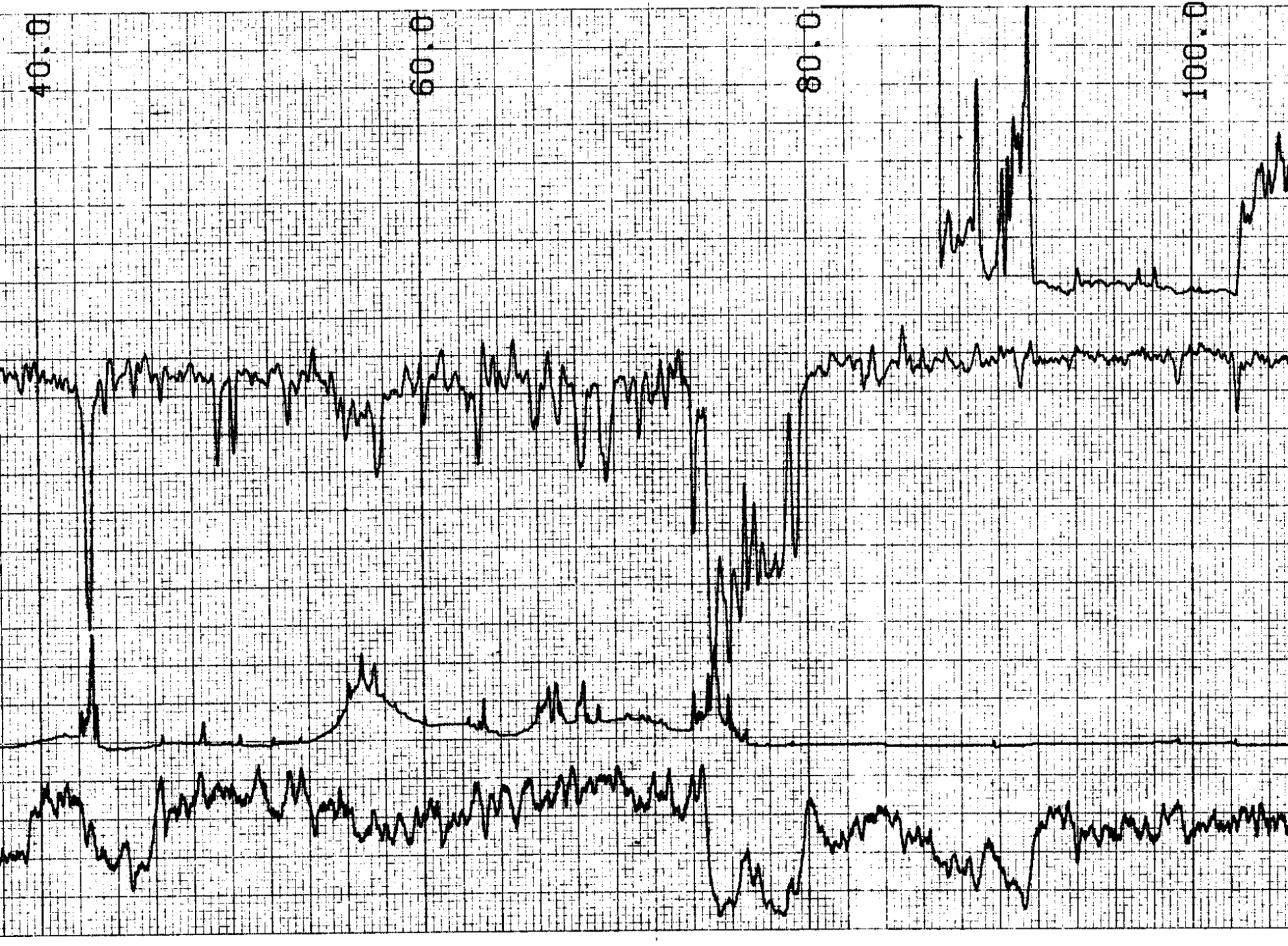
HOLE DIAMETER : 09.5
PROBE # 0030A - 408
SENSOR #4 CAL STD CPS = 6588
SENSOR #4 CAL RUN CPS = 5021
SENSOR #4 CAL BIAS = 98
DATA V8L2 TRUCK # P811
K. SKARBO APPL.#1033L1

1:40 DETAILED

CENTURY (

L CORP. PART NO. 786-0040

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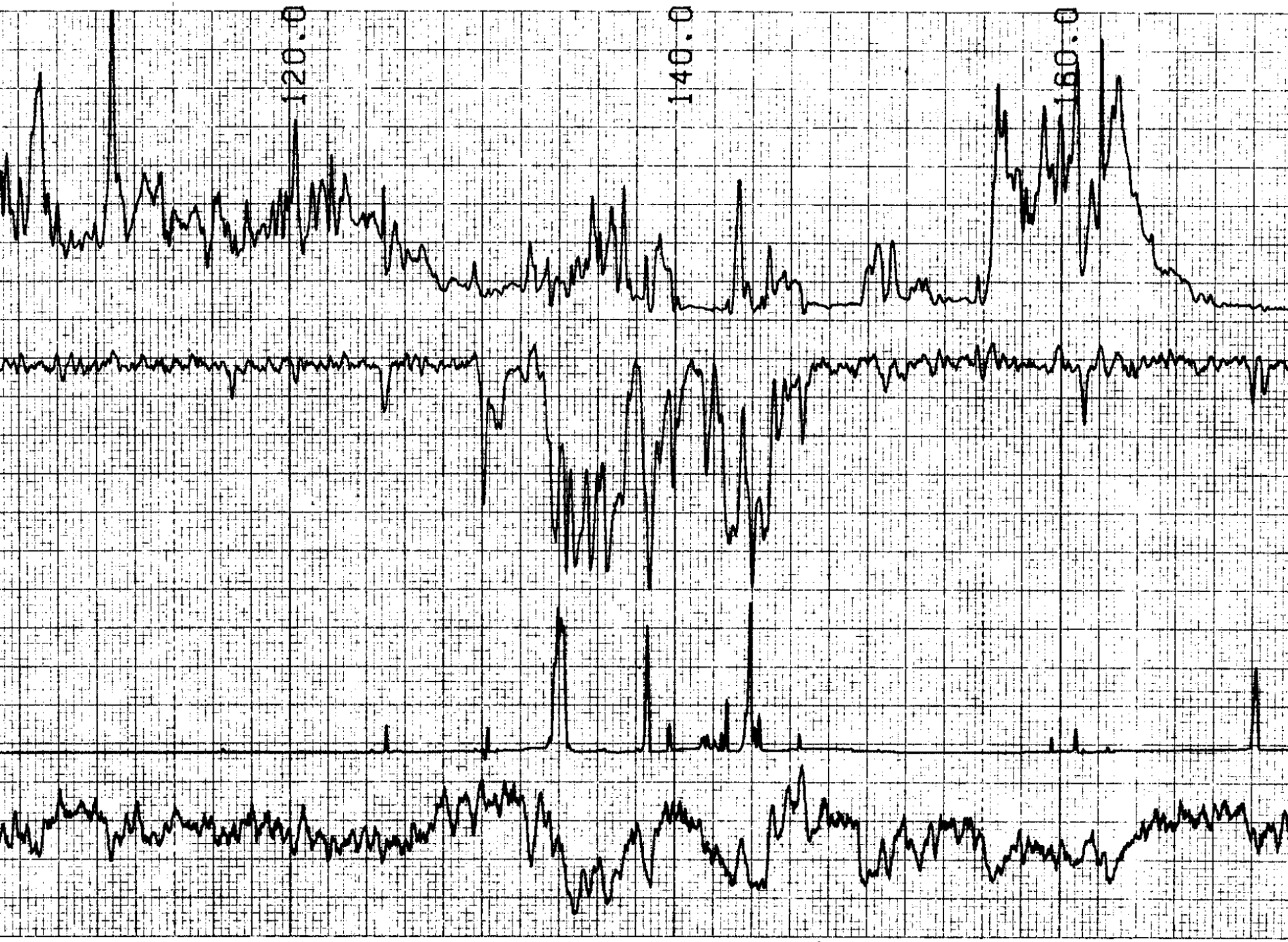
60.0
80.0
100.0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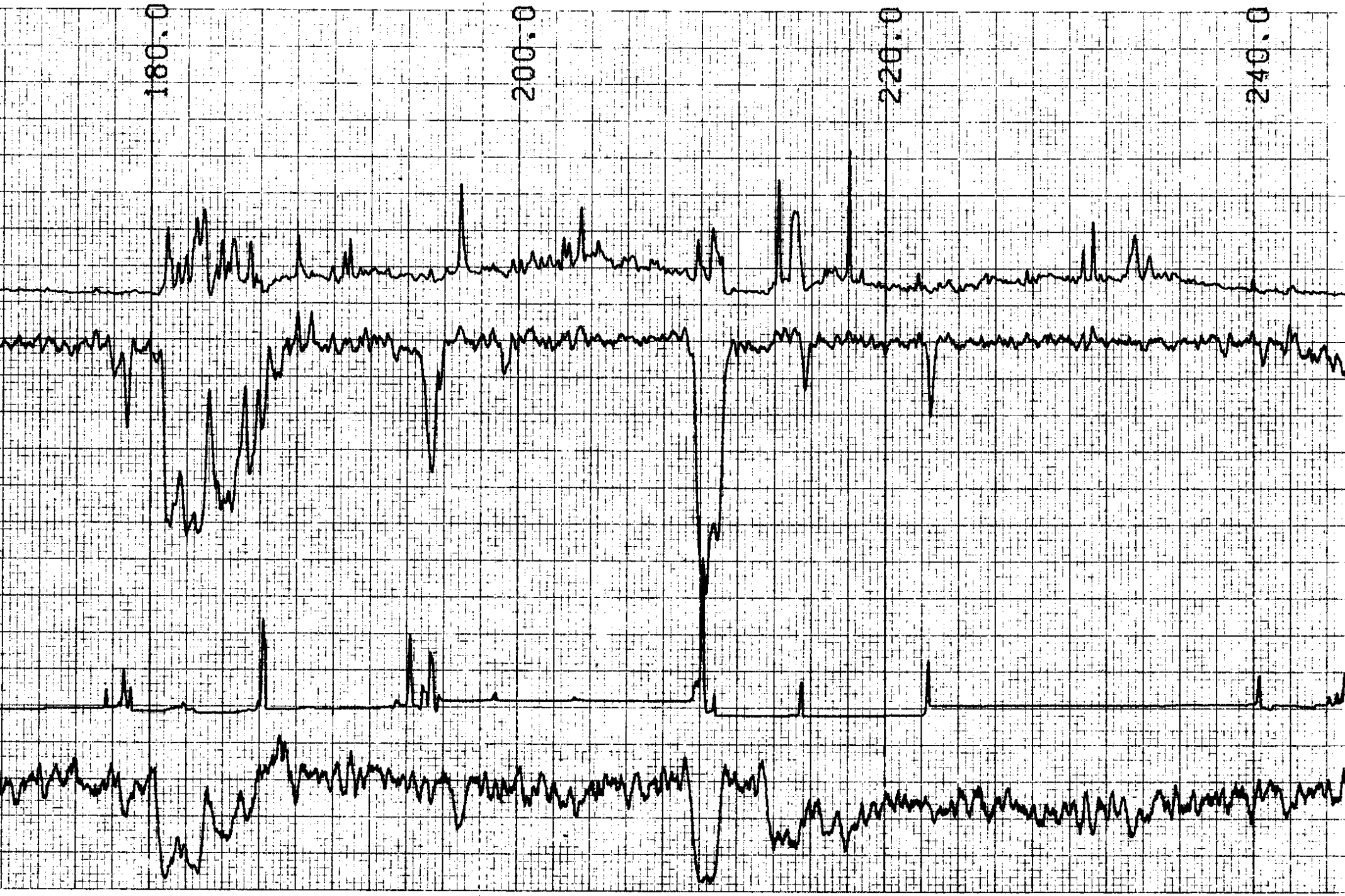
140.0
160.0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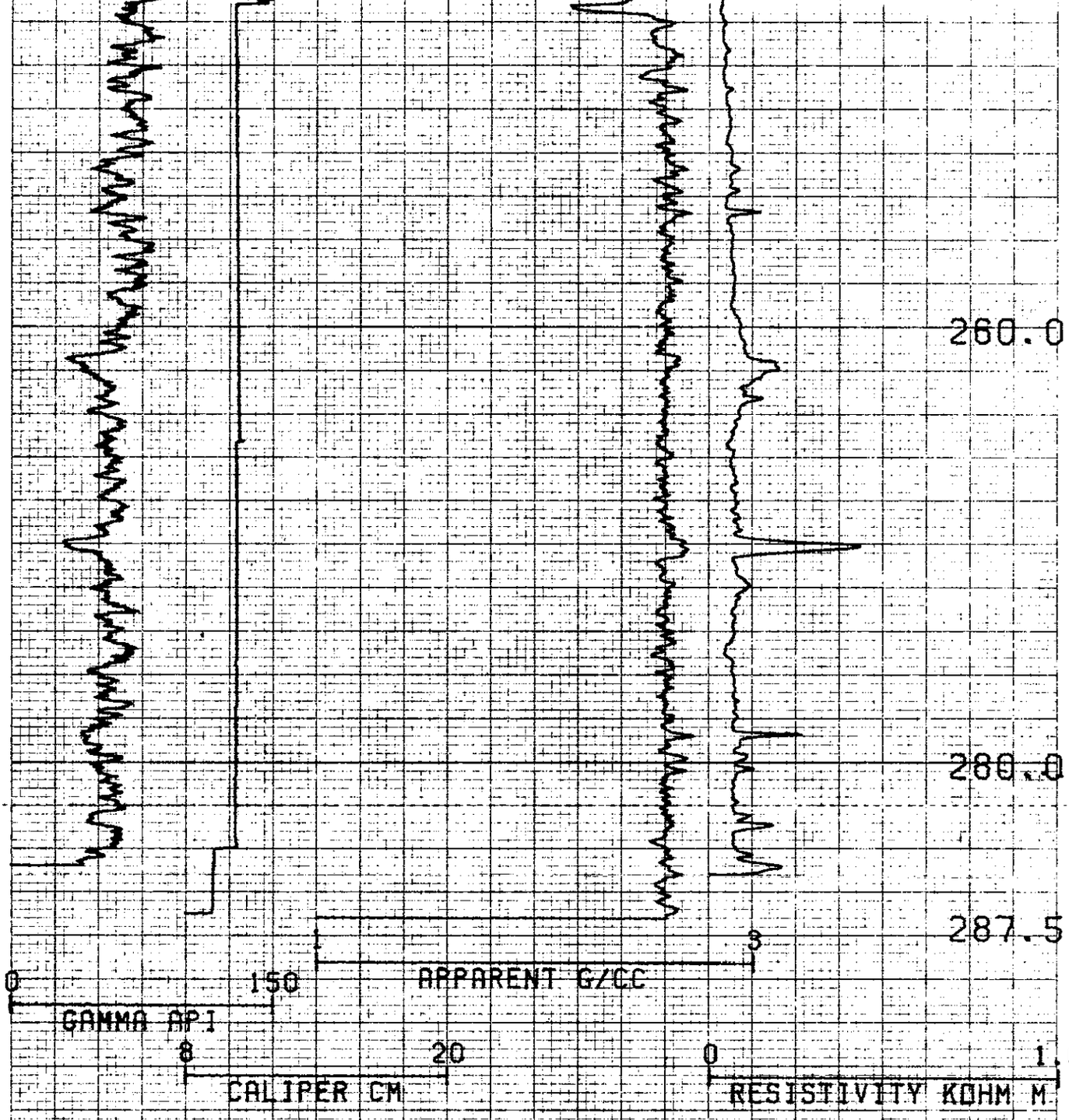
200.0
220.0
240.0



CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

COMPU-LOG V8L2 PLOT 08-08-83

DDH-83-001
GULF CANADA RES.
MT. KLAPPAN

HOLE DIAMETER : 09.5

PROBE # 9030A - 409

SENSOR #4 CAL STD CPS = 8588

SENSOR #4 CAL RUN CPS = 5021

SENSOR #4 CAL BIAS = 98

DATA V8L2 TRUCK # P811

K. SKARBO APPL.#2030L1

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

VERTICAL DEVIATION

111

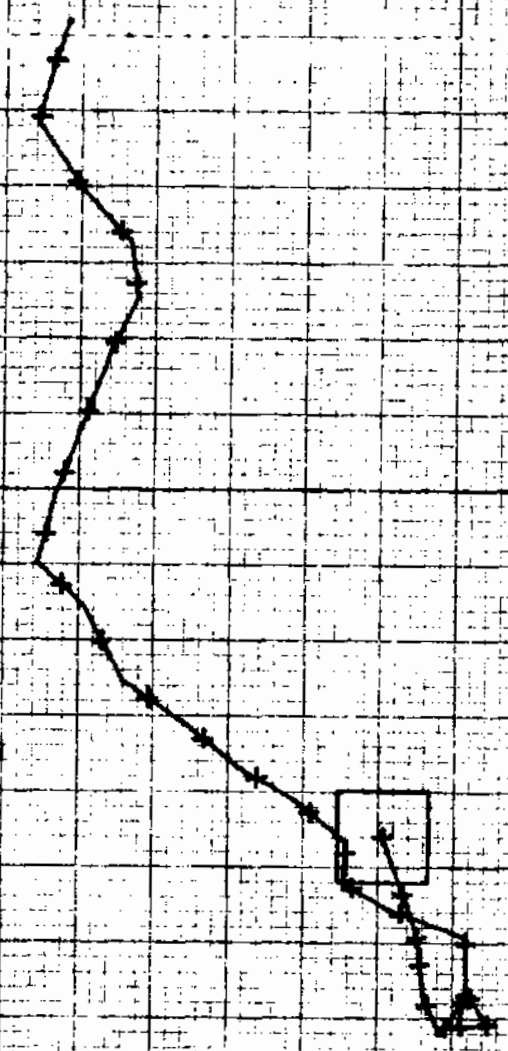
COMPU-LOG V8L1 DEVIATION
DATA FROM : V8L2

CLIENT : GULF CANADA RES.
LOCATION : MT. KLAPPAN
HOLE ID : DDH-83-001
DATE OF LOG : 08-08-83
PROBE : 9055A 0008

SCALE: .25 M/DIV
MAG DECL: 29.5
TRUE DEPTH: 297.3 M
AZIMUTH: 338.7
DISTANCE: 2.90 M

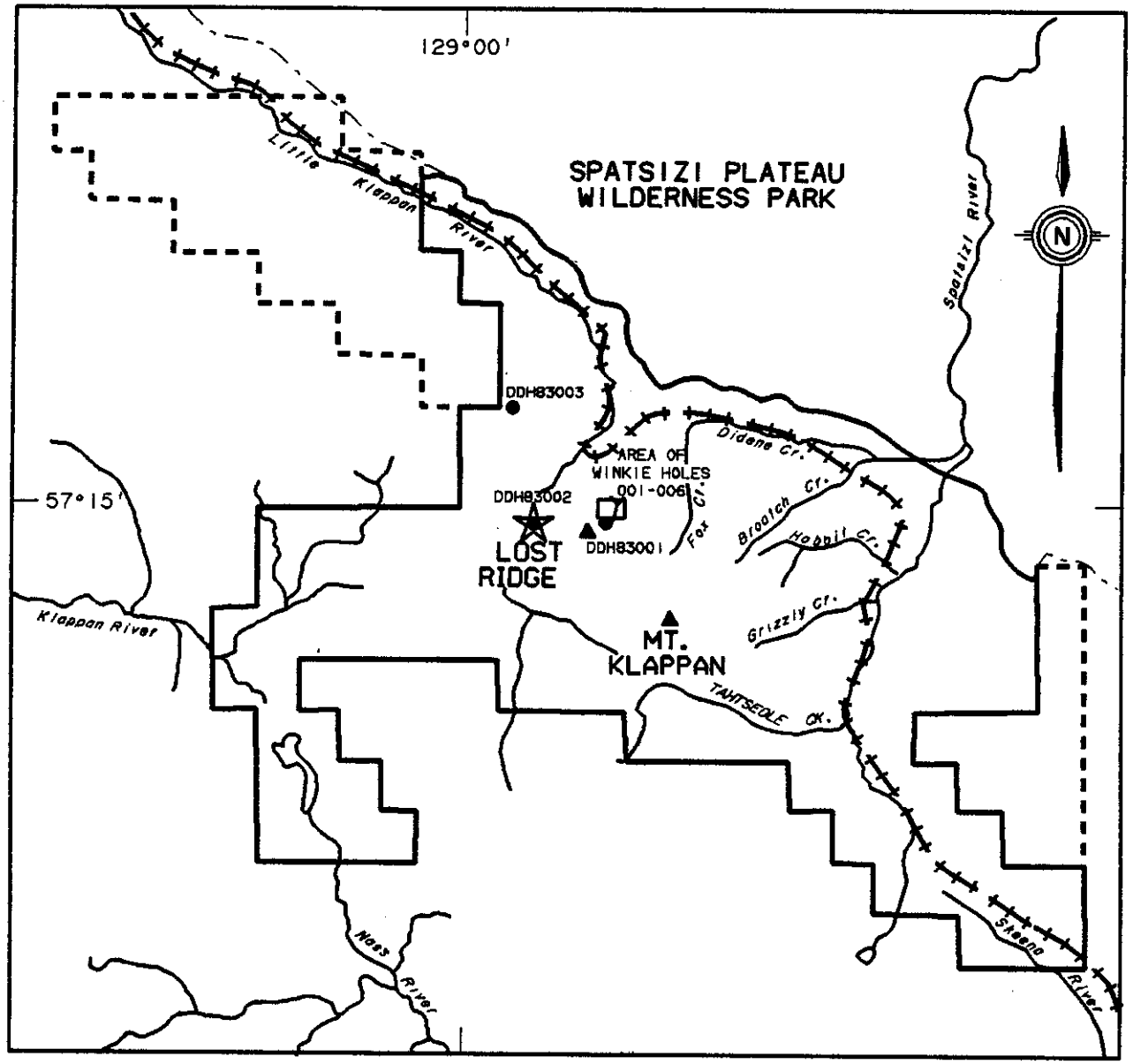
+ = 10.0 M INCR
△ = TOP OF ZONE
◇ = BOTTOM OF ZONE

TRUE NORTH ↑



MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83002



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS DDH83002

	DY MO YR
START DATE	10/08/83
END DATE	13/08/83

CONTRACTOR J.T. THOMAS OPERATOR GCRI
GEOLOGIST G. SEVE SURVEYOR

REMARKS

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS DDH83002

PROVINCE BC ELEVATION (M) 1484.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6342845.00	EASTING 503090.00	
2	LAT-LONG:	LAT 571350	LONG 1285656		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS DDH83002

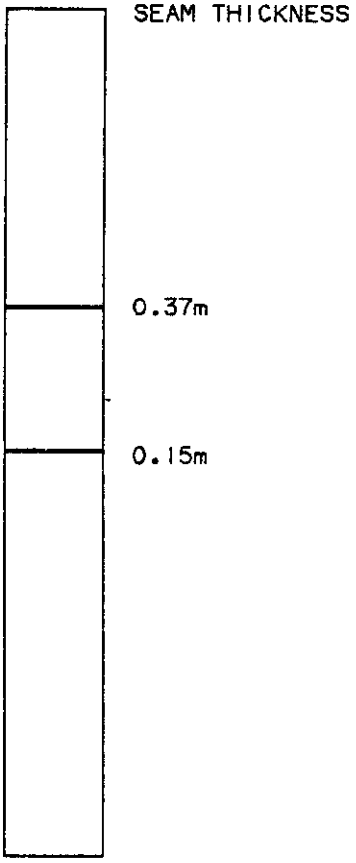
DIMENSIONS AND ORIENTATION:

LENGTH (M) 111.25 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) ____.__ CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83002



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
82	0.00	3.66	3.66			OVERBURDEN	CASING SET TO 3.66M
* 82	3.66	4.33	0.67			MUDSTONE	SLTY.DK.GY.BRKN ANKERITE LAMINATIONS;IRON STAINING ON FRACTURE SURFACE
84	4.33	4.38	0.05			SILTSTONE	CLYY.DK.GY.BRKN
84	4.38	4.54	0.16			MUDSTONE	SLTY.DK.GY.VBRKN CORE LOSS POSSIBLE
* 88	4.54	5.78	1.24			SANDSTONE	SLTY.VFG-.MOD.M.GY.THNB.BRKN MINOR MUDSTONE LAMINATONS AT TOP OF MEASUREMENT;GRAIN SIZE INCREASES TOWARDS BASE;MODERATE ANKERITE VEINING;MINOR LISTRIC SURFACES
88	5.78	7.76	1.98			SANDSTONE	MG-.PR.LT-M.GY.MB.BRKN GRAIN SIZE INCREASES TOWARDS BASE OF MEASUREMENT;MINOR PEBBLE FLOAT TOWARD BASE;CORE VBRKN AT BASE ;MINOR MUDSTONE RIP UP CLASTS IN PART

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 88	7.76	9.27	1.51			SANDSTONE	PBLY.FG-.MOD.LT-M.GY.MB.VBRKN PEBBLE CLASTS UP TO 0.02M-MATRIX SUPPORTED;CLASTS CONSIST OF VFG SANDSTONE AND SILTSTONE;MINOR ANKERITE VEINING
88	9.27	9.77	0.50			SANDSTONE	FG-.MOD.LT-M.GY.MB.BRKN MINOR ANKERITE VEINING
88	9.77	11.20	1.43			SANDSTONE	FG-.MOD.LT-M.GY.MB.SLD VERY MINOR PEBBLE FLOAT IN PART;LAMINATIONS OF SILTSTONE & VFG SANDSTONE TOWARDS BASE OF MEASUREMENT
87	11.20	11.67	0.47			SANDSTONE	FG-.MOD.LT-M.GY.MB.BRKN SILTSTONE & VFG SANDSTONE LAMINATIONS
87	11.67	11.81	0.14			SANDSTONE	FG-.MOD.LT-M.GY.MB.SLD AS ABOVE SILTSTONE AND VFG SANDSTONE LAMINATIONS
* 87	11.81	13.88	2.07			SANDSTONE	FG-.MOD.LT-M.GY.MB.SLD SILTSTONE BANDS UP TO 0.01M IN PART
87	13.88	14.27	0.39			SANDSTONE	SLTY.FG.MOD.M.GY.THNB.BRKN
87	14.27	14.30	0.03			ANKERITE	WH.THNB.SLD MUST BE SCRATCHED TO EFFERVESCE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 87	14.30	15.85	1.55			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.XBDG.BRKN MINOR SILTSTONE & MUDSTONE BANDS IN PAR T;XBDG INDICATES TOPS UPRIGHT
* 84	15.85	17.32	1.47			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.SSD.SLD CONVOLUTED LAMINATIONS OF MUDSTONE IN P ART
85	17.32	17.90	0.58			SANDSTONE	SLTY.FG.MOD.M.GY.MB.SLD MINOR MUDSTONE RIP UP CLASTS
* 86	17.90	19.29	1.39			SANDSTONE	SLTY.FG-.MOD.M-DK.GY.THNB.SSD.SLD INCREASING AMOUNTS OF SILTSTONE & MUDST ONE LAMINATIONS AND THIN BANDS;MINOR AN KERITE VEINS
86	19.29	19.99	0.70			SANDSTONE	SLTY.FG.MOD.M-DK.GY.THNB.SLD
* 87	19.99	22.13	2.14			SANDSTONE	SLTY.FG.MOD.M-DK.GY.THNB.SLD MINOR SSD IN PART;ANKERITE VEINING TOWA RDS BASE
89	22.13	22.19	0.06			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.SLD MINOR ANKERITE BANDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 90	22.19	23.04	0.85			SANDSTONE	SLTY.VFG-.MOD.M.GY.MB.SSD.BRKN SSD AT TOP IN FINE GRAINED SILTSTONE-MU DSTONE
89	23.04	23.99	0.95			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.SSD.BRKN NUMEROUS SILTSTONE & MUDSTONE LAMINATIO NS;POSSIBLE BIOTURBATION NEAR BASE
89	23.99	24.44	0.45			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.XBDG BRKN
89	24.44	24.92	0.48			SILTSTONE	SSY.M-DK.GY.VTHNB.BRKN
* 88	24.92	25.89	0.97			SILTSTONE	SSY.M-DK.GY.VTHNB.BIOTR.SLD CLAM BURROWS AT TOP;SSD TOWARDS BASE OF MEASUREMENT
88	25.89	26.27	0.38			SILTSTONE	SSY.M-DK.GY.VTHNB.SSD.SLD
* 87	26.27	27.75	1.48			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.SSD.BRKN CONVOLUTED MUDSTONE LAMINATONS TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
83	27.75	27.99	0.24			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.BRKN
* 79	27.99	29.38	1.39			SILTSTONE	SSY.M-DK.GY.THNB.BRKN MODERATE ANKERITE VEINING;BECOMING CLAYEY AT BASE
79	29.38	29.77	0.39			MUDSTONE	SLTY.DK.GY.VTHNB.SLD
78	29.77	30.23	0.46			MUDSTONE	SLTY.DK.GY.VTHNB.SLD
78	30.23	30.52	0.29			SILTSTONE	PYR.M-DK.GY.MB.BRKN
78	30.52	31.11	0.59			MUDSTONE	SLTY.DK.GY.VTHNB.BRKN PYRITIC IN PART
* 78	31.11	31.30	0.19			SILTSTONE	CLYY.DK.GY.MB.SLD
* 80	31.30	31.71	0.41			MUDSTONE	SLTY.DK.GY.VTHNB.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	31.71	32.47	0.76			MUDSTONE	CARB.DK.GY.LAM.VBRKN PYRITE ON FRACTURE PLANE-INCREASES TOWARDS BASE;INCREASINGLY CARBONACEOUS
79	32.47	32.59	0.12			MUDSTONE	CARB.DK.GY.VBRKN MINOR COAL C-6 IN CORE
79	32.59	33.70	1.11			MUDSTONE	CARB.DK.GY.SLD PYRITE VUGS IN PART
78	33.70	35.58	1.88			MUDSTONE	CARB.DK.GY.BRKN MINOR PYRITE INCLUSIONS IN PART
78	35.58	35.75	0.17			MUDSTONE	CARB.DK.GY.BRKN
77	35.75	37.54	1.79			CLAYSTONE	CARB.BLK.VBRKN MINOR BIVALVE FOSSILS
76	37.54	37.72	0.18			CLAYSTONE	CARB.BLK.VBRKN MINOR PYRITE INCLUSIONS IN PART
* 76	37.72	39.24	1.52			CLAYSTONE	CARB.BLK.BRKN BIVALVES AT TOP;BECOMES INCREASINGLY PYRITIC TOWARDS BASE
78	39.24	39.39	0.15			COAL	C-1.BLK.BRKN COAL INTERBEDED WITH PYRITIC CLAYSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	39.39	39.44	0.05			CLAYSTONE	CARB.BLK.BRKN
78	39.44	39.61	0.17			COAL	C-1.BLK.SLD INTERBEDDED WITH MUDSTONE;MODERATE ANKE RITE VEINING
* 80	39.61	40.78	1.17			CLAYSTONE	CARB.BLK.BRKN COAL LAMINATIONS AND INCLUSIONS DECREAS ING TOWARDS BASE;PYRITIC AT TOP; CARBON ACEOUS PLANT FRAGMENTS
82	40.78	41.16	0.38			CLAYSTONE	CARB.BLK.BRKN MINOR COAL INCLUSIONS AND LAMINATIONS A T TOP;CARBONACEOUS PLANT FRAGMENTS
83	41.16	41.59	0.43			CLAYSTONE	CARB.BLK.VBRKN
* 85	41.59	43.27	1.68			MUDSTONE	CARB.BLK.SSD.BRKN MINOR CARBONACEOUS PLANT FRAGMENTS
84	43.27	43.92	0.65			MUDSTONE	CARB.BLK.VTHNB.BRKN MINOR CARBONACEOUS PLANT FRAGMENTS
* 83	43.92	45.26	1.34			MUDSTONE	CARB.BLK.VTHNB.BRKN MINOR CARBONACEOUS PLANT FRAGMENTS;INCR EASINGLY CARBONACEOUS TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 89	45.26	47.07	1.81			MUDSTONE	CARB.BLK.VTHNB.BIOTR.BRKN SILTY STRINGERS;MINOR CARBONACEOUS PLAN T FRAGMENTS;MINOR WORM BURROWS
85	47.07	47.34	0.27			MUDSTONE	CARB.BLK.VTHNB.SLD MINOR CARBONACEOUS PLANT FRAGMENTS
* 82	47.34	48.73	1.39			MUDSTONE	CARB.BLK.VTHNB.BIOTR.BRKN POSSIBLE WORM BURROWS
84	48.73	49.07	0.34			MUDSTONE	CARB.BLK.SHRD LISTRIC SURFACES;CORE BADLY BROKEN
84	49.07	49.43	0.36			MUDSTONE	CARB.BLK.VTHNB.VBRKN MINOR CARBONACEOUS PLANT FRAGMENTS;MINO R PYRITE
85	49.43	50.22	0.79			MUDSTONE	CARB.BLK.VTHNB.BRKN MINOR CARBONACEOUS PLANT FRAGMENTS
* 87	50.22	51.41	1.19			MUDSTONE	SLTY.DK.GY.THNB.SLD
87	51.41	51.70	0.29			MUDSTONE	SLTY.DK.GY.VTHNB.SLD MINOR CARBONACEOUS PLANT FRAGMENTS
87	51.70	52.26	0.56			SILTSTONE	SSY.DK.GY.THNB.SLD COAL INCLUSIONS IN PART

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 87	52.26	53.39	1.13			MUDSTONE	SLTY.DK.GY.VTHNB.SLD MINOR ANKERITE VEINING
87	53.39	53.49	0.10			MUDSTONE	SLTY.DK.GY.VTHNB.BRKN
87	53.49	53.63	0.14			SILTSTONE	CLYY.LT-M.GY.MB.BRKN
87	53.63	54.18	0.55			MUDSTONE	SLTY.DK.GY.VTHNB.SLD LISTRIC SURFACES
86	54.18	55.61	1.43			MUDSTONE	SLTY.DK.GY.VTHNB.SLD LISTRIC SURFACES
86	55.61	56.46	0.85			MUDSTONE	SLTY.DK.GY.VTHNB.BRKN MINOR FRACTURE DISPLACEMENT
* 86	56.46	57.43	0.97			MUDSTONE	SLTY.DK.GY.VTHNB.SLD LISTRIC SURFACES;MINOR ANKERITE VEINS
* 83	57.43	58.30	0.87			MUDSTONE	SLTY.DK.GY.VTHNB.SLD CORE INCREASINGLY CARBONACEOUS;PYRITIC TOWARDS BASE;COAL STRINGERS AT BASE
83	58.30	58.45	0.15			COAL	C-1.BLK.SLD COAL INTERBEDDED WITH CLAYSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
84	58.45	59.55	1.10			CLAYSTONE	CARB.DK.GY.BRKN COAL LAMINATIONS & INCLUSIONS DECREASE TOWARDS BASE
85	59.55	59.61	0.06			CLAYSTONE	CARB.DK.GY.SLD MINOR COAL LAMINATIONS
85	59.61	60.01	0.40			MUDSTONE	CARB.DK.GY.LAM.SLD MINOR COAL LAMINATONS;CORE BECOMES SILTIER TOWARDS BASE
85	60.01	60.42	0.41			SILTSTONE	CLYY.M-DK.GY.LAM.SLD BECOMES SANDY TOWARDS BASE
* 86	60.42	61.69	1.27			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.SLD SILTSTONE & MUDSTONE LAMINATONS THROUGHOUT
87	61.69	61.95	0.26			SANDSTONE	SLTY.VFG-.WEL.M.GY.VTHNB.BRKN MUDSTONE LAMINATIONS THROUGHOUT
87	61.95	62.26	0.31			SILTSTONE	SSY.M-DK.GY.LAM.SLD MINOR COAL LAMINATONS AT TOP
87	62.26	62.73	0.47			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.VBRKN LISTRIC SURFACES AND ANKERITE VEINS INCREASE TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
88	62.73	63.67	0.94			SANDSTONE	FG-.PR.M.GY.MB.BRKN MODERATE ANKERITE VEINING THROUGHOUT;LI STRIC SURFACES
* 89	63.67	65.30	1.63			SANDSTONE	FG-.MOD.M.GY.MB.BRKN MINOR ANKERITE VEINING-SOME LISTRIC SUR FACES
87	65.30	65.57	0.27			SANDSTONE	FG-.MOD.M.GY.MB.SLD OCCASIONAL MUDSTONE CLASTS
86	65.57	66.44	0.87			SANDSTONE	FG-.PR.LT-M.GY.MB.BRKN MINOR MUDSTONE BANDS
86	66.44	66.69	0.25			SILTSTONE	SSY.M-DK.GY.LAM.BIOTR.SLD BIOTURBATION INCLUDES CLAM & WORM BURRO WS
85	66.69	67.49	0.80			SANDSTONE	FG-.MOD.LT-M.GY.MB.SLD MINOR SILTSTONE LAMINATIONS
83	67.49	68.31	0.82			SANDSTONE	CARB.FG-.MOD.LT-M.GY.MB.BRKN MINOR CARBONACEOUS STRINGERS
82	68.31	69.35	1.04			SANDSTONE	FG-.MOD.LT-M.GY.MB.BRKN MINOR MUDSTONE BANDS;MINOR ANKERITE VEI NING TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 80	69.35	70.47	1.12			SANDSTONE	CARB.FG-.PR.LT-M.GY.MB.BRKN MUDSTONE CLASTS IN PART;POSSIBLE BIOTUR BATION AT TOP
81	70.47	70.69	0.22			SILTSTONE	SSY.M-DK.GY.THNB.WRMBU.VBRKN ZONE OF CONSIDERABLE BIOTURBATION
82	70.69	71.35	0.66			SANDSTONE	FG-.MOD.LT-M.GY.MB.BRKN MINOR MUDSTONE BANDS;ANKERITE VEINING
83	71.35	72.16	0.81			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.BRKN SILTSTONE BANDS THROUGHOUT
84	72.16	72.87	0.71			SANDSTONE	SLTY.FG.WEL.M-DK.GY.MB.SLD BECOMES INCREASINGLY SILTY TOWARDS BASE
85	72.87	73.39	0.52			SILTSTONE	SSY.M-DK.GY.THNB.SSD.SLD MODERATE ANKERITE VEINING
85	73.39	74.18	0.79			SILTSTONE	CARB.M-DK.GY.THNB.VBRKN SANDY IN PART;LISTRIC SURFACES;MINOR AN KERITE VEINING
86	74.18	74.56	0.38			SILTSTONE	CARB.M-DK.GY.THNB.BRKN MODERATE ANKERITE VEINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 87	74.56	75.21	0.65			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.SLD MINOR MUDSTONE CLASTS IN PART;MODERATE ANKERITE VEINING
86	75.21	76.11	0.90			SANDSTONE	SLTY.FG.WEL.M.GY.MB.SLD MINOR MUDSTONE LAMINATIONS IN PART
* 85	76.11	76.54	0.43			SILTSTONE	SSY.M-DK.GY.THNB.SLD MINOR QUARTZ VEINING
86	76.54	77.27	0.73			SANDSTONE	VFG-.MOD.M.GY.MB:SLD
* 88	77.27	78.95	1.68			SANDSTONE	SLTY.VFG-.MOD.M.GY.MB.BRKN MUDSTONE LAMINATIONS AND RIP UP CLASTS IN PART
86	78.95	79.01	0.06			SANDSTONE	SLTY.VFG.WEL.M-DK.GY.MB.SLD
85	79.01	79.13	0.12			MUDSTONE	CARB.DK.GY.LAM.VBRKN CARBONACEOUS MUDSTONE INTERBEDDED WITH ANKERITE
85	79.13	79.18	0.05			SANDSTONE	SLTY.FG.MOD.M.GY.MB.BRKN LISTRIC SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
85	79.18	79.25	0.07			SANDSTONE	SLTY.FG.WEL.M.GY.MB.BRKN
* 82	79.25	81.31	2.06			SANDSTONE	FG-.MOD.M.GY.MB.BRKN MINOR ANKERITE VEINING & LISTRIC SURFACES
81	81.31	82.15	0.84			SANDSTONE	VFG-.MOD.M.GY.MB.SLD
* 80	82.15	83.21	1.06			SANDSTONE	VFG-.PR.M.GY.MB.BRKN MINOR SILTSTONE BANDS
83	83.21	83.37	0.16			SANDSTONE	VFG-.MOD.M.GY.MB.VBRKN
* 87	83.37	85.08	1.71			SANDSTONE	VFG-.MOD.M.GY.MB.SSD.BRKN MINOR ANKERITE VEINING;CONVOLUTED LAMINATIONS AT BASE;POSSIBLE WORM BURROWS AT BASE OF MEASUREMENT
39	85.08	85.35	0.27			SANDSTONE	SLTY.VFG.WEL.LT-M.GY.MB.BRKN
* 15	85.35	86.07	0.72			SILTSTONE	SSY.LT-M.GY.LAM.SLD BCA'S SWING TO LOW ANGLE;POSSIBLE XBDG

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
47	86.07	86.54	0.47			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.SSD.SLD FLAME STRUCTURES
* 65	86.54	86.73	0.19			SANDSTONE	SLTY.FG-.PR.M-DK.GY.MB.SLD
* 85	86.73	87.09	0.36			SILTSTONE	SSY.M-DK.GY.THNB.BIOTR.SLD MODERATE TO HEAVY BIOTURBATION;MINOR XB DG INDICATES TOPS UPRIGHT
* 81	87.09	87.56	0.47			SILTSTONE	SSY.M-DK.GY.LAM.BIOTR.SLD MODERATE BIOTURBATION (BURROWS)
82	87.56	87.88	0.32			SANDSTONE	SLTY.VFG-.MOD.M.GY.MB.BRKN
83	87.88	89.09	1.21			SILTSTONE	SSY.M-DK.GY.THNB.BIOTR.SLD MODERATE TO HEAVY BIOTURBATION-BURROWS
* 84	89.09	89.66	0.57			SILTSTONE	SSY.M-DK.GY.THNB.BIOTR.BRKN BIOTURBATION MODERATE;MINOR ANKERITE VE INING NEAR BASE
84	89.66	90.86	1.20			SILTSTONE	CARB.DK.GY.LAM.BIOTR.VBRKN MODERATE BIOTURBATION;LISTRIC SURFACES; INCREASINGLY CARBONACEOUS TOWARDS BASE
85	90.86	90.89	0.03			ANKERITE	CLYY.WH.BRKN INTERBEDDED WITH MUDSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
85	90.89	90.91	0.02			ANKERITE	CLYY.WH.LAM.SLD INTERBEDDED WITH MUDSTONE
85	90.91	91.41	0.50			SILTSTONE	CLYY.DK.GY.LAM.SLD MUDSTONE INTERBEDS THROUGHOUT
85	91.41	91.50	0.09			SANDSTONE	FG.MEL.M.GY.MB.SLD
* 85	91.50	91.82	0.32			SILTSTONE	CLYY.M-DK.GY.THNB.SLD MINOR SANDSTONE BANDS
86	91.82	92.80	0.98			MUDSTONE	SLTY.DK.GY.LAM.SLD MINOR PYRITE INCLUSIONS AT BASE OF MEAS UREMENT
86	92.80	92.90	0.10			MUDSTONE	SLTY.DK.GY.LAM.SLD
86	92.90	93.61	0.71			MUDSTONE	SLTY.DK.GY.BRKN MINOR PYRITE INCLUSIONS AT TOP;LISTRIC SURFACES;SLIGHTLY CARBONACEOUS
87	93.61	93.75	0.14			SILTSTONE	SSY.M-DK.GY.SLD FRACTURE DISPLACEMENT UP TO 0.03M;MODER ATE ANKERITE VEINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 87	93.75	94.73	0.98			MUDSTONE	SLTY.DK.GY.THNB.BIOTR.SLD MODERATE BIOTURBATION (BURROWS)
86	94.73	94.83	0.10			MUDSTONE	SLTY.DK.GY.BRKN
86	94.83	94.93	0.10			SANDSTONE	FG.NEL.M.GY.THNB.SLD
85	94.93	95.77	0.84			SILTSTONE	SSY.M-DK.GY.LAM.BIOTR.SLD BURROWS IN PART;SANDSTONE BANDS UP TO 0 .06M
* 83	95.77	96.35	0.58			SILTSTONE	SSY.DK.GY.LAM.BIOTR.SLD BECOMES SANDIER TOWARDS BASE;MINOR ANKE RITE VEINING AT BASE;MODERATE BURROWING
83	96.35	96.75	0.40			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.SLD ANKERITE VEINING MODERATE AT BASE
84	96.75	97.59	0.84			SANDSTONE	SLTY.FG-.MOD.M.GY.MB.SSD.BRKN ANKERITE VEINING AT TOP;CONVOLUTED BEDD ING IN PART;MINOR MUDSTONE RIP UP CLAST S
84	97.59	97.74	0.15			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDH83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 85	97.74	98.82	1.08			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.SSD.SLD CONVOLUTED BEDDING IN PART
82	98.82	99.36	0.54			SANDSTONE	FG-.MOD.M.GY.MB.SLD
* 79	99.36	100.53	1.17			SILTSTONE	SSY.M-DK.GY.LAM.BIOTR.BRKN LISTRIC SURFACES;MODERATE BIOTURBATION (BURROWS)
82	100.53	100.73	0.20			ROCK LOSS	
83	100.73	100.90	0.17			SILTSTONE	DK.GY.LAM.SLD
84	100.90	101.44	0.54			SILTSTONE	DK.GY.LAM.BIOTR.BRKN MINOR BIOTURBATION
* 86	101.44	101.90	0.46			SANDSTONE	SLTY.VFG-.MOD.M-DK.GY.THNB.BIOTR SLD MINOR BIOTURBATION
86	101.90	102.21	0.31			SILTSTONE	CLYY.DK.GY.VTHNB.BIOTR.SLD MINOR ANKERITE VEINING
86	102.21	102.90	0.69			MUDSTONE	DK.GY.VBRKN MINOR ANKERITE VEINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDHB3002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
85	102.90	103.25	0.35			ROCK LOSS	
* 85	103.25	104.60	1.35			MUDSTONE	DK.GY.BIOTR.SLD MODERATE BIOTURBATION;XBDG INDICATES TO PS UPRIGHT
81	104.60	105.22	0.62			MUDSTONE	SLTY.DK.GY.BIOTR.SLD MODERATE BURROWING;DEPTH MARKER DISPLACED
80	105.22	105.52	0.30			MUDSTONE	SLTY.DK.GY.BIOTR.SLD MINOR BIOTURBATION (BURROWING)
* 78	105.52	106.19	0.67			MUDSTONE	SLTY.DK.GY.BIOTR.SLD BURROWING MODERATE
77	106.19	106.27	0.08			SANDSTONE	VFG-.WEL.M.GY.MB.SLD
77	106.27	106.59	0.32			MUDSTONE	SLTY.DK.GY.BIOTR.SLD MINOR BIOTURBATION
77	106.59	106.69	0.10			ANKERITE	CLYY.MH.SLD MUDSTONE REPLACED BY ANKERITE
76	106.69	107.32	0.63			MUDSTONE	SLTY.DK.GY.BIOTR.SLD BIOTURBATION (BURROWS) MODERATE TO HEAVY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: DDHB3002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	107.32	107.74	0.42			SILTSTONE	SSY.M.GY.BIOTR.SLD CLAM BURROWS INDICATE TOPS UPRIGHT
74	107.74	108.33	0.59			MUDSTONE	SLTY.DK.GY.BIOTR.SLD MODERATE BURROWING
73	108.33	109.18	0.85			MUDSTONE	DK.GY.BIOTR.SLD MINOR BIOTURBATION;LISTRIC SURFACES
* 70	109.18	111.25	2.07			MUDSTONE	SLTY.DK.GY.BIOTR.SLD LIGHT TO MODERATE BIOTURBATION;BURROWS INDICATE TOPS UPRIGHT; ********** * END OF CORE (365'/111.25M)********** ******

* DENOTES MEASURED BCA
NEWPAGE

CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * * VERTICAL DEVIATION * * * * * * * * *

COMPU-LOG V8L1 DEVIATION

CLIENT : GULF CANADA RES. HOLE ID : DDH-83-002

LOCATION : MT. KLAPPAN DATE OF LOG : 08-13-83

DATA FROM : V8L2* PROBE : 9055A 0008

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TD = TOTAL DEPTH
T = TOP OF ZONE
B = BOTTOM OF ZONE

	DEPTH	TRUE DEPTH	NORTH DEV	EAST DEV	DISTANCE	AZIMUTH	SA	SAB
	.00	.00	.00	.00	.00	.0	.0	.0
	5.00	4.60	.23	-1.92	1.94	277.0	22.8	277.0
	10.00	9.20	.47	-3.85	3.88	277.0	22.8	277.0
	15.00	13.79	.79	-5.82	5.87	277.8	23.4	279.3
	20.00	18.33	1.31	-7.85	7.96	279.5	24.8	284.1
	25.00	22.87	1.91	-9.86	10.04	281.0	24.7	286.7
	30.00	27.42	2.46	-11.85	12.10	281.7	24.4	285.4
	35.00	31.96	3.04	-13.86	14.19	282.4	24.7	286.2
	40.00	36.50	3.65	-15.86	16.27	283.0	24.7	287.0
	45.00	41.04	4.27	-17.85	18.36	283.5	24.6	287.2
	50.00	45.58	4.89	-19.86	20.45	283.8	24.8	287.0
	55.00	50.11	5.50	-21.87	22.56	284.1	24.8	287.0
	60.00	54.65	6.12	-23.87	24.65	284.4	24.7	287.1
	65.00	59.20	6.75	-25.86	26.73	284.6	24.6	287.6
	70.00	63.73	7.32	-27.89	28.83	284.7	24.9	285.7
	75.00	68.24	8.06	-29.89	30.96	285.1	25.3	290.2
	80.00	72.78	8.80	-31.86	33.06	285.4	24.8	290.3
	85.00	77.32	9.45	-33.84	35.14	285.6	24.6	288.3
	90.00	81.87	10.10	-35.82	37.21	285.8	24.5	288.1
	95.00	86.42	10.78	-37.77	39.28	285.9	24.4	289.1
	100.00	90.96	11.46	-39.74	41.36	286.1	24.6	289.0
	105.00	95.52	12.06	-41.71	43.42	286.1	24.3	286.9
	110.00	100.09	12.71	-43.63	45.45	286.2	24.0	288.6
TD	110.90	100.91	12.84	-43.98	45.82	286.3	24.0	290.3

46706

GULF CANADA RESOURCES INC.

Coal Division

PREPARED BY: C. LOUIE	LOGGED BY: G. SEVE	SCALE : 1:200, 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB. 1984	DRAWING No. KPN83502

MOUNT KLAPPAN

DRILL HOLE LOG

DDH83002

111

SCALE : 1:200 (M) 0 5 — 1:40 (M) 0 0.5 1

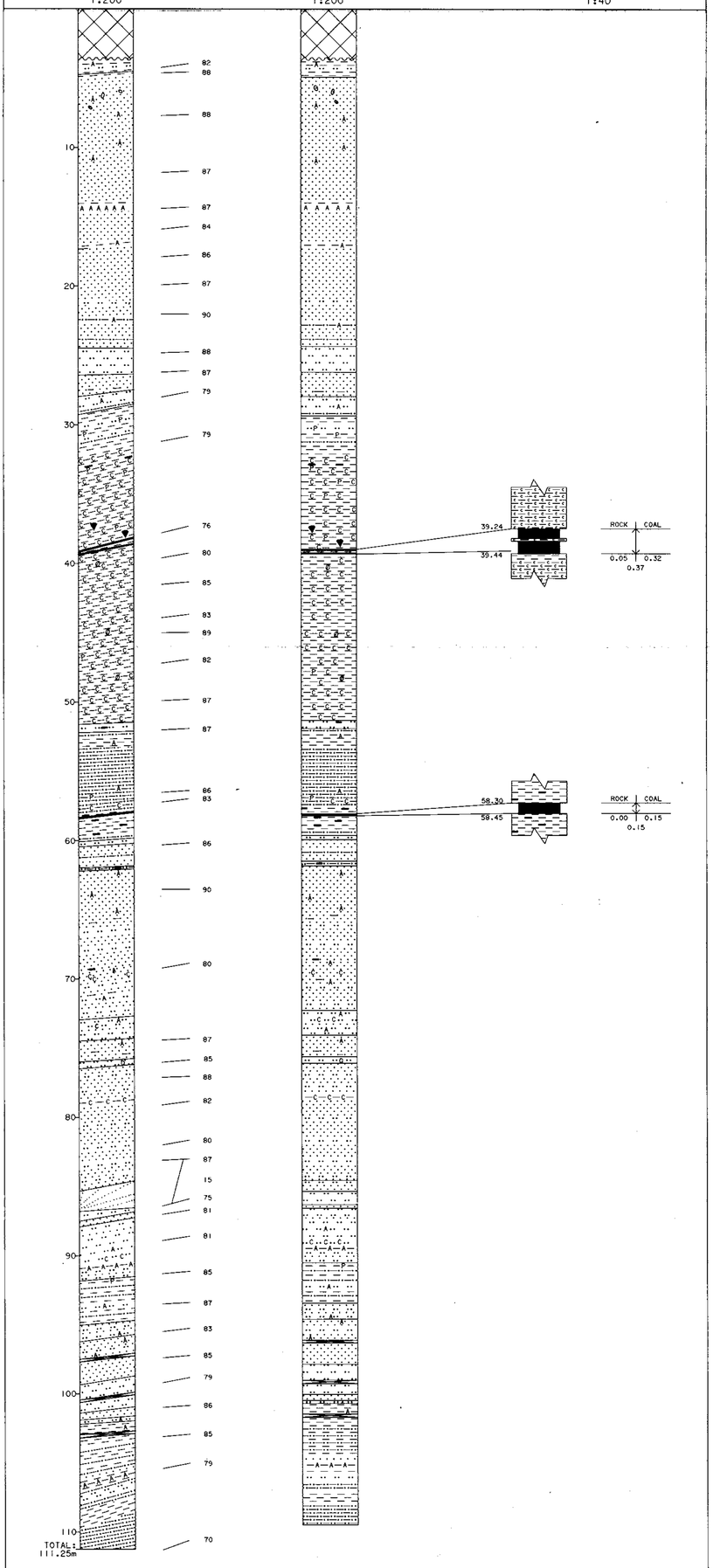
NORTHING : 6342845.0 N
EASTING : 503090.0 E

INCLINATION : 90.0°
BEARING : -

LITHOLOGIC SYMBOLS

- CONGLOMERATE
- SANDSTONE
- CARBONACEOUS
- SILTSTONE
- COAL
- COAL-THIN BEDS
- OVERBURDEN
- QUARTZ
- PEBBLY SANDSTONE
- MUDSTONE, CLAYSTONE
- BENTONITE
- PYRITE
- CORE LOSS
- PLANT FOSSIL
- SHELL FOSSIL
- MARL
- ANKERITE

APPARENT THICKNESS 1:200 — TRUE THICKNESS 1:200 — SEAM DETAIL TRUE THICKNESS 1:40



QSO:[205,57]83I024026.LOG

ART NO. 786-0040
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
.0
20.0
40.0
60.0
80.0
100.0
111.1
0
GAMMA API
150
APPARENT G/CC
3
8
CALIPER CM
20
0
RESISTIVITY KOHM M
4
COMPU-LOG V8L2 PLOT 08-13-83
DDH-83-002
GULF CANADA RES.
MT. KLAPPAN
HOLE DIAMETER = 09.5
PROBE # 9038A - 483
SENSOR #4 CAL STD CPS = 6588
SENSOR #4 CAL RUN CPS = 5021
SENSOR #4 CAL BIAS = 98
DATA V8L2 TRUCK # P811
K. SKARBO APPL.#30 L1

ART NO. 786 0040
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
CENTURY
0
20.0
40.0
60.0
80.0
100.0
111.0
0
600
GAMMA API
0
2000
N-N CPS
COMPU-LOG VAL2 PLOT 08-12-83
DDH-83-002
GULF CANADA RES.
MT. KLAPPAN
HOLE DIAMETER = 08.3
PROBE # 3055A - 008
SENSOR #4 CAL STD CPS = 152
SENSOR #4 CAL RUN CPS = 217
SENSOR #4 CAL BIAS = 0
DATA VAL2 TRUCK # F811
K. SKARBO APPL.#1067L1

VERTICAL DEVIATION

COMPU-LOG V8LI DEVIATION
DATA FROM : V8L2

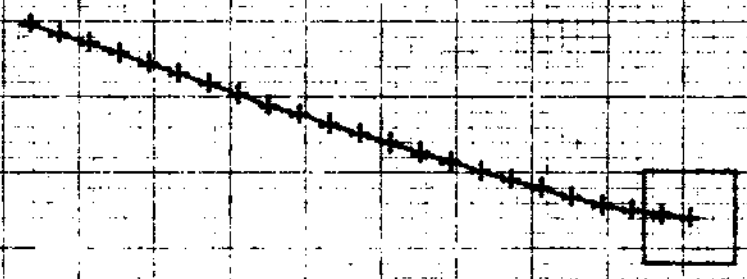
111

CLIENT : GULF CANADA RES.
LOCATION : MT. KLAPPAN
HOLE ID : DDH-83-002
DATE OF LOG : 08-13-83
PROBE : 9055A 0008

SCALE: 5.00 M/DIV
MAG DECL: 29.5
TRUE DEPTH: 100.9 M
AZIMUTH: 286.3
DISTANCE: 45.82 M

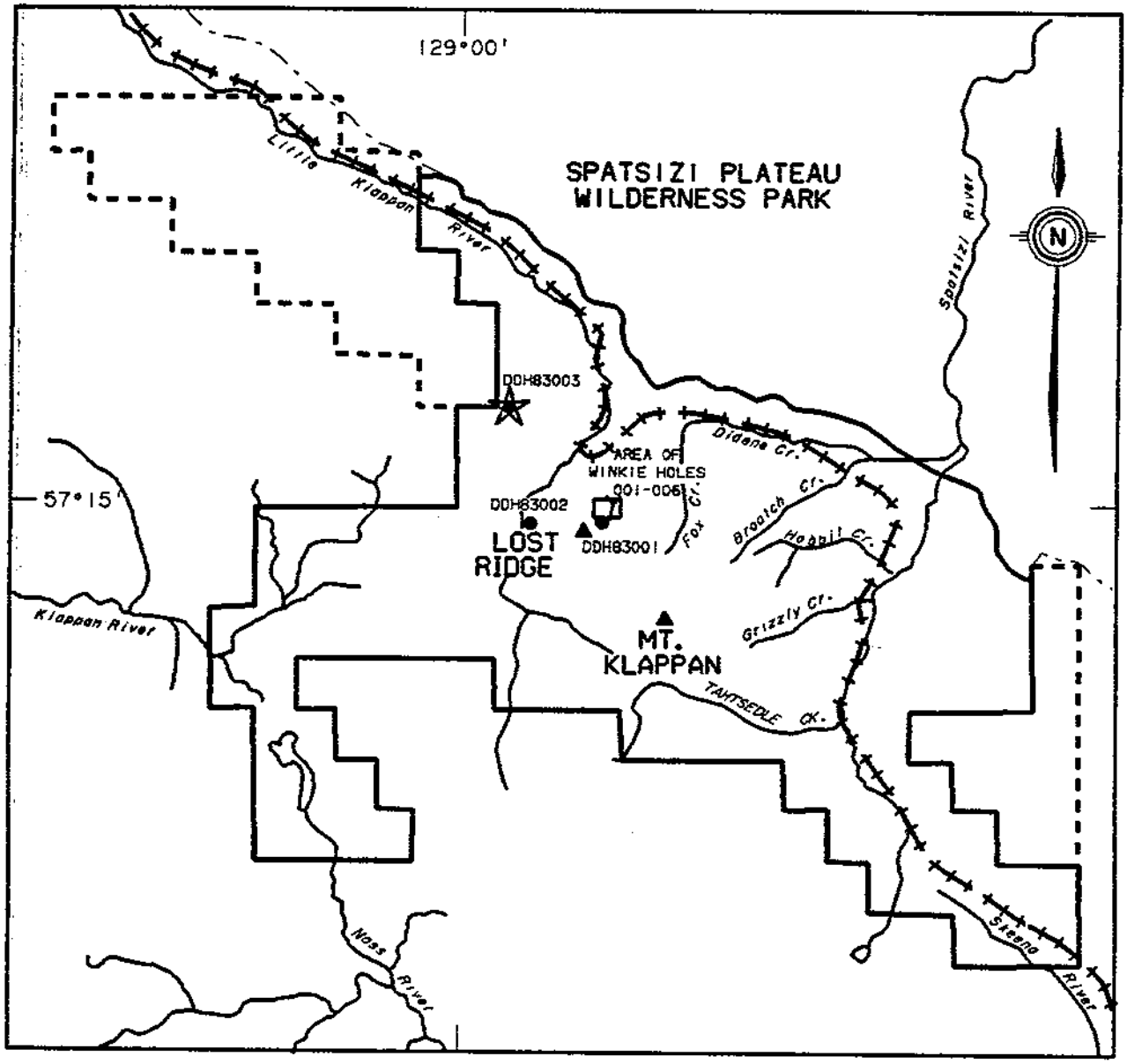
+ = 5.0 M INCR
△ = TOP OF ZONE
◇ = BOTTOM OF ZONE

TRUE NORTH ↑



MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH830003



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

GCRI COAL DIVISION HISTORY PROJ KPN BLK SS DS DDH83003

	DY MO YR
START DATE	12/08/83
END DATE	18/08/83

CONTRACTOR J.T. THOMAS OPERATOR G.C.R.I.
GEOLOGIST S. MCKENZIE SURVEYOR

REMARKS

GCRI COAL DIVISION LOCATION PROJ KPN BLK SS DS DDH83003

PROVINCE BC ELEVATION (M) 1825.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6349585.00	EASTING 501657.00		
2	LAT-LONG:	LAT 571728	LONG 1285821			

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK SS DS DDH83003

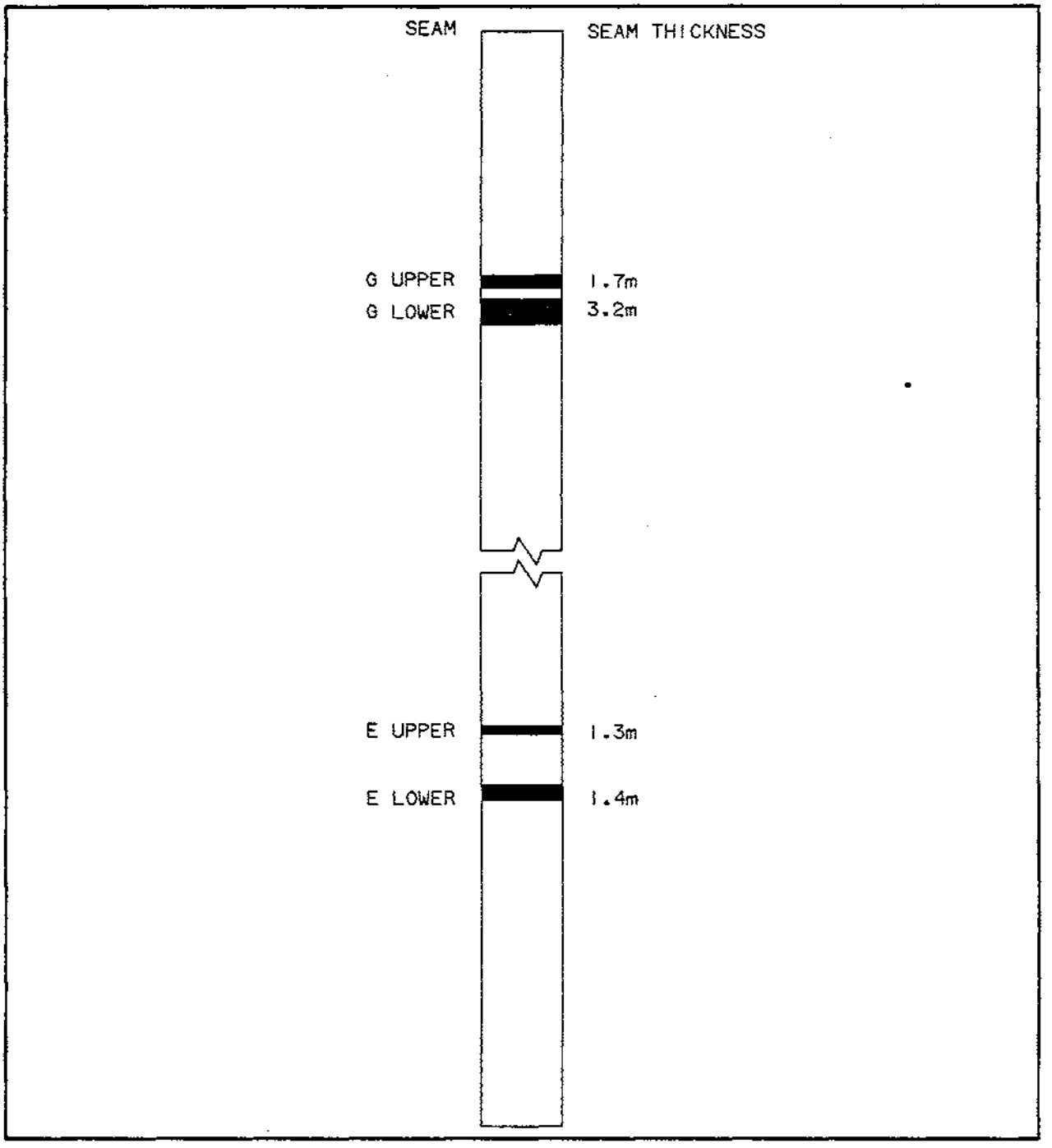
DIMENSIONS AND ORIENTATION:

LENGTH (M) 192.60 INCLINATION 60.0 AZIMUTH 230.0
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 5.50 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____._ ____._
LOST CIRC. DEPTHS (M) ____._ ____._

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83003



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM H

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 7.21 m - 7.68 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	7.21													
				0.47	100									
	7.68													

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GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM G UPPER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 40.30 m - 40.83 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	40.30			(0.07) 0.27	86.8	06373			55.24				20.69	
	40.83		0.13	0.06										
			0.10											
			(0.25)											
				0.06										
				(0.41)										
			(0.20)											
				(0.20)										
	42.05													
	44.80													

[205,57]831024019.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM G LOWER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 44.80 m - 48.00 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	44.80			(0.20)										
			(0.02)	0.09										
			0.02	0.26										
			(0.11)											
			0.24											
				0.26										
			(0.05)	(0.05)										
			0.09											
				0.19	65.3	06374	10	1.62	55.49	7.25	35.64	0.38	13.05	
			0.06											
			(0.12)											
				0.44										
			(0.40)											
			0.05	0.01										
			0.03	0.14										
			0.08											
				0.13										
	48.00			(0.16)										

[205.57]831024019.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM E UPPER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 126.95 m - 128.24 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	126.95			0.27										
				(0.28)										
			0.16		78.3	06375	11	1.38	61.14	5.55	31.93	0.62	10.44	
				0.47										
	128.24		0.04	0.07										
	132.22													

[205,571831024019.LOG

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM E LOWER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 137.68 m - 139.10 m

DENSITY SCALE 2.00 1.50 2.00 2.50

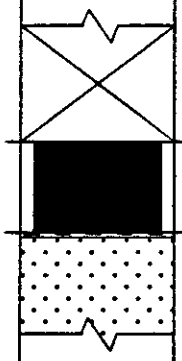
RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	132.22													
	137.68			0.08										
			0.08	0.21	80.0	06376								
				(0.03)										
			0.02	0.02										
			0.11											
			(0.10)											
				(0.07)										
				0.62	90.0	03677								
	139.10													

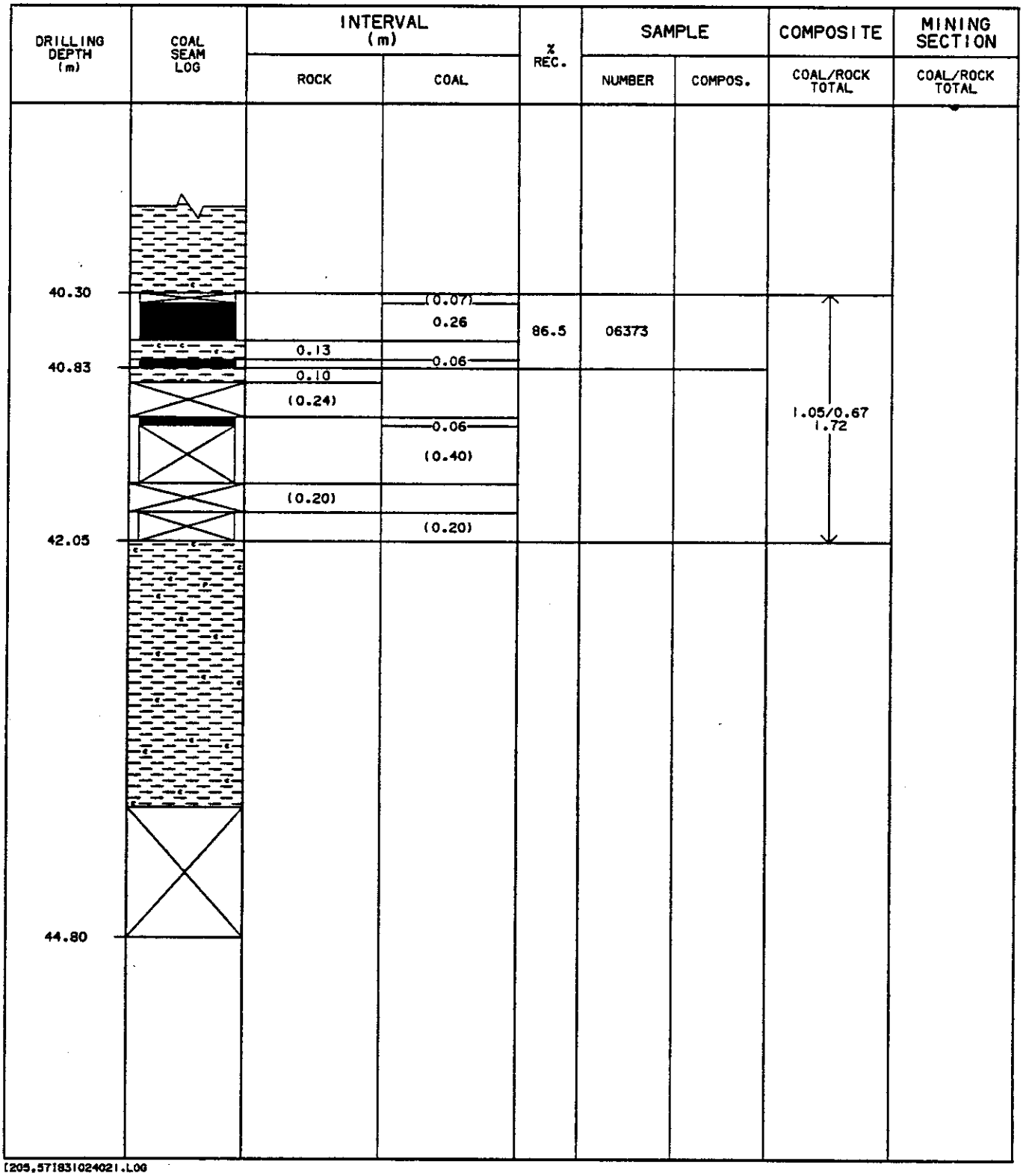
12 | 1.49 | 52.42 | 6.71 | 39.38 | 1.24 | 13.98

[205,57]831024019.LOG

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m)		% REC.	SAMPLE		COMPOSITE	MINING SECTION
		ROCK	COAL		NUMBER	COMPOS.	COAL/ROCK TOTAL	COAL/ROCK TOTAL
7.21			0.47	100			0.47/0.00 0.47	
7.68								

[205,57]831024021.LOG

GULF CANADA RESOURCES INC.	
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS DDH83003 SEAM H	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



[205,571831024021.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM G UPPER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	COMPOSITE COAL/ROCK TOTAL	MINING SECTION COAL/ROCK TOTAL
44.80			(0.20)					
		(0.02)	0.09					
		0.02	0.26					
		(0.11)						
		0.24						
			0.26					
		(0.05)	(0.05)					
		0.09						
			0.19	65.3	06374	10	1.93/1.27 3.20	
		0.06						
		(0.12)						
			0.44					
		(0.40)						
		0.05	0.01					
		0.03	0.14					
		0.08						
			0.13					
48.00			(0.16)					

[205,571831024021.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

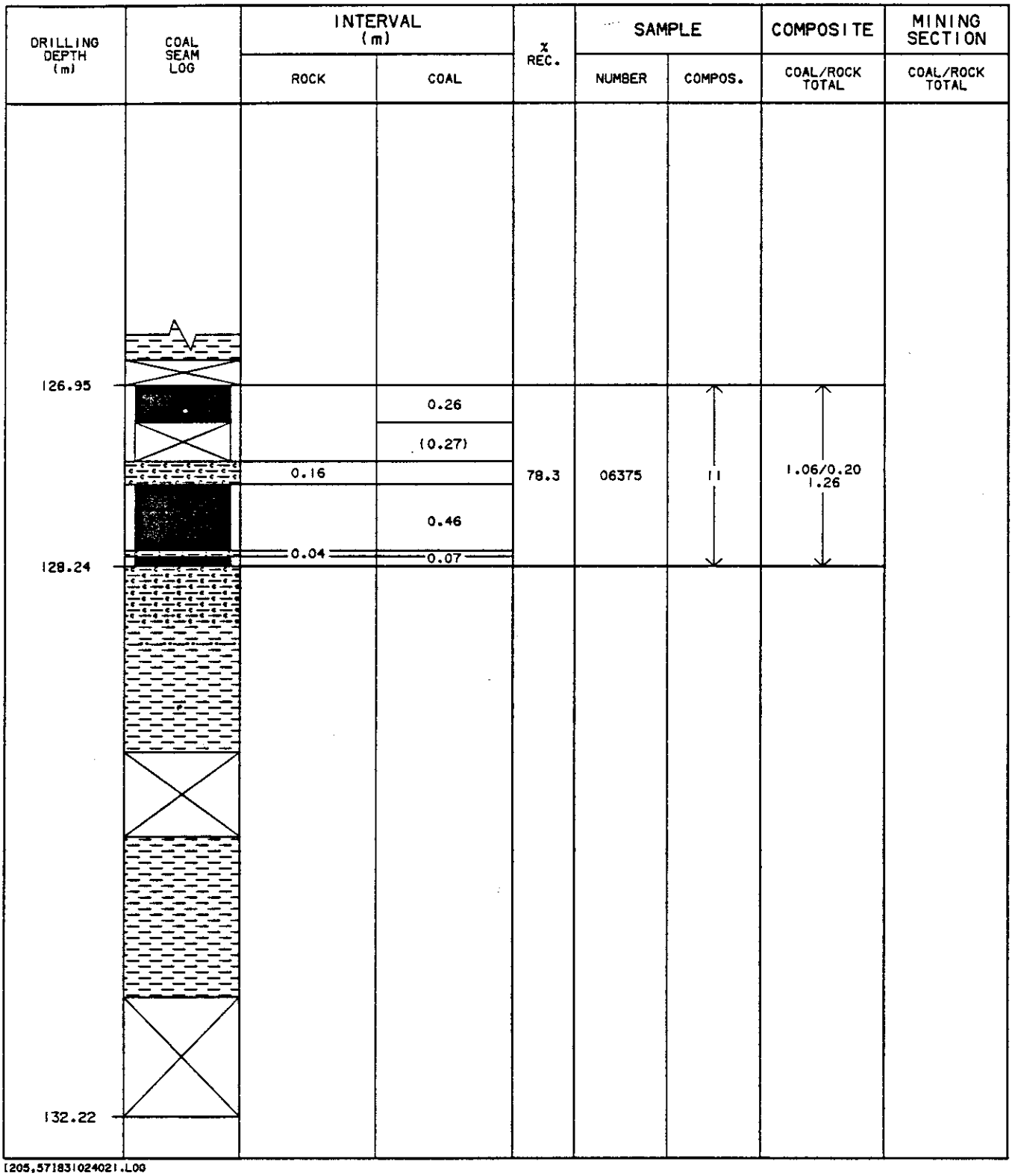
SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM G LOWER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



[205,57183102402].LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

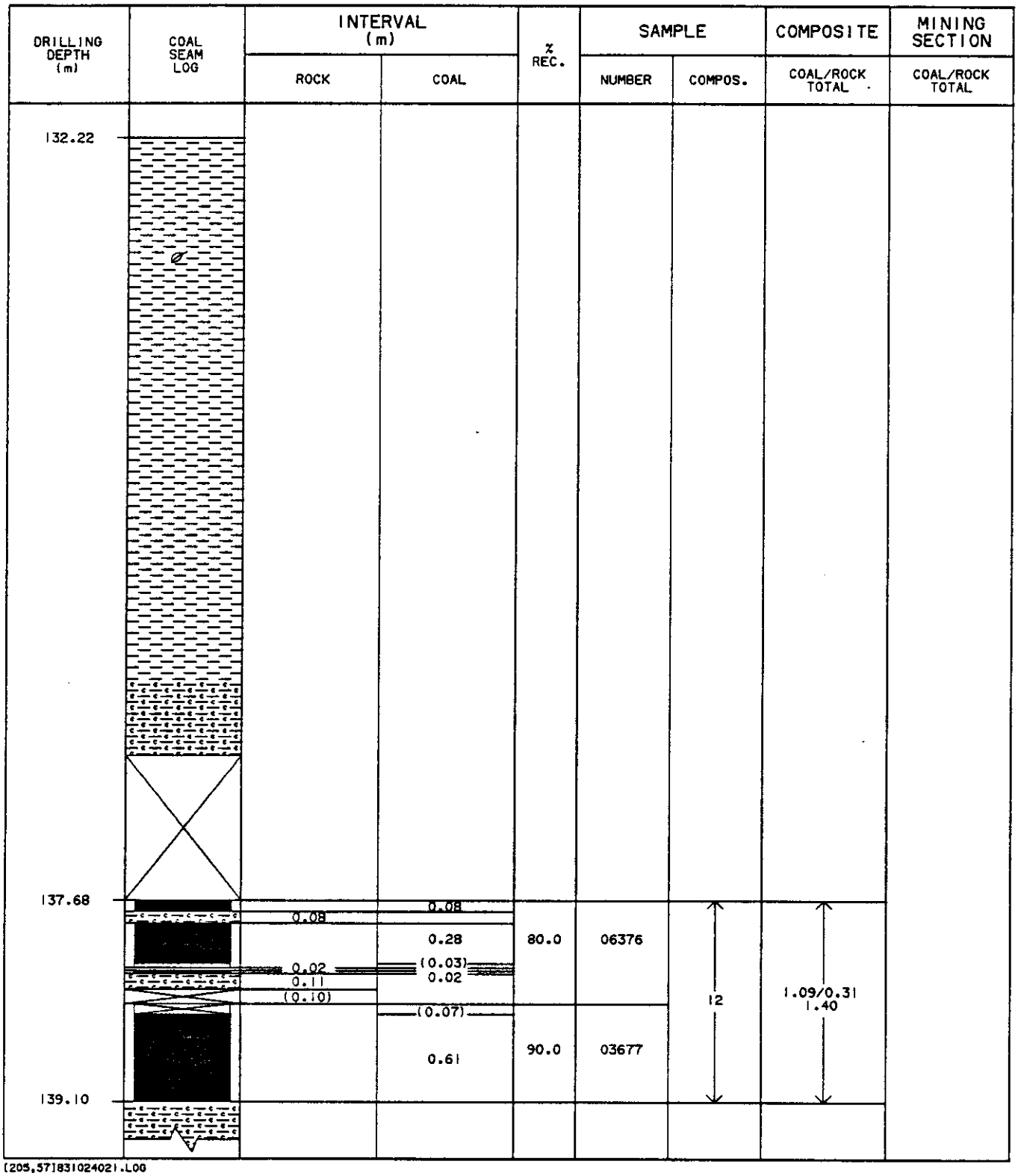
SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM E UPPER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



[205,57]83102402].LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM E LOWER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84

SIMPLE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83003										
	G UPPER	6373	40.30	42.05	35.42	0.39	0.23	0.68	0.45	1.07- 0.68
	G LOWER	6374	44.80	48.00	65.31	1.52	0.57	0.41	0.70	1.93- 1.27
	E UPPER	6375	126.95	128.24	78.29	0.81	0.20	0.28	0.00	1.09- 0.20
	E LOWER	6376	137.68	138.48	75.00	0.39	0.21	0.10	0.10	0.49- 0.31
	E LOWER	6377	138.48	139.10	100.00	0.62	0.00	0.00	0.00	0.62- 0.00

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 COMPOSITE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	COMP ID	SAMPLE FROM	SAMPLE TO	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83003												
	g lower	10	6374	6374	44.80	48.00	65.31	1.52	0.57	0.41	0.70	1.93- 1.27
	e upper	11	6375	6375	126.95	128.24	78.29	0.81	0.20	0.28	0.00	1.09- 0.20
	e lower	12	6376	6377	137.68	139.10	85.91	1.01	0.21	0.10	0.10	1.11- 0.31

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	0.00	5.50	5.50			OVERBURDEN	VBRKN CASING TO 5.50 M
80	5.50	5.67	0.17			MUDSTONE	CARB.WEATH.BLK.BRKN WEATHERED ROOF ROCK OR ROCK SPLIT WITHI N COAL SEAM, UPPER CONTACT OF THE COAL ZONE PROBABLY NOT REACHED
80	5.67	7.21	1.54			ROCK LOSS	
80	7.21	7.35	0.14			COAL	C-3.DK.BLK.BRKN
80	7.35	7.39	0.04			COAL	C-4.M.BLK
80	7.39	7.42	0.03			COAL	C-3.DK.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	7.42	7.48	0.06			COAL	C-2.DK.BLK.BRKN
80	7.48	7.55	0.07			COAL	C-4.M.BLK.BRKN
80	7.55	7.68	0.13			COAL	C-6.M.BLK.BRKN
80	7.68	7.70	0.02			MUDSTONE	CARB.DK.BLK.VTHNB.SLD INCLUDES 1 CM. QUARTZ BAND PARALLEL TO THE BEDDING PLANE QUARTZ IS COARSELY CR YSTALLINE WITH CRYSTALS ELONGATE PERPEN DICULAR TO THE BEDDING PLANE
80	7.70	8.20	0.50			SANDSTONE	VFG-.MOD.LT-M.GY.MAS.SLD QUARTZ OVERGROWTHS; CLAST MINERALOGY PR EDOMINANTLY CHERT AND QUARTZ
80	8.20	8.83	0.63			SANDSTONE	FG.MOD.LT-M.GY.MAS.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	8.83	9.91	1.08			ROCK LOSS	
80	9.91	9.97	0.06			SANDSTONE	FG.MOD.LT-M.GY.MAS.SLD DISSEMINATED PYRITE AND QUARTZ INFILLIN G SUB-PARALLEL DISCONTINUOUS FRACTURES WITH NO APPARENT DISPLACEMENT
* 80	9.97	10.37	0.40			SANDSTONE	FG.MOD.LT-M.GY.MAS.SLD
* 72	10.37	11.76	1.39			SANDSTONE	FG.MOD.LT-M.GY.MAS.BRKN IRREGULAR FRACTURES RUNNING ROUGHLY PER PENDICULAR TO BEDDING INFILLED WITH (A NKERITE)
70	11.76	11.94	0.18			SANDSTONE	FG.MOD.LT-M.GY.MAS.SLD TWO FRACTURE SYSTEMS TRENDING 50 DEGREE S TO EACHOTHER, RELATIONSHIP TO BEDDING NOT OBSERVED, BOTH INFILLED WITH (ANK ERITE)
69	11.94	12.33	0.39			SANDSTONE	FG.MOD.LT-M.GY.MAS.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
68	12.33	12.46	0.13			SANDSTONE	FG.MOD.LT-M.GY.MAS.VBRKN POORLY DEVELOPED LISTRIC SURFACES
68	12.46	12.69	0.23			SANDSTONE	FG.MOD.M.GY.BRKN VERTICAL FRACTURES INFILLED WITH MINOR (ANKERITE)
67	12.69	13.32	0.63			SANDSTONE	FG.MOD.M.GY.BRKN MINOR FRACTURES , NO INFILLING OR CEMEN TATION
66	13.32	13.41	0.09			SANDSTONE	SLTY.VFG.MOD.M.BLK.VBRKN MINOR LISTRIC SURFACES
65	13.41	13.60	0.19			MUDSTONE	MEL.M.BLK.VTHNB.SLD OCCASIONAL SILTY MUDSTONE INTERBEDS
• 65	13.60	13.64	0.04			SANDSTONE	VFG.MOD.M.GY.BIOTR.BRKN MINOR HORIZONTAL BIOTURBATION AT TOP OF SAND UNIT ; RARE BURROWS OBSERVED AT T HE BASE OF THE SEQUENCE
66	13.64	13.79	0.15			MUDSTONE	SLTY.MOD.M-DK.GY.VTHNB.SLD MINOR LISTRIC SURFACES AT TOP OF THE UN IT, BECOMES GRADUALLY SILTIER IN THE MI DDLE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 68	13.79	13.84	0.05			SANDSTONE	FG.MOD.M.GY.VTHNB.XBDG.BRKN
66	13.84	13.86	0.02			MUDSTONE	M.BLK.VTHNB.BIOTR.BRKN LISTRIC SURFACES AT THE TOP OF THE UNIT ; HORIZONTAL BURROWS ARE VISIBLE AT THE BASAL CONTACT
64	13.86	13.92	0.06			SANDSTONE	VFG.M.GY.VTHNB.SLD
* 57	13.92	14.13	0.21			MUDSTONE	SLTY.LT-M.BLK.VTHNB.BIOTR.SLD MUDSTONE WITH INTERBEDS OF SILTY MUDSTO NE; HORIZONTAL BURROWS ARE EVIDENT AT B EDDING CONTACTS
58	14.13	14.44	0.31			MUDSTONE	SLTY.LT-M.BLK.VTHNB.BIOTR.SLD MUDSTONE WITH INTERBEDS OF SILTY MUDSTO NE; HORIZONTAL BIOTURBATION EVIDENT AT BEDDING CONTACTS; MINOR BIOTURBATION TH ROUGHOUT UNIT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
59	14.44	14.61	0.17			MUDSTONE	DK.GY.VBRKN FRACTURED; IRREGULAR FRACTURES INFILLED WITH (ANKERITE); PLANAR LISTRIC SURF ACES AT THE BASAL CONTACT
60	14.61	14.94	0.33			MUDSTONE	SLTY.DK.GY.BRKN
61	14.94	15.29	0.35			MUDSTONE	SLTY.M.GY.SSD.VBRKN IRREGULAR FRACTURES INFILLED WITH (ANK ERITE)
62	15.29	15.81	0.52			MUDSTONE	SLTY.M.GY.BRKN UNIT BECOMES SILTIER TOWARDS THE BASE
63	15.81	15.88	0.07			MUDSTONE	CLYY.M.GY.VBRKN " SOAPY " FEEL TO MUDSTONE
64	15.88	16.18	0.30			MUDSTONE	SLTY.M.GY.SLD MINOR FRACTURES WITH MINOR INFILLING WI TH (ANKERITE)
64	16.18	16.27	0.09			MUDSTONE	SLTY.DK.GY.VBRKN FRACTURED AND SHEARED; LISTRIC SURFACES DEVELOPED OBLIQUELY TO BEDDING PLANE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
65	16.27	16.80	0.53			MUDSTONE	DK.GY.BRKN MINOR IRREGULAR FRACTURES INFILLED WITH (ANKERITE)
67	16.80	16.91	0.11			MUDSTONE	LT.BLK.VBRKN (ANKERITE) LINING LISTRIC SURFACES
68	16.91	17.59	0.68			MUDSTONE	SLTY.DK.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)
* 71	17.59	18.79	1.20			MUDSTONE	SLTY.DK.GY.VBRKN OCCASIONAL SILTY MUDSTONE BEDS WITH MIN OR BIOTUTBATION CAUSED BY HORIZONTAL BURROWING
72	18.79	19.90	1.11			SANDSTONE	FG.MOD.LT-M.GY.THNB.BRKN MINOR SILTY MUDSTONE INTERBEDS
72	19.90	19.92	0.02			MUDSTONE	DK.GY.THNB.BRKN MINOR HORIZONTAL BURROWS: SUB-PARALLEL CONTINUOUS MUDSTONE LAMINATIONS WITH INTERBEDDED FINE GRAINED LIGHT GREY SANDSTONE BEDS
72	19.92	20.17	0.25			SANDSTONE	FG.MOD.M.GY.BIOTR.SLD MINOR HORIZONTAL BURROWS APPARENT IN THIN MUDSTONE INTERBEDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 72	20.17	20.32	0.15			SANDSTONE	VFG.MOD.M-DK.GY.BIOTR.SLD THIN SUB-PARALLEL MUDSTONE INTERBEDS DISPLAYING HORIZONTAL BURROWS
72	20.32	20.70	0.38			SANDSTONE	FG.MOD.LT.GY.MAS.SLD
73	20.70	21.25	0.55			SANDSTONE	FG.MOD.LT.GY.MAS.SLD
73	21.25	21.36	0.11			SANDSTONE	FG.MOD.LT-M.GY.MAS.SLD MASSIVE SANDSTONE WITH OCCASIONAL SILTY SANDSTONE INTERBEDS DISPLAYING CONTINUOUS SUB-PARALLEL BEDDING
73	21.36	21.38	0.02			MUDSTONE	DK.GY.THNB.BIOTR.SLD BASAL AND UPPER CONTACT SHOW MINOR HORIZONTAL BURROWS
73	21.38	21.40	0.02			SANDSTONE	FG.MOD.M.GY.BIOTR.SLD BASAL AND UPPER CONTACT DISPLAY HORIZONTAL BURROWS
73	21.40	21.41	0.01			MUDSTONE	DK.GY.BIOTR.SLD PROMINANT HORIZONTAL BURROWS INFILLED WITH LT GREY MEDIUM GRAIN SIZED SANDSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	21.41	22.22	0.81			SANDSTONE	FG.MOD.M.GY.MAS.SLD MINOR OCCASIONAL SILTY MUDSTONE INTERBE DS (0.3CM) THICK; MINOR PARALLEL FRACTU RES INFILLED WITH (ANKERITE)
75	22.22	23.12	0.90			SANDSTONE	FG.MOD.M.GY.MAS.VBRKN FRACTURE ZONE; BRECCIATED AND INFILLED WITH (ANKERITE)
* 76	23.12	24.34	1.22			SANDSTONE	VFG-.MOD.LT-M.GY.VTHNB.SLD INTERBEDDED MUDSTONE AND VFG TO FG LIGH T GREY SANDSTONE; MINOR FRACTURES INFIL LED WITH (ANKERITE)
72	24.34	24.40	0.06			SANDSTONE	FG.MOD.LT-DK.GY.VTHNB.BIOTR.SLD MINOR FRACTURES INFILLED WITH (ANKERIT E)
* 72	24.40	24.47	0.07			MUDSTONE	SLTY.MOD.M.GY.VTHNB.SLD MINOR FRACTURES INFILLED WITH (ANKERIT E); BCA MEASUREMENT INCLUDES DEPOSITIO NAL DIP
* 77	24.47	24.56	0.09			MUDSTONE	SLTY.MOD.DK.GY.VTHNB.SLD INTERBEDDED LIGHT BLACK MUDSTONE BEDS A ND DARK GREY SILTY MUDSTONE BEDS; BEDDI NG CONTACTS ARE CONTINUOUS AND SUB-PARA LLEL; MINOR FRACTURES INFILLED WITH (A NKERITE)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	24.56	24.61	0.05			SANDSTONE	SLTY.FG.MOD.LT-DK.GY.VTHNB.BIOTR SLD MINOR HORIZONTAL BURROWS AND SOFT SEDIM ENT DEFORMATION IN INTERBEDDED LT.GREY SANDSTONE AND MEDIUM GREY MUDSTONE
75	24.61	25.42	0.81			MUDSTONE	SLTY.MOD.M.GY.VTHNB.BIOTR.VBRKN MINOR HORIZONTAL BURROWS IN INTERBEDDED MUDSTONE AND LIGHT GREY SANDSTONE
* 73	25.42	25.71	0.29			MUDSTONE	SLTY.MOD.M.GY.VTHNB.BIOTR.SLD MINOR HORIZONTAL BURROWS; MINOR SOFT SE DIMENT DEFORMATION
73	25.71	26.23	0.52			MUDSTONE	SLTY.MOD.LT-M.GY.VTHNB.BIOTR.BRKN MINOR HORIZONTAL BURROWS WITH MINOR SOF T SEDIMENT DEFORMATION; MINOR SHEAR AT BASAL CONTACT
73	26.23	28.14	1.91			MUDSTONE	SLTY.MOD.LT-M.GY.VTHNB.BIOTR.BRKN MINOR FRACTURE, APPROX. 80 DEGREES TO B EDDING PLANE; MINOR HORIZONTAL BURROWS AND SOFT SEDIMENT DEFORMATION
74	28.14	29.35	1.21			MUDSTONE	MOD.DK.GY.SLD RARE HORIZONTAL BURROWS; MINOR SOFT SED IMENT DEFORMATION CREATING ISOLATED SAN D LENSES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	29.35	30.68	1.33			MUDSTONE	MOD.DK.GY.SLD OCCASIONAL ISOLATED SAND LENSES DISTURBED BY MINOR HORIZONTAL BURROWING AND MINOR SOFT SEDIMENT DEFORMATION
75	30.68	31.19	0.51			MUDSTONE	MOD.M-DK.GY.BRKN RARE HORIZONTAL BURROWS AND SOFT SEDIMENT DEFORMATION; OCCASIONAL SILTY MUDSTONE BEDS 0.5 TO 2.5 CM THICK
* 75	31.19	34.02	2.83			MUDSTONE	MOD.M.GY.SLD RARE HORIZONTAL BURROWS AND SOFT SEDIMENT DEFORMATION; OCCASIONAL SILTY MUDSTONE BEDS WITH DISTINCT CONTACTS; OCCASIONAL VFG SANDSTONE BEDS OCCURING AS TRUNCATED ISOLATED OSCILATION RIPPLE MARKS DISPLAYING RIPPLE CROSS LAMINATION INDICATING TOPS UP
76	34.02	34.07	0.05			SANDSTONE	FG.M.GY.LAM.BIOTR.SLD SINGLE VERTICAL BURROW CAUSING CROSS LAMINATION INDICATING TOPS UP; PYRITIZATION OF RARE HORIZONTAL BURROW
76	34.07	34.14	0.07			SANDSTONE	FG.M-DK.GY.LAM.SLD MINOR SILTY MUDSTONE BEDS
76	34.14	34.60	0.46			MUDSTONE	M-DK.GY.LAM.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	34.60	34.61	0.01			MUDSTONE	PYR.M-DK.GY.LAM.SLD PYRITE CONCRETIONS
76	34.61	36.88	2.27			MUDSTONE	M-DK.GY.SLD OCCASIONAL SILTY MUDSTONE BEDS AND VFG SANDSTONE BEDS SOFT SEDIMENT DEFORMATION DISPLAYED AT CONTACTS
77	36.88	38.49	1.61			MUDSTONE	M-DK.GY.SLD OCCASIONAL SILTY MUDSTONE BEDS, DISCONTINUOUS DUE TO SOFT SEDIMENT DEFORMATION
78	38.49	39.88	1.39			MUDSTONE	DK.GY.MAS.BRKN RARE SILTY MUDSTONE BEDS
78	39.88	40.21	0.33			MUDSTONE	DK.GY.MAS.BRKN
78	40.21	40.30	0.09			MUDSTONE	SLTY.DK.GY.MAS.BRKN SHEARED, MINOR LISTRIC SURFACES
78	40.30	40.37	0.07	06373	G UPPER	COAL LOSS	
79	40.37	40.64	0.27	06373	G UPPER	COAL	C-4.DK.GY.BRKN
79	40.64	40.77	0.13	06373	G UPPER	MUDSTONE	CARB.M-DK.GY.SLD CARBONACEOUS STRINGERS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	40.77	40.79	0.02	06373 G	UPPER	COAL	C-3.M.GY.BRKN
79	40.79	40.83	0.04	06373 G	UPPER	COAL	C-4.M.GY.VBRKN
79	40.83	40.93	0.10	06373 G	UPPER	MUDSTONE	CARB.M.GY.SLD CARBONACEOUS STRINGERS
79	40.93	41.18	0.25	06373 G	UPPER	ROCK LOSS	
79	41.18	41.24	0.06	06373 G	UPPER	COAL	C-4.M.GY.PWRD
79	41.24	41.65	0.41	06373 G	UPPER	COAL LOSS	
79	41.65	41.85	0.20	06373 G	UPPER	ROCK LOSS	
79	41.85	42.05	0.20	06373 G	UPPER	COAL LOSS	
79	42.05	42.62	0.57			MUDSTONE	M.GY.SLD RARE CARBONACEOUS STRINGERS
80	42.62	43.78	1.16			MUDSTONE	M.GY.SLD RARE CARBONACEOUS STRINGERS; MINOR PYRITE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
80	43.78	43.90	0.12			MUDSTONE	CLYY.LI-M.GY.SLD RARE CARBONACEOUS STRINGERS WITH CONTORTED BEDDING
80	43.90	44.80	0.90			ROCK LOSS	
81	44.80	45.00	0.20	06374 G	LOWER	COAL LOSS	
81	45.00	45.07	0.07	06374 G	LOWER	COAL	C-3.M.GY.SLD
81	45.07	45.09	0.02	06374 G	LOWER	COAL	C-3.M.GY.SLD PLANAR, 0.5 CM THICK (ANKERITE) INFILLING FRACTURE SUBPARALLEL TO BEDDING
81	45.09	45.11	0.02	06374 G	LOWER	ROCK LOSS	
81	45.11	45.13	0.02	06374 G	LOWER	MUDSTONE	CARB.M.GY.SLD MINOR CARBONACEOUS STRINGERS
81	45.13	45.23	0.10	06374 G	LOWER	COAL	C-2.M.GY.SHRD
81	45.23	45.25	0.02	06374 G	LOWER	COAL	C-4.M.GY.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	45.25	45.30	0.05	06374	G LOWER	COAL	C-3.M.GY.BRKN
81	45.30	45.32	0.02	06374	G LOWER	COAL	C-4.M.GY.BRKN
81	45.32	45.39	0.07	06374	G LOWER	COAL	C-2.M.GY.BRKN
81	45.39	45.50	0.11	06374	G LOWER	ROCK LOSS	
81	45.50	45.74	0.24	06374	G LOWER	MUDSTONE	CARB.M.GY.SLD CARBONACEOUS STRINGERS
81	45.74	45.80	0.06	06374	G LOWER	COAL	C-3.M.GY.BRKN
81	45.80	45.98	0.18	06374	G LOWER	COAL	C-2.M.GY.BRKN
81	45.98	46.00	0.02	06374	G LOWER	COAL	C-3.M.GY.BRKN
81	46.00	46.05	0.05	06374	G LOWER	COAL LOSS	
81	46.05	46.10	0.05	06374	G LOWER	ROCK LOSS	
81	46.10	46.19	0.09	06374	G LOWER	MUDSTONE	LT-M.GY.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	46.19	46.38	0.19	06374	G LOWER	COAL	C-3.M.GY.SHRD
81	46.38	46.44	0.06	06374	G LOWER	MUDSTONE	CARB.M.GY.SLD
81	46.44	46.56	0.12	06374	G LOWER	ROCK LOSS	
81	46.56	46.67	0.11	06374	G LOWER	COAL	C-5.M.GY.BRKN
81	46.67	46.89	0.22	06374	G LOWER	COAL	C-2.M.GY.SHRD
81	46.89	46.92	0.03	06374	G LOWER	COAL	C-5.M.GY.BRKN
81	46.92	46.95	0.03	06374	G LOWER	COAL	C-3.M.GY.BRKN
81	46.95	47.00	0.05	06374	G LOWER	COAL	C-5.M.GY.BRKN
82	47.00	47.40	0.40	06374	G LOWER	ROCK LOSS	
82	47.40	47.45	0.05	06374	G LOWER	MUDSTONE	M.GY.BRKN
82	47.45	47.46	0.01	06374	G LOWER	COAL	C-2.M.GY.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
82	47.46	47.49	0.03	06374	G LOWER	MUDSTONE	M.GY.BRKN
82	47.49	47.53	0.04	06374	G LOWER	COAL	C-2.M.GY.BRKN
82	47.53	47.55	0.02	06374	G LOWER	COAL	C-4.M.GY.SHRD
82	47.55	47.63	0.08	06374	G LOWER	COAL	C-3.M.GY.BRKN
82	47.63	47.71	0.08	06374	G LOWER	MUDSTONE	M.GY.BRKN MINOR CARBONACEOUS STRINGERS
82	47.71	47.84	0.13	06374	G LOWER	COAL	C-3.M.GY.BRKN
82	47.84	48.00	0.16	06374	G LOWER	COAL LOSS	
* 82	48.00	48.42	0.42			MUDSTONE	SLTY.M.GY.BRKN OCCASIONAL SILTY MUDSTONE BEDS FINING U PWARDS INTO MUDSTONE CYCLES VARY FROM 1 .0 CM TO 4.0 CM IN THICKNESS
82	48.42	48.78	0.36			SANDSTONE	VFG.LT-M.GY.MAS.BRKN ARGILLACEOUS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	48.78	49.42	0.64			SANDSTONE	FG.M.GY.MAS.SLD THIN INTERBEDDED MUDSTONE BEDS, SUBPARA LLEL AND DISCONTINUOUS, DISPLAYING RARE VERTICAL AND HORIZONTAL BURROWS
80	49.42	50.55	1.13			SANDSTONE	FG.M.GY.MAS.SLD
79	50.55	52.03	1.48			SANDSTONE	FG.M.GY.MAS.SLD INTERBEDDED MEDIUM GREY FINE GRAINED SA NDSTONE AND A SLIGHTLY DARKER GREY FINE GRAINED SANDSTONE
78	52.03	52.73	0.70			MUDSTONE	SLTY.M-DK.GY.THNB.BIOTR.SLD INTERBEDDED MUDSTONE AND SANDSTONE SEQU ENCE WITH VERTICAL AND HORIZONTAL BURRO WS
77	52.73	53.00	0.27			MUDSTONE	SLTY.M-DK.GY.THNB.BIOTR.SLD INTERBEDDED MUDSTONE AND SANDSTONE SEQU ENCE WITH HORIZONTAL AND VERTICAL BURRO WS
77	53.00	53.51	0.51			SANDSTONE	FG.M.GY.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	53.51	53.56	0.05			MUDSTONE	M.GY.SLD INTERBEDDED SANDSTONE AND MUDSTONE
77	53.56	53.80	0.24			MUDSTONE	SLTY.M.GY.THNB.BIOTR.SLD DISCONTINUOUS (DUE TO BURROWING) SAND STONE BEDS IN DARK GREY MUDSTONE
76	53.80	54.45	0.65			ROCK LOSS	
76	54.45	54.58	0.13			SANDSTONE	VFG.M.GY.SLD MINOR DISCEMINATED PYRITE
76	54.58	55.09	0.51			SANDSTONE	FG.M.GY.SLD VERTICAL SUBPARALLEL FRACTURES INFILLED WITH (ANKERITE)
75	55.09	55.45	0.36			SANDSTONE	VFG.PR.M.GY.BRKN
* 74	55.45	57.32	1.87			SANDSTONE	FG.M-DK.GY.VTHNB.BRKN INTERBEDDED SANDSTONE AND MUDSTONE SEQU ENCE WITH MINOR FRACTURES INFILLED WITH (ANKERITE)
77	57.32	57.81	0.49			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	57.81	58.42	0.61			SANDSTONE	FG.M-DK.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE); MINOR DARK GREY MUDSTONE INTERBEDS
* 80	58.42	59.37	0.95			SANDSTONE	FG.M.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE); MINOR DARK GREY MUDSTONE INTERBEDS
79	59.37	60.22	0.85			SANDSTONE	FG.M.GY.BRKN VERY MINOR FRACTURES WITH MINOR INFILLI NG WITH (ANKERITE); MINOR DARK GREY MUD STONE INTERBEDS
78	60.22	62.31	2.09			SANDSTONE	FG.M.GY.BRKN THICK (ANKERITE) VEINS INFILLING VERTIC AL AND HORIZONTAL FRACTURES
78	62.31	62.82	0.51			SANDSTONE	FG.M.GY.VBRKN MODERATELY FRACTURED AND INFILLED WITH (ANKERITE)
77	62.82	63.99	1.17			ROCK LOSS	
77	63.99	64.21	0.22			SANDSTONE	FG.M.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERIT E)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	64.21	64.77	0.56			SANDSTONE	FG.M.GY.BRKN MINOR FRACTURES; NO INFILLING
76	64.77	65.73	0.96			ROCK LOSS	
75	65.73	66.05	0.32			SANDSTONE	FG.M.GY.VBRKN FRACTURED WITH VERY MINOR SHEARING
75	66.05	66.49	0.44			SANDSTONE	FG.M.GY.VBRKN MODERATE FRACTURING WITH (ANKERITE) INF ILLING; FRACTURES UP TO 0.7 CM THICK
75	66.49	66.86	0.37			SANDSTONE	FG.M.GY.SHRD MINOR FRACTURES AND SHEARS INFILLED WIT H (ANKERITE)
75	66.86	67.04	0.18			SANDSTONE	FG.M.GY.VBRKN MINOR LISTRIC SURFACES
75	67.04	67.66	0.62			SANDSTONE	FG.M.GY.BRKN
74	67.66	68.46	0.80			SANDSTONE	FG.M.GY.BRKN MINOR LISTRIC SURFACES
74	68.46	68.62	0.16			SANDSTONE	VFG.M-DK.GY.SLD
74	68.62	69.21	0.59			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 73	69.21	70.23	1.02			SANDSTONE	SLTY.VFG.MOD.M.GY.BRKN INTERBEDDED SILTY VERY FINE GRAINED AN ARGILLACEOUS SILTSTONES; MINOR SHEARS I NFILLED WITH (ANKERITE)
74	70.23	70.33	0.10			SANDSTONE	SLTY.VFG.MOD.M-DK.GY.VBRKN MINOR SHEARS INFILLED WITH (ANKERITE)
* 75	70.33	72.06	1.73			SANDSTONE	SLTY.VFG.MOD.M-DK.GY.BRKN MINOR SHEARS INFILLED WITH (ANKERITE) UP TO 1.0 CM THICK
* 76	72.06	74.20	2.14			MUDSTONE	SLTY.MOD.M-DK.GY.BRKN
76	74.20	74.36	0.16			ROCK LOSS	
76	74.36	75.30	0.94			MUDSTONE	SLTY.MOD.M-DK.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)
76	75.30	77.02	1.72			MUDSTONE	SLTY.M.GY.BRKN RARE BELEMNITE INTACT LYING IN BEDDING PLANE
76	77.02	77.26	0.24			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 76	77.26	77.96	0.70			SANDSTONE	SLTY.M.GY.BRKN
76	77.96	78.19	0.23			SANDSTONE	FG.PR.M.GY.BRKN
75	78.19	78.76	0.57			MUDSTONE	SLTY.M.GY.BRKN BECOMES SLIGHTLY SILTIER TOWARDS THE BA SE
75	78.76	78.87	0.11			MUDSTONE	SLTY.M.GY.BRKN DEATH ASSEMBLAGE OF THIN SHELLED (BIVAL VES); MINOR DISSEMINATED PYRITE
* 75	78.87	79.18	0.31			SANDSTONE	SLTY.VFG.PR.M.GY.BRKN FINING UPWARDS CYCLE CONTAINING BIOCLAS TIC MATERIAL (FRAGMENTED BIVALVES)
75	79.18	79.60	0.42			SANDSTONE	MG.M.GY.BRKN
75	79.60	80.02	0.42			SANDSTONE	MG.M.GY.BRKN CONTAINS FRAGMENTED BIOCLASTIC DEBRIS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	80.02	80.59	0.57			SANDSTONE	VFG.LT.GY.SHRD VERY BROKEN CORE WITH PROMINENT LISTRIC SURFACES AND INTERCRYSTALLINE PORE SPA CES INFILLED WITH (ANKERITE)
76	80.59	82.74	2.15			ROCK LOSS	
76	82.74	82.78	0.04			MUDSTONE	CARB.DK.GY.SHRD
76	82.78	82.99	0.21			MUDSTONE	SLTY.LT.GY.BRKN
76	82.99	84.07	1.08			ROCK LOSS	
77	84.07	85.26	1.19			SANDSTONE	FG.M.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	85.26	86.94	1.68			SANDSTONE	FG.M.GY.BRKN MINOR INTERCALATED LAMINATED MUDSTONE A ND VERY FINE GRAINED LIGHT GREY SANDSTO NE SEQUENCE
77	86.94	87.16	0.22			ROCK LOSS	
78	87.16	88.73	1.57			SANDSTONE	FG.PR.M.GY.BRKN
* 78	88.73	88.98	0.25			SANDSTONE	FG.PR.M.GY.BRKN
78	88.98	89.26	0.28			SANDSTONE	FG.PR.M.GY.BRKN MINOR FRACTURES
78	89.26	89.35	0.09			MUDSTONE	SLTY.PR.M.GY.VBRKN GROUND CORE WITH FRACTURING INFILLED WI TH (ANKERITE)
78	89.35	89.46	0.11			MUDSTONE	SLTY.PR.M.GY.SLD FRACTURES INFILLED WITH (ANKERITE)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	89.46	89.97	0.51			ROCK LOSS	
78	89.97	90.34	0.37			MUDSTONE	SLTY.PR.M.GY.BRKN FRACTURES INFILLED WITH (ANKERITE)
78	90.34	90.93	0.59			MUDSTONE	SLTY.PR.M.GY.SHRD FRACTURES INFILLED WITH (ANKERITE)
79	90.93	93.44	2.51			SILTSTONE	CLYY.PR.M.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE); GRADES DOWNWARD INTO A SILTY VFG TO FG SANDSTONE; MINOR BEDS OF DARK GREY M UDSTONE
* 79	93.44	94.40	0.96			SANDSTONE	SLTY.VFG.PR.M.GY.BRKN FRACTURED AND INFILLED WITH (ANKERITE) AT BASE ; MINOR BIOTURBATION
79	94.40	94.99	0.59			ROCK LOSS	
* 80	94.99	96.67	1.68			SANDSTONE	SLTY.VFG.PR.M.GY.BRKN MINOR BEDS OF VERY MUDDY SILTSTONE
79	96.67	97.31	0.64			ROCK LOSS	
79	97.31	98.32	1.01			SANDSTONE	SLTY.PR.M.GY.SSD.BRKN PYRITE CONCRETIONS; MINOR FRACTURES INF ILLED WITH (ANKERITE)

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	98.32	98.73	0.41			ROCK LOSS	
78	98.73	100.81	2.08			SANDSTONE	SLTY.VFG.PR.M.GY.BRKN MINOR FRACTURES AND SHEARS (VERY LITTL E APPARENT DISPLACEMENT)
78	100.81	101.06	0.25			SANDSTONE	SLTY.VFG-.MOD.M.GY.BRKN COARSENING UPWARDS UNIT BECOMES CLEANER TOWARDS TOP; MINOR SHEAR INFILLED WITH (ANKERITE)
78	101.06	101.35	0.29			SANDSTONE	FG.MOD.M.GY.SHRD SHEARED WITH ASSOCIATED FRACTURES INFIL LED WITH (ANKERITE); PROMINANT LISTRIC SURFACES
78	101.35	101.63	0.28			SANDSTONE	FG.MOD.M.GY.SHRD SIMPLE SHEAR WITH PLANAR LISTRIC SURFAC ES APPROXIMATELY 70 DEGREES TO BEDDING PLANE
77	101.63	101.82	0.19			SANDSTONE	FG.MOD.M.GY.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 77	101.82	103.71	1.89			SANDSTONE	FG.MOD.M.GY.BRKN INTERRBEDDED MEDIUM GREY SANDSTONE AND SILTY MUDSTONE; MUDSTONE BEDS SHOW CROS S LAMINATION INDICATING TOPS UP; ZONES OF DISSEMINATED PYRITE; RARE FLAME STRU CTURES
78	103.71	104.42	0.71			SANDSTONE	SLTY.FG.M.GY.SLD MINOR FRACTURE INFILLED WITH (ANKERITE)
78	104.42	104.46	0.04			MUDSTONE	SLTY.MOD.LT-M.GY.SLD INTERBEDDED VERY FINE GRAINED SANDSTONE AND SILTY MUDSTONE DISPLAYING RIPPLE C ROSS LAMINATION SYMMETRICAL RIPPLES
78	104.46	104.63	0.17			SANDSTONE	FG.MOD.LT-M.GY
* 78	104.63	104.88	0.25			SANDSTONE	SLTY.FG.MOD.M.GY.SLD INTERBEDDED SANDSTONE AND MUDSTONE DISP LAYING CROSS LAMINATION WITH LOW ANGLE (1 TO 5 DEGREES) TRUNCATIONS INDICATI NG TOPS UP

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 81	104.88	107.98	3.10			SANDSTONE	SLTY.FG.MOD.M.GY.SLD INTERBEDDED MUDSTONE, SANDSTONE AND SILTY MUDSTONE; CROSS LAMINATED INDICATING TOPS UP; VARYING AMOUNTS OF HORIZONTAL AND VERTICAL BURROWING; VERTICAL BURROWS VARY FROM 1.0 TO 2.5 CM IN WIDTH; MINOR SSD; SYM RIPPLES FORMING CROSS LAMINATED STRUCTURES
80	107.98	108.36	0.38			MUDSTONE	SLTY.DK.GY.SSD.SLD MINOR SSD AT BASE; DISSEMINATED PYRITE AT BASE
80	108.36	108.43	0.07			SANDSTONE	FG.DK.GY.BIOTR.SLD VERTICAL BURROWS (APPROXIMATELY 45 DEGREES TO BEDDING PLANE)
79	108.43	110.84	2.41			SANDSTONE	FG.PR.M.GY.MAS.SLD RARE SHEARS INFILLED WITH (ANKERITE)
* 78	110.84	110.95	0.11			SANDSTONE	FG.PR.M.GY.MAS.SLD
78	110.95	112.39	1.44			MUDSTONE	SLTY.PR.M-DK.GY.VTHNB.BRKN INTERBEDDED MUDSTONE AND VERY FINE GRAIN SIZED MEDIUM GREY SANDSTONE DISPLAYING LOW ANGLE CROSS LAMINATION; OCCASIONAL VERTICAL BURROW

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	112.39	114.17	1.78			ROCK LOSS	
79	114.17	115.09	0.92			MUDSTONE	SLTY.PR.M-DK.GY.THNB.BRKN INTERBEDDED VERY FINE GRAINED CLAYEY SANDSTONE AND SILTY MUDSTONE; BEDDING DISPLAYED IS SUB PARALLEL AND DISCONTINUOUS
* 80	115.09	117.95	2.86			MUDSTONE	SLTY.PR.M-DK.GY.VTHNB.SLD SILTY MUDSTONE WITH MINOR CLAYEY VFG-FG MEDIUM GREY SANDSTONE INTERBEDS
79	117.95	118.04	0.09			MUSTONE	SLTY.PR.M-DK.GY.VTHNB.SSD.SLD MINOR PENECONTEMPORANEOUS (WITH DEPOSITION) SLUMPING IN INTERBEDDED VERY FINE GRAINED SANDSTONE AND SILTY MUDSTONE UNIT
79	118.04	118.34	0.30			MUDSTONE	SLTY.PR.DK.GY.THNB.SSD.SLD SOFT SEDIMENT DEFORMATION MAY BE BIOGENIC IN NATURE; CROSS LAMINATION (LOW ANGLE TRUNCATIONS) INDICATE TOPS UP

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	118.34	118.43	0.09			SANDSTONE	FG.M.GY.SLD
79	118.43	120.06	1.63			MUSTONE	SLTY.PR.DK.GY.VTHNB.SLD MINOR HORIZONTAL BURROWS APPROXIMATELY 1 CM. IN DIAMETER; MINOR SANDSTONE INTERBEDS
78	120.06	120.80	0.74			MUDSTONE	SLTY.PR.DK.GY.VTHNB.SLD MINOR PYRITE CONCRETIONS; MINOR SANDSTONE INTERBEDS
77	120.80	124.40	3.60			MUDSTONE	SLTY.PR.DK.GY.SSD.BRKN MINOR PYRITE CONCRETIONS
76	124.40	126.17	1.77			MUDSTONE	SLTY.PR.DK.GY.SLD MINOR PYRITE CONCRETIONS
76	126.17	126.58	0.41			MUDSTONE	PR.DK.GY.SLD MINOR PYRITE CONCRETIONS
76	126.58	126.61	0.03			SANDSTONE	SLTY.FG.PR.M.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)
76	126.61	126.78	0.17			MUDSTONE	SLTY.PR.M.GY.SLD MINOR PYRITE CONCRETIONS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
76	126.78	126.95	0.17			ROCK LOSS	
76	126.95	126.98	0.03	06375	E UPPER	COAL	C-4.DK.GY.PHRD
76	126.98	127.13	0.15	06375	E UPPER	COAL	C-4.DK.GY.PHRD
76	127.13	127.18	0.05	06375	E UPPER	COAL	C-4.DK.GY.SHRD
75	127.18	127.22	0.04	06375	E UPPER	COAL	C-1.DK.GY.SLD
75	127.22	127.50	0.28	06375	E UPPER	COAL LOSS	
75	127.50	127.56	0.06	06375	E UPPER	MUDSTONE	CARB.DK.GY.SLD
75	127.56	127.66	0.10	06375	E UPPER	MUDSTONE	CARB.DK.GY.BRKN
75	127.66	128.03	0.37	06375	E UPPER	COAL	C-2.DK.GY.BRKN MEDIUM BANDED COAL
75	128.03	128.13	0.10	06375	E UPPER	COAL	C-3.DK.GY.SHRD SHEARED AND POWDERED COAL

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	128.13	128.17	0.04	06375	E UPPER	MUDSTONE	CARB.DK.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)
75	128.17	128.24	0.07	06375	E UPPER	COAL	C-1.DK.GY.SHRD SHEARED; THICK BANDED COAL
75	128.24	128.36	0.12			MUDSTONE	CARB.DK.GY.BRKN MINOR FRACTURES INFILLED WITH (ANKERITE)
75	128.36	128.61	0.25			MUDSTONE	CARB.DK.GY.SHRD WELL DEVELOPED LISTRIC SURFACES
75	128.61	128.99	0.38			MUDSTONE	SLTY.M.GY.BRKN MINOR FRACTURES AND MINOR SHEARS INFILLED WITH (ANKERITE)
75	128.99	129.56	0.57			MUDSTONE	PR.DK.GY.VTHNB.VBRKN PLANT FOSSILS (INTACT) LYING IN THE BEDDING PLANE
74	129.56	130.10	0.54			ROCK LOSS	
* 74	130.10	131.35	1.25			MUDSTONE	PR.DK.GY.VTHNB.VBRKN PLANT FRAGMENTS (FERN-LIKE), INTACT, LYING IN BEDDING PLANE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	131.35	132.22	0.87			ROCK LOSS	
75	132.22	133.69	1.47			MUDSTONE	PR.DK.GY.VTHNB.BRKN PLANT FRAGMENTS (FEN-LIKE), INTACT LYING IN THE BEDDING PLANE
76	133.69	135.41	1.72			MUDSTONE	PR.DK.GY.VTHNB.SLD MINOR SHEARS WITH LISTRIC SURFACES
77	135.41	136.17	0.76			MUDSTONE	PR.DK.GY.VTHNB.SLD MINOR SHEARS WITH (CHLORITE) LINING LITRIC SURFACES; (FERN-LIKE) PLANT FRAGMENTS LYING IN THE BEDDING PLANE
77	136.17	136.68	0.51			MUDSTONE	CARB.PR.DK.GY.VTHNB.VBRKN LISTRIC SURFACES SHEARED AND LINED WITH (CHLORITE); PYRITE CONCRETIONS
78	136.68	137.68	1.00			ROCK LOSS	
78	137.68	137.76	0.08	06376	E LOWER	COAL	C-4.M.GY.BRKN MEDIUM BANDED COAL; PYRITE CLUSTERS ELONGATE PARALLEL TO BEDDING PLANE
78	137.76	137.84	0.08	06376	E LOWER	MUDSTONE	CARB.M.GY.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	137.84	137.92	0.08	06376	E LOWER	COAL	C-3.M-DK.GY.SLD THIN BANDED COAL
78	137.92	138.13	0.21	06376	E LOWER	COAL	C-4.PWRD
78	138.13	138.16	0.03	06376	E LOWER	COAL LOSS	
78	138.16	138.18	0.02	06376	E LOWER	MUDSTONE	CARB.M.GY.SLD
78	138.18	138.20	0.02	06376	E LOWER	COAL	C-4.M.GY.PWRD
78	138.20	138.22	0.02	06376	E LOWER	MUDSTONE	CARB.M.GY.SLD
78	138.22	138.24	0.02	06376	E LOWER	MUDSTONE	CARB.M.GY.PWRD COALY FRAGMENTS
78	138.24	138.27	0.03	06376	E LOWER	MUDSTONE	CARB.M.GY.BRKN CARBONACEOUS STRINGERS
78	138.27	138.31	0.04	06376	E LOWER	MUDSTONE	CARB.M.GY.PWRD COALY FRAGMENTS
78	138.31	138.41	0.10	06376	E LOWER	ROCK LOSS	
78	138.41	138.48	0.07	06376	E LOWER	COAL LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	138.48	138.72	0.24	06377	E LOWER	COAL	C-2.M.GY.BRKN
78	138.72	138.92	0.20	06377	E LOWER	COAL	C-3.M.GY.PWRD
78	138.92	139.00	0.08	06377	E LOWER	COAL	C-3.M.GY.BRKN
79	139.00	139.10	0.10	06377	E LOWER	COAL	C-2.M.GY.SLD MEDIUM BANDED COAL
79	139.10	139.30	0.20			MUDSTONE	CARB.M.GY.VTHNB.SLD PLANT FRAGMENTS IN BEDDING PLANE
* 79	139.30	140.58	1.28			MUDSTONE	CARB.M.GY.LAM.SLD MINOR SILTY MUDSTONE BANDS; BEDDING IS SUB PARALLEL AND DISCONTINUOUS
79	140.58	141.37	0.79			MUDSTONE	SLTY.M.GY.VTHNB.VBRKN MINOR PYRITE CONCRETIONS CONCENTRATED A LONG BEDDING PLANES; MINOR PLANT FRAGME NTS ALOND BEDDING PLANE
79	141.37	142.47	1.10			SANDSTONE	VFG-.LT.GY.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	142.47	143.79	1.32			ROCK LOSS	
79	143.79	143.89	0.10			SANDSTONE	FG.PR.LT-M.GY.VTHNB.BIOTR.BRKN HORIZONTAL BURROWS
79	143.89	144.22	0.33			SANDSTONE	VFG.PR.LT-M.GY.VTHNB.BRKN
79	144.22	145.09	0.87			SANDSTONE	SLTY.VFG.VPR.M.GY.BRKN
79	145.09	145.21	0.12			SANDSTONE	SLTY.VFG.PR.M.GY.VTHNB.BIOTR.BRKN SMALL HORIZONTAL BURROWS (LESS THAN 0. 5 CM. IN DIAMETER)
79	145.21	145.29	0.08			SANDSTONE	FG.PR.M.GY.SLD
* 79	145.29	145.65	0.36			SANDSTONE	FG.PR.M.GY.SLD
79	145.65	146.10	0.45			SANDSTONE	FG.PR.M-DK.GY.BIOTR.SLD HORIZONTAL BURROWS APPROXIMATELY 1 CM. IN DIAMETER

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	146.10	146.90	0.80			SANDSTONE	FG.PR.M.GY.LAM.BRKN
79	146.90	147.00	0.10			SANDSTONE	FG.PR.M.GY.SLD
79	147.00	147.14	0.14			MUDSTONE	SLTY.PR.M.GY.SLD MINOR VERTICAL AND HORIZONTAL BURROWS
78	147.14	149.07	1.93			SANDSTONE	FG.PR.LT-M.GY.BRKN INTERBEDDED FINE GRAINED SANDSTONE, SIL TY SANDSTONE AND SILTY MUDSTONE; CROSS LAMINATION SHOWS TOPS UP
* 78	149.07	150.69	1.62			MUDSTONE	SLTY.PR.M.GY.BRKN FRACTURES INFILLED WITH (ANKERITE) AN D MINOR SHEARS LINED WITH (CHLORITE)
78	150.69	152.91	2.22			MUDSTONE	SLTY.PR.M.GY.THNB.BRKN INTERBEDDED MUDSTONE AND FINE GRAINED S ANDSTONE; MINOR BIOTURBATION; MINOR CAR BONACEOUS PLANT FRAGMENTS ON BEDDING PL ANE
78	152.91	154.87	1.96			SANDSTONE	SLTY.VFG.PR.LT.GY.VBRKN SHEARED AND ROUGHLY FRACTURED PERPENDIC ULAR TO BEDDING PLANE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	154.87	156.73	1.86			ROCK LOSS	
79	156.73	157.92	1.19			SANDSTONE	FG.LT.GY.BRKN MINOR MUDSTONE INTERBEDS
* 79	157.92	160.04	2.12			SANDSTONE	SLTY.FG.PR.LT-M.GY.BRKN INTERBEDDED MUDSTONE AND FINE GRAINED S ANDSTONE; MINOR BIOTURBATION; RIPPLE CR OSS LAMINATION INDICATES TOPS UP; LOW A MPLITYUDE OSCILATION RIPPLE MARKS
80	160.04	161.51	1.47			ROCK LOSS	
81	161.51	161.69	0.18			SANDSTONE	SLTY.VFG.PR.LT-M.GY.BIOTR.SLD INTERBEDDED BIOTURBATED MUDSTONE AND SA NDSTONE; MINOR HORIZONTAL BURROWS
82	161.69	164.99	3.30			SANDSTONE	SLTY.VFG.PR.LT-M.GY.BIOTR.SLD INTERBEDDED BIOTURBATED MUDSTONE AND SA NDSTONE; MINOR HORIZONTAL BURROWS; PENE CONTEMPORANEOUS SLUMPING; RIPPLE CROSS LAMINATION

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
83	164.99	165.89	0.90			SANDSTONE	SLTY.VFG.PR.M.GY.SLD
* 84	165.89	168.06	2.17			SANDSTONE	SLTY.VFG.PR.M-DK.GY.BIOTR.SLD INTERBEDDED BIOTURBATED MUDSTONE AND VE RY FINE GRAINED SANDSTONE BEDS
84	168.06	168.96	0.90			SANDSTONE	SLTY.VFG.PR.M-DK.GY.SLD OVERALL DECREASE IN THE AMOUNT OF BIOTU RBATION AS DEPTH INCREASES
* 85	168.96	171.94	2.98			MUDSTONE	SLTY.DK.GY.SLD DRILLER'S MARKER IS IN ERROR; OCCASIONA L VERY SILTY MUDSTONE BEDS, MINOR BIOTU RBATION
85	171.94	172.91	0.97			MUDSTONE	DK.GY.SLD
85	172.91	172.98	0.07			BRECCIA	CLYY.MH.SLD FAULT BRECCIA MAINLY COMPOSED OF SECOND ARY (ANKERITE) WITH MINOR CALCITE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
85	172.98	173.69	0.71			MUDSTONE	DK.GY.SLD MINOR SILTY BEDS
86	173.69	175.06	1.37			MUDSTONE	DK.GY.SLD MINOR SILTY BEDS
86	175.06	177.65	2.59			MUDSTONE	SLTY.DK.GY.BRKN MINOR BIOTURBATION IS APPARENT IN SILTI ER BEDS
86	177.65	179.88	2.23			MUDSTONE	SLTY.DK.GY.BRKN MINOR SHEARS AND FRACTURES; SHEARS ARE LINED WITH (CHLORITE)
87	179.88	181.82	1.94			MUDSTONE	DK.GY.BRKN MINOR FRACTURE INFILLED WITH (ANKERITE
87	181.82	181.94	0.12			MUDSTONE	DK.GY.BRKN
87	181.94	182.68	0.74			MUDSTONE	DK.GY.BRKN
87	182.68	182.85	0.17			MUDSTONE	LT.GY.BRKN MUDSTONE IS POSSIBLY DERIVED FROM A VOL CANIC ASH

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
87	182.85	185.09	2.24			MUDSTONE	DK.GY RARE BELEMNITE, APPROXIMATELY 1.0 CM. I N DIAMETER
88	185.09	188.04	2.95			MUDSTONE	SLTY.DK.GY.BRKN RARE BELEMNITE LYING IN BEDDING PLANE; MUDSTONE BECOMES SILTIER TOWARDS BASAL CONTACT
88	188.04	188.20	0.16			SANDSTONE	SLTY.FG.PR.LT-M.GY.BIOTR.BRKN MUDDIER TOWARDS UPPER CONTACT
* 88	188.20	190.13	1.93			SANDSTONE	SLTY.FG.PR.LT-M.GY.LAM.BRKN ABUNDANT MUDSTONE INTERBEDS
87	190.13	190.15	0.02			ROCK LOSS	
87	190.15	191.24	1.09			MUDSTONE	SLTY.LT-M.GY.BRKN
87	191.24	191.31	0.07			MUDSTONE	SLTY.M.GY.LAM.BRKN FINE GRAINEDSILTY SANDSTONE INTERBEDS
86	191.31	191.43	0.12			SANDSTONE	FG.LT.GY.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: SS DATA SOURCE: DDH83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 86	191.43	192.60	1.17			MUDSTONE	SLTY M.GY.LAM.BRKN VERY FINE GRAINED SILTY SANDSTONE INTER BEDS; END OF HOLE; TOTAL DRILLER'S DEPT H 192.60 METERS

-854- NOW IN CONTACT WITH SYSTEM 2000 -
-855- NO LONGER IN CONTACT WITH SYSTEM 2000 -

GULF CANADA RESOURCES INC.

Coal Division

PREPARED BY: C. LOUIE	LOGGED BY: SCOTT McKENZIE	SCALE : 1:200, 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB. 1984	DRAWING No. KPN83S03

MOUNT KLAPPAN

DRILL HOLE LOG

DDH83003

SCALE : 1:200 1:40

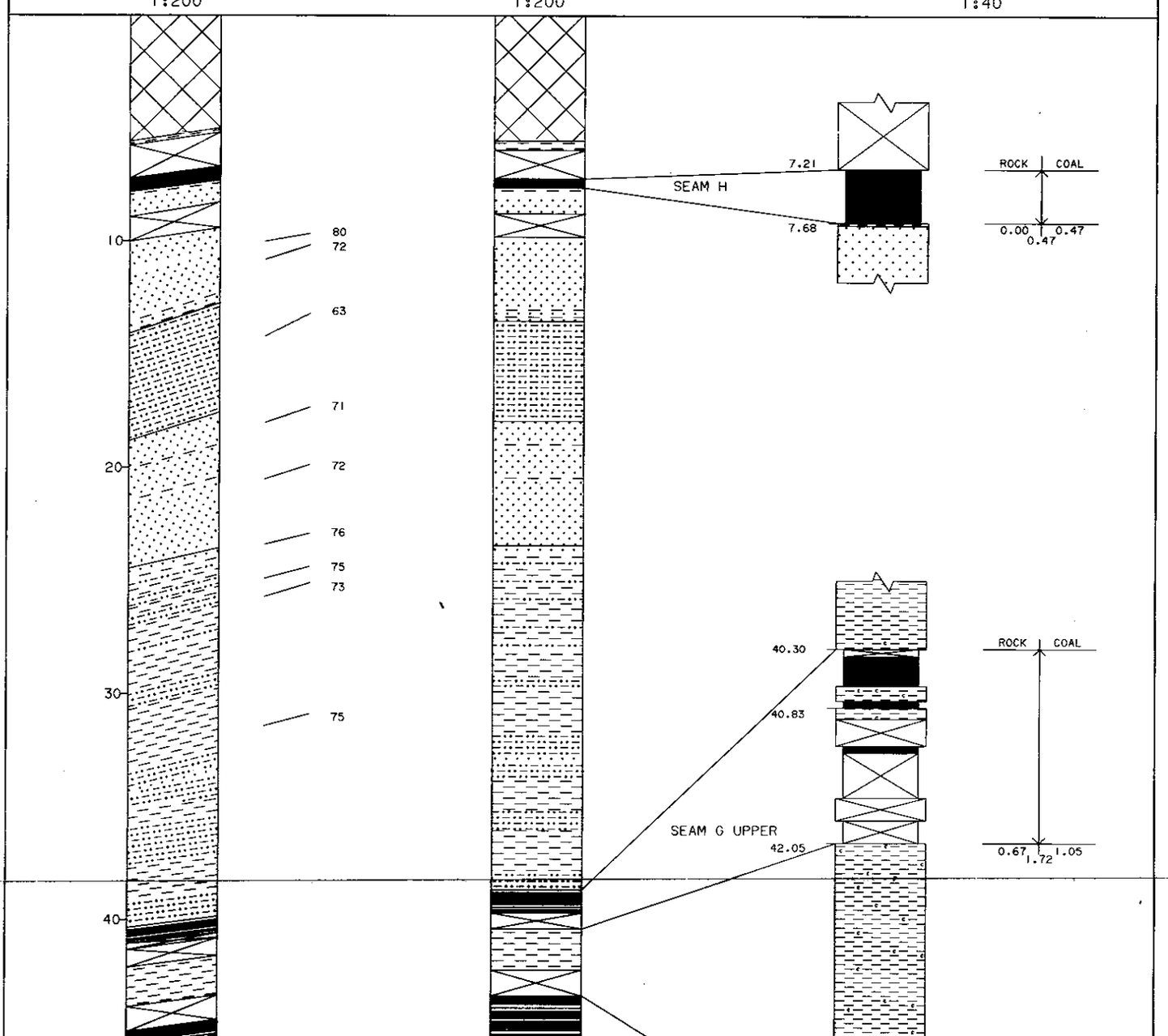
0 — 5 (M) 0 — 0.5 — 1 (M)

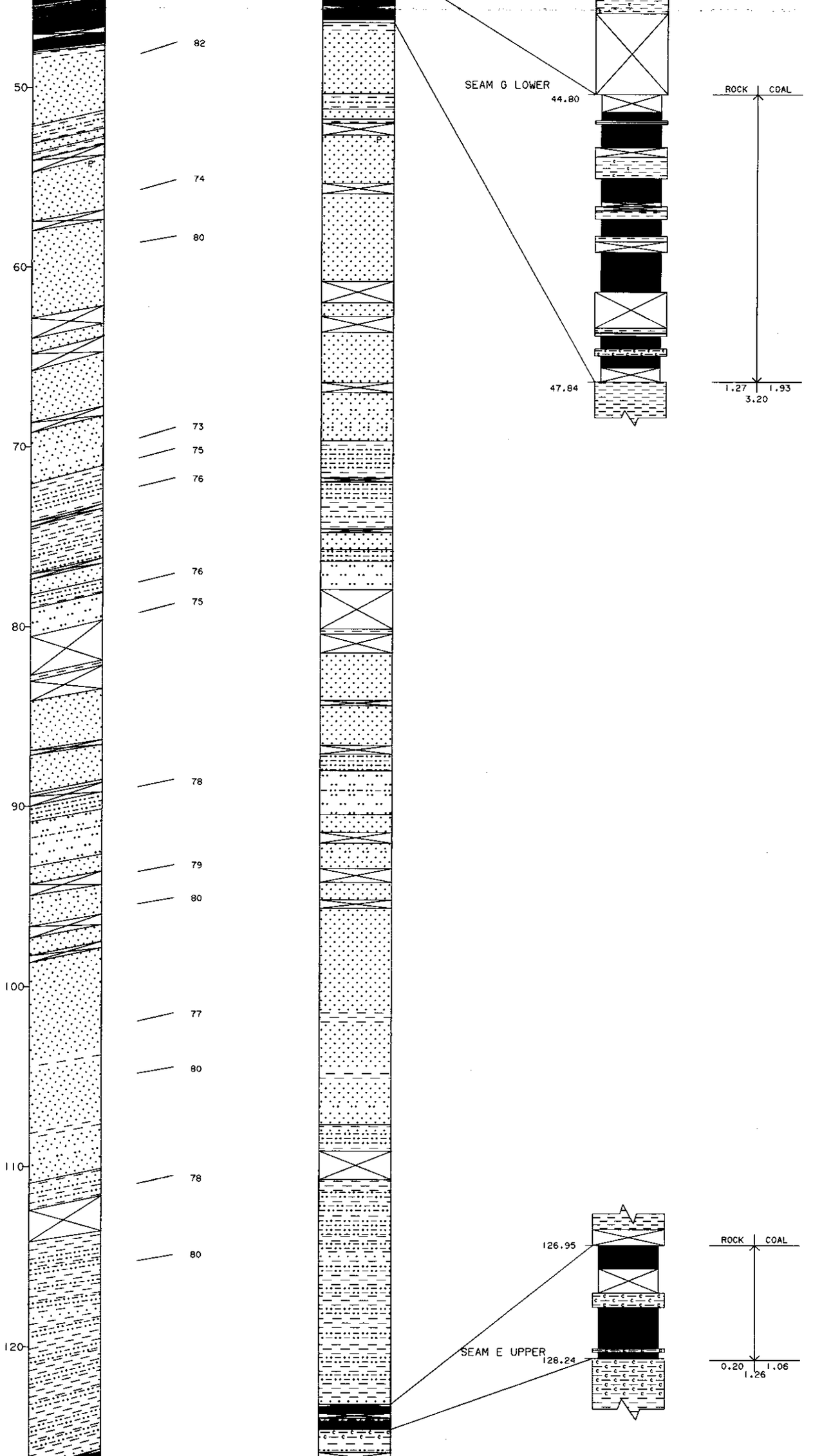
NORTHING : 6349585.0 N
EASTING : 501657.0 E

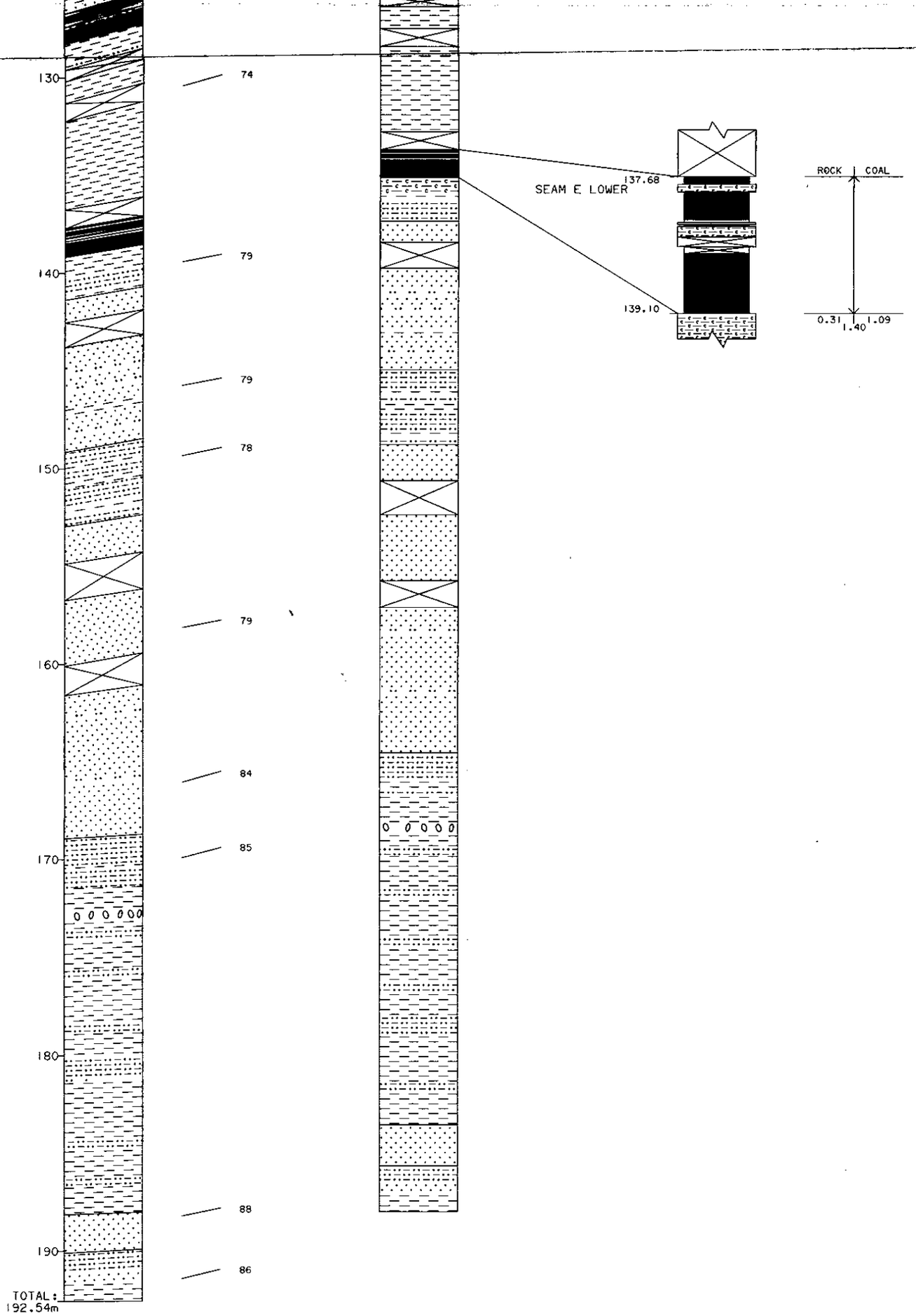
INCLINATION : 60.0°
BEARING : 230.0°

LITHOLOGIC SYMBOLS

- CONGLOMERATE
- SANDSTONE
- CARBONACEOUS
- SILTSTONE
- COAL
- COAL-THIN BEDS
- OVERBURDEN
- QUARTZ
- PEBBLY SANDSTONE
- MUDSTONE, CLAYSTONE
- BENTONITE
- PYRITE
- CORE LOSS
- PLANT FOSSIL
- SHELL FOSSIL
- MARL
- ANKERITE




82
50
74
80
60
73
70
75
76
76
75
80
78
90
79
80
100
77
80
110
78
80
120
SEAM G LOWER
44.80
47.84
ROCK
COAL
1.27
1.93
3.20
126.95
SEAM E UPPER
128.24
ROCK
COAL
0.20
1.06
1.26


130
140
150
160
170
180
190
TOTAL:
192.54m
74
79
79
78
79
84
85
88
86
SEAM E LOWER
137.68
139.10
ROCK
COAL
0.31
1.40
1.09

111

CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * VERTICAL DEVIATION * * * * * * * *

COMPU-LOG V8L1 DEVIATION

CLIENT : GULF CANADA RES.

HOLE ID : DDH-83-003

LOCATION : MT. KLAPPAN

DATE OF LOG : 08-17-83

DATA FROM : V8L2*

PROBE : 9055A 0008

TD = TOTAL DEPTH
T = TOP OF ZONE
B = BOTTOM OF ZONE

	DEPTH	TRUE DEPTH	NORTH DEV	EAST DEV	DISTANCE	AZIMUTH	SA	SAB
	.00	.00	.00	.00	.00	.0	.0	.0
	10.00	8.89	-2.90	-3.53	4.57	230.5	27.2	230.5
	20.00	17.78	-5.81	-7.06	9.14	230.5	27.2	230.5
	30.00	26.68	-8.71	-10.59	13.71	230.5	27.2	230.5
	40.00	35.57	-11.62	-14.12	18.28	230.5	27.2	230.5
	50.00	44.46	-14.52	-17.65	22.85	230.5	27.2	230.5
	60.00	53.36	-17.43	-21.18	27.43	230.5	27.2	230.5
	70.00	62.25	-20.33	-24.71	32.00	230.5	27.2	230.5
	80.00	71.14	-23.24	-28.24	36.57	230.5	27.2	230.5
	90.00	80.04	-26.14	-31.77	41.14	230.5	27.2	230.5
	100.00	88.93	-29.05	-35.30	45.71	230.5	27.2	230.5
	110.00	97.82	-31.95	-38.83	50.29	230.5	27.2	230.5
	120.00	106.72	-34.86	-42.36	54.86	230.5	27.2	230.5
	130.00	115.61	-37.77	-45.89	59.43	230.5	27.2	230.5
	140.00	124.51	-40.67	-48.42	64.00	230.5	27.2	230.5
	150.00	133.40	-43.58	-52.95	68.57	230.5	27.2	230.5
	160.00	142.29	-46.48	-56.48	73.15	230.5	27.2	230.5
	170.00	151.19	-49.39	-60.01	77.72	230.5	27.2	230.5
	180.00	160.08	-52.29	-63.54	82.29	230.5	27.2	230.5
	190.00	168.98	-55.19	-67.06	86.85	230.6	27.1	230.6
TD	191.80	170.59	-55.58	-67.67	87.57	230.6	24.1	237.2

46701

CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * VERTICAL DEVIATION * * * * * * * *

COMPU-LOG V8L1 DEVIATION

111

CLIENT : GULF CANADA RES.

HOLE ID : DDH-83-003

LOCATION : MT. KLAPPAN

DATE OF LOG : 08-17-83

DATA FROM : V8L2*

PROBE : 9055A 0008

TD = TOTAL DEPTH
T = TOP OF ZONE
B = BOTTOM OF ZONE

	DEPTH	TRUE DEPTH	NORTH DEV	EAST DEV	DISTANCE	AZIMUTH	SA	SAB
	.00	.00	.00	.00	.00	.0	.0	.0
	5.00	4.33	-1.53	-1.95	2.48	231.8	29.8	231.8
	10.00	8.67	-3.07	-3.91	4.97	231.8	29.8	231.8
	15.00	13.01	-4.61	-5.87	7.46	231.8	29.8	231.8
	20.00	17.34	-6.15	-7.82	9.95	231.8	29.8	231.8
	25.00	21.68	-7.71	-9.75	12.43	231.7	29.8	230.9
	30.00	26.03	-9.30	-11.65	14.90	231.4	29.5	230.1
	35.00	30.38	-11.00	-13.37	17.31	230.6	29.0	225.3
	40.00	34.74	-12.68	-15.10	19.72	230.0	28.9	225.7
	45.00	39.10	-14.28	-16.94	22.16	229.9	29.2	229.0
	50.00	43.46	-15.95	-18.75	24.61	229.6	29.3	227.3
	55.00	47.82	-17.54	-20.60	27.06	229.6	29.2	229.2
	60.00	52.16	-19.13	-22.51	29.54	229.6	29.7	230.3
	65.00	56.52	-20.69	-24.38	31.98	229.7	29.2	230.0
	70.00	60.89	-22.26	-26.22	34.40	229.7	28.9	229.5
	75.00	65.27	-23.86	-28.05	36.83	229.6	29.0	228.9
	80.00	69.64	-25.47	-29.84	39.23	229.5	28.8	227.8
TD	80.80	70.34	-25.76	-30.11	39.63	229.4	29.6	222.8

46704

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

0

20.0

40.0

60.0

80.0

100.0

120.0

140.0

160.0

180.0

190.0

0 GAMMA API 600

0 N-N CPS 2000

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

COMPU-LOG VBL2 PLOT 08-17-83

DDH-83-003

GULF CANADA RES.

MT. KLAPPAN

HOLE DIAMETER = 08.3

PROBE # 9055A - 008

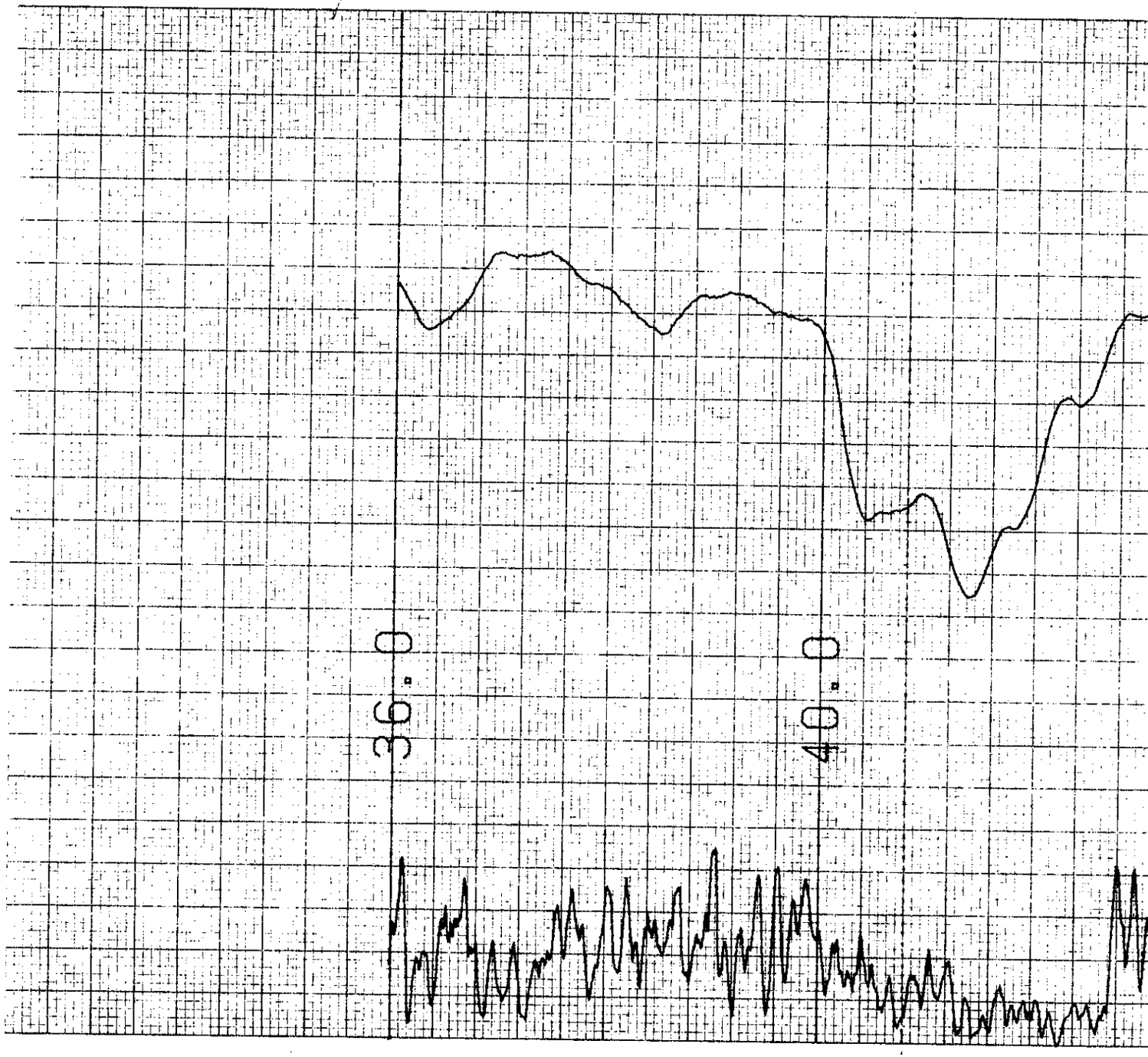
SENSOR #4 CAL STD CPS = 152

SENSOR #4 CAL RUN CPS = 217

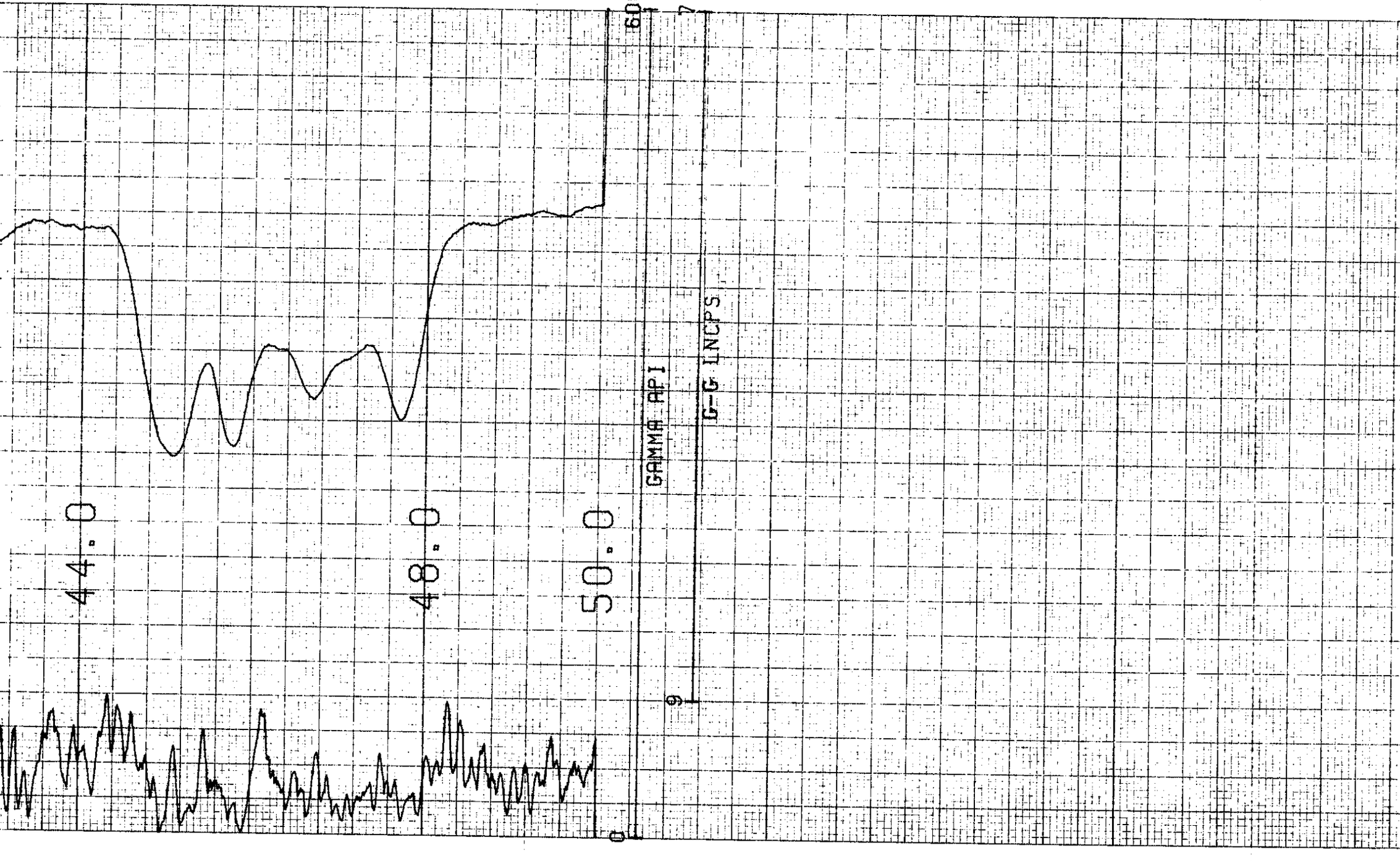
SENSOR #4 CAL BIAS = 0

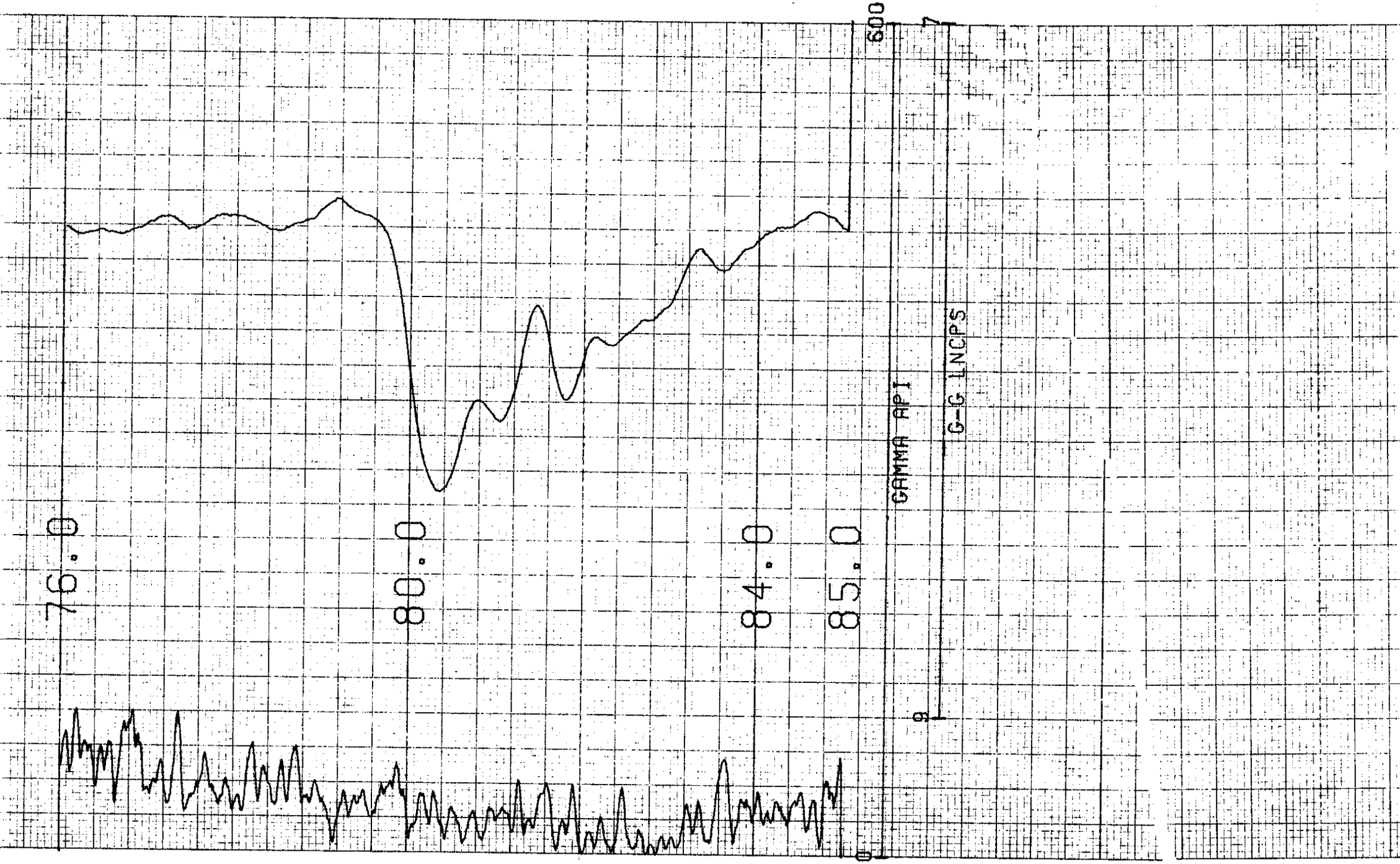
DATA VBL2 TRUCK # PB11

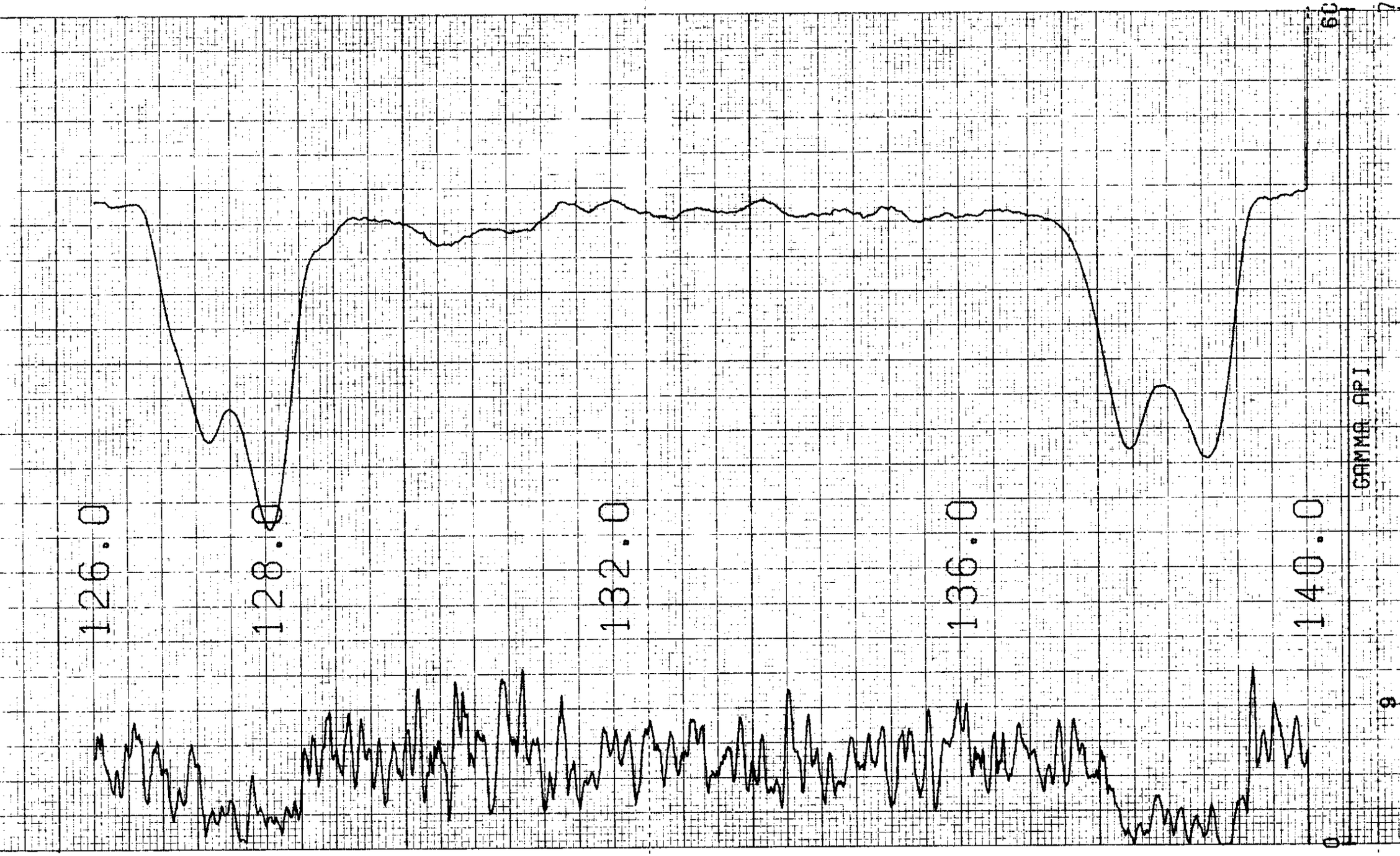
K. SKARBO APPL.#1007L1


36.0
40.0

CENTURY GEOPHYSICAL CORP. PART




76.0
80.0
84.0
85.0
0
GAMMA API
0
600
G-G LNCPS
7


126.0
128.0
132.0
136.0
140.0
GAMMA API
0
600

G-G LNCPS

111

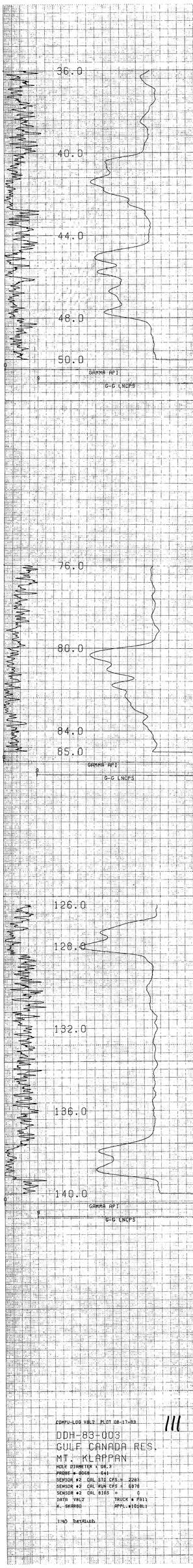
COMPU-LOG V8L2 PLOT 08-17-83

DDH-83-003
GULF CANADA RES.
MT. KLAPPAN

HOLE DIAMETER : 08.3
PROBE # 9068 - 641
SENSOR #2 CAL STD CPS = 2283
SENSOR #2 CAL RUN CPS = 6878
SENSOR #2 CAL BIAS = 0
DATA V8L2 TRUCK # (8J)
K. SKARBO APPL.#10:3L)

1:40 DETAILED

ENTURY GEOPHYSICAL CORP. PART NO. 786-0040


CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
36.0
40.0
44.0
48.0
50.0
0
600
GAMMA API
9
7
G-G LNCPS
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
76.0
80.0
84.0
85.0
0
600
GAMMA API
9
7
G-G LNCPS
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
126.0
128.0
132.0
136.0
140.0
0
600
GAMMA API
9
7
G-G LNCPS
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040
COMPU-LOG V8L2 PLOT 08-17-83
DDH-83-003
GULF CANADA RES.
MT. KLAPPAN
HOLE DIAMETER = 08.3
PROBE # 8068 - 641
SENSOR #2 CAL STD CPS = 2283
SENSOR #2 CAL RUN CPS = 6878
SENSOR #2 CAL RIES = 0
DATA V8L2 TRUCK # 7811
K. SKARBO APPL.#1016L1
NO Detailed
CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

VERTICAL DEVIATION

111

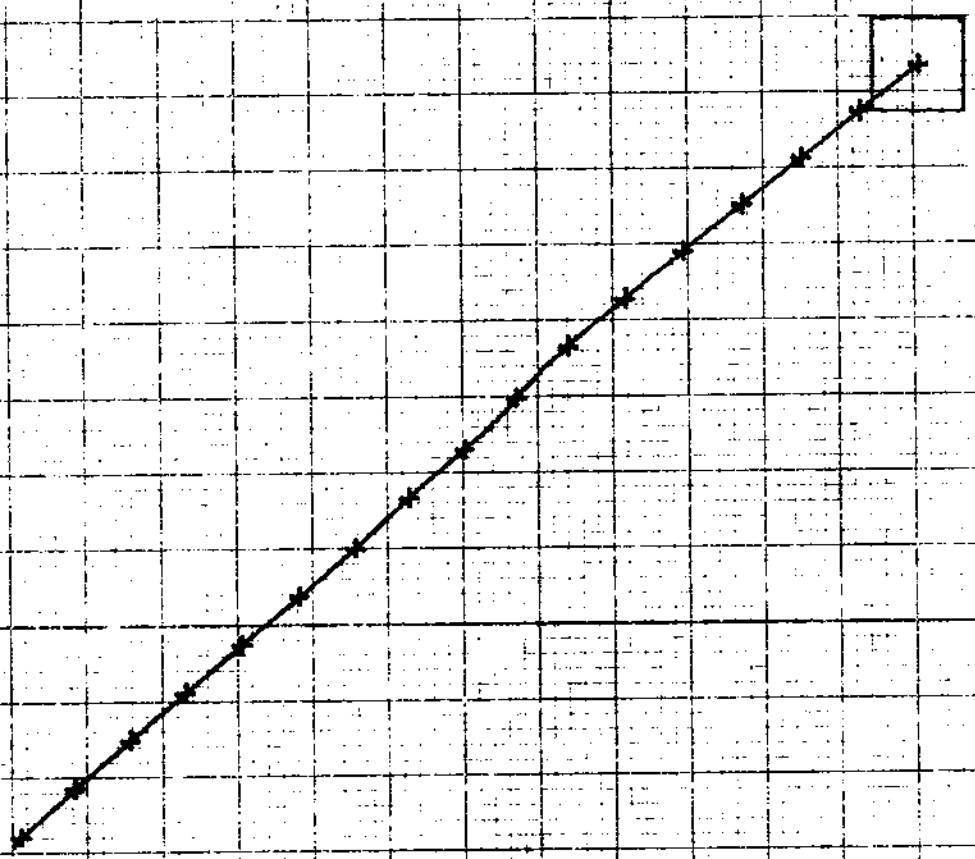
COMPU-LOG V8L1 DEVIATION
DATA FROM : V8L2

CLIENT : GULF CANADA RES.
LOCATION : MT. KLAPPAN
HOLE ID : DDH-83-003
DATE OF LOG : 08-17-83
PROBE : 9055A 0008

SCALE: 2.50 M/DIV
MAG DECL: 29.5
TRUE DEPTH: 70.3 M
AZIMUTH: 229.4
DISTANCE: 39.63 M

+ = 5.0 M INCR
△ = TOP OF ZONE
◇ = BOTTOM OF ZONE

TRUE NORTH ↑



CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

1.3

VERTICAL DEVIATION

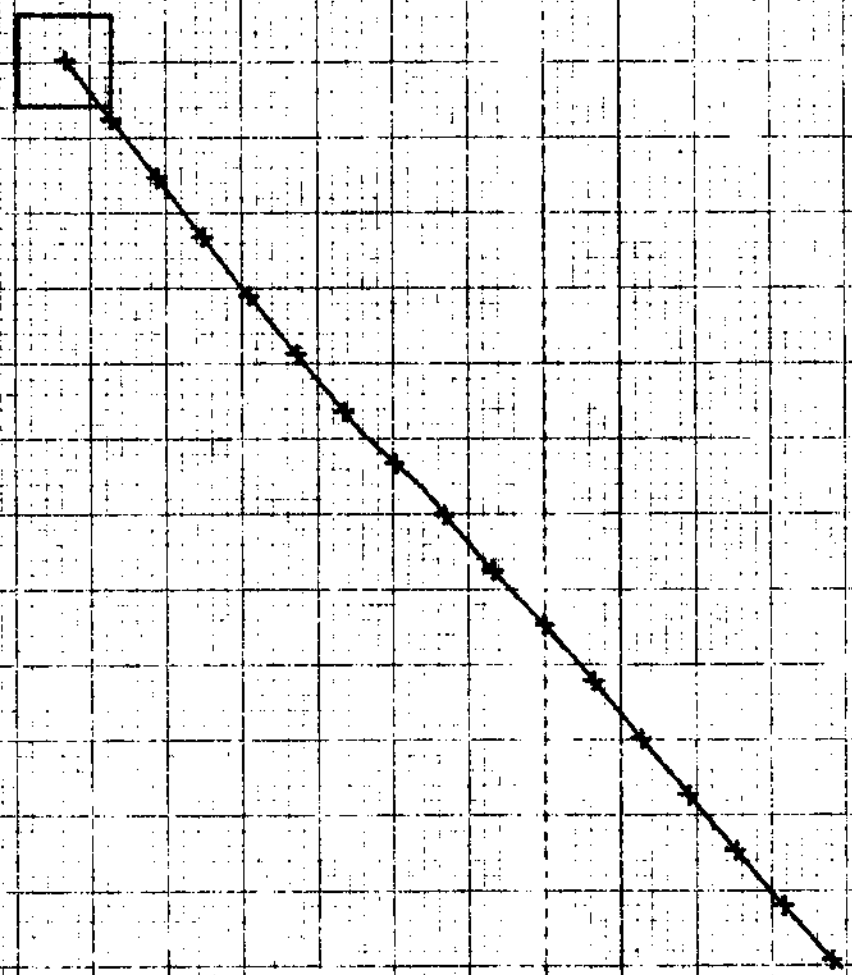
COMPU-LOG V8L1 DEVIATION
DATA FROM : V8L2

CLIENT : GULF CANADA RES.
LOCATION : MT. KLAPPAN
HOLE ID : DDH-83-003
DATE OF LOG : 08-17-83
PROBE : 9055A 0008

SCALE: 2.50 M/DIV
MAG DECL: 29.5
TRUE DEPTH: 70.3 M
AZIMUTH: 229.4
DISTANCE: 39.63 M

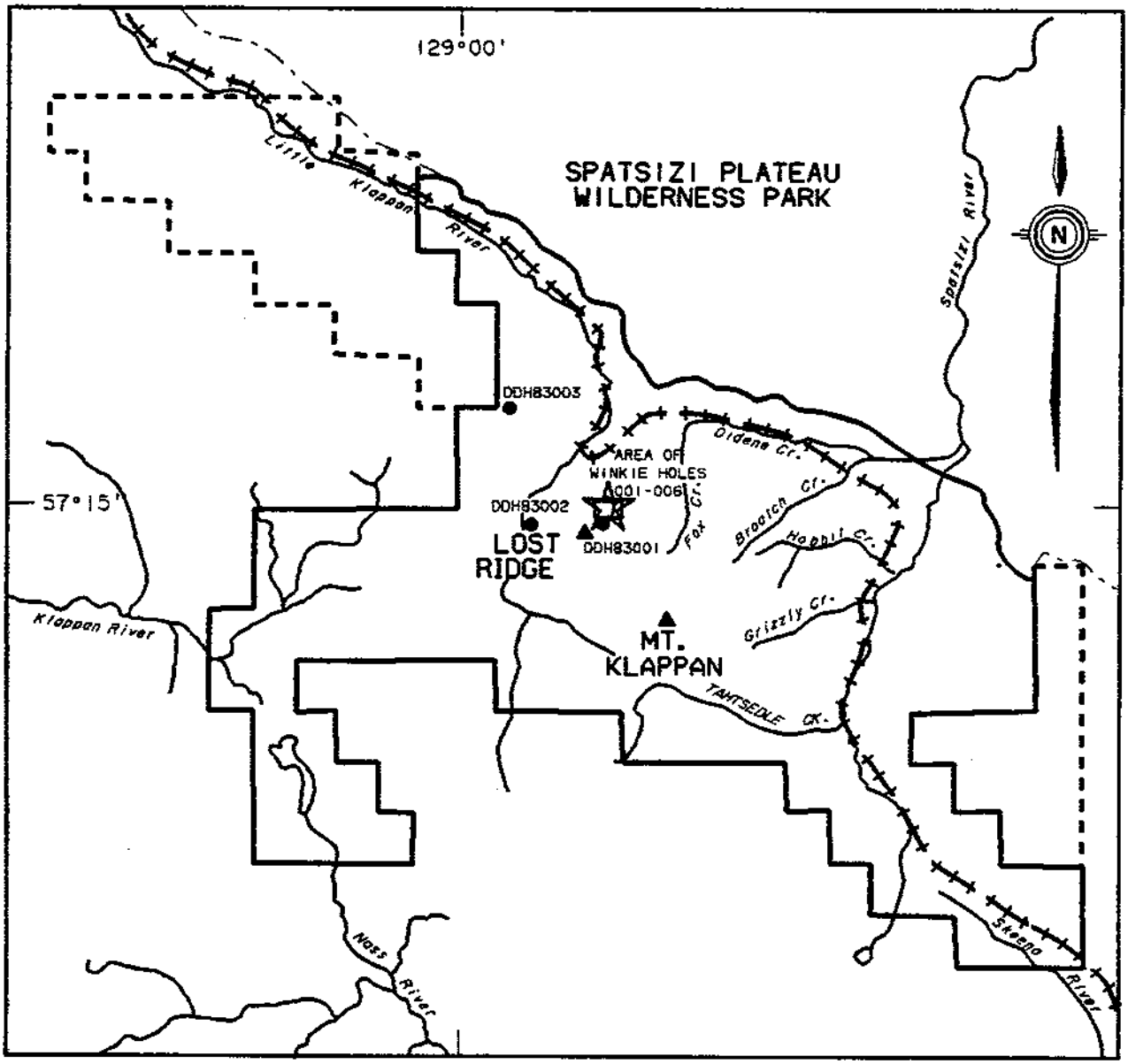
+ = 5.0 M INCR
Δ = TOP OF ZONE
◇ = BOTTOM OF ZONE

TRUE NORTH ↑



MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

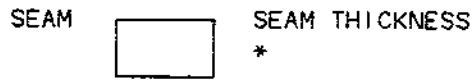
GULF CANADA RESOURCES INC.
09/03/84

Gulf

```
CRI COAL DIVISION  HISTORY     PROJ  KPN      BLK  LR      DS  WKD83001
=================  =======    ========================================

                   DY MO YR
    START DATE     07/07/83
      END DATE     08/07/83

    CONTRACTOR     TECK                    OPERATOR    GCRI
    GEOLOGIST      C.WILLIAMS              SURVEYOR    ___________

   REMARKS      CORE BARREL TWISTED OFF ; HOLE LOST DUE TO CAVE IN
                .

GCRI COAL DIVISION  LOCATION    PROJ  KPN    BLK  LR    DS  WKD83001
==================  ========    ================================
         PROVINCE     BC                      ELEVATION (M)  1827.00
                    LICENCE / LEASE NUMBER     __________
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER    _
*-------------------------------------------------------------------*
|  1  UTM:     ZONE  09       NORTHING  6344339.00    EASTING   505758.00  |
|-------------------------------------------------------------------|
|  2  LAT-LONG:     LAT  ______      LONG  _______                    |
 -------------------------------------------------------------------|

GCRI COAL DIVISION  ORIENTATION     PROJ  KPN    BLK  LR    DS  WKD83001
==================  ===========     ================================

      DIMENSIONS AND ORIENTATION:

LENGTH (M)      7.01     INCLINATION   90.0    AZIMUTH  ___.-
SIZE WIDTH     34.0      SIZE HEIGHT
ROOF STRIKE              DIP          DIR
FLOOR STRIKE             DIP          DIR


CASING DEPTH (M)      1.50    CEMENT(Y,_)  N    PLUG(Y,_)  N    PIEZ(Y,_)  _
AQUIFER DEPTHS (M)            ____.__      ____.__
LOST CIRC. DEPTHS (M)         ____.__      ____.__
```

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83001



* NOTE: HOLE LOST DUE TO COREING

SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
85	0.00	0.03	0.03			OVERBURDEN	
85	0.03	1.03	1.00			ROCK LOSS	
85	1.03	1.06	0.03			MUDSTONE	M.GY.VBRKN ENDS OF CORE ROUNDED
85	1.06	1.09	0.03			SILTSTONE	CLYY.LT.GY.SLD ENDS OF CORE ROUNDED;VERY CALCAREOUS
85	1.09	1.13	0.04			SANDSTONE	VFG.LT.GY.BRKN UNIT APPEARS TO BE WEATHERED ALONG EXIS TING FRACTURES;IRON STAINING
85	1.13	1.15	0.02			MUDSTONE	SLTY.LT.ORNG.VBRKN VERY CALCAREOUS;PERHAPS ORANGE WEATHERE D NODULE BEDS SEEN IN OUTCROP
85	1.15	1.24	0.09			SILTSTONE	CLYY.M.GY.LAM
* 85	1.24	1.33	0.09			SILTSTONE	CLYY.M.GY.LAM.SLD ROCK HAS UNDERGONE WEATHERING ALONG FRA CTURE SURFACES;REACTS TO 10 % HCL APPEA RS TO BE INTERLAMINATED WITH LT GY SILT STONE AND M GY MUDSTONE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
60	1.33	1.36	0.03			MUDSTONE	SLTY.LT.BN.LAM.SLD UNIT IS LAMINATED WITH LT GY SILSTONE;S ILSTONE LAM REACT TO HCL;END OF PIECES ROUNDED FROM DRILL
* 45	1.36	1.40	0.04			SILTSTONE	CLYY.M.ORNG.LAM.WRMBU.SLD POSSIBLE IRONSTONE BAND;NOTE - BCA: IIE M IDENTIFIED AS WRMBUR;MAY BE SOMETHING ELSE;PIECE COULD BE FROM CAVE.
62	1.40	1.45	0.05			SILTSTONE	CLYY.LT.GY.LAM.VBRKN SILSTONE INTERLAMINATED WITH MUDSTONE;S ILSTONE REACTS WITH HCL
* 80	1.45	1.50	0.05			SILSTONE	CLYY.MOD.M.GY.LAM.BRKN SILSTONE ALSO SSY AND FER;SURFACES SHOW WEATHERING;ENDS OF CORE ROUNDED BY DRI LL
52	1.50	1.53	0.03			MUDSTONE	SLTY.M.ORNG.LAM.BRKN BRKN SURFACES ARE OXIDIZED
* 20	1.53	1.59	0.06			SANDSTONE	CLYY.VFG.M.GY.LAM.VBRKN PIECE MAY BE SLUMPED (20 DEGREE BCA)
35	1.59	1.63	0.04			MUDSTONE	SLTY.M.GY.LAM.VBRKN SOME ORANGE COLORED LAM;CORE HAS BEEN D AMAGED BY DRILL

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
52	1.63	1.70	0.07			MUDSTONE	SLTY.M.GY.LAM.VBRKN CORE HAS BEEN ROUNDED ; SLTY INTERVALS APPEAR TO HAVE ORANGE STAINING
* 85	1.70	1.85	0.15			SILTSTONE	CLYY.LT.GY.LAM.WRMBU.BRKN SED STRUX APPEAR TO BE BURROWS
85	1.85	1.92	0.07			SILTSTONE	CLYY.LT.GY.LAM.VBRKN SILTSTONE ALSO FER
85	1.92	1.97	0.05			MUDSTONE	CLYY.LT.TAN.BRKN MUDSTONE ALSO FER;POSSIBLE TUFF;REACTS WITH HCL;SOFT-EASILIY SCRATCHED WITH FINGERNAIL
85	1.97	2.07	0.10			MUDSTONE	SLTY.M.GY.LAM.VBRKN MUDSTONE ALSO FER;CORE IS HIGHLY BROKEN AND ROUNDED;FRACTURE FACE INDICATES WEATHERING
85	2.07	2.31	0.24			SILTSTONE	CLYY.M.GY.LAM.VBRKN SILTSTONE ALSO SSY AND FER
84	2.31	2.54	0.23			SILTSTONE	CLYY.M.GY.LAM.VBRKN SILSTONE ALSO SSY AND FER;ORANGE WEATHERING IRONSTONE CONCRETIONS FROM .11 TO .13 METERS;UNIT BECOMES SANDIER TOWARDS BASE;NOTE-PURP TINT ON SOME FRACTURE FACES;ALL LAM APPEAR UNIFORM

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 84	2.54	2.68	0.14			SANDSTONE	CLYY.VFG.MOD.LT.GY.LAM.VBRKN LAM APPEAR UNIFORM;ORANGE WEATHERING IRONSTONE BAND AT .08 CM
82	2.68	2.83	0.15			MUDSTONE	SLTY.MOD.M.GY.LAM.VBRKN ORANGE WEATHERED IRONSTONE BAND AT .14 AND .16 M;POSSIBLE IRONSTONE NODULES; NOTE-PURP COLORED FRACTURE SURFACES
80	2.83	3.04	0.21			SANDSTONE	SLTY.MOD.M.GY.LAM.VBRKN SANDSTONE ALSO CLYY;UNIFORM LAMINATIONS ;FEW ORANGE TO BROWN WEATHER BANDS- GENERALLY .01 TO .02 M THICKNESS;FRACTURE SURFACES OXIDIZED
* 75	3.04	3.59	0.55			MUDSTONE	SLTY.M.GY.LAM.VBRKN UNIFORM LAMINATIONS WHERE PRESENT;UNIT STILL APPEARS TO HAVE ORANGE TO ORANGE BROWN BANDING-ACYCLIC NATURE TO IT (VARVED ALMOST);FRACTURE SURFACES HAVE PURP AND RED STAINING;CORE EXTREMELY BRKN;BANDING COULD BE IRONSTONE IN NATURE
73	3.59	4.57	0.98			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83001

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	4.57	5.06	0.49			ROCK LOSS	
70	5.06	5.14	0.08			MUDSTONE	SLTY.M.GY.VTHNB.VBRKN CLAY AND IRONSTONE NODULE AT .06 M;FRAC TURE SURFACES SHOW WEATHERING FEATURES
* 70	5.14	5.22	0.08			SILTSTONE	CLYY.MOD.LT.GY.LAM.BRKN SILTSTONE ALSO FER;CORE IS ROUNDED DUE TO DRILL
73	5.22	5.64	0.42			MUDSTONE	SLTY.M.GY.LAM.VBRKN ORANGE-BROWN LAMINATING OCCUR THROUGHOU T MEASURED INTERVAL EVERY .01 TO .05 M ON AVERAGE; CLAY GALL AT 0.23 METERS
77	5.64	5.71	0.07			MUDSTONE	SLTY.M.GY.VBRKN ALL PIECES HAVE BEEN TURNED IN DRILL CO RE
* 80	5.71	6.10	0.39			MUDSTONE	SLTY.M.GY.LAM.VBRKN ALL FRACTURE FACES ARE OXIDIZED AND COV ERED WITH LIMONITE STAIN AND PURPLE STA IN-FRACTURE ANGLE 45 AND 90 DEGREES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83001

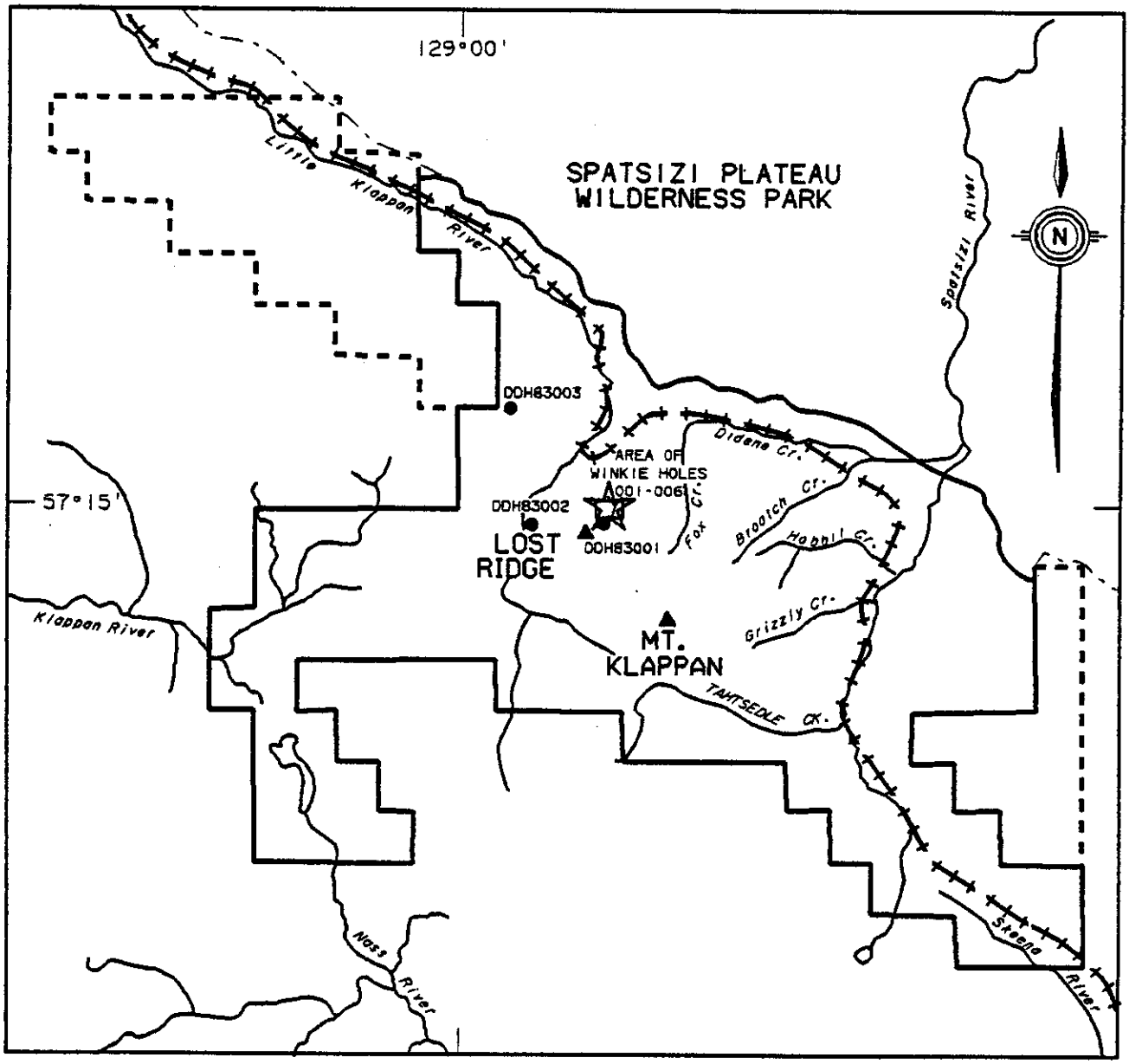
BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	6.10	6.16	0.06			MUDSTONE	M.GY.LAM.VBRKN
* 72	6.16	6.34	0.18			MUDSTONE	SLTY.M.GY.LAM.VBRKN FRACTURE ANGLES 20 AND 90 DEG;ALL FRACT URE SURFACES ARE OXIDIZED;SOME PIECES H EAVILIY GROUND BY DRILL
72	6.34	6.58	0.24			MUDSTONE	SLTY.M.GY.LAM.VBRKN IRON STAINED FRACTURES THROUGHOUT
72	6.58	6.63	0.05			MUDSTONE	LT.GY.SLD INTERVAL MARKS UNIT WHICH IS MUCH LIGHT ER IN COLOR THAN UNITS ABOVE;HAS SOFT S OAPY TEXTURE
72	6.63	6.81	0.18			MUDSTONE	SLTY.LT.GY.LAM.VBRKN CLAY-IRONSTONE NODULE AT .09 M ******** *END OF CORE;7.01 M**********; CORE BA RREL TWISTED OFF;HOLE LOST DUE TO CAVEI N
72	6.81	7.01	0.20			ROCK LOSS	**********END OF CORE (7.01M)********** *** HOLE LOST DUE TO CAVE;CORE BARREL T WISTED OFF

* DENOTES MEASURED BCA

NEWPAGE

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83002

	DY MO YR
START DATE	09/07/83
END DATE	10/07/83

CONTRACTOR TECK CORP OPERATOR GCRI
GEOLOGIST C WILLIAMS SURVEYOR

REMARKS ENTIRE HOLE INCLUDING COAL SHOW SIGNS OF OXIDATION . TIGHT INTERVAL AT APPROXIMATELY 3.05 METERS AND AGAIN AT 8.23 METERS.

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83002

PROVINCE BC ELEVATION (M) 1827.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1 UTM: ZONE 09 NORTHING 6344340.00 EASTING 505758.00

2 LAT-LONG: LAT _____ LONG _____

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83002

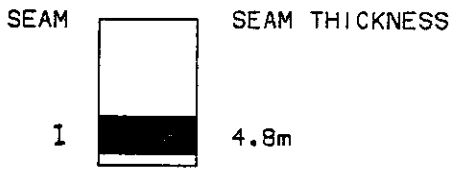
DIMENSIONS AND ORIENTATION:

LENGTH (M) 17.22 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH 34.0 SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 2.74 CEMENT(Y,_) N PLUG(Y,_) N PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83002



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83002 SEAM _____ APPARENT THICKNESS

SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 12.41m-17.18m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	12.41			0.26										
			0.01											
			(0.01)	0.10										
			0.03											
				0.29										
			0.01	0.03	99.3	06352		1.70	19.10	7.70	71.50	0.45	6292	
				0.73										
	13.89		0.10	0.02										
			0.01	0.05										
			0.02	0.10										
			(0.15)											
				(0.10)										
				0.24										
				(0.21)										
			0.05											
				0.24										
			0.01											
				0.49	75.4	06353		1.70	22.10	7.50	68.70	0.41	5957	
			0.02											
				0.53										
				(0.15)										
				0.65										
				(0.15)										
	17.18													

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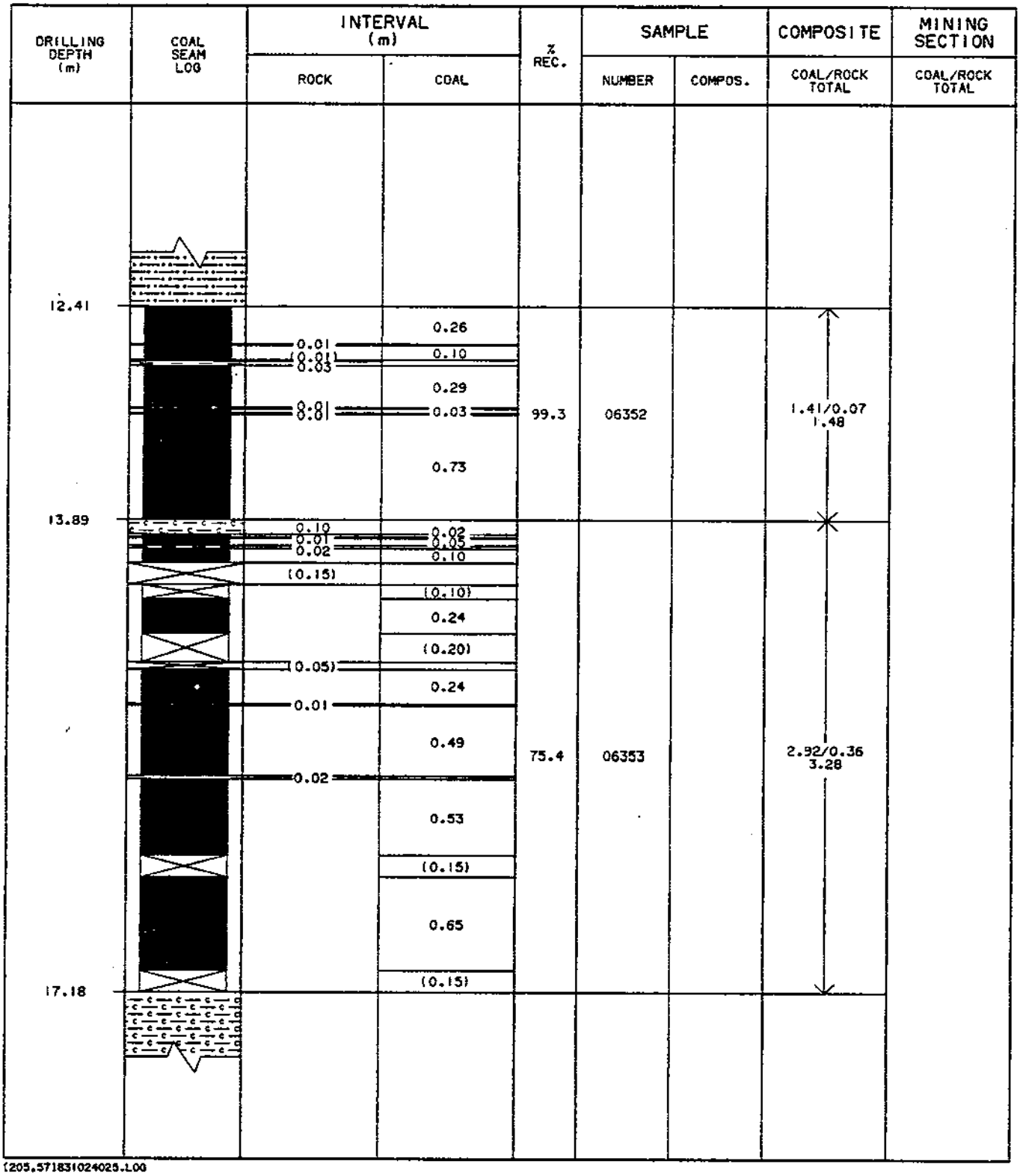

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GULF CANADA RESOURCES INC.	Gulf
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS WKD83002 SEAM 1	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84

SIMPLE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WKD83002										
		6352	12.41	13.89	99.32	1.41	0.06	0.00	0.01	1.41- 0.07
		6353	13.89	17.18	75.37	2.32	0.16	0.61	0.20	2.93- 0.36

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 3

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WKD83003										
	1	6351	15.63	20.50	74.74	3.48	0.16	0.88	0.35	4.36- 0.51

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	0.00	0.89	0.89			ROCK LOSS	
75	0.89	0.99	0.10			SANDSTONE	SLTY.VFG.WEL.LT.GY.THNB.XBDG.BRKN END OF CORE PIECES ARE ROUNDED;POSSIBLE CORE LOSS
75	0.99	1.21	0.22			SILTSTONE	CLYY.LT.TAN UNIT APPEARS VERY SOFT
75	1.21	1.22	0.01			MUDSTONE	SLTY.LT.GY VERY SOFT-ALMOST LIKE A CLAY;POSSIBLE CORE LOSS
75	1.22	1.87	0.65			ROCK LOSS	
75	1.87	2.00	0.13			SILTSTONE	CLYY.M.GY.LAM.VBRKN POSSIBLE CORE LOSS
* 75	2.00	2.31	0.31			SILTSTONE	CLYY.M.GY.LAM.NRMBU.VBRKN ABUNDANT INTERSTITUAL LIMONITE STAINING
76	2.31	2.35	0.04			SILTSTONE	CLYY.LT.GY.LAM.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	2.35	2.51	0.16			SILTSTONE	CLYY.LT.GY.LAM.VBRKN HEAVY OXIDATION ALONG FRACTURES;LIMONITE STAINING
78	2.51	2.59	0.08			SILTSTONE	CLYY.LT.GY.LAM.VBRKN POSSIBLE CORE LOSS AT END OF UNIT
79	2.59	2.69	0.10			SILTSTONE	CLYY.LT.GY.VBRKN
* 80	2.69	2.87	0.18			SILTSTONE	CLYY.LT.GY.VBRKN
83	2.87	3.05	0.18			ROCK LOSS	
* 90	3.05	3.71	0.66			SILTSTONE	CLYY.LT.GY.LAM.VBRKN POSSIBLE CORE LOSS THROUGHOUT;UNIT EXHIBITS SOME FACILITY;ORANGE COLOURED CLAY NODULES PRESENT THROUGHOUT
85	3.71	3.98	0.27			MUDSTONE	SLTY.LT.GY.LAM.VBRKN
82	3.98	4.19	0.21			MUDSTONE	SLTY.LT.GY.LAM.VBRKN LIMONITE STAINING ON FRACTURE SURFACES AND AROUND CLAY NODULES;POSSIBLE CORE LOSS THROUGHOUT;CORE ENDS ARE ROUNDED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	4.19	4.42	0.23			ROCK LOSS	
* 75	4.42	4.98	0.56			SILTSTONE	CLYY.M.GY.LAM.VBRKN FEW ORANGE WEATHER CLAY NODULES THROUGH OUT
* 75	4.98	5.71	0.73			MUDSTONE	SLTY.M.GY.LAM.VBRKN
74	5.71	5.79	0.08			ROCK LOSS	
* 72	5.79	6.75	0.96			MUDSTONE	SLTY.M.GY.LAM.VBRKN NUMEROUS ORANGE WEATHER CLAY NODULES TH ROUGHOUT;ALL FRACTURE SURFACES HEAVILY OXIDIZED
72	6.75	6.86	0.11			ROCK LOSS	
* 72	6.86	7.42	0.56			MUDSTONE	SLTY.M.GY.LAM.VBRKN NUMEROUS CLAY GALLS THROUGHOUT-ORANGE W EATHERING;POSSIBLE CORE LOSS THROUGHOUT :SOME PIECES ARE ROUNDED OFF BY DRILL

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
74	7.42	8.19	0.77			MUDSTONE	SLTY.M.GY.LAM.VBRKN PIECES ROUNDED OFF BY DRILL
76	8.19	8.38	0.19			ROCK LOSS	
79	8.38	9.48	1.10			MUDSTONE	SLTY.M.GY.LAM.VBRKN NUMEROUS CLAY GALLS THROUGHOUT;POSSIBLE CORE LOSS;PIECES ROUNDED BY DRILL
81	9.48	9.62	0.14			MUDSTONE	SLTY.M.GY.VBRKN CLAY NODULES AT .01M AND .04M;FRACTURE SURFACES OXIDIZED WITH LIMONITE STAININ G
82	9.62	9.91	0.29			CORE LOSS	
* 83	9.91	10.40	0.49			MUDSTONE	SLTY.M.GY.LAM.BRKN CLAY-ORANGE BROWN WEATHER NODULES AT .0 4M AND .20M;ALL FRACTURE SURFACES OXIDI ZED-SHOW LIMONITE COATING
* 77	10.40	10.82	0.42			MUDSTONE	SLTY.M.GY.LAM.BRKN ORANGE WEATHER CLAY NODULES AT .00M & . 10M & .21M & .33M;FRACTURE BCA 20-40 DE G;FRACTURE SURFACES OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 80	10.82	11.27	0.45			MUDSTONE	SLTY.M.GY.LAM.BRKN ORANGE WEATHERING CLAY NODULES AT .02M & .10M & .19M
79	11.27	11.38	0.11			MUDSTONE	SLTY.M.GY.LAM.VBRKN CORE IS VERY BADLY BRKN WITH ROUNDED ENDS;AREA OF POSSIBLE CORE LOSS
* 77	11.38	12.41	1.03			MUDSTONE	SLTY.M.GY.LAM.VBRKN ORANGE WEATHERING CLAY NODULES OR BANDS EVERY .07M & .25M & .56M & .66M & .80M ETC.;POSSIBLE WORM BURROW AT .15M
77	12.41	12.45	0.04	06352	I	COAL	C-5.BLK.PWRD UNIT CONSISTS OF GROUNDUP COAL AND MUDSTONE FROM DRILL
77	12.45	12.46	0.01	06352	I	COAL	C-5.BLK.VBRKN CORE VBRKN TO PWRD;VERY BADLY WEATHERED
77	12.46	12.48	0.02	06352	I	COAL	C-1.BLK.VBRKN ABUNDANT GYPSUM ALONG CLEAT FACES;CRUMBLES READILY
77	12.48	12.59	0.11	06352	I	COAL	C-3.BLK.VBRKN CORE VBRKN TO PWRD;CLEAT FACE CONTAINS LIMONITE STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	12.59	12.61	0.02	06352	I	COAL	C-2.BLK.SLD OXIDIZED ALONG CLEAT FACES
77	12.61	12.62	0.01	06352	I	COAL	C-4.BLK SEVERAL 1MM ASH BANDS
77	12.62	12.65	0.03	06352	I	COAL	C-3.BLK.SLD OXIDIZED ALONG CLEAT FACES
77	12.65	12.67	0.02	06352	I	COAL	C-6.BLK.SLD SEVERAL .5MM BRIGHT BANDS & A 2.0MM BRIGHT BAND;TOP ROUNNDED-POSSIBLE CORE LOSS AT EITHER END
77	12.67	12.68	0.01	06352	I	CLAYSTONE	CARB.M.GY.PWRD
77	12.68	12.71	0.03	06352	I	COAL	C-4.BLK.SLD DIFFICULT TO DETERMINE MODIFIER SINCE ALL CLEAT FACES ARE COVERED WITH LIMONITE
77	12.71	12.74	0.03	06352	I	COAL	C-2.BLK.SLD SEVERAL 2.0MM DULL C-5 BANDS THROUGH CENTER

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	12.74	12.78	0.04	06352	I	COAL	C-4.BLK.SLD ABUNDANT GYPSUM? ON CLEAT FACES-DIFFICU LT TO DETERMINE MODIFIER;POSSIBLE CORE
77	12.78	12.79	0.01	06352	I	ROCK LOSS	
77	12.79	12.81	0.02	06352	I	MUDSTONE	CARB.PHRD POSSIBLE CORE LOSS
77	12.81	12.82	0.01	06352	I	MUDSTONE	CARB.SLD ONE 2MM C-1 BAND
77	12.82	12.85	0.03	06352	I	COAL	C-2.BLK.SLD SEVERAL 1-2MM ASH BANDS AT 1CM AND 2.5C M;CLEAT FACES COVERED BY GYPSUM? AND HE MATITE STAINING
77	12.85	12.86	0.01	06352	I	COAL	C-5.BLK.SLD CLEAT FACES COVERED AS ABOVE
77	12.86	12.89	0.03	06352	I	COAL	C-3.BLK.SLD CLEATS COVERED AS ABOVE
77	12.89	12.90	0.01	06352	I	COAL	C-5.BLK.SLD POSSIBLE 2-3MM ASH BAND
77	12.90	12.91	0.01	06352	I	COAL	C-3.BLK.SLD SEVERAL SMALL 1MM ASH BANDS AT BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	12.91	12.96	0.05	06352	I	COAL	C-3.BLK.SLD CLEAT FACES COVERED WITH GYPSUM
77	12.96	12.98	0.02	06352	I	COAL	C-3.BLK.SLD 3MM ASH BAND AT TOP
77	12.98	12.99	0.01	06352	I	COAL	C-4.BLK.SLD NOTE-BLUE AND PURPLE SHEEN ON CLEAT FAC ES
77	12.99	13.02	0.03	06352	I	COAL	C-2.BLK.SLD DIFFICULT TO DETERMINE MODIFIER DUE TO COATING OF GYPSUM ON ALL CLEAT FACES
77	13.02	13.04	0.02	06352	I	COAL	C-2.BLK.VBRKN
77	13.04	13.06	0.02	06352	I	COAL	BLK.SLD OXIDIZED
77	13.06	13.08	0.02	06352	I	COAL	C-2.BLK.SLD OXIDIZED-CLEAT FACES ARE COVERED WITH M INERAL DEPOSITS
77	13.08	13.09	0.01	06352	I	COAL	C-5.BLK.SLD SEVERAL APPARENT 1MM ASH BANDS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	13.09	13.11	0.02	06352	I	COAL	C-4.BLK.SLD AS ABOVE
77	13.11	13.12	0.01	06352	I	MUDSTONE	CARB.PHRD
77	13.12	13.13	0.01	06352	I	COAL	C-4.BLK.SLD SEVERAL 1MM ASH BANDS THROUGHOUT
77	13.13	13.14	0.01	06352	I	COAL	C-2.BLK
77	13.14	13.15	0.01	06352	I	COAL	C-4.BLK
77	13.15	13.16	0.01	06352	I	MUDSTONE	CARB.SLD GREEN STAIN ON CLEAT FACES
77	13.16	13.18	0.02	06352	I	COAL	C-3.BLK.SLD SEVERAL 1MM ASH BANDS
77	13.18	13.21	0.03	06352	I	COAL	C-1.BLK.SLD
77	13.21	13.24	0.03	06352	I	COAL	C-2.BLK.SLD OXIDIZED
77	13.24	13.34	0.10	06352	I	COAL	C-3.BLK.SLD OXIDIZED COATINGS ON ALL SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	13.34	13.39	0.05	06352	I	COAL	C-2.BLK.SLD
77	13.39	13.43	0.04	06352	I	COAL	C-2.BLK.SLD
77	13.43	13.45	0.02	06352	I	COAL	C-3.BLK.SLD
77	13.45	13.48	0.03	06352	I	COAL	C-1.BLK.SLD 1MM ASH BAND AT END OF MEASURMENT
77	13.48	13.50	0.02	06352	I	COAL	C-1.BLK.VBRKN
77	13.50	13.51	0.01	06352	I	COAL	C-3.BLK.SLD
77	13.51	13.52	0.01	06352	I	COAL	C-4.BLK.SLD GREEN COATING-SARICITE
77	13.52	13.55	0.03	06352	I	COAL	C-3.BLK.SLD
77	13.55	13.59	0.04	06352	I	COAL	C-3.BLK.SLD
77	13.59	13.61	0.02	06352	I	COAL	C-4.BRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	13.61	13.62	0.01	06352	I	COAL	C-2.BRKN OXIDIZED
77	13.62	13.64	0.02	06352	I	COAL	C-3.BLK.SLD OXIDIZED
77	13.64	13.65	0.01	06352	I	COAL	C-4.BLK.SLD OXIDIZED
77	13.65	13.68	0.03	06352	I	COAL	C-4.BLK.SLD
77	13.68	13.69	0.01	06352	I	COAL	C-1.BLK.VBRKN PWRD IN TRAY
77	13.69	13.70	0.01	06352	I	COAL	C-2.BLK.SLD
77	13.70	13.75	0.05	06352	I	COAL	C-4.BLK.SLD
77	13.75	13.78	0.03	06352	I	COAL	C-2.BLK.VBRKN
77	13.78	13.87	0.09	06352	I	COAL	C-1.BLK.SLD
77	13.87	13.89	0.02	06352	I	COAL	C-5.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	13.89	13.99	0.10	06353	I	CLAY	CARB.SLD
77	13.99	14.01	0.02	06353	I	COAL	C-4.BLK.SLD
77	14.01	14.02	0.01	06353	I	MUDSTONE	CARB.SLD GREEN OXIDATION MATERIAL ON FRACTURE SU RFACES
77	14.02	14.07	0.05	06353	I	COAL	C-4.BLK.SLD SEVERAL 3MM BRIGHT BANDS THROUGHOUT
77	14.07	14.09	0.02	06353	I	MUDSTONE	CARB.BRKN OXIDIZED GREEN COATING ON FRACTURE SURF ACES
77	14.09	14.11	0.02	06353	I	COAL	C-3.SLD SEVERAL 1MM ASH BANDS THROUGHOUT
77	14.11	14.14	0.03	06353	I	COAL	C-3.BLK AS ABOVE
77	14.14	14.16	0.02	06353	I	COAL	C-4.BLK.SLD GREENISH STAINED AND VUGGY PLANT MATERI AL;UNIT IS VERY DIRTY AT END OF MEASURE MENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	14.16	14.17	0.01	06353	I	COAL	C-5.BLK
77	14.17	14.19	0.02	06353	I	COAL	C-3.BLK.BRKN SEVERAL 2 MM AS ABOVE
77	14.19	14.34	0.15	06353	I	ROCK LOSS	
77	14.34	14.44	0.10	06353	I	COAL LOSS	
77	14.44	14.45	0.01	06353	I	COAL	C-1.BLK.VBRKN POWDER
77	14.45	14.50	0.05	06353	I	COAL	C-3.BLK.SHRD OXIDIZED
77	14.50	14.52	0.02	06353	I	COAL	C-1.BLK.SLD COAL IS SHEARED;OXIDIZED
77	14.52	14.53	0.01	06353	I	COAL	C-4.BLK.SLD VERY HEAVILIY OXIDIZED WITH LIMONITE AN D GREEN STAINING
77	14.53	14.54	0.01	06353	I	COAL	C-3.BLK.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	14.54	14.56	0.02	06353	I	COAL	C-4.BLK.BRKN OXIDIZED
77	14.56	14.58	0.02	06353	I	COAL	C-1.BLK.BRKN
77	14.58	14.60	0.02	06353	I	COAL	C-1.BLK.BRKN
77	14.60	14.62	0.02	06353	I	COAL	C-1.BLK.SLD
77	14.62	14.65	0.03	06353	I	COAL	C-2.BLK.BRKN OXIDIZED
77	14.65	14.68	0.03	06353	I	COAL	C-2.BLK.BRKN OXIDIZED
77	14.68	14.89	0.21	06353	I	COAL LOSS	
77	14.89	14.94	0.05	06353	I	ROCK LOSS	
77	14.94	14.99	0.05	06353	I	COAL	BLK.PWRD POSSIBLE CORE LOSS AT THIS POINT
77	14.99	15.03	0.04	06353	I	COAL	C-3.BLK

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	15.03	15.04	0.01	06353	I	COAL	C-4.BLK.SLD OXIDIZED
77	15.04	15.09	0.05	06353	I	COAL	C-1.BLK.SLD
77	15.09	15.14	0.05	06353	I	COAL	C-2.BLK.VBRKN OXIDIZED
77	15.14	15.16	0.02	06353	I	COAL	C-4.BLK.SLD
77	15.16	15.18	0.02	06353	I	COAL	C-2.BLK.SLD
77	15.18	15.19	0.01	06353	I	MUDSTONE	CARB.SLD
77	15.19	15.21	0.02	06353	I	COAL	C-4.SLD 3 MM BRIGHT BAND AT THE TOP OF MEASUREM ENT
77	15.21	15.22	0.01	06353	I	COAL	C-2.SLD OXIDIZED
77	15.22	15.26	0.04	06353	I	COAL	C-2.BLK.BRKN SEVERAL MM ASH BANDS NEAR TOP OF MEASUR EMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	15.26	15.28	0.02	06353	I	COAL	C-1.BLK.SLD
77	15.28	15.30	0.02	06353	I	COAL	C-3.BLK.SLD SEVERAL MM ASH BANDS
77	15.30	15.32	0.02	06353	I	COAL	C-3.BLK.SLD
77	15.32	15.36	0.04	06353	I	COAL	C-1.BLK.SLD
77	15.36	15.46	0.10	06353	I	COAL	C-1.BLK.SLD
77	15.46	15.50	0.04	06353	I	COAL	C-2.BLK.SLD SEVERAL 1 MM ASH BANDS
77	15.50	15.52	0.02	06353	I	COAL	C-1.BLK.SLD OXIDIZED STAINING ON ALL FACES
77	15.52	15.56	0.04	06353	I	COAL	C-2.BLK.SLD SEVERAL 1 MM ASH BANDS
77	15.56	15.61	0.05	06353	I	COAL	C-1.BLK.SLD OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	15.61	15.68	0.07	06353 I		COAL	C-2.BLK.SLD OXIDIZED
77	15.68	15.70	0.02	06353 I		MUDSTONE	CARB.SLD SEVERAL BRIGHT BANDS;NOTE HEAVY GREEN S TAINING THROUGHOUT
77	15.70	15.76	0.06	06353 I		COAL	C-1 WHITE FLAKES ON ALL FRACTURE SURFACES
77	15.76	15.93	0.17	06353 I		COAL	C-1.BLK.SLD SEVERAL 1 MM ASH BANDS NEAR BASE
77	15.93	15.97	0.04	06353 I		COAL	C-4.BLK.SLD 2 MM ASH BANDS AT BASE
77	15.97	16.12	0.15	06353 I		COAL	C-2.BLK SEVERAL 2-5MM BRIGHT BANDS THROUGHOUT;S EVERAL 1MM ASH BANDS AT TOP AND BOTTOM OF UNIT;OXIDATION PRESENT ON CLEAT FACE S OF COAL;LIMONITE STAINING AND WHITE C OATING GYPSUM?
77	16.12	16.17	0.05	06353 I		COAL	C-1.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	16.17	16.19	0.02	06353 I		COAL	C-2.BLK.VBRKN
77	16.19	16.21	0.02	06353 I		COAL	C-1.BLK.VBRKN
77	16.21	16.23	0.02	06353 I		COAL	C-3.BLK.VBRKN POWDER
77	16.23	16.38	0.15	06353 I		COAL LOSS	
77	16.38	16.41	0.03	06353 I		COAL	C-3.BLK.BRKN
77	16.41	16.42	0.01	06353 I		COAL	C-1.BLK.BRKN
77	16.42	16.47	0.05	06353 I		COAL	C-2.BLK.BRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	16.47	16.51	0.04	06353 I		COAL	C-3.BLK
77	16.51	16.56	0.05	06353 I		COAL	C-2.BLK.SLD SEVERAL 1MM ASH BANDS THROUGHOUT
77	16.56	16.59	0.03	06353 I		COAL	C-2.BLK.BRKN
77	16.59	16.67	0.08	06353 I		COAL	C-1.BLK.YBRKN
77	16.67	16.70	0.03	06353 I		COAL	C-2.BLK.BRKN SEVERAL 1MM ASH BANDS
77	16.70	16.74	0.04	06353 I		COAL	C-1.BLK.BRKN
77	16.74	16.87	0.13	06353 I		COAL	C-2.BLK.YBRKN
77	16.87	16.89	0.02	06353 I		COAL	C-4.BLK.YBRKN
77	16.89	16.91	0.02	06353 I		COAL	C-4.BLK.SLD

* DENOTES MEASURED BCA

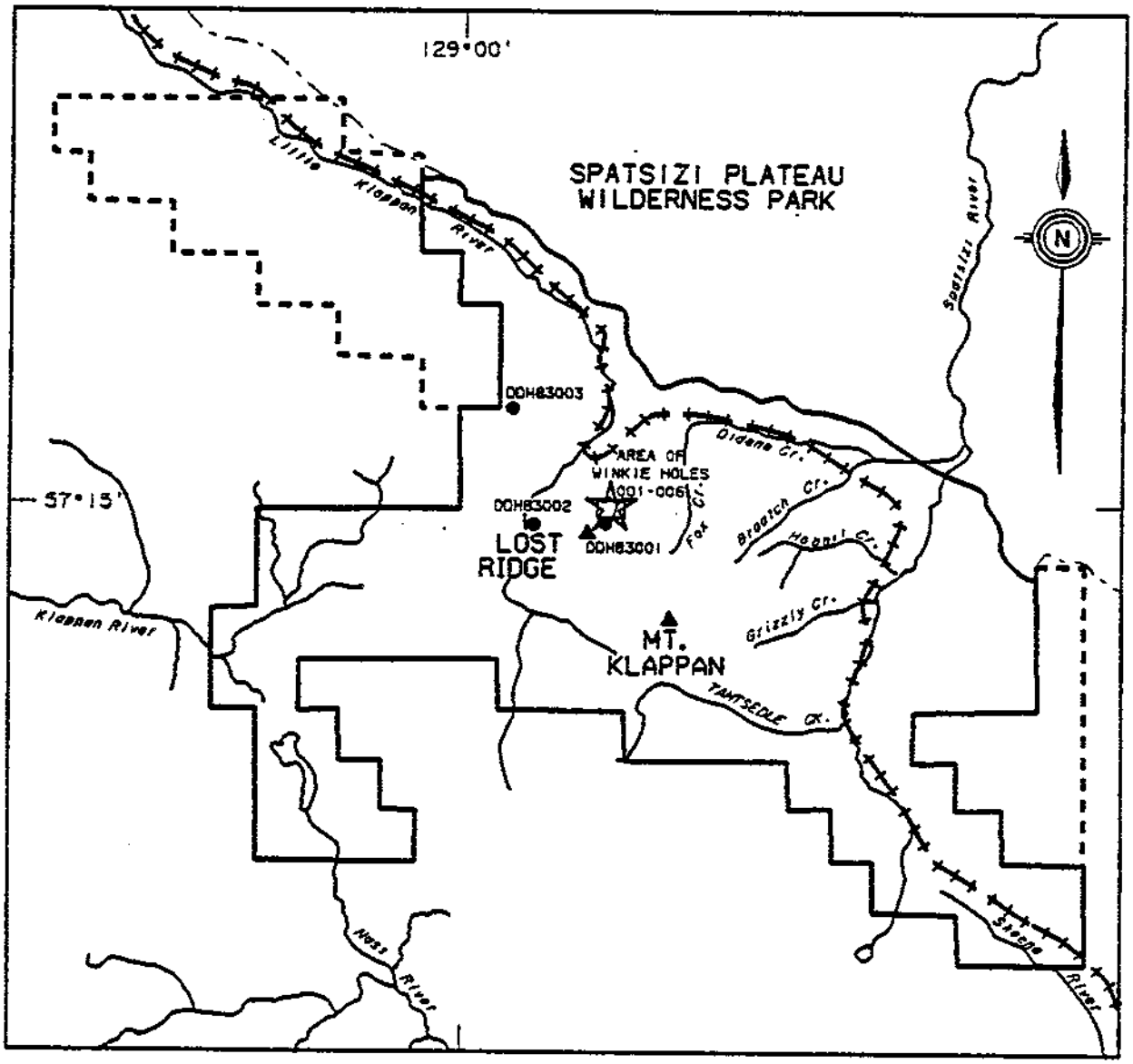
PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83002

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	16.91	17.00	0.09	06353 I		COAL	C-3.BLK.SLD SEVERAL 1MM ASH BANDS AT TOP;REDDISHSTA IN ON CLEAT FACES
77	17.00	17.03	0.03	06353 I		COAL	C-6.BLK.PWRD
77	17.03	17.18	0.15	06353 I		COAL LOSS	
77	17.18	17.24	0.06			MUDSTONE	CARB.DK.GY.BRKN LIMONITE STAINING ON FRACTURE FACES;POS SIBLE CORE LOSS
77	17.24	17.62	0.38			MUDSTONE	CARB.M.GY.BRKN POSSIBLE CORE LOSS ;NOTE-ENTIRE HOLE HA S HEAVY STAINING ON ALL FRACTURE SURFAC ES - OH TO 17.22M. THEREFORE ENTIRE HOL E MAY BE OXIDIZED.

* DENOTES MEASURED BCA
NEWPAGE

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83003

	DY MO YR
START DATE	11/07/83
END DATE	14/07/83

CONTRACTOR TECK CORP OPERATOR GCRI
GEOLOGIST C. WILLIAMS SURVEYOR

REMARKS RIG DOWN FROM 12/07/83 TO 13/07/83;ENTIRE HOLE SHO
WS SIGNS OF OXIDATION INCLUDES COAL SEAM

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83003

PROVINCE BC ELEVATION (M) 1832.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344324.00	EASTING 505758.00	
2	LAT-LONG:	LAT _____	LONG _____		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83003

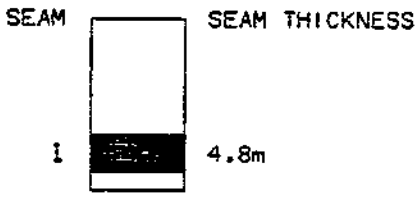
DIMENSIONS AND ORIENTATION:

LENGTH (M) 21.00 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH 34.0 SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 4.89 CEMENT(Y,_) N PLUG(Y,_) N PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83003



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83003 SEAM _____

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 15.63m-20.50m

GEOPHYSICAL LOGS

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	15.63			(0.08)										
				0.17										
			0.06											
				0.07										
				(0.30)										
			(0.05)											
			0.02											
				0.28										
			0.01											
				0.41										
			(0.05)											
			(0.06)											
				0.05										
				(0.20)										
			(0.14)											
				0.37										
				(0.18)	74.7	06351								
			(0.05)											
				0.27										
				(0.05)										
			(0.05)											
				0.33										
			0.01											
			0.01	0.06										
				0.88										
				(0.07)										
				0.59										
	20.50													

[205,57]831024024.LOG

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	COMPOSITE COAL/ROCK TOTAL	MINING SECTION COAL/ROCK TOTAL
15.63			(0.08)					
			0.17					
		0.06						
			0.07					
			(0.29)					
		(0.05) 0.02						
			0.28					
		0.01						
			0.41					
		0.05 (0.06)						
			0.05					
			(0.19)					
		(0.13)						
			0.36					
			(0.17)	74.7	06351		4.62/0.50 4.81	
		(0.05)						
			0.27					
			(0.05)					
		(0.05)						
			0.33					
		0.01 0.01	0.06					
			0.87					
			0.07					
			0.59					
20.50								

(205,571)831024025.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

WKD83003

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
60	0.00	0.98	0.98			OVERBURDEN	CASING FROM 0.00 TO 4.88M
60	0.98	1.02	0.04			SILTSTONE	CLYY.M.GY.SLD CORE IS ROUNDED AT ENDS;POSSIBLE CORE L OSS.
60	1.02	1.22	0.20			SILTSTONE	CLYY.LT.TAN.LAM.VBRKN POSSIBLE CORE LOSS
60	1.22	1.61	0.39			ROCK LOSS	
* 60	1.61	1.83	0.22			SILTSTONE	CLYY.LT.TAN.LAM.VBRKN POSSIBLE CORE LOSS
62	1.83	2.17	0.34			ROCK LOSS	
65	2.17	2.44	0.27			SANDSTONE	CLYY.LT.TAN.LAM.VBRKN VERY FRIABLE-COMES APART READILY;CORE I S OXIDIZED
67	2.44	2.79	0.35			SANDSTONE	CLYY.VFG.LT.TAN.LAM.VBRKN FRACTURE ANGLE 20 DEG. FROM CORE AXIS (VERTICAL)
* 70	2.79	3.07	0.28			SILTSTONE	CLYY.LT.TAN.LAM.VBRKN POSSIBLE CORE LOSS
71	3.07	3.35	0.28			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
71	3.35	3.73	0.38			SILTSTONE	CLYY.LT.TAN.LAM.VBRKN POSSIBLE CORE LOSS;CORE IS OXIDIZED;END S GROUND OFF
72	3.73	3.96	0.23			ROCK LOSS	
72	3.96	4.16	0.20			SILTSTONE	CLYY.LT.TAN.LAM.VBRKN OXIDIZED
72	4.16	4.22	0.06			SILTSTONE	CLYY.LT.GY.LAM.VBRKN OXIDIZED
73	4.22	4.71	0.49			ROCK LOSS	
73	4.71	4.91	0.20			SILTSTONE	CLYY.M.GY.LAM.VBRKN
74	4.91	5.06	0.15			MUDSTONE	SLTY.M.GY.LAM.VBRKN POSSIBLE CORE LOSS;OXIDIZED
74	5.06	5.18	0.12			SILTSTONE	CLYY.M.GY.LAM.VBRKN POSSIBLE CORE LOSS;OXIDIZED
74	5.18	5.39	0.21			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	5.39	6.13	0.74			MUDSTONE	SLTY.M.GY.LAM.VBRKN INTERLAMINATED SLTY MUDSTONE AND SILTST ONE;HEAVILY OXIDIZED ALONG FRACTURE FAC ES;FRACTURE ANGLE 20 DEG BCA
77	6.13	7.45	1.32			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED THROUGHOUT;ORANGE WEATHERING C LAY NODULES THROUGHOUT
78	7.45	7.48	0.03			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;POSSIBLE CORE LOSS
79	7.48	8.11	0.63			ROCK LOSS	
* 80	8.11	8.62	0.51			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;POSSIBLE CORE LOSS
78	8.62	9.06	0.44			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;CLAY NODULES THROUGHOUT;POSSIB LE CORE LOSS
* 75	9.06	10.28	1.22			MUDSTONE	SLTY.M.GY.LAM.VBRKN CLAY NODULES THROUGHOUT;OXIDIZED;POSSIB LE CORE LOSS
75	10.28	10.52	0.24			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	10.52	11.37	0.85			MUDSTONE	SLTY.M.GY.LAM.VBRKN CORE IS HEAVILY OXIDIZED AND BRKN;ABUND ANT CLAY NODULES THROUGHOUT
75	11.37	11.97	0.60			MUDSTONE	SLTY.LT.GY.LAM.VBRKN NOTE THAT THERE APPEARS TO BE ABUNDANT CAVES WITHIN THIS PORTION;APPEARS TO BE ABUNDANT CLAY NODULES THROUGHOUT
75	11.97	12.43	0.46			ROCK LOSS	
* 75	12.43	13.69	1.26			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;CLAY NODULES THROUGHOUT;VERY B ADLY BRKN;ENDS OF CORE ROUNDED;POSSIBLE COR LOSS
75	13.69	14.92	1.23			MUDSTONE	SLTY.M.GY.LAM.VBRKN AS ABOVE;FRACTURE CORE BCAS 50 DEG & 0 DEG &75 DEG (PARALLEL TO BEDDING)
75	14.92	15.18	0.26			ROCK LOSS	
75	15.18	15.27	0.09			MUDSTONE	SLTY.M.GY.LAM.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	15.27	15.63	0.36			MUDSTONE	CARB.M.GY.LAM.BRKN PLANT FOSSILS BECOME MORE ABUNDANT TOWA RDS BASE OF MEASUREMENTS BECOMING MORE CARBONACEOUS;NUMEROUS 1MM VITRAIN BANDS AT BASE
75	15.63	15.71	0.08	06351	I	COAL LOSS	
75	15.71	15.76	0.05	06351	I	COAL	C-3.BLK.VBRKN VERY OXIDIZED;BLUE SHEEN ON ALL CLEAR F ACES
75	15.76	15.80	0.04	06351	I	COAL	C-4.BLK.VBRKN AS ABOVE
75	15.80	15.86	0.06	06351	I	COAL	C-4.BLK.VBRKN AS ABOVE
75	15.86	15.88	0.02	06351	I	COAL	C-1.BLK.VBRKN AS ABOVE
75	15.88	15.94	0.06	06351	I	MUDSTONE	CARB.M.GY.SLD
75	15.94	16.01	0.07	06351	I	COAL	C-6.BLK.SLD OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	16.01	16.31	0.30	06351	I	COAL LOSS	
75	16.31	16.36	0.05	06351	I	ROCK LOSS	
75	16.36	16.38	0.02	06351	I	MUDSTONE	CARB.PHRD BRKN AND PHRD
75	16.38	16.43	0.05	06351	I	COAL	C-4.BLK.SLD
75	16.43	16.50	0.07	06351	I	COAL	C-1.BLK.SLD
75	16.50	16.53	0.03	06351	I	COAL	C-3.BLK.RTB.SLD SEVERAL 2MM ASH BANDS AT BASE OF MEASUR EMENT
75	16.53	16.55	0.02	06351	I	COAL	C-2.BLK.SLD OXIDIZED
75	16.55	16.57	0.02	06351	I	COAL	C-4.BLK.SLD SEVERAL 1MM ASH BANDS
75	16.57	16.64	0.07	06351	I	COAL	C-3.BLK.SLD SEVERAL 1MM ASH BANDS
75	16.64	16.66	0.02	06351	I	COAL	C-4.BLK.SLD BECOMING VERY DIRTY TOWARDS BASE;OXIDIZ ED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	16.66	16.67	0.01	06351 I		MUDSTONE	CARB.SLD
75	16.67	16.73	0.06	06351 I		COAL	C-1.BLK.SLD OXIDIZED
75	16.73	16.76	0.03	06351 I		COAL	C-3.BLK.VBRKN OXIDIZED;POSSIBLE CORE LOSS
75	16.76	16.82	0.06	06351 I		COAL	C-1.BRKN POSSIBLE CORE LOSS
75	16.82	16.88	0.06	06351 I		COAL	C-2.BLK.SLD SEVERAL 1MM ASH BANDS;NOTE-END OF BOX 6 -BOX IS NOT FULL
75	16.88	16.89	0.01	06351 I		COAL	C-3.BLK.SLD
75	16.89	16.91	0.02	06351 I		COAL	C-3.BLK.SLD
75	16.91	16.93	0.02	06351 I		COAL	C-3.BLK.SLD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	16.93	17.02	0.09	06351 I		COAL	C-1.BLK.VBRKN CORE IS VBRKN TO PWRD
75	17.02	17.08	0.06	06351 I		COAL	C-2.BLK.SLD CORE IS OXIDIZED;NUMEROUS 1MM ASH BANDS THROUGHOUT
75	17.08	17.11	0.03	06351 I		MUDSTONE	CARB.SLD NUMEROUS 1MM BRIGHT BANDS THROUGHOUT
75	17.11	17.13	0.02	06351 I		MUDSTONE	CARB.PWRD PWRD COAL MIXED WITH MUDSTONE
75	17.13	17.19	0.06	06351 I		ROCK LOSS	
75	17.19	17.21	0.02	06351 I		COAL	C-2.BLK.SLD OXIDIZED
75	17.21	17.23	0.02	06351 I		COAL	C-4.BLK.SLD OXIDIZED
75	17.23	17.24	0.01	06351 I		COAL	C-6.BLK.SHRD BONE COAL
75	17.24	17.44	0.20	06351 I		COAL LOSS	
75	17.44	17.58	0.14	06351 I		ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	17.58	17.73	0.15	06351	I	COAL	BLK.PHRD OXIDIZED
75	17.73	17.83	0.10	06351	I	COAL	BLK.PHRD
75	17.83	17.86	0.03	06351	I	COAL	C-2.BLK.BRKN OXIDIZED
75	17.86	17.91	0.05	06351	I	COAL	BLK.PHRD
75	17.91	17.95	0.04	06351	I	COAL	C-6.BLK.SHRD
75	17.95	18.13	0.18	06351	I	COAL LOSS	
75	18.13	18.18	0.05	06351	I	ROCK LOSS	
75	18.18	18.22	0.04	06351	I	COAL	BLK.PHRD
75	18.22	18.26	0.04	06351	I	COAL	C-3.BLK.VBRKN CORE VBRKN TO PHRD;OXIDIZED
75	18.26	18.32	0.06	06351	I	COAL	C-3.BLK.VBRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	18.32	18.36	0.04	06351	I	COAL	C-4.BLK.SHRD OXIDIZED
75	18.36	18.39	0.03	06351	I	COAL	C-6.BLK.SHRD VERY SANDY;HEAVY OXIDATION
75	18.39	18.45	0.06	06351	I	COAL	C-4.BLK.SHRD NUMEROUS 1MM ASH BANDS THROUGHOUT
75	18.45	18.50	0.05	06351	I	COAL LOSS	
75	18.50	18.55	0.05	06351	I	ROCK LOSS	
75	18.55	18.68	0.13	06351	I	COAL	C-2.BLK.VBRKN HEAVILY OXIDIZED
75	18.68	18.71	0.03	06351	I	COAL	C-1.BLK.VBRKN
75	18.71	18.73	0.02	06351	I	COAL	C-1.BLK.SLD ONE 1MM VITRAIN BAND AT TOP
75	18.73	18.74	0.01	06351	I	COAL	C-1.BLK.SLD
75	18.74	18.76	0.02	06351	I	COAL	C-1.BLK.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	18.76	18.79	0.03	06351 I		COAL	C-3.BLK.VBRKN OXIDIZED;SEVERAL 1MM ASH BANDS
75	18.79	18.87	0.08	06351 I		COAL	C-3.BLK.VBRKN
75	18.87	18.88	0.01	06351 I		COAL	C-1.BLK.SLD OXIDIZED
75	18.88	18.89	0.01	06351 I		MUDSTONE	SLD
75	18.89	18.95	0.06	06351 I		COAL	C-2.BLK.SLD NUMEROUS 1MM ASH BANDS THROUGHOUT;OXIDI ZED;CORE BREAKS EASILY
75	18.95	18.96	0.01	06351 I		MUDSTONE	CARB.SLD
75	18.96	19.00	0.04	06351 I		COAL	C-1.BLK.SLD THREE 3MM ASH BANDS AT BASE OF MEASUREM ENT
75	19.00	19.07	0.07	06351 I		COAL	C-1.BLK.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	19.07	19.12	0.05	06351 I		COAL	C-2.BLK.SLD OXIDIZED
75	19.12	19.16	0.04	06351 I		COAL	C-2.BLK.SLD
75	19.16	19.18	0.02	06351 I		COAL	C-2.BLK.SLD OXIDIZED
75	19.18	19.19	0.01	06351 I		COAL	C-3.BLK.SHRD OXIDIZED ALONG SHEAR FACES
75	19.19	19.34	0.15	06351 I		COAL	C-3.BLK.VBRKN OXIDIZED;SHEARED IN PLACES-CORE DISSEMM INATES WHEN TOUCHED
75	19.34	19.39	0.05	06351 I		COAL	C-3.BLK.SLD OXIDIZED
75	19.39	19.41	0.02	06351 I		COAL	C-2.BLK.SLD OXIDIZED
75	19.41	19.43	0.02	06351 I		COAL	C-3.BLK.SLD OXIDIZED
75	19.43	19.44	0.01	06351 I		COAL	C-1.BLK.SLD OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	19.44	19.46	0.02	06351	I	COAL	C-3.BLK.SLD OXIDIZED
75	19.46	19.51	0.05	06351	I	COAL	C-2.BLK.SLD
75	19.51	19.55	0.04	06351	I	COAL	C-2.BLK.SLD OXIDIZED;1MM ASH BAND AT TOP
75	19.55	19.64	0.09	06351	I	COAL	C-1.BLK.VBRKN
75	19.64	19.76	0.12	06351	I	COAL	C-1.BLK.VBRKN OXIDIZED
75	19.76	19.84	0.08	06351	I	COAL	C-3.BLK.VBRKN SHEARED;OXIDIZED
75	19.84	19.91	0.07	06351	I	COAL LOSS	
75	19.91	19.93	0.02	06351	I	COAL	C-3.BLK.SLD
75	19.93	19.98	0.05	06351	I	COAL	C-4.BLK.SLD OXIDIZED;0.3-2MM ASH BANDS
75	19.98	20.03	0.05	06351	I	COAL	C-1.BLK.SLD OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	20.03	20.13	0.10	06351	I	COAL	C-2.BLK.SLD OXIDIZED
75	20.13	20.18	0.05	06351	I	COAL	OXIDIZED
75	20.18	20.22	0.04	06351	I	COAL	C-2.BLK.SLD
75	20.22	20.25	0.03	06351	I	COAL	C-3.BLK.SLD
75	20.25	20.27	0.02	06351	I	COAL	C-1.BLK.SLD ASH BAND <2MM IN CENTRE OF UNIT
75	20.27	20.33	0.06	06351	I	COAL	C-3.BLK.SLD OXIDIZED
75	20.33	20.38	0.05	06351	I	COAL	C-4.BLK.SLD OXIDIZED;7MM ASH BAND AT TOP
75	20.38	20.39	0.01	06351	I	COAL	C-1.BLK.SLD CORE ROUNDED AT TOP-POSSIBLE CORE LOSS
75	20.39	20.44	0.05	06351	I	COAL	C-3.BLK.SLD OXIDIZED
75	20.44	20.50	0.06	06351	I	COAL	C-3.BLK.VBRKN

* DENOTES MEASURED BCA

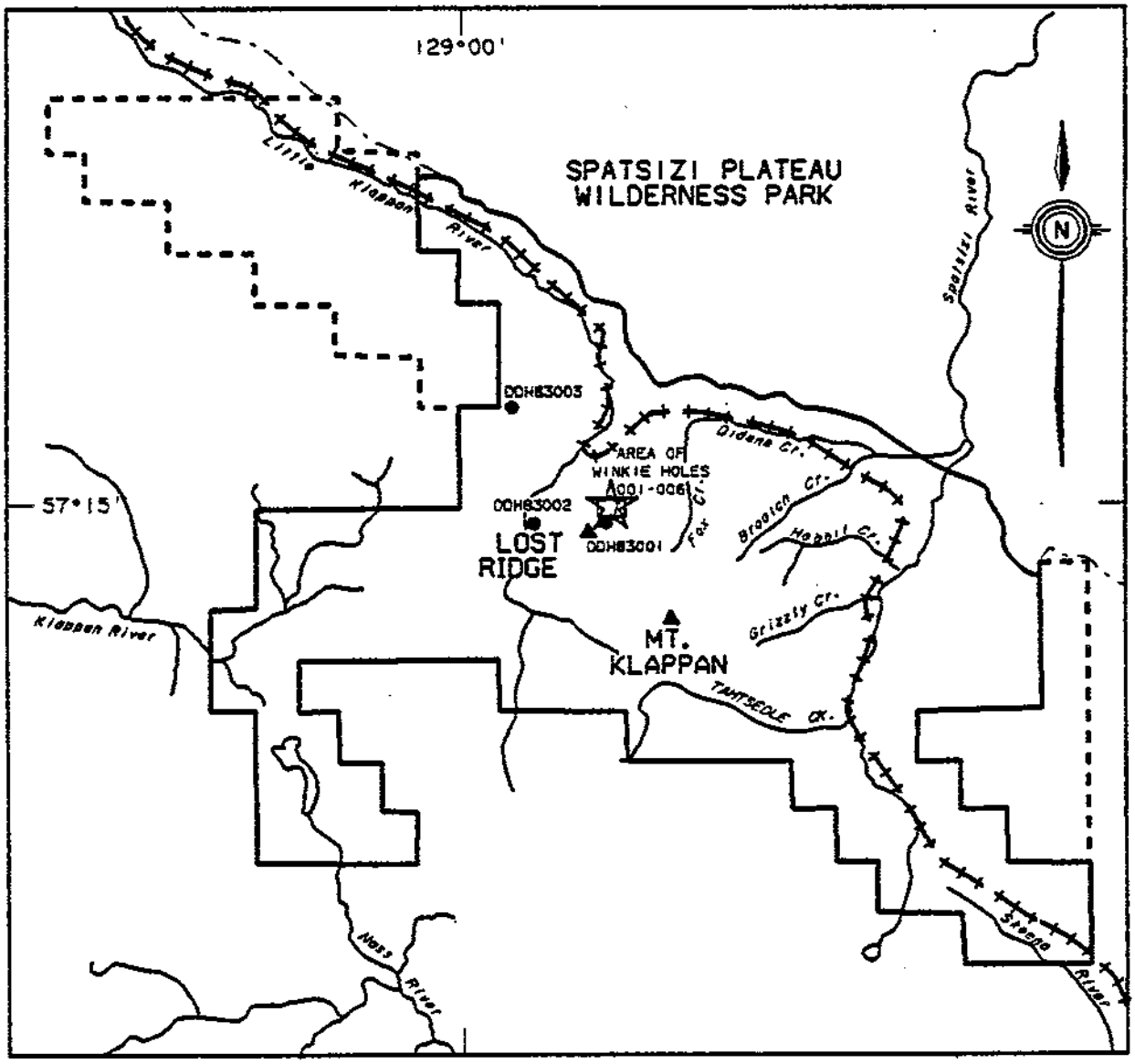
PROJECT: KPN BLOCK: LR DATA SOURCE: HKDB3003

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
75	20.50	20.99	0.49			MUDSTONE	CARB.V8RKN POSSIBLE CORE LOSS THOUGHOUT;BECOMES SL TY TOWARDS BASE **********END OF CORE 21.OH**********:ENTIRE HOLE IS OXIDIZED
75	20.99	21.12	0.13			ROCK LOSS	

* DENOTES MEASURED BCA
NEWPAGE

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83004

	DY MO YR
START DATE	15/07/83
END DATE	17/07/83

CONTRACTOR TECK CORP OPERATOR GCRI
GEOLOGIST C.WILLIAMS SURVEYOR

REMARKS 72% COAL SEAM RECOVERY

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83004

PROVINCE BC ELEVATION (M) 1824.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344334.00	EASTING 505816.00		
2	LAT-LONG:	LAT 571438	LONG 1285413			

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83004

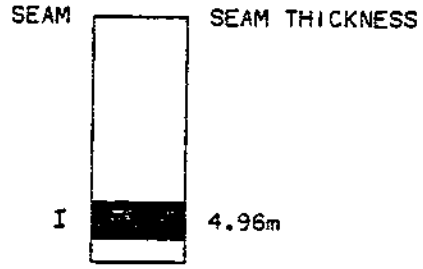
DIMENSIONS AND ORIENTATION:

LENGTH (M) 30.93 INCLINATION 90.0 AZIMUTH ___.-
SIZE WIDTH 34.0 SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) ____.-- CEMENT(Y,_) N PLUG(Y,_) N PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.-- ____.--
LOST CIRC. DEPTHS (M) ____.-- ____.--

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83004



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83004 SEAM _____ APPARENT THICKNESS
SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 26.69m-30.69m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	25.69			0.14										
			0.01	0.10										
			0.03	0.02										
				(0.26)										
			0.05											
				0.22										
			0.03		81.2	06354		1.40	15.70	6.30	76.60	0.48	6782	
				0.22										
				(0.05)										
				0.52										
	27.34		0.09											
				0.19										
			(0.14)											
				(0.20)										
				0.29										
			0.05											
				0.08										
				(0.36)										
			(0.04)											
				0.50	50.1	06355		1.50	30.00	7.40	61.10	0.39	5257	
				(0.40)										
				0.48										
				(0.53)										
	30.69													

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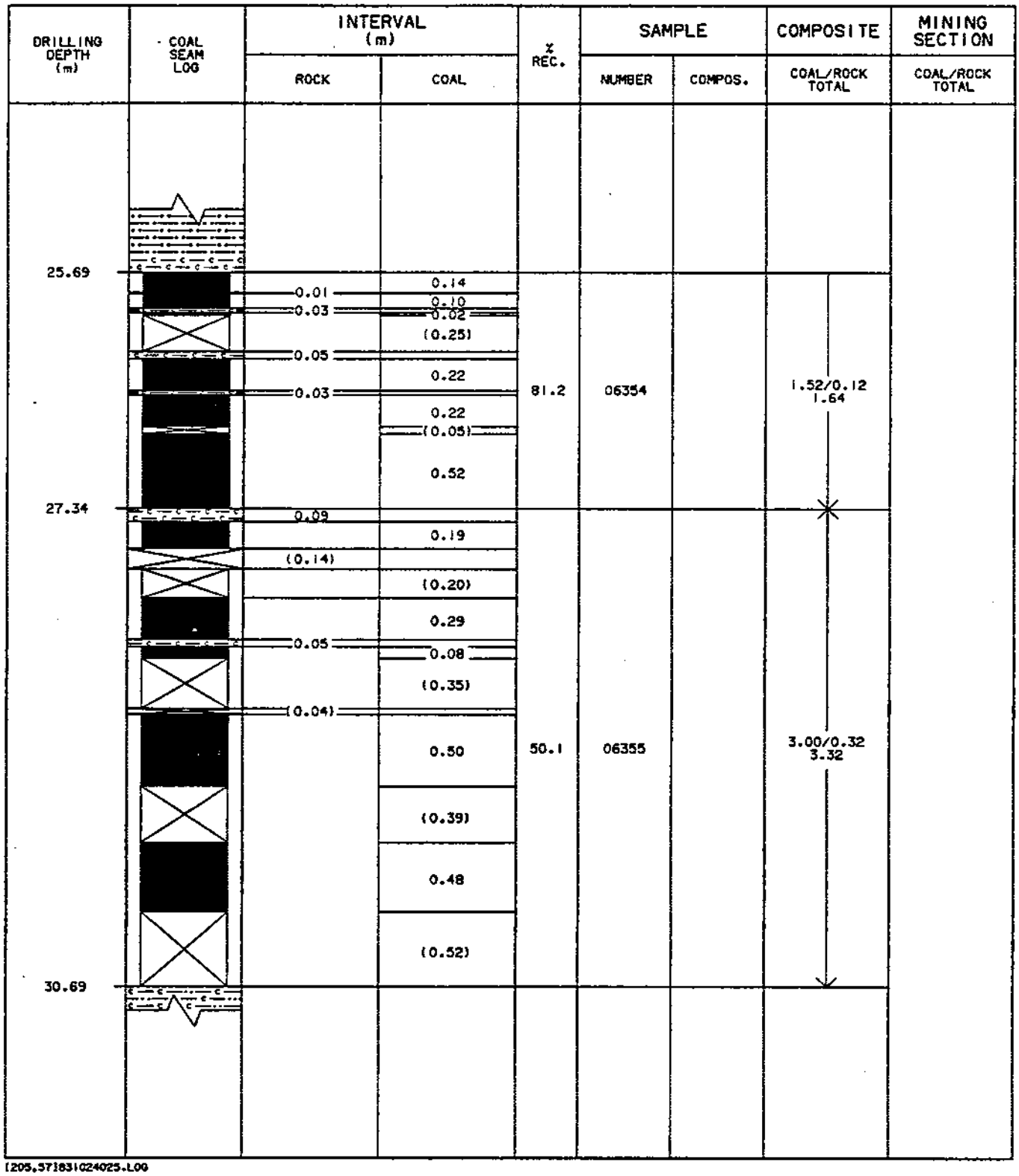

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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

WKD83004

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 5

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WKD83005	I	6356	23.62	29.75	61.01	3.54	0.20	2.01	0.38	5.55- 0.58

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84

SIMPLE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WKD83004										
		6354	25.69	27.34	81.21	1.22	0.12	0.31	0.00	1.53- 0.12
		6355	29.68	30.69	47.52	0.48	0.00	0.53	0.00	1.01- 0.00

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
88	0.00	1.35	1.35			ROCK LOSS	
88	1.35	1.55	0.20			SANDSTONE	CLYY.FG.MOD.LT.TAN.LAM.VBRKN MOST PIECES ARE ROUNDED AT ENDS;POSSIBL E CORE LOSS
* 88	1.55	2.13	0.58			SANDSTONE	CLYY.FG.PR.LT.GY.LAM.SSD.BRKN SANDSTONE LAMINATIONS 70% WHITE CHERT A ND 30% BLACK CHERTS;INTERSITUTAL LIMONI TESTAINING THROUGH SANDSTONE HORIZONS
86	2.13	2.26	0.13			SANDSTONE	CLYY.FG.PR.LT.GY.LAM.VBRKN POSSIBLE CORE LOSS-PIECES ROUNDED
85	2.26	2.59	0.33			MUDSTONE	SLTY.M.GY.VBRKN OXIDATION ON FRACTURE FACES
* 83	2.59	3.39	0.80			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED
79	3.39	4.04	0.65			ROCK LOSS	
77	4.04	4.13	0.09			MUDSTONE	SLTY.M.GY.LAM.VBRKN CORE PIECES ARE ROUNDED;POSSIBLE CORE L OSS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 76	4.13	4.41	0.28			SANDSTONE	CLYY.FG.PR.LT.GY.LAM.WRMBU.BRKN ABUNDANT INTERSTITIAL LIMONITE STAINING ;CORE IS OXIDIZED
* 73	4.41	5.32	0.91			SILTSTONE	CLYY.PR.M.GY.LAM.WRMBU.SLD SILTSTONE IS INTERBEDDED WITH MUDSTONE AND VERY FINE GRAINED SANDSTONE;SANDSTO NEAND SILTSTONE LAMINATIONS ARE A LIGHT GREY
74	5.32	5.76	0.44			SILTSTONE	CLYY.PR.M.GY.LAM.WRMBU.SLD SILTSTONE INTERBEDDED WITH SANDSTONE LA MINATIONS AND MUDSTONE;POSSIBLE CLAM BU RROW
76	5.76	7.16	1.40			SILTSTONE	CLYY.PR.M.GY.LAM.WRMBU.SLD INTERLAMINATED LIGHT GREY SILTSTONES AN D SANDSTONES;WITH MEDIUM GREY MUDSTONES ; SOME SSD PRESENT
* 78	7.16	7.66	0.50			SILTSTONE	CLYY.PR.M.GY.LAM.WRMBU.SLD AS ABOVE
* 75	7.66	8.75	1.09			MUDSTONE	SLTY.M.GY.LAM.BRKN FEW ORANGE BANDS THROUGHOUT;BECOMING SI LTIER TOWARDS BASE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
78	8.75	8.97	0.22			SILTSTONE	CLYY.M.GY.LAM.BRKN
78	8.97	9.11	0.14			MUDSTONE	SLTY.M.GY.LAM.BRKN OXIDIZED;PIECES ROUNDED AT END OF MEASU REMENT
79	9.11	9.14	0.03			ROCK LOSS	
* 80	9.14	9.80	0.66			MUDSTONE	SLTY.M.GY.LAM.WRMBU.BRKN SILTY LAMINATIONS CONTAIN HEAVY LIMONIT E STAINING;CORE IS BRKN WITH SOME ROUND EDENDS;UNIT BECOMES SANDIER TOWARDS BAS E OF MEASUREMENT;CORE APPEARS TO HAVE H EAVYBIOGENETIC ACTIVITY IN SOME OF THE SILTIER AND SANDIER LAMINATIONS
* 82	9.80	10.49	0.69			SANDSTONE	CLYY.VFG.PR.M.GY.LAM.BRKN ALL FRACTURE SURFACES ARE OXIDIZED;FRAC TURE ANGLE 85 DEG
81	10.49	10.66	0.17			ROCK LOSS	
* 80	10.66	10.89	0.23			SANDSTONE	CLYY.VFG.MOD.LT.GY.LAM.VBRKN POSSIBLE GREENISH TINGE AT .20M

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 75	10.89	11.13	0.24			SANDSTONE	CLYY.VFG.MOD.LT.GY.LAM.BRKN OXIDIZED;POSSIBLE DARK GREY MINERAL LAM INATIONS THROUGHOUT
76	11.13	11.25	0.12			MUDSTONE	SLTY.M.GY.LAM
76	11.25	11.30	0.05			ROCK LOSS	
77	11.30	12.08	0.78			MUDSTONE	SLTY.M.GY.LAM.BRKN OXIDIZED
* 80	12.08	12.80	0.72			SANDSTONE	CLYY.FG.WEL.LT.GY.VTHNB.WRMBU.BRKN UNOXIDIZED SURFACES ARE LIGHT GREY;OXID IZED SURFACES ARE REDDISH BROWN;POSSIBL E AREAS OF DARK MINERAL LAMINATIONS PAR ALLEL TO BEDDING
* 75	12.80	13.76	0.96			SANDSTONE	CLYY.FG.WEL.LT.GY.WRMBU.SLD AS ABOVE
76	13.76	13.97	0.21			SANDSTONE	CLYY.FG.WEL.LT.GY.SLD
77	13.97	14.28	0.31			CLAYSTONE	LT.GY.THNB.SLD FEELS SOFT AND SMOOTH TO THE TOUCH

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	14.28	14.44	0.16			CLAYSTONE	LT.GY.THNB.BRKN BECOMES LIGHTER IN COLOUR AND SOFTER TO WARDS BASE OF MEASUREMENT
78	14.44	14.57	0.13			SILTSTONE	CLYY.M.GY.LAM.VBRKN OXIDIZED
78	14.57	14.60	0.03			CLAYSTONE	LT.TAN.VBRKN SOFT AND SOAPY TO TOUCH;CRUMBLES EASILY
78	14.60	14.97	0.37			SILTSTONE	CLYY.M.GY.LAM.WRMBU.VBRKN INTERLAMINATED SILTSTONE & SILTY MUDSTO NE & SOME SANDSTONE;SANDSTONE OXIDIZED WITH ORANGE COLOURATION READILY;UNIT IS HEAVILY OXIDIZED
79	14.97	15.08	0.11			ROCK LOSS	
* 80	15.08	16.28	1.20			SILTSTONE	CLYY.PR.M.GY.LAM.WRMBU.SLD MUDSTONE & SILTSTONE & FG SANDSTONE INT ERLAMINATED;CORE IS OXIDIZED;BIOTURBATE D ZONES THROUGHOUT
78	16.28	16.67	0.39			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
77	16.67	17.22	0.55			SILTSTONE	CLYY.M.GY.LAM.WRMBU.BRKN OXIDIZED;UNIT BECOMES MORE ARGILLACEOUS TOWARDS END OF MEASUREMENT
* 75	17.22	17.82	0.60			MUDSTONE	SLTY.M.GY.LAM.WRMBU.BRKN OXIDIZED
* 75	17.82	18.36	0.54			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;CORE PIECES ROUNDED BY DRILL-P OSSIBLE CORE LOSS
76	18.36	19.24	0.88			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED;SOME PIECES ARE ROUNDED BY DRI LL;FEW CLAY NODULES THROUGHOUT;POSSIBLE CORE LOSS AT END OF MEASUREMENT
78	19.24	19.67	0.43			ROCK LOSS	
79	19.67	20.57	0.90			MUDSTONE	SLTY.M.GY.LAM.VBRKN CLAY NODULES;OXIDIZED;POSSIBLE CORE LOS S
* 81	20.57	21.82	1.25			MUDSTONE	SLTY.M.GY.LAM.VBRKN OXIDIZED AND HEAVILY BROKEN;NUMEROUS CL AY NODULES THROUGHOUT;POSSIBLE CORE LOS S

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
81	21.82	22.82	1.00			MUDSTONE	SLTY,M.GY,LAM,VBRKN CLAY NODULES ARE BECOMING MORE NUMEROUS ;CORE IS OXIDIZED AND BROKEN;.10M OF PO SSIBLE CAVE AT END OF MEASUREMENT
80	22.82	23.16	0.34			ROCK LOSS	
80	23.16	23.31	0.15			MUDSTONE	SLTY,M.GY,LAM,VBRKN AS ABOVE
* 80	23.31	24.40	1.09			MUDSTONE	SLTY,M.GY,LAM,VBRKN CLAY NODULES THROUGHOUT;ALL FRACTURE SU RFACES ARE OXIDIZED;ENDS OF CORE ARE RO UNDED
79	24.40	24.64	0.24			ROCK LOSS	
* 79	24.64	25.60	0.96			MUDSTONE	SLTY,M.GY,LAM,MRMBU,VBRKN OXIDIZED;CLAY NODULES THROUGHOUT
79	25.60	25.69	0.09			MUDSTONE	CARB,M.GY,SLD CORE ENDS ARE ROUNDED;BECOMING MORE CAR BONACEOUS AT END OF MEASUREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	25.69	25.72	0.03	06354	1	COAL	C-4,BLK,BRKN OXIDIZED
79	25.72	25.75	0.03	06354	1	COAL	C-1,BLK,BRKN OXIDIZED
79	25.75	25.80	0.05	06354	1	COAL	C-4,BLK,SLD OXIDIZED
79	25.80	25.83	0.03	06354	1	COAL	C-1,BLK,VBRKN
79	25.83	25.84	0.01	06354	1	MUDSTONE	CARB,M,BR,SLD DIRT BAND HAS A BROWNISH GREEN TINT
79	25.84	25.88	0.04	06354	1	COAL	C-1,BLK,SLD HEAVILY OXIDIZED
79	25.88	25.92	0.04	06354	1	COAL	C-3,BLK,SLD OXIDIZED-BLUE SHEEN ON CLEAT FACES
79	25.92	25.94	0.02	06354	1	COAL	C-4,BLK,SLD SEVERAL 1MM DIRT BANDS AT END OF MEASUR EMENT
79	25.94	25.97	0.03	06354	1	MUDSTONE	CARB,VBRKN VBRKN TO PWDR;SHEARED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	25.97	25.99	0.02	06354	I	COAL	C-4.BLK VBRKN TO PWDR .
79	25.99	26.25	0.26	06354	I	COAL LOSS	
79	26.25	26.30	0.05	06354	I	MUDSTONE	CARB.PWRD
79	26.30	26.36	0.06	06354	I	COAL	C-3.BLK.VBRKN SEVERAL 1MM DIRT BANDS AT TOP OF MEASUR EMENT;OXIDIZED-BLUE SHEEN PRESENT ON CL EAT FACES
79	26.36	26.39	0.03	06354	I	COAL	C-4.BLK.VBRKN
79	26.39	26.42	0.03	06354	I	COAL	C-4.BLK.BRKN SEVERAL 1MM ASH BANDS THROUGHOUT
79	26.42	26.44	0.02	06354	I	COAL	C-1.BLK.SLD
79	26.44	26.52	0.08	06354	I	COAL	C-3.BLK.SLD OXIDIZED;0.01M ASH BAND BETWEEN 0.03M A ND 0.04M

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	26.52	26.55	0.03	06354	I	MUDSTONE	CARB VBRKN TO POWDERED
79	26.55	26.60	0.05	06354	I	COAL	C-1.BLK.VBRKN
79	26.60	26.63	0.03	06354	I	COAL	C-3.BLK.VBRKN VBRKN TO POWDERED
79	26.63	26.71	0.08	06354	I	COAL	C-3.BLK.SLD DIFFICULT TO DETERMINE COAL RATING DUE TO HEAVY IRON STAINING ON CLEAT FACES
79	26.71	26.77	0.06	06354	I	COAL	C-1.BLK.SLD
79	26.77	26.82	0.05	06354	I	COAL LOSS	
79	26.82	26.98	0.16	06354	I	COAL	C-2.BLK.SLD OXIDIZED;POSSIBLE CORE LOSS AT FOOTAGE BLOCK-CORE ENDS ROUNDED
79	26.98	27.05	0.07	06354	I	COAL	C-3.BLK.SLD SEVERAL 1MM ASH BANDS THROUGHOUT
79	27.05	27.08	0.03	06354	I	COAL	C-2.BLK.VBRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	27.08	27.18	0.10	06354	I	COAL	C-3.BLK.VBRKN OXIDIZED
79	27.18	27.26	0.08	06354	I	COAL	C-4.BLK.VBRKN SEVERAL 1MM ASH BANDS THROUGHOUT;HEAVY IRON STAINING ON CLEAT FACES
79	27.26	27.34	0.08	06354	I	COAL	BLK.VBRKN VBRKN TO POWDERED
79	27.34	27.43	0.09	06355	I	MUDSTONE	CARB.VBRKN VBRKN TO POWDERED;SHEARED
79	27.43	27.62	0.19	06355	I	COAL	BLK.PWRD
79	27.62	27.76	0.14	06355	I	ROCK LOSS	
79	27.76	27.96	0.20	06355	I	COAL LOSS	
79	27.96	28.04	0.08	06355	I	COAL	C-3.BLK.VBRKN VBRKN TO POWDERED
79	28.04	28.23	0.19	06355	I	COAL	C-2.BLK.VBRKN CORE IS VBRKN TO POWDERED-THIS INCLUDES ABUNDANT SHEARING WITH LISTRIC SURFACE S PRESENT;OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	28.23	28.25	0.02	06355	I	COAL	C-3.BLK.SLD
79	28.25	28.30	0.05	06355	I	MUDSTONE	CARB.SLD
79	28.30	28.38	0.08	06355	I	COAL	C-3.BLK.SHRD CORE IS BADLY BRKN-POWDERED AND SHEARED ;SOLID PIECES HAVE SEVERAL 1MM ASH BAND S
79	28.38	28.74	0.36	06355	I	COAL LOSS	
79	28.74	28.78	0.04	06355	I	ROCK LOSS	
79	28.78	28.83	0.05	06355	I	COAL	PWRD POWDERED COAL AND MUDSTONE INTERMIXED
79	28.83	28.86	0.03	06355	I	COAL	C-3.BLK.BRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	28.86	28.89	0.03	06355	I	COAL	C-6.BLK.BRKN OXIDIZED
79	28.89	28.90	0.01	06355	I	COAL	C-1.BLK.BRKN OXIDIZED
79	28.90	28.97	0.07	06355	I	COAL	C-3.BLK.BRKN OXIDIZED;SEVERAL 1MM ASH BANDS
79	28.97	29.03	0.06	06355	I	COAL	C-3.BLK.SLD
79	29.03	29.07	0.04	06355	I	COAL	C-5.BLK.BRKN
79	29.07	29.09	0.02	06355	I	COAL	C-6.BLK.BRKN SEVERAL 2-3MM ASH BANDS THROUGHOUT
79	29.09	29.11	0.02	06355	I	COAL	C-3.BLK.BRKN
79	29.11	29.13	0.02	06355	I	COAL	C-1.BLK.SLD OXIDIZED;SEVERAL 1MM ASH BANDS
79	29.13	29.24	0.11	06355	I	COAL	C-3.BLK.SLD
79	29.24	29.28	0.04	06355	I	COAL	C-3.BLK.VBRKN POSSIBLE CORE LOSS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	29.28	29.68	0.40	06355	I	COAL LOSS	
79	29.68	29.83	0.15	06355	I	COAL	C-3.BLK
79	29.83	29.93	0.10	06355	I	COAL	C-1.BLK.VBRKN
79	29.93	30.04	0.11	06355	I	COAL	C-2.BLK.VBRKN OXIDIZED
79	30.04	30.16	0.12	06355	I	COAL	C-1.BLK.VBRKN OXIDIZED;POSSIBLE CORE LOSS AT END OF M EASUREMENT
79	30.16	30.69	0.53	06355	I	COAL LOSS	
79	30.69	30.91	0.22			MUDSTONE	CARB.M.GY.BRKN SILTY AND SHEARED;FRACTURE SURFACES ARE OXIDIZED
79	30.91	31.51	0.60			ROCK LOSS	

* DENOTES MEASURED BCA

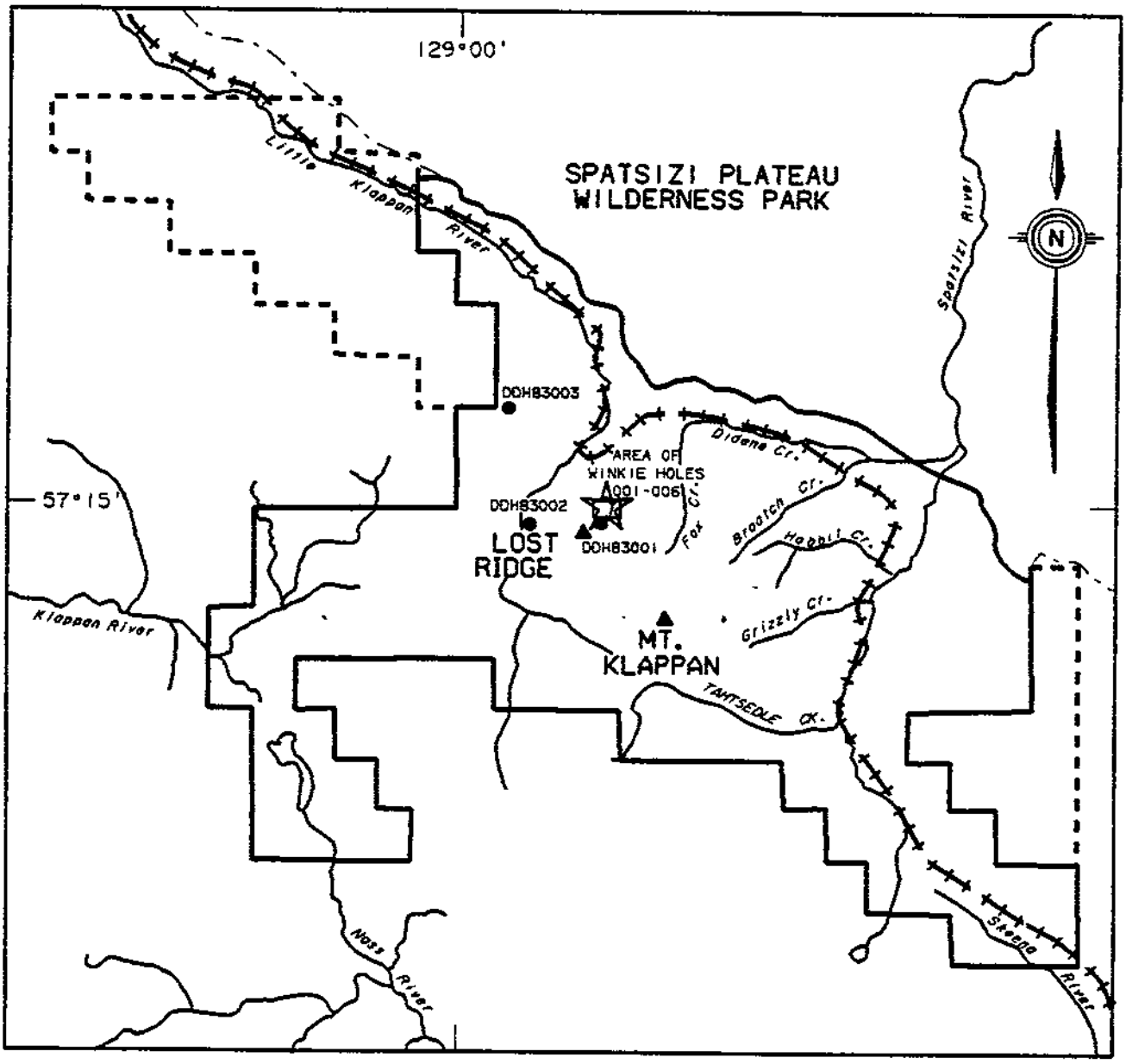
PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3004

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
79	31.51	31.76	0.25			MUDSTONE	SLTY,M-DK.GY,LAM,SHRD CORE VERY BADLY BRKN & SHRD;ALL FRACTUR E FACES IRON STAINED;CORE IS CARB;SHRD FACES MAY BE COVERED WITH QTZ &/OR GYPS UM; NOTE:DUE TO DEGREE OF HEAVY SHEARIN G-BDG PLANE FAULT MAY EXIST WITHIN BASE OF OR BELOW SEAM;****END OF CORE 30.93 ****

* DENOTES MEASURED BCA
NEWPAGE

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83005

	DY MO YR
START DATE	18/07/83
END DATE	22/07/83

CONTRACTOR TECK CORP OPERATOR KEVIN LEHMANN
GEOLOGIST ROSS MAYLOR SURVEYOR GCRI

REMARKS HOLE LOST IN "I" SEAM DUE TO CAVING

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83005

PROVINCE BC ELEVATION (M) 1670.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344670.00	EASTING	504620.00
2	LAT-LONG:	LAT 571449	LONG 1285524		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83005

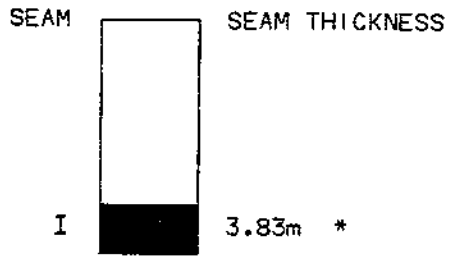
DIMENSIONS AND ORIENTATION:

LENGTH (M) 29.87 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 3.96 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83005



* NOTE: HOLE LOST DUE TO COREING
SEAM OVERTURNED

SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83005 SEAM 1

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 23.62m-29.87m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	23.62			0.23										
			(0.23)											
				0.54										
				(1.19)										
				0.51	59.8	06356								
			0.01											
				1.00										
			0.04											
			0.03	0.09										
			(0.15)											
				0.32										
			0.06											
				0.11										
				(0.11)										
				0.25										
			0.06											
				0.49										
	29.87			(0.12)										

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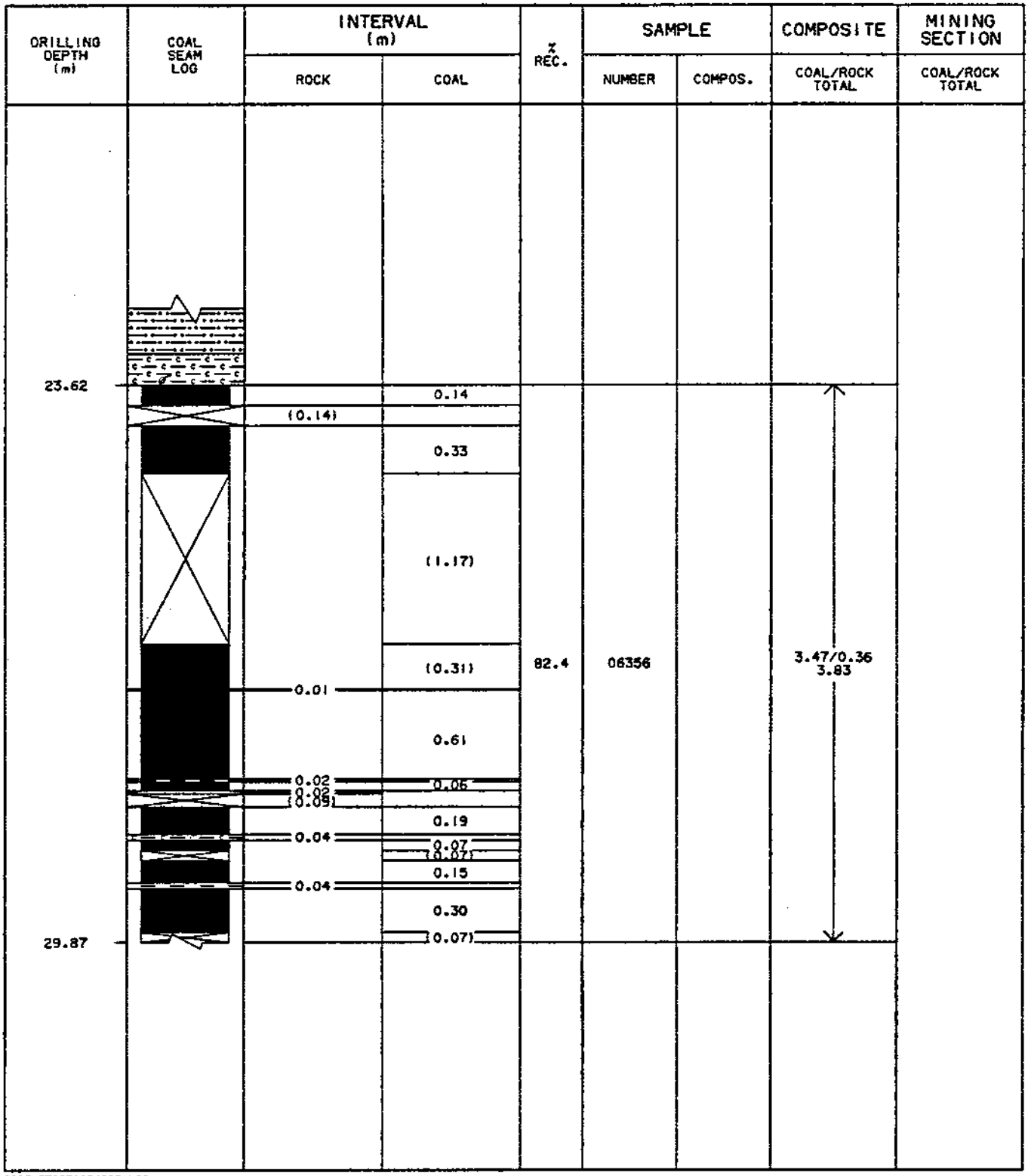

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GULF CANADA RESOURCES INC.	Gulf
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS WKD83005 SEAM 1	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
45	0.00	0.84	0.84			OVERBURDEN	
45	0.84	1.37	0.53			SILTSTONE	CLYY.M.GY.LAM.VBRKN A LOT OF THE PEICES OF CORE SHOW ROUNDI NG FROM DRILL
45	1.37	1.76	0.39			SILTSTONE	CLYY.M.GY.LAM.VBRKN AS ABOVE
45	1.76	2.29	0.53			ROCK LOSS	
* 45	2.29	2.64	0.35			SILTSTONE	CLYY.M.GY.LAM.VBRKN
42	2.64	3.05	0.41			ROCK LOSS	
* 38	3.05	3.52	0.47			SILTSTONE	CLYY.M.GY.LAM.WRMBU.VBRKN CORE ENDS REGROUND; BECOMES SANDIER TOW ARDS BASE OF MEASURMENT
40	3.52	3.67	0.15			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 42	3.67	4.12	0.45			SANDSTONE	SLTY.VFG.LT-M.GY.VTHNB.WRMBU.BRKN SOME CARBONACEOUS MATERIAL FOUND IN COR E,POSSIBLE ROOTLETS
* 34	4.12	4.42	0.30			SANDSTONE	SLTY.VFG.LT-M.GY.VTHNB.WRMBU.VBRKN SANDSTONE ISD BECOMING SILTIER TOWARDS BASE; WORM BURROWS INDICATE THAT THE BE DS IS OVERTURNED; MINOR CROSSBEDDING
34	4.42	5.20	0.78			SANDSTONE	CLYY.VFG.LT-M.GY.LAM.WRMBU.VBRKN LT-GY SANDSTONE AND M-GY MUDSTONE INTER LAMINATED
34	5.20	5.49	0.29			ROCK LOSS	
* 34	5.49	6.21	0.72			SANDSTONE	CLYY.VFG.LT-M.GY.LAM.WRMBU.VBRKN SANDSTONE GRAIN SIZE INCREASES TO FINE GRAIN FROM 0.34 TO 0.48 CM AND 0.6A TO 0.72 CM
38	6.21	6.40	0.19			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 42	6.40	7.06	0.66			SANDSTONE	CLYY.VFG.PR.LT-M.GY.LAM.WRMBU.VBRKN LT-GY VFG TO MGR SANDSTONE INTERLAMINATED WITH M-GY SILTY MUDSTONE; CORE BREAKS LARGLY ALONG BEDDING PLANES; POSSIBLE CORELOSS; RIP-UP CLASTS AT 0.25 CM
41	7.06	7.37	0.31			ROCK LOSS	
40	7.37	8.08	0.71			SANDSTONE	CLYY.FG.LT-M.GY.VTHNB.BRKN SANDSTONE INTERLAMINATED WITH MEDIUM GREY MUDSTONE; CORE IS OXIDIZED ALONG FRACTURE SURFACES; FRACTURE ANGLE 45 DEGREES
39	8.08	8.48	0.40			SANDSTONE	SLTY.FG.LT-M.GY.VTHNB.BRKN
38	8.48	8.79	0.31			SANDSTONE	CLYY.FG.LT-M.GY.VTHNB.VBRKN SANDSTONE IS POORLY CEMENTED WITH CORE DISINTIGRATING RAPIDLY
37	8.79	9.30	0.51			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
36	9.30	9.73	0.43			SANDSTONE	CLYY.FG.LT-M.GY.VTHNB.VBRKN SANDSTONE IS BECOMING MORE ARGILLACEOUS AT END OF MEASUREMENT; POSSIBLE CORE LOSS
35	9.73	10.19	0.46			ROCK LOSS	
35	10.19	10.52	0.33			MUDSTONE	SLTY.M.GY.VBRKN POSSIBLE CORE LOSS
34	10.52	10.69	0.17			MUDSTONE	M.GY.VBRKN AS ABOVE
33	10.69	11.23	0.54			MUDSTONE	SLTY.M.GY.LAM.WRMBU.VBRKN ABUNDENT 1-2MM DIAMETER WORM BURROWS; CORE DETERIORATES RAPIDLY
32	11.23	11.73	0.50			ROCK LOSS	
31	11.73	12.36	0.63			SILTSTONE	M.GY.LAM.WRMBU.VBRKN AS ABOVE
30	12.36	12.50	0.14			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 30	12.50	12.65	0.15			MUDSTONE	SLTY.M.GY.LAM.BRKN AS ABOVE CORE ENDS SHOW ROUNDING FROM D RILL
31	12.65	12.87	0.22			ROCK LOSS	
32	12.87	13.41	0.54			SANDSTONE	CLYY.VFG.LT.GY.VTHNB.BRKN INTERLAMINATIONS OF M-DK.GY CLAYSTONE
* 34	13.41	14.33	0.92			SANDSTONE	CLYY.VFG.LT.GY.VTHNB.WRMBU.BRKN INTERLAMINATED WITH M-DK GY CLAYSTONE; SANDSTONE COARSENING SLIGHTLY TO BASE
35	14.33	14.36	0.03			SANDSTONE	CLYY.VFG.LT.GY.VTHNB.WRMBU.BRKN AS ABOVE
35	14.36	14.52	0.16			ROCK LOSS	
35	14.52	14.63	0.11			SANDSTONE	SLTY.FG.LT.GY.THKB.BRKN RIP-UP CLASTS
36	14.63	15.35	0.72			SANDSTONE	SLTY.FG.LT.GY.THKB.BRKN RIP-UP CLASTS UP TO 2.5X2.5CM; FRACTURE ANGLE 45 DEGREES; OXIDIZED ALONG FRACT URES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
37	15.35	15.54	0.19			ROCK LOSS	
37	15.54	16.29	0.75			SANDSTONE	CLYY.VFG.M-DK.GY.THNB.BRKN SANDSTONE IS INTERLAMINATED WITH MEDIUM TO DARK GREY CLAYSTONE; SANDSTONE COLO R GRADING TO LT-M NEAR BASE OF MEASUREM ENT;LESS ARGILLACEOUS TOWARDS BASER
* 38	16.29	16.38	0.09			SANDSTONE	CLYY.VFG.LT.GY.VTHNB.VBRKN INTERLAMINATED CARBONACEOUS MATERIAL DI SPLAYING CALCITE HALOS, POSSIBLE ROOTLE TS
38	16.38	16.43	0.05			SANDSTONE	SLTY.FG.LT-M.GY.THNB.VBRKN CORE HAS BEEN SPUN BY DRILL; POSSIBLE C ORE LOSS
37	16.43	16.95	0.52			SANDSTONE	SLTY.FG.LT.GY.THNB.BRKN FEW INTERLAMINATIONS OF M-DK GY CLAYSTO NE LESS THAN 2CM THICK; PARTS OF MEASUR EMENT VERY IRONSTAINED
37	16.95	17.15	0.20			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
35	17.15	18.13	0.98			SANDSTONE	SLTY.FG.LT.GY.THNB.WRMBU.BRKN VERY BROKEN AT TOP; POSSIBLE CORE LOSS; MINOR INTERLAMINATIONS OF M-DK GY CLAY STONE LESS THAN 2CM THICK; CLAYSTONE LA MINATIONS OFTEN DEFORMED FROM HEIGHT OF OVERLYING SEDIMENT
34	18.13	18.37	0.24			ROCK LOSS	
34	18.37	18.72	0.35			SANDSTONE	SLTY.FG.LT.GY.THNB.WRMBU.BRKN AS ABOVE CORE ENDS ROUNDED BY DRILL; PO SSIBLE CORE LOSS
33	18.72	18.92	0.20			ROCK LOSS	
32	18.92	19.96	1.04			SANDSTONE	CLYY.VFG.LT.GY.THNB.WRMBU.BRKN SANDSTONE INTERLAMINATED WITH M-DK GY C LAYSTONE; CLAYSTONE LAMINATIONS OFTEN D EFORMED BY SANDSTONE; FLAME AND LOADING STRUCTURES INDICATE BEDS ARE OVERTURNE D

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 30	19.96	20.88	0.92			SANDSTONE	CLYY.VFG.LT.GY.THNB.WRMBU.VBRKN AS ABOVE SANDSTONE BECOMING FINER WITH DEPTH; CLAYSTONE LAMINATIONS MORE FREQU ENT WITH DEPTH
31	20.88	21.06	0.18			ROCK LOSS	
33	21.06	21.78	0.72			SILTSTONE	CLYY.LT-M.GY.LAM.WRMBU.VBRKN AS ABOVE
34	21.78	21.87	0.09			SILTSTONE	CLYY.LT.GY.LAM.BRKN SANDSTONE INTERLAMINATED WITH MEDIUM TO DARK GREY CLAYSTONE CLAYSTONE LAMINATI ONS OFTEN DEFORMED BY SANDSTONE; FLAME AND LOADING STRUCTURES INDICATE BEDS AR E OVERTURNED
35	21.87	22.71	0.84			SILTSTONE	CLYY.LT-M.GY.LAM.WRMBU.BRKN AS ABOVE
37	22.71	23.30	0.59			SILTSTONE	CLYY.M-DK.GY.LAM.VBRKN ROUNDING OF CORE BY DRILL; POSSIBLE COR E LOSS; BECOMING MORE CLAYEY TOWARDS BA SE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
* 38	23.30	23.62	0.32			CLAYSTONE	CARB.BLK.LAM.BRKN PLANT FRAGMENT FOSSILS INCREASE TOWARDS BASE
38	23.62	23.65	0.03	06356	I	COAL	C-3.VBRKN 3MM OF CALCITE LIGHTLY SHEARED WITH ABUNDENT LISTRIC SURFACES; POSSIBLE CORE LOSS
38	23.65	23.67	0.02	06356	I	COAL	C-1.BRKN CLEAT SURFACES COATED WITH CALCITE
38	23.67	23.73	0.06	06356	I	COAL	C-1.BRKN CLEAT SURFACES COATED WITH CALCITE
38	23.73	23.77	0.04	06356	I	COAL	C-2.VBRKN
38	23.77	23.78	0.01	06356	I	COAL	C-1.BRKN MINOR ROCK SPLIT LESS THAN ONE MM
38	23.78	23.79	0.01	06356	I	COAL	C-4.BRKN OXIDIZED
38	23.79	23.81	0.02	06356	I	COAL	C-1.BRKN CALCITE ON CLEAT SURFACES; OXIDIZED
38	23.81	23.85	0.04	06356	I	COAL	C-1.VBRKN OXIDIZED; CALCITE ON CLEAT SURFACES

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	23.85	24.08	0.23	06356	I	COAL LOSS	
38	24.08	24.28	0.20	06356	I	COAL	C-1.PWRD QUARTZ VEINING FROM .02 TO .10 UP TO 2MM THICK
38	24.28	24.62	0.34	06356	I	COAL	C-1.VSHRD OXIDIZED
38	24.62	26.52	1.90	06356	I	COAL LOSS	
38	26.52	26.67	0.15	06356	I	COAL	C-1.PWRD
38	26.67	26.75	0.08	06356	I	COAL	C-1.PWRD
38	26.75	26.79	0.04	06356	I	COAL	PWRD
38	26.79	26.89	0.10	06356	I	COAL	
38	26.89	26.99	0.10	06356	I	COAL	C-1.VBRKN OXIDIZED
38	26.99	27.02	0.03	06356	I	COAL	C-2.SHRD OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	27.02	27.03	0.01	06356 I		COAL	C-2.VBRKN OXIDIZED
38	27.03	27.04	0.01	06356 I		CLAYSTONE	CARB.VBRKN
38	27.04	27.08	0.04	06356 I		COAL	C-1.VBRKN OXIDIZED
38	27.08	27.16	0.08	06356 I		COAL	C-2.VBRKN OXIDIZED; POSSIBLE MINOR ROCK SPLITS LESS THAN ONEMM
38	27.16	27.22	0.06	06356 I		COAL	C-2.SHRD
38	27.22	27.24	0.02	06356 I		COAL	C-1.BRKN OXIDIZED; CLEAT SURFACE COATED WITH NON HCL REACTIVE MATERIAL
38	27.24	27.25	0.01	06356 I		COAL	C-4.BRKN OXIDIZED
38	27.25	27.26	0.01	06356 I		COAL	C-1.BRKN OXIDIZED
38	27.26	27.27	0.01	06356 I		COAL	C-4.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	27.27	27.31	0.04	06356 I		COAL	C-1.BRKN OXIDIZED
38	27.31	27.34	0.03	06356 I		COAL	C-3.VBRKN
38	27.34	27.59	0.25	06356 I		COAL	C-1.PWRD
38	27.59	27.63	0.04	06356 I		COAL	C-3.VBRKN OXIDIZED
38	27.63	27.69	0.06	06356 I		COAL	C-1.BRKN END HAS BEEN ROUNDED BY DRILL; MINOR C-4LESS THAN 2MM
38	27.69	27.71	0.02	06356 I		COAL	C-1.VBRKN
38	27.71	27.72	0.01	06356 I		COAL	C-4.VBRKN
38	27.72	27.74	0.02	06356 I		COAL	C-1.VBRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	27.74	27.75	0.01	06356	I	COAL	C-4.VBRKN
38	27.75	27.79	0.04	06356	I	COAL	C-1.BRKN OXIDIZED
38	27.79	27.86	0.07	06356	I	COAL	C-2.VBRKN OXIDIZED; CLEAT FACES COVERED WITH NON HCL REACTANT MATERIAL
38	27.86	27.91	0.05	06356	I	COAL	C-2.VBRKN
38	27.91	27.94	0.03	06356	I	COAL	C-2.VBRKN OXIDIZED; CLEAT FACES COVERED WITH NON HCL REACTANT MATERIAL
38	27.94	27.98	0.04	06356	I	COAL	C-2.BRKN OXIDIZED; MINOR IRONSTAINING; MINOR QUARTZ VEINING
38	27.98	28.00	0.02	06356	I	COAL	C-4.BRKN
38	28.00	28.02	0.02	06356	I	COAL	C-1.BRKN OXIDIZED

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	28.02	28.03	0.01	06356	I	COAL	C-4.BRKN
38	28.03	28.04	0.01	06356	I	COAL	C-1.BRKN
38	28.04	28.08	0.04	06356	I	MUDSTONE	DK.GY.VBRKN MINOR COAL STRINGERS LESS THAN 2MM
38	28.08	28.09	0.01	06356	I	COAL	C-2.VBRKN MINOR CLAYSTONE LENSES LESS THAN 2MM
38	28.09	28.11	0.02	06356	I	COAL	C-5.VBRKN
38	28.11	28.12	0.01	06356	I	COAL	C-5.VBRKN
38	28.12	28.17	0.05	06356	I	COAL	C-2.VBRKN OXIDIZED; CLEAT COATED WITH NON HCL REACTANT MATERIAL
38	28.17	28.20	0.03	06356	I	CLAYSTONE	CARB.VBRKN COALY STRINGERS
38	28.20	28.35	0.15	06356	I	ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	28.35	28.50	0.15	06356 I		COAL	C-2.VSHRD ABUNDENT CLAYSTONE PARTINGS LESS THAN 2 MM
38	28.50	28.67	0.17	06356 I		COAL	C-5.SHRD
38	28.67	28.73	0.06	06356 I		CLAYSTONE	CARB.PHRD MINOR COAL
38	28.73	28.81	0.08	06356 I		COAL	C-3.PHRD ABUNDENT CLAYSTONE
38	28.81	28.84	0.03	06356 I		COAL	C-3.VBRKN LISTRIC SURFACES
38	28.84	28.95	0.11	06356 I		COAL LOSS	
38	28.95	29.01	0.06	06356 I		COAL	C-1.PHRD MINOR CLAYSTONE
38	29.01	29.11	0.10	06356 I		COAL	C-1.PHRD MINOR CLAYSTONE
38	29.11	29.20	0.09	06356 I		COAL	C-4.VBRKN MINOR CLAYSTONE CARBONACEOUS

* DENOTES MEASURED BCA

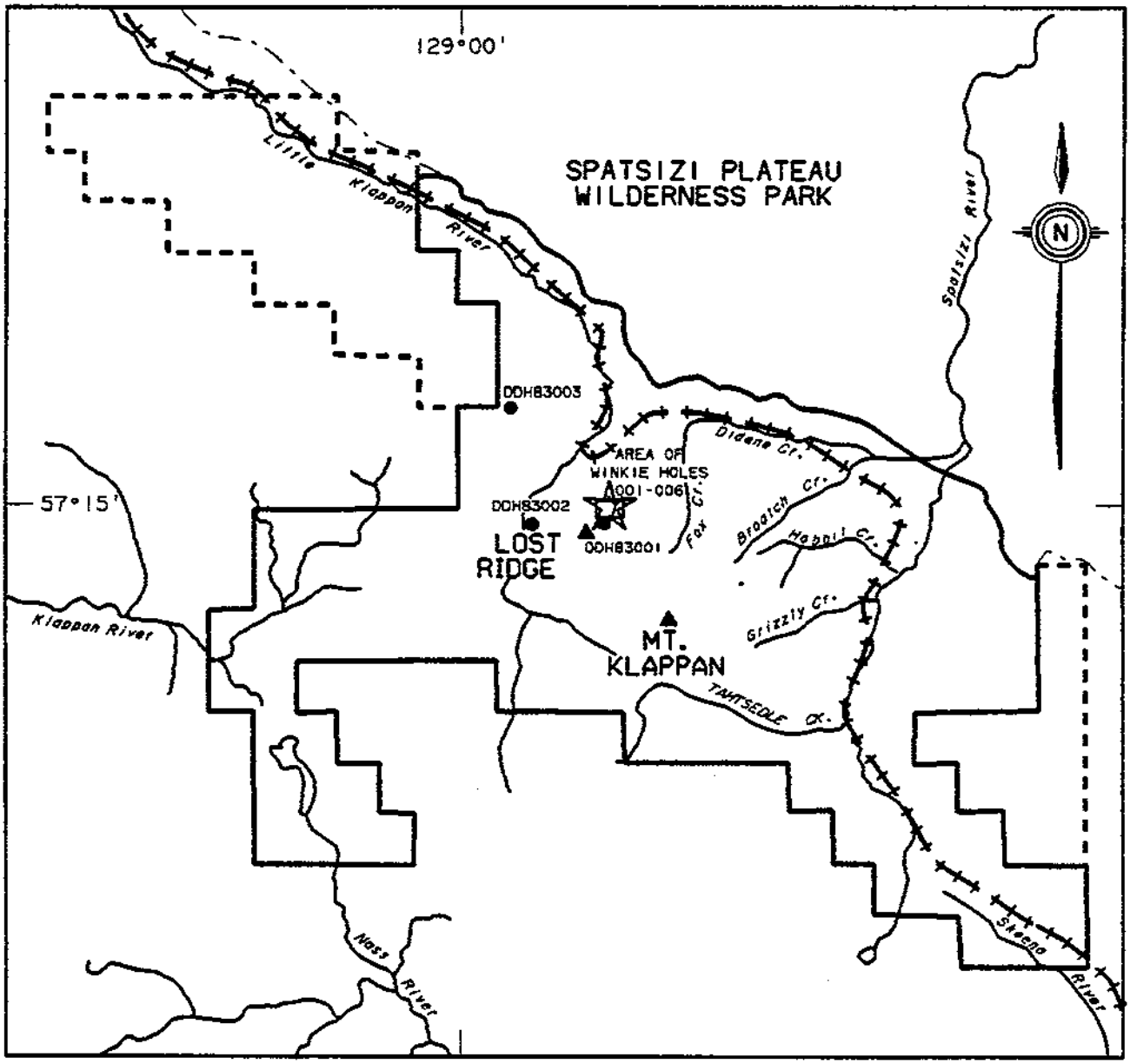
PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83005

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
38	29.20	29.23	0.03	06356 I		CLAYSTONE	M.GY.BRKN
38	29.23	29.26	0.03	06356 I		CLAYSTONE	M.GY.BRKN CORE SPUN BY DRILL
38	29.26	29.32	0.06	06356 I		COAL	C-4.SHRD
38	29.32	29.51	0.19	06356 I		COAL	C-1.PHRD
38	29.51	29.59	0.08	06356 I		COAL	C-3.PHRD IRONSTAINED
38	29.59	29.68	0.09	06356 I		COAL	C-3.PHRD
38	29.68	29.75	0.07	06356 I		COAL	C-3.VSHRD
38	29.75	29.87	0.12			COAL LOSS	END OF HOLE

* DENOTES MEASURED BCA
NEWPAGE

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83006

	DY MO YR
START DATE	23/07/83
END DATE	25/07/83

CONTRACTOR TECK CORP OPERATOR KEVIN LEHMAN
GEOLOGIST R. MAYLOR SURVEYOR

REMARKS

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83006

PROVINCE BC ELEVATION (M) 1675.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344675.00	EASTING	504625.00
2	LAT-LONG:	LAT 571449	LONG 1285524		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83006

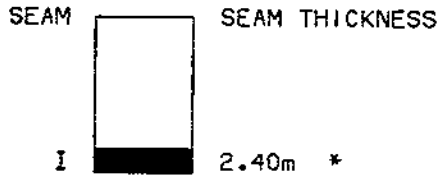
DIMENSIONS AND ORIENTATION:

LENGTH (M) 19.81 INCLINATION 70.0 AZIMUTH 205.0
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 4.27 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) 6.09 ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83006



* NOTE: HOLE LOST DUE TO COREING
SEAM IS OVERTURNED

SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83006 SEAM _____

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 16.58m-19.41m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	16.58			0.30										
				(0.39)										
			0.01	0.05										
				0.51										
				(0.20)	71.0	06357								
			0.01	0.08										
			0.01	0.05										
				0.25										
			0.01	0.06										
			(0.02)	0.05										
			0.01	0.03										
			0.01											
				0.36										
				(0.08)										
				0.18										
	19.41			(0.13)										

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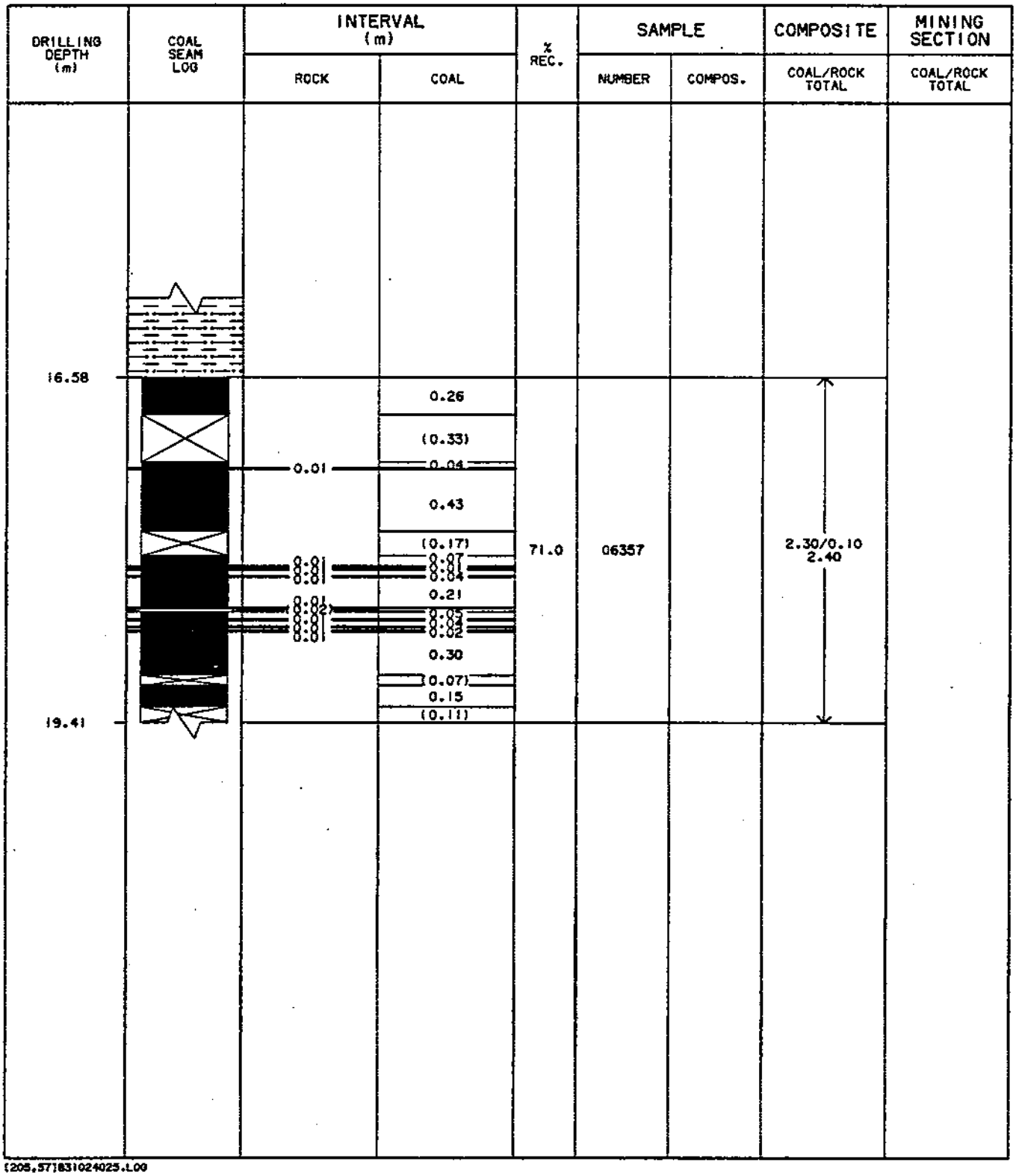

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GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

WKD83006

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
52	0.00	0.36	0.36			SILTSTONE	CLYY.M.GY.LAM.VBRKN ROUNDING OF CORE; POSSIBLE CORE LOSS
52	0.36	0.97	0.61			ROCK LOSS	
52	0.97	1.17	0.20			SILSTONE	CLYY.M.GY.LAM.VBRKN ROUNDING OF CORE; POSSIBLE CORE LOSS; I RON STAINED
* 52	1.17	1.64	0.47			SILSTONE	CLYY.M.GY.LAM.VBRKN ROUNDING OF CORE; POSSIBLE CORE LOSS; I RON STAINING
53	1.64	1.83	0.19			SILSTONE	CLYY.M.GY.LAM.VBRKN MINOR VERY FINE GRAINED SANDSTONE LAMIN ATIONS LESS THAN 1CM. THICK
54	1.83	2.23	0.40			ROCK LOSS	
* 56	2.23	2.79	0.56			SANDSTONE	CLYY.VFG.LT.GY.LAM.BRKN LAMINATIONS OF DARK GREY CLAYSTONE
57	2.79	3.15	0.36			ROCK LOSS	
58	3.15	3.43	0.28			SANDSTONE	CLYY.VFG.LT.GY.LAM.BRKN LAMINATIONS OF MEDIUM DARK GREY CLAYSTO NE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKDB3006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
59	3.43	3.76	0.33			ROCK LOSS	
* 60	3.76	4.42	0.66			SANDSTONE	CLYY.VFG.LT.GY.LAM.BRKN LAMINATIONS OF MEDIUM DARK GREY CLAYSTO NE; SOME CORE ENDS ROUNDED BY DRILLING; POSSIBLE CORE LOSS; LOADING FEATURES S UGGEST BEDS ARE OVERTURNED
59	4.42	4.67	0.25			ROCK LOSS	
59	4.67	5.14	0.47			SANDSTONE	SLTY.VFG.LT.GY.LAM.BRKN INTERLAMINATED WITH MEDIUM TO DARK GREY CLAYSTONE; SANDSTONE COARSENING SLIGHT LY DOWN HOLE; IRON STAINING
* 58	5.14	5.87	0.73			SANDSTONE	SLTY.FG.LT.GY.LAM.BRKN MINOR INTERLAMINATED MEDIUM TO DARK GRE Y CLAYSTONE; FRACTURES AT 33 DEGREES
58	5.87	6.04	0.17			SANDSTONE	SLTY.MG.M.GY.VBRKN IRON STAINED; VERY FRIABLE; LACKS COHES ION; MUCH OF CORE IN POWDERED STATE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
57	6.04	6.05	0.01			SILSTONE	LT-M.GY.BRKN
57	6.05	6.35	0.30			ROCK LOSS	
57	6.35	6.40	0.05			SANDSTONE	SLTY.VFG.LT.GY.VTHNB.BRKN IRON STAINING
57	6.40	6.54	0.14			SANDSTONE	MG.M.GY.THNB.VBRKN VERY FRIABLE; IRON STAINED
57	6.54	6.59	0.05			SANDSTONE	MG.M.GY.THNB.VBRKN VERY FRIABLE; IRON STAINING; SOME ROUND ING OF CORE
57	6.59	6.73	0.14			CLAYSTONE	DK.GY.THNB.BRKN
57	6.73	7.26	0.53			ROCK LOSS	
56	7.26	7.95	0.69			CLAYSTONE	DK.GY.THNB.VBRKN MINOR IRON STAINING
56	7.95	8.18	0.23			ROCK LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
55	8.18	8.28	0.10			SILTSTONE	CLYY.M.GY.LAM.VBRKN SOME ROUNDING OF CORE
* 55	8.28	9.09	0.81			CLAYSTONE	DK.GY.LAM.VBRKN
56	9.09	9.39	0.30			ROCK LOSS	
56	9.39	9.58	0.19			CLAYSTONE	DK.GY.LAM.WRMBU.BRKN
56	9.58	9.76	0.18			SILTSTONE	CLYY.LT-M.GY.LAM.WRMBU.BRKN IRON STAINING; INTERBEDDED MEDIUM TO DA RK GREY CLAYSTONE
57	9.76	9.85	0.09			SANDSTONE	SLTY.VFG.LT.GY.LAM.BRKN INTERBEDDED WITH MINOR LAMINATIONS OF M EDIUM TO DARK GREY CLAYSTONE
57	9.85	10.27	0.42			SILTSTONE	CLYY.LT.GY.LAM.BRKN INTERBEDDED WITH MINOR LAMINATIONS OF M EDIUM DARK GREY CLAYSTONE; ROUNDING OF CORE ENDS; POSSIBLE CORE LOSS
57	10.27	10.49	0.22			SANDSTONE	MG.LT.GY.THNB.BRKN MINOR CLAYSTONE CLASTS ; FRACTURE ANGLE 30 DEGREES; IRON STAINING

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
58	10.49	11.46	0.97			SANDSTONE	FG-.LT-M.GY.THNB.BRKN MINOR CLAY RIP UP CLASTS; MINOR CLAY LA MINATIONS AT 26 CM., 32 CM., 39 CM. AND 43 CM. ALL LESS THAN 1 CM. THICK
59	11.46	11.68	0.22			ROCK LOSS	
* 60	11.68	12.61	0.93			SANDSTONE	FG-.LT-M.GY.THNB.BRKN MINOR CLAY LAMINATIONS AT 3 CM., 23 CM. , 34 CM. AND 51 CM. ALL LESS THAN 1 CM. THICK
59	12.61	12.85	0.24			SANDSTONE	CLYY.FG-.LT.GY.THNB.BRKN THIN CLAYSTONE INTERBEDS
59	12.85	13.05	0.20			ROCK LOSS	
59	13.05	13.21	0.16			SANDSTONE	SLTY.FG.LT.GY.VTHNB.BRKN CORE ENDS ROUNDED BY DRILLING; POSSIBLE CORE LOSS
59	13.21	13.48	0.27			SANDSTONE	SLTY.FG.LT.GY.VTHNB.WRMBU.VBRKN VERY FRIABLE; IRON STAINED; MINOR CLAY BANDS LESS THAN 0.5 CM. THICK

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: WKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
59	13.48	13.57	0.09			SANDSTONE	VFG.LT-M.GY.LAM.WRMBU.BRKN INTERBEDDED MEDIUM TO DARK GREY CLAYSTO NE
58	13.57	13.60	0.03			ROCK LOSS	
* 58	13.60	14.42	0.82			SANDSTONE	VFG.LT-M.GY.LAM.WRMBU.BRKN INTERBEDDED MEDIUM TO DARK GREY CLAYSTO NE
58	14.42	15.06	0.64			SANDSTONE	SLTY.VFG.LT-M.GY.LAM.WRMBU.BRKN INTERBEDDED MEDIUM TO DARK GREY CLAYSTO NE; CLAYSTONE BANDS, MORE PROMINANT TOW ARDS BASE OF MEASUREMENT
58	15.06	15.87	0.81			CLAYSTONE	SLTY.M-DK.GY.LAM.WRMBU.BRKN IRON STAINING; ROUNDING OF CORE BY DRIL LING; POSSIBLE CORE LOSS
58	15.87	16.28	0.41			CLAYSTONE	SLTY.M-DK.GY.LAM.WRMBU.BRKN
58	16.28	16.58	0.30			CLAYSTONE	CARB.BLK.LAM.BRKN COAL STRINGERS INCREASE TOWARDS TOP OF MEASUREMENT

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
58	16.58	16.66	0.08	06357 I		COAL	C-2.VBRKN QUARTZ VEINING; IRON STAINING
58	16.66	16.88	0.22	06357 I		COAL	C-1.SHRD SOME QUARTZ ON CLEAT SURFACES; MINOR IR ON STAINING; SOME CORE SHOWS ROUNDING G Y DRILLING; POSSIBLE CORE LOSS
58	16.88	17.27	0.39	06357 I		COAL LOSS	
58	17.27	17.32	0.05	06357 I		COAL	C-1.VBRKN
58	17.32	17.33	0.01	06357 I		CLAYSTONE	CARB.VBRKN IRON STAINING
58	17.33	17.84	0.51	06357 I		COAL	C-1.VSHRD IRON STAINING; MINOR QUARTZ ON CLEAT SU RFACES
58	17.84	18.04	0.20	06357 I		COAL LOSS	
58	18.04	18.12	0.08	06357 I		COAL	C-1.BRKN

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
58	18.12	18.13	0.01	06357 I		CLAYSTONE	CARB.BRKN MINOR COAL STRINGERS
58	18.13	18.14	0.01	06357 I		COAL	C-1.BRKN
58	18.14	18.15	0.01	06357 I		CLAYSTONE	CARB.BRKN MINOR COAL STRINGERS
58	18.15	18.20	0.05	06357 I		COAL	C-1.BRKN
58	18.20	18.21	0.01	06357 I		CLAYSTONE	CARB.BRKN
58	18.21	18.31	0.10	06357 I		COAL	C-1.VBRKN QUARTZ ON CLEAT SURFACES
58	18.31	18.46	0.15	06357 I		COAL	C-3.VBRKN
58	18.46	18.47	0.01	06357 I		CLAYSTONE	CARB.VBRKN
58	18.47	18.49	0.02	06357 I		ROCK LOSS	
58	18.49	18.55	0.06	06357 I		COAL	C-3.VBRKN

* DENOTES MEASURED BCA

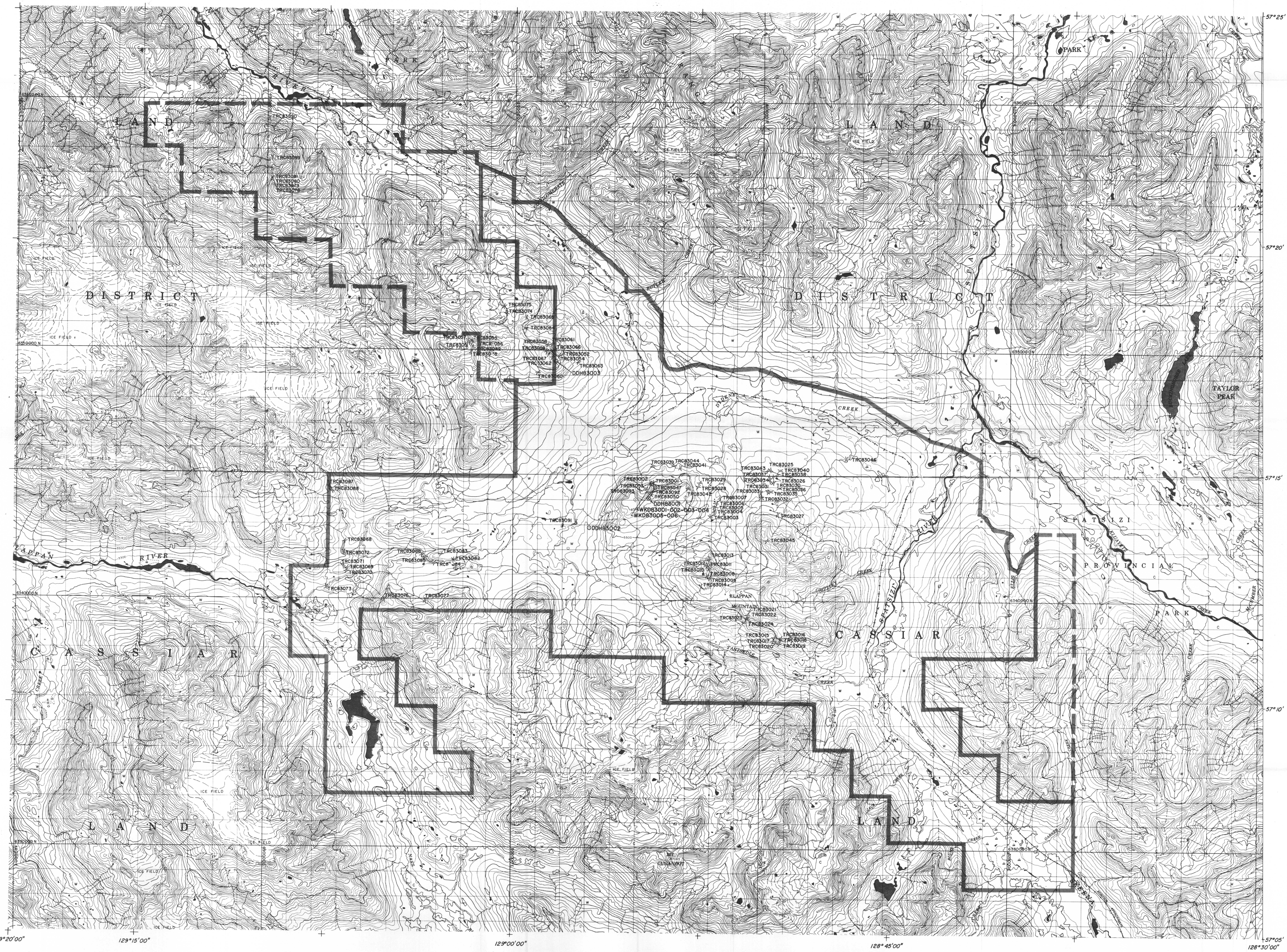
PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
58	18.55	18.56	0.01	06357	I	CLAYSTONE	CARB.VBRKN
58	18.56	18.61	0.05	06357	I	COAL	C-3.VBRKN
58	18.61	18.62	0.01	06357	I	CLAYSTONE	CARB.VBRKN IRON STAINING
58	18.62	18.65	0.03	06357	I	COAL	C-4.VBRKN
58	18.65	18.66	0.01	06357	I	CLAYSTONE	CARB.VBRKN
58	18.66	18.71	0.05	06357	I	COAL	C-4.VBRKN
58	18.71	18.89	0.18	06357	I	COAL	C-2.VBRKN
58	18.89	18.95	0.06	06357	I	COAL	C-4.VSHRD
58	18.95	19.02	0.07	06357	I	COAL	C-2.VBRKN
58	19.02	19.10	0.08	06357	I	COAL LOSS	

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: MKD83006

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
58	19.10	19.28	0.18	06357	I	COAL	C-2.VBRKN LISTRIC SURFACE
58	19.28	19.41	0.13	06357	I	COAL LOSS	



LEGEND

ROADS AND RELATED FEATURES
HARD SURFACE, ALL WEATHER
LOOSE SURFACE
CART TRACK, WINTER ROAD, UNDER CONSTRUCTION
TRAIL, CUTLINE, PORTAGE
BUILT UP AREA
RAILWAY, SIDING, STATION, STOP
BRIDGE
SEAPLANE BASE, ANCHORAGE

LANDMARK FEATURES
HOUSE, BARN
CHURCH, SCHOOL
POST OFFICE
HISTORICAL SITE
TOWERS: FIRE, RADIO
WELL: OIL, GAS
TANK: OIL, GASOLINE, WATER
TELEPHONE LINE
POWER TRANSMISSION LINE
MINE
CUTTING, EMBANKMENT
GRAVEL PIT

BOUNDARIES AND CONTROL
INTERNATIONAL, PROVINCIAL, BOUNDARY MONUMENT
COUNTY, DISTRICT
TOWNSHIP PARISH — SURVEYED — UNSURVEYED
TOWNSHIP DLS — SURVEYED — UNSURVEYED — SECTION CORNERS
MUNICIPALITY
INDIAN RESERVE, PARK, ETC.
HORIZONTAL CONTROL POINT
BENCH MARK
SPOT ELEVATION, ELEVATION APPROXIMATE

DRAINAGE AND RELATED FEATURES
STREAM, SHORELINE: INDEFINITE
DIRECTION OF FLOW
LAKE, INTERMITTENT
INUNDATED, FLOODED LAND
MARSH OR SWAMP (WOODED)
DRY RIVER BED WITH CHANNELS
SAND, ABOVE, IN WATER
STRING BOG
TUNDRA PONDS, POLYGONS
RAPIDS
FORESHORE FLATS
ROCK
DAM
WHARF
DITCH

RELIEF FEATURES
CONTOURS
APPROXIMATE CONTOUR
DEPRESSION
ESKER
PINGO
SAND, SAND DUNES
PALSA BOG
WOODED AREA
LICENCE BOUNDARY
LICENCE UNDER APPLICATION

SCALE 1:50,000

0 1 2 3 MILES
0 1 2 3 4 5 KILOMETERS

104 H/11	104 H/10	104 H/9
104 H/6	104 H/7	104 H/8
104 H/3	104 H/2	104 H/1
104 A/14	104 A/15	104 A/16

57°45' 56°45' 129°30' 128°00'

111

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA
Gulf

MT. KLAPPAN COAL PROPERTY

1983 TRENCH AND DRILL HOLE LOCATION MAP

PREPARED BY: C. LOUIE	DRAWING No. KPN83A03
APPROVED BY: C. WILLIAMS DATE: JAN., 1984	

MOUNT KLAPPAN COAL PROJECT

GEOLOGICAL REPORT

1983

APPENDIX IV

COAL QUALITY DATA

VOLUME III

GULF CANADA RESOURCES INC.

COAL DIVISION

APPENDIX IV
VOLUME III
COAL QUALITY DATA

APPENDIX III
Coal Quality
TABEL OF CONTENTS

VOLUME I

CONFIDENTIAL COAL QUALITY DATA HAS BEEN SEPERATED FROM THIS VOLUME

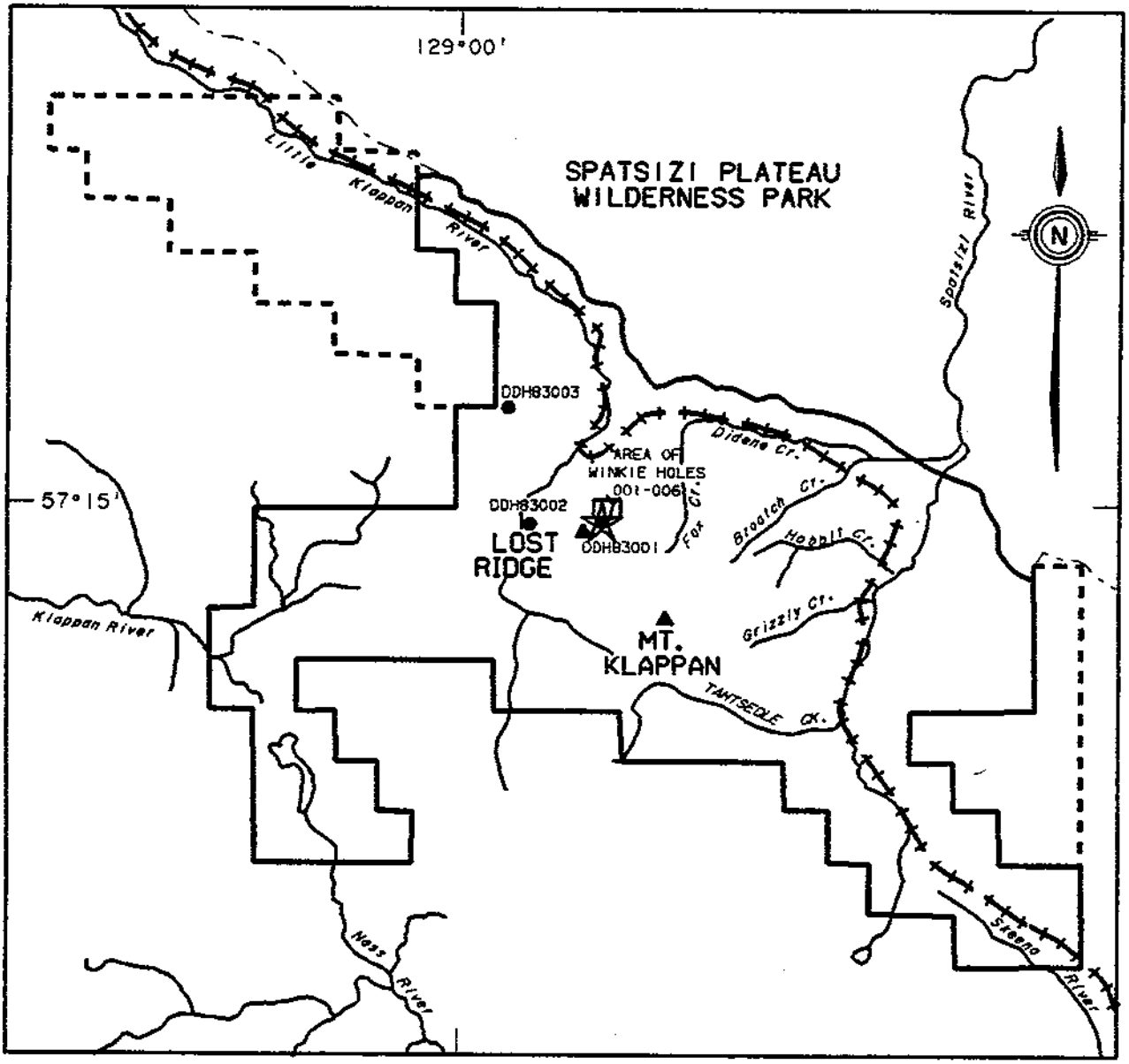
Explanation of Computer Printout Abbreviations

PROJ KPN	Mt. Klappan Project
BLK BC	Broatch Creek
BLK EL	Ellis Ridge
BLK FC	Fox Creek
BLK GC	Grizzley Creek
BLK HC	Hobbit Creek
BLK KH	Knooph Hill
BLK KN	Little Klappan North
BLK KS	Little Klappan South
BLK KW	Little Klappan West
BLK LR	Lost Ridge
BLK RW	Lost Ridge West
BLK MS	Mount Klappan South
BLK MV	Mount Klappan North
BLK NR	Nass River
BLK SK	Skeena
BLK SS	Summit South
BLK SN	Summit North
DDH	Diamond Drill Hole
TRC	Trench
OTC	Outcrop
HD1+	Head Analysis
WA1+	Washability Analysis
SZ1+	Size Analysis
SP1*	Sample Product
CC1+	Coal Composition
AF1+	Ash Fusion Analysis
AM1+	Ash Mineral Analysis
UL1+	Ultimate Analysis
SU1+	Sulphur Analysis

*where 1=Raw, 2=5%, 3=10%, 5=25% Reject from 5%, 6=25% Reject from 10%
+where 1=Cyclone Engineering Sales

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83001



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS DDH83001

	DY MO YR
START DATE	01/08/83
END DATE	08/08/83

CONTRACTOR J.T. THOMAS OPERATOR GCRI
GEOLOGIST K. JENNER SURVEYOR

REMARKS 410 LITRES OF DIESEL INTRODUCED INTO DRILLING FLUID AT A DEPTH OF 45 METERS

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS DDH83001

PROVINCE BC ELEVATION (M) 1841.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344261.00	EASTING 505704.00	
2	LAT-LONG:	LAT 571436	LONG 1285420		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS DDH83001

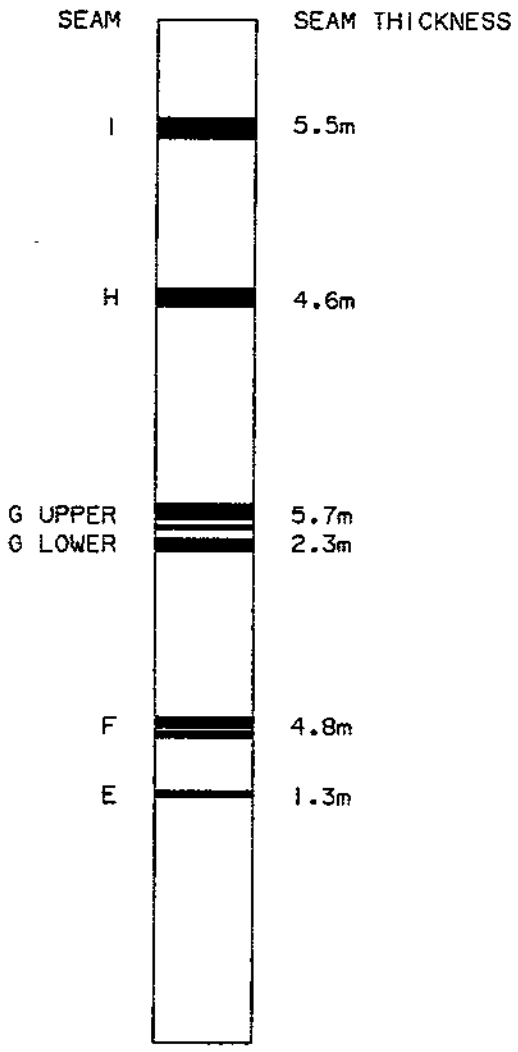
DIMENSIONS AND ORIENTATION:

LENGTH (M) 299.40 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 3.66 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) 37.45 42.60

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83001



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83001										
	I	6358	26.90	30.07	92.11	2.61	0.31	0.13	0.12	2.74- 0.43
	I	6359	30.07	32.68	100.00	2.46	0.15	0.00	0.00	2.46- 0.15
	H	6360	74.73	77.10	92.82	1.74	0.46	0.17	0.00	1.91- 0.46
	H	6361	77.10	78.74	100.00	1.62	0.02	0.00	0.00	1.62- 0.02
	H	6362	78.74	79.38	100.00	0.40	0.24	0.00	0.00	0.40- 0.24
	G	6363	133.42	137.43	92.01	2.74	0.95	0.32	0.00	3.06- 0.95
	G	6364	137.43	138.22	100.00	0.00	0.79	0.00	0.00	0.00- 0.79
	G	6365	138.22	139.19	88.65	0.52	0.34	0.11	0.00	0.63- 0.34
	G	6367	142.45	144.75	96.52	1.22	1.00	0.04	0.04	1.26- 1.04
	F	6368	180.62	182.98	100.00	2.30	0.06	0.00	0.00	2.30- 0.06
	F	6369	182.98	183.25	100.00	0.06	0.21	0.00	0.00	0.06- 0.21
	F	6370	183.25	184.65	100.00	1.26	0.14	0.00	0.00	1.26- 0.14
	F	6371	184.65	185.52	100.00	0.34	0.53	0.00	0.00	0.34- 0.53
	E	6372	209.60	210.94	97.76	1.31	0.00	0.03	0.00	1.34- 0.00

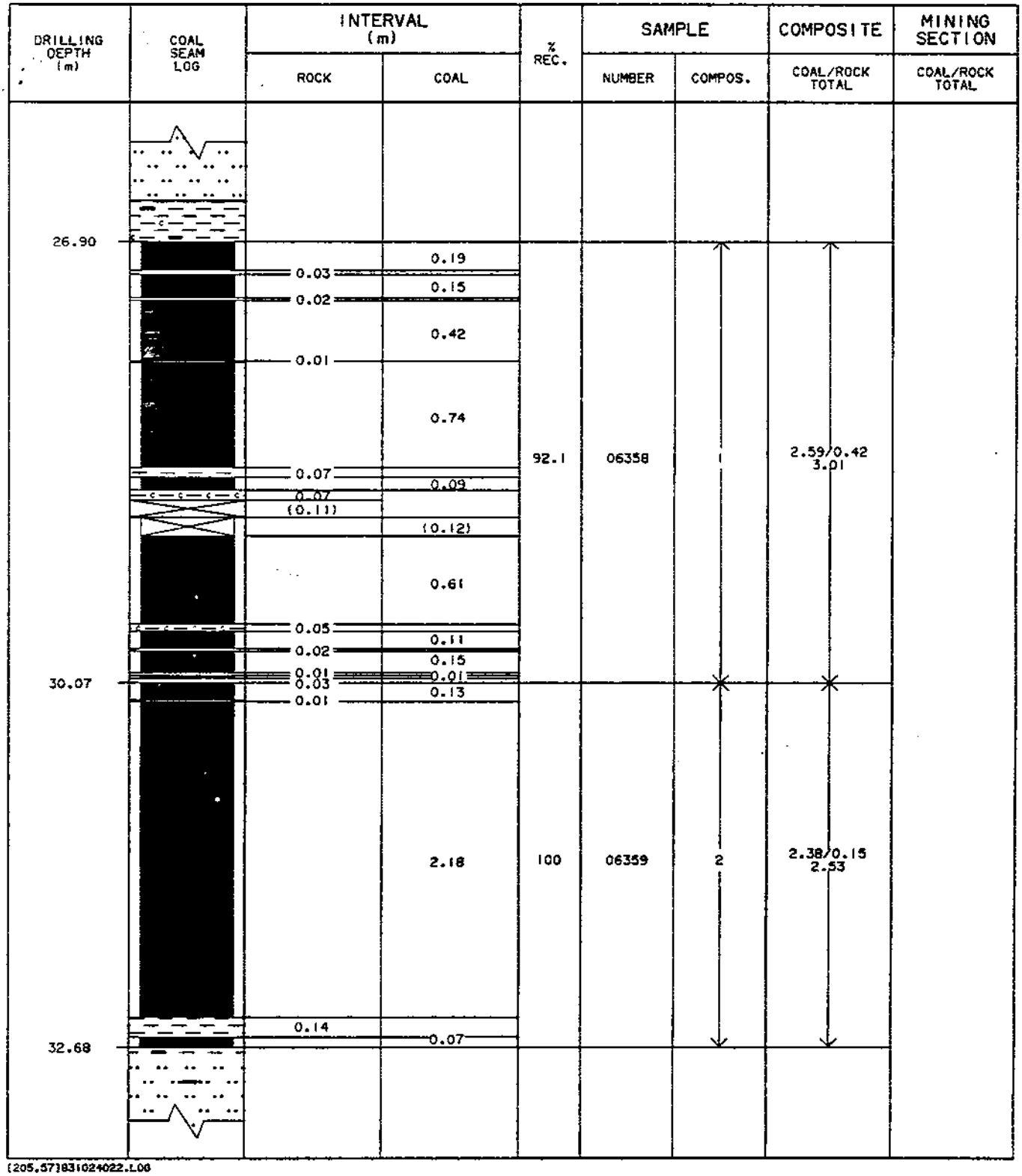
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 COMPOSITE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	COMP ID	SAMPLE FROM	SAMPLE TO	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83001												
	SEAM I	1	6358	6358	26.90	30.07	92.11	2.61	0.31	0.13	0.12	2.74- 0.43
	SEAM I	2	6359	6359	30.07	32.68	100.00	2.46	0.15	0.00	0.00	2.46- 0.15
	SEAM H	3	6360	6360	74.73	77.10	92.82	1.74	0.46	0.17	0.00	1.91- 0.46
	SEAM H	4	6361	6361	77.10	78.74	100.00	1.62	0.02	0.00	0.00	1.62- 0.02
	SEAM H	5	6362	6362	78.74	79.38	100.00	0.40	0.24	0.00	0.00	0.40- 0.24
	SEAM G	6	6363	6363	133.42	137.43	92.01	2.74	0.95	0.32	0.00	3.06- 0.95
	SEAM G	7	6367	6367	142.45	144.75	96.52	1.22	1.00	0.04	0.04	1.26- 1.04
	SEAM F	8	6368	6371	180.62	185.52	100.00	3.96	0.94	0.00	0.00	3.96- 0.94
	SEAM E	9	6372	6372	209.60	210.94	97.76	1.31	0.00	0.03	0.00	1.34- 0.00



(205.57)831024022.L06

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM 1 APPARENT THICKNESS
SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 26.90 m - 32.68 m

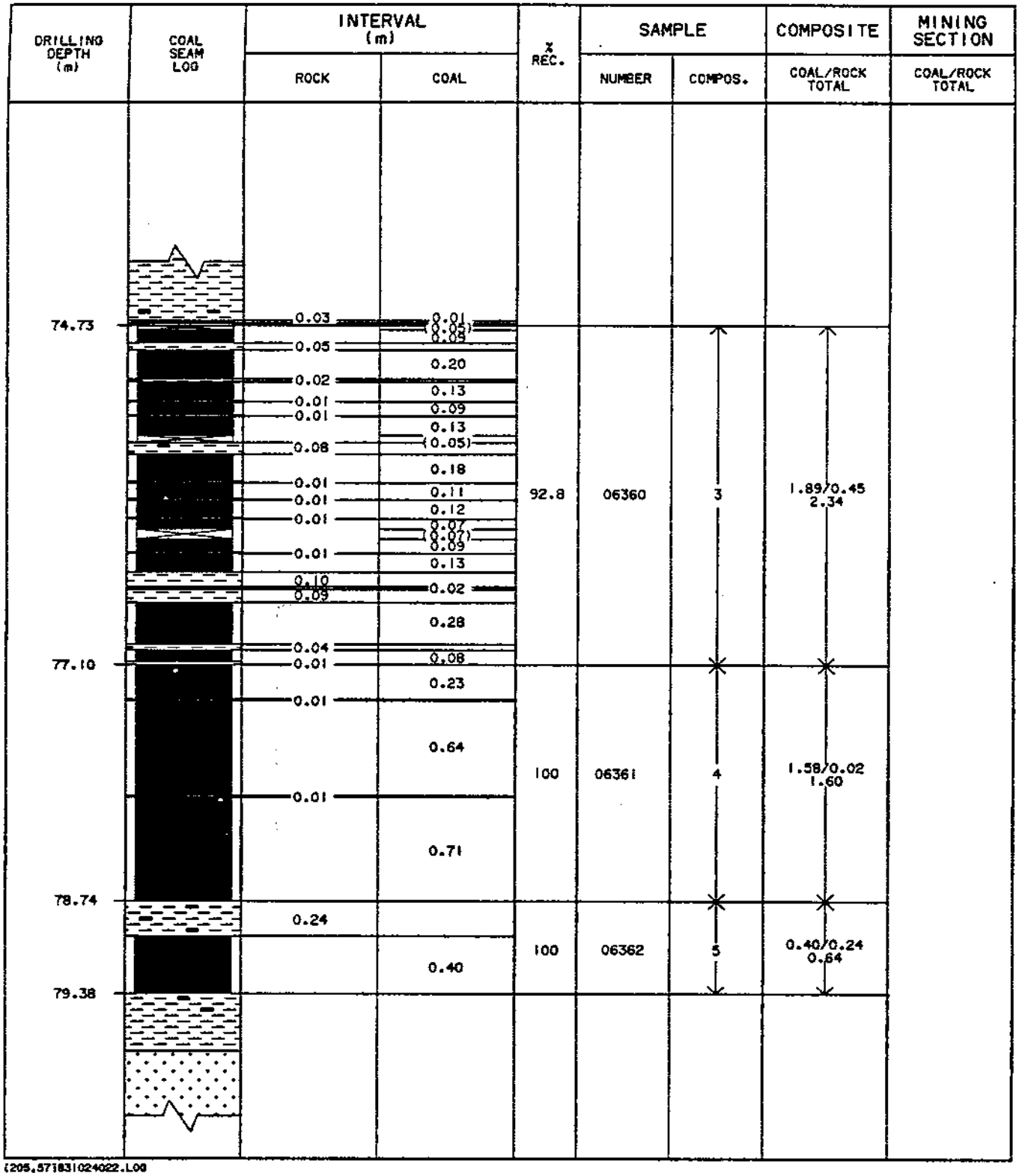
GEOPHYSICAL LOGS

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	26.90			0.20										
			0.03	0.16										
			0.02	0.44										
			0.01											
				0.78	92.1	06358	1	2.54	25.98	6.67	64.81	0.39	23.98	
			0.07											
			0.07	0.09										
			(0.12)											
				(0.13)										
				0.65										
			0.05											
			0.02	0.12										
			0.01	0.16										
	30.07		0.01	0.01										
			0.03	0.13										
			0.01											
				2.26	100	06359	2	4.17	16.66	10.73	68.44	0.41	26.20	
			0.14											
				0.07										
	32.68													

[205,57]831024020.LOG



(205.57183102402Z.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM H

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM H

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 74.73 m - 79.38 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	74.73			(0.05)										
			0.05	0.09										
				0.20										
			0.02	0.13										
			0.01	0.09										
			0.01	0.13										
				(0.05)										
			0.08	0.19										
			0.01	0.11										
			0.01	0.12	92.8	06360	3	1.58	38.58	6.20	53.64	0.42	19.63	
			0.01	0.07										
				(0.07)										
			0.01	0.09										
				0.13										
			0.10	0.02										
			0.09	0.29										
			0.04	0.08										
	77.10		0.02	0.24										
			0.01	0.66	100	06361	4	1.47	16.74	5.39	76.40	0.43	28.45	
			0.01	0.72										
	78.74		0.24	0.40	100	06362	5	1.69	49.94	9.68	38.69	0.28	14.75	
	79.38													

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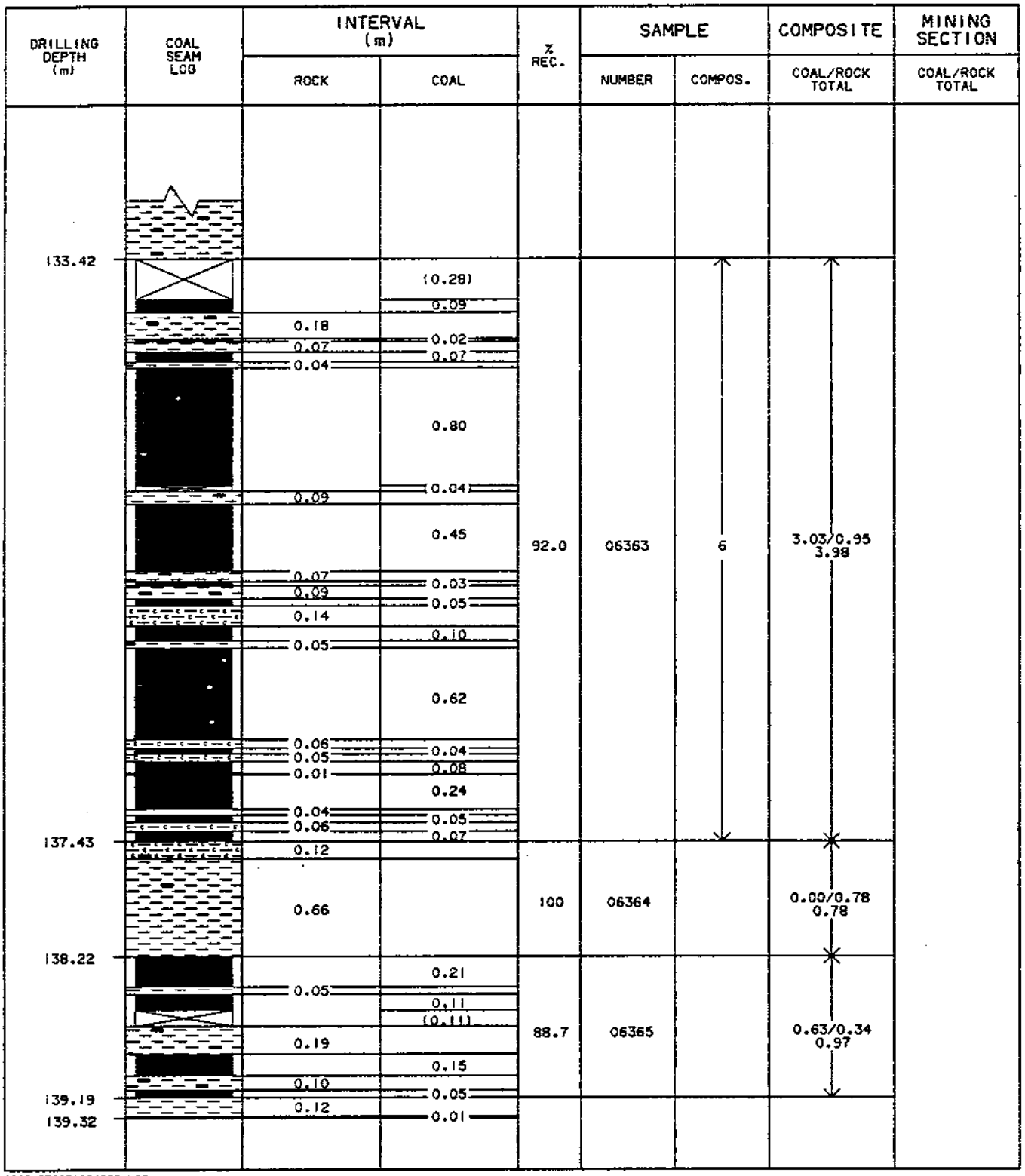


(205,571831024022.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM G UPPER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

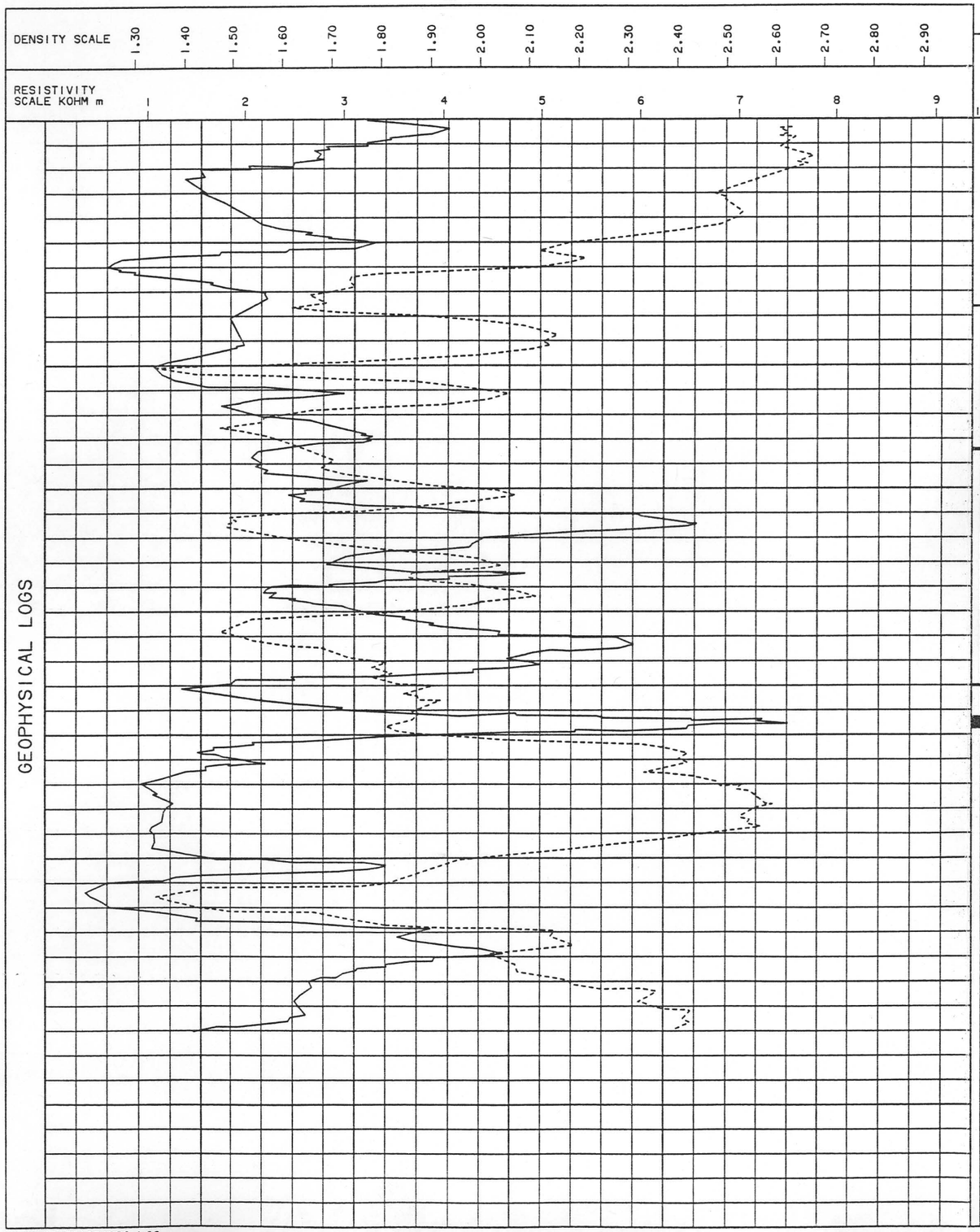
COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM G UPPER

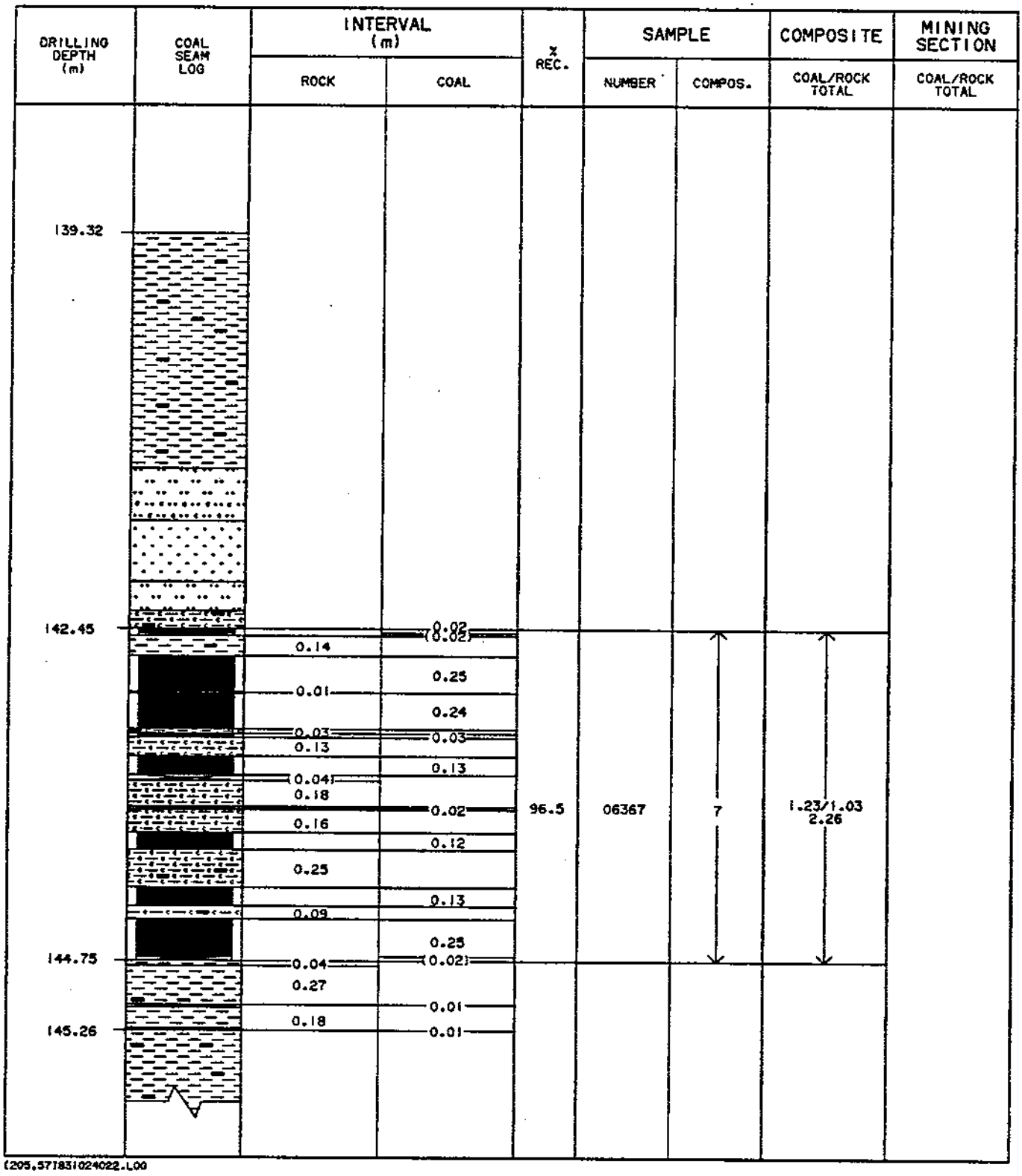
SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 133.42 m - 139.19 m



SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6														
	133.42			(0.28)										
				0.09										
			0.18											
				0.02										
			0.07											
				0.07										
			0.04											
				0.81										
				0.04										
			0.09											
				0.46	92.0	06363	6	1.33	42.75	7.21	48.71	0.51	17.88	
			0.07											
				0.03										
			0.09											
				0.05										
			0.14											
				0.10										
			0.05											
				0.63										
			0.06											
				0.04										
			0.05											
				0.08										
			0.01											
				0.24										
			0.04											
				0.05										
			0.06											
	137.43			0.07										
			0.12											
			0.67		100	06364			89.44					
	138.22			0.21										
			0.05											
				0.11										
				(0.11)										
			0.19		88.7	06365			64.03				10.08	
				0.15										
			0.10											
	139.19			0.05										
	139.32			0.01										

[205,571831024020.LOG



(205,57183)024022.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM G LOWER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM G LOWER

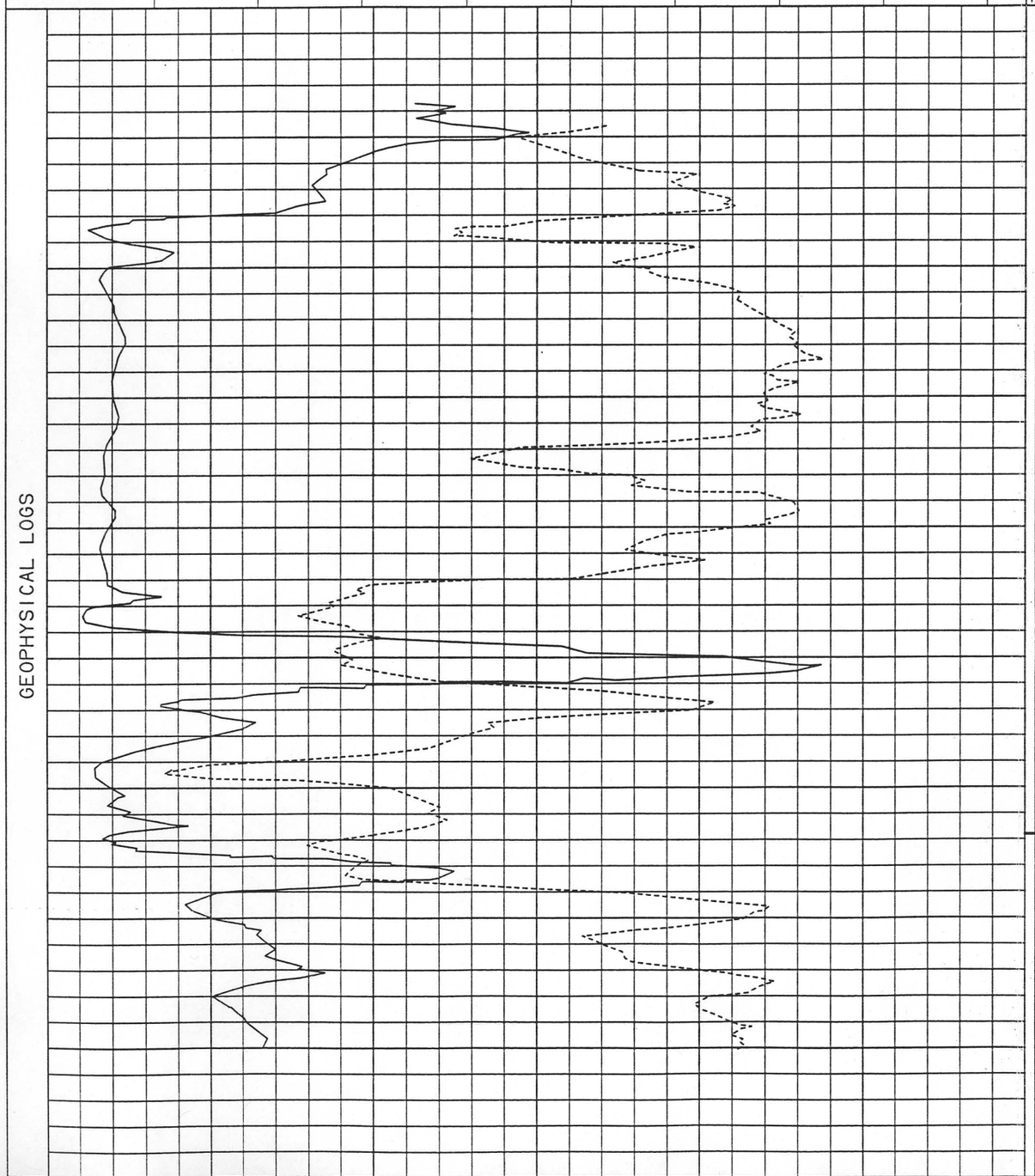
SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 142.45 m - 144.75 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

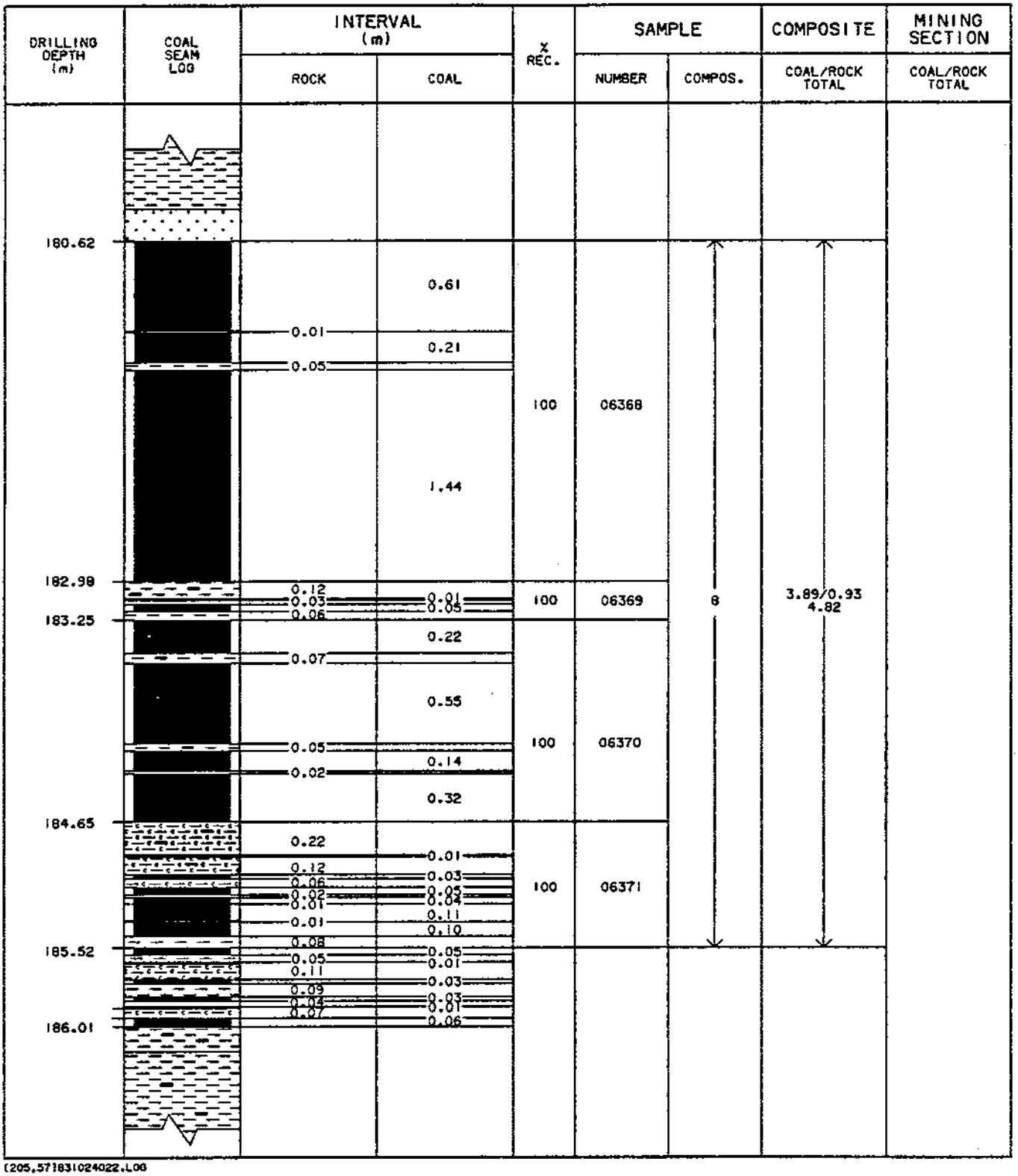
RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

GEOPHYSICAL LOGS



SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6	139.32													
	142.45			0.02										
				(0.02)										
			0.14											
				0.25										
			0.01											
				0.25										
			0.03											
				0.03										
			0.13											
				0.13										
			(0.04)											
			0.18											
				0.02	96.5	06367	7	1.43	53.80	6.12	38.65	0.26	13.81	
			0.16											
				0.12										
			0.26											
				0.13										
			0.09											
				0.26										
	144.75			(0.02)										
			0.04											
				0.01										
			0.27											
				0.01										
			0.18											
	145.26			0.01										

[205,571831024020.LOG



(205,571831024022,LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM F

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

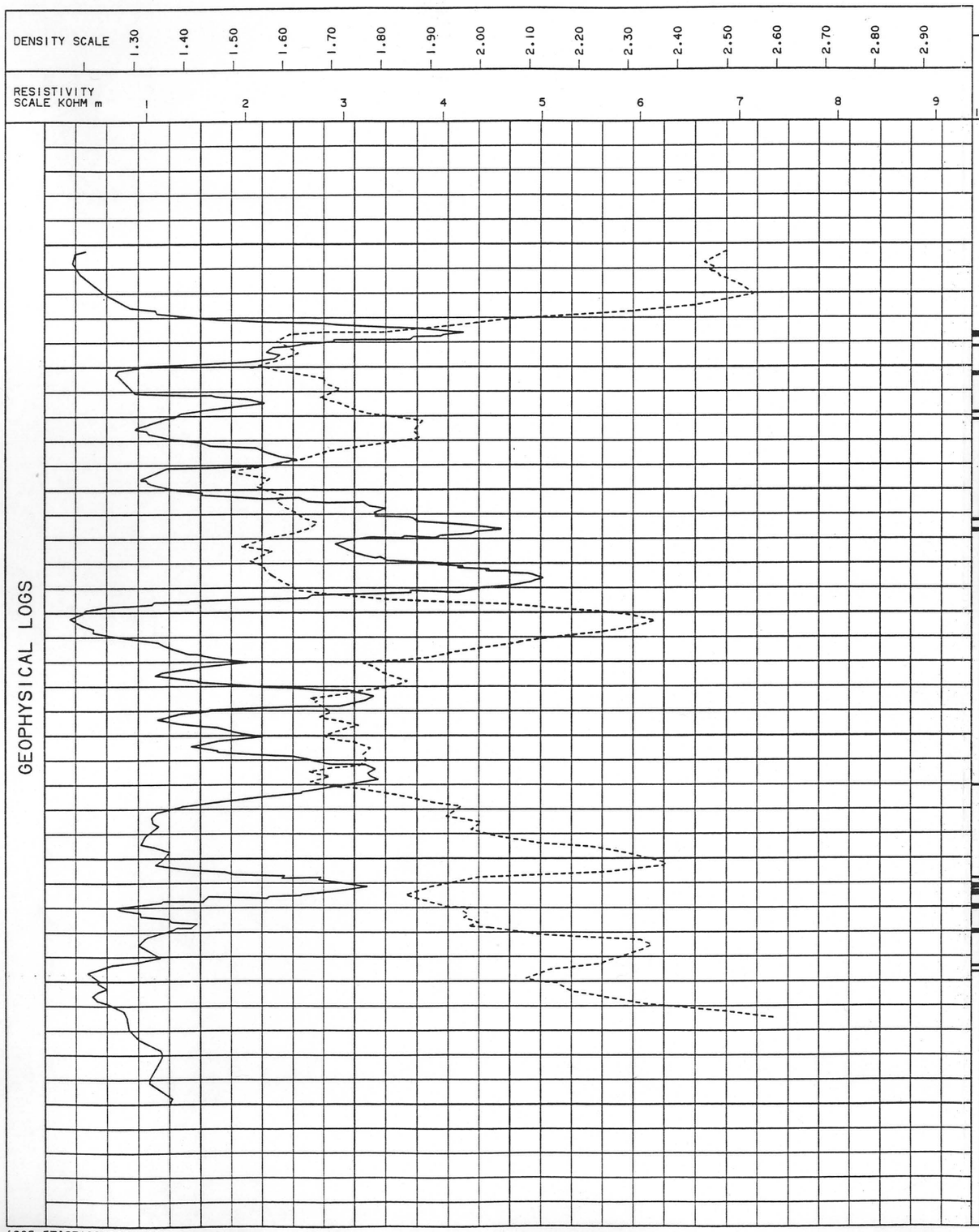
COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM F

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 180.62 m - 185.52 m



SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6	180.62			0.62										
			0.01	0.21										
			0.05		100	06368								
				1.47										
	182.98		0.12	0.01										
			0.03	0.05	100	06369	8	1.42	36.68	6.30	55.60	0.86	20.74	
	183.25		0.06											
				0.23										
			0.07											
				0.56										
			0.05		100	06370								
				0.14										
			0.02											
				0.33										
	184.65		0.23											
				0.01										
			0.12	0.03										
			0.06	0.05										
			0.02	0.04	100	06371								
			0.01	0.11										
			0.01	0.10										
			0.08											
	185.52			0.05										
			0.11											
				0.03										
			0.09	0.03										
			0.04	0.01										
	186.01		0.07	0.06										

[205,571831024020.LOG

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	COMPOSITE COAL/ROCK TOTAL	MINING SECTION COAL/ROCK TOTAL
209.60								
			1.29	97.8	06372	9	1.32/0.00 1.32	
210.94			(0.03)					

(205,571831024022.L00)

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83001

SEAM E

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83001 SEAM E

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 209.60 m - 210.94 m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

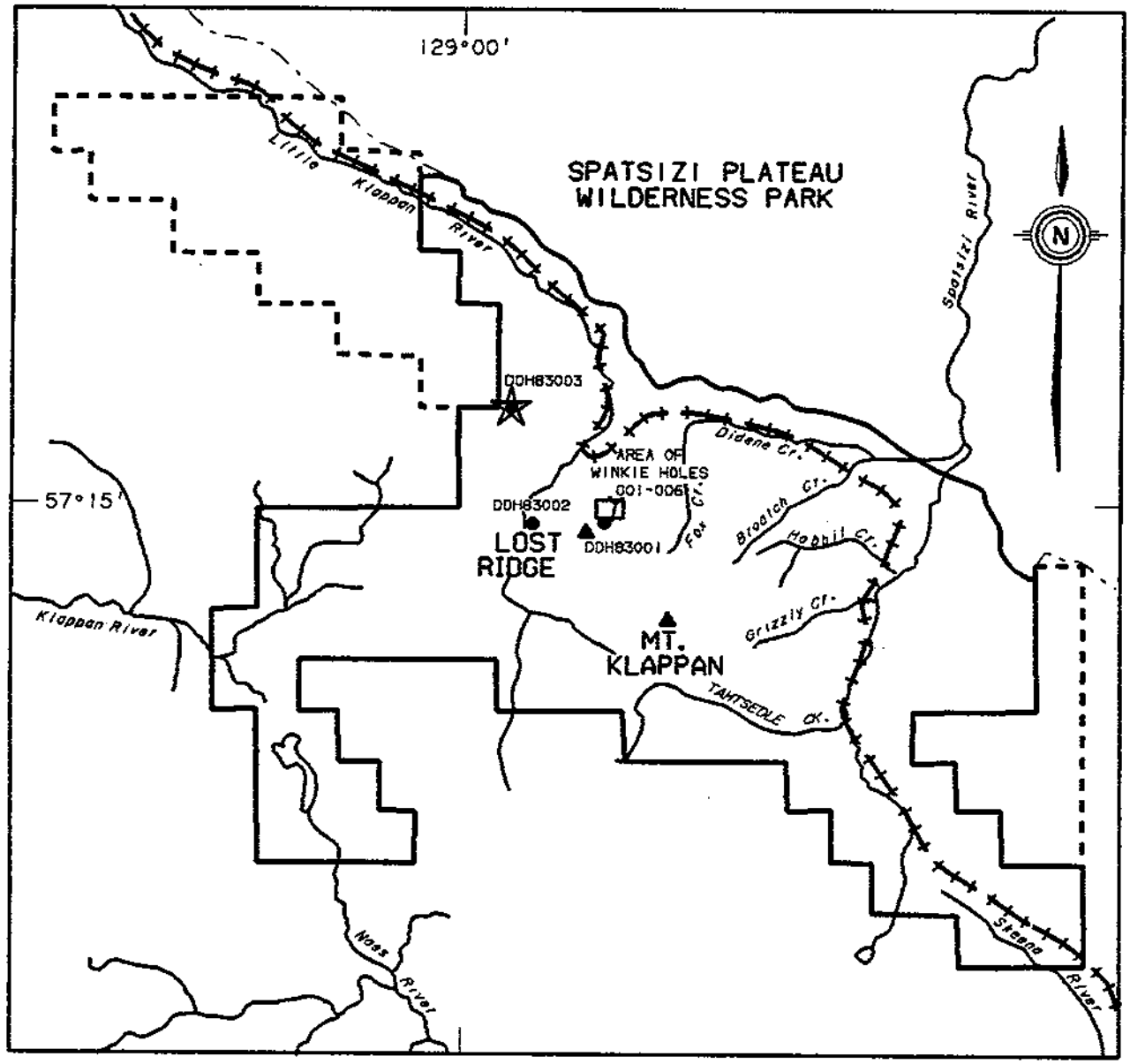
GEOPHYSICAL LOGS

SEAM COMP.	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
1 2 3 4 5 6														
	209.60			1.31	97.8	06372	9	1.41	17.43	6.32	74.84	0.45	28.11	
	210.94			(0.03)										

[205,57]831024020.LOG

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH830003



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

GCRI COAL DIVISION HISTORY PROJ KPN BLK SS DS DDH83003

	DY MO YR
START DATE	12/08/83
END DATE	18/08/83

CONTRACTOR J.T. THOMAS OPERATOR G.C.R.I.
GEOLOGIST S. MCKENZIE SURVEYOR

REMARKS

GCRI COAL DIVISION LOCATION PROJ KPN BLK SS DS DDH83003

PROVINCE BC ELEVATION (M) 1825.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6349585.00	EASTING 501657.00
2	LAT-LONG:	LAT 571728	LONG 1285821

CRI COAL DIVISION ORIENTATION PROJ KPN BLK SS DS DDH83003

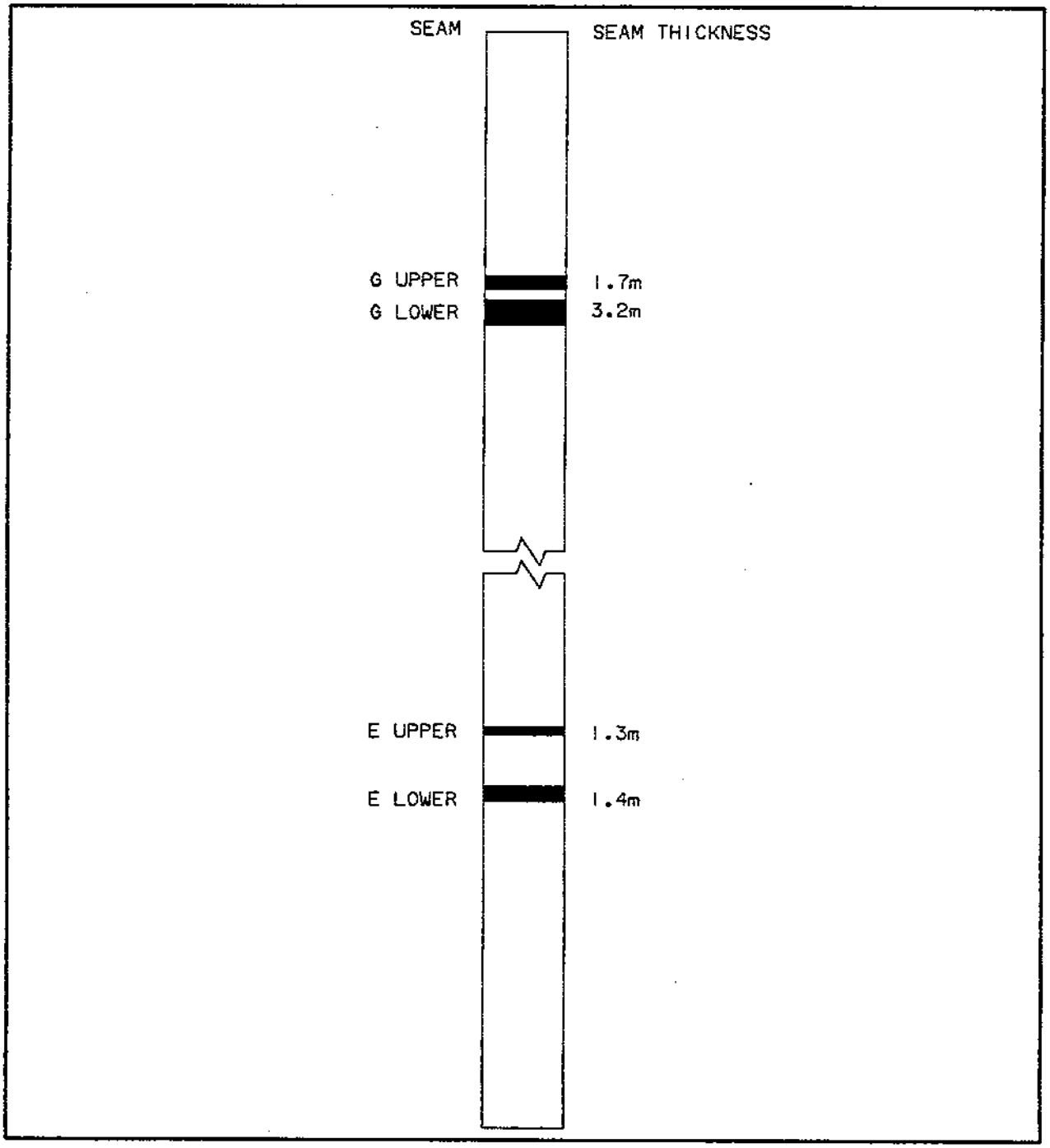
DIMENSIONS AND ORIENTATION:

LENGTH (M) 192.60 INCLINATION 60.0 AZIMUTH 230.0
SIZE WIDTH ___._ SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 5.50 CEMENT(Y,_) _ PLUG(Y,_) _ PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 DIAMOND DRILL HOLE
DDH83003



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83003										
	G UPPER	6373	40.30	42.05	35.42	0.39	0.23	0.68	0.45	1.07- 0.68
	G LOWER	6374	44.80	48.00	65.31	1.52	0.57	0.41	0.70	1.93- 1.27
	E UPPER	6375	126.95	128.24	78.29	0.81	0.20	0.28	0.00	1.09- 0.20
	E LOWER	6376	137.68	138.48	75.00	0.39	0.21	0.10	0.10	0.49- 0.31
	E LOWER	6377	138.48	139.10	100.00	0.62	0.00	0.00	0.00	0.62- 0.00

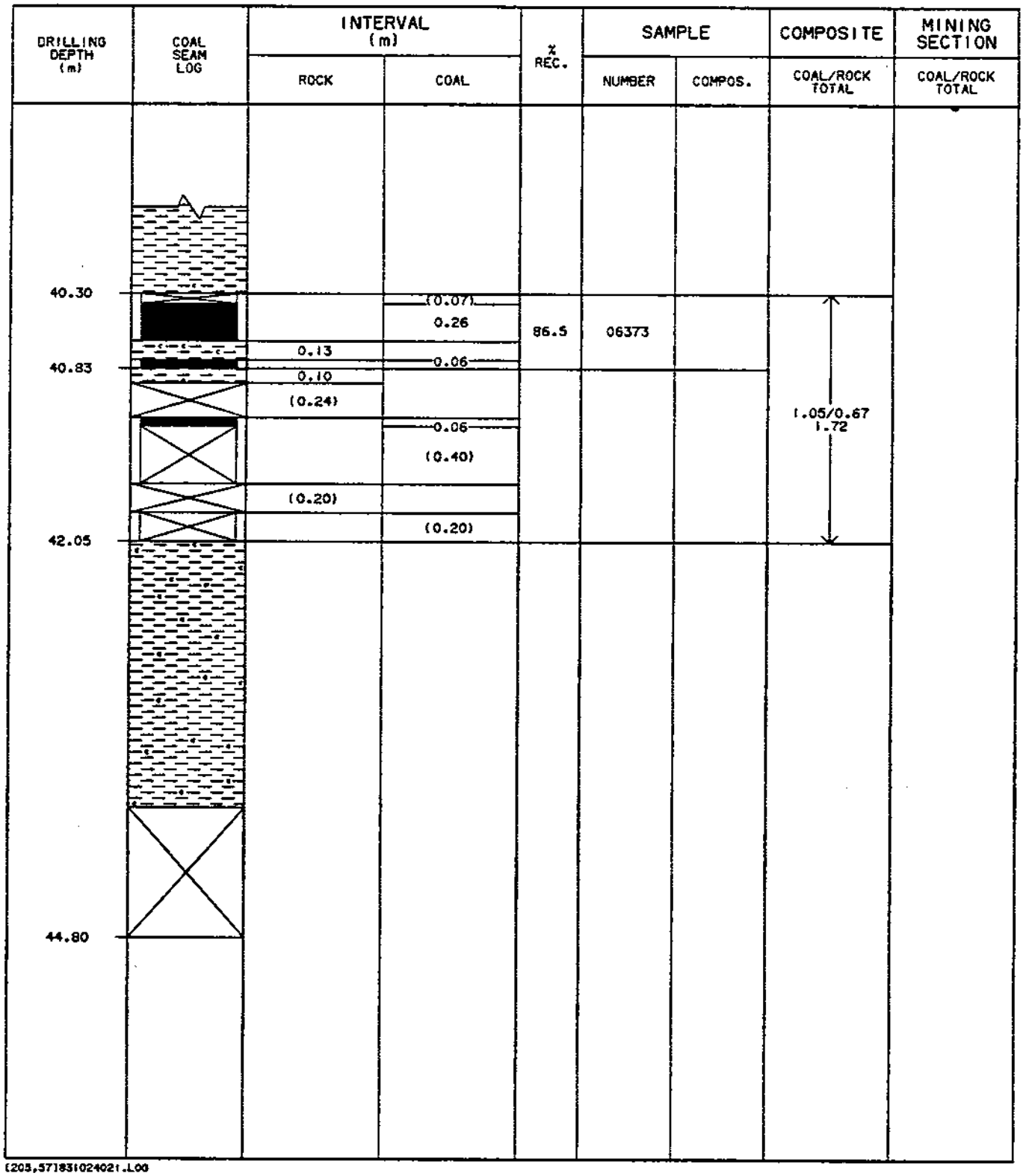
GULF CANADA RESOURCES INC. - COAL DIVISION

16/MAR/84 COMPOSITE SAMPLE SUMMARY

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	COMP ID	SAMPLE FROM	SAMPLE TO	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
DDH83003												
	G LOWER	10	6374	6374	44.80	48.00	65.31	1.52	0.57	0.41	0.70	1.93- 1.27
	E UPPER	11	6375	6375	126.95	128.24	78.29	0.81	0.20	0.28	0.00	1.09- 0.20
	E LOWER	12	6376	6377	137.68	139.10	85.91	1.01	0.21	0.10	0.10	1.11- 0.31



(203,5718310240211.LOG

GULF CANADA RESOURCES INC.	Gulf
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS DDH83003 SEAM G UPPER	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM G UPPER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 40.30 m - 40.83 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	40.30			(0.07) 0.27	86.8	06373			55.24				20.69	
			0.13	0.06										
	40.83		0.10											
			(0.25)											
				0.06										
				(0.41)										
			(0.20)											
	42.05			(0.20)										
	44.80													

[205,57]831024019.LOG

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	COMPOSITE COAL/ROCK TOTAL	MINING SECTION COAL/ROCK TOTAL
44.80			(0.20)					
		(0.02)	0.09					
		0.02	0.26					
		(0.11)						
		0.24						
			0.26					
			(0.05)					
		(0.05)						
		0.09						
			0.19	65.3	06374	10	1.93/1.27 3.20	
		0.06						
		(0.12)						
			0.44					
		(0.40)						
		0.05	0.01					
		0.03	0.14					
		0.08						
			0.13					
48.00			(0.16)					

[205,371831024021.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM G LOWER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM G LOWER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 44.80 m - 48.00 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	44.80			(0.20)										
			(0.02)	0.09										
			0.02	0.26										
			(0.11)											
			0.24	0.26										
			(0.05)	(0.05)										
			0.09	0.19	65.3	06374	10	1.62	55.49	7.25	35.64	0.38	13.05	
			0.06											
			(0.12)	0.44										
			(0.40)											
			0.05	0.01										
			0.03	0.14										
			0.08											
				0.13										
	48.00			(0.16)										

[205.571831024019.LOG

DRILLING DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	COMPOSITE COAL/ROCK TOTAL	MINING SECTION COAL/ROCK TOTAL
126.95			0.26	78.3	06375	11	1.06/0.20 1.26	
			(0.27)					
		0.16						
			0.46					
128.24		0.04	0.07					
132.22								

[205,571831024021.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

DDH83003

SEAM E UPPER

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM E UPPER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 126.95 m - 128.24 m

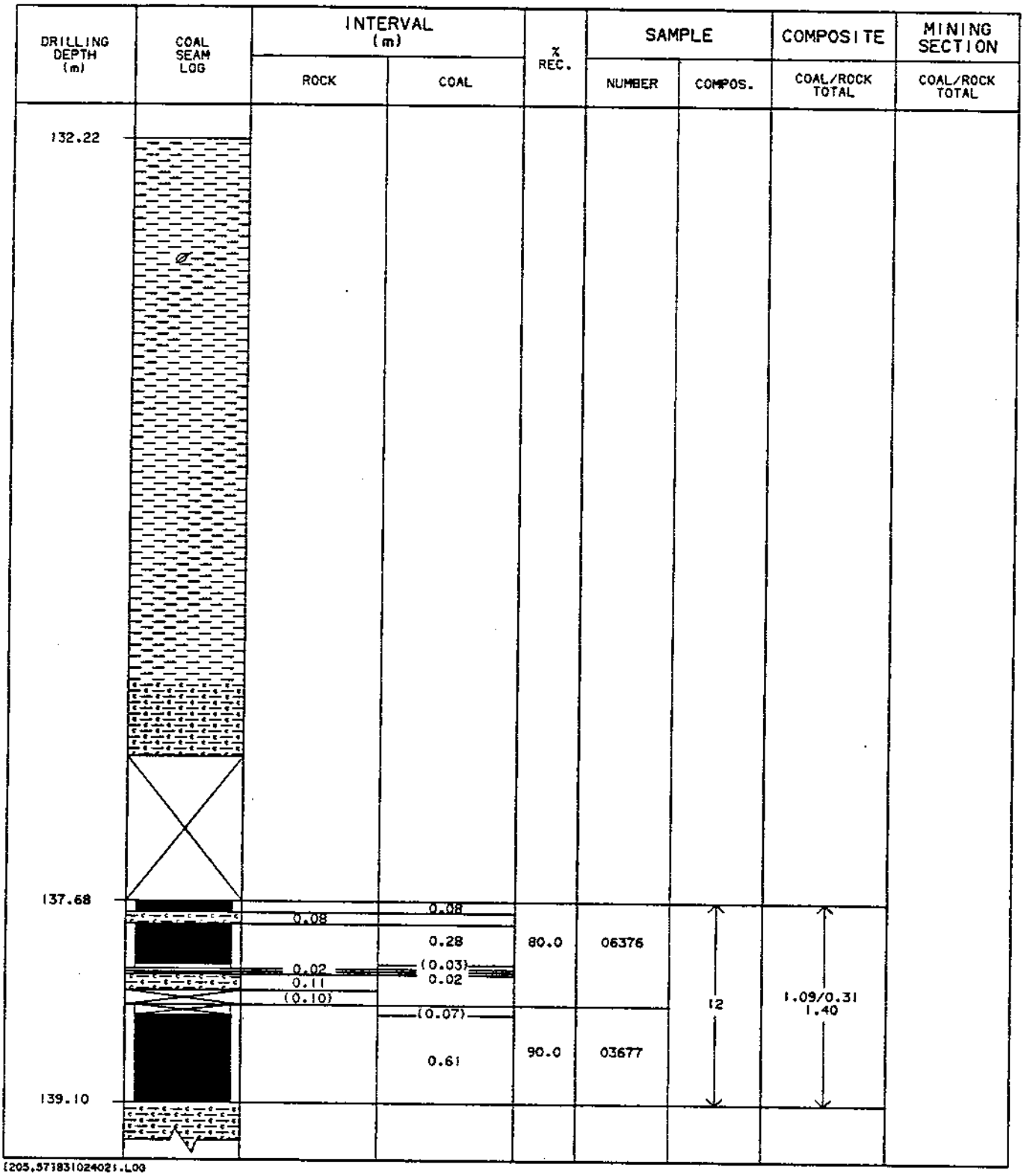
DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	126.95			0.27										
				(0.28)										
			0.16		78.3	06375	11	1.38	61.14	5.55	31.93	0.62	10.44	
				0.47										
	128.24		0.04	0.07										
	132.22													

[205,57]831024019.LOG



[205,57183102402s.LOG

GULF CANADA RESOURCES INC.	
MT. KLAPPAN COAL PROPERTY SEAM DETAIL TRUE THICKNESS DDH83003 SEAM E LOWER	
DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

GULF CANADA RESOURCES INC.
COAL DIVISION

COAL SEAM DATA SHEET

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. KPN-DDH83003 SEAM E LOWER

SCALE 1:40 FORMATION KLAPPAN SEQUENCE

APPARENT THICKNESS
SEAM INTERVAL 137.68 m - 139.10 m

DENSITY SCALE 2.00 1.50 2.00 2.50

RESISTIVITY SCALE KOHM m

GEOPHYSICAL LOGS

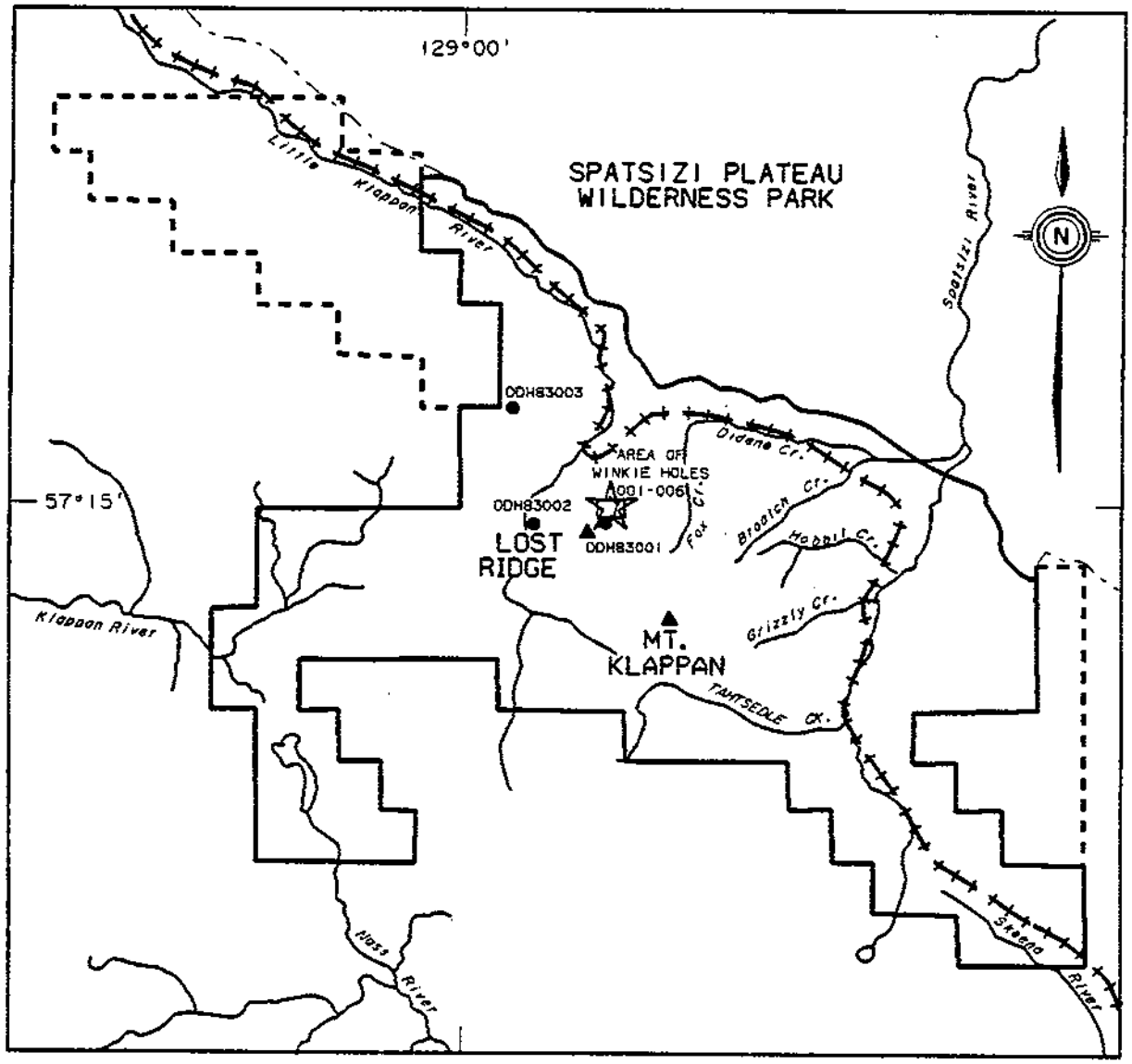
SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	132.22													
	137.68		0.08	0.08										
				0.21	80.0	06376								
				(0.03)										
			0.02	0.02										
			0.11											
			(0.10)											
				(0.07)										
				0.62	90.0	03677								
	139.10													

								12	1.49	52.42	6.71	39.38	1.24	13.98

[205,571831024019.LOG

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83002

	DY MO YR
START DATE	09/07/83
END DATE	10/07/83

CONTRACTOR TECK CORP OPERATOR GCRI
GEOLOGIST C WILLIAMS SURVEYOR

REMARKS ENTIRE HOLE INCLUDING COAL SHOW SIGNS OF OXIDATION . TIGHT INTERVAL AT APPROXIMATELY 3.05 METERS AND AGAIN AT 8.23 METERS.

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83002

PROVINCE BC ELEVATION (M) 1827.00
LICENCE / LEASE NUMBER _____

CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344340.00	EASTING	505758.00
2	LAT-LONG:	LAT _____	LONG _____		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83002

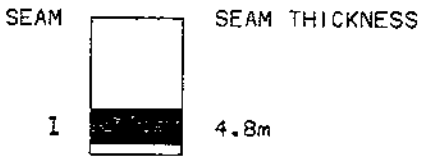
DIMENSIONS AND ORIENTATION:

LENGTH (M) 17.22 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH 34.0 SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) 2.74 CEMENT(Y,_) N PLUG(Y,_) N PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83002



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

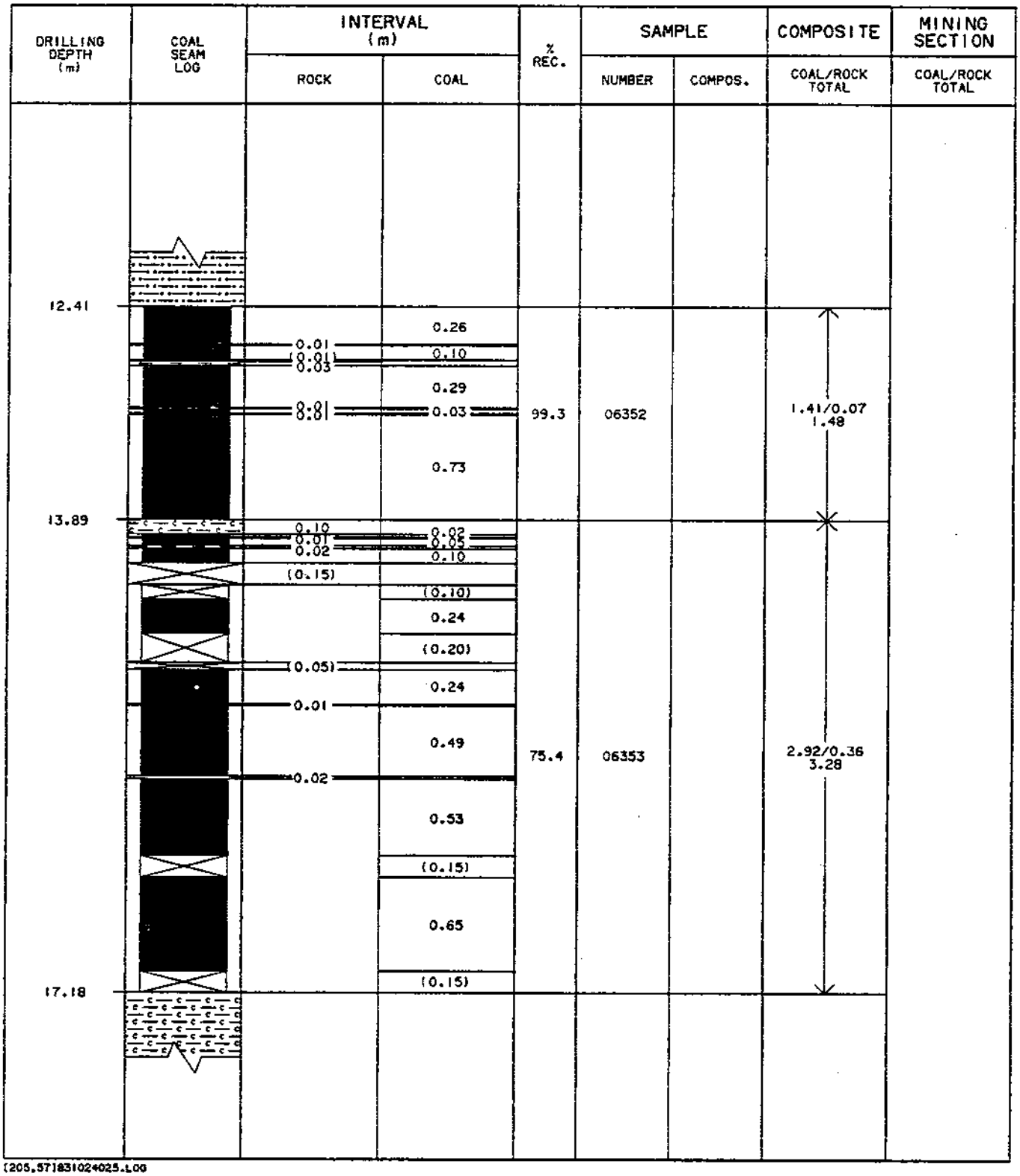
GULF CANADA RESOURCES INC. - COAL DIVISION

15/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WK083002										
		6352	12.41	13.89	99.32	1.41	0.06	0.00	0.01	1.41- 0.07
		6353	13.89	17.18	75.37	2.32	0.16	0.61	0.20	2.93- 0.36



[205,571831024025.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

WKD83002

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83002 SEAM _____ APPARENT THICKNESS
SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 12.41m-17.18m

DENSITY SCALE 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90

RESISTIVITY SCALE KOHM m 1 2 3 4 5 6 7 8 9

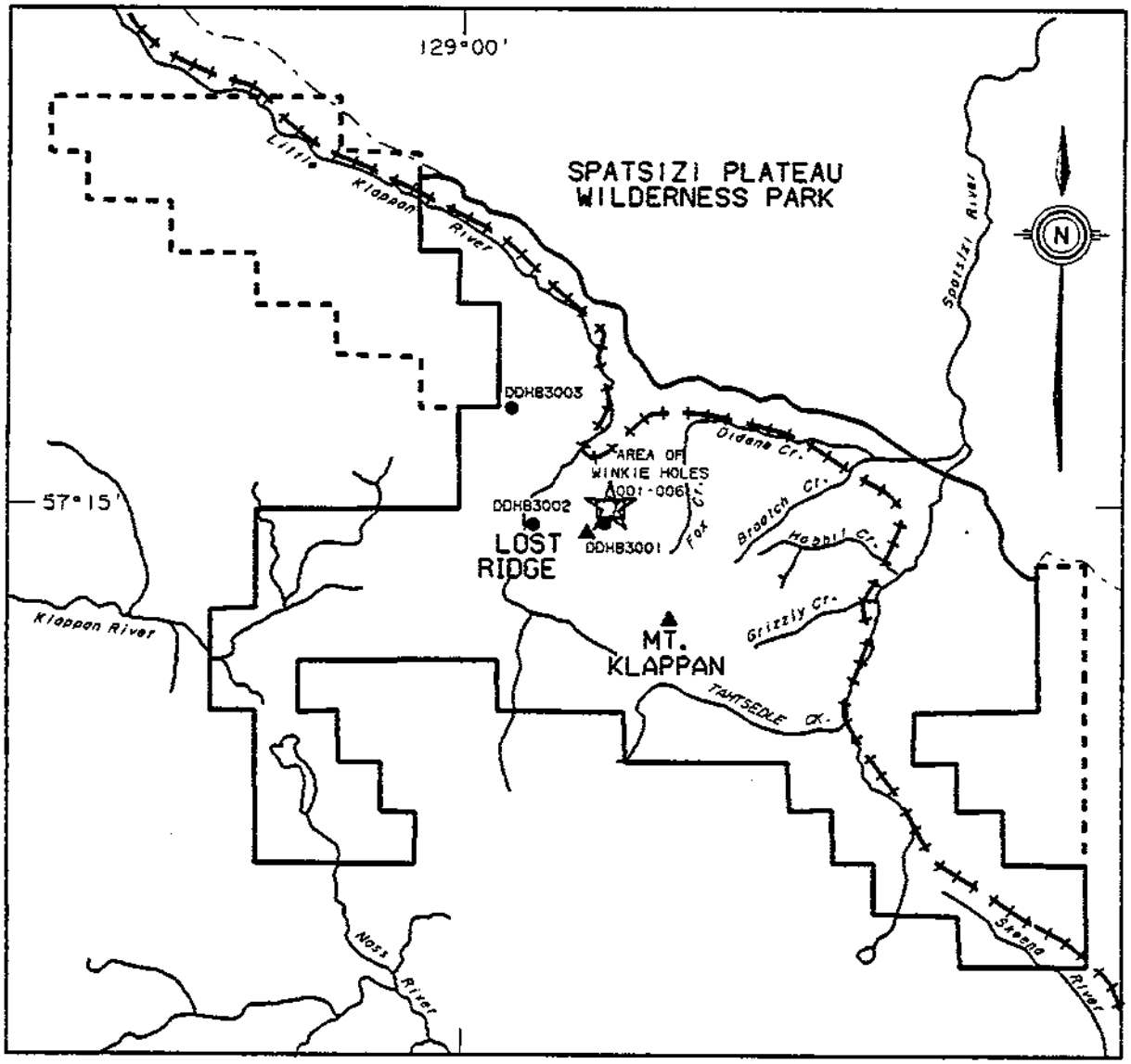
GEOPHYSICAL LOGS

SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	12.41			0.26										
			0.01	(0.01)										
			0.03	0.29										
			0.01	0.03	99.3	06352		1.70	19.10	7.70	71.50	0.45	6292	
				0.73										
	13.89		0.10	0.02										
			0.01	0.05										
			0.02	0.10										
			(0.15)											
				(0.10)										
				0.24										
				(0.21)										
			(0.05)											
				0.24										
			0.01											
				0.49	75.4	06353		1.70	22.10	7.50	68.70	0.41	5957	
			0.02											
				0.53										
				(0.15)										
				0.65										
	17.18			(0.15)										

[205,57]831024024.LOG

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLES
WKD83001 -WKD83006



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
09/03/84

Gulf

GCRI COAL DIVISION HISTORY PROJ KPN BLK LR DS WKD83004

	DY MO YR
START DATE	15/07/83
END DATE	17/07/83

CONTRACTOR TECK CORP OPERATOR GCRI
GEOLOGIST C.WILLIAMS SURVEYOR

REMARKS 72% COAL SEAM RECOVERY

GCRI COAL DIVISION LOCATION PROJ KPN BLK LR DS WKD83004

PROVINCE BC ELEVATION (M) 1824.00
LICENCE / LEASE NUMBER _____
CHOOSE ONE LOCATION TYPE AND INPUT THE CORRESPONDING NUMBER _

1	UTM:	ZONE 09	NORTHING 6344334.00	EASTING	505816.00
2	LAT-LONG:	LAT 571438	LONG 1285413		

GCRI COAL DIVISION ORIENTATION PROJ KPN BLK LR DS WKD83004

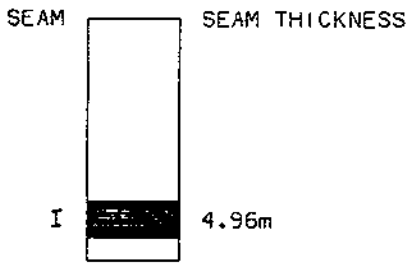
DIMENSIONS AND ORIENTATION:

LENGTH (M) 30.93 INCLINATION 90.0 AZIMUTH ___._
SIZE WIDTH 34.0 SIZE HEIGHT
ROOF STRIKE DIP DIR
FLOOR STRIKE DIP DIR

CASING DEPTH (M) ____.__ CEMENT(Y,_) N PLUG(Y,_) N PIEZ(Y,_) _
AQUIFER DEPTHS (M) ____.__ ____.__
LOST CIRC. DEPTHS (M) ____.__ ____.__

MT. KLAPPAN COAL PROPERTY

1983 WINKIE DIAMOND DRILL HOLE
WKD83004



SCALE: 1:1000

GULF CANADA RESOURCES INC.
09/03/84

GULF CANADA RESOURCES INC. - COAL DIVISION

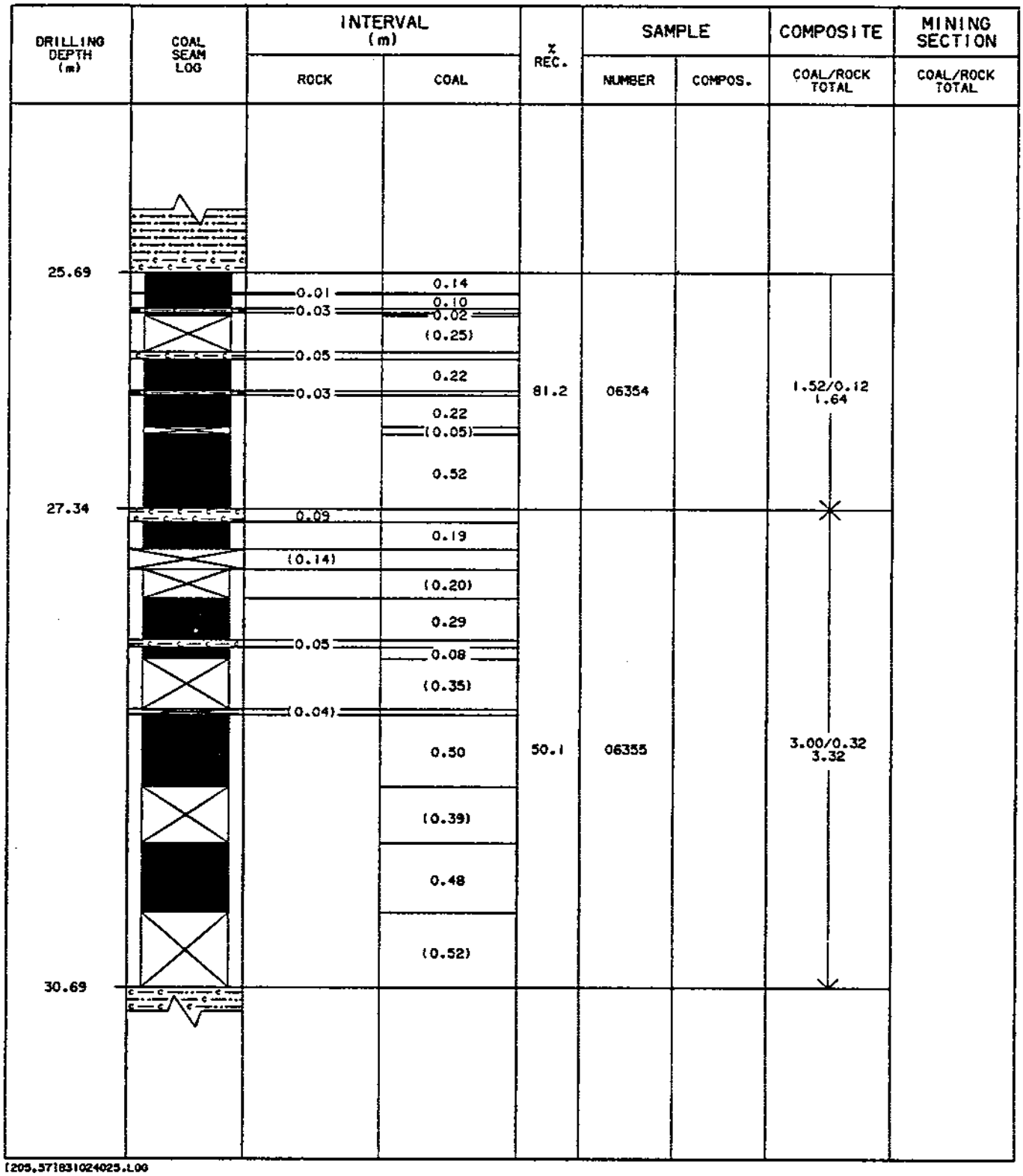
16/MAR/84 SIMPLE SAMPLE SUMMARY PAGE 1

APPARENT THICKNESS

KLAPPAN PROJECT

DATA SOURCE	SEAM	SAMPLE ID	DEPTH FROM	DEPTH TO	PERCENT REC	RECOVERED COAL	RECOVERED ROCK	MISSING COAL	MISSING ROCK	TOTAL COAL-ROCK
WKD83004										
		6354	25.69	27.34	81.21	1.22	0.12	0.31	0.00	1.53- 0.12
		6355	29.68	30.69	47.52	0.48	0.00	0.53	0.00	1.01- 0.00

FORM 9999



[205,57183102402S.LOG

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

WKD83004

SEAM 1

DRAWN BY: C. LOUIE	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

COAL SEAM DATA SHEET

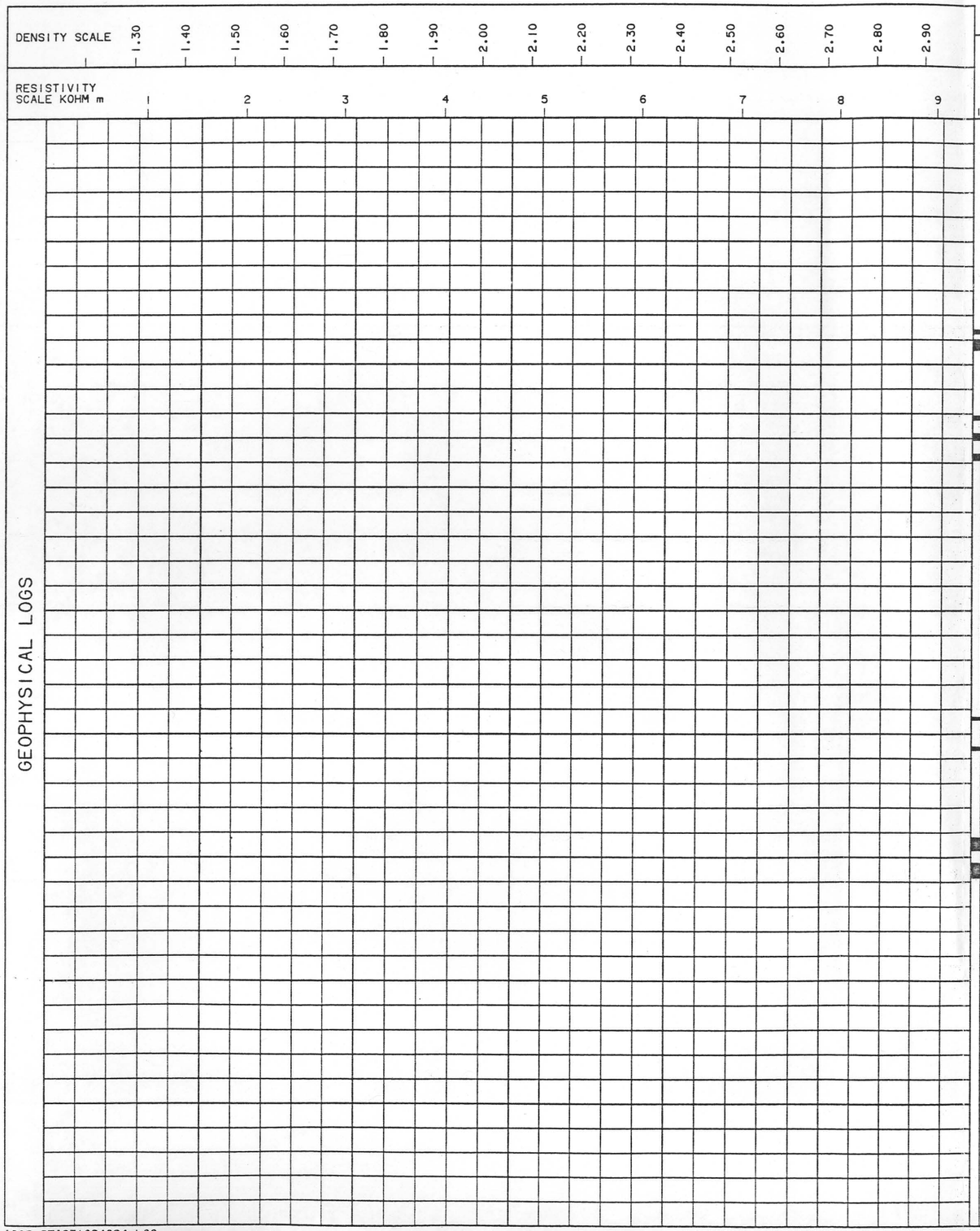
GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT DENSITY GRAMS/cc _____ RESISTIVITY _____

DRILL No. WKD-83004 SEAM _____ APPARENT THICKNESS

SCALE 1:40 FORMATION KLAPPAN SEQUENCE SEAM INTERVAL 26.69m-30.69m

GEOPHYSICAL LOGS



SEAM COMP. 1 2 3 4 5 6	DEPTH (m)	COAL SEAM LOG	INTERVAL (m) ROCK	INTERVAL (m) COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	MOIST	ASH	VM	FC	S'	CAL. VAL. MJ/KG	FSI
	25.69			0.14										
			0.01	0.10										
			0.03	0.02										
				(0.26)										
			0.05											
				0.22										
			0.03		81.2	06354		1.40	15.70	6.30	76.60	0.48	6782	
				0.22										
				(0.05)										
				0.52										
	27.34		0.09											
				0.19										
			(0.14)											
				(0.20)										
				0.29										
			0.05											
				0.08										
				(0.36)										
			(0.04)											
				0.50	50.1	06355		1.50	30.00	7.40	61.10	0.39	5257	
				(0.40)										
				0.48										
				(0.53)										
	30.69													

[205,57]831024024.LOG

111

GR. MT KLAPPAN 83(3)

MOUNT KLAPPAN COAL PROJECT

GEOLOGICAL REPORT

1983

APPENDIX IV

ADIT PROGRAM

VOLUME IV

GULF CANADA RESOURCES INC.

COAL DIVISION

CONFIDENTIAL

GULF CANADA RESOURCES INC.

MOUNT KLAPPAN BULK SAMPLE PROGRAM

1983

PART I PROCEDURES

PART II COAL QUALITY

CONFIDENTIAL COAL QUALITY DATA HAS BEEN REMOVED

GULF CANADA RESOURCES INC.

MARCH, 1984

MT. KLAPPAN ADIT REPORT PART I

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MT. KLAPPAN 1983 BULK SAMPLE PROGRAM

1.0 INTRODUCTION

1.1 Exploration Framework

The Mount Klappan Coal Property is located in northwestern British Columbia, some 336 kilometers northeast of Prince Rupert. The licences lie at the northern end of the Bowser Basin, just north of the Groundhog coalfield, and cover coal-bearing strata of Upper Jurassic to Lower Cretaceous age.

To date Gulf Canada Resources Inc. has conducted three years of exploration on the property which has resulted in the identification of two large areas of open-pit mine potential, (see Figure 1.1).

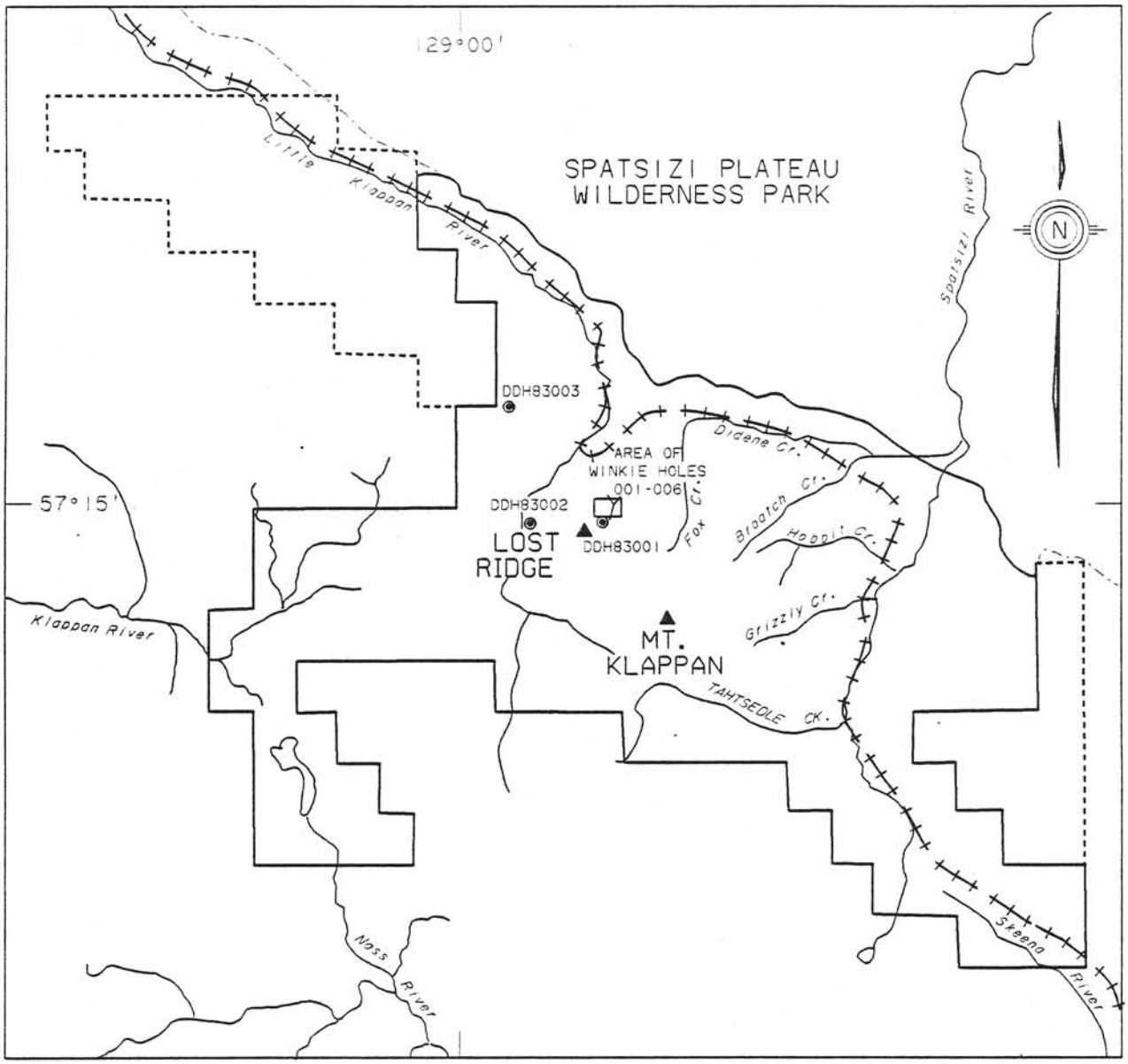
A bulk sampling program was undertaken in one of these areas on Lost Ridge during the period September 2nd to October 14th, 1983. A total of 39.24 tonnes of coal were taken from Seam I: 37.19 tonnes formed the bulk sample while the remaining 2.05 tonnes comprised various channel samples. The precise objectives of the bulk sampling program, which formed part of a much wider exploration effort, are discussed below in Section 1.2.

The data included in the following report is concerned solely with the bulk sampling program; Part I deals with logistics, monitoring, supervision and data collection processes while Part

FIGURE 1.1

MT. KLAPPAN COAL PROPERTY

LOCATION MAP



LEGEND

- PREPARED RAIL BED
- PROVINCIAL PARK BOUNDARY
- HQ DIAMOND DRILL HOLE - 1983
- AIX WINKIE HOLES - 1983 001-006
- ADIT 1983
- LICENCE AREA
- LICENCES UNDER APPLICATION

SCALE

0 1 2 3 4 5 km

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15/03/84

Gulf

II presents the technical data derived from the various samples that were taken.

1.2 Program Objectives

The three primary objectives of the 1983 Mount Klappan bulk sample program were as follows:

1) To provide information on the natural size distribution of anthracite from seam I in a mining situation.
2) To provide a sufficiently large and representative sample for a comprehensive analysis of a variety of sized coals in raw and cleaned states.
3) To provide material for sample product distribution to a number of potential customers.

Care was taken that sufficient material was extracted at the sample point both to provide for full representation of the seam and for all the samples for which requests had been received.

2.0 Logistics

2.1 Introduction

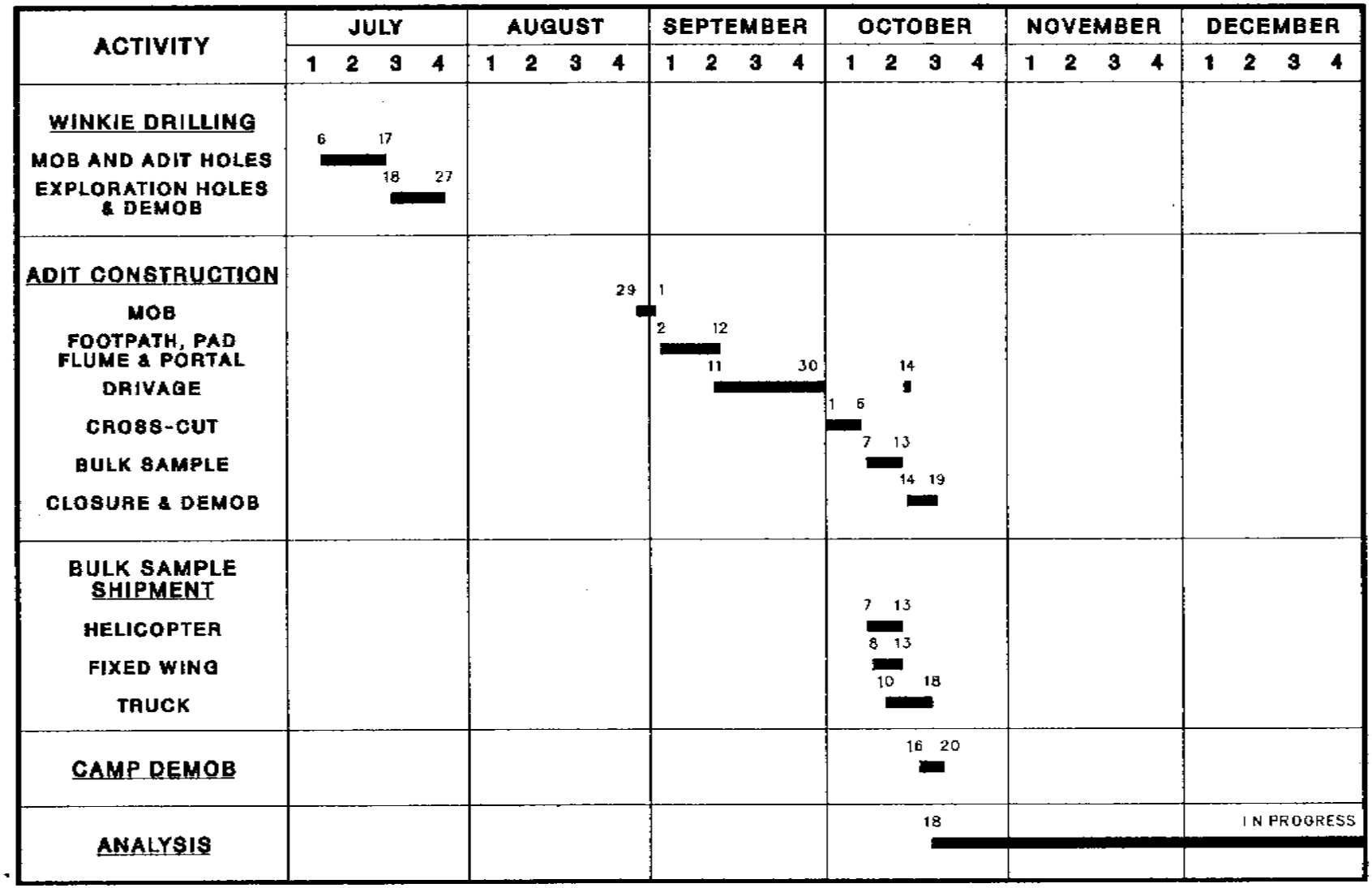
The bulk sample program consisted of two phases; phase I was a small drilling program followed by phase II, the actual adit construction. The entire program was spread over 14 weeks with a 5 week break between phase I and phase II. A schedule of events relating to the bulk sampling program is presented in Figure 2.1.

Prior to the final adit site selection it was necessary to determine whether an acceptable sample could be obtained from the bulk sample point. To this end a series of holes were drilled on Lost Ridge which were designed to penetrate only Seam I. The drilling was carried out using a light-weight, small core diameter Winkie drill (see Section 2.2). Core obtained from the drilling was described in detail, sampled and sent to Calgary for analysis.

The results of the core sample analyses (presented in Part II) confirmed the location of the adit and once final approval had been granted, adit construction began. Details of the procedures used in adit construction are discussed in Section 4.0 while further information about the contractor and equipment is presented below in Section 2.3.

As access to the Property, during 1982, was by air only, all support of the Winkie drilling and adit construction was by helicopter. A Hughes 500D was used to move the drill crew, adit crew and geologists. This helicopter also moved the Winkie drill equipment and most of the equipment and supplies for the adit.

FIGURE 2.1
SCHEDULE OF EVENTS:
BULK SAMPLE PROGRAM, 1983



A1190A.
A1190A1

Three heavy pieces of equipment, the compressor, generator and tugger were lifted from the airstrip to the top of Lost Ridge by a Bell 205. This machine was also used to demobilize equipment at the end of the program.

Mobilization of adit equipment and supplies was from Dease Lake using a DeHavilland Caribou and from Smithers using a Beechcraft 18 and a Norman Britten Islander. Bulk sample transport was by Hughes 500D from the adit to the Summit airstrip, by fixed wing to the nearest truck accessible airstrip (at Burrage Creek) and then by truck to Calgary.

Camp facilities for phase I were provided by Gulf Canada while phase II required the additional facilities of a second camp. This camp, located at the airstrip, had earlier been used to house a diamond drill crew who had been contracted for the general exploration program. The camp was leased from the drilling contractor and run by Gulf. Camp demobilization was mainly via Hughes 500D to the Burrage airstrip on Highway 37 and then by truck to Smithers.

2.2 Winkie Drilling

The contractor for the Winkie drilling was Teck Corporation of Vancouver, British Columbia. This equipment was operated by 2 men on a 12 hour shift and produced AIX sized core from a hole of approximately 3.5 centimetres in diameter. The support equipment is listed below:

1) Drill Stem = 100 metres
2) Casing = 20 metres
3) Waterpumps = 2
4) Mudtanks = 2 - 200 gallons each
5) Waterline = 500 metres

No geophysical logs were run down the drill holes.

2.3 Adit

The contractor for the adit construction was Target Tunnelling of Strathmore, Alberta. The drill crew comprised five qualified underground miners and two surface laborers. A list of the equipment used in the construction of the adit is provided below.

1) Air Compressor
2) Tugger (winch) and Cable
3) Generator
4) Pneumatic Picks
5) Miscellaneous Shovels, Picks and Augers
6) Explosives Magazines - (3)

Plus supplies of sheet metal ducting for the flume, logs, planks and explosives.

2.4 Project Management and Primary Contractors

Geological services and supervision of field operations for the adit drivage and bulk sampling were provided by JHP Coal-Ex Consulting Ltd. The program was carried out under the supervision of B. P. Flynn, and assistance in the field was provided by J. W. Innis.

The supervision of the Winkie drill portion of the program and the collection of data from the drill core was conducted by Gulf Canada personnel under the direction of C. S. Williams.

The personnel and primary contractors who contributed to the 1983 Mt. Klappan Bulk Sampling Program are listed below:

Gulf Personnel

B. P. Flynn	Project Supervisor
C. S. Williams	Project Geologist
J. W. Innis	Senior Geologist
P. Tsavalos	Accountant

Consultant

John H. Perry	JHP Coal-Ex Consulting Ltd.

Contracting Companies

Target Tunneling	Adit Construction
Teck Corporation	Winkie Drilling
Glacier Helicopters	Helicopter Support
Northern Mountain Helicopters	Helicopter Support
Aero Expediting	Expediting Services
Central Mountain Air Services	Fixed Wing Support and Coal Haulage
Kelowna Flight Craft	Fixed Wing Support
Smithers Transport	Truck Coal Haulage
Cyclone Engineering Sales	Coal Analysis
Birtley Coal & Mineral Testing	Coal Analysis
David E. Pearson and Assoc.	Petrography

3.0 GEOLOGY

3.1 Stratigraphy of Lost Ridge

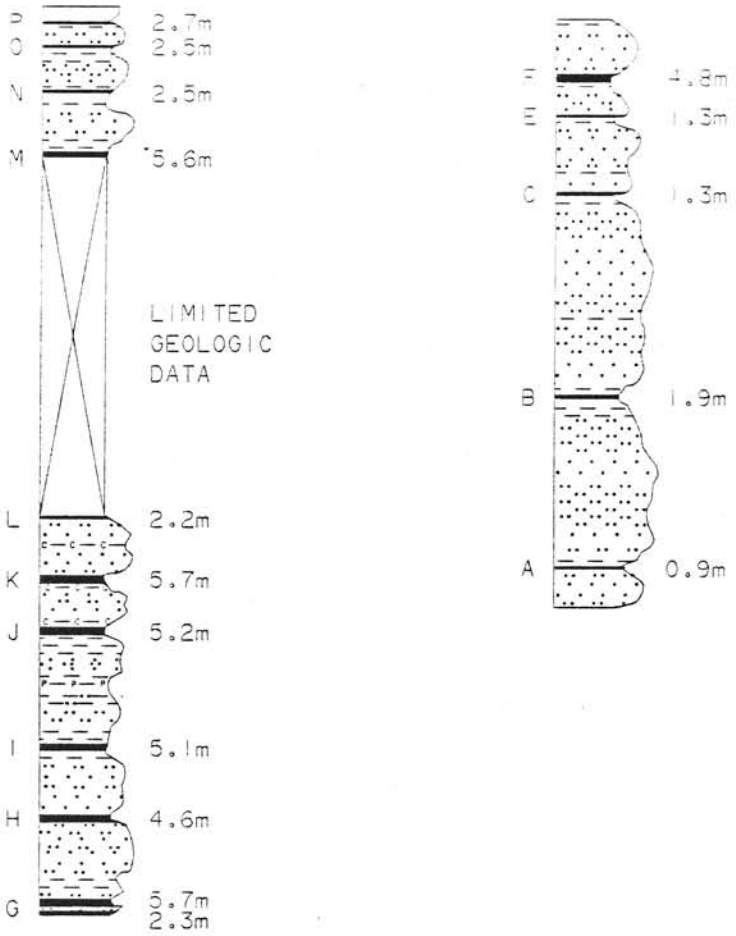
The Lost Ridge area is underlain by rocks of the Middle Klappan Unit of the Klappan Sequence. The precise age of these strata is, as yet, undetermined but they are generally considered to lie within the Upper Jurassic to Lower Cretaceous. This unit consists of a series of coarsening upward sequences of fine to medium grained sandstone, occasional conglomerate, siltstone, claystone and coal. It contains all the major coal seams that have been identified within the property which, in the Lost Ridge area, includes 12 coal seams greater than 0.50 meters in thickness. These seams have a cumulative average thickness of 24.3 meters over a 350 meter stratigraphic interval. The general stratigraphy of the Middle Klappan Unit in the Lost Ridge area is illustrated in Table 3.1.

TABLE 3.1

MT. KLAPPAN COAL PROPERTY

LOST-FOX AREA COAL SEAM DISTRIBUTION

AVERAGE SEAM THICKNESS *



* INCLUDES SEAM INTERSECTIONS >0.5m

SCALE: 1:5000

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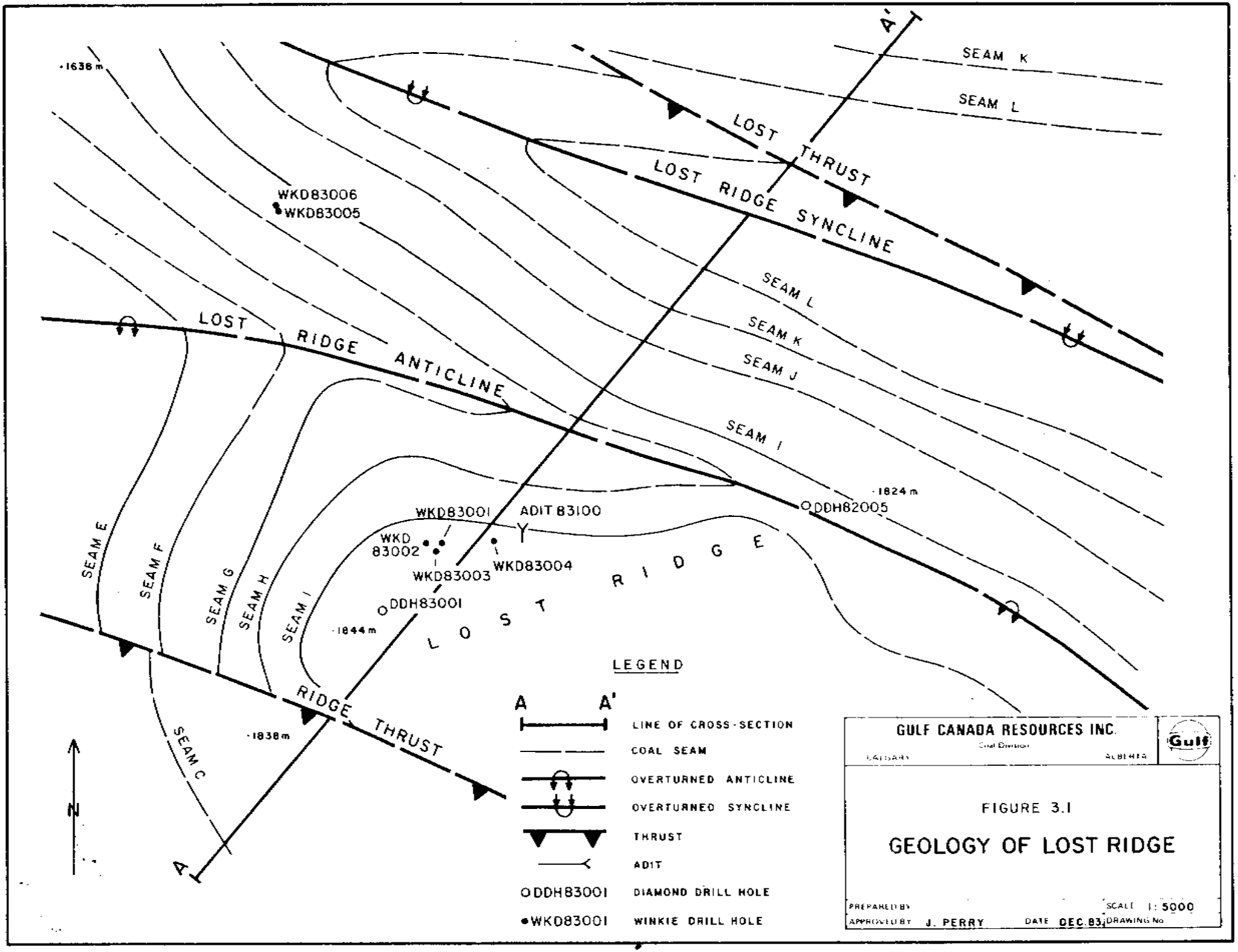
15/03/84

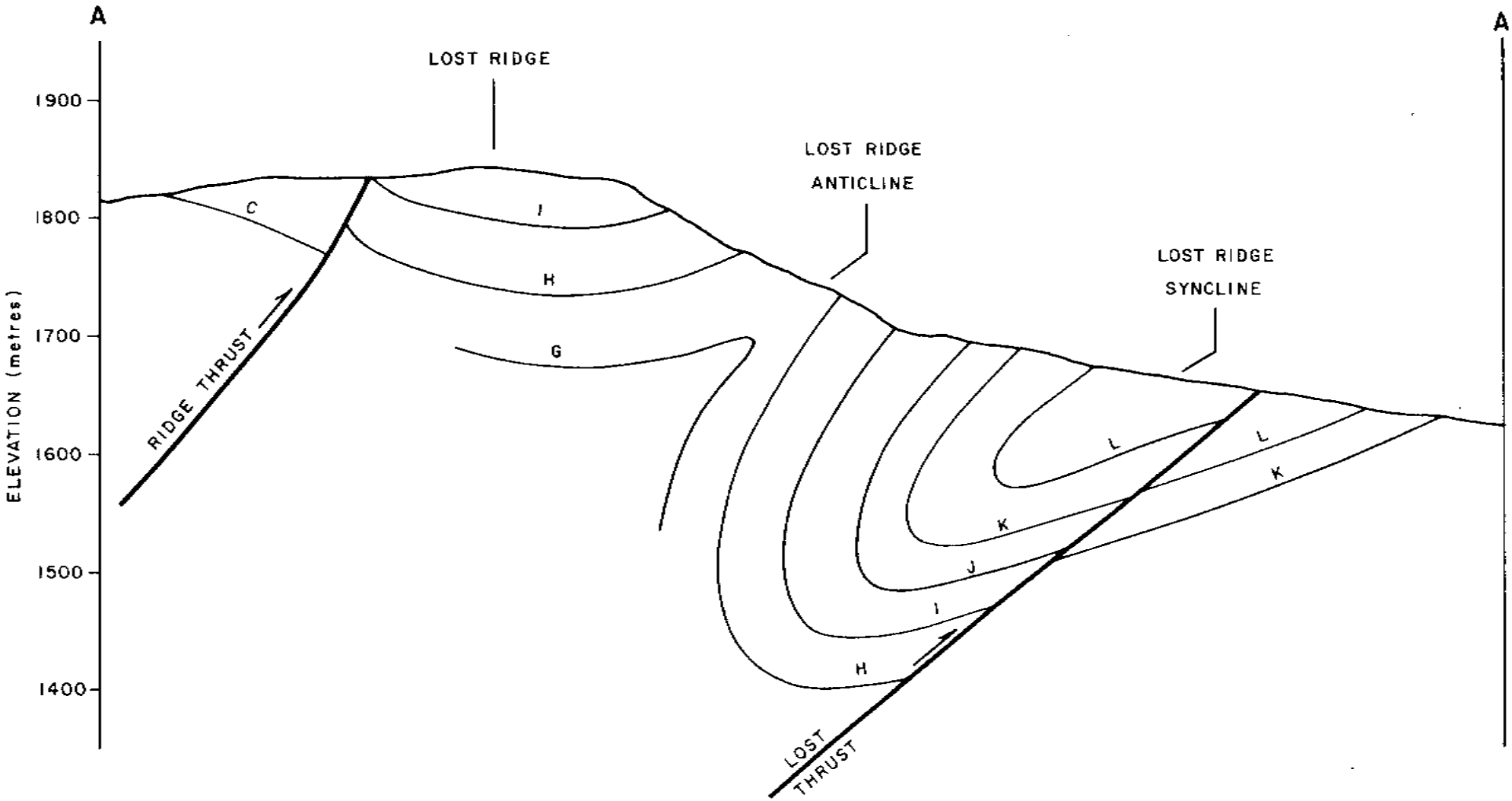
3.2 Structure of Lost Ridge

The structure of Lost Ridge is dominated by a large southeasterly plunging anticline - syncline pair, (the Lost Ridge anticline, syncline). These folds are overturned to the northeast and are cut by a series of steep, southwest dipping thrust faults (see Figures 3.1 and 3.2).

The folds are characterized by long, gently dipping southwesterly limbs and shorter but steeply dipping overturned, vertical or right-way-up northeast limbs.

A second phase of folding is present, the trend of which is roughly east-west. This second phase manifests itself as regular changes and/or reversals in plunge along the axes of the primary phase folds. The effects of this second fold phase are not evident on Lost Ridge.


A'
SEAM K
SEAM L
LOST THRUST
LOST RIDGE SYNCLINE
1638 m
WKD83006
WKD83005
SEAM L
SEAM K
SEAM J
SEAM I
LOST RIDGE ANTICLINE
1824 m
ODDH82005
WKD83001
ADIT 83100
WKD 83002
WKD83003
WKD83004
ODDH83001
1844 m
SEAM E
SEAM F
SEAM G
SEAM H
SEAM I
LOST RIDGE
RIDGE THRUST
SEAM C
1838m
A
N
LEGEND
A A'
LINE OF CROSS-SECTION
COAL SEAM
OVERTURNED ANTICLINE
OVERTURNED SYNCLINE
THRUST
ADIT
ODDH83001 DIAMOND DRILL HOLE
WKD83001 WINKIE DRILL HOLE
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA
Gulf
FIGURE 3.1
GEOLOGY OF LOST RIDGE
PREPARED BY
APPROVED BY J. PERRY
DATE DEC. 83
SCALE 1:5000
DRAWING No



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Coal Division
CALGARY ALBERTA

FIGURE 3.2

SCHEMATIC CROSS-SECTION

THROUGH LOST RIDGE

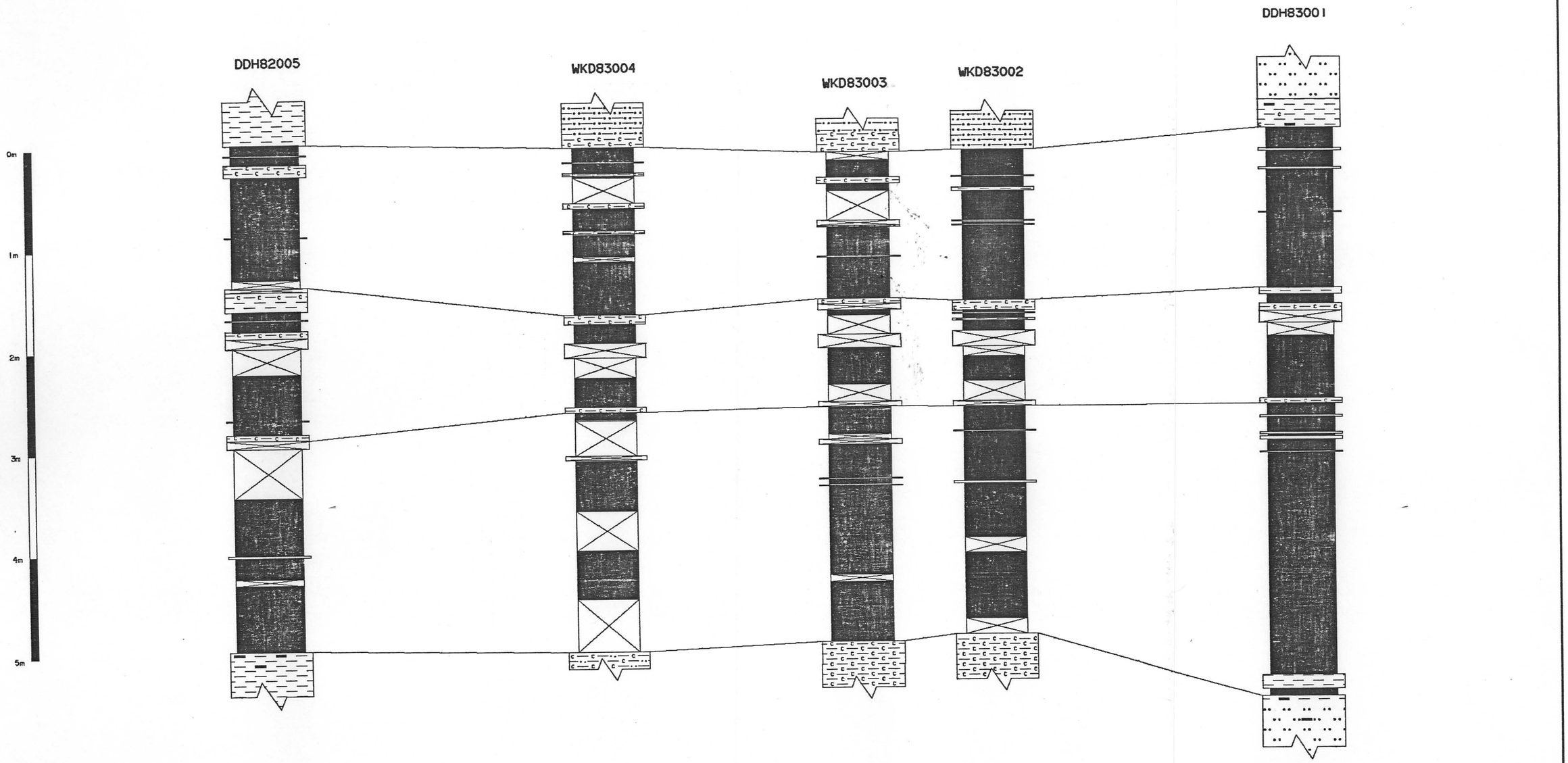
PREPARED BY
APPROVED BY J. PERRY
DATE DEC. 83.
SCALE 1:5000
DRAWING No.

3.3 Stratigraphy of Seam I

Prior to construction of the adit the most reliable data concerning Seam I in the Lost Ridge area came from two diamond drill holes, DDH 82005 and DDH 83001. This data was supplemented by three Winkie hole intersections (WDH 83002, 3 and 4), and a number of hand trenches dug during the 1982 and 1983 exploration programs.

Columnar sections of the Seam I intersections from holes DDH 82005 and DDH 83001 are presented in Figure 3.3. Seam thicknesses are 4.98 metres (DDH 82005) and 5.54 metres (DDH 83001). The latter may, however, have been subject to some structural thickening. Rock bands vary up to 0.20 metres in thickness and are generally restricted to the upper half of the seam.

More detailed discussion of the seam stratigraphy is presented in Section 5.4.



[205,57]831024100.LOC

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MT. KLAPPAN COAL PROPERTY
CORRELATION OF
SEAM 1 PROFILES

FIGURE 3.3

DRAWN BY:	SCALE: 1:40
APPROVED BY:	DATE: MAR 1984

4.0 ADIT CONSTRUCTION

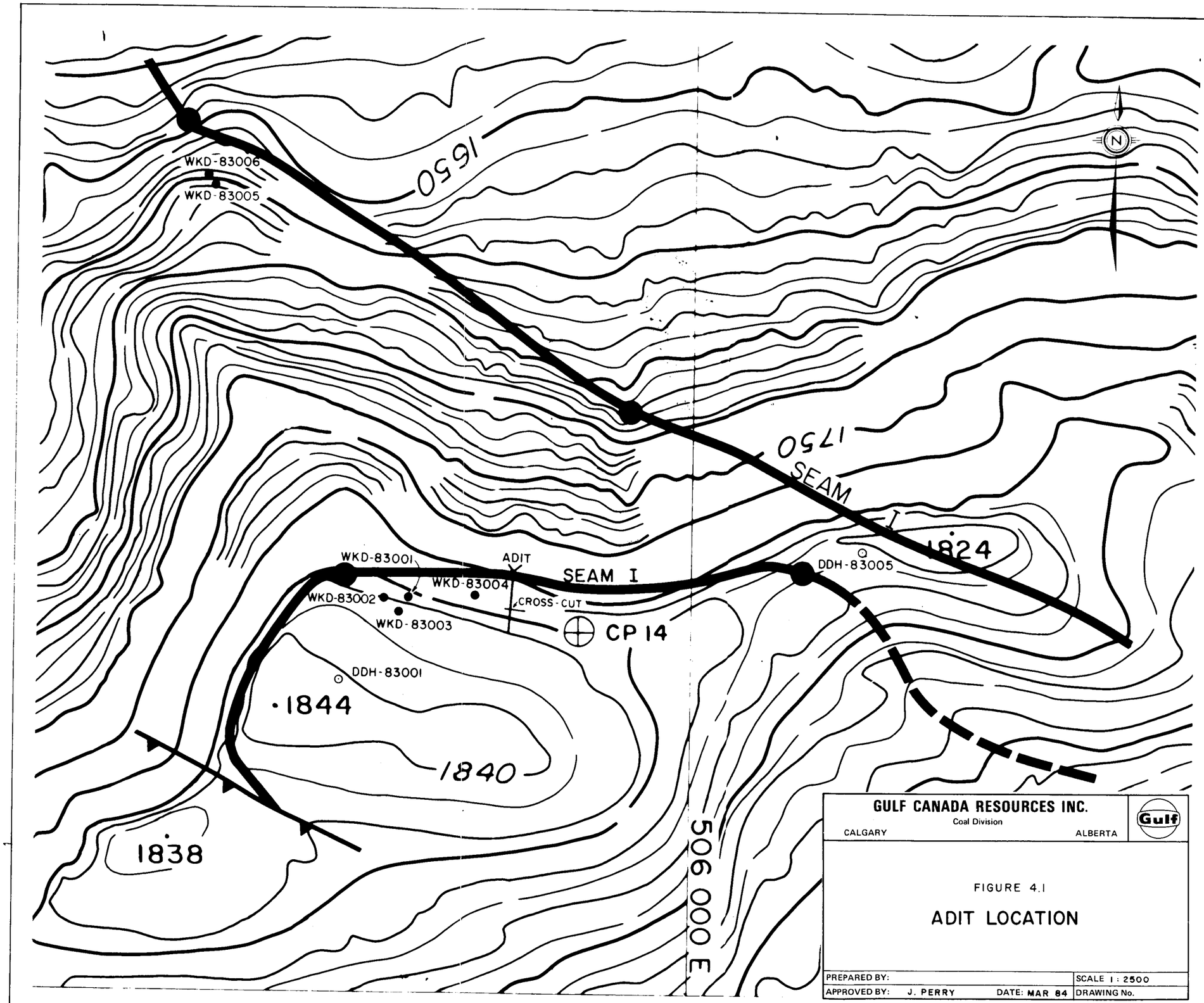
4.1 Site Selection

Several sites were initially considered for the 1983 bulk sampling program, all of which lie on the northern slopes of Lost Ridge (see Figure 4.1). The major factors which determined the final site selection were:

i) Access
ii) Ease of site construction
iii) Rate of increase in depth of cover vs. length of driveage
iv) Proximity to suitable areas for waste coal disposal
v) Geological control of seam stratigraphy

The adit site selected optimized all of these factors and was presented for permitting and approval. During the time needed to receive the permits several Winkie holes (WKD 83002, 3 and 4, see Figure 3.1) were drilled in the proposed bulk sample area to test the level of oxidation, thickness and quality of the seam. The results from the drilling indicated that an acceptable sample could be obtained from this location. Two Winkie holes (WKD 83005 and 6) were drilled at a second site to provide an alternative if the primary site proved unsuitable or was not approved.

Once government approval for the primary site had been received construction of the adit began.



GULF CANADA RESOURCES INC. Coal Division	
CALGARY ALBERTA	Gulf
FIGURE 4.1 ADIT LOCATION	
PREPARED BY:	SCALE 1 : 2500
APPROVED BY: J. PERRY DATE: MAR 84	DRAWING No.

4.2 Regulatory Approvals

Application to conduct a bulk sampling program on the Mt. Klappan property was made to the British Columbia Ministry of Energy, Mines and Petroleum Resources in April, 1983. Several site visits were conducted during June, July and August by Gulf and Government personnel to assess the adit location, access and waste coal disposal proceedures. Final approval was granted in August, 1983.

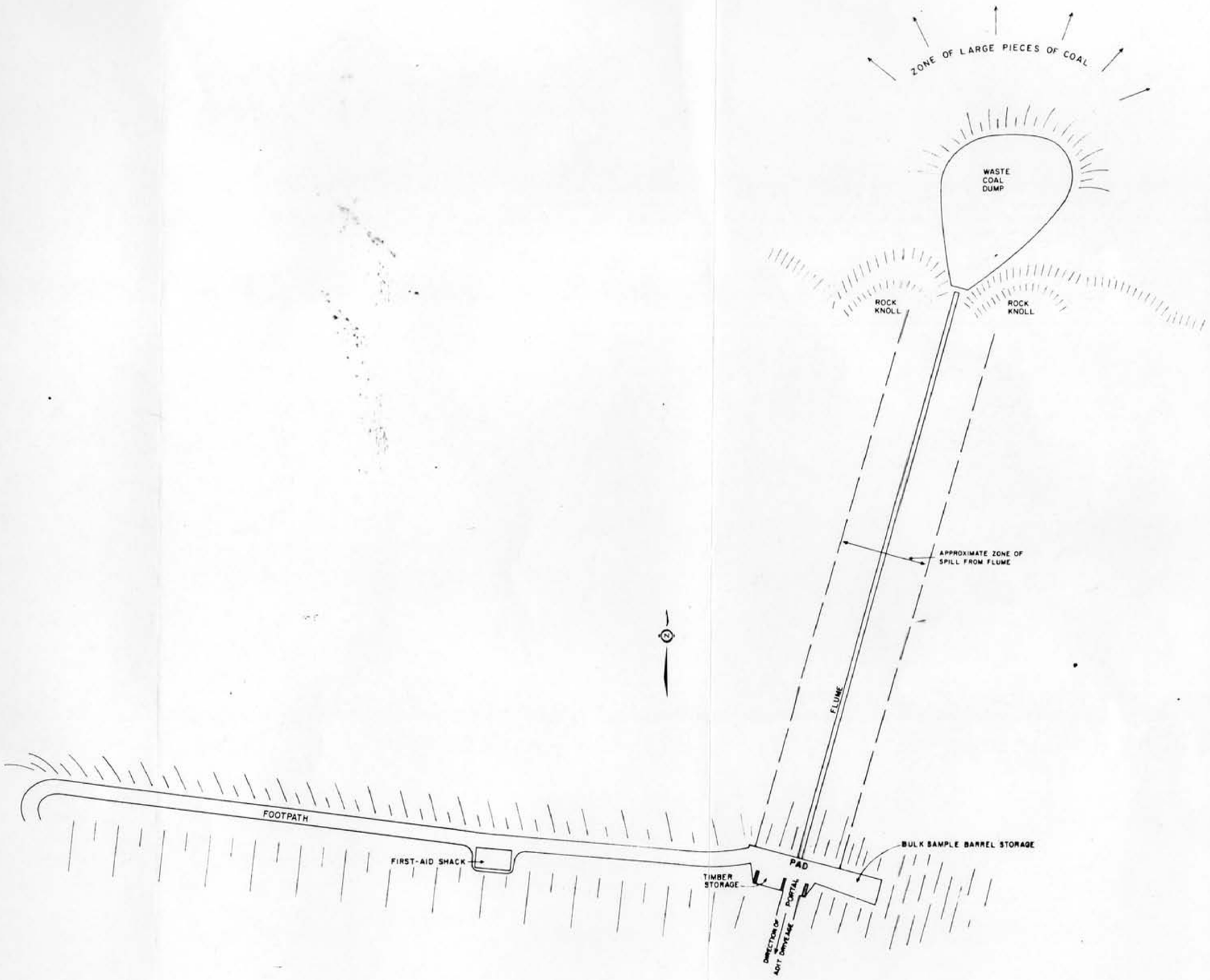
4.3 Site Preparation

Preparation of the adit site commenced on September 2, 1983 and was completed on September 9, 1982. All work was carried out by hand using shovels, picks and pneumatic drills.

A diagram illustrating the layout of the site is presented in Figure 4.2. As the adit was located part-way down a steep slope it was necessary to build a footpath from the top of Lost Ridge to the portal area. A pad was constructed at the adit site to provide a safe, flat area on which to work and store materials. This pad, which measured 9 metres long x 4 metres wide, was constructed at the base of the seam. Material produced as a result of cutting into the mountain side was used to build up the outer edge of the pad. The resulting high wall, (3 metres in height), was braced and timbered to prevent sloughing and to protect personnel from possible rock fall from above.

A smaller pad was excavated some way up the path from the portal area to accomodate a first aid post/lunch room.

The area selected for waste coal disposal was a small, dry gully immediately down slope from the portal. A flume measuring 87 metres in length was built from the portal to the top of the gully (approximately 1778 metres elevation). Sheet metal central heating ducting was used for the flume. Sections measuring 3.66 metres x 0.60 metres x 0.25 metres (length, width and depth, respectively) were riveted together at the pad and lowered down the slope.



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Coal Division
CALGARY ALBERTA

SKETCH OF ADIT SITE

FIG. 4.2

PREPARED BY
SCALE 1:200
APPROVED BY JOHN PERRY
DATE DEC 5-83 DRAWING No

4.4 Adit Driveage

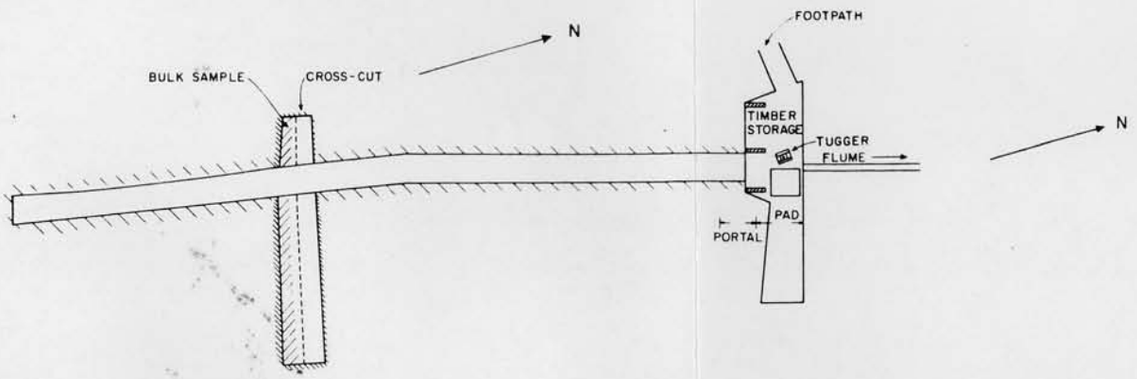
The underground portion of the bulk sample program consisted of driveage of an adit for a total of 50 metres and the extraction of approximately 39.24 tonnes of coal. Initially, it was planned that the adit be driven to 30 metres. However, due to concerns about the possible effects of permafrost on the size distribution of the sample, it was later decided to take the adit to 60 metres and then sample. A channel sample comprising four barrels was taken from the adit face at 30 metres and analyzed as the driveage continued. Deteriorating weather conditions forced a review of the timetable in late September. The results of size analysis of the channel sample were favourable and therefore, it was decided that the bulk sample would be taken at the 30 metre point and, subject to weather conditions, the adit would later be driven to 60 metres where a smaller bulk sample would be taken.

Drivage commenced on September 11th; the work was carried out on an 11 hour shift, seven days a week unless poor weather prevented access to the site. Advance of the adit face was achieved by drilling a series of 1.22 meter (4 foot) holes in the direction of driveage, and then blasting. Clearing of the face after blasting would usually provide an overall advance of approximately 1.5 metres. The waste coal was removed using a bucket and tugger, powered by compressed air. Upon removal of the waste the advance was timbered and lagged along the roof. As the sides of the adit exhibited little or no sloughing, no side wall lagging was necessary past the portal. Ventilation was supplied

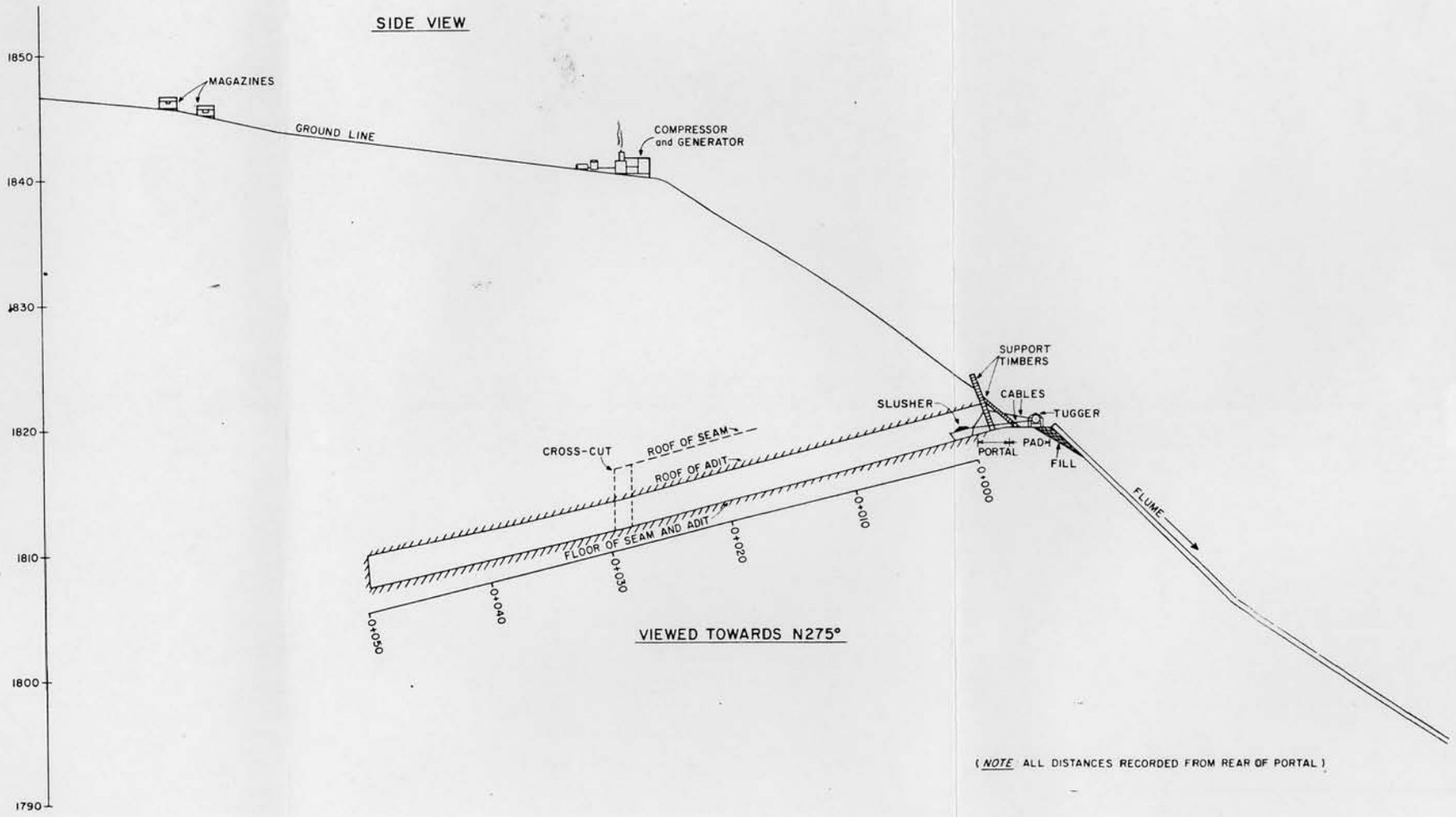
Once in position the flume was reinforced and braced at its lower end so that a slope sufficient to carry fine coal particles to the waste pile could be maintained. Installation of the flume commenced on September 10, 1983 and was completed by September 12, 1983.

Prior to taking the bulk sample the pad was extended to provide an area to store full sample barrels awaiting collection by the helicopter.

PLAN VIEW



SIDE VIEW



VIEWED TOWARDS N275°

(*NOTE* ALL DISTANCES RECORDED FROM REAR OF PORTAL)

SCALE

0 2.5 5 10 20 metres

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CALGARY ALBERTA

PLAN VIEW AND CROSS-SECTION OF ADIT DRIVEAGE

KPN-ADIT-83-100

FIG 4.3

PREPARED BY:
APPROVED BY: JOHN PERRY
DATE: DEC. 5, 83
SCALE: 1:200
DRAWING No.

by an air-mover and a 0.4 metre diameter cloth hose suspended along the wall of the adit and powered by a fan.

Apart from some surface run-off no water was encountered in the adit. The small amount of water that entered the adit through the portal was confined to one side of the tunnel and directed to an open joint in the floor approximately 2 metres inside the portal, down which it disappeared. Due to the hardness of the coal, very little dust was generated at the face and so no dust suppression procedures were necessary.

The adit was driven along the floor of the coal seam so that control could be exercised on the slope of the adit should the dip of the seam alter significantly under Lost Ridge.

The adit was not driven down the true dip of the seam and so the slope of the adit floor represents an apparent dip. The difference between the true dip direction and the adit driveage is approximately 25° to 30°.

The adit dimensions are approximately 2.0 metres wide by 2.30 metres high. The first 30.0 metres of adit were driven at 14.5° decline, from 30.0 to 36.5 metres at 13.5° and from 36.5 to 50 metres at 12.5° indicating a gradual "shallowing of the slope". The overall decline of the adit is 13°. A cross-cut exposing the full section of the coal seam was driven perpendicular to the adit at 30.0 metres. The cross-cut was taken inclined to the roof of the coal seam at a slope of approximately 18°. A plan and

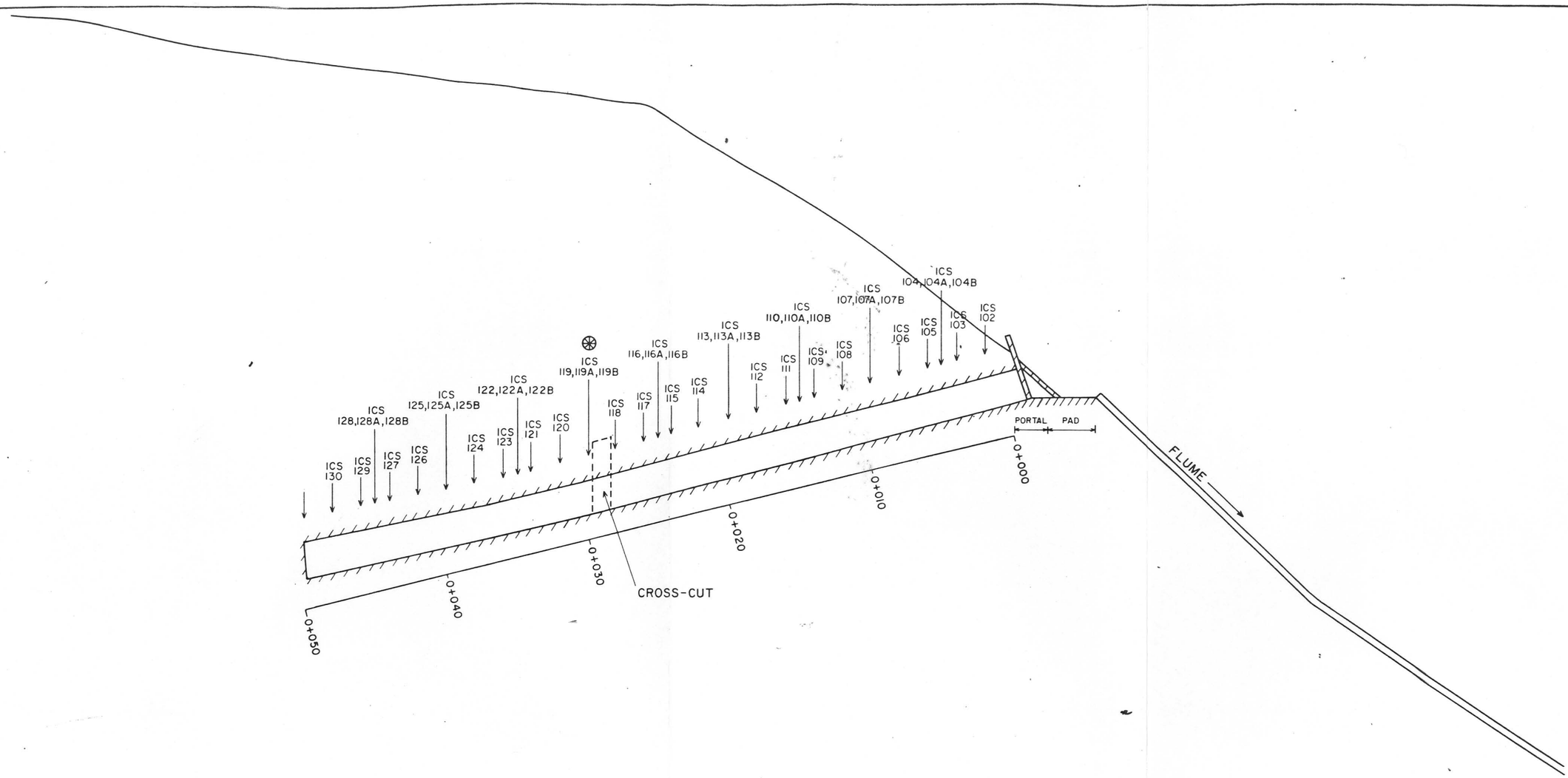
cross-section view of the adit is presented in Figure 4.3 while more detailed diagrams of the cross-cut are found in Section 5.0.

4.5 Incremental Channel Sampling

A series of channel samples were taken at regular intervals from the adit for testing in the field. These samples were crushed, screened and subjected to froth flotation testing in an attempt to establish roughly the level of coal oxidation. The method of analysis and the results are presented in Section 4.6, below, and in Part II of this report, respectively.

The samples taken were hand-picked from the face of the adit as driveage proceeded. Unfortunately, construction at the portal covered the surface coal so that a sample could not be obtained; otherwise the samples were taken at 2 metre intervals. Additional samples were taken every 5 metres from the face and from above the adit roof. These latter samples were obtained by drilling into the roof of the adit with a 1.5 metre auger and taking samples at 0.75 metre intervals. The location of these samples and the method of sample collection are illustrated in Figures 4.4 and 4.5, respectively.

The samples are generally considered to be stratigraphically equivalent, although a thin rock band in the roof of the adit may be partially included in some of the "hand-picked" samples and not in others. Similar samples were collected from the cross-cut before and after bulk sampling. Here, the seam was divided into three zones where the lower-most zone was stratigraphically equivalent to the incremental samples taken by hand pick.



SCALE:

0 2.5 5 10 20 metres

LEGEND

ICS — INCREMENTAL CHANNEL SAMPLE

105 — SAMPLE NUMBER

107A/B — SAMPLES TAKEN BY DRILLING INTO ROOF

⊛ — SITE OF 4-BARREL CHANNEL SAMPLE

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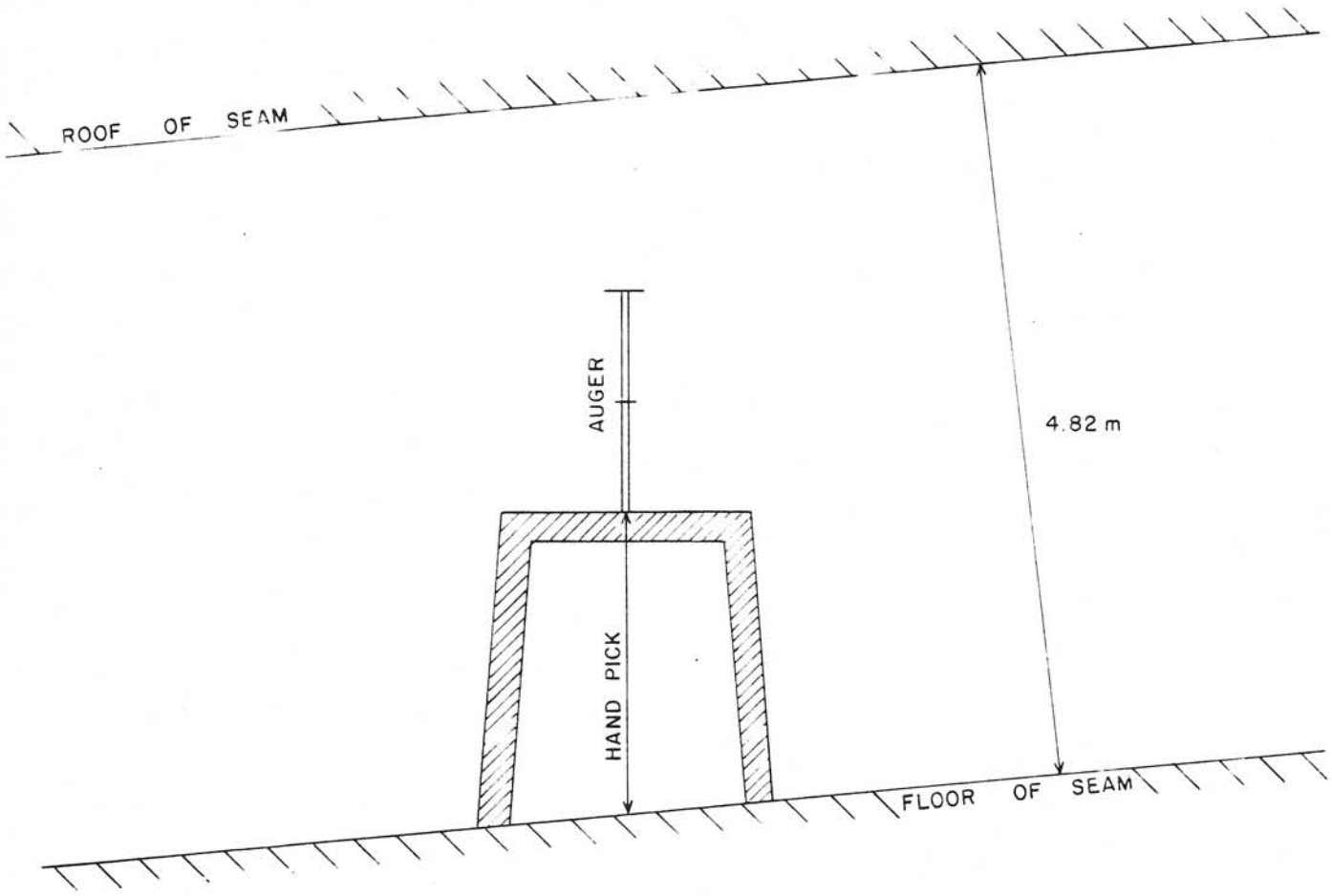
CALGARY ALBERTA

LOCATION OF INCREMENTAL CHANNEL SAMPLES FOR FROTH FLOATATION TESTING

FIG. 4.4

PREPARED BY.	SCALE 1 200
APPROVED BY: JOHN PERRY DATE: DEC. 5-83	DRAWING No.



NOTE: Sample obtained by HAND PICK from the adit face every 2metres and 5metres.
Sample obtained by AUGER from roof of adit every 5metres.

SCALE
0 1metres

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

SCHEMATIC DIAGRAM ILLUSTRATING METHOD OF INCREMENTAL CHANNEL SAMPLING

FIG. 4.5

PREPARED BY:	SCALE 1:50
APPROVED BY: JOHN PERRY DATE: DEC. 5-83	DRAWING No.

The results of froth flotation tests were somewhate variable and suggest that a number of factors other than oxidation may contribute to the percentage of froth yield obtained. The samples were analyzed further (proximate, sulphur, B.T.U. and Hardgrove Index) by Cyclone Engineering Sales Ltd. to provide some other parameters for comparison with the flotation results.

4.6 Field Analysis

The two facets of the field analysis program were designed to monitor the quality and oxidation level of the coal penetrated by the adit, as the adit was being driven.

4.6.1 Froth Flotation

A froth flotation test was conducted on site by J. Innis using a simplified technique and equipment purchased by Gulf or borrowed from Birtley Coal and Minerals Testing Ltd. Continuous processing of samples as they were received from the adit allowed constant review of the certain coal characteristics. A direct measure of oxidation level was not afforded by the froth flotation results but several observations were made. Part II - Section 3.0 covers this study in detail.

4.6.2 Petrography

Two samples, from the wall of adit driveage, and from an auger penetration of the adit roof were sent to D.E. Pearson and Assoc. Ltd. for vitrinite reflectance determination and vitrinite staining for oxidation testing. This exercise was to serve as a supplementary indication of oxidation levels at different depths of penetration and different seam horizons. A detailed discussion of the procedure and results are presented in Part II - Section 3.0

4.7 Adit Survey

All surveying at the adit site and inside the adit was conducted by Mr. J. Perry using chain and compass techniques.

The location of the portal entrance was established by surveying from drill hole DDH-83001, while the elevation of the portal floor was obtained from many altimeter observations. The co-ordinates and elevation of the portal entrance are:

UTM	Northing 6344350	Easting 505855
	Latitude 57° 14' North	Longitude 128° 54' West
	Elevation	1820 m

Prior to the commencement of bulk sampling the topographic profile from the mouth of the flume to the top of Lost Ridge was surveyed along the direction of the adit drivage. This enabled an accurate calculation to be made of the depth of cover from the ground surface to the proposed sample point.

Upon completion of the work the adit, cross-cut and sampled area were surveyed with respect to headings, slope and dimensions.

5.0 Channel and Bulk Sampling

5.1 Introduction

A series of channel samples and one bulk sample totalling 39.24 tonnes of coal were taken from Seam I. These samples consisted of:

4 - Barrel Channel: - a 0.787 tonne sample taken from the face of the adit at 30 metres.

Total Seam Channel: - comprising three separate plys which cover the full thickness of Seam I

Ply 1 - 0.401 tonnes, top portion of seam

Ply 2 - 0.365 tonnes, middle portion of seam

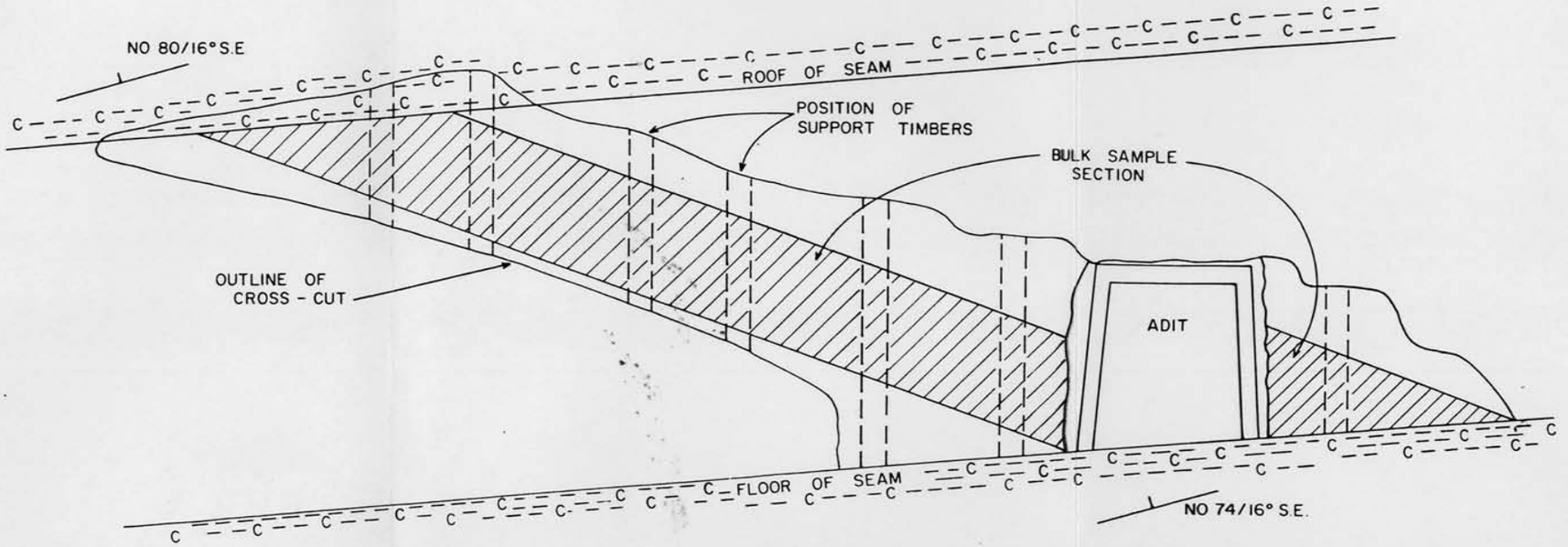
Ply 3 - 0.497 tonnes, bottom portion of seam

Bulk Sample: - 37.191 tonnes, representative of the entire se seam.

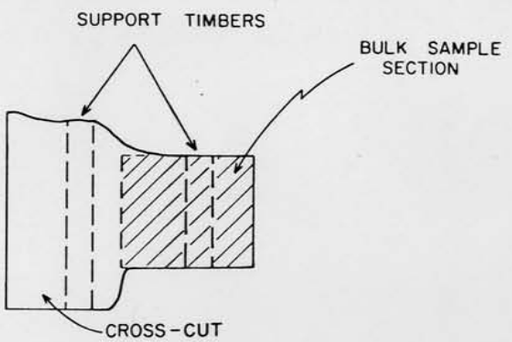
The depth of cover to the roof and floor of Seam I at the 30 metre point was 23 metres and 28 metres, respectively.

The 4 barrel channel sample was taken from the adit face during driveage while the other channel samples and the bulk sample were obtained from a cross-cut. The cross-cut and the location of the various samples are illustrated in Figures 5.1 and 5.2.

CROSS-SECTION ALONG CROSS-CUT



VIEWED TO LEFT HAND SIDE OF ADIT ALONG THE CROSS-CUT AT THE LEVEL OF THE THIRD SUPPORT TIMBER



SCALE
0 0.5 1 2 metres

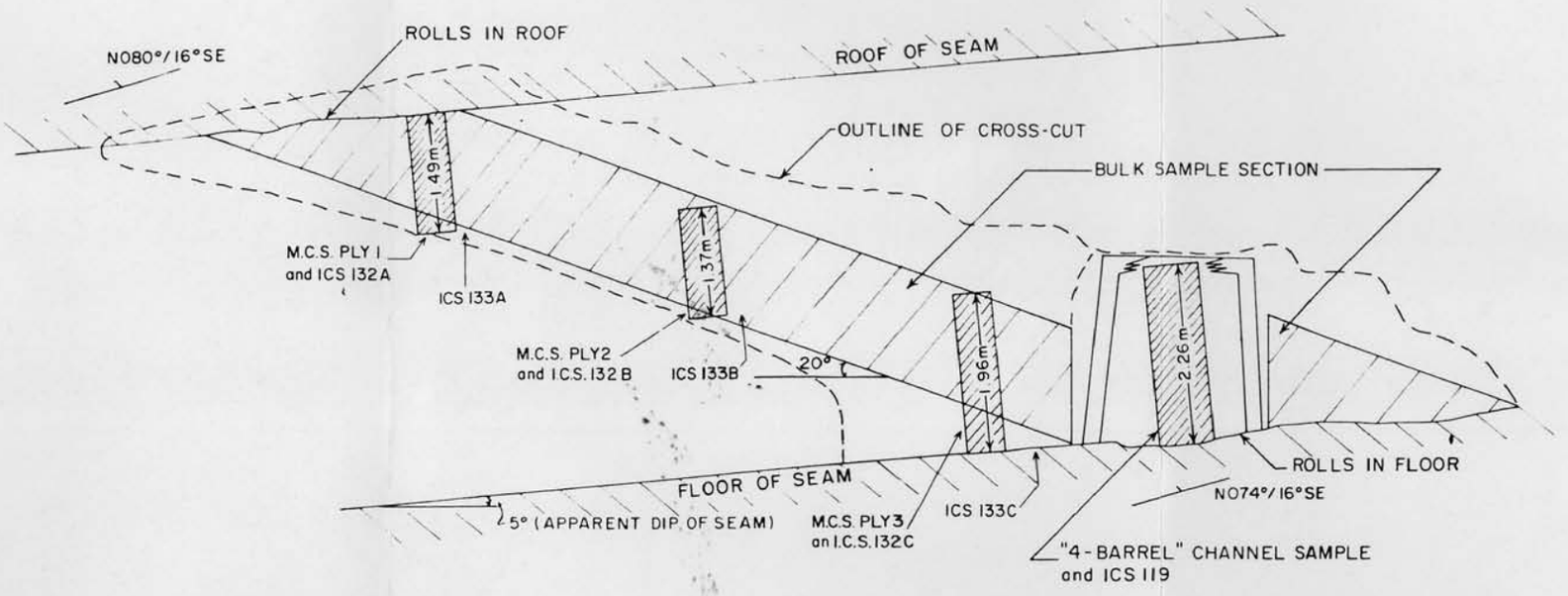
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

DIAGRAM OF CROSS-CUT FOR BULK SAMPLE

FIG. 5.1

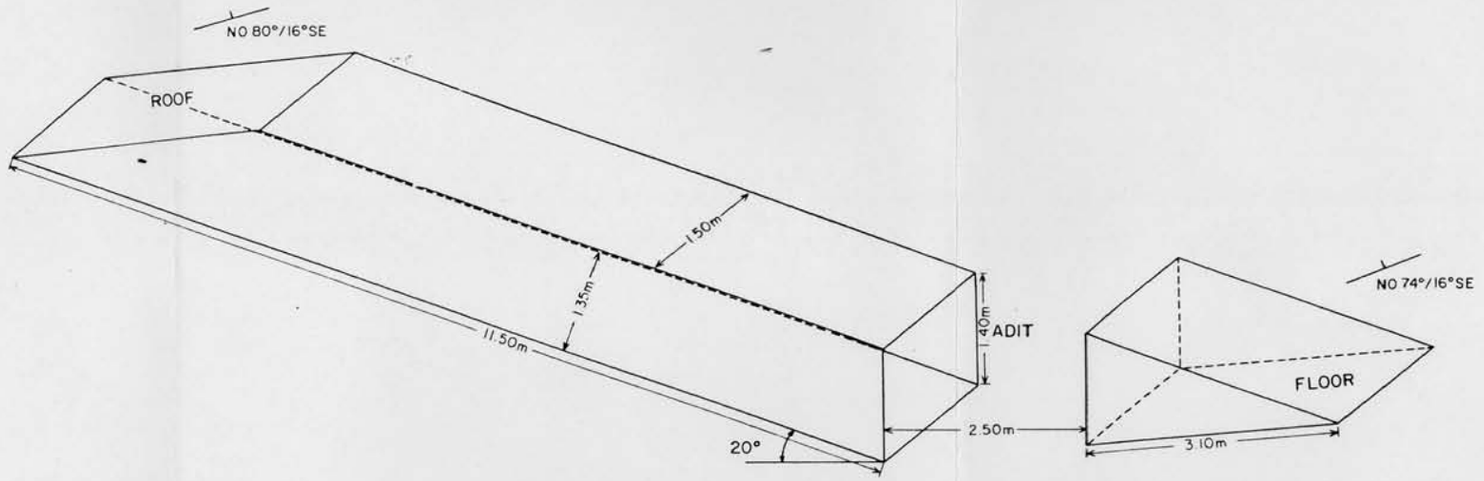
PREPARED BY:	SCALE 1:50
APPROVED BY: JOHN PERRY DATE: DEC. 5-83	DRAWING No.

CROSS-SECTION ALONG CROSS-CUT SHOWING CHANNEL SAMPLE LOCATIONS



M.C.S. – MAJOR CHANNEL SAMPLE
I.C.S. – INCREMENTAL CHANNEL SAMPLE

BLOCK DIAGRAM OF BULK SAMPLE



(N.B. ALL MEASUREMENTS ARE APPROXIMATE)

SCALE
0 0.5 1 2 metres

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

DIAGRAMS ILLUSTRATING CHANNEL AND BULK SAMPLES

FIG. 5.2

PREPARED BY	SCALE 1:50
APPROVED BY JOHN PERRY — DATE DEC 5-83	DRAWING No.

Prior to sampling the coal face was squared off, logged in detail and the dimensions of the sample were calculated. The limiting boundaries of each sample were marked on the coal face and the sample was taken. Channel samples were obtained by air-pick while the bulk sample was collected mainly by the use of explosives. Air pick work was necessary to clean off the face after blasting and to square off the face during the last stages of sample collection.

The coal sample was usually put into barrels on the pad; a bucket and tugger was used to haul the sample out of the adit, the coal was tipped onto a large plywood sheet and shovelled into barrels. Occasionally, when the weather was particularly bad, the sample barrels were filled at the cross-cut and hauled out in the bucket. The full sample barrels were stored on the pad extension and were periodically collected by the helicopter and hauled to the air-strip. A single barrel was slung at a time to reduce the danger of dropping one should the hooks not be positioned correctly. On average the turn-around time for the helicopter was approximately four minutes. The barrels were loaded onto fixed-wing aircraft, a Beechcraft 18 (usually 4 barrels) and a Norman-Britten Islander (usually 3 barrels) and flown to Burrage airstrip on Highway 37, where they were loaded onto trucks and taken to Calgary.

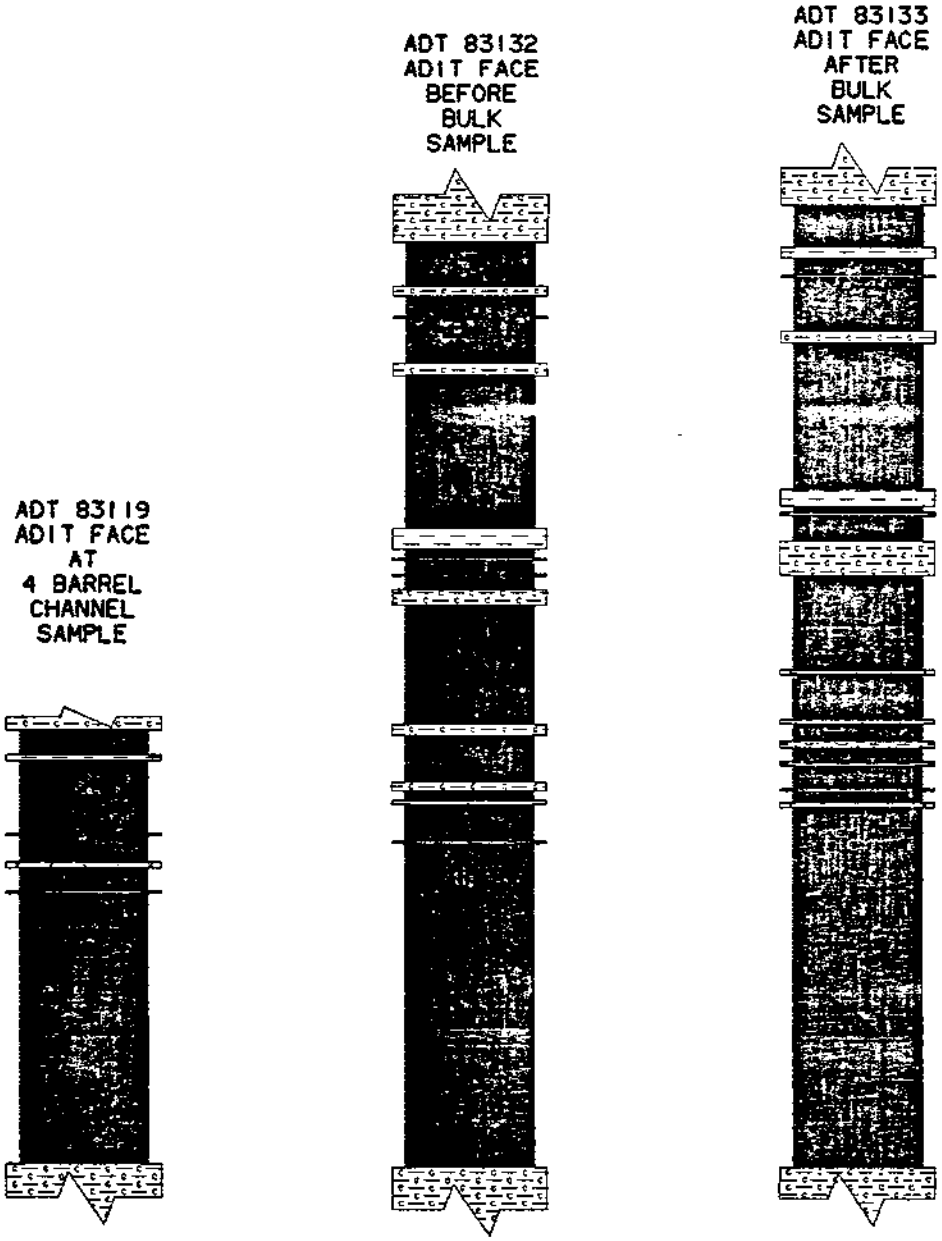
5.2 4 - Barrel Channel Sample

This sample represents only the bottom portion of the coal seam and is equivalent to the incremental channel samples and to Ply 3 of the total seam channel sample. A description of the sampled section is presented in Appendix A and a columnar log of the channel is included in Figure 5.3.

As permafrost was present in the adit at the 30 metre point it was decided that, rather than bulk sample immediately, a small sample should be taken for testing. The purpose of this sample was to determine the size distribution of the coal to see if it was affected by the presence of the permafrost. The sample was taken from a channel of dimensions 2.26 x 0.70 x 0.40 metres (height, width and depth, respectively), loaded into four drums and flown immediately to Calgary.

5.3 Sampling from the Cross-Cut

Deteriorating weather conditions forced a review of the program in late September, 1983. As encouraging results had been obtained from the 4 barrel channel sample it was decided to cross-cut and take the main bulk sample at 30 metres and then, if conditions permitted, take a further sample at 60 metres. The main cross-cut was driven from the seam floor to the roof in the eastern adit wall while a smaller cut was driven in the western wall to compensate for the coal removed in the driveage of the adit, (see Figures 5.1 and 5.2). The cross-cut so produced was used to mine the total seam channel and bulk samples. Driveage of



[205,57183|024101.LOC

GULF CANADA RESOURCES INC.	Gulf
MT. KLAPPAN COAL PROPERTY SEAM PROFILES OF SAMPLED SECTIONS FIGURE 5.3	
DRAWN BY:	SCALE: 1:40
APPROVED BY:	DATE: MAR 1984

the adit was stopped at 50 metres and no further samples were taken.

5.3.1 Total Seam Channel Samples

Upon completion of the cross-cut a series of channel samples were taken across the entire thickness of Seam I. Rock bands within the seam divided it into three intervals each of which were sampled separately (see Figures 5.2 and 5.3). The channels were approximately 0.70 metres wide by 0.40 metres deep and 1.49 metres (ply 1 upper), 1.37 metres (ply 2 middle) and 1.96 metres (ply 3 lower) in length. The total sample weight for all the plies was 1.263 tonnes; ply 1 = 0.401 tonnes, ply 2 = 0.365 tonnes and ply 3 = 0.497 tonnes.

5.3.2 Bulk Sample

The bulk sample was taken after collection of the channel samples. It was not considered necessary to take the cross-cut face back to remove the channels as proportional amounts of coal had been remove from each part of the seam. The volume of coal taken from cross-cut was in the shape of a three dimensional parallelogram (Figure 5.2) the dimensions of which were approximately 11.5 metres in length, 1.50 metres in width and 1.35 metres in depth. Special care was taken to ensure that the boundaries of the sample remained parallel so that a fully representative section of the seam was taken.

Most of the sample was mined by blasting. The development of prominent cleats within the coal seam and the presence of some joints in the claystone roof made precise control of the blast very difficult. As a result pieces of coal and/or rock not belonging to the sample had to be identified and removed. Consequently, it was necessary for a geologist to examine the results of the blast before removal of the sample could take place.

As the size distribution of the sample was considered to be of substantial importance none of the pieces of coal or rock were broken down to facilitate handling. All the large peices were loaded by hand into the bucket and barrels and packed around with the smaller pieces. At the end the

cross-cut was swept to recover smaller coal particles and dust.

The sample was collected over a period of seven days from October 7, 1983 to October 13, 1983 and arrived at the laboratory in Calgary on October 18, 1983.

Geological descriptions of the cross-cut face before and after bulk sampling are included in Appendix A.

5.4 Geology of the Adit and Sampled Sections

Examination of the excavated coal at the portal showed few effects of weathering beyond the heavy development of permafrost and thin ice veins. The amounts of permafrost and ice decreased rapidly over the first few metres of driveage. The rate of decrease then dropped to a gradual reduction over the length of the adit. Thin ice veins and permafrost coatings on cleat surfaces were noted in various parts of the coal seam within the cross-cut. Occasional peacock staining was seen at the surface. This staining was not noted past the portal except on some occasions where it was present on pieces of waste coal and, occasionally, on the adit walls. Careful examination of the stained coal pieces indicated that the peacock colouration was the result of scorching from the blast and was not due to oxidation.

Another, more prominent, stain or coating on the coal was orange-rust in colour and was present throughout the length of the adit. This stain/coating did not diminish noticeably with depth and covered well developed cleat surfaces. The scraping of a fingernail along these surface often removed the film of colour. This stain/coating was present throughout the seam but was much more prevalent in the highly coated lower portions (i.e. ply 3).

The adit driveage showed that the seam is both stratigraphically and structurally consistent. Minor structures observed were restricted to shear planes sub-parallel or at a high angle to bedding. One sub-parallel shear zone, with a thickness of 0.30 metres suggested the presence of bedding plane thrusts within

the seam. The high angle shears were usually thin and well spaced. Occasionally, however, zones containing many such shears would be intersected by the adit; any displacements along these shears would usually be limited to just a few centimetres.

Detailed logging of the cross-cut before and after bulk sampling (Appendix A) gave total thicknesses for Seam I of 4.82 and 5.01 metres respectively. Most of this difference is accounted for in ply 3 and is due to the presence of small low amplitude rolls in the floor. Indeed, there is a difference in thickness of 0.33 metres for ply 3 before bulk sampling and the equivalent section from the 4 barrel channel sample (see Figure 5.3). Similar rolls were found in the roof. Consequently, any seam thickness measurement could differ from another by several tens of centimetres depending upon the points of measurement, relative to the rolls in the roof and floor.

From Figure 5.3 it can be seen that Seam I may be divided into three distinct intervals based on the presence and frequency of contained rock bands. Each interval is roughly equivalent to one third of the seam and is equivalent to plys 1, 2 and 3 of the total seam channel sample. The upper interval (ply 1) contains two main rock bands in its top half ranging from 0.05 to 0.07 metres in thickness. The rest of the ply is essentially rock free. The middle interval (ply 2) contains two main rock bands near the top and many thin bands in the lower half. The upper rock bands vary from 0.08 to 0.18 metres thick while the lower bands range from 0.02 to 0.06 metres in thickness. The lower interval of the seam

(ply 3) is essentially free of rock bands except for a couple of thin (0.01 - 0.03 metre) bands near the top.

The coal throughout the seam is predominantly bright (80-100% vitrain), hard, with only a few thin bands containing less vitrain and occasional thin boney or stony layers. The coal is often well cleated, particularly in ply 3. Some sheared zones are present as well as some thin crushed zones. These crushed zones are usually cemented by permafrost and as a result are very hard.

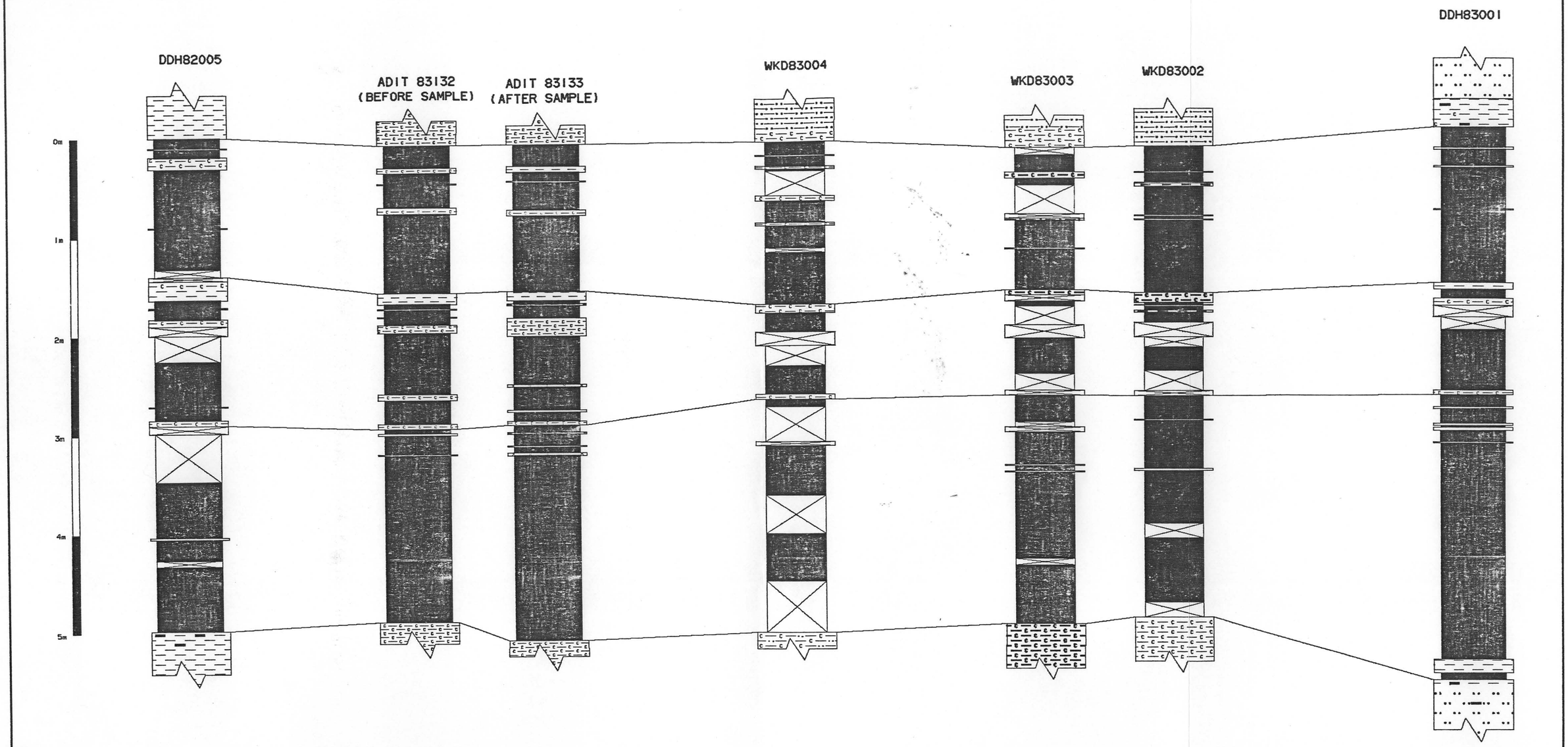
Rock bands within Seam I are commonly carbonaceous claystone; the degree of carbon content varies but most bands are highly carbonaceous. Most of the rock bands are poorly bedded, relatively soft and contain thin stringers or rootlets of bright coal. They thicken and thin (by as much as 0.10 metres) rapidly along strike and down dip; some of the thin bands may be discontinuous but the major bands were always traceable accross the length of the cross-cut. Ply 3 occasionally contains some thin (0.01 to 0.03 metre) discontinuous gritty, orange coloured lenses. While most of these can only be traced approximately 0.20 metres they are always found in the same horizons along the cross-cut.

Most of the variations in rock band thickness are considered to be due to sedimentological causes. However, the presence of listric surfaces along the coal/rock contact and within some of the bands does suggest that structural thickening may have contributed to some of the variations. Apart from bedding plane

and high angle shears, very little structural disturbance of the seam was noted. Two well developed cleat patterns were present in the coal; the strike and dip of the primary cleat was 170°/84°W and that of the secondary cleat was 094°/77°N. The strike and dip of the roof and floor was quite variable due to the presence of of the rolls. On average however the strike and dip for the roof and floor were 080°/16°S and 074°/16°S, respectively.

The roof and floor of seam were formed by carbonaceous claystone. The contacts for each were quite abrupt; the claystone nearest the coal was highly carbonaceous for the first 0.15 metres or so but then became rapidly less carbonaceous. Both the roof and floor were poorly bedded and quite competent. The roof was not heavily jointed and only slabbed in close proximity to blast points.

A correlation of the adit sections of Seam I with the Winkie and diamond drill holes on Lost Ridge is presented in Figure 5.4. This diagram illustrates the consistent stratigraphic development of the seam accross Lost Ridge. Details of the Winkie core descriptions can be found in Appendix III.



[205,57]831024099.LOC

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY
CORRELATION CHART
INCLUDING ADIT INTERSECTIONS

FIGURE 5.4

DRAWN BY:	SCALE: 1:40
APPROVED BY:	DATE: MAR 1984

6.0 Adit Closure

Upon completion of the bulk sample the adit was sealed in compliance with government regulations.

Support timbers were installed along the cross-cut and sampled section to prevent collapse of the roof and, hence, ensure that the adit can be re-opened at a later date with minimum difficulty.

A large steel door was installed some 5 metres inside the entrance to the adit and padlocked, to seal off access to the tunnel. This door consists of a heavy steel frame and steel mesh which allows circulation of air and any possible gas, and is approved by the British Columbia Government's Mines Inspection Branch. A berm was built across the bottom of the door to prevent any surface water or melt water from reaching the face. In addition any ice or snow build up will be in front of the door which should make for easier access to the adit next spring or summer.

The tugger and bucket were left inside the portal for possible use next year and two magazines, one containing explosives and the other blasting caps, were left on top of Lost Ridge. These magazines are separated by the regulation distance and are securely padlocked. Approximately 30 metres of the bottom end of the flume was removed. However, most of the flume and its wooden supports had to be left in place as they were was solidly iced in.

Demobilization of equipment and camp began on October 16, 1983.

7.0 Reclamation

The full bulk sampling program which included Winkie drilling and adit construction was undertaken on a minimum disturbance basis. All aspects of the work were supported by helicopter and no earth moving equipment was involved in drill site or adit site construction.

No reclamation has yet been carried out.

It is unlikely that any reclamation will be needed on the Winkie drill sites on Lost Ridge as no site preparation was needed. All equipment and garbage has been removed from the sites and if the hole locations were not marked they would be almost impossible to locate.

Due to heavy snow and, consequently, difficult work conditions, no reclamation was carried out on the adit and waste-coal disposal site. Reclamation of these areas will be undertaken in 1984 subject to the necessity of keeping the adit open. As the footpath and adit site were prepared by hand a minimum amount of surface disturbance was caused. Most of the reclamation effort will be concentrated on removing coal from the slope below the adit where it spilled out of the flume, and consolidating the waste-coal below the mouth of the flume and covering it with earth and rock.

All camp equipment has been removed and has been stored either in Smithers or in the B.C.R. trailers at the 1982 camp site. All garbage has been removed and the only remaining items are the wooden tent frames and floors.

MT. KLAPPAN ADIT REPORT PART I

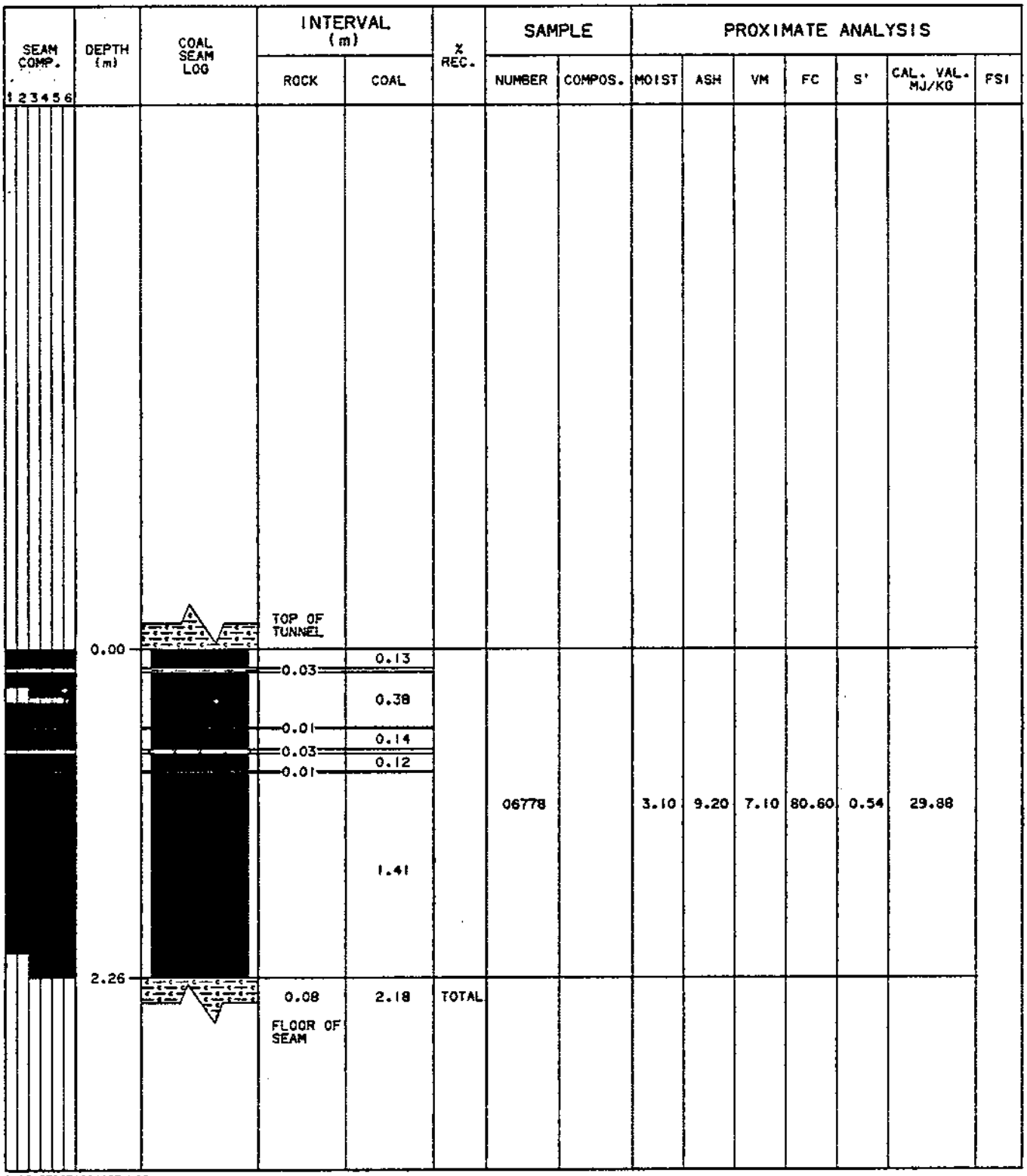
APPENDIX A

DESCRIPTIVE LOGS OF SAMPLED SECTIONS

ADT 83119 = 4 Barrel Channel Sample

ADT 83132 = Adit Face Before Bulk Sample

ADT 83133 - Adit Face After Bulk Sample



[205,57]83I024023.LOG

BOTTOM 2.26m OF SEAM 1
(AT +30m)

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

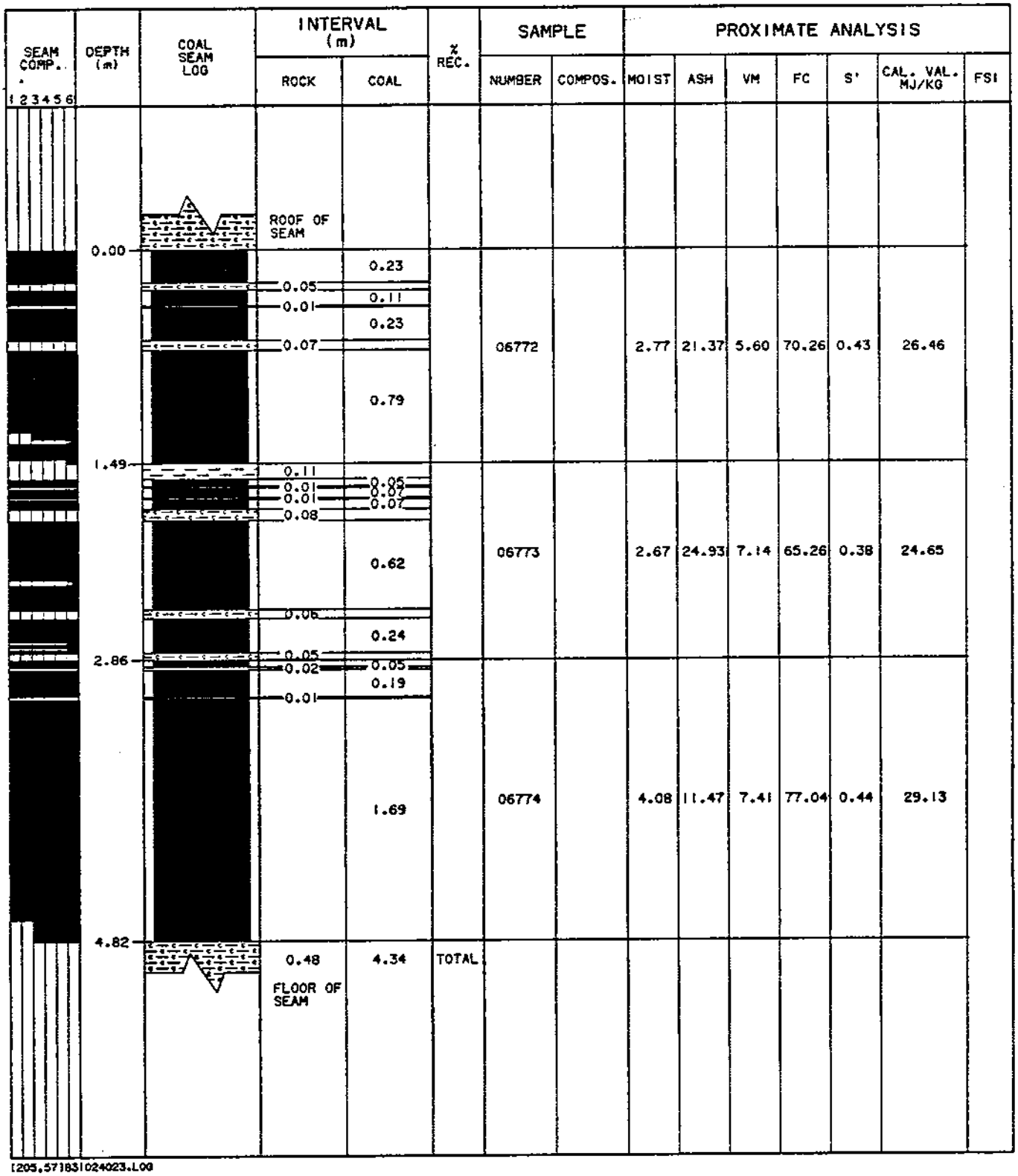
SEAM DETAIL

TRUE THICKNESS

ADIT 83119

SEAM 1

DRAWN BY: J. PERRY	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



[205,5718]3024023.LOG

AT CROSS-CUT FACE
PRIOR TO SAMPLING

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

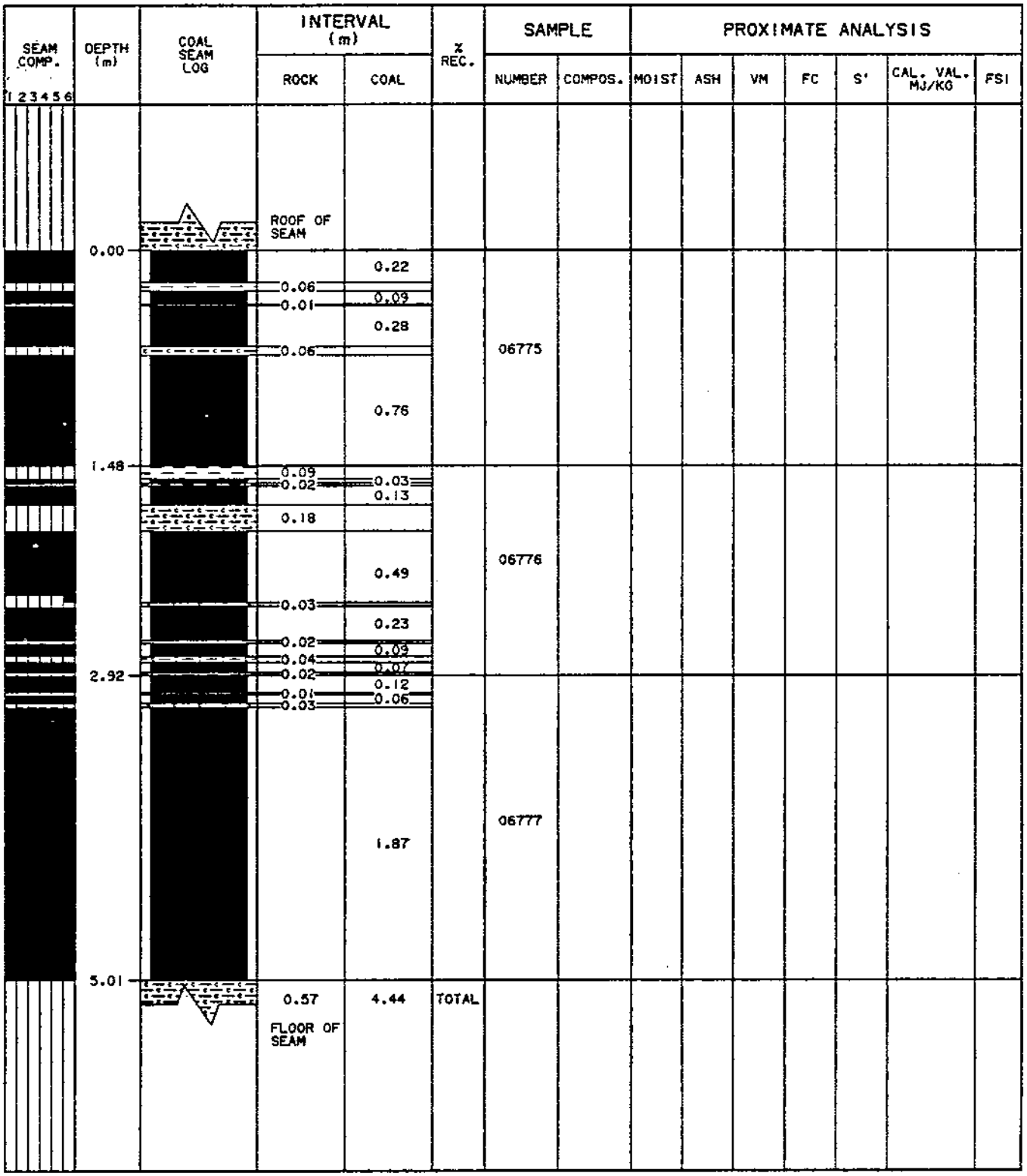
SEAM DETAIL

TRUE THICKNESS

ADIT 83132

SEAM 1

DRAWN BY: J. PERRY	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984



(205.571831024023.L09

AT CROSS-CUT FACE
AFTER SAMPLING

GULF CANADA RESOURCES INC.

MT. KLAPPAN COAL PROPERTY

SEAM DETAIL

TRUE THICKNESS

ADIT 83133

SEAM 1

DRAWN BY: J. PERRY	SCALE: 1:40
APPROVED BY: C. WILLIAMS	DATE: FEB 1984

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83119

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
			0.03	I		CLYST	DK.GY.VTHNB SOFT, POORLY BEDDED, SEVERAL ORANGE STR EAKS WITHIN. SLIGHTLY CARB.
			0.04	I		COAL	C-6 INTERBANDS OF DARK GREY CLYST AND HARD, DULL AND BRIGHT COAL. (50:50)
			0.17	I		COAL	C-1 VERY HARD
			0.10	I		COAL	C-1 FRIABLE, CLEATED, SOME RUSTY ORANGE STA INING,FEW CLYST LAMS.
			1.00	I		CLYST	CARB.DK.GY ROOF: AT THE BASE OF A CLYST PARTING IN MID-SEAM THAT MARKED THE ROOF OF THE A DIT TUNNEL. CLYST SOFT, POORLY BEDDED A ND SHEARED
			0.13	I		COAL	C-1 WELL CLEATED, FRIABLE, SMALL AMOUNT OF PERMAFROST. SOME RUSTY ORANGE STAINING ON CLEAT SURFACES
			0.07	I		COAL	C-3 HARD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83119

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
			0.01	I		CLYST	DK.GY ORANGE ZONES, SOFT DISCONT. LENSES UP T O 0.01M.
			0.14	I		COAL	C-1
			0.03	I		COAL	C-6 STONY - CLAY AND COAL - LENTICULAR
			0.12	I		COAL	C-1 WELL CLEATED, FRIABLE
			0.01	I		CLYST	CARB.DK.GY COALY - DISCONT. LENSES
			1.24	I		COAL	C-1 WELL CLEATED WITH HARD BRIGHT COAL BAND S .01 TO .05M THICK.
			0.17	I		COAL	C-3 VERY HARD, RUSTY.
			1.00	I		CLYST	CARB.DK.GY.THNB FLOOR: POORLY BEDDED, SHALLOW ROLLS IN FLOOR. PLANT FRAGS. BEDDING 076/17S.

* DENOTES MEASURED BCA
NEWPAGE

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83132

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00		I	CLYST	CARB.DK.GY.THNB.RTB ROOF - SHARP CONTACT WITH COAL, LOW AMP LI. ROLLS STRIKE VARIES FROM 068 TO 080 AND DIPS 13 TO 20 S ROOF COMPETENT THOUGH SOME SLABS DISLODGED BY BLASTING AT T. 080/16S
	1.00	1.23	0.23	06772	I	COAL	C-1 HARD, WELL CLEATED, OCCASIONAL VERT. ICE VEINS AT TOP. MAJOR CLEAT 170/82W, 2ND ARY 094/72N
	1.23	1.28	0.05	06772	I	CLYST	CARB.M-DK.GY.VTHNB SOFT,POORLY BEDDED. THICK. VARIES FROM .03 TO .06 M OVER 2M STRIKE LENGTH. OCC . COAL STRINGERS
	1.28	1.39	0.11	06772	I	COAL	C-1 HARD
	1.39	1.40	0.01	06772	I	CLYST	CARB.M-DK.GY.VTHNB
	1.40	1.63	0.23	06772	I	COAL	C-2
	1.63	1.70	0.07	06772	I	CLYST	CARB.M-DK.GY.VTHNB SOFT, POORLY BEDDED - .03 TO .09 M ALONG STRIKE. OCC. COAL STRINGERS

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83132

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.70	2.27	0.57	06772	I	COAL	C-1 WELL CLEATED - THIN ICE COATING ON SOME CLEAT SURFACES. THIN DISCONT. CLAY BAND IN CENTRE. RUSTY ORANGE STAIN ON COAL AT BASE
	2.27	2.32	0.05	06772	I	COAL	C-3 CRUSHED BUT HARD
	2.32	2.35	0.03	06772	I	COAL	C-6
	2.35	2.46	0.11	06772	I	COAL	C-1
	2.46	2.49	0.03	06772	I	COAL	C-6 STONY COAL
	2.49	2.60	0.11	06773	I	CLYST	M-DK.BN.THNB SOFT, POORLY BEDDED, PLANT FRAGS. - .07 TO .12M THICK ALONG STRIKE.
	2.60	2.65	0.05	06773	I	COAL	C-1 SEVERAL THIN CLAY LAMS.
	2.65	2.66	0.01	06773	I	CLYST	M-DK.BN.VTHNB AS CLYST ABOVE

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83132

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	2.66	2.73	0.07	06773 I		COAL	C-1
	2.73	2.74	0.01	06773 I		CLYST	M-DK.BN
	2.74	2.81	0.07	06773 I		COAL	C-2 HARD
	2.81	2.89	0.08	06773 I		CLYST	CARB.DK.GY.THNB SOFT, POORLY BEDDED - SMALL VARIATIONS IN THICK. ALONG STRIKE. MANY COAL LAMS.
	2.89	3.00	0.11	06773 I		COAL	C-1 THIN ICE VEINS IN FACE
	3.00	3.06	0.06	06773 I		COAL	C-1 SHEARED - THIN CLYST LAMS.
	3.06	3.30	0.24	06773 I		COAL	C-1
	3.30	3.34	0.04	06773 I		COAL	C-6 STONY
	3.34	3.51	0.17	06773 I		COAL	C-1

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83132

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.51	3.57	0.06	06773 I		CLYST	CARB.DK.GY.THNB VERY SOFT - WITH LISTRIC SHEAR SURFACES
	3.57	3.73	0.16	06773 I		COAL	C-1
	3.73	3.75	0.02	06773 I		COAL	C-6 STONY
	3.75	3.77	0.02	06773 I		COAL	C-1
	3.77	3.79	0.02	06773 I		COAL	C-6 STONY
	3.79	3.81	0.02	06773 I		COAL	C-1
	3.81	3.86	0.05	06773 I		CLYST	CARB.DK.GY.THNB AS ABOVE
	3.86	3.91	0.05	06774 I		COAL	C-1
	3.91	3.93	0.02	06774 I		CLYST	CARB.DK.GY.THNB
	3.93	4.12	0.19	06774 I		COAL	C-1 HARD

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83132

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.12	4.13	0.01	06774	I	SLTST	M-DK.GY RUSTY STAINING - IRONSTONE? LENSES UP T O .20 M LONG
	4.13	5.17	1.04	06774	I	COAL	C-1 HELL CLEATED
	5.17	5.47	0.30	06774	I	COAL	C-1 VERY HARD. ICE VEINS IN FACE.
	5.47	5.67	0.20	06774	I	COAL	C-1 HELL CLEATED - RUSTY ORANGE STAINING TH ROUGHOUT FACE
	5.67	5.82	0.15	06774	I	COAL	C-3 HARD
	5.82	6.82	1.00		I	CLYST	CARB.DK.GY.FMNB FLOOR: SHARP CONTACT HITH COAL - ROLLS ALSO IN FLOOR. HIGHLY CARBONACEOUS AT C ONTACT. PLANT FRAGS. AND COAL STRINGERS . BEDDING 074/16S

* DENOTES MEASURED BCA
NEWPAGE

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83133

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	0.00	1.00	1.00		I	CLYST	CARB.DK.GY.THNB.RTB ROOF: AS DESCRIBED IN SEAM LOG PRIOR TO SAMPLING. SEE ADT83133.
	1.00	1.22	0.22	06775	I	COAL	C-1 SOME ICE VEINS NEAR TOP
	1.22	1.28	0.06	06775	I	CLYST	DK.GY.THNB SOMEWHAT CARBONACEOUS, SOFT, POORLY BEDDED.
	1.28	1.37	0.09	06775	I	COAL	C-1
	1.37	1.38	0.01	06775	I	CLYST	CARB.DK.GY POORLY BEDDED, SOFT
	1.38	1.66	0.28	06775	I	COAL	C-1 SEVERAL THIN (.01M) BONY COAL BANDS
	1.66	1.72	0.06	06775	I	CLYST	CARB.DK.GY SOFT, POORLY BEDDED, COAL STRINGERS AND LAMS.

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83133

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	1.72	2.48	0.76	06775	I	COAL	C-1 THIN (~.01M) CLYST BAND IN CENTRE WHICH REACHES .02 M IN THICKNESS ALONG STRIKE. SEVERAL THIN STONY COAL BANDS NEAR BASE.
	2.48	2.57	0.09	06776	I	CLYST	M.GY.THNB POORLY BEDDED, SOFT, THICKNESS VARIATION ALONG STRIKE.
	2.57	2.60	0.03	06776	I	COAL	C-1
	2.60	2.62	0.02	06776	I	CLYST	CARB.DK.GY.VTHNB SOFT - COAL STRINGERS AND LAMS.
	2.62	2.75	0.13	06776	I	COAL	C-1 OCC. CLAY LAMS.
	2.75	2.93	0.18	06776	I	CLYST	M-DK.GY.THNB POORLY BEDDED, SOFT. CARB ZONES AND SOME COAL STRINGERS AND LAMS.
	2.93	3.37	0.44	06776	I	COAL	C-1 OCC. CLYST LAMS. AND THIN BANDS
	3.37	3.42	0.05	06776	I	COAL	C-6 BONY

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83133

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	3.42	3.45	0.03	06776	I	CLYSI	CARB.M-DK.GY.VTHNB AS ABOVE
	3.45	3.68	0.23	06776	I	COAL	C-1
	3.68	3.70	0.02	06776	I	CLYSI	M.GY.VTHNB LENTICULAR AND DISCONT. FINE COALY MATE RIAL THROUGHOUT - POSSIBLE IRONSTONE.
	3.70	3.79	0.09	06776	I	COAL	C-1
	3.79	3.83	0.04	06776	I	CLYST	CARB.M-DK.GY.VTHNB CONTAINS V. HARD ZONE IN CENTRE, POSS. IRONSTONE
	3.83	3.90	0.07	06776	I	COAL	C-1 CRUSHED
	3.90	3.92	0.02	06776	I	CLYST	CARB.DK.GY SOFT, SOME SHEARING, THICKENS TO 0.05 M ALONG STRIKE.
	3.92	4.04	0.12	06777	I	COAL	C-1

* DENOTES MEASURED BCA

PROJECT: KPN BLOCK: LR DATA SOURCE: ADT83133

BCA	DEPTH FROM	DEPTH TO	INTRVAL THICK.	SAMP. ID	SEAM ID	LITHOLOGY	DESCRIPTION
	4.04	4.05	0.01	06777	I	SLTST	M.GY V. HARD, POSS. IRONSTONE, LENTICULAR AN D DISCONT.
	4.05	4.11	0.06	06777	I	COAL	C-1
	4.11	4.14	0.03	06777	I	CLYST	CARB.M-DK.GY.VTHNB BANDED CARB CLYST AND COAL.
	4.14	6.01	1.87	06777	I	COAL	C-1 WELL CLEATED, RUSTY ORANGE STAINING ON FACE. OCC. THIN LENSES "IRONSTONE" UP T O .03 M THICK, VERY DISCONT., AT VARIOU S LEVELS.
	6.01	7.01	1.00		I	CLYST	CARB.DK.GY.THNB FLOOR: SEE COMMENTS IN LOG PRIOR TO BUL K SAMPLE (ADT83133). BEDDING 066/18S.

MT. KLAPPAN ADIT REPORT PART II

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1.0 INTRODUCTION

A multi-stage program of coal sampling and quality analysis spanned the period prior to, during and following the extraction of the 1983 Mt. Klappan bulk sample.

In Phase I (as described in Part I of this report) a Winkie drilling program provided core samples to verify that coal quality in the target seam was as anticipated from the drilling program of 1982. (See Part II - Section 2.0)

During the driveage of the adit petrography and a field froth flotation procedures was conducted to monitor the oxidation level of the coal (Part II - Section 3.0).

A sample comprising 4 barrels of material was taken mid-way through adit driveage (see Part I - Section 5.2) and analyzed to confirm the expected size analysis (Part II - Section 4.0).

Finally, the bulk sample extracted provided abundant material for a comprehensive product analytical program . Part II - Section 5.0 reports quality results for five products sized between 50mm and 0 on a raw basis and cleaned to 5% and 10% ash.

2.0 DRILLING PROGRAM

The upper and lower intervals of Seam I as intersected by two Winkie drill holes were subjected to complete coal quality analysis to determine if the same coal could be expected in the adit as was sampled in DDH 82-005. Proximate analyses for all Winkie intervals are very comparable to hole -005, though the level of oxygen from ultimate analysis suggests a slight degree of oxidation.

The trend from hole -005 in the east to the Winkie holes in the west is one of slightly decreasing ash in the seam as a whole. The quality of the samples from Winkie drilling verified that there was no substantial change in quality at a distance internally along the seam from hole 005. The point of seam penetration of the deepest Winkie hole (25m depth) was selected as the target point for the adit.

2.1 Introduction

Four Winkie drill holes were spudded along the ridge line of Lost Ridge to obtain core samples of Seam I and to confirm, through quality analysis, the optimum site for adit driveage. Drill holes WKD 83-001, -002 and -003 are all situated about 360m east of DDH 82-005. Drill hole 001 was not completed due to mechanical problems, but drill hole -002, at essentially the same site, penetrated the top of the seam at 12.4m depth and intersected 4.77m of coal with 83% recovery. Hole -003 was 12m south of -002 and penetrated Seam I at 15.5m, intersecting 4.84m of coal with 73% recovery. Drill hole -004 was situated about 280m east of DDH 82-005. It penetrated Seam I at 25.69m and yielded 70% recovery over 4.36m of coal.

Samples from holes -002 and -004 were subjected to complete analysis atBirtley Coal & Minerals Testing. Hole -002 had the best recovery of any hole and hole -004, although it had relatively poor recovery, sampled Seam I in a different area, from beneath a significantly greater amount of cover.

The Seam I intersection from both holes -002 and 004 contained a rock split of .10m thickness about 1.5m from the top of the seam. Hole -004 had an additional 6cm split about 0.5m lower (see Part I, Figure 3.3). In sampling, the core for both holes was split in two, the material from above the rock band comprising one sample, and the material below and including the rock band comprising the second.

Material from each interval was analyzed separately. The reported analyses for the seam as a whole are averages weighted by interval thickness and are not the results of direct analysis (see Table 2.1).

TABLE 2.1

TOTAL SEAM I COMPARISON

	DDH 82-005	WKD 83-004	WKD 83-002
Proximate Analysis			
R. M.	2.5	1.5	1.7
Ash	22.4	24.0	21.2
Vol. M.	7.4	6.9	7.6
F.C.	67.7	67.6	69.5
T.S.	0.4	0.4	0.4
Gross C.V. (cal/g)	6212*	5871	6054
Ultimate Analysis			
Carbon	70.8	68.8	70.7
Hydrogen	2.1	2.2	2.2
Nitrogen	0.8	0.4	0.5
Oxygen	1.0	2.7	3.3
Ash Fusion Temperatures			
Oxidizing Atmos. (°C)			
Init. T	1245	1335	1305
Soft. T.	1300	1390	1390
Hemi. T.	1330	1420	1430
Final T.	1370	1500	1480
Reducing Atmos. (°C)			
Init. T.	1185	1305	1275
Soft. T.	1240	1345	1370
Hemi. T.	1270	1370	1400
Final T.	1315	1445	1460
Ash Composition			
SiO2	50.5	64.5	62.6
Al203	24.2	19.9	21.1
Fe203	8.6	6.6	5.6
CaO	5.0	0.6	1.7
MgO	3.9	2.2	1.8
TiO2	0.5	1.0	1.0
Na20	1.0	1.2	1.4
K20	0.9	1.7	1.5
SO3	3.7	0.3	0.4
P205	1.2	0.4	1.3

*Calculated

TABLE 2.2

UPPER INTERVAL COMPARISON

	DDH 82-005 Upper	WKD 83-004 Upper	WKD 83-002 Upper
Proximate Analysis			
R. M.	2.5	1.4	1.7
Ash	34.6	15.7	19.1
Vol. M.	7.3	6.3	7.7
F.C.	55.6	76.6	71.5
T.S.	0.3	0.5	0.5
Gross C.V. (cal/g)	5055*	6728	6292
Ultimate Analysis			
Carbon	59.8	76.5	70.5
Hydrogen	1.9	2.4	2.1
Nitrogen	0.7	0.4	0.6
Oxygen	0.2	3.1	5.5
Ash Fusion Temperatures			
Oxidizing Atmos. (°C)			
Init. T	1270	1410	1360
Soft. T.	1385	1440	1390
Hemi. T.	1420	1465	1455
Final T.	1470	1535	1525
Reducing Atmos. (°C)			
Init. T.	1205	1365	1305
Soft. T.	1325	1405	1370
Hemi. T.	1370	1415	1420
Final T.	1430	1520	1500
Ash Composition			
SiO2	58.2	65.4	68.2
Al203	26.3	20.5	18.0
Fe203	5.3	6.0	4.5
CaO	1.8	0.7	1.3
MgO	2.8	1.4	1.5
TiO2	0.4	0.9	0.7
Na2O	1.4	1.3	1.2
K2O	1.0	1.5	1.4
SO3	1.7	0.1	0.6
P205	0.3	0.4	0.4

*Calculated

TABLE 2.3

LOWER INTERVAL COMPARISON

	DDH 82-005 Lower	WKD 83-004 Lower	WKD 83-002 Lower
Proximate Analysis			
R. M.	2.5	1.5	1.7
Ash	14.2	30.0	22.1
Vol. M.	7.5	7.4	7.5
F.C.	75.8	61.1	68.7
T.S.	0.4	0.4	0.4
Gross C.V. (cal/g)	6983*	5257	5957
Ultimate Analysis			
Carbon	78.1	63.3	70.8
Hydrogen	2.3	2.0	2.2
Nitrogen	0.8	0.4	0.5
Oxygen	1.7	2.4	2.3
Ash Fusion Temperatures			
Oxidizing Atmos. (°C)			
Init. T	1225	1280	1280
Soft. T.	1245	1355	1390
Hemi. T.	1270	1385	1420
Final T.	1305	1475	1460
Reducing Atmos. (°C)			
Init. T.	1170	1260	1265
Soft. T.	1185	1300	1370
Hemi. T.	1205	1335	1390
Final T.	1235	1390	1440
Ash Composition			
SiO2	45.3	63.8	60.3
Al2O3	22.8	19.5	22.4
Fe2O3	7.2	7.1	6.1
CaO	4.7	0.6	1.8
MgO	0.6	2.7	1.9
TiO2	0.8	1.0	1.1
Na2O	0.9	1.1	1.5
K2O	5.1	1.9	1.6
SO3	5.1	0.5	0.3
P2O5	1.8	0.4	1.6

*Calculated

2.2 Proximate, Total Sulphur & Calorific Value

2.2.1 Upper Interval

Proximate analysis of coal from the upper interval of Seam I in DDH-82-005, WKD-83-004 and WKD-83-002 indicates consistency in moisture and volatile levels, but considerable fluctuation in measured ash levels, and therefore fixed carbon values. Moisture levels are 2.5% (-005), 1.4% (-004) and 1.7% (-002), while volatile levels are 7.3%, 6.3% and 7.7% respectively. The moisture level of -005 may have been affected by a longer delay between drilling and shipping of the sample to the laboratory.

The ash levels of the three intersections are 34.6% (-005), 15.7% (-004) and 19.1% (-002). This is most simply explained via comparison of ratios of recovered coal and rock 1.36/0.55 (coal/rock in -005), 1.22/0.12 (-004) and 1.37/0.06 (-002). Corresponding percentages of recovered rock are 29%, 9%, and 4%. This suggests that the coal itself may be fairly consistent in ash content and changes in ash level in the upper interval are largely a function of the amount of rock included in the seam. There must, however, be a slight shift towards higher ash in the coal between -004 and -002 as the ash level is increasing even though the rock content is decreasing.

Total sulphur values are similar in all three holes. Calorific values are consistent with the trend in ash and

range from 5055 cal/g in hole -005 to 6728 cal/g in hole -004.

2.2.2 Lower Interval

Moisture levels in the upper and lower intervals are virtually identical. The sample from DDH-82-005 still shows a somewhat elevated value (2.5%). Volatile contents are also comparable and show great consistency (7.4% - 7.5%). Ash levels in the lower interval are lower for -005 (14.2%) and higher for both -004 (30.0%) and -002 (22.1%). This is not so easily explained by comparing coal rock ratios: 2.00/0.09 coal/rock, 4% rock for -005; 1.55/0.15, 9% rock for -004; 2.43/0.16, 6% rock for -002. The -005 intersection has much less rock in the lower interval, and a corresponding much lower ash level. The -002 intersection shows a slight increase in both rock proportion and measured ash. Intersection -004, however, has exactly the same percentage of sampled rock in the lower and upper intervals, yet a markedly higher ash content in the lower interval.

Total sulphur values are constant for all three samples at 0.4%. Calorific values reflect the ash levels in the lower interval and range from 6983 cal/g. (-005) to 5257 cal/g. (-004).

2.2.3 Total Seam

When the trends in the lower and upper intervals are

averaged over the whole seam, the parameters of proximate analyses are quite consistent from hole to hole. Moisture levels still appear to be lower in the Winkie holes than in hole -005 (-002 is 1.7%, -004 is 1.5% and -005 is 2.5%), butash content remains constant at 22-24%, volatiles remain around 7% and fixed carbon levels range from 67% to 69%.

Total sulphur for all samples is 0.4% and gross calorific value ranges just above and below 6000 cal/g (6212 for -005 and 5871 for -004).

2.3 Ultimate Analysis

2.3.1 Upper Interval

Ultimate analysis results for all three samples are quite comparable except for the depressed carbon content of -005, due to the elevated ash level. In addition, the oxygen levels for the WKD samples (3.1% for -004 and 5.5% for -002) seem to be higher than would be expected and are likely affected by a small degree of weathering. Hydrogen levels are relatively constant, ranging between 1.9% and 2.4%. Nitrogen levels range from 0.4% (-004) through 0.6% (-002) to 0.7% (-005).

2.3.2 Lower Interval

The oxygen levels indicate a lesser degree of weathering in the lower intervals of intersections -004 and -002. However, a slightly higher oxygen content in the stratigraphically lower interval of -005 compared with its upper interval reflects the fact that in DDH-82-005 the seam is overturned.

Hydrogen levels are quite consistent for all intersections (ranging from 2.0% to 2.3%). Nitrogen levels exhibit almost the identical trend observed in the upper interval samples, 0.4% (-004) to 0.5% (-002) to 0.8% (-005).

2.3.3 Total Seam

By averaging the interval results together the variations are reduced to some extent. For all samples the carbon level is very close to 70% and the hydrogen level is just over 2%. Nitrogen levels vary in the same way as for each of the intervals separately, and the oxygen levels appear to rise towards the west (1.0% to 2.7% to 3.3% from -005 to -004 to -002) indicating slightly increasing degrees of weathering as the amount of cover declines.

2.4 Ash Fusion Temperatures

2.4.1 Upper Interval

In both oxidizing and reducing atmospheres the ash fusion temperatures for the -004 interval are highest followed closely by -002. The temperatures for -005 are significantly lower than both. In an oxidizing atmosphere the difference between the initial temperature of -004 and -002 is 50°C and between -004 and -005 is 140°C. The respective differences from the final temperature of -004 are 10°C for -002 and 65°C for -005. Temperatures in a reducing atmosphere show a similar trend.

	DDH 82-005	WKD 83-004	WKD 83-002
Oxidizing (°C)			
Init. T.	1270	1410	1360
Final T.	1470	1535	1525
Reducing (°C)			
Init. T.	1205	1365	1305
Final T.	1430	1520	1500

2.4.2 Lower Interval

The fusion temperatures for the lower intervals of -004 and -002 are essentially the same, within the bounds of analytical error, while the temperatures for -005 are again distinctly lower. The trend of separation appears to be the reverse of the upper interval, being (in an oxidizing atmosphere) 55°C between -005 and the Winkie samples at the initial temperature and 170°C at the final temperature.

	DDH 82-005	WKD 83-004	WKD 83-002
Oxidizing (°C)			
Init. T.	1225	1280	1280
Final T.	1305	1475	1460
Reducing (°C)			
Init. T.	1170	1260	1265
Final T.	1235	1390	1440

2.4.3 Total Seam

When results of the upper and lower intervals are averaged, the fusion temperatures for -004 and -002 are roughly 100 to 150°C higher than for -005.

2.5 Ash Mineral Composition

2.5.1 Upper Interval

The relatively small differences in fluid temperatures for the upper intervals are a function of quite similar ash mineral compositions. The silica content of the samples from -004 and -002 is a few percent higher and the aluminum content a few percent lower than for -005, CaO, MgO, Na_2O and Fe_2O_3 levels are comparable, TiO_2, K_2O and P_2O_5 levels are slightly higher and SO_3 levels are lower (by 1.0% to 1.5%).

2.5.2 Lower Interval

The lower interval WKD samples have comparable ash mineral compositions but are quite different from DDH 82-005. The WKD silica levels are higher by about 15% (60% rather than 45%) and the alumina levels are slightly lower (-005 is 22.8%, -004 is 20.3% and -002 is 18.0%). Otherwise, TiO_2, Na_2O and K_2O levels for the WKD samples are slightly higher, MgO, Fe_2O_3 and P_2O_5 levels are significantly lower and CaO and SO_3 levels are much lower. The low ash fusion temperatures of -005 are accounted for by excess silica (SiO_2:Al_2O_3 ratio greater than 2:1) in the

presence of iron, calcium and magnesium oxides. The WKD samples have a much greater amount of excess SiO_2 but lack the Fe_2O_3, CaO and MgO to form low fusion temperature compounds.

2.5.3 Total Seam

The average values listed for ash mineral composition are consistent with the trends indicated by the averaged ash fusion temperatures.

2.6 Petrography

A test of vitrinite weathering was conducted by D.E. Pearson and Assoc. Ltd. using a technique of etching with KOH and staining with Safranin-O organic dye. The number of grains stained in a count of 1000 vitrinite grains was determined. Only 4.3% of the grains showed any signs of staining (only weathered grains will stain) and of these most were stained only about the periphery. On a qualitative basis this coal can be described as sustaining a very low level of oxidation and is effectively unoxidized.

This test was conducted on coal taken from the lower level of -002 as this sample was the only one sufficiently large that some might be spared for petrography. It is expected that coal from -004 will show even fewer signs of oxidation.

2.7 Conclusion

There is no significant difference in coal quality between the initial exploration hole, DDH-82-005 and the Winkie holes put down as verification of seam quality continuity, chiefly WKD 83-002 and -004. The quality for the Winkie samples is even better than that found in hole -005 in some regards. Moisture values and ash values in -002 are slightly lower. The only indications of oxidation are mildly elevated oxygen values in the ultimate results from the Winkie holes and the presence of some oxidized vitrinite grains in the lower part of -002. As WKD 83-004 penetrated seam I at a vertical depth of 25m, yielded samples that indicated coal quality well within acceptable ranges, and penetrated the seam at a point within a reasonable distance (30m) of a potential portal, the base of the hole (at the base of the seam) was designated as the target point for the adit.

3.0 OXIDATION TESTING

3.1 Petrography

Coal samples for petrography were taken on the premise that oxidation to any substantial degree will cause reduction in the apparent mean maximum reflectance of vitrinite. As driveage proceeded, two samples were sent to David E. Pearson and Associates for vitrinite reflectance determination and a specific test for oxidation involving etching with potassium hydroxide (KOH) and staining with satranin-O organic dye. A greenish colouration will be absorbed by oxidized vitrinite grains exposed to this dye.

One of the samples examined (04804) was taken by auger driven into the roof of the adit at 5m of driveage. It represents an interval of roughly 1.0 to 1.5 metres from the roof of the seam, where the effects of oxidation should be most noticeable. The other sample (04805) is part of a channel sample taken down the wall of the adit (from the floor to 2.30 m above the floor) at 10 m of driveage. It represents the character of the coal both at greater penetration beneath cover and at a lower level in the seam.

One thousand grains from each sample were examined for staining. The results of analysis were:

	Depth of Cover	No. of Stained Grains	Ro Max.
04804	7m	0	4.06%
04805	13m	0	4.03%

The staining test obviously indicates that oxidation is limited, within the sensitivity of the test, and the reflectance values correspond very closely with what is expected in an unweathered sample of seam I (DDH82005 produced a value of 3.97% reflectance).

3.2 Froth Flotation

The principle of oxidation level determination by froth flotation is that, all other things being equal, an oxidized sample of a coal will exhibit poorer flotation than an unoxidized sample of the same coal. A series of froth flotation tests was conducted on a somewhat experimental basis in the field as the adit was being driven. The tests gave a very broad indication that oxidation levels decreased very rapidly with penetration but the considerable fluctuation between stations indicated that the technique was subject to a number of influences beyond oxidation.

3.2.1 Technique

Two sets of samples were taken at intervals along the adit, one every 2m and another every 5m. The chief difference between the sets was that the 5m incremental samples include material representing almost the complete thickness of the seam, divided into intervals of 0 to 2.30m, 2.30 to 3.20m and 3.20m to 4.00m from the floor of the adit seam. The 2m incremental samples included material only up to 2.30m (the level of the adit roof). The sampling procedure is described in Part 1 Section 4.5.

The equipment used for froth flotation analysis included:

1 geological hammer and steel pan
1 iron mortar and pestle
12 aluminum pans
4 small paint brushes

1 Coleman oil heater
1 thermometer
envelopes
coffee filters
2 filter masks
1 Philips blender
1 Krups KM50 electric coffee grinder.
1 100M x 0 screen
1 Sauter balance
diesel oil
methyl isobutyl carbonol (MIBC)
sample bags

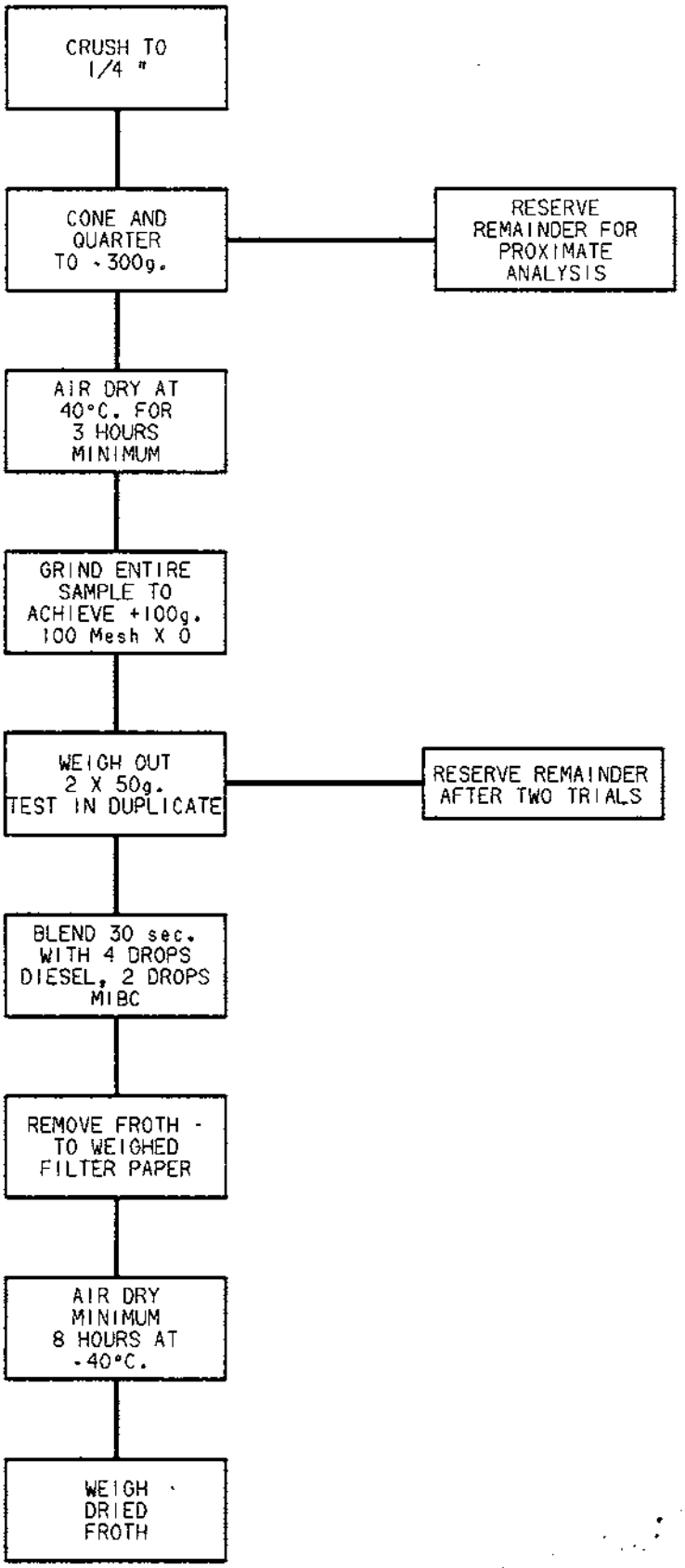
The procedure for analysis is summarized in Figure 3.1. The initial crushing was accomplished by hand and the drying temperature, over the oil heater, was modulated using both the heat control on the heater and the distance of the sample pan above the heater surface. The samples were weighed before and after drying and the moisture loss calculated.

The post drying grinding was a two stage process. The entire sample was crushed once with the mortar and pestle and then run through the coffee grinder as many times as it took to generate 100g of minus 100 mesh material. This varied with the sample and took up to five passes with extremely hard coal.

Frothing would be accomplished as quickly as possible after the sample had been ground to prevent the reabsorption of moisture by the fine material. Two trials of 50g each were run, each time the resulting froth being skimmed off

FIGURE 3.1
MOUNT KLAPPAN 1983

INCREMENTAL ADIT SAMPLES
FROTH FLOTATION ANALYSIS



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onto previously weighed filter paper. The froth was dried on the oil heater for at least eight hours and usually overnight. Drying was judged to be complete by this time, occasional tests with longer drying times yielded no additional weight loss.

After drying, the froth was weighed, the weight of the filter paper (coffee filter) subtracted and all details recorded. The results of the two trials were compared with each other and with results of other samples to detect any experimental irregularities.

3.2.2 Results

3.2.2.1 Lower Seam Interval

As testing for each channel sample station was completed, the results were added to a continuous graph. At the first sample point, 2m into the adit, froth recovery was an average 34.5% between two trials. Two metres further in, at +4m, froth recovery rose to 54.2% of the original sample weight. From here onwards there is fluctuation about this level (average of all channel samples is 49%) but no real trend of increasing recovery beneath greater thicknesses of cover. At +25m froth recovery plunged to 26.6% but was back up to average levels at +26m. Froth recovery also drops into the range of 36-38% at

+5m and +40m but all of these appear to be anomalies in the general trend.

Although the froth analysis program was not a strong indicator of oxidation levels in itself, it did afford an opportunity for close visual inspection of coal sampled at close intervals along the adit. With deeper penetration into the seam an increasing incidence was noted of zones of extremely hard and bright coal. Difficulty was sometimes encountered in the later samples in generating the required 100g of minus 1000 mesh material. Despite this coals very shiny and fresh appearance it sometimes produced lower than average froth recoveries.

3.2.2.2 Upper Seam Interval

The samples taken by auger from the roof of the adit at 5m intervals were used to monitor the oxidation trends in the upper part of the seam. Presumably, the oxidation level might be greater here because the thickness of cover is somewhat reduced. In fact, however, the average froth recovery was marginally higher for the roof samples than for the channel samples from the lower interval, 50.8% for the 2.30m - 3.20m interval and 52.1% over 3.20m to 4.00m from the floor. Again, there is no consistent trend of increasing froth recovery with increasing depth of

cover, but the fluctuation between sample stations is less pronounced (see Table 3.1).

3.2.3 Further Analyses

The portion of the incremental samples that remained after the extraction of the subsamples for froth flotation were held in reserve and forwarded to Cyclone Engineering Sales Ltd. for further analyses after the completion of the adit. It was hoped that the measurement of a number of the parameters from these samples would provide sufficient information to shed some light on the fluctuation in froth recovery observed. Proximate, Total Sulphur and Specific Gravity determinations were performed on the 5m incremental samples taken by auger from the roof. These analyses and Hardgrove Grindability testing were performed on the 2m incremental channel samples, and all previous analyses plus Calorific Value were performed on the 5m incremental channel samples.

3.2.3.1 Lower Seam Interval

A possible correspondence was sought between froth recovery and both moisture level, because of its possible effect on surface tension around coal particles, and ash, because of its effect on density. A linear regression was calculated between froth recovery and each of the parameters in turn and a very weak relationship was found with each. There was an

unexpected stronger but still insignificant statistical correlation between froth recovery and volatile matter. A moderate relationship was apparent between H.G.I. and froth recovery which bears out the observation made while grinding the samples preparatory to the froth flotation analysis.

Apart from trends in two-variable statistical calculations there is a fairly distinct drop in moisture values from 3.68% at 2m inside the portal to 1.06% at +46m in the adit. Again, there is considerable variation about the general trend, but the trend does exist. There is a corresponding slight rise in calorific value with depth and at lower moisture levels. These latter trends indicate that there is a tendency to lower levels of oxidation at greater depths of cover.

3.2.3.2 Upper Seam Interval

The number of samples available from the upper part of the seam is smaller as the sample points were spaced at a larger interval. Therefore, a statistical correspondence numerically equivalent to one in the lower interval will not be as significant. Several poorly defined relationships exist here as with the channel samples, but there is one quite striking link. A well delineated inversely proportional linear regression appears between ash

level and froth recovery. This is the expected trend and may be better defined in the upper interval because ash levels are higher overall (due to a greater number of rock splits - see Part I, Section 5.4) and display a greater range.

4.0 PRELIMINARY SUBSAMPLE

As part of a continuing process of coal quality monitoring, leading up to the extraction of the bulk sample, a preliminary sample was taken at +30m of driveage, comprising 4 barrels (787 kg) of material and representing the total thickness of the seam exposed at the advancing face (see Part I - Section 5.2). The main purpose of the sample was to demonstrate the natural size consisting of extracted coal. With the shearing recognized within the seam (Part I - Section 5.4) it was considered possible that a passive particle size reduction might take place as the permafrost in the coal melted after mining. Alternatively, the action of the frostitself might tend to break down the coal to some degree, the consequences of which could only be appreciated through size analysis after stabilization of an extracted sample at temperatures above freezing.

A further benefit that was derived from the analysis of a preliminary sample was an early look at the proximate parameters and washability by size fraction of at least part of the seam.

4.1 Raw Analyses

4.1.1 Proximate Analysis

A proximate sulphur and calorific value analysis of the entire sampled interval reaffirmed the indications of analyses of previous samples from drill core. The lower part of Seam I is quite low in ash with correspondingly high fixed carbon and calorific values (see Table 4.1). The only unusual value is the slightly elevated moisture level compared with previous measurements (3.10% compared with a maximum of 2.50% in drill core). This situation appears with regularity in the bulk sample as well (see Part II - Section 5.4.1) and is due to an air-drying period inadequate to compensate for the superior moisture retention of the larger particles in bulk samples.

4.1.2 Size Consist

The size distribution of the 4 barrel preliminary sample was measured for the natural coal, and for the naturally larger than 30 mm coal after crushing to pass 30mm. From these screenings the size distribution of run-of-mine coal crushed to less than 30 mm is calculated (see Table 4.2).

The natural sizing of the coal indicates an almost bimodal distribution, with 27% of the the mass existing in particles larger than 30 mm and 36% falling into the less

Table 4.1

PRELIMINARY SUBSAMPLE
RAW COAL QUALITY

	RM	3.1%
	Ash	9.2%
	VM	7.1%
	FC	80.6%
	S	0.54%
Gross	CV	7141 cal/gm

(partially air dried)

Table 4.2

PRELIMINARY SUBSAMPLE
SIZE DISTRIBUTION

(Raw Coal)

	Natural Sizing (i.e. Uncrushed)	+30 mm Crushed	Total Natural Size and Crushed Material
+30 mm	27.1	-	-
30 x 20 mm	12.5%	50.7%	26.2%
20 x 10 mm	13.2%	18.3%	18.2%
10 x 6 mm	11.4%	8.9%	13.8%
6 x 0 mm	35.8%	22.1%	-
6 x 1 mm	-	-	26.1%
1 x 0 mm	-	-	15.7%

than 6 mm fraction. Between 6 and 30 mm the size distribution seems to be very even. A certain brittleness of character is demonstrated by the reaction of +30 mm coal to being crushed to pass 30 mm. Only half of the original material remains above 20 mm in size, almost 1/4 is reduced to less than 6 mm and the remaining 27% falls in between. Despite this material being crushed by hand tamper (the potentially least destructive method for size reduction) the coal appears prone to a significant amount of overbreakage.

4.2 Float-Sink Analyses

4.2.1 Washability

The washability of each of five size fractions was assessed through flotation at 6 specific gravities (see Table 4.3). The washability of all size fractions down to 1 mm are remarkably comparable. There is some variation in the yield of material at 1.50 S.G. but the ash level is consistent at 2.40 - 2.70%. Cumulatively to 1.60 S.G., however, each of these fractions yield between 90 and 95% coal of ash content between 4.70 and 6%. There is a marked increase in ash level in the floats at greater than 1.60 S.G.

The 1 mm x 0 material is the only exception to the general finding. The weight percent is more widely distributed with only a 65% yield at 1.60 S.G. (still with a 4.80% ash level). The increase in ash of elemental fractions above 1.60 S.G. is not as striking but because these fractions make up a greater portion of the whole size fraction the total head ash is higher: 14.50% compared with 8.0 to 8.4% for the other size fractions, bringing the total ash for the entire sample up to 9.2% (see Section 4.1.1 above).

4.2.2 Attrition through Cleaning

A further examination of the degradation

characteristics of the coal involved a float-sinking test at a single specific gravity to simulate the effects of cleaning in product preparation. Separate representative samples of each size fraction were floated at 1.6 S.G. Following drying the coal was rescreened and the degradation in each size through cleaning was assessed (see Part II - Table 4.4). In each size approximately 80% of original mass remained in the original size fraction while the remainder fell into finer fractions. There is a strong skew in distribution towards the coarser sizes, suggesting that the degradation in float-sinking is largely due to abrasion rather than fracturing of particles.

5.0 BULK SAMPLE ANALYSIS

5.1 Summary

Analysis of the raw characteristics of coal from seam I was carried out for seven different size fractions between 50mm and 0. The size reduction that occurred during preparation of the sized material from raw as-mined coal points out the necessity for careful planning and efficient handling in order to preserve the coarse fractions desired. Raw coal quality is relatively consistent through all fractions except for a rise in ash level below 1mm.

Product analysis was carried out for each of five size fractions (the three fractions below 1mm examined on a raw basis being combined into one). Yields at 5% and 10% ash improve (from 53% and 80%, respectively, for the 50 x 25mm fraction) toward finer fractions through liberation. Below 1mm yields are lower due to higher initial ash levels. Quality for products is again quite consistent from size to size with most variation being accounted for by differences in ash chemistry and mineralogy.

For all 5% ash products down to 1mm, the gross calorific value is around 7700 cal/gm (a.d.b.). Sulphur levels are uniformly 0.5%, Nitrogen levels are 1.0% or less, and the ash fusion temperatures are consistently high. The quality of 10% ash products in terms of sulphur, nitrogen and ash fusibility is equally high and the calorific value (gross) is 7200-7300 cal/gm (a.d.b.).

Table 5.4

MT. KLAPPAN BULK SAMPLE

Size Distribution of Total
Sample Crushed to 50 mm

SIZE FRACTION (mm)	WT%	CUMULATIVE WT%
50 x 25	14.00	14.00
25 x 12	9.40	23.40
12 x 6	11.20	34.60
6 x 1	33.60	68.20
1 x 0.5	11.90	80.10
0.5 x 0.15	12.20	92.30
0.15 x 0	7.70	100.00

5.2 Procedures and Parameters

5.2.1 Objectives

There were three primary objectives of the 1983 Mt. Klappan bulk sample program.

1) To provide information on the natural size distribution of anthracite from seam I in a mining situation.
2) To provide a sufficiently large and representative sample for a comprehensive analysis of a variety of sized coals in raw and cleaned states.
3) To provide material for sample product distribution to a number of interested parties and potential customers.

5.2.2 Methodology

Part I - Section 5.0 describes in detail how the bulk sample was taken. The bulk sample itself was taken to represent the entire thickness of the seam. The sample was to be representative of run-of-mine coal that would be derived from a future mining operation. Other smaller samples were taken by ply to allow comparison with previous ply samples of the seam, and mapping of coal quality variation within the seam.

Care was taken that all parts of the seam were equally represented in the sample and that none of the sample was lost in packing and transportation.

The bulk of cleaning and analysis was done at Birtley Coal and Minerals Testing Ltd. in Calgary. Comparative and specialty analyses were done at Cyclone Engineering Sales Ltd. in Edmonton, Loring Laboratories in Calgary and Coors Spectro-Chemical Laboratories in Golden, Colorado.

5.2.3 Analytical Procedures

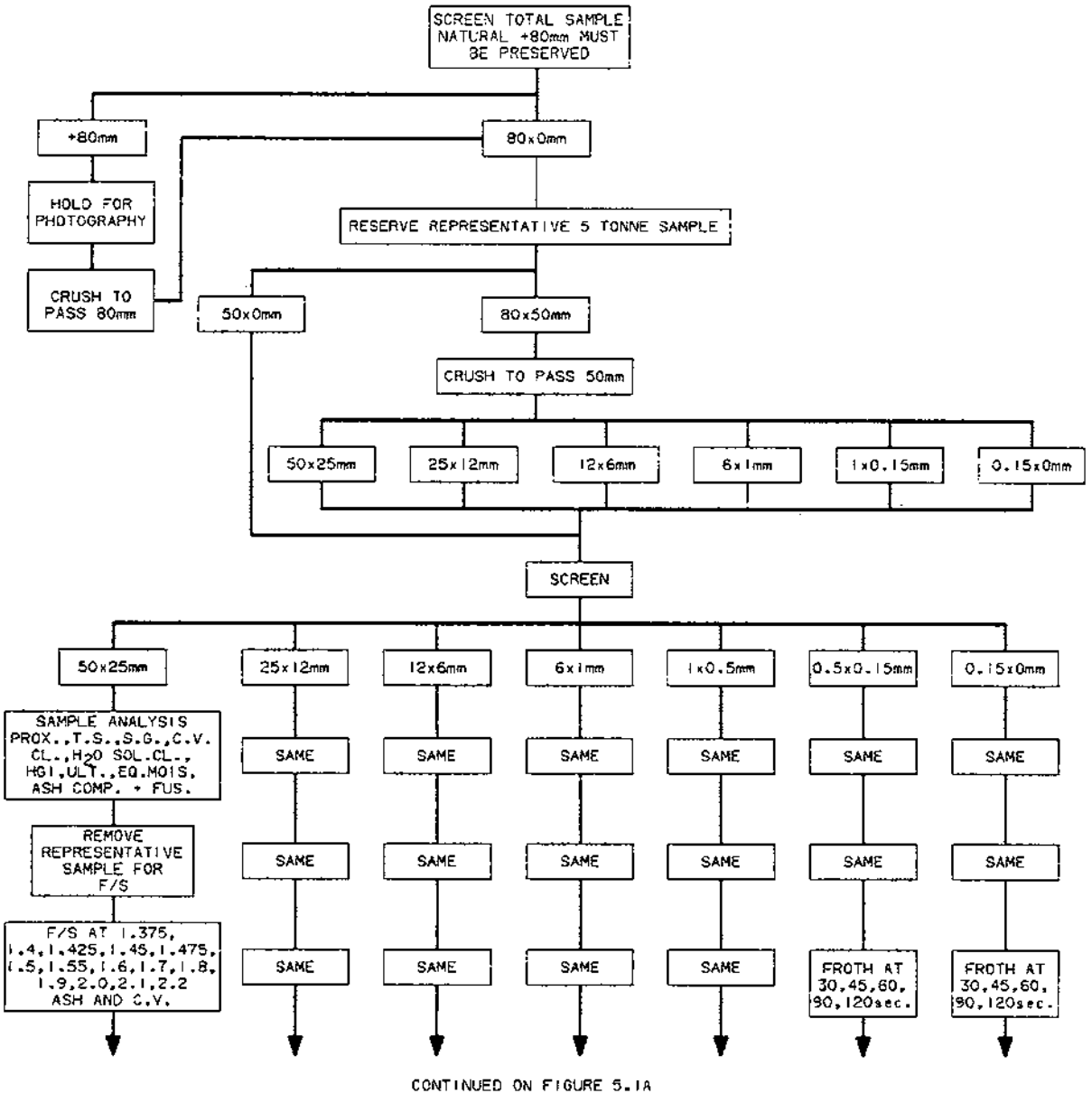
The flow sheet (Figure 5.1) illustrates three phases of analysis.

1) Screening and size analysis.
2) Raw coal quality studies and detailed washability analysis.
3) Product preparation and analysis.

5.2.3.1 Size Analysis

The intensive screening program undertaken with the bulk sample reflects the importance of size consist to anthracite production. Screening was carried out at 80 mm, 50 mm, 25 mm, 12 mm, 6 mm, 1 mm, 0.5 mm, and 0.15 mm. The natural +80 mm material was reduced to less than 80 mm and recombined with the recombined with the sample. Six tonnes of 80 mm x 50

FIGURE 5.1
MT. KLAPPAN COAL PROPERTY
1983 BULK SAMPLE ANALYSIS PROGRAM

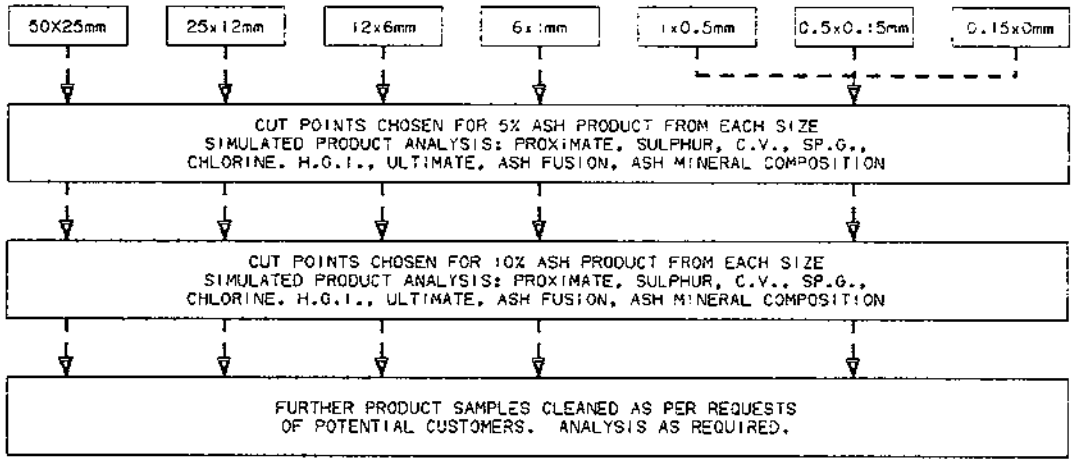


CONTINUED ON FIGURE 5.1A

FIGURE 5.1A

MT. KLAPPAN COAL PROPERTY

1983 BULK SAMPLE ANALYSIS PROGRAM CONTINUED



mm coal was set aside in reserve while the remainder was crushed to pass 50 mm. All analytical and washability studies were carried out on the sized material less than 50 mm. Once segregated by size each fraction was treated as a distinct and separate material. Products were produced from each size fraction individually without combination of more than one fraction. The exception is coal falling into the range below 1 mm. Though raw analyses and float/sinking were conducted for 1 x 0.5 mm, 0.5 x 0.15 mm and 0.15 x 0 fractions, all products were generated from material in the range of 1 mm x 0.

5.2.3.2 Float Sink Data

Material from each of the initial 7 size fractions beneath 50 mm was floated at 14 specific gravities. Between 1.375 S.G. and 1.5 S.G. an increment of 0.025 S.G. was used. Float proportion was also measured at 1.55 S.G. and at 0.10 S.G. intervals from 1.60 S.G. to 2.20 S.G. The concentration on the range below 1.55 S.G. was intended to yield detailed data to assist in the cleaning of low ash products. The two size fractions beneath 0.50 mm were tested using froth flotation at 30, 45 ,60 90 and 120 seconds.

5.2.3.3 Product Analysis

From coal in the size ranges of 50 x 25 mm, 25 x 12 mm, 12 x 6 mm, 6 x 1 mm and 1 mm x 0, products were produced and analyzed at 5% and 10% target ash. Additional analysis was done on miscellaneous products generated at higher and lower ash levels. Analyses included proximate, ultimate, calorific value, specific gravity, chlorine, H.G.I., carbon dioxide, ash fusion temperatures and ash mineral composition. The initial raw analyses included these plus equilibrium moisture and water soluble chlorine.

5.2.4 Terminology

Many of the parameters discussed in comparing and contrasting the coal quality of the size fractions into which the bulk sample was divided show considerable similarity from fraction to fraction. This is to be expected since all the coal of the bulk sample is drawn from a single seam. Some of the trends that do differentiate the coal of one size fraction from the coal of another occur in ash fusion temperatures and ash mineral composition. For the latter, differences are explained not just in terms of the percentage content of various individual constituents, but also in terms of ratios of the content of constituents relative to each other. Many subtleties in the characteristics of an ash are the result of the interaction of several contained minerals.

The ratios used in the discussions of the ash character of raw and product coals are as follows:

$$\text{Silica:Alumina Ratio} = SiO_2\%:Al_2O_3\%$$

A ratio of 2:1 or lower indicates an ash will have a higher fusion temperature than another ash which is similar in composition, but has a silica:alumina ratio above 2:1. Above 3:1 ash fusion temperatures tend to drop off sharply. There is no absolute relationship between this ratio and specific fusion temperatures, other elements affect the range into which the temperatures fall.

$$\text{Silica Percentage} = \frac{100 \times SiO_2}{SiO_2 + Fe_2O_3 + CaO + MgO}$$

This ratio can be applied in similar situations as the silica:alumina ratio. In general, a value of 82 indicates low fusion temperature while 30 or less indicates high fusion temperatures. Other ratios are more strongly linked to ash fusion trends than this one.

$$Fe_2O_3\%:CaO\% + MgO\%$$

Where this ratio is greater than 1 (more iron than calcium plus magnesium), the ash is termed "bituminous type ash". Where the ratio is less than 1, the terminology is "lignitic type ash". This designation can be applied to any coal regardless of its rank. The actual value of the ratio

is not important but the balance between these elements can be very influential in determining the degree of significance of other elemental ratios:

$$\text{Dolomite Percentage} = \frac{100 \times (CaO + MgO)}{Fe_2O_3 + CaO + MgO + Na_2O + K_2O}$$

This ratio can be significantly applied only to a "lignitic type ash" that has an acid content ($SiO_2\%$ + $Al_2O_3\%$ + $TiO_2\%$) less than 60%. These criteria are never met by Mount Klappan coal and the values are quoted for comparative purposes only.

$$\text{Base:Acid Ratio} = \frac{Fe_2O_3 + CaO + MgO + K_2O + Na_2O}{SiO_2 + Al_2O_3 + TiO_2}$$

This ratio has considerable correspondence with ash fusion temperatures throughout all analyses of Mount Klappan coals. For "lignitic type ash", a value less than 0.25 indicates high fusion temperatures while a value over 0.80 indicates low fusion temperatures. For "bituminous type ash", a value less than 0.5 indictes high fusion temperatures and temperatures drop systematically above 0.5.

$$\text{Fouling Factor } (R_f) = \text{Base:Acid} \times Na_2O\%$$

This is not a measure of the fusion behaviour of ash but indicates the potential for accumulation of deposits on the heat exchange surfaces of a furnace through sublimation

of gasses produced in combustion. For "bituminous type ash" a figure below 0.2 indicates a low fouling tendency while a figure over 1.0 indicates a severe fouling tendency. This factor cannot be applied to coals with "lignitic type ash" because the high relative content of calcium and magnesium reduces the fouling tendency overall to be out of the effective range of the ratio. A straight reading of fouling tendency can be drawn from $Na_2O\%$. The range (low to severe tendency for "bituminous type ash" is 0.5-2.50%, while for "lignitic type ash" it is 3.0-5.0%.

5.3 Size Consist Analysis

The initial screening, crushing and homogenization of the coal as it was received at Birtley from the adit revealed the same brittle nature as observed in the preliminary subsample (see Part II - Section 4.0). Due to the careful extraction and packing of the bulk sample (Part I - Section 5.3.2) the substantial every coarse size consist of the coal was preserved. Screening at 80 mm yielded 23.6% of the sample coarser then 80 mm with some pieces upwards of 450 mm. Rehandling and crushing the plus 80 mm material to pass through the 80 mm screen resulted in some over-reduction in size. The distribution following the first crushing stage indicated only 5.3% of the sample fell into the 80 x 50 mm fraction while the remainder of the 26% passed not only 80 mm but also 50 mm.

After reservation of 6 tonnes of 80 mm x 0 material, all remaining +50 mm coal was crushed to less than 50 mm. Again, the brittle nature of the coal created a degree of over-reduction and final distribution was slightly skewed towards finer sizes, with the most stable size consist appearing to be 6 x 1 mm (33.6%). The proportion of the total sample in coarse size fractions did not conform to the earliest indications but over 1/3 of the sample remained coarser then 6 mm (see Table 5.4).

5.4 Raw Coal Quality

The entire 31 tonnes of sample remaining after the 80 mm x 0 reserve was screened at 25 mm. The quantity of material below 25 mm was stored as 25 x 0 mm with representative quantities being extracted to provide sized samples for raw and product analyses. The results of raw analysis of seven size fractions between 50 m and 0 are summarized in Tables 5.5 through 5.11.

5.4.1 Proximate, Sulphur, C.V., H.G.I.

The unique quality of the bulk sample analysis program was that each of a number of size fractions was analyzed, float-sinked and cleaned into various products individually. Several trends of variation among certain parameters were noted that had not previously been encountered in analytical programs concentrating exclusively on drill core.

Moisture content of air dried raw coal was found to fluctuate quite substantially depending on size fraction. The coal was dried under controlled conditions for a length of time that experimental experience indicated should conform with A.S.T.M. standards. It was found, however, that the coarser coals (as 50 x 25 mm) and the coals with higher ash content retained far more moisture than was expected from past analysis of drill core samples. Moisture levels were 3.20% for 50 x 25 mm coal and around 5.0% for all fractions less than 6 mm. The size fraction about the same size range as drill core (12 x 6 mm) had about the same moisture level

(1.20%). To combat this problem, samples from each size fraction were reduced (if necessary) to less than 6 mm and then all were dried under more carefully controlled conditions while weight loss was monitored. Most fractions under these circumstances yielded a moisture value between 1 and 1.5%. It is these moisture values that are reported on Tables 5.5 to 5.11.

Ash content is quite consistent in general. The coarse fraction, down to 6 mm, contains about 20% ash with levels gradually declining with size (through liberation effect) to a low of 13.9% in the 6 x 1 mm fraction. Below 6 mm the ash level rapidly rises again to 38.4% in the 0.15 mm x 0 fraction, an effect often observed in drill core (see Mount Klappan reports for 1982 and 1983) and due to the ash material being softer than the coal and falling naturally into the finest size fractions.

Volatile matter content also exhibits a trend not previously observed. Values are quite consistent through most size fractions (on both an air dried and dry mineral matter free basis) but then rise in the finest fractions. Carbonate content is only slightly higher in the fine size fractions and may account for some of the difference. Another effect though is likely, as with moisture, a reflection of increasing ash level. Hydrated clays in the ash contain both physical moisture (raising the apparent moisture level) and chemical moisture, bound into the clay molecules and not released until temperatures employed in

volatile content determination are reached. This chemical water vapour, then, will contribute to the volatile content and will cause that content to fluctuate with ash level. It can be seen that the 6 x 1 mm fraction, with the lowest ash content, also has the lowest volatile content. Also, because clay minerals will generally degrade into the finest size fraction, the fine fraction will have higher volatile levels even at constant ash levels (see Part II - Section 5.5).

Fixed carbon levels average about 70% for most size fractions and decrease in the high ash finer fractions. Sulphur levels are quite consistent at around 0.40% through all size fractions. The calorific value varies universely with ash and is also quite strongly influenced by moisture level. This has been observed through comparison of initial calorific values and values measured after repetition of drying. The Hardgrove Grindability Index, as expected, rises in the finer fractions from an initially constant value of 37 through all size fractions above 6 mm.

5.4.2 Ultimate Analysis

Ultimate analysis of each size fraction in raw form indicates that there is substantial variation in ultimate composition from size to size. Apart from the variability in moisture, described above, and that in carbon caused chiefly by fluctuation in ash, hydrogen levels are fairly consistent around 2% and nitrogen and sulphur levels range around 0.4%. Oxygen levels, between 3 and 4%, indicate a slight degree of

oxidation as was previously observed (see Part II- Section 2.3).

5.4.3 Ash Fusion and Ash Mineral Analysis

There is consistency also in ash fusion temperatures between size fractions. Temperatures in general are quite high, with the lowest initial deformation temperatures (in a reducing environment) being just over 1200°C. and the highest fluid temperatures (in an oxidizing environment) being just under the maximum reading for the equipment used, at 1530°C. The temperatures at the four points of measurement rise and fall almost in concert, the range from initial deformation to fluid temperatures (in either atmosphere) varying from 170°C to 270°C but generally falling around 220 - 240°C. There is also good correspondence between oxidizing and reducing temperatures, the difference between the two being in most cases less than 50°C.

There is a trend in fusion temperatures noticeable from fraction to fraction in which, from the coarsest size (50 x 25 mm), the fluid (and all) temperatures rise to peak in the 1 x 0.5 mm fraction and then drop off again. The span is from 1425°C to 1530°C. This trend can be directly linked to the ash mineral composition measured in each fraction and may be a function of the habit of mineral matter in the coal, its reaction to progressive liberation and its possible tendency to concentrate in the finer

fractions (as part of the ash material) Apart from this mild variance, the ash character of each fraction, as measured by ash fusion temperatures is quite similar.

The chief difference in ash mineral composition of the 1 x 0.50 mm fraction compared with the others is the low silica: alumina ratio; just over 2:1 compared with almost 3:1 in the 50 x 25 mm fraction. Below a ratio of 2:1, fluid temperatures are found to rise quite rapidly as the ratio decreases. Temperatures drop gradually between ratios 2:1 and 3:1 and then more quickly above 3:1. The temperature fluctuation is a function of available excess silica to combine with other oxides (chiefly calcium, magnesium, iron, sodium and potassium) to form compounds with depressed melting temperatures. The silica ratio, which compares silica content with the contents of iron, calcium, and magnesium is another measure of the tendency of ash to melt at lower temperatures. A silica percentage of 82 is considered a benchmark in the scale of fusion temperatures. The ash from the 1 x 0.5 mm fraction is the only ash to have a silica percentage below 82 (81.65); the other fractions have marginally higher percentages (in the range of 85 to 87) and correspondingly lower fusion temperatures.

Several general observations can be made on the ash from all size fractions. Regardless of the rank of a coal, if its ash has an iron content greater than the contents of magnesium and calcium combined, then it can be characterized as a coal with a "bituminous type" ash. Such is the case with

the raw coal from seam I. Several indices can be used to assess the slagging and fouling potential of a bituminous coal.

In the case of seam I, some of the indices are found to conflict. The silica percentage indicates a slagging potential at the high end of the range (over 82) while the base to acid ratio (comparing the contents of iron, calcium, magnesium, potassium and sodium with the sum of silica, alumina and titanium contents) points to an extremely low slagging potential. The measured fusion temperature would seem to support the latter indicator.

Similarly, the fouling potential as indicated by sodium alone (1.5 to 1.6%) is again high, but the fouling factor (base:acid ratio/sodium content) is low (0.2 to 0.3). The mineral balance of the ash appears to be generally favorable through all size fractions.

5.4.4 Washability

There is minor variation in the washability characteristics of the coal in different size fractions (see Appendix A). As mentioned previously, the head ash in each size fraction is around 20% down to 0.5 mm (slightly lower in the 6 x 1 mm fraction). Cleaning to 5% ash can be accomplished for each fraction, down to 0.5 mm, at an S.G. of 1.55. There is some fluctuation in ash level ($\pm$0.5%) and the laboratory yield rises from 57% in the 50 x 25 mm fraction to

the 6 x 1 mm fraction. There is a slight decrease in yield (58%) in the 1 x 0.5 mm fraction but the ash is also lower (4.50%). This is a function of increasing liberation in the finer sizes. No 5% ash product can be produced from the two froth fractions below 0.5 mm due to their accumulation of the soft and, therefore, generally fine ash material.

Comparison of the cut points for 10% ash from fraction to fraction produces an even more vivid demonstration of the effects of liberation. For the coarsest fractions (above 12 mm), a cut point of 1.80 S.G. will yield 83% of an approximately 10% ash product. Maintaining the same ash level, the cut point climbs to 2.00 S.G. for an 89% yield in the 12 x 6 mm fraction and 2.20 S.G. for a 93% yield in the 6 x 1 mm fraction. The yield at the same cut point (S.G. 2.20) in the 1 x 0.5 mm fraction is down to 89% at a slightly higher ash (10.4%) suggesting that this fraction has inherited some of the ash liberated from the slightly coarser coal that becomes more concentrated in the finer fractions below. The 1 x 0.5 mm fraction appears to be at a node between two trends, the progressive liberation which leads to lower ash and better cleaning at finer sizes, and the progressive accumulation of liberated ash which causes increasing ash levels in the very finest fractions.

Below 0.5 mm froth flotation testing indicates a 32% yield of 10% ash material in the 0.5 mm x 0.15 mm fraction. 10% ash material does not appear in any froth fraction of the 0.15 mm x 0 size coal.

5.5 5% Ash Product Quality

Analyses were conducted for a 5% ash product derived from each size fraction. Below 1 mm the material was combined into a single fraction (1 mm x 0) as there is no demand for low ash products at finely divided fractions in this size range.

5.5.1 Proximate, Sulphur, C.V., H.G.I.

A similar problem with moisture was encountered in the 5% ash product analyses as in the raw analyses. The moisture retention in the coarse fraction was higher than expected and therefore moisture values measured after the application of standard drying techniques were also high. Re-measurement using the same techniques described is Part II - Section 5.4.1 produced moisture values between 1 and 2%. These values are reported on tables 5.12 through 5.16 along with values for proximate, ultimate and calorific value determinations adjusted to compensate for the lower moisture.

Products at 5% ash were obtainable from all size fractions generally at yields between 50% and 67%. The 37.5% yield from the 1 mm x 0 fraction is likely largely drawn from coal above 0.5 mm in size considering the washability of the fines below 0.5 mm (see part II - Section 5.4.4 and Appendix A). The yields reported on the following tables are those achieved in actual bulk float-sinking and may

differ slightly from those discussed in Part II - Section 5.4.4).

Volatile matter contents measured from the low ash products are not as affected by interference from ash mineral breakdown and are therefore generally lower than for the corresponding raw analysis. Some interference is seen in the finest fractions (below 6 mm) wherein the ash material that remains is likely to contain a higher proportion of fine clay material. A higher proportion of clay in the same percentage of ash will have a greater effect on measured volatiles.

Fixed carbon levels reflect the cleaning of the coal to a constant 5% ash and most are at about 87%. The fixed carbon value for the 1 mm x 0 fraction is depressed to 84% because of its elevated volatiles. Sulphur values are very consistent at 0.5%. Calorific value largely reflects ash level and ranges around 7700 cal./g. (gross) through all sizes except the 1 mm x 0 fraction. In this fine fraction, despite the moisture and ash levels being consistent with the analyses of other size fractions, the gross calorific value is only 7400 cal./g. This corresponds with the elevated level of volatiles in that the difference in heat value from other fractions is due to increased moisture retention in the clay constituents of the ash. The excess heat generated in other fractions is here absorbed in the process of breaking down hydrated clays. Once the clays are degraded, the released moisture appears as part of the volatile content (see discussion in Part II - Section 5.4.1).

Variation in the Hardgrove Grindability Index between size fractions cleaned to 5% ash and between the product and raw analyses of respective size fractions are largely a function of ash level. The H.G.I. at 5% ash through all fractions down to 1 mm is between 30 and 32, compared with 37 to 40 in raw coal. As the H.G.I. rose in raw coals with ash level (towards the finer size fractions), it also rises slightly (to 40) in the 5% ash products as the ash composition changes. In addition, the inclusion of some fine material (less than 0.5 mm) in the 1 mm x 0 5% ash product may artificially influence the apparent reading of H.G.I.

5.5.2 Ultimate Analysis

Cleaning of the raw coal to 5% ash products alters the balance of ultimate constituents, but, except for the 1 x 0 mm fraction, there is little variation in product analyses from size to size. Carbon levels are uniform at about 86% and nitrogen levels are just under 1%. Oxygen content ranges from 2.6% to 3.9%. It is slightly lower than for the corresponding raw fractions and accompanies the reduction in apparent volatile matter. The ultimate analysis of the 1 x 0 mm 5% ash fraction is comparable in all respects to the coarser fractions except that carbon levels are lower (80.9%) and oxygen levels are much higher (8.2%). The elevation of the oxygen content correlates with the raised volatile matter content and suggests again that the volatiles are not derived so much from the coal as from the ash. A rise in combustible

volatiles should be accompanied by a rise particularly in the hydrogen content. That the excess volatiles in the 1 x 0 mm fraction relative to coarser fractions occur with relatively higher oxygen content indicates that the additional volatile matter is largely composed of water vapour, derived in all probability from clays in the ash.

5.5.3 Ash Fusion and Ash Mineral Analysis

The general trend in fusion temperatures observed in the raw analyses is also seen in the 5% ash products, with some variation and at a higher overall temperature. From the coarsest to the finest fractions ash fusion temperatures rise. Trends are noticeable only below the final or fluid temperature. However, because in both oxidizing and reducing temperatures, the fluid temperature in all fractions is in excess of the capacity of the furnace used (over 1540°C). The hemispherical temperatures in both atmospheres rise together from about 1450°C to 1510°C for the 50 x 25 mm and 1 mm x 0 fractions, respectively. The separation between oxidizing and reducing temperatures varies between 10°C and 45°C. Softening temperatures in oxidizing and reducing atmospheres also exhibit comparable trends. In an oxidizing atmosphere the softening temperature rises from 1400°C in the 50 x 25 mm fraction to 1500°C in the 1 mm x 0. Temperatures in a reducing atmosphere are about 75°C to 100°C lower. The most marked difference between oxidizing and reducing atmospheres, and the largest rise in temperature from the coarsest to the finest size fraction is noted in the initial

deformation temperatures. In a reducing atmosphere the temperature is almost constant through all fractions, at 1250°C to 1275°C. In an oxidizing environment, however, the initial deformation temperature rises from 1255°C in the 50 x 25 mm to 1435°C in the 1 mm x 0 fraction. Overall, the span between fusion temperatures in oxidizing and reducing atmospheres reduces systematically from the initial to the final measurement point.

There is a significant variation in the ash mineral composition of the different size fractions to account for the above described trends in fusion temperatures. The most apparent variation between size fractions is the increase in silica (SiO_2) content from 41.4% in the 50 x 25 mm fraction to 56.8% in the 6 x 1 mm fraction. This is accompanied by a consistent drop in alumina (Al_2O_3) content from 33.8% to 27.9% between the same two fractions. The most significant general difference between the mineral composition of raw ash and the composition of the ash remaining after cleaning to a 5% ash product is the alteration of the balance between iron and the sum of calcium and magnesium oxides. While the ash in raw coal of all size fractions is characterized as "bituminous type", (Fe_2O_3% is greater than CaO% + MgO%), the ash from the 5% ash product of most size fractions contains less iron than calcium plus magnesium and so must be characterized as "lignitic type". This change in character affects the interaction of other oxides and alters the

significance of various factors in the assessment of ash behaviour.

The silica:alumina ratio is much less than 2:1 for the 50 x 25 mm fraction (1.22:1) and rises to just over 2:1 for the 6 x 1 mm fraction. Because of the content of other minerals, this does not have a direct correlation with fusion temperatures (they rise where the SiO_2/Al_2O_3 ratio indicates they should be falling) other than to make all temperatures, especially fluid temperatures, quite high.

Normally, for coal with "lignitic type" ash, the dolomite percentage (below) is used to indicate tendencies for fusion temperatures. The steadily dropping percentage towards finer sizes should be accompanied by lower fusion temperatures.

$$\text{Dolomite Percentage} = \frac{100 \times (CaO + MgO)}{Fe_2O_3 + CaO + MgO + Na_2O + K_2O}$$

The 5% ash product from each size fraction, however, has only marginally lignitic ash, and the character decreases steadily towards the finer size fraction until the 1 mm x 0 ash is marginally bituminous in type. The other parameter used to determine the appropriateness of application of the dolomite percentage is the content of acid components (SiO_2, Al_2O_3 and TiO_2). All of the size fractions exceed the maximum 60% cut-off.

The most significant parameter for judging (and explaining) trends in fusion temperatures is the base:acid ratio:

$$\text{Base:Acid} = \frac{Fe_2O_3 + CaO + MgO + Na_2O + K_2O}{SiO_2 + Al_2O_3 + TiO_2}$$

From the 50 x 25 mm fraction, the ratio drops steadily from 0.19 to a minimum of 0.12 in the 6 x 1 mm fraction. There is a slight rise again in the 1 mm x 0 (to 0.15). This corresponds exactly with the rise in fusion temperatures from coarse to fine fractions and the levelling off below 1 mm. In absolute terms, the base/acid ratio (consistently below 0.25) indicates that melting temperatures should be high and slagging tendency very low, an observation borne out by the actual fusion temperature measurements.

Because of the "lignitic type" character of the ash, the influence of sodium content on the fouling potential of the coal is much reduced. The presence of a greater relative proportion of calcium is thought to have moderating effect on sodium accumulation and, therefore, a content of less than 2% is considered very favourable in a lignitic ash. The content of chlorine as measured through the interference of heavy liquid contribution is also satisfactorily low (less than .2%). Below 6 mm, the fineness of the material causes much greater absorption and retention of float/sink fluid and these values are entirely unreliable (See Tables 5.9, 5.10 and 5.11).

5.6 10% Ash Product Quality

The same fine size fractions discussed in the 5% ash product section (5.5) were also cleaned in a separate procedure to assess their product potential at 10% ash. Many of the trends noted for the 5% ash products also apply to the 10% ash products but there are also some interesting differences, particularly in ash mineral composition and behaviour.

5.6.1 Proximate, Sulphur, Calorific Value, H.G.I.

The tendency for moisture values to be high in coarse fractions because of moisture retention in larger particles, lower in the middle range of size fractions because of the greater surface area to mass ratio in this range, and then higher again in fine size fractions because of the higher content of persistently moist clays in the ash, is quite clearly defined in the 10% ash fractions. In these products also, the moisture values initially measured by standard procedures were very high (up to 6%) and they were remeasured using the more carefully controlled technique described previously (Section 5.4.1). All other proximate and ultimate factors affected by moisture were adjusted as per the new values and are reported on Tables 5.14 through 5.18. The moisture in the coarser fractions is around 1.5%, dropping to 1.0% in the 6 x 1 mm fraction and rising again to 2.0% in the 1 mm x 0 fraction.

There is some fluctuation around the target ash from size to size; values range from 9.5% up to 10.3%. Yields are very good through all fractions above 1 mm and illustrate the influence of liberation from the 50 x 25 mm fraction (80.4% yield) to the 6 x 1 mm fraction (92.7% yield) with a steady increase in between. Liberation in cleaning is not the only relevant factor, as the head ash of the 6 x 1 mm fraction is also the lowest of all size fractions. The high head ash of the 1 mm x 0 fraction, partly through liberation of fine ash material from the coarser fractions (see Section 5.4.1) contributes to its relatively low yield of 46.8% (at 9.9% ash).

The volatile matter content of the 10% ash products is not influenced by contribution from ash material to a significantly greater extent than that of the 5% ash products. This interference by ash does not come into play until higher ash levels are reached. For the size fractions from 50 mm down to 1 mm, volatiles are in the range of 5.1% to 5.7%. These values are actually lower than those reported for the 5% ash products, but this is a function of the correction calculation from the initial measured moisture to the later (lower) residual moisture. True values for volatiles at true residual moisture will be very similar for 5% and 10% ash products. The effect of the high clay content of the 1 x 0 mm ash is demonstrated again by a drastically

inflated "apparent" volatile level (9.2%).

Fixed carbon levels are largely a function of ash content through all fractions down to 1 mm. To this point the range is between 83% and 84%. In the 1 mm x 0 fraction, because of the high volatile control, a reading of only 78.9% is recorded.

Calorific values are quite consistent at 7300 cal/gm (gross) or slightly above for most size fractions. The gross calorific value for the 6 x 1 mm fraction is lower (7220 cal/gm.) because the ash level is slightly higher. The value for the 1 mm x 0 fraction is even lower as some heat is internally absorbed in the breakdown of ash material (see Section 5.5.1).

There is no significant variation in sulphur values through all size fractions (0.4 - 0.5%).

The Hardgrove Grindability Index is marginally higher in the 10% ash products than in the 5% ash products. It is comparable in all fractions down to 6 mm (31 to 33) and then rises in the finer fractions (37 in the 6 x 1 mm and 49 in the 1 mm x 0). Again, the readings in the finest fractions may not be as accurate as for coarser fractions due to the abundance of fine particles already in the sample prior to grinding.

5.6.2 Ultimate Analysis

The ultimate analysis is the measurement that indicates the greatest consistency between the coals of the different size fractions. Proximate analysis can be altered in some degree, as has been seen, by peculiarities of the ash contained within the coal. The hydrogen and nitrogen levels in the ultimate analysis should not be affected unduly by the ash constituents and for the 10% ash products, these two measures are most constant. Hydrogen values are 2.4% to 2.6% through all size fractions and nitrogen ranges from 0.7% to 0.9%. The carbon level more or less reflects fixed carbon; 80.5% to 82.3% down to 1 mm, and 77.7% for 1 mm x 0, and the oxygen levels are subject to the same influence as the volatiles at 2.9% - 3.7% down to 6 mm, 4.3% for the 6 x 1 fraction and rising to 6.8% in the 1 mm x 0 fraction.

5.6.3 Ash Fusion and Ash Mineral Analysis

Much the same trends exist for the ash fusion temperatures in the 5% and 10% ash products. There is a general rise in temperatures from the coarsest to the finest size fractions. The span between initial and fluid temperature in an oxidizing atmosphere appears to remain about the same, (200°C), though below the 12 x 6 mm fraction the fluid temperature exceeds the maximum calibrated

temperature for the fusion furnace. In a reducing atmosphere, the fluid temperature also rises but the initial temperature appears to decrease. In the 50 x 25 mm fraction, the range (in a reducing atmosphere) is 1250°C - 1490°C (initial to fluid, a span of 240°C). For the 1 mm x 0 fraction the range is 1215°C - 1540°C, a span of at least 325°C. The result of these tendencies taken jointly is that the span between temperatures in an oxidizing and reducing atmosphere increases as the size decreases. Fluid temperatures in both atmospheres are near or in excess of 1540°C for all fractions, but initial temperatures span 55°C (1305°C oxidizing and 1250°C reducing) for the 50 x 25 mm fraction and 160°C (1375°C oxidizing and 1215°C reducing) for the 1 mm x 0 fraction.

As mentioned earlier, the differences between ash minerals compositions in the 5% and 10% ash products are intriguing. Where the ash of most of the 5% ash products (down to 6 mm) is "lignitic type" (Fe_2O_3% is less than MgO% + CaO%) and then a transition to "bituminous type" (the reverse situation) occurs, in the 10% ash products the transition is much earlier. Only the 50 x 25 mm fraction has "lignitic type" ash. Below 25 mm, the ash becomes propressively more bituminous in character. The same trend in silica:alumina ratios seen in the 5% ash products occurs with the exceptions that the ratios are, in general, much higher (and the fusion temperatures, therefore, lower), and

the peak comes in the 12 x 6 mm fraction rather than in the 6 x 1 mm fraction.

Silica contents are also higher than in the 5% ash products at 52.4% for the 50 x 25 mm fraction, rising to peak at 62.0% in the 12 x 6 mm fraction, and dropping again to 57.1% in the 1 mm x 0 fraction. Alumina contents describe exactly the opposite variation going from 26.8% to 23.2% to 26.8%, respectively.

The apparent discrepancy between the peaking of various mineral contents in the 12 x 6 mm fraction and the peaking of fusion temperatures in the 6 x 1 mm fraction (although the fluid temperature remains high, both hemispherical and softening temperatures drop off again in the 1 mm x 0 fraction) lies in the interaction of the base:acid ratios and the silica:alumina ratios. The base:acid ratio declines quite steadily between 50 x 25 mm fraction (0.16) and the 12 x 6 mm fraction (0.12) and the fusion temperatures, in consequence, rise. The base:acid ratio stays the same in the 6 x 1 mm fraction (0.12) but the silica:alumina ratio, having peaked in 12 x 6 mm fraction, is slightly lower. Ash fusion temperatures, therefore, are the highest of all in the 6 x 1 mm fraction.

In absolute terms, the slagging tendency for all

fractions, as indicated by the base:acid ratio is very low (always less than the standard of 0.5 for bituminous type ash, and less than 0.25 for lignitic type ash). The fouling factor is also satisfactorily low (uniformly less than 0.25) even though the sodium levels are somewhat high (more than 0.5%) in cases where the ash is of bituminous type (anything less than 3.0% is considered very favourable in a lignitic ash).