MOUNT KLAPPAN ANTHRACITE PROJECT

LOST - FOX AREA

GEOLOGICAL REPORT

1987

APPENDIX IV

DIAMOND DRILL HOLE COAL QUALITY
VOLUME I

KPNLRDDH 87001

TO

KPNLRDDH 87019

GULF CANADA RE

COAL

APPENDIX IV

LOST-FOX AREA

DIAMOND DRILL HOLE

COAL QUALITY

VOLUME I

LOST-FOX AREA

1987

Coal Quality Legend

Composite Sample I.D.	1 - 161 Raw Coal
	200 - 309 35.0 x 6.0 mm Size Fraction
	400 - 493 6.0 mm x 0.5 mm Size Fraction
Sample Product #	SP-1 Raw Coal
	SP-2 6.3% Ash Coal Product
	SP-3 7.5% Ash Coal Product
	SP-4 12.0% Ash (Primary Wash) Coal Product
	SP-5 12.0% Ash (Middlings) Coal Product (produced from 6.3% ash product reject)
Ash Minerals Analysis (Raw and Product Coal)	AM-1 Head
	AM-3 0.5 x 0.15 mm Size Fraction
	AM-4 0.15 x 0 mm Size Fraction
Ash Fusion Analysis (Raw and Product Coal)	AF-1 Head
	AF-3 0.5 x 0.15 mm Size Fraction
	AF-4 0.15 x 0 mm Size Fraction

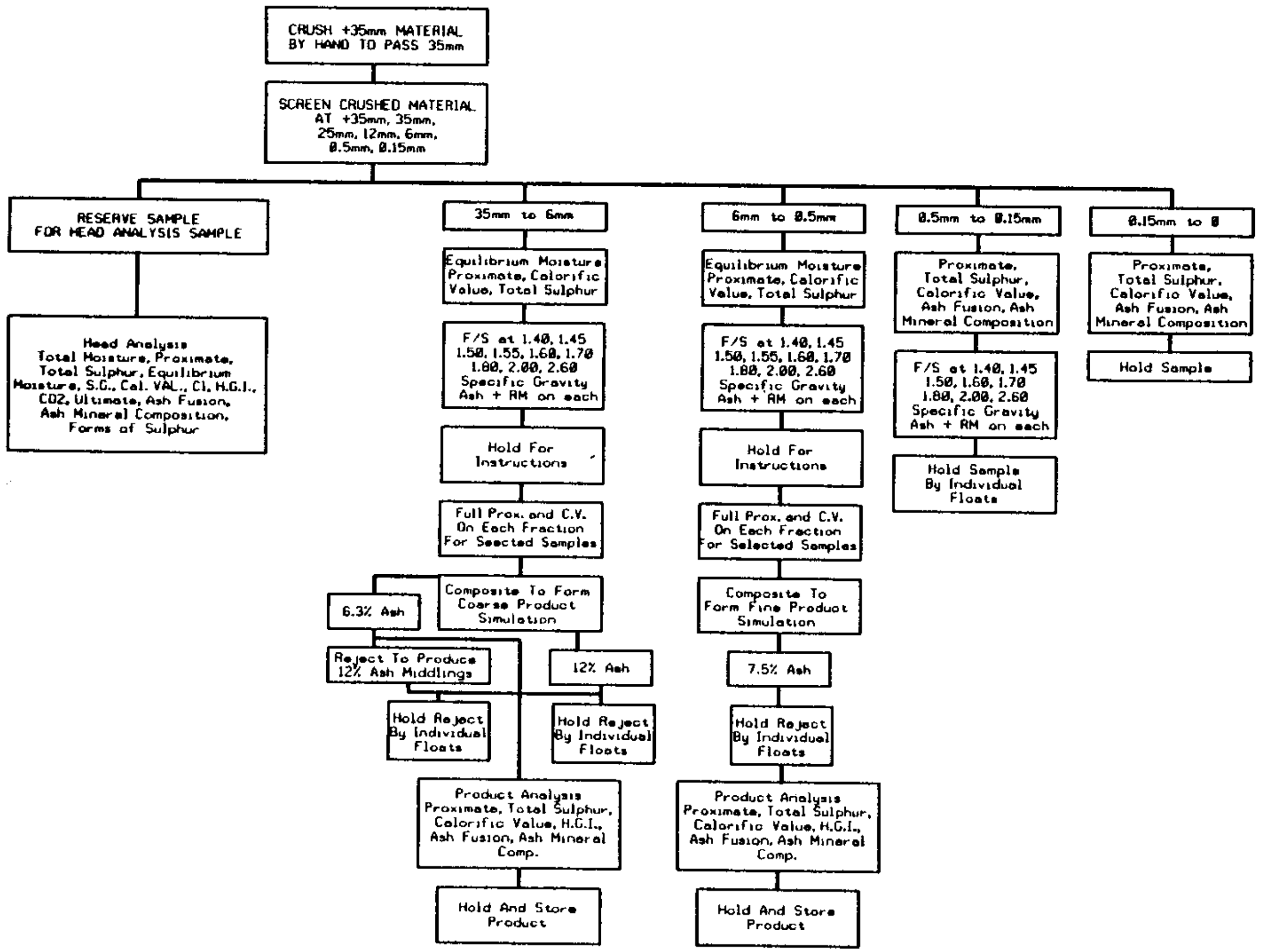


FIGURE 8-1

MOUNT KLAPPAN ANTHRACITE PROJECT

DIAMOND DRILL HOLE
COAL CORE ANALYSIS FLOW SHEET

GULF CANADA RESOURCES LTD.

KPNLRDDH87001

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87001 DATE - 03/04/88

- H I S T O R Y -

START DATE - 08/25/87
END DATE - 08/26/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SRIVASTAVA

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - VERTICAL HOLE, SITE A, SEAM I,H.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1507.48

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6345007.34
EASTING - 508063.36

LATITUDE - 571500
LONGITUDE - 1285159

- O R I E N T A T I O N -

LENGTH - 132.03

CORE SIZE - 0.0

INCLINATION - 90.0
AZIMUTH - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 7.62
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87001										
		7101	19.24	19.60	100.00		0.260			0.000- 0.260
	I	7102	19.60	22.35	55.27	0.456	0.687	0.687	0.264	1.143- 0.951
		7103	22.35	22.57	100.00		0.180			0.000- 0.180
		7104	118.18	118.78	100.00		0.591			0.000- 0.591
	H	7105	118.78	123.05	95.78	3.710	0.254	0.176		3.886- 0.254
	H	7106	123.05	125.05	100.00		1.918			0.000- 1.918
	H	7107	125.05	126.38	97.74	1.263		0.029		1.292- 0.000
		7108	126.38	127.00	100.00		0.606			0.000- 0.606

GULF CANADA CORPORATION - COAL DIVISION

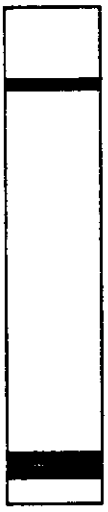
14/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87001												
	H	1	7105	7105	118.78	123.05	95.78	3.83	0.26	0.18	0.00	4.01- 0.26
	H	2	7106	7106	123.05	125.05	100.00	0.00	2.00	0.00	0.00	0.00- 2.00
	H	3	7107	7107	125.05	126.38	97.74	1.30	0.00	0.03	0.00	1.33- 0.00
	H	200	7105	7107	118.78	126.38	96.25	5.13	0.26	0.21	0.00	5.34- 0.26
	H	400	7105	7107	118.78	126.38	96.25	5.13	0.26	0.21	0.00	5.34- 0.26

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
I	2.09m
H	5.43m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87001

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87001 SEAM : H TOTAL INTERVAL(M) : 118.78 – 126.38 ELEVATION(M) : 1507.5
INTERVAL(M) : 118.78 – 123.05
GEOLOGIST : SRIVASTAVA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	118.78			(0.14)											
				0.46											
			0.14												
				0.57											
			0.01												
			0.02	0.16											
			0.00												
				1.58	99.7	7105	1	3.89/ 0.25 4.14		0.53	34.89	7.77	56.81	1.10	21.80
				(0.04)											
				0.94											
	123.05														

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87001 SEAM : H TOTAL INTERVAL(M) : 118.76 – 126.38 ELEVATION(M) : 1507.5
INTERVAL(M) : 123.05 – 125.05
GEOLOGIST : SRIVASTAVA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
									3.89/ 0.25 4.14							
	123.05		0.16													
			1.76		100.0	7105	2	0.00/ 1.92 1.92		1.00	89.38	8.38	1.24	—	3.59	—
	125.05															

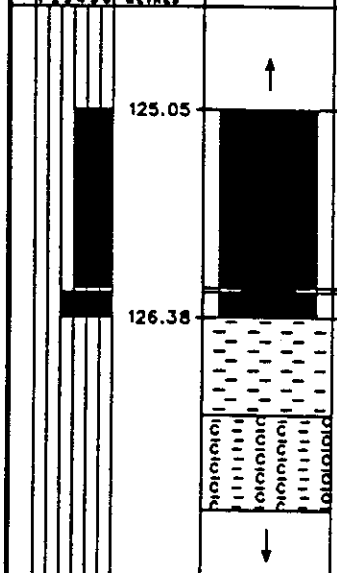
GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87001 SEAM : H TOTAL INTERVAL(M) : 118.78 – 126.38 ELEVATION(M) : 1507.5
GEOLOGIST : SRIVASTAVA SCALE: 1:40 INTERVAL(M) : 125.05 – 126.38
DATE : MAR 04/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	125.05															
				1.11	97.8	7107	3	1.29 / 0.00 1.29	1.29 / 0.00 1.29	0.44	33.83	7.94	57.68	1.75	20.98	——
				(0.93) 0.18												
	126.38															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87001
Coal zone:	H		
Field sample no.:	07105	Composite sample no.:	1
Lab sample no.:	30632		
True sample thickness:	4.140 meters	Drill core recovery (%):	95.78 %
Coal/Rock:	3.886 / 0.254 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	21.07	19.35	24.84	26.22	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	5.62	2.90			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.53	
Ash (%):	34.89	35.07
Volatile matter (%):	7.77	7.81
Fixed carbon (%):	56.81	57.12
Total sulphur (%):	1.10	1.11
Combustible sulphur (%):	0.54	
Net calorific value (cal/g):	5162.00	5190.00
Gross calorific value (cal/g):	5162.00	5190.00
Volatile matter (dmmf%):	7.50	
Hardgrove index:	68.00	
Specific gravity:	1.66	
Carbon dioxide (%):	2.44	
Phosphorous in coal (%):	0.187	
Chlorine in coal (ppm):	2840.00	
Forms of Sulphur (%):	PYRITE 00.32 SULPHATE 00.01 ORGANIC 00.77	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	57.00	57.30
Hydrogen (%):	2.00	2.01
Nitrogen (%):	0.75	0.75
Oxygen (%):	3.73	3.76

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1229.00	1200.00
Softening temperature (°C):	1278.00	1224.00
Hemispherical temperature (°C):	1294.00	1235.00
Final temperature (°C):	1348.00	1321.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	59.31	TiO2 (%):	0.85
Al2O3 (%):	16.25	Na2O (%):	1.63
Fe2O3 (%):	5.36	K2O (%):	0.57
CaO (%):	5.60	SO3 (%):	4.01
MgO (%):	1.57	P2O5 (%):	1.23

scri coal division ash fusion proj KPN BLK LR DB DDH87001

sample id 00001
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1219.0
softening temp.(C)	1305.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1309.0	hemispherical temp.(C)	1246.0
fluid temp.(C)	1366.0	fluid temp.(C)	1342.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87001

sample id 00001
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	51.10
aluminium oxide %	(al2o3)	21.87
ferric oxide %	(fe2o3)	6.04
titanium dioxide %	(tio2)	0.93
phosphorous pentoxide %	(p2o5)	1.28
calcium oxide %	(cao)	5.29
magnesium oxide %	(mgo)	1.84
sulphur trioxide %	(so3)	4.51
sodium oxide %	(na2o)	1.88
potassium oxide %	(k2o)	0.58

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87001

sample id 00001
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1238.0	initial temp.(C)	1208.0
softening temp.(C)	1316.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1319.0	hemispherical temp.(C)	1272.0
fluid temp.(C)	1380.0	fluid temp.(C)	1376.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87001

sample id 00001
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	52.42
aluminium oxide %	(al2o3)	23.80
ferric oxide %	(fe2o3)	5.13
titanium dioxide %	(tio2)	0.69
phosphorous pentoxide %	(p2o5)	1.22
calcium oxide %	(cao)	4.80
magnesium oxide %	(mgo)	1.76
sulphur trioxide %	(so3)	3.53
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	0.56

90.0 <= total <= 100.0

(1)

scri coal division ash fusion proj KPN BLK LR DB DDH87001

sample id 00003
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1235.0
softening temp.(C)	1313.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1318.0	hemispherical temp.(C)	1270.0
fluid temp.(C)	1364.0	fluid temp.(C)	1355.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87001

sample id 00003
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	48.46
aluminium oxide %	(al2o3)	23.17
ferric oxide %	(fe2o3)	5.79
titanium dioxide %	(tio2)	1.14
phosphorous pentoxide %	(p2o5)	1.78
calcium oxide %	(cao)	8.29
magnesium oxide %	(mgo)	1.43
sulphur trioxide %	(so3)	3.43
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	0.62

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87001

sample id 00003
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1283.0
softening temp.(C)	1358.0	softening temp.(C)	1299.0
hemispherical temp.(C)	1369.0	hemispherical temp.(C)	1310.0
fluid temp.(C)	1417.0	fluid temp.(C)	1404.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87001

sample id 00003
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	50.86
aluminium oxide %	(al2o3)	27.18
ferric oxide %	(fe2o3)	4.88
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	2.10
calcium oxide %	(cao)	4.91
magnesium oxide %	(mgo)	1.42
sulphur trioxide %	(so3)	1.38
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	0.59

90.0 <= total <= 100.0

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87001
Coal zone:	H		
Field sample no.:	07107	Composite sample no.:	3
Lab sample no.:	30632		
True sample thickness:	1.292 meters	Drill core recovery (%):	97.74 %
Coal/Rock:	1.292 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	25.09	20.12	15.28	26.54
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	8.39	4.58		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.44	
Ash (%):	33.93	34.08
Volatile matter (%):	7.94	7.97
Fixed carbon (%):	57.69	57.95
Total sulphur (%):	1.75	1.76
Combustible sulphur (%):	0.96	
Net calorific value (cal/g):	5014.00	5036.00
Gross calorific value (cal/g):	5014.00	5036.00
Volatile matter (dmmf%):	7.40	
Hardgrove index:	93.00	
Specific gravity:	1.65	
Carbon dioxide (%):	2.87	
Phosphorous in coal (%):	0.188	
Chlorine in coal (ppm):	2800.00	

Forms of Sulphur (%): PYRITE 01.35 SULPHATE 00.04 ORGANIC 00.36

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	59.09	59.35
Hydrogen (%):	1.79	1.80
Nitrogen (%):	0.69	0.69
Oxygen (%):	2.31	2.32

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1235.00	1165.00
Softening temperature (°C):	1272.00	1181.00
Hemispherical temperature (°C):	1281.00	1197.00
Final temperature (°C):	1358.00	1323.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	55.25	TiO2 (%):	0.62
Al2O3 (%):	13.77	Na2O (%):	1.17
Fe2O3 (%):	8.53	K2O (%):	0.43
CaO (%):	7.01	SO3 (%):	5.80
MgO (%):	1.84	P2O5 (%):	1.27

KPNLRDDH87002

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87002 DATE - 03/01/88

- H I S T O R Y -

START DATE - 08/28/87
END DATE - 08/30/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - MURRAY

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SEAMS INTERSECTED 1, 1 (OVT), 1 (REP), H/1, H. VERTICAL HOLE.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1480.79

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6345393.82
EASTING - 508172.54

LATITUDE - 571512
LONGITUDE - 1285152

- O R I E N T A T I O N -

LENGTH - 205.47

CORE SIZE - 0.0

INCLINATION - 90.0
AZIMUTH - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 3.66
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87002										
		5980	132.57	132.63	100.00		0.055			0.000- 0.055
		5981	23.05	23.08	100.00		0.029			0.000- 0.029
		6801	132.93	133.26	100.00		0.302			0.000- 0.302
	I REP	6802	133.26	135.74	63.71	1.417	0.046	0.661	0.166	2.078- 0.212
	I REP	6803	135.74	138.16	57.85	1.251	0.065	0.693	0.261	1.944- 0.326
	I REP	6804	138.16	141.73	91.60	3.117		0.289		3.406- 0.000
		6805	141.73	143.36	100.00		1.574			0.000- 1.574
		6806	193.12	193.64	100.00		0.452			0.000- 0.452
	H	6807	193.89	196.13	77.23	1.187	0.300	0.439		1.626- 0.300
	H	6808	196.13	197.44	91.60		1.018		0.093	0.000- 1.111
	H	6809	197.44	200.04	64.23	1.189	0.209	0.558	0.217	1.747- 0.426
		6810	200.04	200.31	100.00		0.223			0.000- 0.223
		6811	47.98	48.80	100.00		0.307			0.000- 0.307
	I OVT	6812	48.80	51.67	100.00	1.234				1.234- 0.000
	I OVT	6813	51.67	56.45	70.92	1.711	0.162	0.569	0.194	2.280- 0.356
		6814	56.45	57.05	100.00		0.386			0.000- 0.386
		6815	23.08	23.27	89.47		0.166		0.019	0.000- 0.185
	I	6816	23.27	27.29	59.95	2.303	0.020	1.382	0.130	3.685- 0.150
	I	6817	27.29	30.09	48.93	1.224		1.311		2.535- 0.000
		6818	30.09	30.54	100.00		0.395			0.000- 0.395

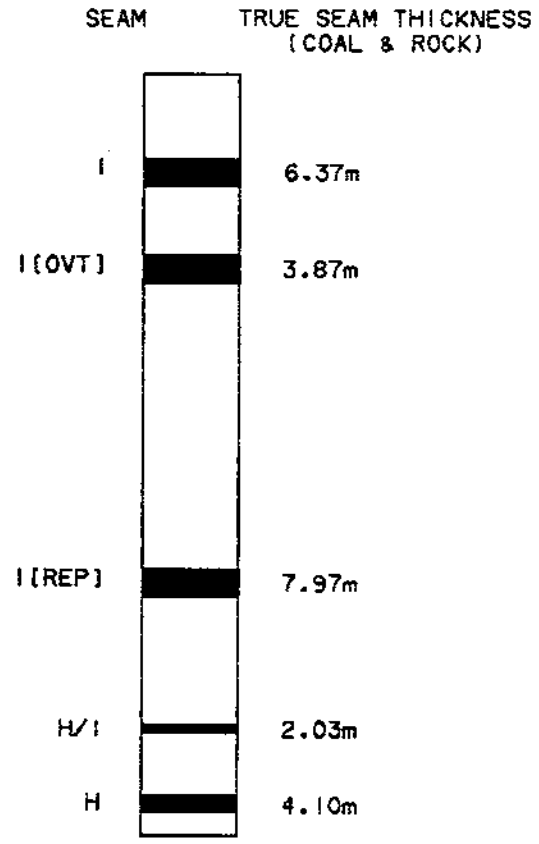
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87002												
	I	4	6816	6816	23.27	27.29	59.95	2.39	0.02	1.47	0.14	3.86- 0.16
	I	5	6817	6817	27.29	30.09	48.92	1.37	0.00	1.43	0.00	2.80- 0.00
	I OVT	6	6812	6812	48.80	51.67	100.00	2.87	0.00	0.00	0.00	2.87- 0.00
	I OVT	7	6813	6813	51.67	56.45	70.92	3.08	0.31	1.05	0.34	4.13- 0.65
	I REP	8	6802	6803	133.26	138.16	60.81	2.86	0.12	1.46	0.46	4.32- 0.58
	I REP	9	6804	6804	138.16	141.73	91.59	3.27	0.00	0.30	0.00	3.57- 0.00
	H	10	6807	6807	193.89	196.13	77.23	1.38	0.35	0.51	0.00	1.89- 0.35
	H	11	6808	6808	196.13	197.44	91.60	0.00	1.20	0.00	0.11	0.00- 1.31
	H	12	6809	6809	197.44	200.04	64.23	1.42	0.25	0.67	0.26	2.09- 0.51
	I	201	6816	6816	23.27	27.29	59.95	2.39	0.02	1.47	0.14	3.86- 0.16
	I	202	6817	6817	27.29	30.09	48.92	1.37	0.00	1.43	0.00	2.80- 0.00
	H	203	6807	6807	193.89	196.13	77.23	1.38	0.35	0.51	0.00	1.89- 0.35
	H	204	6809	6809	197.44	200.04	64.23	1.42	0.25	0.67	0.26	2.09- 0.51
	I	401	6816	6817	23.27	30.09	55.42	3.76	0.02	2.90	0.14	6.66- 0.16
	H	402	6807	6809	193.89	200.04	70.24	2.80	0.60	1.18	0.26	3.98- 0.86



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87002

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:I205057188007Z0:2.LG

COAL SEAM DATA SHEETS

AND

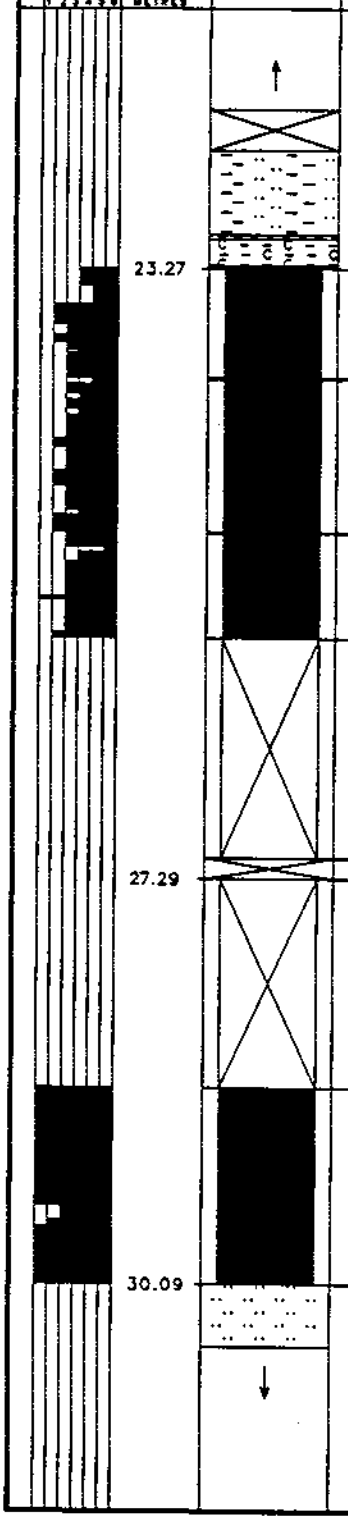
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION, MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87002 SEAM : 1 INTERVAL(M) : 23.27 - 30.09 ELEVATION(M) : 1480.8

GEOLOGIST : MURRAY SCALE: 1:40 DATE : FEB 29/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	23.27			0.69												
			0.01													
				0.96												
			0.01													
				0.66	60.6	6816	4	3.68/ 0.15 3.83		0.80	30.34	7.27	61.48	0.33	21.85	—
				(1.38)					6.22 / 0.15 6.37							
	27.29		(0.13)													
				(1.31)												
					46.3	6817	5	2.54 / 0.00 2.54		0.32	12.49	7.09	80.10	0.45	30.38	—
				1.22												
	30.09															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I		
Field sample no.:	06816	Composite sample no.:	4
Lab sample no.:	30632-1		
True sample thickness:	3.835 meters	Drill core recovery(%):	59.95 %
Coal/Rock:	3.685 / 0.150 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	6.50	14.42	23.56	41.39
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	9.16	4.97		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	30.34	30.62
Volatile matter(%):	7.27	7.34
Fixed carbon(%):	61.49	62.04
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.10	
Net calorific value(cal/g):	5222.00	5270.00
Gross calorific value(cal/g):	5222.00	5270.00
Volatile matter(dmmf%):	7.20	
Hardgrove index:	44.00	
Specific gravity:	1.60	
Carbon dioxide(%):	2.24	
Phosphorous in coal(%):	0.045	
Chlorine in coal(ppm):	128.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.31

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	63.11	63.68
Hydrogen(%):	2.13	2.15
Nitrogen(%):	0.82	0.83
Oxygen(%):	2.37	2.39

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1283.00	1262.00
Softening temperature(°C):	1315.00	1278.00
Hemispherical temperature(°C):	1337.00	1291.00
Final temperature(°C):	1455.00	1407.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	60.09	TiO2(%):	1.02
Al2O3(%):	19.77	Na2O(%):	1.95
Fe2O3(%):	4.42	K2O(%):	1.17
CaO(%):	2.89	SO3(%):	1.90
MgO(%):	2.77	P2O5(%):	0.34

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I		
Field sample no.:	06817	Composite sample no.:	5
Lab sample no.:	30632		
True sample thickness:	2.535 meters	Drill core recovery (%):	48.92 %
Coal/Rock:	2.535 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	19.92	27.82	19.00	27.42
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	4.04	1.80		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.32	
Ash (%):	12.49	12.53
Volatile matter (%):	7.09	7.11
Fixed carbon (%):	80.10	80.36
Total sulphur (%):	0.45	0.45
Combustible sulphur (%):	0.10	
Net calorific value (cal/g):	7260.00	7283.00
Gross calorific value (cal/g):	7261.00	7284.00
Volatile matter (dmmf%):	6.90	
Hardgrove index:	42.00	
Specific gravity:	1.45	
Carbon dioxide (%):	3.18	
Phosphorous in coal (%):	0.185	
Chlorine in coal (ppm):	3000.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.43

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	80.24	80.50
Hydrogen (%):	2.45	2.46
Nitrogen (%):	0.94	0.94
Oxygen (%):	3.11	3.12

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1262.00	1149.00
Softening temperature (°C):	1281.00	1154.00
Hemispherical temperature (°C):	1289.00	1165.00
Final temperature (°C):	1291.00	1224.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	32.74	TiO2 (%):	1.13
Al2O3 (%):	16.39	Na2O (%):	1.60
Fe2O3 (%):	17.95	K2O (%):	0.65
CaO (%):	10.48	SO3 (%):	7.07
MgO (%):	3.15	P2O5 (%):	3.40

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00004
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1396.0	initial temp.(C)	1291.0
softening temp.(C)	1434.0	softening temp.(C)	1393.0
hemispherical temp.(C)	1458.0	hemispherical temp.(C)	1434.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00004
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.93
aluminium oxide %	(al2o3)	23.93
ferric oxide %	(fe2o3)	2.65
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.40
calcium oxide %	(cao)	2.66
magnesium oxide %	(mgo)	2.05
sulphur trioxide %	(so3)	1.74
sodium oxide %	(na2o)	2.10
potassium oxide %	(k2o)	1.20

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00004
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1263.0	initial temp.(C)	1280.0
softening temp.(C)	1434.0	softening temp.(C)	1401.0
hemispherical temp.(C)	1458.0	hemispherical temp.(C)	1437.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00004
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.95
aluminium oxide %	(al2o3)	23.80
ferric oxide %	(fe2o3)	2.58
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.42
calcium oxide %	(cao)	2.46
magnesium oxide %	(mgo)	1.97
sulphur trioxide %	(so3)	1.44
sodium oxide %	(na2o)	2.03
potassium oxide %	(k2o)	1.14

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00005
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1254.0
softening temp.(C)	1299.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1267.0
fluid temp.(C)	1332.0	fluid temp.(C)	1328.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00005
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	44.07
aluminium oxide %	(al2o3)	25.12
ferric oxide %	(fe2o3)	6.88
titanium dioxide %	(tio2)	1.14
phosphorous pentoxide %	(p2o5)	3.63
calcium oxide %	(cao)	6.95
magnesium oxide %	(mgo)	1.74
sulphur trioxide %	(so3)	3.01
sodium oxide %	(na2o)	1.75
potassium oxide %	(k2o)	0.82

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00005
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1267.0
softening temp.(C)	1305.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1293.0
fluid temp.(C)	1337.0	fluid temp.(C)	1332.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00005
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	47.14
aluminium oxide %	(al2o3)	25.51
ferric oxide %	(fe2o3)	5.25
titanium dioxide %	(tio2)	1.09
phosphorous pentoxide %	(p2o5)	3.40
calcium oxide %	(cao)	6.58
magnesium oxide %	(mgo)	1.49
sulphur trioxide %	(so3)	2.21
sodium oxide %	(na2o)	1.96
potassium oxide %	(k2o)	0.92

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : 1 OVT TOTAL INTERVAL(M) : 48.80 – 56.45
INTERVAL(M) : 48.80 – 51.67
ELEVATION(M) : 1480.8

GEOLOGIST : MURRAY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	48.80			1.23	100.0	6812	8	1.23 / 0.00 1.23		0.49	15.02	6.83	77.66	0.45	29.66	—
	51.67															

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : 1 OVT TOTAL INTERVAL(M) : 46.80 - 56.45 ELEVATION(M) : 1480.8
INTERVAL(M) : 51.67 - 56.45
GEOLOGIST : MURRAY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	51.67			0.05												
				0.31												
				0.18												
				(0.51)												
				0.40	71.1	6813	7	2.28 / 0.36 2.64	3.51 / 0.36 3.87	0.51	31.47	7.75	60.27	0.33	22.93	—
				0.36												
				0.31												
	56.45															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I OVT		
Field sample no.:	06812	Composite sample no.:	6
Lab sample no.:	30632		
True sample thickness:	1.234 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	1.234 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	13.49	16.28	16.00	36.76
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	11.30	6.17		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.49	
Ash(%):	15.02	15.09
Volatile matter(%):	6.63	6.66
Fixed carbon(%):	77.86	78.25
Total sulphur(%):	0.45	0.45
Combustible sulphur(%):	0.35	
Net calorific value(cal/g):	7088.00	7122.00
Gross calorific value(cal/g):	7089.00	7123.00
Volatile matter(dmmf%):	6.40	
Hardgrove index:	53.00	
Specific gravity:	1.46	
Carbon dioxide(%):	1.03	
Phosphorous in coal(%):	0.198	
Chlorine in coal(ppm):	3820.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.43

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	75.61	75.98
Hydrogen(%):	2.52	2.53
Nitrogen(%):	0.91	0.91
Oxygen(%):	5.00	5.04

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1272.00	1211.00
Softening temperature(°C):	1278.00	1224.00
Hemispherical temperature(°C):	1299.00	1243.00
Final temperature(°C):	1332.00	1326.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	50.09	TiO2(%):	1.11
Al2O3(%):	22.64	Na2O(%):	1.91
Fe2O3(%):	5.74	K2O(%):	1.10
CaO(%):	5.32	SO3(%):	1.72
MgO(%):	2.41	P2O5(%):	3.02

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I OVT		
Field sample no.:	06813	Composite sample no.:	7
Lab sample no.:	30632		
True sample thickness:	2.636 meters	Drill core recovery (%):	70.92 %
Coal/Rock:	2.280 / 0.356 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	11.20	19.07	22.20	34.43
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	8.56	4.54		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.51	
Ash (%):	31.47	31.63
Volatile matter (%):	7.75	7.79
Fixed carbon (%):	60.27	60.58
Total sulphur (%):	0.33	0.33
Combustible sulphur (%):	0.16	
Net calorific value (cal/g):	5480.00	5508.00
Gross calorific value (cal/g):	5480.00	5508.00
Volatile matter (dmmf%):	7.90	
Hardgrove index:	64.00	
Specific gravity:	1.62	
Carbon dioxide (%):	2.22	
Phosphorous in coal (%):	0.150	
Chlorine in coal (ppm):	4720.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.31

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	61.60	61.91
Hydrogen (%):	1.75	1.76
Nitrogen (%):	0.74	0.74
Oxygen (%):	3.60	3.63

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1316.00	1243.00
Softening temperature (°C):	1359.00	1267.00
Hemispherical temperature (°C):	1369.00	1297.00
Final temperature (°C):	1471.00	1417.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	60.82	TiO2 (%):	0.71
Al2O3 (%):	20.04	Na2O (%):	2.02
Fe2O3 (%):	3.92	K2O (%):	0.79
CaO (%):	2.63	SO3 (%):	1.33
MgO (%):	2.69	P2O5 (%):	1.09

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00006
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1160.0
softening temp.(C)	1305.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1310.0	hemispherical temp.(C)	1283.0
fluid temp.(C)	1364.0	fluid temp.(C)	1355.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00006
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide	%	(sio2)	43.03
aluminium oxide	%	(al2o3)	27.84
ferric oxide	%	(fe2o3)	4.85
titanium dioxide	%	(tio2)	1.78
phosphorous pentoxide	%	(p2o5)	3.66
calcium oxide	%	(cao)	6.38
magnesium oxide	%	(mgo)	2.48
sulphur trioxide	%	(so3)	2.21
sodium oxide	%	(na2o)	1.87
potassium oxide	%	(k2o)	1.04

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00006
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1281.0
softening temp.(C)	1310.0	softening temp.(C)	1294.0
hemispherical temp.(C)	1342.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1450.0	fluid temp.(C)	1410.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00006
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	46.83
aluminium oxide %	(al2o3)	28.35
ferric oxide %	(fe2o3)	4.35
titanium dioxide %	(tio2)	1.55
phosphorous pentoxide %	(p2o5)	3.44
calcium oxide %	(cao)	5.71
magnesium oxide %	(mgo)	2.26
sulphur trioxide %	(so3)	1.63
sodium oxide %	(na2o)	1.81
potassium oxide %	(k2o)	0.99

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00007
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1337.0	initial temp.(C)	1299.0
softening temp.(C)	1364.0	softening temp.(C)	1316.0
hemispherical temp.(C)	1369.0	hemispherical temp.(C)	1337.0
fluid temp.(C)	1471.0	fluid temp.(C)	1463.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00007
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	54.82
aluminium oxide %	(al2o3)	24.96
ferric oxide %	(fe2o3)	3.63
titanium dioxide %	(tio2)	0.87
phosphorous pentoxide %	(p2o5)	2.17
calcium oxide %	(cao)	4.08
magnesium oxide %	(mgo)	1.42
sulphur trioxide %	(so3)	1.63
sodium oxide %	(na2o)	1.84
potassium oxide %	(k2o)	0.83

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00007
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1340.0	initial temp.(C)	1310.0
softening temp.(C)	1369.0	softening temp.(C)	1358.0
hemispherical temp.(C)	1396.0	hemispherical temp.(C)	1377.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00007
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	57.18
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	3.08
titanium dioxide %	(tio2)	0.86
phosphorous pentoxide %	(p2o5)	1.87
calcium oxide %	(cao)	3.51
magnesium oxide %	(mgo)	1.23
sulphur trioxide %	(so3)	1.22
sodium oxide %	(na2o)	1.68
potassium oxide %	(k2o)	0.78

90.0 <= total <= 100.0

GULF CANADA CORPORATION

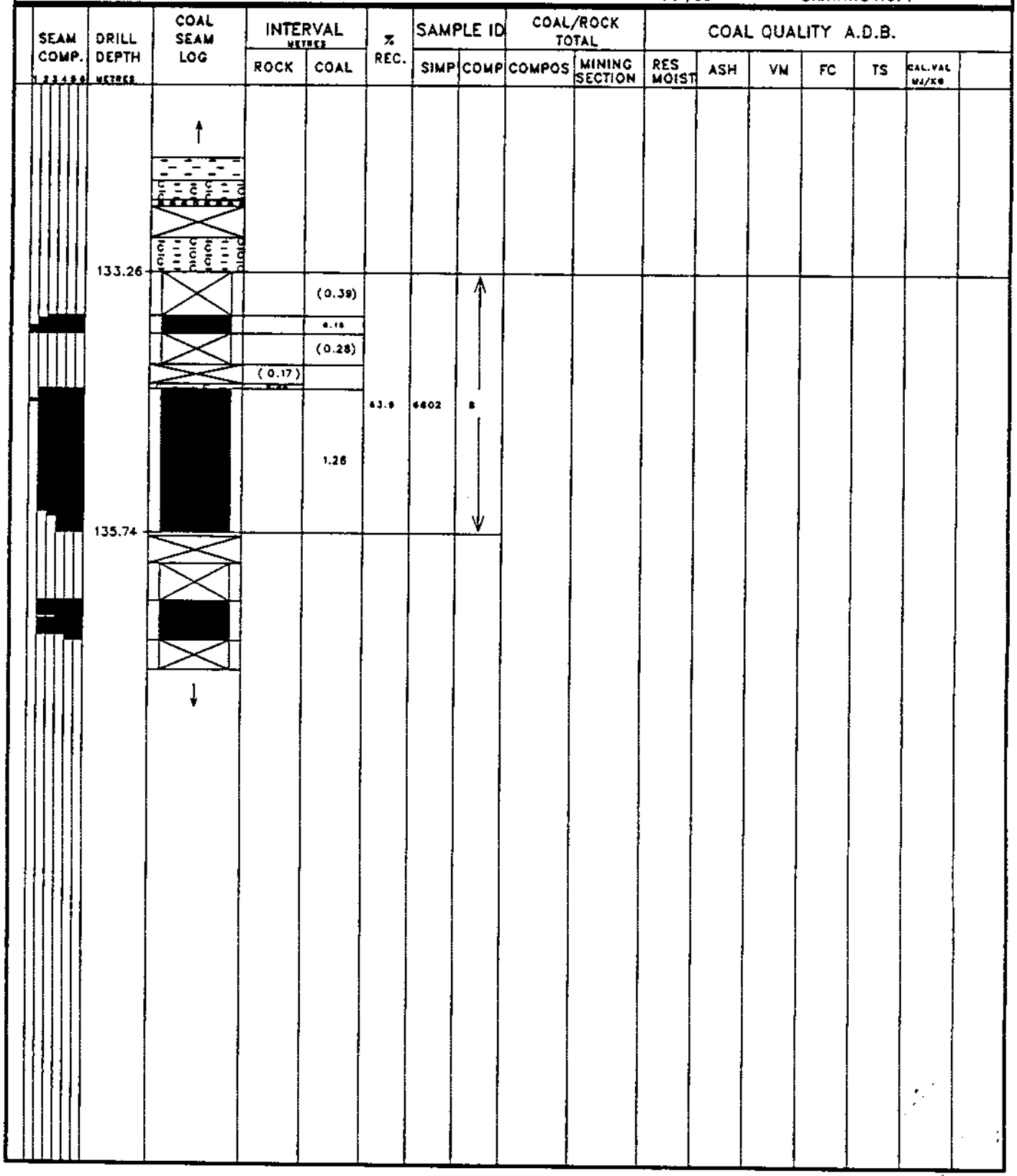
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : 1 REP TOTAL INTERVAL(M) : 133.26 – 141.73
INTERVAL(M) : 133.26 – 135.74
ELEVATION(M) : 1480.6

GEOLOGIST : MURRAY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



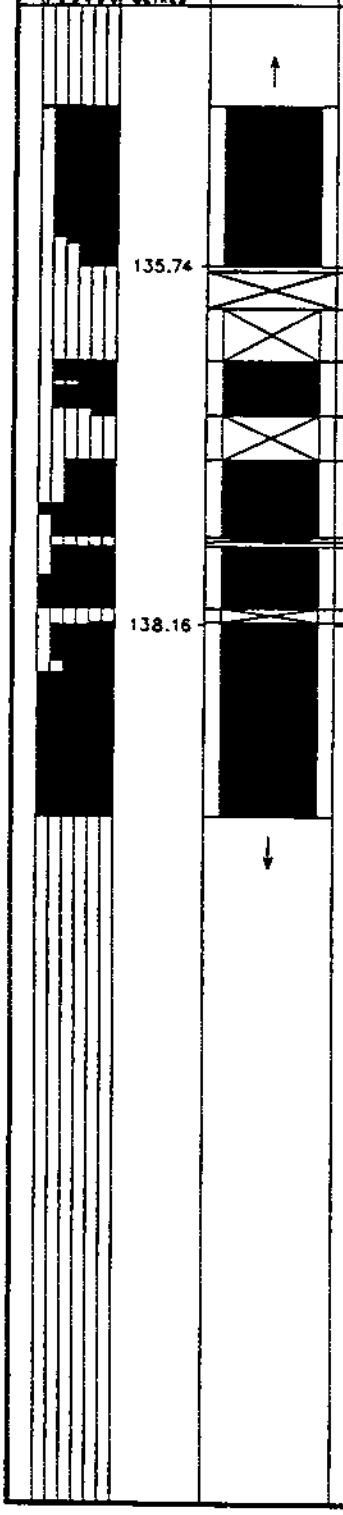
GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : I REP TOTAL INTERVAL(M) : 133.26 – 141.73 ELEVATION(M) : 1480.8
INTERVAL(M) : 135.74 – 138.16
GEOLOGIST : MURRAY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP. 0 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	135.74														
			(0.23)												
				(0.33)											
				0.35											
				(0.28)	58.0	6803	8	4.02 / 0.54		1.37	27.40	7.89	63.24	0.37	24.09
				0.49				4.56							
			(0.33)												
				0.40											
	138.16			(0.22)											

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : 1 REP TOTAL INTERVAL(M) : 133.26 – 141.73 ELEVATION(M) : 1480.8
GEOLOGIST : MURRAY SCALE: 1:40 INTERVAL(M) : 138.16 – 141.73 DRAWING NO. :
DATE : MAR 04/88

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	138.16														
				3.12	91.5	6804	9	3.41 / 0.00 3.41	7.43 / 0.54 7.97	0.89	11.20	6.07	81.84	0.47	31.12
				(0.29)											
	141.73														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I REP		
Field sample no.:	06802 - 06803	Composite sample no.:	8
Lab sample no.:	30632		
True sample thickness:	4.560 meters	Drill core recovery (%):	60.81 %
Coal/Rock:	4.022 / 0.538 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	18.09	22.88	19.55	27.45
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	7.68	4.35		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.37	
Ash (%):	27.40	27.78
Volatile matter (%):	7.99	8.10
Fixed carbon (%):	63.24	64.12
Total sulphur (%):	0.37	0.38
Net calorific value (cal/g):	5758.00	5838.00
Gross calorific value (cal/g):	5758.00	5838.00
Volatile matter (dmmf%):	8.30	
Hardgrove index:	72.00	
Specific gravity:	1.59	
Carbon dioxide (%):	2.82	
Phosphorous in coal (%):	0.030	
Chlorine in coal (ppm):	2860.00	
Forms of Sulphur (%):	PYRITE 00.05	SULPHATE 00.00 ORGANIC 00.32

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	64.88	65.78
Hydrogen (%):	1.96	1.99
Nitrogen (%):	0.77	0.78
Oxygen (%):	3.25	3.29

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1254.00	1227.00
Softening temperature (°C):	1272.00	1251.00
Hemispherical temperature (°C):	1278.00	1267.00
Final temperature (°C):	1337.00	1326.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	58.99	TiO2 (%):	0.72
Al2O3 (%):	16.64	Na2O (%):	1.66
Fe2O3 (%):	6.32	K2O (%):	0.74
CaO (%):	4.94	SO3 (%):	3.38
MgO (%):	2.15	P2O5 (%):	0.25

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	I REP		
Field sample no.:	06804	Composite sample no.:	9
Lab sample no.:	30632		
True sample thickness:	3.406 meters	Drill core recovery(%):	91.59 %
Coal/Rock:	3.406 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	7.38	11.08	19.39	39.81
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	13.50	8.84		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.89	
Ash(%):	11.20	11.30
Volatile matter(%):	6.07	6.12
Fixed carbon(%):	81.84	82.58
Total sulphur(%):	0.47	0.47
Combustible sulphur(%):	0.33	
Net calorific value(cal/g):	7437.00	7504.00
Gross calorific value(cal/g):	7438.00	7505.00
Volatile matter(dmmf%):	5.80	
Hardgrove index:	58.00	
Specific gravity:	1.40	
Carbon dioxide(%):	0.73	
Phosphorous in coal(%):	0.166	
Chlorine in coal(ppm):	3200.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.44

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	81.29	82.02
Hydrogen(%):	2.40	2.42
Nitrogen(%):	0.97	0.98
Oxygen(%):	2.78	2.81

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1283.00	1246.00
Softening temperature(°C):	1297.00	1254.00
Hemispherical temperature(°C):	1316.00	1262.00
Final temperature(°C):	1321.00	1294.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	46.26	TiO2(%):	0.64
Al2O3(%):	24.45	Na2O(%):	1.85
Fe2O3(%):	5.40	K2O(%):	0.98
CaO(%):	6.76	SO3(%):	3.14
MgO(%):	2.96	P2O5(%):	3.40

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00008
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1316.0	initial temp.(C)	1262.0
softening temp.(C)	1337.0	softening temp.(C)	1326.0
hemispherical temp.(C)	1373.0	hemispherical temp.(C)	1364.0
fluid temp.(C)	1452.0	fluid temp.(C)	1451.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00008
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	56.81
aluminium oxide %	(al2o3)	24.82
ferric oxide %	(fe2o3)	3.73
titanium dioxide %	(tio2)	0.88
phosphorous pentoxide %	(p2o5)	0.41
calcium oxide %	(cao)	2.80
magnesium oxide %	(mgo)	1.43
sulphur trioxide %	(so3)	2.19
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.05

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00008
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1308.0	initial temp.(C)	1301.0
softening temp.(C)	1423.0	softening temp.(C)	1366.0
hemispherical temp.(C)	1439.0	hemispherical temp.(C)	1380.0
fluid temp.(C)	1472.0	fluid temp.(C)	1466.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00008
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 30/11/87

silicon dioxide %	(sio2)	58.57
aluminium oxide %	(al2o3)	23.68
ferric oxide %	(fe2o3)	3.98
titanium dioxide %	(tio2)	0.77
phosphorous pentoxide %	(p2o5)	0.32
calcium oxide %	(cao)	2.07
magnesium oxide %	(mgo)	1.45
sulphur trioxide %	(so3)	1.79
sodium oxide %	(na2o)	1.58
potassium oxide %	(k2o)	0.96

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00009
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1284.0	initial temp.(C)	1256.0
softening temp.(C)	1305.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1310.0	hemispherical temp.(C)	1272.0
fluid temp.(C)	1369.0	fluid temp.(C)	1345.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00009
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	42.07
aluminium oxide %	(al2o3)	28.43
ferric oxide %	(fe2o3)	4.79
titanium dioxide %	(tio2)	1.45
phosphorous pentoxide %	(p2o5)	3.87
calcium oxide %	(cao)	6.86
magnesium oxide %	(mgo)	2.76
sulphur trioxide %	(so3)	2.89
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.18

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00009
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1240.0	initial temp.(C)	1238.0
softening temp.(C)	1280.0	softening temp.(C)	1276.0
hemispherical temp.(C)	1310.0	hemispherical temp.(C)	1289.0
fluid temp.(C)	1316.0	fluid temp.(C)	1305.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00009
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	43.05
aluminium oxide %	(al2o3)	29.73
ferric oxide %	(fe2o3)	4.48
titanium dioxide %	(tio2)	1.56
phosphorous pentoxide %	(p2o5)	3.81
calcium oxide %	(cao)	6.27
magnesium oxide %	(mgo)	2.60
sulphur trioxide %	(so3)	1.68
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	1.01

90.0 <= total <= 100.0

GULF CANADA CORPORATION

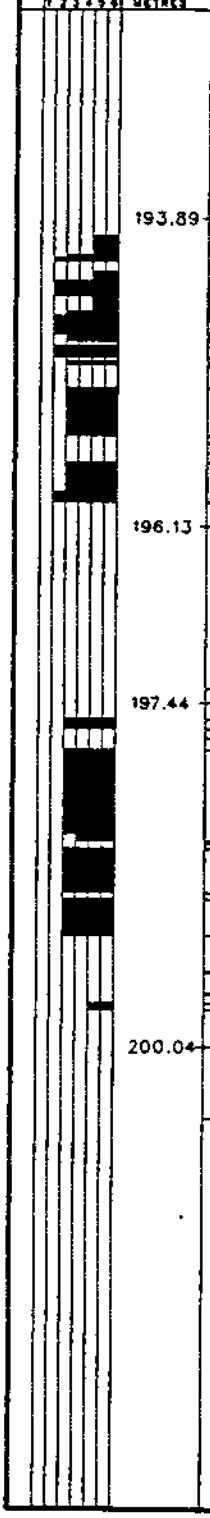
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87002 SEAM : H INTERVAL(M) : 193.89 – 200.04 ELEVATION(M) : 1480.8

GEOLOGIST : MURRAY SCALE: 1:40 DATE : FEB 29/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	193.89			(0.14)												
				0.14												
			0.04	(0.14)												
				0.38												
			0.05													
			0.02	0.07												
				(0.14)	77.2	6807	10	1.63 / 0.30	1.63 / 0.30	1.64	48.51	9.37	40.48	0.28	15.01	—
				0.29				1.93	1.93							
			0.04													
			0.04													
				0.25												
				(0.18)												
	196.13															
			1.02		91.6	6808	11	0.00/ 1.11		1.38	75.10	9.32	14.20	—	5.20	—
								1.11								
	197.44		(0.08)													
				(0.16)												
			0.08	0.08												
			(0.08)													
				0.57												
			0.03													
				0.28	64.0	6809	12	1.75 / 0.43	1.75 / 0.43	1.73	32.53	7.54	58.20	0.43	20.65	—
				0.23				2.17	2.17							
				(0.23)												
			(0.16)													
			0.08													
				(0.23)												
	200.04															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	H		
Field sample no.:	06807	Composite sample no.:	10
Lab sample no.:	30632		
True sample thickness:	1.926 meters	Drill core recovery (%):	77.23 %
Coal/Rock:	1.626 / 0.300 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	33.20	30.18	13.84	17.68
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.44	1.66		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.64	
Ash (%):	48.51	49.32
Volatile matter (%):	9.37	9.53
Fixed carbon (%):	40.48	41.15
Total sulphur (%):	0.28	0.28
Combustible sulphur (%):	0.04	
Net calorific value (cal/g):	3587.00	3647.00
Gross calorific value (cal/g):	3587.00	3647.00
Volatile matter (dmmf%):	11.80	
Hardgrove index:	62.00	
Specific gravity:	1.70	
Carbon dioxide (%):	5.18	
Phosphorous in coal (%):	0.023	
Chlorine in coal (ppm):	1600.00	

Forms of Sulphur (%): PYRITE 00.05 SULPHATE 00.00 ORGANIC 00.23

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	44.89	45.64
Hydrogen (%):	1.89	1.92
Nitrogen (%):	0.50	0.51
Oxygen (%):	2.29	2.33

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1213.00	1204.00
Softening temperature (°C):	1275.00	1262.00
Hemispherical temperature (°C):	1289.00	1267.00
Final temperature (°C):	1434.00	1388.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	63.08	TiO2 (%):	0.66
Al2O3 (%):	17.63	Na2O (%):	1.57
Fe2O3 (%):	5.15	K2O (%):	1.00
CaO (%):	4.62	SO3 (%):	1.24
MgO (%):	1.72	P2O5 (%):	0.11

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87002
Coal zone:	H		
Field sample no.:	06809	Composite sample no.:	12
Lab sample no.:	30632		
True sample thickness:	2.173 meters	Drill core recovery (%):	64.23 %
Coal/Rock:	1.747 / 0.426 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	22.24	24.00	17.37	27.13
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	6.20	3.06		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.73	
Ash (%):	32.53	33.10
Volatile matter (%):	7.54	7.67
Fixed carbon (%):	58.20	59.23
Total sulphur (%):	0.43	0.44
Combustible sulphur (%):	0.02	
Net calorific value (cal/g):	4935.00	5022.00
Gross calorific value (cal/g):	4935.00	5022.00
Volatile matter (dmmf%):	7.60	
Hardgrove index:	53.00	
Specific gravity:	1.64	
Carbon dioxide (%):	2.37	
Phosphorous in coal (%):	0.226	
Chlorine in coal (ppm):	1200.00	

Forms of Sulphur (%): PYRITE 00.07 SULPHATE 00.00 ORGANIC 00.36

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	60.18	61.24
Hydrogen (%):	2.05	2.09
Nitrogen (%):	0.70	0.71
Oxygen (%):	2.38	2.42

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1211.00	1204.00
Softening temperature (°C):	1275.00	1251.00
Hemispherical temperature (°C):	1283.00	1259.00
Final temperature (°C):	1340.00	1329.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	55.36	TiO2 (%):	0.98
Al2O3 (%):	19.95	Na2O (%):	1.91
Fe2O3 (%):	3.67	K2O (%):	0.79
CaO (%):	6.41	SO3 (%):	3.18
MgO (%):	1.68	P2O5 (%):	1.59

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00010
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1340.0	initial temp.(C)	1272.0
softening temp.(C)	1417.0	softening temp.(C)	1366.0
hemispherical temp.(C)	1439.0	hemispherical temp.(C)	1380.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00010
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	54.64
aluminium oxide %	(al2o3)	27.08
ferric oxide %	(fe2o3)	3.95
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	0.32
calcium oxide %	(cao)	2.85
magnesium oxide %	(mgo)	1.36
sulphur trioxide %	(so3)	1.97
sodium oxide %	(na2o)	2.21
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87002

sample id 00010
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1383.0	initial temp.(C)	1358.0
softening temp.(C)	1472.0	softening temp.(C)	1431.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1468.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87002

sample id 00010
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	53.96
aluminium oxide %	(al2o3)	27.84
ferric oxide %	(fe2o3)	3.95
titanium dioxide %	(tio2)	0.65
phosphorous pentoxide %	(p2o5)	0.28
calcium oxide %	(cao)	2.61
magnesium oxide %	(mgo)	1.39
sulphur trioxide %	(so3)	1.70
sodium oxide %	(na2o)	2.10
potassium oxide %	(k2o)	0.81

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00012
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1281.0	initial temp.(C)	1272.0
softening temp.(C)	1315.0	softening temp.(C)	1275.0
hemispherical temp.(C)	1326.0	hemispherical temp.(C)	1322.0
fluid temp.(C)	1391.0	fluid temp.(C)	1389.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00012
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	49.36
aluminium oxide %	(al2o3)	26.33
ferric oxide %	(fe2o3)	4.13
titanium dioxide %	(tio2)	0.78
phosphorous pentoxide %	(p2o5)	2.08
calcium oxide %	(cao)	5.49
magnesium oxide %	(mgo)	1.62
sulphur trioxide %	(so3)	2.63
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	0.81

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87002

sample id 00012
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1259.0	initial temp.(C)	1243.0
softening temp.(C)	1401.0	softening temp.(C)	1366.0
hemispherical temp.(C)	1417.0	hemispherical temp.(C)	1385.0
fluid temp.(C)	1471.0	fluid temp.(C)	1442.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87002

sample id 00012
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	51.34
aluminium oxide %	(al2o3)	26.71
ferric oxide %	(fe2o3)	4.08
titanium dioxide %	(tio2)	0.76
phosphorous pentoxide %	(p2o5)	1.70
calcium oxide %	(cao)	4.43
magnesium oxide %	(mgo)	1.52
sulphur trioxide %	(so3)	1.96
sodium oxide %	(na2o)	1.94
potassium oxide %	(k2o)	0.81

90.0 <= total <= 100.0

KPNLRDDH87003

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87003 DATE - 03/07/88

- H I S T O R Y -

START DATE - 08/29/87
END DATE - 08/31/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SRIVASTAVA
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - VERTICAL HOLE, SEAM 1, H/1, H.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1493.35
ZONE - 9
NORTHING - 6345148.65
EASTING - 508294.18

LICENCE/LEASE NUMBER -

LATITUDE - 571504
LONGITUDE - 1285145

- O R I E N T A T I O N -

LENGTH - 101.75
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 4.57
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87003										
		5983	38.39	38.49	100.00		0.100			0.000- 0.100
		7109	38.73	38.90	100.00		0.170			0.000- 0.170
	I	7110	38.90	40.49	72.96	1.030	0.130	0.430		1.460- 0.130
	I	7111	40.49	42.28	72.63	1.150	0.150	0.360	0.130	1.510- 0.280
	I	7112	42.28	44.42	67.76	1.450		0.690		2.140- 0.000
		7113	44.42	45.55	100.00		1.130			0.000- 1.130
		7114	89.50	90.27	100.00		0.593			0.000- 0.593
	H	7115	90.27	92.49	50.45	0.650	0.315	0.751	0.173	1.401- 0.488
	H	7116	92.49	94.27	65.17	1.079		0.373	0.207	1.452- 0.207
		7117	94.27	94.82	100.00		0.532			0.000- 0.532

GULF CANADA CORPORATION - COAL DIVISION

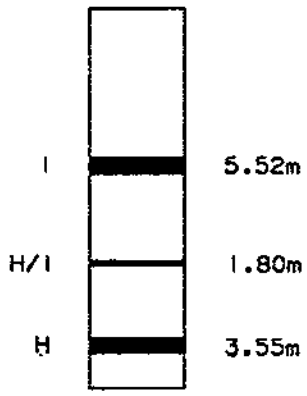
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87003												
	I	13	7110	7111	38.90	42.28	72.78	2.18	0.28	0.79	0.13	2.97- 0.41
	I	14	7112	7112	42.28	44.42	67.75	1.45	0.00	0.69	0.00	2.14- 0.00
	H	15	7115	7115	90.27	92.49	50.45	0.75	0.37	0.90	0.20	1.65- 0.57
	H	16	7116	7116	92.49	94.27	65.16	1.16	0.00	0.40	0.22	1.56- 0.22
	I	205	7110	7111	38.90	42.28	72.78	2.18	0.28	0.79	0.13	2.97- 0.41
	I	206	7112	7112	42.28	44.42	67.75	1.45	0.00	0.69	0.00	2.14- 0.00
	I	403	7110	7112	38.90	44.42	70.83	3.63	0.28	1.48	0.13	5.11- 0.41

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87003

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:{2050571880072012.LG

COAL SEAM DATA SHEETS

AND

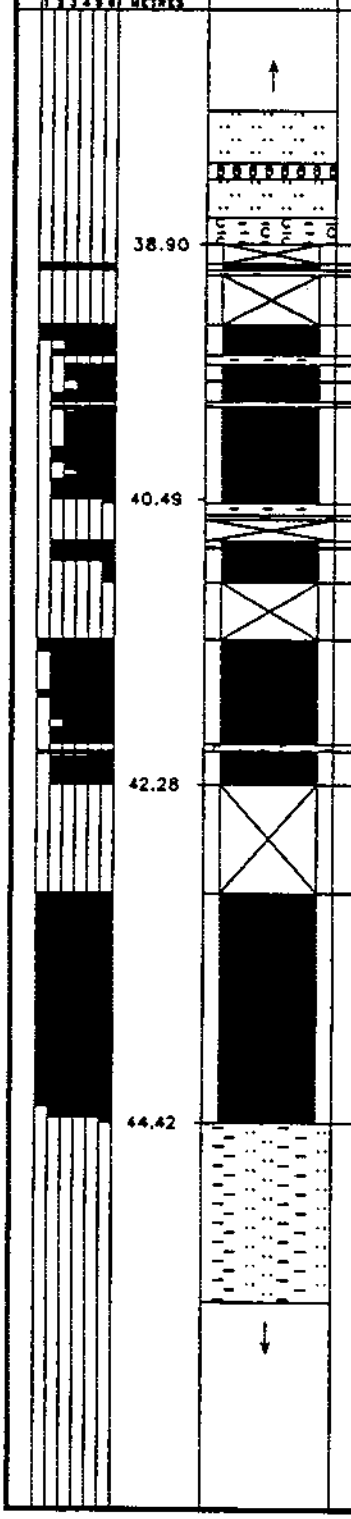
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87003 SEAM : 1 INTERVAL(M) : 38.90 – 44.42 ELEVATION(M) : 1493.4

GEOLOGIST : SRIVASTAVA SCALE: 1:40 DATE : FEB 17/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	38.90			(0.12)											
			0.03	(0.31)											
				0.18											
			0.18	0.10	73.0	7110									
			0.03	0.12											
				0.61											
	40.49		1.15												
			(0.13)				13	2.97 / 0.41		1.38	31.81	8.09	57.71	0.33	21.27
				0.21				3.38							
				(0.36)											
				0.66	72.6	7111			5.11 / 0.41						
				0.21					5.52						
	42.28			(0.69)											
				1.45	67.8	7112	14	2.14 / 0.00		1.47	13.66	8.53	78.34	0.44	30.17
								2.14							
	44.42														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87003
Coal zone:	I		
Field sample no.:	07110 - 07111	Composite sample no.:	13
Lab sample no.:	30632		
True sample thickness:	3.380 meters	Drill core recovery(%):	72.78 %
Coal/Rock:	2.970 / 0.410 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	23.94	20.73	18.99	28.66	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	4.99	2.69			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.39	
Ash(%):	31.81	32.26
Volatile matter(%):	9.09	9.22
Fixed carbon(%):	57.71	58.52
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.03	
Net calorific value(cal/g):	5084.00	5155.00
Gross calorific value(cal/g):	5084.00	5155.00
Volatile matter(dmmf%):	10.10	
Hardgrove index:	62.00	
Specific gravity:	1.64	
Carbon dioxide(%):	4.14	
Phosphorous in coal(%):	0.056	
Chlorine in coal(ppm):	1680.00	

Forms of Sulphur(%): PYRITE 00.05 SULPHATE 00.00 ORGANIC 00.28

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	60.30	61.15
Hydrogen(%):	2.09	2.12
Nitrogen(%):	0.78	0.79
Oxygen(%):	3.30	3.35

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1236.00
Softening temperature(°C):	1297.00	1272.00
Hemispherical temperature(°C):	1305.00	1275.00
Final temperature(°C):	1434.00	1420.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	55.77	TiO2(%):	0.80
Al2O3(%):	18.60	Na2O(%):	2.28
Fe2O3(%):	6.39	K2O(%):	0.66
CaO(%):	5.64	SO3(%):	2.35
MgO(%):	2.36	P2O5(%):	0.40

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87003
Coal zone:	I		
Field sample no.:	07112	Composite sample no.:	14
Lab sample no.:	30632		
True sample thickness:	2.140 meters	Drill core recovery(%):	67.75 %
Coal/Rock:	2.140 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.49	28.44	18.07	22.12
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	2.66	1.22		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.47	
Ash(%):	13.66	13.86
Volatile matter(%):	6.53	6.63
Fixed carbon(%):	78.34	79.51
Total sulphur(%):	0.44	0.45
Combustible sulphur(%):	0.26	
Net calorific value(cal/g):	7210.00	7317.00
Gross calorific value(cal/g):	7211.00	7318.00
Volatile matter(dmmf%):	6.30	
Hardgrove index:	61.00	
Specific gravity:	1.45	
Carbon dioxide(%):	1.20	
Phosphorous in coal(%):	0.146	
Chlorine in coal(ppm):	2400.00	
Forms of Sulphur(%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.41	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	77.20	78.35
Hydrogen(%):	2.58	2.62
Nitrogen(%):	0.98	0.99
Oxygen(%):	3.67	3.73

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1272.00	1227.00
Softening temperature(°C):	1291.00	1251.00
Hemispherical temperature(°C):	1302.00	1267.00
Final temperature(°C):	1332.00	1330.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.42	TiO2(%):	1.15
Al2O3(%):	20.15	Na2O(%):	1.61
Fe2O3(%):	4.02	K2O(%):	1.22
CaO(%):	5.89	SO3(%):	3.31
MgO(%):	1.44	P2O5(%):	2.44

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87003

sample id 00013
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1251.0	initial temp.(C)	1246.0
softening temp.(C)	1299.0	softening temp.(C)	1272.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1340.0	fluid temp.(C)	1335.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87003

sample id 00013
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	56.15
aluminium oxide %	(al2o3)	21.10
ferric oxide %	(fe2o3)	3.78
titanium dioxide %	(tio2)	0.72
phosphorous pentoxide %	(p2o5)	0.46
calcium oxide %	(cao)	5.83
magnesium oxide %	(mgo)	1.88
sulphur trioxide %	(so3)	2.89
sodium oxide %	(na2o)	1.73
potassium oxide %	(k2o)	0.77

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87003

sample id 00013
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1305.0	initial temp.(C)	1213.0
softening temp.(C)	1345.0	softening temp.(C)	1305.0
hemispherical temp.(C)	1353.0	hemispherical temp.(C)	1350.0
fluid temp.(C)	1407.0	fluid temp.(C)	1405.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87003

sample id 00013
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	57.65
aluminium oxide %	(al2o3)	23.28
ferric oxide %	(fe2o3)	3.22
titanium dioxide %	(tio2)	0.77
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	5.00
magnesium oxide %	(mgo)	1.48
sulphur trioxide %	(so3)	2.24
sodium oxide %	(na2o)	1.81
potassium oxide %	(k2o)	0.88

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87003

sample id 00014
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1247.0
softening temp.(C)	1315.0	softening temp.(C)	1283.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1348.0	fluid temp.(C)	1345.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87003

sample id 00014
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	48.34
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	4.56
titanium dioxide %	(tio2)	0.89
phosphorous pentoxide %	(p2o5)	2.08
calcium oxide %	(cao)	6.77
magnesium oxide %	(mgo)	1.48
sulphur trioxide %	(so3)	3.94
sodium oxide %	(na2o)	2.12
potassium oxide %	(k2o)	0.92

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87003

sample id 00014
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1326.0	initial temp.(C)	1305.0
softening temp.(C)	1348.0	softening temp.(C)	1321.0
hemispherical temp.(C)	1356.0	hemispherical temp.(C)	1348.0
fluid temp.(C)	1391.0	fluid temp.(C)	1388.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87003

sample id 00014
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	48.85
aluminium oxide %	(al2o3)	27.66
ferric oxide %	(fe2o3)	3.63
titanium dioxide %	(tio2)	0.82
phosphorous pentoxide %	(p2o5)	1.91
calcium oxide %	(cao)	5.77
magnesium oxide %	(mgo)	1.22
sulphur trioxide %	(so3)	2.78
sodium oxide %	(na2o)	2.23
potassium oxide %	(k2o)	0.95

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION, MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87003 SEAM : H INTERVAL(M) : 90.27 – 94.27 ELEVATION(M) : 1493.4

GEOLOGIST : SRIVASTAVA SCALE: 1:40 DATE : FEB 17/88 DRAWING NO. :

SEAM COMP. 1,2,3,4,5,6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	90.27			0.66												
				(0.16)												
			0.16													
				0.69												
				(0.59)	51.1	7115	16	1.40 / 0.49 1.88		0.81	74.00	7.25	17.94	—	6.35	—
			(0.17)													
			0.13													
				0.48					2.85 / 0.70 3.55							
	92.49			0.58												
				(0.37)	46.0	7116	16	1.45 / 0.21 1.66		1.48	30.10	8.01	60.41	0.48	21.71	—
			(0.21)													
				0.50												
	94.27															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87003
Coal zone:	H		
Field sample no.:	07116	Composite sample no.:	16
Lab sample no.:	30632		
True sample thickness:	1.659 meters	Drill core recovery (%):	65.16 %
Coal/Rock:	1.452 / 0.207 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	21.53	24.09	14.97	27.96	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.25	4.20			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.48	
Ash (%):	30.10	30.55
Volatile matter (%):	8.01	8.13
Fixed carbon (%):	60.41	61.32
Total sulphur (%):	0.45	0.46
Combustible sulphur (%):	0.02	
Net calorific value (cal/g):	5189.00	5267.00
Gross calorific value (cal/g):	5189.00	5267.00
Volatile matter (dmmf%):	8.30	
Hardgrove index:	60.00	
Specific gravity:	1.60	
Carbon dioxide (%):	4.56	
Phosphorous in coal (%):	0.244	
Chlorine in coal (ppm):	2880.00	
Forms of Sulphur (%):	PYRITE 00.06 SULPHATE 00.01 ORGANIC 00.38	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	62.05	62.98
Hydrogen (%):	2.13	2.16
Nitrogen (%):	0.71	0.72
Oxygen (%):	3.08	3.13

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1229.00	1192.00
Softening temperature (°C):	1246.00	1213.00
Hemispherical temperature (°C):	1251.00	1219.00
Final temperature (°C):	1299.00	1289.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	50.22	TiO2 (%):	0.86
Al2O3 (%):	18.99	Na2O (%):	2.12
Fe2O3 (%):	3.58	K2O (%):	0.62
CaO (%):	11.04	SO3 (%):	3.56
MgO (%):	2.83	P2O5 (%):	1.86

(1)

scri coal division ash fusion proj KPN BLK LR DB DDH87003

sample id 00016
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1283.0	initial temp.(C)	1251.0
softening temp.(C)	1289.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1299.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1353.0	fluid temp.(C)	1350.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87003

sample id 00016
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	52.64
aluminium oxide %	(al2o3)	22.55
ferric oxide %	(fe2o3)	2.97
titanium dioxide %	(tio2)	1.12
phosphorous pentoxide %	(p2o5)	3.32
calcium oxide %	(cao)	6.74
magnesium oxide %	(mgo)	1.25
sulphur trioxide %	(so3)	2.45
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	0.57

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87003

sample id 00016
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1267.0	initial temp.(C)	1258.0
softening temp.(C)	1337.0	softening temp.(C)	1305.0
hemispherical temp.(C)	1342.0	hemispherical temp.(C)	1337.0
fluid temp.(C)	1417.0	fluid temp.(C)	1412.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87003

sample id 00016
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	53.66
aluminium oxide %	(al2o3)	24.82
ferric oxide %	(fe2o3)	2.79
titanium dioxide %	(tio2)	1.12
phosphorous pentoxide %	(p2o5)	2.44
calcium oxide %	(cao)	5.49
magnesium oxide %	(mgo)	1.41
sulphur trioxide %	(so3)	2.01
sodium oxide %	(na2o)	1.73
potassium oxide %	(k2o)	0.53

90.0 <= total <= 100.0

KPNLRDDH87004

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87004 DATE - 12/14/87

- H I S T O R Y -

START DATE - 28/08/87
END DATE - 30/08/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SAVOIE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SEAMS INTERSECTED I, H/I, ?, H, PH. VERTICAL HOLE.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1479.52
ZONE - 9
NORTHING - 6345072.00
EASTING - 508530.94

LICENCE/LEASE NUMBER -

LATITUDE - 571502
LONGITUDE - 1285131

- O R I E N T A T I O N -

LENGTH - 101.83
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 4.57
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87004										
		5979	32.95	32.97	100.00		0.020			0.000- 0.020
		7118	33.32	33.43	100.00		0.109			0.000- 0.109
	H/I	7119	33.43	34.75	71.97	0.822	0.119	0.368		1.190- 0.119
		7120	34.75	35.43	100.00		0.670			0.000- 0.670
		7121	52.17	52.97	100.00		0.797			0.000- 0.797
	?	7122	52.97	53.49	55.77	0.290		0.229		0.519- 0.000
		7123	53.49	53.80	64.52	0.050	0.149	0.030	0.080	0.080- 0.229
	I	7124	18.52	22.77	18.35	0.701		3.119		3.820- 0.000
	H	7126	69.08	70.99	74.35	1.357	0.060	0.179	0.309	1.536- 0.369
		7127	70.99	71.64	23.08		0.149		0.498	0.000- 0.647
		7128	94.40	94.80	100.00		0.387			0.000- 0.387
	PH	7129	94.80	96.27	64.63	0.921		0.504		1.425- 0.000
		7130	96.27	96.44	100.00		0.166			0.000- 0.166

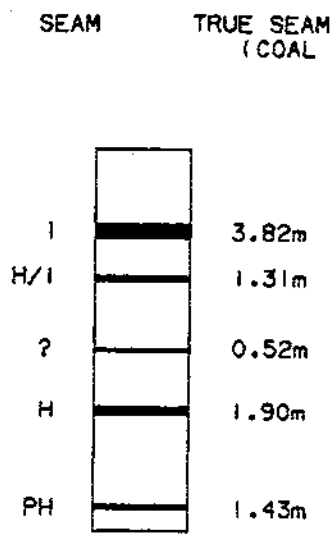
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
DDH87004												
	I	17	7124	7124	18.52	22.77	18.35	0.78	0.00	3.47	0.00	4.25- 0.00
	H/I	18	7119	7119	33.43	34.75	71.96	0.83	0.12	0.37	0.00	1.20- 0.12
	?	19	7122	7122	52.97	53.49	55.76	0.29	0.00	0.23	0.00	0.52- 0.00
	H	20	7126	7126	69.08	70.99	74.34	1.36	0.06	0.18	0.31	1.54- 0.37
	PH	21	7129	7129	94.80	96.27	64.62	0.95	0.00	0.52	0.00	1.47- 0.00
	H/I	207	7119	7119	33.43	34.75	71.96	0.83	0.12	0.37	0.00	1.20- 0.12
	H	208	7126	7126	69.08	70.99	74.34	1.36	0.06	0.18	0.31	1.54- 0.37
	Ph	209	7129	7129	94.80	96.27	64.62	0.95	0.00	0.52	0.00	1.47- 0.00
	H/I	404	7119	7119	33.43	34.75	71.96	0.83	0.12	0.37	0.00	1.20- 0.12
	H	405	7126	7126	69.08	70.99	74.34	1.36	0.06	0.18	0.31	1.54- 0.37
	Ph	406	7129	7129	94.80	96.27	64.62	0.95	0.00	0.52	0.00	1.47- 0.00



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87004

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(20505718800720)2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

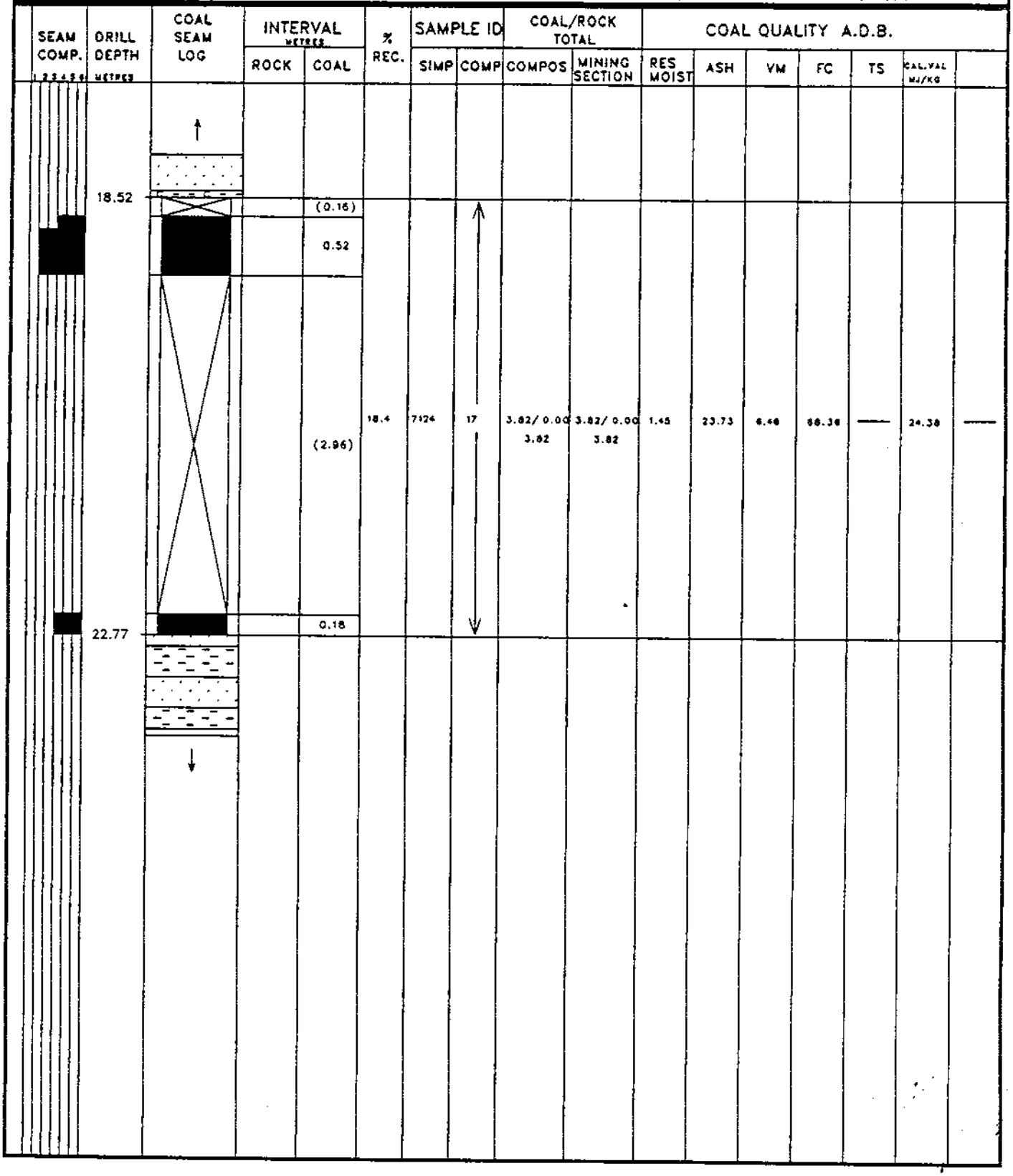
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87004 SEAM : 1 INTERVAL(M) : 18.52 - 22.77 ELEVATION(M) : 1479.5

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	18.52			(0.16)												
				0.52												
				(2.96)	18.4	7+24	17	3.82/ 0.00 3.82	3.82/ 0.00 3.82	1.45	23.73	6.46	68.36	—	24.38	—
	22.77			0.18												

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87004 SEAM : H/1 INTERVAL(M) : 33.43 – 34.75 ELEVATION(M) : 1479.5

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	33.43			0.12												
				(0.37)												
				0.60	71.9	7118	18	1.19 / 0.12 1.31	1.19 / 0.12 1.31	1.18	47.34	9.80	41.58	0.48	14.53	—
			0.12													
	34.75			0.10												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87004
Coal zone:	H/1		
Field sample no.:	07119	Composite sample no.:	18
Lab sample no.:	30632-1		
True sample thickness:	1.309 meters	Drill core recovery(%):	71.96 %
Coal/Rock:	1.190 / 0.119 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	27.13	24.18	15.51	24.94	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	5.32	2.92			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.18	
Ash(%):	47.34	47.90
Volatile matter(%):	9.90	10.02
Fixed carbon(%):	41.58	42.08
Total sulphur(%):	0.48	0.49
Combustible sulphur(%):	0.18	
Net calorific value(cal/g):	3473.00	3514.00
Gross calorific value(cal/g):	3473.00	3514.00
Volatile matter(dmmf%):	12.50	
Hardgrove index:	59.00	
Specific gravity:	1.77	
Carbon dioxide(%):	7.67	
Phosphorous in coal(%):	0.081	
Chlorine in coal(ppm):	720.00	
Forms of Sulphur(%):	PYRITE 00.13 SULPHATE 00.00 ORGANIC 00.35	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	45.64	46.18
Hydrogen(%):	1.59	1.61
Nitrogen(%):	0.49	0.50
Oxygen(%):	3.28	3.32

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1248.00	1221.00
Softening temperature(°C):	1259.00	1229.00
Hemispherical temperature(°C):	1262.00	1235.00
Final temperature(°C):	1281.00	1280.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	50.56	TiO2(%):	0.59
Al2O3(%):	16.88	Na2O(%):	1.43
Fe2O3(%):	7.59	K2O(%):	2.00
CaO(%):	9.63	SO3(%):	1.59
MgO(%):	4.97	P2O5(%):	0.39

scri coal division ash fusion proj KPN BLK LR DB DDH87004

sample id 00018
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1275.0	initial temp.(C)	1213.0
softening temp.(C)	1283.0	softening temp.(C)	1233.0
hemispherical temp.(C)	1297.0	hemispherical temp.(C)	1257.0
fluid temp.(C)	1342.0	fluid temp.(C)	1340.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87004

sample id 00018
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.56
aluminium oxide %	(al2o3)	20.71
ferric oxide %	(fe2o3)	6.39
titanium dioxide %	(tio2)	0.76
phosphorous pentoxide %	(p2o5)	0.49
calcium oxide %	(cao)	4.58
magnesium oxide %	(mgo)	3.73
sulphur trioxide %	(so3)	1.66
sodium oxide %	(na2o)	1.55
potassium oxide %	(k2o)	1.64

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87004

sample id 00018
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1246.0
softening temp.(C)	1364.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1375.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1444.0	fluid temp.(C)	1434.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87004

sample id 00018
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	53.80
aluminium oxide %	(al2o3)	23.42
ferric oxide %	(fe2o3)	5.72
titanium dioxide %	(tio2)	1.01
phosphorous pentoxide %	(p2o5)	0.52
calcium oxide %	(cao)	3.23
magnesium oxide %	(mgo)	3.27
sulphur trioxide %	(so3)	1.84
sodium oxide %	(na2o)	1.57
potassium oxide %	(k2o)	1.58

90.0 <= total <= 100.0

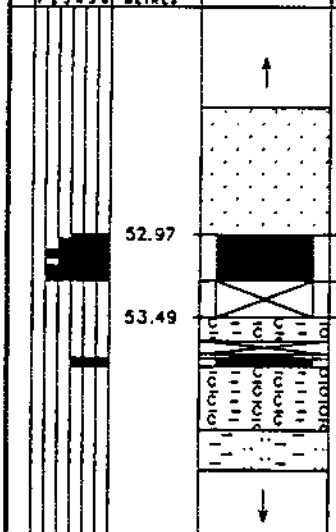
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87004 SEAM : ? INTERVAL(M) : 52.97 – 53.49 ELEVATION(M) : 1479.5

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	52.97			0.29	55.9	7122	∧ 18 ∨	0.52 / 0.00		0.89	35.53	7.44	36.04	—	13.30	—
	53.49			(0.23)				0.52								

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87004 SEAM : H INTERVAL(M) : 69.08 – 70.99 ELEVATION(M) : 1479.5

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	69.08			(0.18)											
				0.35											
			(0.31)												
				0.63	74.4	7126	20	1.54 / 0.37 1.90	1.54 / 0.37 1.90	0.82	33.82	8.79	56.57	1.26	20.37
				0.36											
	70.99														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87004
Coal zone:	H		
Field sample no.:	07126	Composite sample no.:	20
Lab sample no.:	30632-1		
True sample thickness:	1.905 meters	Drill core recovery(%):	74.34 %
Coal/Rock:	1.536 / 0.369 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	21.69	22.44	16.03	29.73	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	6.51	3.60			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.82	
Ash(%):	33.82	34.10
Volatile matter(%):	8.79	8.86
Fixed carbon(%):	56.57	57.04
Total sulphur(%):	1.26	1.27
Combustible sulphur(%):	0.52	
Gross calorific value(cal/g):	4916.00	4957.00
Volatile matter(dmmf%):	9.10	
Hardgrove index:	57.00	
Specific gravity:	1.65	
Carbon dioxide(%):	4.25	
Phosphorous in coal(%):	0.136	
Chlorine in coal(ppm):	600.00	
Forms of Sulphur(%):	PYRITE 01.12 SULPHATE 00.03 ORGANIC 00.11	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1232.00	1149.00
Softening temperature(°C):	1270.00	1203.00
Hemispherical temperature(°C):	1275.00	1213.00
Final temperature(°C):	1318.00	1315.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	47.82	TiO2(%):	0.44
Al2O3(%):	15.72	Na2O(%):	1.39
Fe2O3(%):	9.48	K2O(%):	1.10
CaO(%):	8.67	SO3(%):	5.44
MgO(%):	4.72	P2O5(%):	0.92

:cri coal division ash fusion proj KPN BLK LR DS DDH87004

:ample id 00020
:ample product id SP1 data type (real,boro,aver,calc) REAL
:plit sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1251.0
softening temp.(C)	1364.0	softening temp.(C)	1297.0
hemispherical temp.(C)	1385.0	hemispherical temp.(C)	1342.0
fluid temp.(C)	1439.0	fluid temp.(C)	1429.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

:cri coal division ash mineral proj KPN BLK LR DS DDH87004

:ample id 00020
:ample product id SP1 data type (real,boro,aver,calc) REAL
:plit sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	52.89
aluminium oxide %	(al2o3)	22.26
ferric oxide %	(fe2o3)	7.06
titanium dioxide %	(tio2)	1.01
phosphorous pentoxide %	(p2o5)	0.61
calcium oxide %	(cao)	2.77
magnesium oxide %	(mgo)	3.60
sulphur trioxide %	(so3)	2.02
sodium oxide %	(na2o)	1.69
potassium oxide %	(k2o)	1.32

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87004

sample id 00020
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1251.0	initial temp.(C)	1232.0
softening temp.(C)	1380.0	softening temp.(C)	1323.0
hemispherical temp.(C)	1405.0	hemispherical temp.(C)	1342.0
fluid temp.(C)	1450.0	fluid temp.(C)	1415.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87004

sample id 00020
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	54.10
aluminium oxide %	(al2o3)	23.93
ferric oxide %	(fe2o3)	6.75
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.50
calcium oxide %	(cao)	1.95
magnesium oxide %	(mgo)	3.70
sulphur trioxide %	(so3)	1.88
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	1.32

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87004 SEAM : PH INTERVAL(M) : 94.80 - 96.27 ELEVATION(M) : 1479.5

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	94.80														
				(0.50)											
				0.92	64.6	7128	21	1.43 / 0.00 1.43	1.43 / 0.00 1.43	1.00	23.36	5.92	69.72	0.58	24.65
	96.27														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87004
Coal zone:	PH		
Field sample no.:	07129	Composite sample no.:	21
Lab sample no.:	30632-1		
True sample thickness:	1.425 meters	Drill core recovery(%):	64.62 %
Coal/Rock:	1.425 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM			
Size analysis:	SZ1			
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	17.72	18.45	12.04	38.78
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	8.83	4.18		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.00	
Ash(%):	23.36	23.60
Volatile matter(%):	5.92	5.98
Fixed carbon(%):	69.72	70.42
Total sulphur(%):	0.58	0.59
Combustible sulphur(%):	0.37	
Net calorific value(cal/g):	5891.00	5951.00
Gross calorific value(cal/g):	5891.00	5951.00
Volatile matter(dmmf%):	5.20	
Hardgrove index:	55.00	
Specific gravity:	1.55	
Carbon dioxide(%):	0.78	
Phosphorous in coal(%):	0.092	
Chlorine in coal(ppm):	140.00	
Forms of Sulphur(%):	PYRITE 00.10 SULPHATE 00.00 ORGANIC 00.48	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	70.12	70.83
Hydrogen(%):	2.25	2.27
Nitrogen(%):	0.76	0.77
Oxygen(%):	1.93	1.94

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1289.00	1229.00
Softening temperature(°C):	1337.00	1294.00
Hemispherical temperature(°C):	1348.00	1315.00
Final temperature(°C):	1391.00	1389.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.79	TiO2(%):	0.93
Al2O3(%):	19.72	Na2O(%):	1.79
Fe2O3(%):	5.59	K2O(%):	1.17
CaO(%):	2.91	SO3(%):	2.20
MgO(%):	2.64	P2O5(%):	0.90

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87004

sample id 00021
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1415.0	initial temp.(C)	1294.0
softening temp.(C)	1450.0	softening temp.(C)	1391.0
hemispherical temp.(C)	1461.0	hemispherical temp.(C)	1399.0
fluid temp.(C)	1472.0	fluid temp.(C)	1462.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash minéral proj KPN BLK LR DS DDH87004

sample id 00021
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	51.08
aluminium oxide %	(al2o3)	25.84
ferric oxide %	(fe2o3)	5.31
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	1.28
calcium oxide %	(cao)	3.30
magnesium oxide %	(mgo)	2.97
sulphur trioxide %	(so3)	1.82
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.00

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87004

sample id 00021
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1351.0	initial temp.(C)	1348.0
softening temp.(C)	1471.0	softening temp.(C)	1391.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1399.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87004

sample id 00021
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	51.03
aluminium oxide %	(al2o3)	26.51
ferric oxide %	(fe2o3)	5.72
titanium dioxide %	(tio2)	1.01
phosphorous pentoxide %	(p2o5)	1.24
calcium oxide %	(cao)	2.75
magnesium oxide %	(mgo)	3.09
sulphur trioxide %	(so3)	1.53
sodium oxide %	(na2o)	1.63
potassium oxide %	(k2o)	0.87

90.0 <= total <= 100.0

KPNLRDDH87005

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87005 DATE - 03/01/88

- H I S T O R Y -

START DATE - 08/31/87
END DATE - 09/03/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - VERTICAL HOLE. 202.43 M. SEAMS K/L, K, J, I, ?, H/
I, ?, H. CASING WAS ADDED FROM 9.75 TO 28.04 M.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1452.19
ZONE - 9
NORTHING - 6345612.18
EASTING - 508230.62

LICENCE/LEASE NUMBER -

LATITUDE - 571519
LONGITUDE - 1285149

- O R I E N T A T I O N -

LENGTH - 201.62
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 9.75
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87005										
		7131	18.55	19.00	100.00		0.423			0.000- 0.423
	K/L	7132	19.00	23.74	39.87	1.383	0.384	2.667		4.050- 0.384
		7133	23.74	24.06	100.00		0.298			0.000- 0.298
		7134	49.52	49.66	100.00		0.139			0.000- 0.139
	K	7135	49.66	54.70	66.87	3.214	0.139	1.490	0.170	4.704- 0.309
	K	7136	54.70	55.88	100.00		1.176			0.000- 1.176
	K	7137	55.88	58.93	71.80	1.927	0.260	0.720	0.140	2.647- 0.400
		7138	58.93	59.15	100.00		0.220			0.000- 0.220
		7139	129.48	130.23	100.00		0.705			0.000- 0.705
	I	7140	130.23	132.23	100.00	1.673	0.240			1.673- 0.240
	I	7141	132.23	133.80	100.00	1.531				1.531- 0.000
		7142	133.80	134.55	100.00		0.739			0.000- 0.739
		7143	182.23	182.40	100.00		0.139			0.000- 0.139
	H	7144	182.40	184.30	82.63	0.800	0.377	0.239		1.039- 0.377

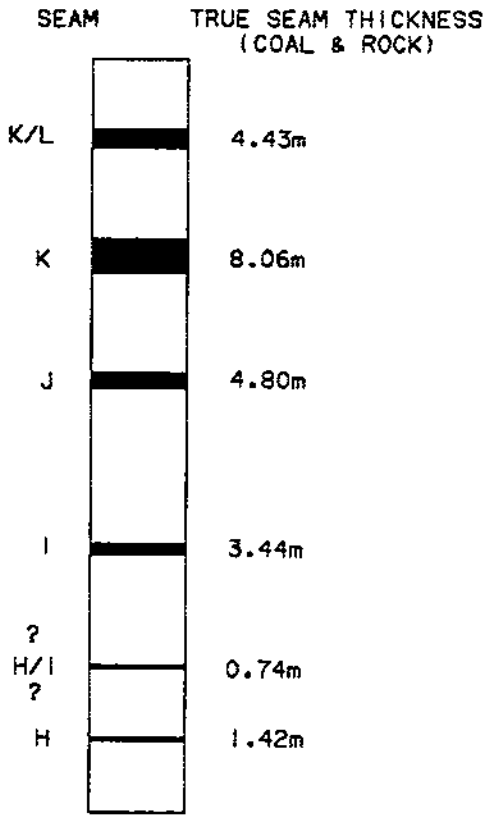
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
DDH87005												
	K/L	22	7132	7132	19.00	23.74	39.87	1.48	0.41	2.85	0.00	4.33- 0.41
	K	23	7135	7135	49.66	54.70	66.86	3.23	0.14	1.50	0.17	4.73- 0.31
	K	24	7136	7136	54.70	55.88	100.00	0.00	1.18	0.00	0.00	0.00- 1.18
	K	25	7137	7137	55.88	58.93	71.80	1.93	0.26	0.72	0.14	2.65- 0.40
	I	26	7140	7140	130.23	132.23	100.00	1.75	0.25	0.00	0.00	1.75- 0.25
	I	27	7141	7141	132.23	133.80	100.00	1.57	0.00	0.00	0.00	1.57- 0.00
	H	28	7144	7144	182.40	184.30	82.63	1.07	0.50	0.33	0.00	1.40- 0.50
	K	210	7135	7135	49.66	54.70	66.86	3.23	0.14	1.50	0.17	4.73- 0.31
	K	211	7137	7137	55.88	58.93	71.80	1.93	0.26	0.72	0.14	2.65- 0.40
	I	212	7140	7140	130.23	132.23	100.00	1.75	0.25	0.00	0.00	1.75- 0.25
	I	213	7141	7141	132.23	133.80	100.00	1.57	0.00	0.00	0.00	1.57- 0.00
	H	214	7144	7144	182.40	184.30	82.63	1.07	0.50	0.33	0.00	1.40- 0.50
	K	407	7135	7137	49.66	58.93	68.72	5.16	0.40	2.22	0.31	7.38- 0.71
	I	408	7140	7141	130.23	133.80	100.00	3.32	0.25	0.00	0.00	3.32- 0.25
	H	409	7144	7144	182.40	184.30	82.63	1.07	0.50	0.33	0.00	1.40- 0.50



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87005

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057188007201 2.LG

COAL SEAM DATA SHEETS

AND

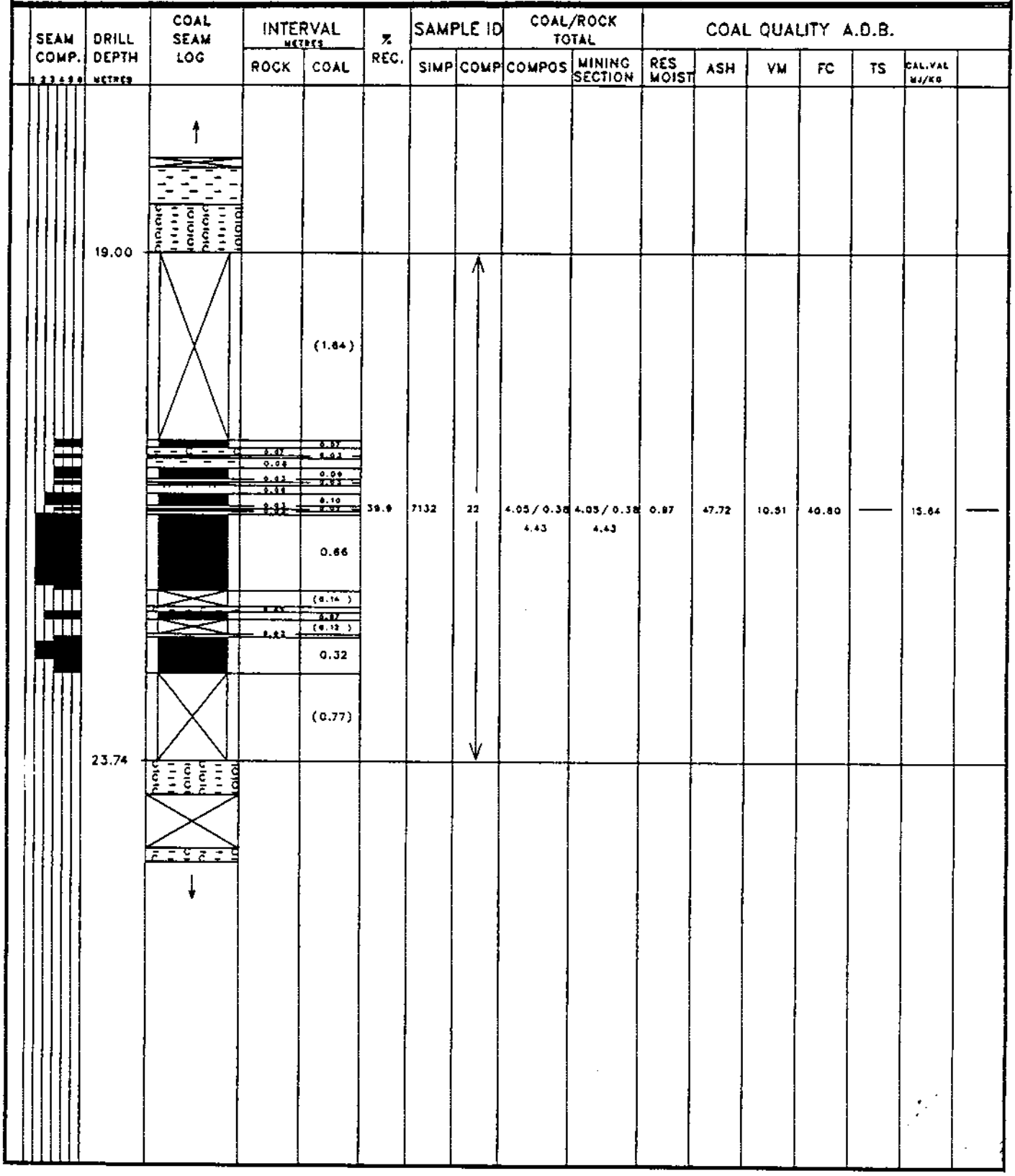
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87005 SEAM : K/L INTERVAL(M) : 19.00 - 23.74 ELEVATION(M) : 1452.2

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 29/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	19.00															
				(1.84)												
				0.87	39.8	7132	22	4.05 / 0.38	4.05 / 0.38	0.87	47.72	10.51	40.80	—	15.64	—
				0.66				4.43	4.43							
				(0.14)												
				0.87												
				(0.12)												
				0.32												
				(0.77)												
	23.74															

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87005 SEAM : K TOTAL INTERVAL(M) : 49.66 – 58.93
INTERVAL(M) : 49.66 – 54.70
ELEVATION(M) : 1452.2

GEOLOGIST : LEDDA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL. VAL MJ/KG
	49.66			(0.51)											
				0.42											
				0.76											
				(0.58)											
				1.47	66.9	7135	23	4.70 / 0.31 5.01		0.95	29.26	7.18	62.61	0.46	22.50
				(0.34)											
				0.57											
	54.70														

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87005 SEAM : K TOTAL INTERVAL(M) : 49.66 - 58.93 ELEVATION(M) : 1452.2
INTERVAL(M) : 54.70 - 55.88
GEOLOGIST : LEDOA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
									4.70 / 0.31 5.01							
	54.70			1.12	100.0	7136	24	0.00/ 1.18 1.18		1.01	88.30	8.59	2.10	—	1.30	—
	55.88															

GULF CANADA CORPORATION

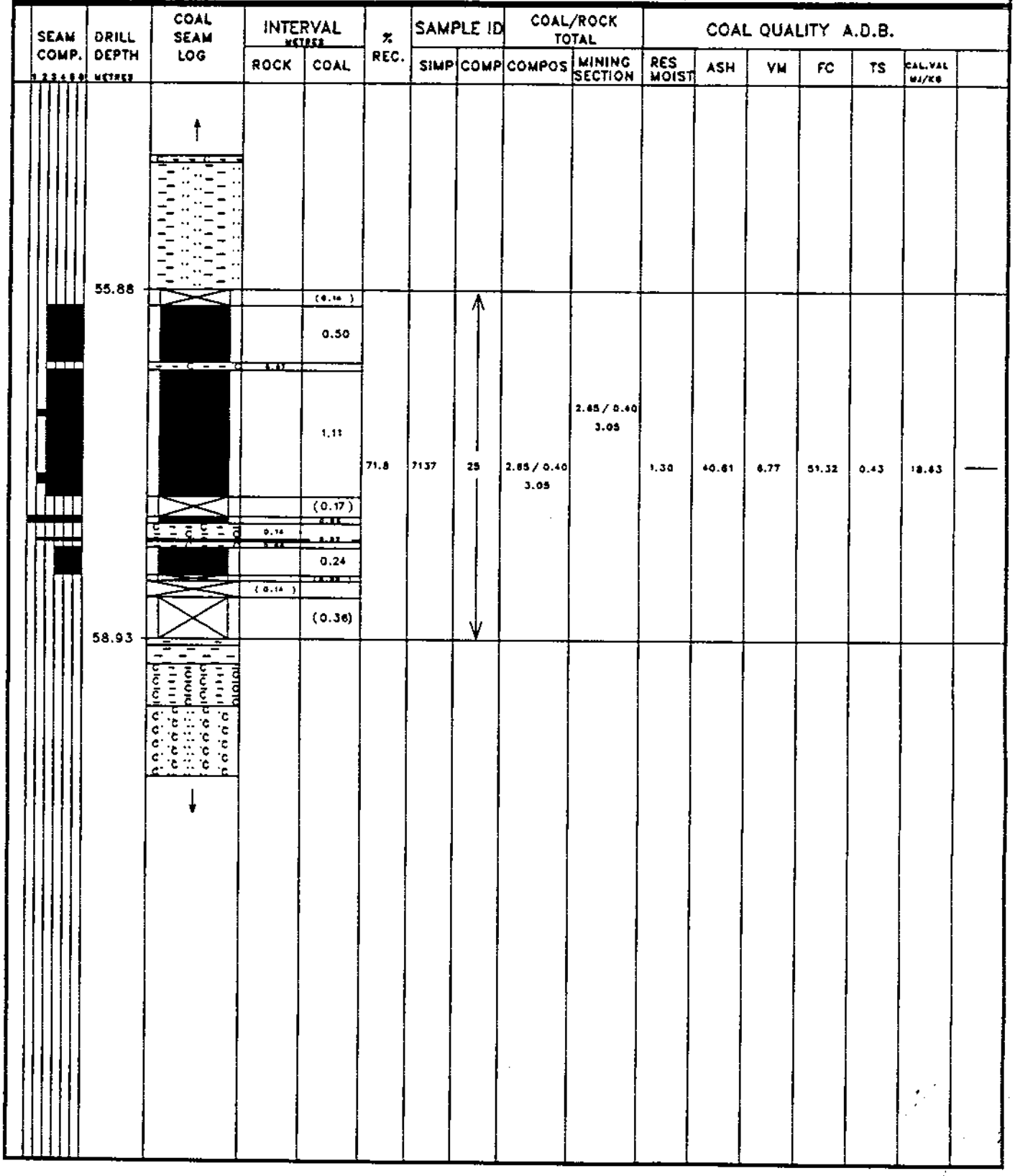
PAGE : 3 / 3

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87005 SEAM : K TOTAL INTERVAL(M) : 49.66 – 58.93 ELEVATION(M) : 1452.2
INTERVAL(M) : 55.88 – 58.93
GEOLOGIST : LEDOA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
1 2 3 4 5 6																
	55.88			(0.14)												
				0.50												
									2.65 / 0.40							
				1.11					3.05							
					71.8	7137	25	2.65 / 0.40		1.30	40.61	6.77	51.32	0.43	18.63	—
								3.05								
				(0.17)												
			0.14													
				0.24												
			(0.14)													
	58.93			(0.36)												

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87005
Coal zone:	K		
Field sample no.:	07135	Composite sample no.:	23
Lab sample no.:	30632-1		
True sample thickness:	5.013 meters	Drill core recovery(%):	66.86 %
Coal/Rock:	4.704 / 0.309 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	22.09	25.76	24.35	17.49
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.51	3.80		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.95	
Ash(%):	29.26	29.54
Volatile matter(%):	7.18	7.25
Fixed carbon(%):	62.61	63.21
Total sulphur(%):	0.46	0.46
Combustible sulphur(%):	0.13	
Net calorific value(cal/g):	5378.00	5429.00
Gross calorific value(cal/g):	5378.00	5429.00
Volatile matter(dmmf%):	7.00	
Hardgrove index:	55.00	
Specific gravity:	1.61	
Carbon dioxide(%):	2.62	
Phosphorous in coal(%):	0.072	
Chlorine in coal(ppm):	170.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.44

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	63.24	63.85
Hydrogen(%):	2.05	2.07
Nitrogen(%):	0.79	0.80
Oxygen(%):	3.25	3.28

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1267.00	1208.00
Softening temperature(°C):	1278.00	1235.00
Hemispherical temperature(°C):	1289.00	1248.00
Final temperature(°C):	1332.00	1321.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	57.63	TiO2(%):	1.01
Al2O3(%):	19.17	Na2O(%):	1.87
Fe2O3(%):	5.65	K2O(%):	0.97
CaO(%):	4.08	SO3(%):	2.80
MgO(%):	2.75	P2O5(%):	0.56

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87005
Coal zone:	K		
Field sample no.:	07137	Composite sample no.:	25
Lab sample no.:	30632-1		
True sample thickness:	3.047 meters	Drill core recovery (%):	71.80 %
Coal/Rock:	2.647 / 0.400 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	19.88	18.61	14.27	29.26
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	11.26	6.72		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.30	
Ash (%):	40.61	41.15
Volatile matter (%):	6.77	6.86
Fixed carbon (%):	51.32	51.99
Total sulphur (%):	0.43	0.44
Combustible sulphur (%):	0.13	
Net calorific value (cal/g):	4453.00	4511.00
Gross calorific value (cal/g):	4453.00	4511.00
Volatile matter (dmmf%):	6.20	
Hardgrove index:	66.00	
Specific gravity:	1.71	
Carbon dioxide (%):	2.26	
Phosphorous in coal (%):	0.021	
Forms of Sulphur (%):	PYRITE 00.05	SULPHATE 00.00 ORGANIC 00.38

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	51.99	52.68
Hydrogen (%):	1.83	1.85
Nitrogen (%):	0.65	0.66
Oxygen (%):	3.19	3.22

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1315.00	1229.00
Softening temperature (°C):	1348.00	1299.00
Hemispherical temperature (°C):	1364.00	1315.00
Final temperature (°C):	1426.00	1420.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	62.85	TiO2 (%):	1.00
Al2O3 (%):	18.20	Na2O (%):	1.37
Fe2O3 (%):	3.19	K2O (%):	1.71
CaO (%):	3.00	SO3 (%):	1.85
MgO (%):	2.92	P2O5 (%):	0.12

gcri coal division ash fusion proj KFN BLK LR DB DDH87005

sample id 00023
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1299.0	initial temp.(C)	1224.0
softening temp.(C)	1342.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1359.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1429.0	fluid temp.(C)	1412.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87005

sample id 00023
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.70
aluminium oxide %	(al2o3)	21.10
ferric oxide %	(fe2o3)	4.78
titanium dioxide %	(tio2)	1.09
phosphorous pentoxide %	(p2o5)	0.59
calcium oxide %	(cao)	2.86
magnesium oxide %	(mgo)	2.30
sulphur trioxide %	(so3)	2.35
sodium oxide %	(na2o)	1.87
potassium oxide %	(k2o)	0.82

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00023
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1380.0	initial temp.(C)	1310.0
softening temp.(C)	1439.0	softening temp.(C)	1391.0
hemispherical temp.(C)	1445.0	hemispherical temp.(C)	1399.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00023
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.51
aluminium oxide %	(al2o3)	23.42
ferric oxide %	(fe2o3)	4.32
titanium dioxide %	(tio2)	1.09
phosphorous pentoxide %	(p2o5)	0.46
calcium oxide %	(cao)	2.43
magnesium oxide %	(mgo)	1.99
sulphur trioxide %	(so3)	1.76
sodium oxide %	(na2o)	1.85
potassium oxide %	(k2o)	0.70

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00025
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1417.0	initial temp.(C)	1358.0
softening temp.(C)	1471.0	softening temp.(C)	1399.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1415.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00025
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	62.30
aluminium oxide %	(al2o3)	21.17
ferric oxide %	(fe2o3)	3.68
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	0.15
calcium oxide %	(cao)	1.48
magnesium oxide %	(mgo)	2.91
sulphur trioxide %	(so3)	1.24
sodium oxide %	(na2o)	1.48
potassium oxide %	(k2o)	1.84

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00025
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1453.0	initial temp.(C)	1399.0
softening temp.(C)	1472.0	softening temp.(C)	1428.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1450.0
fluid temp.(C)	1472.0	fluid temp.(C)	1470.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00025
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	57.52
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	4.15
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	0.12
calcium oxide %	(cao)	1.26
magnesium oxide %	(mgo)	3.15
sulphur trioxide %	(so3)	0.98
sodium oxide %	(na2o)	1.43
potassium oxide %	(k2o)	1.65

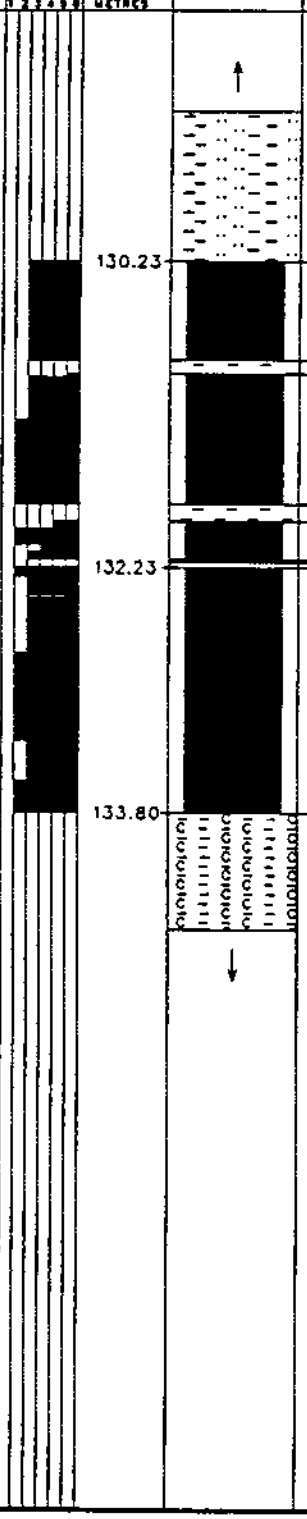
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87005 SEAM : 1 INTERVAL(M) : 130.23 – 133.80 ELEVATION(M) : 1452.2

GEOLOGIST : LEDOA SCALE: 1:40 DATE : FEB 29/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6	130.23			0.62											
			0.09												
				0.82	100.0	7140	26	1.67 / 0.24 1.91		1.27	35.45	7.86	55.62	0.26	20.18
			0.11												
				0.24					3.20 / 0.24 3.44						
	132.23		0.13												
				1.53	100.0	7141	27	1.53 / 0.00 1.53		0.84	12.60	7.08	79.70	0.41	28.71
	133.80														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87005
Coal zone:	I		
Field sample no.:	07140	Composite sample no.:	26
Lab sample no.:	30632-1		
True sample thickness:	1.913 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	1.673 / 0.240 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	18.97	19.09	20.19	20.82
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	12.96	7.97		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.27	
Ash (%):	35.45	35.91
Volatile matter (%):	7.66	7.76
Fixed carbon (%):	55.62	56.33
Total sulphur (%):	0.26	0.26
Combustible sulphur (%):	0.03	
Net calorific value (cal/g):	4825.00	4888.00
Gross calorific value (cal/g):	4825.00	4888.00
Volatile matter (dmmf%):	7.90	
Hardgrove index:	64.00	
Specific gravity:	1.68	
Carbon dioxide (%):	3.49	
Phosphorous in coal (%):	0.043	
Chlorine in coal (ppm):	48.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.24

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	57.15	57.89
Hydrogen (%):	1.76	1.78
Nitrogen (%):	0.68	0.69
Oxygen (%):	3.43	3.47

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1267.00	1219.00
Softening temperature (°C):	1286.00	1229.00
Hemispherical temperature (°C):	1326.00	1246.00
Final temperature (°C):	1350.00	1342.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	57.07	TiO2 (%):	0.94
Al2O3 (%):	19.56	Na2O (%):	2.73
Fe2O3 (%):	6.12	K2O (%):	0.81
CaO (%):	2.34	SO3 (%):	1.61
MgO (%):	4.28	P2O5 (%):	0.28

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87005
Coal zone:	1		
Field sample no.:	07141	Composite sample no.:	27
Lab sample no.:	30632-1		
True sample thickness:	1.531 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	1.531 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	12.04	19.98	16.77	32.67	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	11.03	7.51			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.64	
Ash (%):	12.60	12.68
Volatile matter (%):	7.06	7.11
Fixed carbon (%):	79.70	80.21
Total sulphur (%):	0.41	0.41
Combustible sulphur (%):	0.24	
Net calorific value (cal/g):	6861.00	6905.00
Gross calorific value (cal/g):	6862.00	6906.00
Volatile matter (dmmf%):	6.90	
Hardgrove index:	61.00	
Specific gravity:	1.44	
Carbon dioxide (%):	1.26	
Phosphorous in coal (%):	0.194	
Chlorine in coal (ppm):	2182.00	
Forms of Sulphur (%):	PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.39	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	80.26	80.77
Hydrogen (%):	2.48	2.50
Nitrogen (%):	0.91	0.92
Oxygen (%):	2.70	2.72

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1305.00	1195.00
Softening temperature (°C):	1310.00	1240.00
Hemispherical temperature (°C):	1313.00	1246.00
Final temperature (°C):	1345.00	1307.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	46.97	TiO2 (%):	1.03
Al2O3 (%):	21.33	Na2O (%):	1.45
Fe2O3 (%):	6.36	K2O (%):	1.00
CaO (%):	6.79	SO3 (%):	3.39
MgO (%):	3.94	P2O5 (%):	3.52

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00026
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1267.0	initial temp.(C)	1240.0
softening temp.(C)	1272.0	softening temp.(C)	1246.0
hemispherical temp.(C)	1283.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1348.0	fluid temp.(C)	1278.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00026
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	56.18
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.42
titanium dioxide %	(tio2)	0.99
phosphorous pentoxide %	(p2o5)	0.47
calcium oxide %	(cao)	4.23
magnesium oxide %	(mgo)	3.52
sulphur trioxide %	(so3)	3.03
sodium oxide %	(na2o)	1.81
potassium oxide %	(k2o)	0.79

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00026
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1272.0	initial temp.(C)	1224.0
softening temp.(C)	1291.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1299.0	hemispherical temp.(C)	1257.0
fluid temp.(C)	1369.0	fluid temp.(C)	1291.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00026
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	59.06
aluminium oxide %	(al2o3)	19.52
ferric oxide %	(fe2o3)	4.08
titanium dioxide %	(tio2)	0.59
phosphorous pentoxide %	(p2o5)	0.51
calcium oxide %	(cao)	3.92
magnesium oxide %	(mgo)	3.27
sulphur trioxide %	(so3)	2.58
sodium oxide %	(na2o)	1.73
potassium oxide %	(k2o)	0.70

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00027
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1205.0
softening temp.(C)	1299.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1326.0	hemispherical temp.(C)	1291.0
fluid temp.(C)	1431.0	fluid temp.(C)	1404.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00027
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	47.17
aluminium oxide %	(al2o3)	26.79
ferric oxide %	(fe2o3)	3.87
titanium dioxide %	(tio2)	1.29
phosphorous pentoxide %	(p2o5)	2.33
calcium oxide %	(cao)	5.57
magnesium oxide %	(mgo)	3.33
sulphur trioxide %	(so3)	2.75
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	1.08

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00027
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1227.0	initial temp.(C)	1189.0
softening temp.(C)	1385.0	softening temp.(C)	1342.0
hemispherical temp.(C)	1417.0	hemispherical temp.(C)	1380.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00027
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	47.46
aluminium oxide %	(al2o3)	27.66
ferric oxide %	(fe2o3)	2.98
titanium dioxide %	(tio2)	1.10
phosphorous pentoxide %	(p2o5)	2.22
calcium oxide %	(cao)	4.66
magnesium oxide %	(mgo)	2.71
sulphur trioxide %	(so3)	1.63
sodium oxide %	(na2o)	1.60
potassium oxide %	(k2o)	0.99

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87005 SEAM : H INTERVAL(M) : 182.40 – 184.30 ELEVATION(M) : 1452.2

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 29/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	182.40														
			0.02	0.10											
			0.02	0.17											
			0.10												
				0.24											
			0.08		83.1	7144	28	1.04 / 0.38	1.04 / 0.38	1.12	68.84	9.22	20.82	0.15	7.56
				(0.10)				1.42	1.42						
			0.18												
				(0.14)											
				0.25											
	184.30														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLKDDH87005
Coal zone:	H		
Field sample no.:	07144	Composite sample no.:	28
Lab sample no.:	30632-1		
True sample thickness:	1.416 meters	Drill core recovery(%):	82.63 %
Coal/Rock:	1.039 / 0.377 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	30.55	22.91	16.75	23.32
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.34	2.13		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.12	
Ash(%):	68.84	69.62
Volatile matter(%):	9.22	9.32
Fixed carbon(%):	20.82	21.06
Total sulphur(%):	0.15	0.15
Combustible sulphur(%):	0.11	
Net calorific value(cal/g):	1807.00	1827.00
Gross calorific value(cal/g):	1807.00	1827.00
Volatile matter(dmmf%):	15.00	
Hardgrove index:	65.00	
Specific gravity:	2.25	
Carbon dioxide(%):	6.31	
Phosphorous in coal(%):	0.219	
Chlorine in coal(ppm):	2152.00	
Forms of Sulphur(%):	PYRITE 00.06 SULPHATE 00.00 ORGANIC 00.09	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	25.12	25.40
Hydrogen(%):	0.93	0.94
Nitrogen(%):	0.30	0.30
Oxygen(%):	3.54	3.59

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1240.00	1195.00
Softening temperature(°C):	1256.00	1205.00
Hemispherical temperature(°C):	1273.00	1221.00
Final temperature(°C):	1334.00	1291.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.70	TiO2(%):	0.58
Al2O3(%):	15.37	Na2O(%):	1.53
Fe2O3(%):	6.92	K2O(%):	0.85
CaO(%):	4.59	SO3(%):	0.96
MgO(%):	4.02	P2O5(%):	0.73

scri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00028
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1342.0	initial temp.(C)	1283.0
softening temp.(C)	1375.0	softening temp.(C)	1321.0
hemispherical temp.(C)	1407.0	hemispherical temp.(C)	1369.0
fluid temp.(C)	1450.0	fluid temp.(C)	1444.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00028
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.92
aluminium oxide %	(al2o3)	24.16
ferric oxide %	(fe2o3)	3.49
titanium dioxide %	(tio2)	1.10
phosphorous pentoxide %	(p2o5)	0.49
calcium oxide %	(cao)	2.03
magnesium oxide %	(mgo)	2.52
sulphur trioxide %	(so3)	0.95
sodium oxide %	(na2o)	2.18
potassium oxide %	(k2o)	1.36

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87005

sample id 00028
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1375.0	initial temp.(C)	1181.0
softening temp.(C)	1439.0	softening temp.(C)	1342.0
hemispherical temp.(C)	1442.0	hemispherical temp.(C)	1412.0
fluid temp.(C)	1455.0	fluid temp.(C)	1451.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87005

sample id 00028
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.47
aluminium oxide %	(al2o3)	26.11
ferric oxide %	(fe2o3)	3.34
titanium dioxide %	(tio2)	1.12
phosphorous pentoxide %	(p2o5)	0.46
calcium oxide %	(cao)	1.92
magnesium oxide %	(mgo)	2.55
sulphur trioxide %	(so3)	0.76
sodium oxide %	(na2o)	2.14
potassium oxide %	(k2o)	1.36

90.0 <= total <= 100.0

KPNLRDDH87006

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87006 DATE - 03/01/88

- H I S T O R Y -

START DATE - 08/31/87
END DATE - 09/03/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTS SEAMS I, H/I, H. SITE J.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1462.33
ZONE - 9
NORTHING - 6345329.93
EASTING - 508433.08

LICENCE/LEASE NUMBER -

LATITUDE - 571510
LONGITUDE - 1285137

- O R I E N T A T I O N -

LENGTH - 153.76
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 6.10
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87006										
		6819	120.40	120.57	100.00		0.154			0.000- 0.154
	H	6821	145.02	146.46	100.00	1.280				1.280- 0.000
		6822	146.46	146.66	100.00		0.186			0.000- 0.186
		7146	93.65	93.75	100.00		0.056			0.000- 0.056
	I	7147	93.75	97.47	43.28	0.553	0.236	0.406	0.633	0.959- 0.869
		7148	97.47	98.21	100.00		0.302			0.000- 0.302
		7149	117.43	117.94	100.00		0.469			0.000- 0.469
	H/I	7150	117.94	120.40	73.98	1.661		0.585		2.246- 0.000

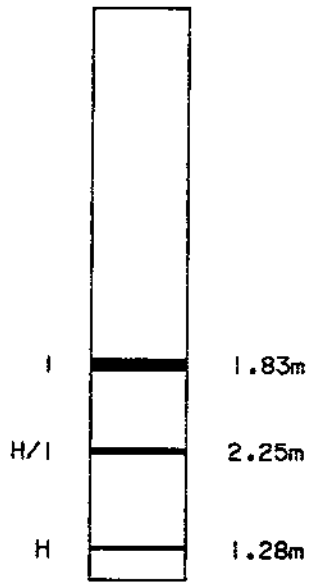
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
DDH87006												
	I	29	7147	7147	93.75	97.47	43.27	1.13	0.48	0.89	1.22	2.02- 1.70
	H/I	30	7150	7150	117.94	120.40	73.98	1.82	0.00	0.64	0.00	2.46- 0.00
	H	31	6821	6821	145.02	146.46	100.00	1.44	0.00	0.00	0.00	1.44- 0.00
	H/I	215	7150	7150	117.94	120.40	73.98	1.82	0.00	0.64	0.00	2.46- 0.00
	H	216	6821	6821	145.02	146.46	100.00	1.44	0.00	0.00	0.00	1.44- 0.00
	H/I	410	7150	7150	117.94	120.40	73.98	1.82	0.00	0.64	0.00	2.46- 0.00
	H	411	6821	6821	145.02	146.46	100.00	1.44	0.00	0.00	0.00	1.44- 0.00



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87006

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87006 SEAM : 1 INTERVAL(M) : 93.75 - 97.47 ELEVATION(M) : 1462.3

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	93.75			0.13												
			(0.20)													
				0.11												
			(0.28)													
				(0.04)												
				0.21	43.2	7147	28	0.96/ 0.87	0.96/ 0.87	0.80	72.84	7.54	19.02	—	6.74	—
			(0.16)					1.83	1.83							
				(0.19)												
				0.03												
				0.21												
	97.47			(0.18)												

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87006 SEAM : H/1 INTERVAL(M) : 117.94 – 120.40 ELEVATION(M) : 1462.3

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	117.94			0.76												
				(0.59)	74.0	7150	30	2.25 / 0.00 2.25	2.25 / 0.00 2.25	1.10	38.56	8.74	53.60	3.77	18.59	—
				0.90												
	120.40															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87006
Coal zone:	H/I		
Field sample no.:	07150	Composite sample no.:	30
Lab sample no.:	30637		
True sample thickness:	2.246 meters	Drill core recovery(%):	73.98 %
Coal/Rock:	2.246 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	22.92	28.24	18.12	24.53
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.03	2.16		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.10	
Ash(%):	38.56	38.99
Volatile matter(%):	6.74	6.81
Fixed carbon(%):	53.60	54.20
Total sulphur(%):	3.77	3.81
Combustible sulphur(%):	3.53	
Net calorific value(cal/g):	4443.00	4492.00
Gross calorific value(cal/g):	4443.00	4492.00
Volatile matter(dmmf%):	3.90	
Hardgrove index:	53.00	
Specific gravity:	1.67	
Carbon dioxide(%):	1.12	
Phosphorous in coal(%):	0.064	
Chlorine in coal(ppm):	3830.00	

Forms of Sulphur(%): PYRITE 02.55 SULPHATE 00.07 ORGANIC 01.15

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	51.01	51.58
Hydrogen(%):	1.98	2.00
Nitrogen(%):	0.66	0.67
Oxygen(%):	2.92	2.95

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1213.00	1165.00
Softening temperature(°C):	1326.00	1205.00
Hemispherical temperature(°C):	1337.00	1227.00
Final temperature(°C):	1434.00	1321.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	53.99	TiO2(%):	1.10
Al2O3(%):	19.94	Na2O(%):	1.60
Fe2O3(%):	9.47	K2O(%):	1.34
CaO(%):	2.51	SO3(%):	1.53
MgO(%):	2.40	P2O5(%):	0.38

(1)

tri coal division ash fusion proj KPN BLK LR DB DDH87006

mple id 00030
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1216.0	initial temp.(C)	1205.0
softening temp.(C)	1326.0	softening temp.(C)	1246.0
emispherical temp.(C)	1334.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1401.0	fluid temp.(C)	1377.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KPN BLK LR DB DDH87006

mple id 00030
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	48.88
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	11.18
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	0.68
calcium oxide %	(cao)	2.18
magnesium oxide %	(mgo)	2.69
sulphur trioxide %	(so3)	1.37
sodium oxide %	(na2o)	1.73
potassium oxide %	(k2o)	1.08

90.0 <= total <= 100.0

(2)

ri coal division ash fusion proj KPN BLK LR DB DIH87004

mple id 00030
mple product id SP1 data type (real,boro,aver,calc) REAL
.it sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1240.0	initial temp.(C)	1162.0
softening temp.(C)	1356.0	softening temp.(C)	1284.0
amispherical temp.(C)	1428.0	hamispherical temp.(C)	1348.0
fluid temp.(C)	1472.0	fluid temp.(C)	1471.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

ri coal division ash mineral proj KPN BLK LR DB DIH87004

mple id 00030
mple product id SP1 data type (real,boro,aver,calc) REAL
.it sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	50.71
aluminium oxide %	(al2o3)	26.40
ferric oxide %	(fe2o3)	8.21
titanium dioxide %	(tio2)	1.03
phosphorous pentoxide %	(p2o5)	0.58
calcium oxide %	(cao)	2.05
magnesium oxide %	(mgo)	2.61
sulphur trioxide %	(so3)	1.41
sodium oxide %	(na2o)	1.85
potassium oxide %	(k2o)	1.08

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87006 SEAM : H INTERVAL(M) : 145.02 – 146.46 ELEVATION(M) : 1462.3

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	145.02			1.28	100.0	6821	31	1.28 / 0.00 1.28	1.28 / 0.00 1.28	0.61	17.73	6.28	75.37	0.31	27.01	——
	146.46															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87006
Coal zone:	H		
Field sample no.:	06821	Composite sample no.:	31
Lab sample no.:	30637		
True sample thickness:	1.280 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	1.280 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	8.15	16.61	22.32	36.47
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	10.21	6.24		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.61	
Ash(%):	17.73	17.84
Volatile matter(%):	6.29	6.33
Fixed carbon(%):	75.37	75.83
Total sulphur(%):	0.51	0.51
Combustible sulphur(%):	0.20	
Net calorific value(cal/g):	6455.00	6495.00
Gross calorific value(cal/g):	6455.00	6495.00
Volatile matter(dmmf%):	5.90	
Hardgrove index:	48.00	
Specific gravity:	1.48	
Carbon dioxide(%):	1.44	
Phosphorous in coal(%):	0.273	
Chlorine in coal(ppm):	128.00	

Forms of Sulphur(%): PYRITE 00.06 SULPHATE 00.00 ORGANIC 00.45

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	75.06	75.52
Hydrogen(%):	2.30	2.31
Nitrogen(%):	0.77	0.77
Oxygen(%):	3.02	3.05

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1332.00	1315.00
Softening temperature(°C):	1342.00	1321.00
Hemispherical temperature(°C):	1348.00	1326.00
Final temperature(°C):	1417.00	1391.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	44.40	TiO2(%):	1.02
Al2O3(%):	20.94	Na2O(%):	1.12
Fe2O3(%):	4.77	K2O(%):	1.48
CaO(%):	9.27	SO3(%):	4.37
MgO(%):	3.73	P2O5(%):	3.53

ri coal division ash fusion proj KPN BLK LR DB DDH87006

mple id 00031
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1242.0	initial temp.(C)	1261.0
softening temp.(C)	1305.0	softening temp.(C)	1286.0
hemispherical temp.(C)	1310.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1340.0	fluid temp.(C)	1334.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

ri coal division ash mineral proj KPN BLK LR DB DDH87006

mple id 00031
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	42.51
aluminium oxide %	(al2o3)	24.84
ferric oxide %	(fe2o3)	5.33
titanium dioxide %	(tio2)	1.02
phosphorous pentoxide %	(p2o5)	2.77
calcium oxide %	(cao)	8.24
magnesium oxide %	(mgo)	3.99
sulphur trioxide %	(so3)	3.95
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

csiro coal division ash fusion proj KPN BLK LR DS DDH87006

sample id 00031
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1332.0	initial temp.(C)	1262.0
softening temp.(C)	1334.0	softening temp.(C)	1310.0
hemispherical temp.(C)	1337.0	hemispherical temp.(C)	1315.0
fluid temp.(C)	1353.0	fluid temp.(C)	1352.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

csiro coal division ash mineral proj KPN BLK LR DS DDH87006

sample id 00031
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	46.27
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	4.53
titanium dioxide %	(tio2)	0.95
phosphorous pentoxide %	(p2o5)	2.14
calcium oxide %	(cao)	7.10
magnesium oxide %	(mgo)	3.04
sulphur trioxide %	(so3)	3.06
sodium oxide %	(na2o)	1.87
potassium oxide %	(k2o)	1.39

90.0 <= total <= 100.0

KPNLRDDH87007

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87007 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/03/87
END DATE - 09/07/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - BARKER

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED SEAMS K?, I?, H?, H LOWER?, PH? (ALL W / FAULT BRECCIA) AND G? SEAM. SITE R.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1694.47

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6343325.08
EASTING - 505991.54

LATITUDE - 571406
LONGITUDE - 1285403

- O R I E N T A T I O N -

LENGTH - 204.76

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 9.75
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87007										
		6837	10.98	11.45	100.00		0.302			0.000- 0.302
	K?	6838	11.45	20.80	25.24	0.816	0.700	4.493		5.309- 0.700
		6839	20.80	23.52	71.69		1.253		0.495	0.000- 1.748
		6840	77.57	77.75	100.00		0.133			0.000- 0.133
	I?	6841	77.75	80.82	70.36	1.185	0.385	0.521	0.137	1.706- 0.522
		6842	80.82	81.11	100.00		0.207			0.000- 0.207
	H?	6844	91.32	96.19	90.76	1.813	0.855	0.117	0.147	1.930- 1.002
		6845	96.19	99.14	93.56		1.560		0.110	0.000- 1.670
	H LOWER	6846	99.14	101.29	90.23	1.007	0.043	0.087	0.027	1.094- 0.070
		6847	101.29	101.51	100.00		0.117			0.000- 0.117
		6848	119.79	121.35	100.00		1.429			0.000- 1.429
	PH?	6849	121.35	122.85	98.67	1.328		0.018		1.346- 0.000
		6850	122.85	123.02	100.00		0.151			0.000- 0.151
		6851	192.11	192.62	100.00	0.047	0.433			0.047- 0.433
	G?	6852	192.62	193.93	84.73	1.044		0.188		1.232- 0.000
	G?	6853	193.93	195.50	100.00	1.100	0.376			1.100- 0.376
	G?	6854	195.50	197.55	89.76	0.263	1.466	0.197		0.460- 1.466
		6855	197.55	198.93	100.00		1.296			0.000- 1.296

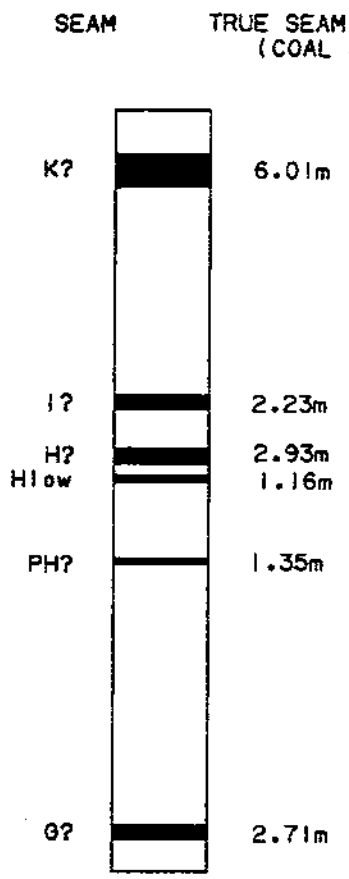
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
DDH87007												
	K	32	6838	6838	11.45	20.80	25.24	1.27	1.09	6.99	0.00	8.26- 1.09
	I	33	6841	6841	77.75	80.82	70.35	1.63	0.53	0.72	0.19	2.35- 0.72
	H/H LOW	34	6844	6844	91.32	96.19	90.75	3.02	1.40	0.20	0.25	3.22- 1.65
	H/H LOW	35	6845	6845	96.19	99.14	93.55	0.00	2.76	0.00	0.19	0.00- 2.95
	H/H LOW	36	6846	6846	99.14	101.29	90.23	1.86	0.08	0.16	0.05	2.02- 0.13
	PH	37	6849	6849	121.35	122.85	98.66	1.48	0.00	0.02	0.00	1.50- 0.00
	G	38	6852	6853	192.62	195.50	93.05	2.28	0.40	0.20	0.00	2.48- 0.40
	G	39	6854	6854	195.50	197.55	89.75	0.28	1.56	0.21	0.00	0.49- 1.56
	I	217	6841	6841	77.75	80.82	70.35	1.63	0.53	0.72	0.19	2.35- 0.72
	H	218	6844	6844	91.32	96.19	90.75	3.02	1.40	0.20	0.25	3.22- 1.65
	H (low)	219	6846	6846	99.14	101.29	90.23	1.86	0.08	0.16	0.05	2.02- 0.13
	Ph	220	6849	6849	121.35	122.85	98.66	1.48	0.00	0.02	0.00	1.50- 0.00
	G	221	6852	6853	192.62	195.50	93.05	2.28	0.40	0.20	0.00	2.48- 0.40
	I	412	6841	6841	77.75	80.82	70.35	1.63	0.53	0.72	0.19	2.35- 0.72
	H	413	6844	6844	91.32	96.19	90.75	3.02	1.40	0.20	0.25	3.22- 1.65
	H (low)	414	6846	6846	99.14	101.29	90.23	1.86	0.08	0.16	0.05	2.02- 0.13
	Ph	415	6849	6849	121.35	122.85	98.66	1.48	0.00	0.02	0.00	1.50- 0.00
	G	416	6852	6853	192.62	195.50	93.05	2.28	0.40	0.20	0.00	2.48- 0.40



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87007

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1:[205057]88007201 2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

COAL DIVISION

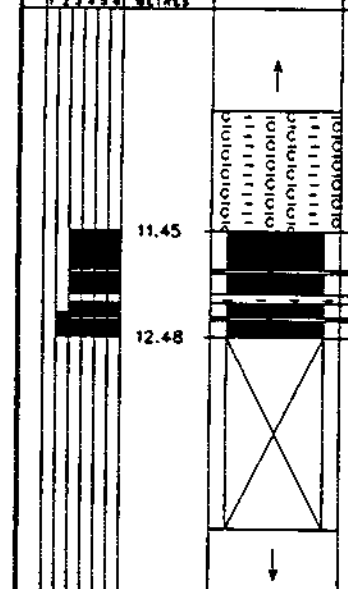
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : K TOTAL INTERVAL(M) : 11.45 - 20.80 ELEVATION(M) : 1694.5

GEOLOGIST : BARKER SCALE: 1:40 INTERVAL(M) : 11.45 - 12.48 DATE : MAR 07/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	11.45			0.24											
			0.07	0.14	100.0	6838	32								
			0.23	0.09											
	12.48		0.03	0.18											

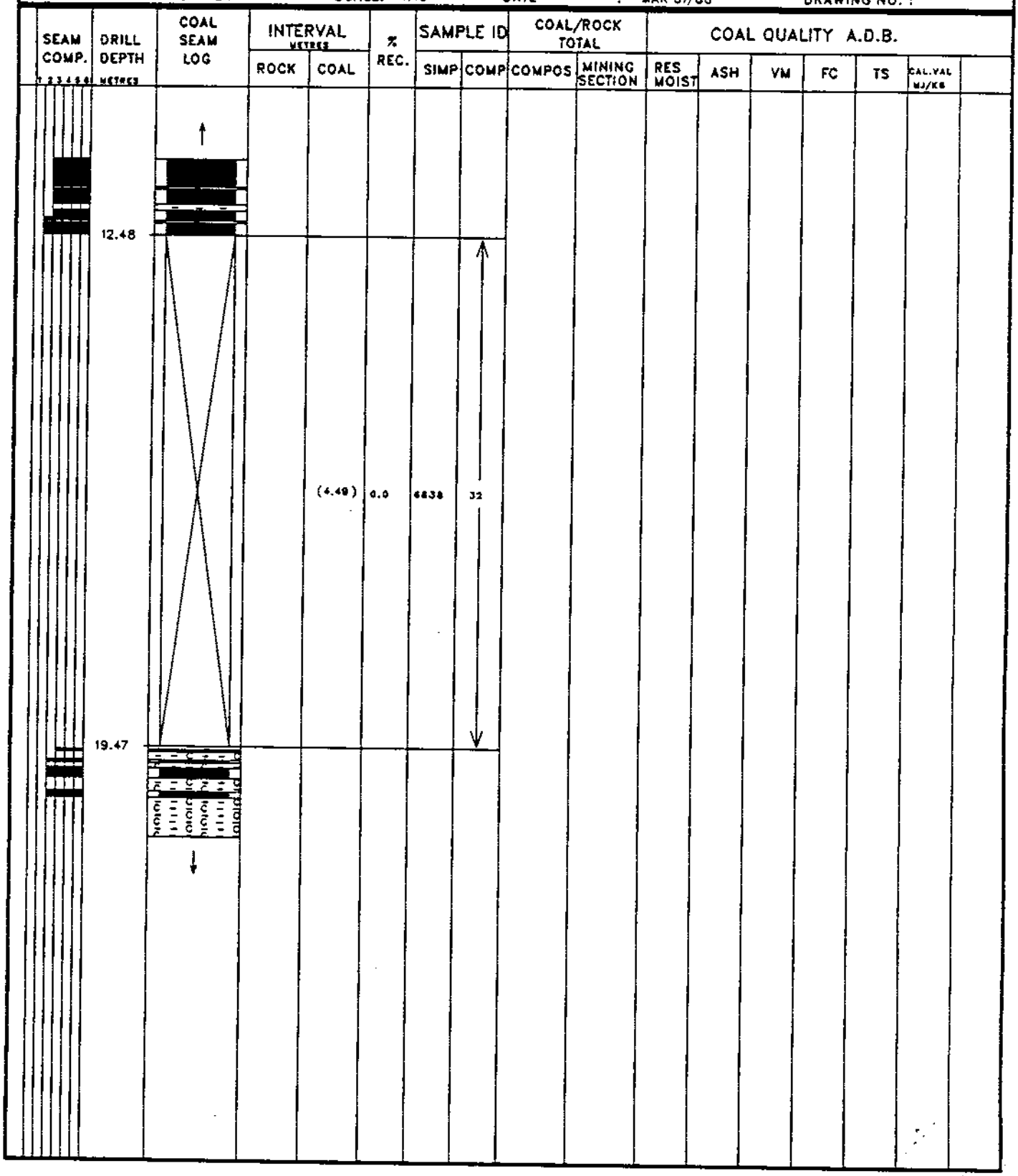
GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : K TOTAL INTERVAL(M) : 11.45 – 20.80 ELEVATION(M) : 1694.5
INTERVAL(M) : 12.48 – 19.47
GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	12.48			(4.49)	0.0	6838	32								
	19.47														

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : K TOTAL INTERVAL(M) : 11.45 - 20.80 ELEVATION(M) : 1694.5
INTERVAL(M) : 19.47 - 20.80
GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :

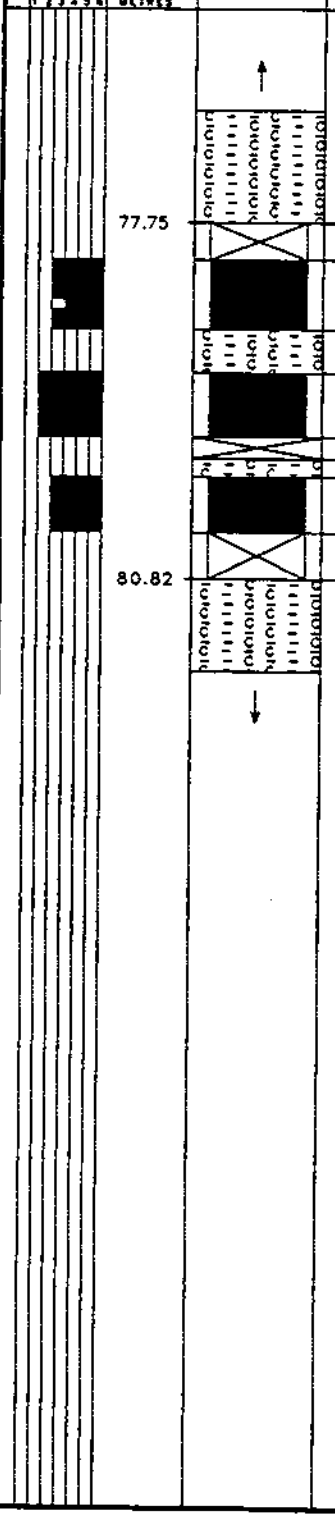
SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	19.47			0.35	100.0	6838	32	5.31 / 0.70 8.01	5.31 / 0.70 8.01	2.05	56.90	9.05	32.00	—	11.18	—
	20.80															

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : 1 INTERVAL(M) : 77.75 – 80.82 ELEVATION(M) : 1694.5

GEOLOGIST : BARKER SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	77.75			(0.23)											
				0.43											
			0.27												
				0.40	70.5	6841	33	1.71 / 0.52 2.23	1.71 / 0.52 2.23	1.44	48.26	4.88	45.42	0.58	15.04
			(0.14) 0.13												
				0.35											
				(0.29)											
	80.82														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87007
Coal zone:	1		
Field sample no.:	06841	Composite sample no.:	33
Lab sample no.:	30667		
True sample thickness:	2.228 meters	Drill core recovery (%):	70.35 %
Coal/Rock:	1.706 / 0.522 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	13.38	19.62	17.38	30.13
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	12.10	7.39		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.44	
Ash (%):	48.26	48.96
Volatile matter (%):	4.88	4.95
Fixed carbon (%):	45.42	46.09
Total sulphur (%):	0.58	0.59
Combustible sulphur (%):	0.44	
Net calorific value (cal/g):	3595.00	3647.00
Gross calorific value (cal/g):	3595.00	3647.00
Volatile matter (dmmf%):	1.80	
Hardgrove index:	73.00	
Specific gravity:	1.74	
Carbon dioxide (%):	0.48	
Phosphorous in coal (%):	0.088	
Chlorine in coal (ppm):	3470.00	

Forms of Sulphur (%): PYRITE 00.22 SULPHATE 00.01 ORGANIC 00.35

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	44.27	44.92
Hydrogen (%):	1.12	1.14
Nitrogen (%):	0.48	0.49
Oxygen (%):	3.85	3.90

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1340.00	1286.00
Softening temperature (°C):	1361.00	1310.00
Hemispherical temperature (°C):	1392.00	1337.00
Final temperature (°C):	1429.00	1408.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	67.64	TiO2 (%):	1.42
Al2O3 (%):	17.39	Na2O (%):	1.19
Fe2O3 (%):	4.08	K2O (%):	1.97
CaO (%):	0.90	SO3 (%):	0.71
MgO (%):	1.62	P2O5 (%):	0.42

;cri coal division ash fusion proj KFN BLK LR DE DDH87007

sample id 00033
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1248.0
softening temp.(C)	1348.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1361.0	hemispherical temp.(C)	1297.0
fluid temp.(C)	1432.0	fluid temp.(C)	1342.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

;cri coal division ash mineral proj KFN BLK LR DE DDH87007

sample id 00033
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	64.54
aluminium oxide %	(al2o3)	18.52
ferric oxide %	(fe2o3)	5.01
titanium dioxide %	(tio2)	1.49
phosphorous pentoxide %	(p2o5)	0.89
calcium oxide %	(cao)	1.68
magnesium oxide %	(mgo)	2.16
sulphur trioxide %	(so3)	0.62
sodium oxide %	(na2o)	1.32
potassium oxide %	(k2o)	1.52

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87007

sample id 00033
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1324.0	initial temp.(C)	1216.0
softening temp.(C)	1363.0	softening temp.(C)	1248.0
hemispherical temp.(C)	1379.0	hemispherical temp.(C)	1289.0
fluid temp.(C)	1424.0	fluid temp.(C)	1380.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87007

sample id 00033
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	57.76
aluminium oxide %	(al2o3)	20.66
ferric oxide %	(fe2o3)	6.48
titanium dioxide %	(tio2)	1.14
phosphorous pentoxide %	(p2o5)	1.08
calcium oxide %	(cao)	2.07
magnesium oxide %	(mgo)	2.84
sulphur trioxide %	(so3)	0.87
sodium oxide %	(na2o)	1.37
potassium oxide %	(k2o)	1.38

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : H/H LOWTOTAL INTERVAL(M) : 91.32 - 101.29 ELEVATION(M) : 1694.5
INTERVAL(M) : 91.32 - 98.19
GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	91.32			0.19	91.0	6844	34	1.93 / 1.00 2.93		1.77	46.62	8.58	44.75	1.21	15.27	—
			0.25													
				0.28												
			0.21													
				0.29												
			0.31													
				0.67												
			(0.16)													
				(0.12)												
				0.39												
	96.19															

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : H/H LOWTOTAL INTERVAL(M) : 91.32 – 101.29 ELEVATION(M) : 1694.5
INTERVAL(M) : 96.19 – 99.14

GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg	
1 2 3 4 5 6																
									1.93 / 1.00 2.93							
	96.19		(0.11)													
			1.56		83.4	6845	35	0.00 / 1.47 1.67		1.18	88.44	9.28	1.09	—	1.15	—
	99.14															

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : H/H LOWTOTAL INTERVAL(M) : 91.32 – 101.29 ELEVATION(M) : 1694.5
INTERVAL(M) : 99.14 – 101.29
GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	99.14			0.37											
				(0.05)											
				0.13	90.2	6646	36	1.08 / 0.07 1.16	1.08 / 0.07 1.16	0.72	41.00	6.23	52.05	0.81	18.85
				0.51											
	101.29														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87007
Coal zone:	H/H LOW		
Field sample no.:	06844	Composite sample no.:	34
Lab sample no.:	30667		
True sample thickness:	2.932 meters	Drill core recovery(%):	90.75 %
Coal/Rock:	1.930 / 1.002 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	12.13	17.47	13.88	30.22
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	14.49	11.81		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.77	
Ash(%):	46.92	47.76
Volatile matter(%):	6.56	6.68
Fixed carbon(%):	44.75	45.56
Total sulphur(%):	1.21	1.23
Combustible sulphur(%):	0.76	
Net calorific value(cal/g):	3650.00	3715.00
Gross calorific value(cal/g):	3650.00	3715.00
Volatile matter(dmmf%):	5.00	
Hardgrove index:	113.00	
Specific gravity:	1.75	
Carbon dioxide(%):	2.21	
Phosphorous in coal(%):	0.064	
Chlorine in coal(ppm):	3312.00	

Forms of Sulphur(%): PYRITE 00.78 SULPHATE 00.04 ORGANIC 00.39

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	45.54	46.36
Hydrogen(%):	1.48	1.51
Nitrogen(%):	0.50	0.51
Oxygen(%):	2.58	2.63

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1261.00	1219.00
Softening temperature(°C):	1287.00	1248.00
Hemispherical temperature(°C):	1332.00	1267.00
Final temperature(°C):	1374.00	1337.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	58.46	TiO2(%):	1.49
Al2O3(%):	19.28	Na2O(%):	1.76
Fe2O3(%):	4.56	K2O(%):	1.55
CaO(%):	3.27	SO3(%):	2.39
MgO(%):	2.33	P2O5(%):	0.31

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87007
Coal zone:	H/H LOW		
Field sample no.:	06846	Composite sample no.:	36
Lab sample no.:	30637		
True sample thickness:	1.164 meters	Drill core recovery(%):	90.23 %
Coal/Rock:	1.094 / 0.070 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	15.49	16.08	15.88	31.14	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	11.65	9.76			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.72	
Ash(%):	41.00	41.30
Volatile matter(%):	6.23	6.28
Fixed carbon(%):	52.05	52.42
Total sulphur(%):	0.81	0.82
Combustible sulphur(%):	0.45	
Net calorific value(cal/g):	4529.00	4562.00
Gross calorific value(cal/g):	4529.00	4562.00
Volatile matter(dmmf%):	4.90	
Hardgrove index:	84.00	
Specific gravity:	1.73	
Carbon dioxide(%):	1.85	
Phosphorous in coal(%):	0.088	
Chlorine in coal(ppm):	240.00	

Forms of Sulphur(%): PYRITE 00.29 SULPHATE 00.00 ORGANIC 00.52

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	53.23	53.62
Hydrogen(%):	1.68	1.69
Nitrogen(%):	0.50	0.50
Oxygen(%):	2.06	2.07

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1227.00	1225.00
Softening temperature(°C):	1353.00	1345.00
Hemispherical temperature(°C):	1391.00	1364.00
Final temperature(°C):	1450.00	1445.00

ASH MINERAL ANALYSIS (AM3)

SiO2(%):	70.63	TiO2(%):	0.69
Al2O3(%):	12.60	Na2O(%):	0.76
Fe2O3(%):	3.14	K2O(%):	0.68
CaO(%):	2.89	SO3(%):	2.19
MgO(%):	2.03	P2O5(%):	0.49

cri coal division ash fusion proj KFN BLK LR DB DDH87007

sample id 00034
sample product id SP1 data type (real,boro,aver,calc) REAL
plit sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1245.0	initial temp.(C)	1193.0
softening temp.(C)	1263.0	softening temp.(C)	1211.0
hemispherical temp.(C)	1284.0	hemispherical temp.(C)	1224.0
fluid temp.(C)	1319.0	fluid temp.(C)	1291.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

cri coal division ash mineral proj KFN BLK LR DB DDH87007

sample id 00034
sample product id SP1 data type (real,boro,aver,calc) REAL
plit sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.08
aluminium oxide %	(al2o3)	15.12
ferric oxide %	(fe2o3)	6.86
titanium dioxide %	(tio2)	1.22
phosphorous pentoxide %	(p2o5)	0.87
calcium oxide %	(cao)	5.23
magnesium oxide %	(mgo)	2.59
sulphur trioxide %	(so3)	4.16
sodium oxide %	(na2o)	1.33
potassium oxide %	(k2o)	0.94

90.0 <= total <= 100.0

(2)

cri coal division ash fusion proj KFN BLK LR DS DDH87007

sample id 00034
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1160.0
softening temp.(C)	1274.0	softening temp.(C)	1216.0
hemispherical temp.(C)	1287.0	hemispherical temp.(C)	1235.0
fluid temp.(C)	1323.0	fluid temp.(C)	1321.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

cri coal division ash mineral proj KFN BLK LR DS DDH87007

sample id 00034
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	62.46
aluminium oxide %	(al2o3)	15.88
ferric oxide %	(fe2o3)	5.99
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	1.01
calcium oxide %	(cao)	4.06
magnesium oxide %	(mgo)	2.18
sulphur trioxide %	(so3)	2.90
sodium oxide %	(na2o)	1.23
potassium oxide %	(k2o)	0.80

90.0 <= total <= 100.0

tri coal division ash fusion proj KPN BLK LR DB DDH87007

ample id 00036
ample product id SF1 data type (real,boro,aver,calc) REAL
:lit sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1297.0	initial temp.(C)	1286.0
softening temp.(C)	1375.0	softening temp.(C)	1364.0
hemispherical temp.(C)	1420.0	hemispherical temp.(C)	1418.0
fluid temp.(C)	147.2	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KPN BLK LR DB DDH87007

ample id 00036
ample product id SF1 data type (real,boro,aver,calc) REAL
:lit sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	70.63
aluminium oxide %	(al2o3)	12.60
ferric oxide %	(fe2o3)	3.14
titanium dioxide %	(tio2)	0.69
phosphorous pentoxide %	(p2o5)	0.49
calcium oxide %	(cao)	2.89
magnesium oxide %	(mgo)	2.03
sulphur trioxide %	(so3)	2.19
sodium oxide %	(na2o)	0.76
potassium oxide %	(k2o)	0.68

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DS DDH87007

sample id 00036
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1407.0	initial temp.(C)	1405.0
softening temp.(C)	1417.0	softening temp.(C)	1414.0
hemispherical temp.(C)	1439.0	hemispherical temp.(C)	1430.0
fluid temp.(C)	147.2	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87007

sample id 00036
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	74.08
aluminium oxide %	(al2o3)	10.96
ferric oxide %	(fe2o3)	2.64
titanium dioxide %	(tio2)	0.53
phosphorous pentoxide %	(p2o5)	0.56
calcium oxide %	(cao)	2.10
magnesium oxide %	(mgo)	1.70
sulphur trioxide %	(so3)	1.72
sodium oxide %	(na2o)	0.60
potassium oxide %	(k2o)	0.55

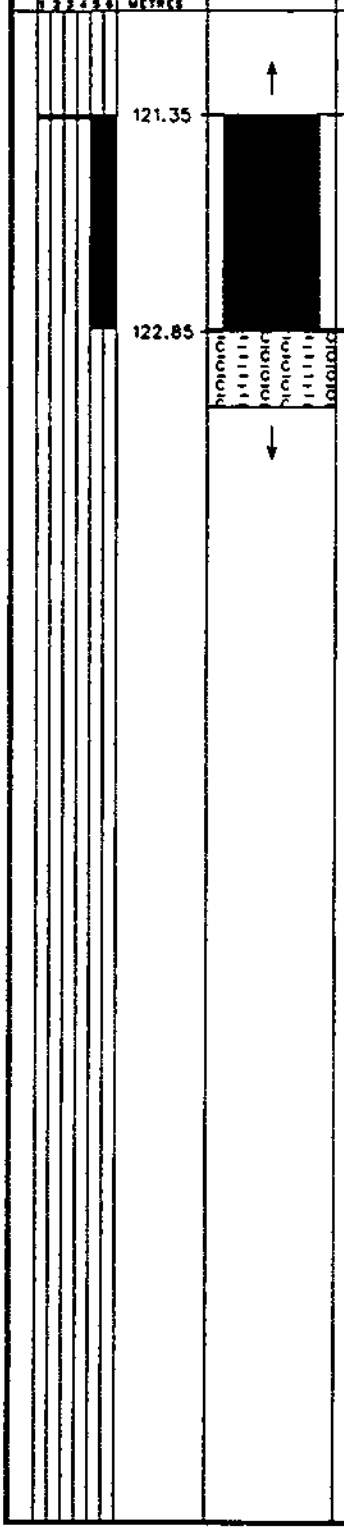
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION, MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87007 | SEAM : PH | INTERVAL(M) : 121.35 – 122.85 | ELEVATION(M) : 1694.5

GEOLOGIST : BARKER | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg	
	121.35			1.33	98.7	6849	37	1.35 / 0.00 1.35	1.35 / 0.00 1.35	0.59	47.13	8.89	45.29	1.73	15.52	—
	122.85															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87007
Coal zone:	PH		
Field sample no.:	06849	Composite sample no.:	37
Lab sample no.:	30637		
True sample thickness:	1.346 meters	Drill core recovery(%):	98.66 %
Coal/Rock:	1.346 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	17.85	25.55	19.96	25.90
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.17	4.57		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.59	
Ash(%):	47.13	47.41
Volatile matter(%):	6.99	7.03
Fixed carbon(%):	45.29	45.56
Total sulphur(%):	1.73	1.74
Combustible sulphur(%):	1.32	
Net calorific value(cal/g):	3709.00	3731.00
Gross calorific value(cal/g):	3709.00	3731.00
Volatile matter(dmmf%):	5.40	
Hardgrove index:	56.00	
Specific gravity:	1.78	
Carbon dioxide(%):	1.99	
Phosphorous in coal(%):	0.095	
Chlorine in coal(ppm):	290.00	

Forms of Sulphur(%): PYRITE 01.24 SULPHATE 00.02 ORGANIC 00.47

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	45.11	45.38
Hydrogen(%):	1.59	1.60
Nitrogen(%):	0.44	0.44
Oxygen(%):	3.41	3.43

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1283.00	1192.00
Softening temperature(°C):	1305.00	1213.00
Hemispherical temperature(°C):	1313.00	1219.00
Final temperature(°C):	1380.00	1332.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	55.68	TiO2(%):	1.11
Al2O3(%):	19.38	Na2O(%):	1.06
Fe2O3(%):	8.33	K2O(%):	1.95
CaO(%):	3.12	SO3(%):	2.17
MgO(%):	2.65	P2O5(%):	0.46

gcri coal division ash fusion proj KPN BLK LR DS DDH87007

sample id 00037
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1350.0	initial temp.(C)	1272.0
softening temp.(C)	1380.0	softening temp.(C)	1305.0
hemispherical temp.(C)	1401.0	hemispherical temp.(C)	1353.0
fluid temp.(C)	1447.0	fluid temp.(C)	1442.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87007

sample id 00037
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	56.16
aluminium oxide %	(al2o3)	22.65
ferric oxide %	(fe2o3)	5.10
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	0.42
calcium oxide %	(cao)	1.97
magnesium oxide %	(mgo)	2.19
sulphur trioxide %	(so3)	1.10
sodium oxide %	(na2o)	1.28
potassium oxide %	(k2o)	2.39

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87007

sample id 00037
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1187.0	initial temp.(C)	1185.0
softening temp.(C)	1334.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1358.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1431.0	fluid temp.(C)	1417.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87007

sample id 00037
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	51.48
aluminium oxide %	(al2o3)	21.17
ferric oxide %	(fe2o3)	4.99
titanium dioxide %	(tio2)	1.10
phosphorous pentoxide %	(p2o5)	0.51
calcium oxide %	(cao)	2.69
magnesium oxide %	(mgo)	2.28
sulphur trioxide %	(so3)	1.50
sodium oxide %	(na2o)	1.21
potassium oxide %	(k2o)	2.02

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION

MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87007 SEAM : G INTERVAL(M) : 192.62 – 197.55 ELEVATION(M) : 1694.5

GEOLOGIST : BARKER SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	192.62			(0.19)											
				1.04	84.7	6852									
	193.93		0.19												
				0.36			38	2.33/ 0.38 2.71	2.33/ 0.38 2.71	0.70	38.74	8.08	52.48	0.33	18.14
			0.17												
				0.17	100.0	6853									
				0.57											
	195.50														
			1.47		89.8	6854	38	0.46/ 1.47 1.93		0.88	50.59	7.40	41.33	—	13.23
				(0.20)											
				0.26											
	197.55														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87007
Coal zone:	G		
Field sample no.:	06852 - 06853	Composite sample no.:	38
Lab sample no.:	30637		
True sample thickness:	2.708 meters	Drill core recovery(%):	93.05 %
Coal/Rock:	2.332 / 0.376 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	18.68	19.45	17.95	32.48
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.05	4.39		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.70	
Ash(%):	38.74	39.01
Volatile matter(%):	8.08	8.14
Fixed carbon(%):	52.48	52.85
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.05	
Net calorific value(cal/g):	4335.00	4366.00
Gross calorific value(cal/g):	4335.00	4366.00
Volatile matter(dmmf%):	8.50	
Hardgrove index:	60.00	
Specific gravity:	1.68	
Carbon dioxide(%):	4.59	
Phosphorous in coal(%):	0.098	
Chlorine in coal(ppm):	64.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.31

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	53.62	54.00
Hydrogen(%):	1.59	1.60
Nitrogen(%):	0.55	0.55
Oxygen(%):	4.47	4.51

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1203.00	1200.00
Softening temperature(°C):	1251.00	1205.00
Hemispherical temperature(°C):	1256.00	1211.00
Final temperature(°C):	1305.00	1235.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	53.75	TiO2(%):	0.90
Al2O3(%):	16.47	Na2O(%):	1.57
Fe2O3(%):	6.89	K2O(%):	0.84
CaO(%):	7.46	SO3(%):	1.78
MgO(%):	4.89	P2O5(%):	0.58

gcri coal division ash fusion proj KPN BLK LR DS DDH87007

sample id 00038
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1234.0	initial temp.(C)	1232.0
softening temp.(C)	1307.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1289.0
fluid temp.(C)	1396.0	fluid temp.(C)	1394.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87007

sample id 00038
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.28
aluminium oxide %	(al2o3)	20.72
ferric oxide %	(fe2o3)	4.08
titanium dioxide %	(tio2)	1.28
phosphorous pentoxide %	(p2o5)	0.46
calcium oxide %	(cao)	3.43
magnesium oxide %	(mgo)	2.98
sulphur trioxide %	(so3)	1.34
sodium oxide %	(na2o)	1.68
potassium oxide %	(k2o)	1.00

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87007

sample id 00038
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1234.0	initial temp.(C)	1231.0
softening temp.(C)	1348.0	softening temp.(C)	1315.0
hemispherical temp.(C)	1396.0	hemispherical temp.(C)	1333.0
fluid temp.(C)	1460.0	fluid temp.(C)	1452.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87007

sample id 00038
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.36
aluminium oxide %	(al2o3)	22.55
ferric oxide %	(fe2o3)	3.65
titanium dioxide %	(tio2)	1.08
phosphorous pentoxide %	(p2o5)	0.45
calcium oxide %	(cao)	2.66
magnesium oxide %	(mgo)	2.74
sulphur trioxide %	(so3)	1.52
sodium oxide %	(na2o)	1.46
potassium oxide %	(k2o)	1.00

90.0 <= total <= 100.0

KPNLRDDH87008

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87008 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/04/87
END DATE - 09/08/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - THREE SEAMS: I (OVTN), I, I (OVTN).

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1484.76

ZONE - 9
NORTHING - 6345453.72
EASTING - 507877.83

LICENCE/LEASE NUMBER -

LATITUDE - 571514
LONGITUDE - 1285210

- O R I E N T A T I O N -

LENGTH - 199.50

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 3.05
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87008										
		5982	119.28	119.47	100.00		0.124			0.000- 0.124
		5984	192.18	192.38	100.00		0.074			0.000- 0.074
		6823	3.05	9.50	11.32		0.662		4.374	0.000- 5.036
	I OVT	6824	9.50	10.50	86.00	0.469	0.011		0.080	0.469- 0.091
	I OVT	6825	10.50	16.80	49.52	0.378	0.425		1.237	0.378- 1.662
	I OVT	6826	16.80	18.76	97.96	0.707	0.008	0.018		0.725- 0.008
		6827	18.76	18.85	100.00		0.040			0.000- 0.040
		6828	119.47	119.71	100.00		0.157			0.000- 0.157
	I	6829	119.71	122.45	88.69	1.482	0.133		0.205	1.482- 0.338
	I	6830	122.45	126.75	59.07	1.677	0.070	1.199		2.876- 0.070
		6831	126.75	127.68	100.00		0.651			0.000- 0.651
		6832	164.58	165.78	100.00		0.507			0.000- 0.507
	I OVT	6833	165.78	173.78	100.00	2.400				2.400- 0.000
	I OVT	6834	173.78	184.08	80.39	2.097		0.477		2.574- 0.000
	I OVT	6835	184.08	191.67	61.26	1.252	0.265	0.855	0.081	2.107- 0.346
		6836	191.67	192.18	100.00		0.183			0.000- 0.183

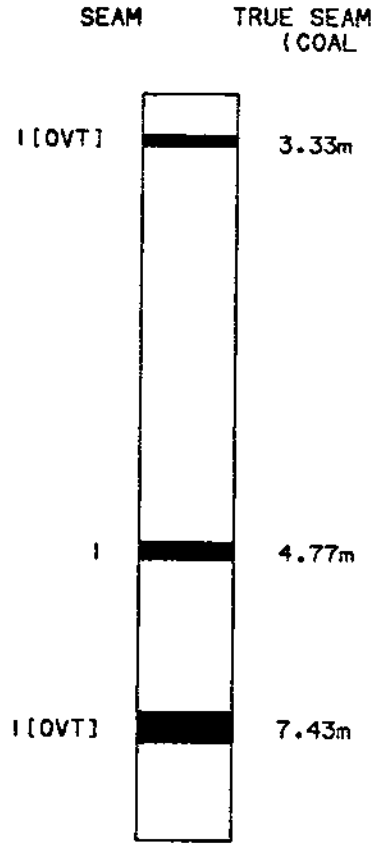
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
DDH87008													
	I	OVT	40	6824	6826	9.50	18.76	63.71	4.50	1.40	0.04	3.32	4.54- 4.72
	I		41	6829	6829	119.71	122.45	88.68	2.23	0.20	0.00	0.31	2.23- 0.51
	I		42	6830	6830	122.45	126.75	59.06	2.44	0.10	1.76	0.00	4.20- 0.10
	I	OVT	43	6833	6833	165.78	173.78	100.00	8.00	0.00	0.00	0.00	8.00- 0.00
	I	OVT	44	6834	6834	173.78	184.08	80.38	8.28	0.00	2.02	0.00	10.30- 0.00
	I	OVT	45	6835	6835	184.08	191.67	61.26	3.84	0.81	2.67	0.27	6.51- 1.08
	I		222	6829	6829	119.71	122.45	88.68	2.23	0.20	0.00	0.31	2.23- 0.51
	I		223	6830	6830	122.45	126.75	59.06	2.44	0.10	1.76	0.00	4.20- 0.10
	I		417	6829	6830	119.71	126.75	70.59	4.67	0.30	1.76	0.31	6.43- 0.61



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87008

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]88007201 2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 9.50 – 18.76
INTERVAL(M) : 9.50 – 10.50
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88
DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	9.50			0.16	83.7	6824	40								
				(0.25)											
	10.50			0.31											

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 9.50 – 18.76 ELEVATION(M) : 1464.8
INTERVAL(M) : 10.50 – 16.80

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	10.50		0.14												
			(1.24)		38.4	6825	40								
				0.44											
				0.21											
	16.80		0.20												

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 9.50 - 18.76
INTERVAL(M) : 16.80 - 18.76
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	16.80															
				0.72	97.5	6826	40	1.97 / 1.76 3.33	1.97 / 1.76 3.33	1.10	32.91	8.74	38.15	—	13.51	—
	18.76															

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 TOTAL INTERVAL(M) : 119.71 – 126.75
INTERVAL(M) : 119.71 – 122.45
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	119.71			0.22											
			0.03												
			(0.11)												
				0.93	88.7	6829	41	1.48 / 0.34		1.00	35.84	6.78	56.71	0.31	20.36
								1.82							
			0.01	0.13											
			(0.19)												
				0.16											
			0.01												
			0.01												
	122.45														

GULF CANADA CORPORATION

COAL DIVISION

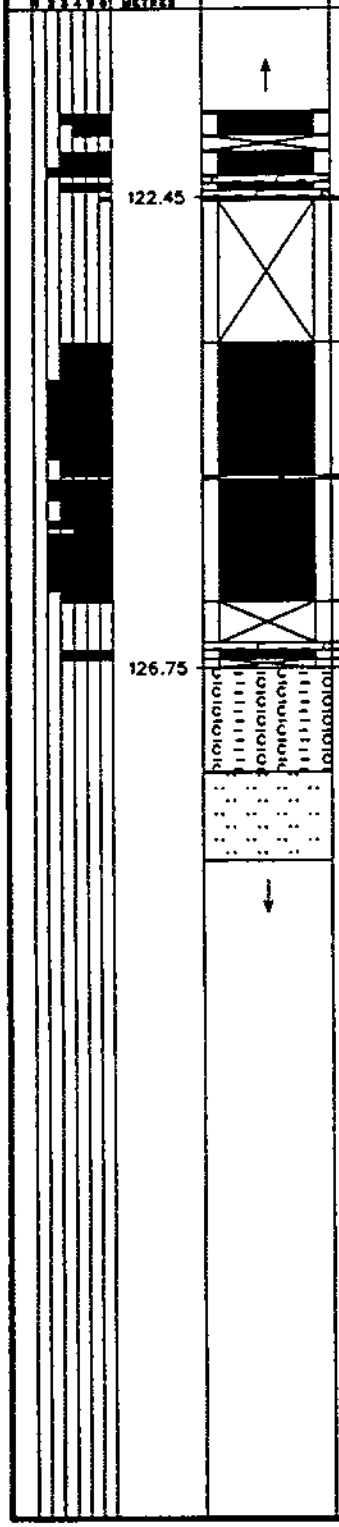
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 TOTAL INTERVAL(M) : 119.71 - 126.75 ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 INTERVAL(M) : 122.45 - 126.75 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	122.45			(0.89)												
				0.84	59.3	6630	42	2.88/ 0.07 2.95	4.38/ 0.41 4.77	0.65	24.89	8.30	66.06	0.36	24.07	—
				0.77												
				(0.26)												
	126.75															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87008
Coal zone:	I		
Field sample no.:	06829	Composite sample no.:	41
True sample thickness:	1.820 meters	Drill core recovery (%):	88.68 %
Coal/Rock:	1.482 / 0.338 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	13.70	16.16	16.10	37.22	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	10.79	6.03			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.00	
Ash (%):	35.54	35.90
Volatile matter (%):	6.75	6.82
Fixed carbon (%):	56.71	57.28
Total sulphur (%):	0.31	0.31
Combustible sulphur (%):	0.09	
Net calorific value (cal/g):	4866.00	4915.00
Gross calorific value (cal/g):	4866.00	4915.00
Volatile matter (dmmf%):	6.30	
Hardgrove index:	66.00	
Specific gravity:	1.66	
Carbon dioxide (%):	2.13	
Phosphorous in coal (%):	0.081	
Forms of Sulphur (%):	PYRITE 00.02	SULPHATE 00.00 ORGANIC 00.29

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	56.64	57.21
Hydrogen (%):	1.94	1.96
Nitrogen (%):	0.70	0.71
Oxygen (%):	3.87	3.91

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1270.00	1246.00
Softening temperature (°C):	1302.00	1270.00
Hemispherical temperature (°C):	1310.00	1283.00
Final temperature (°C):	1396.00	1394.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	62.31	TiO2 (%):	0.60
Al2O3 (%):	18.39	Na2O (%):	2.06
Fe2O3 (%):	3.03	K2O (%):	0.95
CaO (%):	3.57	SO3 (%):	1.54
MgO (%):	2.84	P2O5 (%):	0.52

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87008
Coal zone:	1		
Field sample no.:	06830	Composite sample no.:	42
Lab sample no.:	30642		
True sample thickness:	2.946 meters	Drill core recovery(%):	59.06 %
Coal/Rock:	2.876 / 0.070 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	13.65	14.26	20.19	33.16
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	11.79	6.95		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.65	
Ash(%):	24.99	25.15
Volatile matter(%):	8.30	8.35
Fixed carbon(%):	66.06	66.50
Total sulphur(%):	0.36	0.36
Combustible sulphur(%):	0.08	
Net calorific value(cal/g):	5753.00	5790.00
Gross calorific value(cal/g):	5753.00	5790.00
Volatile matter(dmmf%):	8.60	
Hardgrove index:	60.00	
Specific gravity:	1.56	
Carbon dioxide(%):	3.82	
Phosphorous in coal(%):	0.176	
Forms of Sulphur(%):	PYRITE 00.02	SULPHATE 00.00 ORGANIC 00.34

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	67.39	67.83
Hydrogen(%):	2.26	2.27
Nitrogen(%):	0.84	0.85
Oxygen(%):	3.51	3.54

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1189.00
Softening temperature(°C):	1254.00	1203.00
Hemispherical temperature(°C):	1262.00	1208.00
Final temperature(°C):	1278.00	1262.00

ASH MINERAL ANALYSIS (AM3)

SiO2(%):	53.09	TiO2(%):	1.12
Al2O3(%):	22.64	Na2O(%):	1.80
Fe2O3(%):	4.44	K2O(%):	0.97
CaO(%):	4.15	SO3(%):	2.79
MgO(%):	2.83	P2O5(%):	1.61

gcri coal division ash fusion proj KFN BLK LR DS DDH87008

sample id 00041
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1270.0	initial temp.(C)	1240.0
softening temp.(C)	1289.0	softening temp.(C)	1263.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1270.0
fluid temp.(C)	1396.0	fluid temp.(C)	1394.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87008

sample id 00041
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	59.45
aluminium oxide %	(al2o3)	19.32
ferric oxide %	(fe2o3)	2.53
titanium dioxide %	(tio2)	0.82
phosphorous pentoxide %	(p2o5)	1.09
calcium oxide %	(cao)	4.17
magnesium oxide %	(mgo)	2.83
sulphur trioxide %	(so3)	2.95
sodium oxide %	(na2o)	1.40
potassium oxide %	(k2o)	0.92

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87008

sample id 00041
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1246.0
softening temp.(C)	1310.0	softening temp.(C)	1308.0
hemispherical temp.(C)	1332.0	hemispherical temp.(C)	1331.0
fluid temp.(C)	1415.0	fluid temp.(C)	1411.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87008

sample id 00041
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	63.13
aluminium oxide %	(al2o3)	18.39
ferric oxide %	(fe2o3)	2.63
titanium dioxide %	(tio2)	0.81
phosphorous pentoxide %	(p2o5)	0.94
calcium oxide %	(cao)	2.94
magnesium oxide %	(mgo)	2.42
sulphur trioxide %	(so3)	1.98
sodium oxide %	(na2o)	1.21
potassium oxide %	(k2o)	0.80

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87008

sample id 00042
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1256.0
softening temp.(C)	1299.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1281.0
fluid temp.(C)	1358.0	fluid temp.(C)	1354.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87008

sample id 00042
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 31/12/87

silicon dioxide %	(sio2)	53.09
aluminium oxide %	(al2o3)	22.64
ferric oxide %	(fe2o3)	4.44
titanium dioxide %	(tio2)	1.12
phosphorous pentoxide %	(p2o5)	1.61
calcium oxide %	(cao)	4.15
magnesium oxide %	(mgo)	2.83
sulphur trioxide %	(so3)	2.79
sodium oxide %	(na2o)	1.80
potassium oxide %	(k2o)	0.97

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR D8 DCH87008

sample id 00042
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1287.0	initial temp.(C)	1283.0
softening temp.(C)	1358.0	softening temp.(C)	1321.0
hemispherical temp.(C)	1412.0	hemispherical temp.(C)	1342.0
fluid temp.(C)	1434.0	fluid temp.(C)	1433.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR D8 DCH87008

sample id 00042
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	55.37
aluminium oxide %	(al2o3)	23.79
ferric oxide %	(fe2o3)	4.08
titanium dioxide %	(tio2)	1.16
phosphorous pentoxide %	(p2o5)	1.50
calcium oxide %	(cao)	3.37
magnesium oxide %	(mgo)	2.48
sulphur trioxide %	(so3)	1.79
sodium oxide %	(na2o)	1.93
potassium oxide %	(k2o)	0.88

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 165.78 – 191.67
INTERVAL(M) : 165.78 – 171.88
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	165.78			1.93	100.0	6833	43								
	171.88														

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 165.78 – 191.67
INTERVAL(M) : 171.88 – 173.78 ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	171.88			0.47	100.0	6833	43	2.40 / 0.00 2.40		—	—	—	—	—	—	—
	173.78															

GULF CANADA CORPORATION

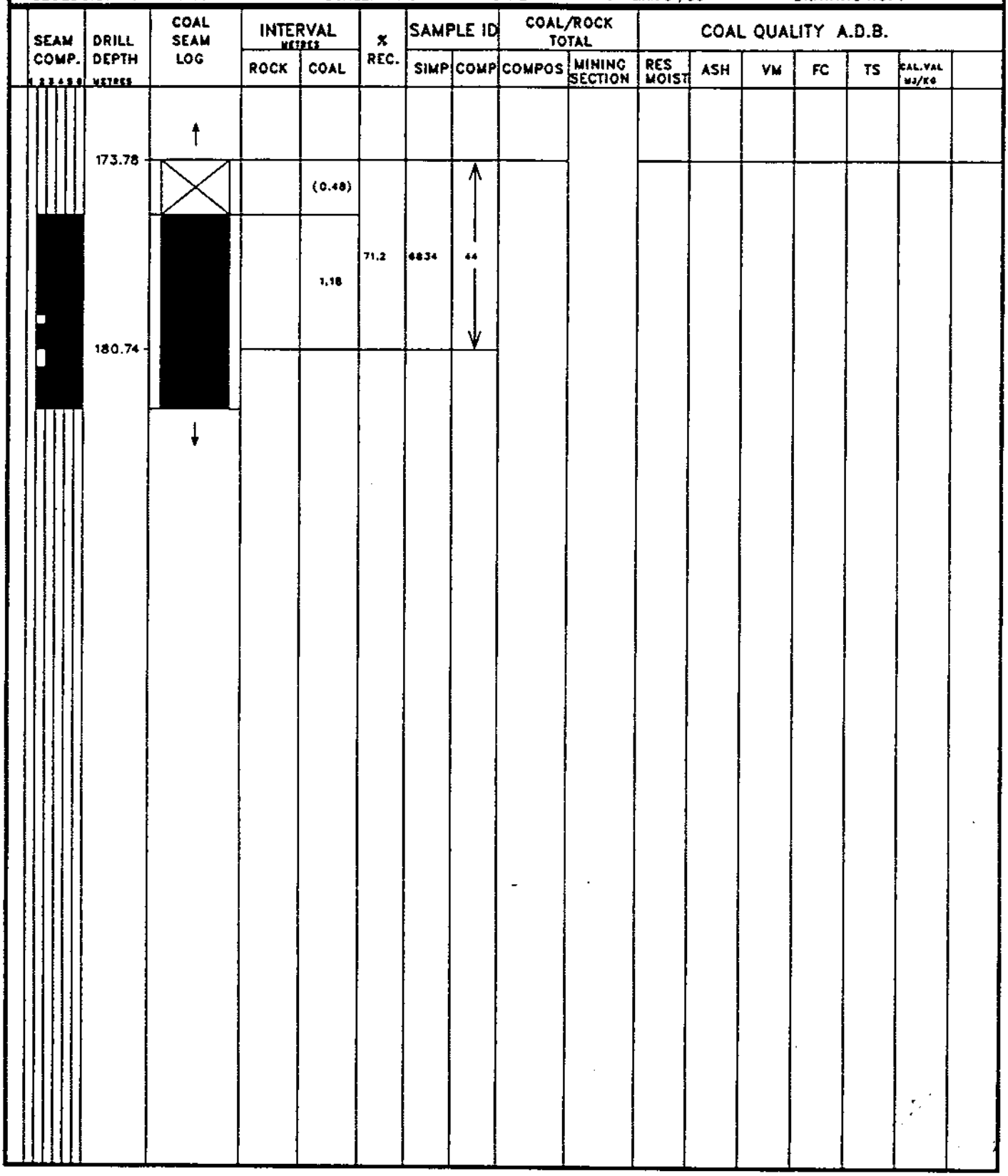
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 165.78 – 191.67
INTERVAL(M) : 173.78 – 180.74
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87008 SEAM : 1 OVT TOTAL INTERVAL(M) : 165.78 – 191.87
INTERVAL(M) : 180.74 – 184.08
ELEVATION(M) : 1484.8

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	180.74			0.92	100.0	6834	44	2.87 / 0.00 2.87		—	—	—	—	—	—	—
	184.08															

GULF CANADA CORPORATION

COAL DIVISION

MOUNT KLAPPAN PROJECT

SE. ETAIL

TRUE THICKNESS

TA SOURCE: KPN LR DDH87006 SEAM : I OVT TOTAL INTERVAL(M) : 165.78 – 191.67 ELEVATION(M) : 1484.8

OLOGIST : PARRY SCALE: 1:40 INTERVAL(M) : 184.08 – 190.48

DATE : MAR 04/88 DRAWING NO. :

DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
184.08														
			(0.36)											
			0.52	62.4	6638	45								
			0.49											
			(0.24)											
190.48														

GE : 6 / 6

KNESS

: 1484.8

:

CAL.VAL MJ/KG

KPNLRDDH87009

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87009 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/08/87
END DATE - 09/10/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - UPRIGHT, INTERSECTED I (POOR RECOVERY), H/I, H AND PH.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1454.72
ZONE - 9
NORTHING - 6345828.14
EASTING - 508266.33

LICENCE/LEASE NUMBER -

LATITUDE - 571526
LONGITUDE - 1285147

- O R I E N T A T I O N -

LENGTH - 125.78
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 7.62
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87009										
		6856	41.07	42.22	100.00		1.081			0.000- 1.081
	I	6857	42.22	47.53	32.02	1.283	0.264	3.119	0.126	4.402- 0.390
		6858	47.53	47.83	100.00		0.260			0.000- 0.260
		6859	98.02	98.57	100.00		0.456			0.000- 0.456
	H	6860	98.57	100.33	45.45	0.385	0.220	0.692	0.056	1.077- 0.276
	H	6861	100.33	101.61	96.09		0.894		0.038	0.000- 0.932
	H	6862	101.61	103.40	64.25	0.786	0.116	0.464	0.058	1.250- 0.174
		6863	103.40	105.29	100.00		1.637			0.000- 1.637
		6864	117.67	118.31	100.00		0.592			0.000- 0.592
	PH	6865	118.31	119.08	72.73	0.018	0.494	0.193		0.211- 0.494
	PH	6866	119.08	120.70	62.35	0.907		0.550		1.457- 0.000
		6867	120.70	121.67	100.00		0.854			0.000- 0.854

GULF CANADA CORPORATION - COAL DIVISION

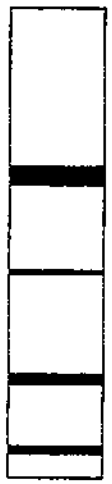
14/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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	TOTAL ROCK
ODH87009													
	I	46	6857	6857	42.22	47.53	32.01	1.41	0.29	3.47	0.14	4.88	0.43
	H	47	6860	6860	98.57	100.33	45.45	0.51	0.29	0.89	0.07	1.40	0.36
	H	48	6861	6861	100.33	101.61	96.09	0.00	1.23	0.00	0.05	0.00	1.28
	H	49	6862	6862	101.61	103.40	64.24	1.00	0.15	0.57	0.07	1.57	0.22
	PH	50	6865	6865	118.31	119.08	72.72	0.02	0.54	0.21	0.00	0.23	0.54
	PH	51	6866	6866	119.08	120.70	62.34	1.01	0.00	0.61	0.00	1.62	0.00
	H	224	6862	6862	101.61	103.40	64.24	1.00	0.15	0.57	0.07	1.57	0.22
	Ph	225	6866	6866	119.08	120.70	62.34	1.01	0.00	0.61	0.00	1.62	0.00
	H	418	6862	6862	101.61	103.40	64.24	1.00	0.15	0.57	0.07	1.57	0.22
	Ph	419	6866	6866	119.08	120.70	62.34	1.01	0.00	0.61	0.00	1.62	0.00

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
I	4.79m
H/I	0.98m
H	2.77m
PH	2.16m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87009

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

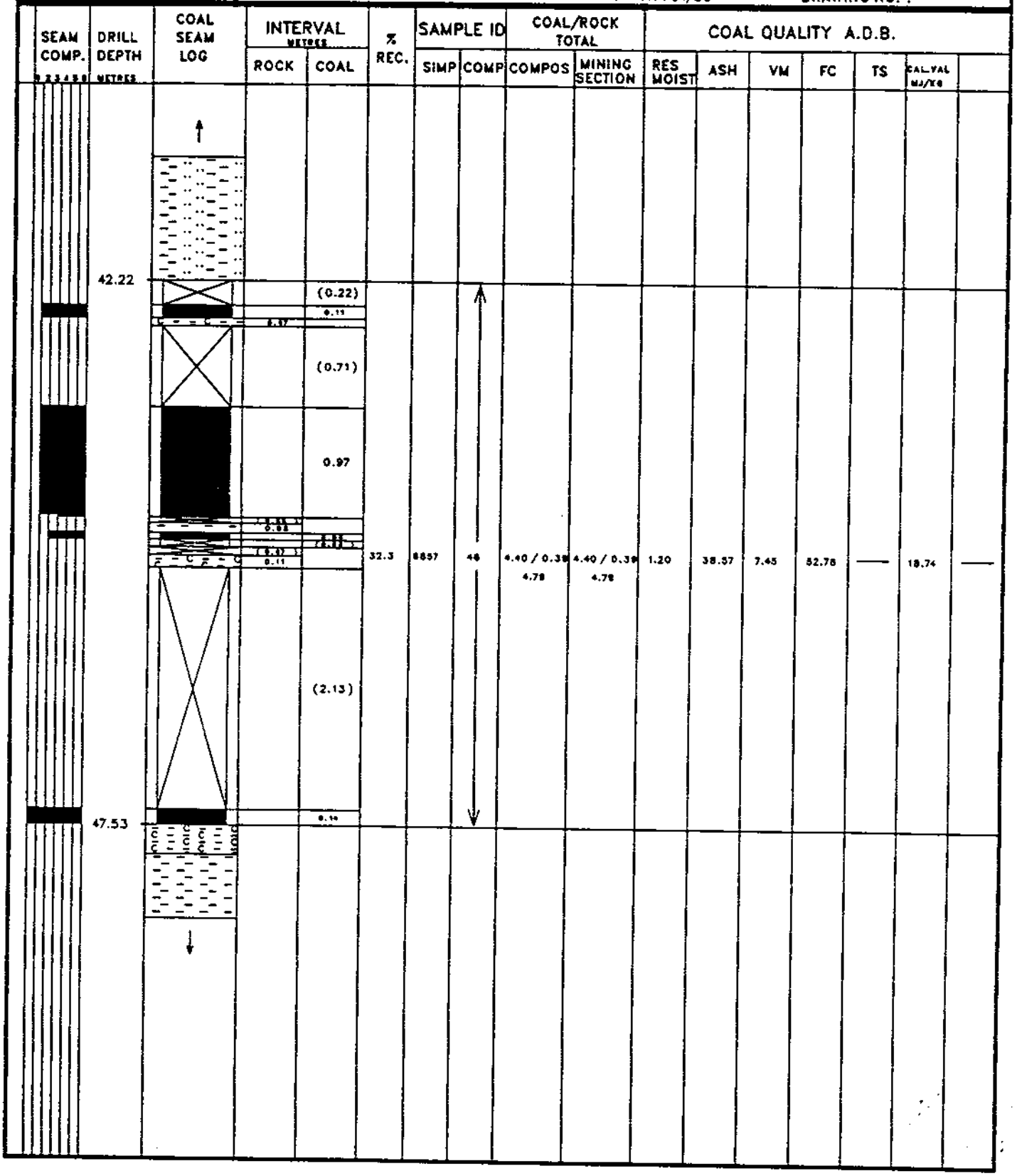
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87009 SEAM : 1 INTERVAL(M) : 42.22 – 47.53 ELEVATION(M) : 1454.7

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



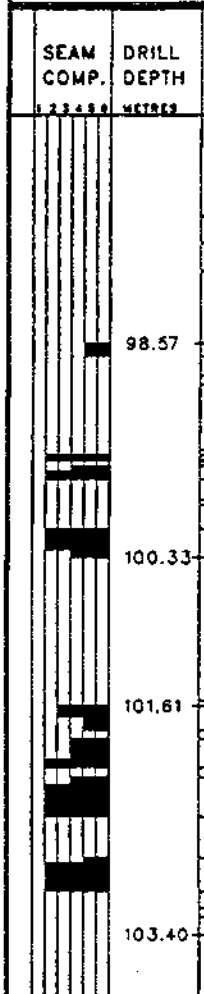
SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
1 2 3 4 5 6	42.22			(0.22)												
				0.11												
				0.17												
				(0.71)												
				0.97												
				0.33												
				0.88												
				0.11												
					32.3	8857	48	4.40 / 0.38 4.78	4.40 / 0.38 4.78	1.20	38.57	7.45	52.78	—	18.74	—
				(2.13)												
				0.14												
	47.53															

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87009 SEAM : H INTERVAL(M) : 98.57 – 103.40 ELEVATION(M) : 1454.7

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	98.57			0.08 (0.12) (0.42) 0.03 0.07 0.09 0.13 0.03 (0.16) 0.18	44.7	6860	47	1.08 / 0.28 1.35	1.08 / 0.28 1.35	1.00	60.64	7.68	30.68	—	9.24	—
	100.33		0.89		95.8	6861	48	0.00 / 0.93 0.93		1.11	82.67	7.37	8.85	—	3.84	—
	101.61			0.18 0.18 0.25 (0.26) 0.21 (0.10) (0.11)	63.3	6862	49	1.25 / 0.17 1.42	1.25 / 0.17 1.42	1.18	48.42	7.88	42.52	1.50	14.92	—
	103.40															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87009
Coal zone:	H		
Field sample no.:	06862	Composite sample no.:	49
Lab sample no.:	30642		
True sample thickness:	1.424 meters	Drill core recovery(%):	64.24 %
Coal/Rock:	1.250 / 0.174 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.27	20.26	14.98	26.50
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.92	4.07		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.18	
Ash(%):	48.42	49.00
Volatile matter(%):	7.88	7.97
Fixed carbon(%):	42.52	43.03
Total sulphur(%):	1.50	1.52
Combustible sulphur(%):	0.89	
Net calorific value(cal/g):	3566.00	3608.00
Gross calorific value(cal/g):	3566.00	3608.00
Volatile matter(dmmf%):	7.50	
Hardgrove index:	63.00	
Specific gravity:	1.79	
Carbon dioxide(%):	3.30	
Phosphorous in coal(%):	0.188	

Forms of Sulphur(%): PYRITE 01.14 SULPHATE 00.01 ORGANIC 00.35

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	44.18	44.71
Hydrogen(%):	1.56	1.58
Nitrogen(%):	0.50	0.51
Oxygen(%):	2.66	2.68

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1289.00	1170.00
Softening temperature(°C):	1299.00	1192.00
Hemispherical temperature(°C):	1307.00	1208.00
Final temperature(°C):	1350.00	1348.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	53.53	TiO2(%):	1.17
Al2O3(%):	18.20	Na2O(%):	1.61
Fe2O3(%):	8.54	K2O(%):	1.29
CaO(%):	3.93	SO3(%):	3.17
MgO(%):	2.79	P2O5(%):	0.89

gcri coal division ash fusion proj KPN BLK LR DB DDH87009

sample id 00049
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1358.0	initial temp.(C)	1275.0
softening temp.(C)	1412.0	softening temp.(C)	1321.0
hemispherical temp.(C)	1452.0	hemispherical temp.(C)	1364.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87009

sample id 00049
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 31/12/87

silicon dioxide %	(sio2)	53.58
aluminium oxide %	(al2o3)	25.35
ferric oxide %	(fe2o3)	3.65
titanium dioxide %	(tio2)	1.46
phosphorous pentoxide %	(p2o5)	1.01
calcium oxide %	(cao)	3.34
magnesium oxide %	(mgo)	2.41
sulphur trioxide %	(so3)	1.69
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	1.21

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KRN BLK LR DB DDH87009

sample id 00049
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1227.0	initial temp.(C)	1226.0
softening temp.(C)	1348.0	softening temp.(C)	1294.0
hemispherical temp.(C)	1396.0	hemispherical temp.(C)	1332.0
fluid temp.(C)	1471.0	fluid temp.(C)	1470.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KRN BLK LR DB DDH87009

sample id 00049
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	53.81
aluminium oxide %	(al2o3)	24.45
ferric oxide %	(fe2o3)	3.62
titanium dioxide %	(tio2)	1.47
phosphorous pentoxide %	(p2o5)	1.09
calcium oxide %	(cao)	4.27
magnesium oxide %	(mgo)	2.23
sulphur trioxide %	(so3)	1.46
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.07

90.0 <= total <= 100.0

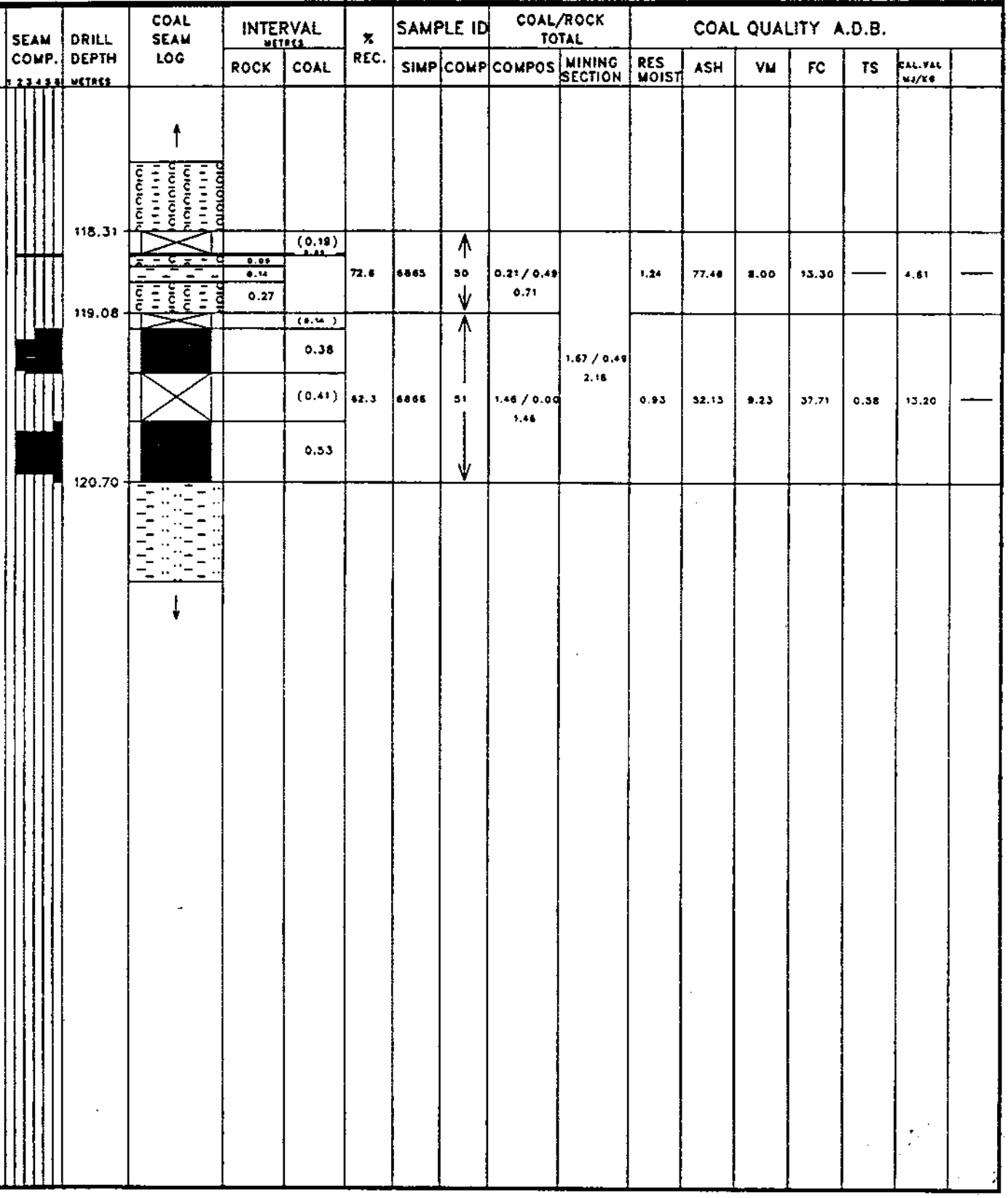
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DOH87009 SEAM : PH INTERVAL(M) : 118.31 - 120.70 ELEVATION(M) : 1454.7

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87009
Coal zone:	PH		
Field sample no.:	06866	Composite sample no.:	51
Lab sample no.:	30642		
True sample thickness:	1.457 meters	Drill core recovery(%):	62.34 %
Coal/Rock:	1.457 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	33.77	27.06	14.46	19.87
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	3.23	1.61		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.93	
Ash(%):	52.13	52.62
Volatile matter(%):	9.23	9.32
Fixed carbon(%):	37.71	38.06
Total sulphur(%):	0.58	0.59
Combustible sulphur(%):	0.04	
Net calorific value(cal/g):	3155.00	3184.00
Gross calorific value(cal/g):	3155.00	3184.00
Volatile matter(dmmf%):	11.40	
Hardgrove index:	57.00	
Specific gravity:	1.84	
Carbon dioxide(%):	5.58	
Phosphorous in coal(%):	0.159	

Forms of Sulphur(%): PYRITE 00.46 SULPHATE 00.00 ORGANIC 00.12

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	39.56	39.93
Hydrogen(%):	1.59	1.60
Nitrogen(%):	0.44	0.44
Oxygen(%):	4.77	4.82

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1240.00	1189.00
Softening temperature(°C):	1246.00	1208.00
Hemispherical temperature(°C):	1256.00	1216.00
Final temperature(°C):	1297.00	1283.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.65	TiO2(%):	0.55
Al2O3(%):	15.87	Na2O(%):	1.67
Fe2O3(%):	6.38	K2O(%):	1.00
CaO(%):	8.00	SO3(%):	2.58
MgO(%):	4.28	P2O5(%):	0.70

(1)

gcri coal division ash fusion proj KPN BLK LR DB DDH87009

sample id 00051
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1267.0	initial temp.(C)	1187.0
softening temp.(C)	1289.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1294.0	hemispherical temp.(C)	1256.0
fluid temp.(C)	1350.0	fluid temp.(C)	1326.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87009

sample id 00051
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	53.59
aluminium oxide %	(al2o3)	21.85
ferric oxide %	(fe2o3)	4.96
titanium dioxide %	(tio2)	0.60
phosphorous pentoxide %	(p2o5)	0.49
calcium oxide %	(cao)	4.59
magnesium oxide %	(mgo)	3.49
sulphur trioxide %	(so3)	1.35
sodium oxide %	(na2o)	1.97
potassium oxide %	(k2o)	1.30

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87009

sample id 00051
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1272.0	initial temp.(C)	1240.0
softening temp.(C)	1299.0	softening temp.(C)	1272.0
hemispherical temp.(C)	1326.0	hemispherical temp.(C)	1283.0
fluid temp.(C)	1380.0	fluid temp.(C)	1376.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87009

sample id 00051
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.45
aluminium oxide %	(al2o3)	23.79
ferric oxide %	(fe2o3)	4.48
titanium dioxide %	(tio2)	0.66
phosphorous pentoxide %	(p2o5)	0.45
calcium oxide %	(cao)	3.60
magnesium oxide %	(mgo)	3.01
sulphur trioxide %	(so3)	0.77
potassium oxide %	(k2o)	1.47
sodium oxide %	(na2o)	1.99

90.0 <= total <= 100.0

KPNLRDDH87010

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87010 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/07/87
END DATE - 09/09/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - DRILLING COMPLICATIONS, HOLE WAS REDRILLED AS DDH8 7011. NO GEOPHYSICAL LOGS. SEAM INTERSECTED: H.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1705.37

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6342981.92
EASTING - 505255.36

LATITUDE - 571355
LONGITUDE - 1285447

- O R I E N T A T I O N -

LENGTH - 59.74

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 3.66
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87010										
		6868	28.36	28.85	100.00		0.375			0.000- 0.375
	H	6869	28.85	31.98	43.45	0.890	0.231	1.432		2.322- 0.231
	H	6870	31.98	34.39	96.68	1.910	0.144	0.073		1.983- 0.144
		6871	34.39	34.83	100.00		0.397			0.000- 0.397

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 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
ODH87010												
	H	52	6869	6869	28.85	31.98	43.45	1.08	0.28	1.77	0.00	2.85- 0.28
	H	53	6870	6870	31.98	34.39	96.68	2.17	0.16	0.08	0.00	2.25- 0.16
	H	226	6869	6870	28.85	34.39	66.60	3.25	0.44	1.85	0.00	5.10- 0.44
	H	420	6869	6870	28.85	34.39	66.60	3.25	0.44	1.85	0.00	5.10- 0.44

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)

4.68m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87010

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(2050571880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

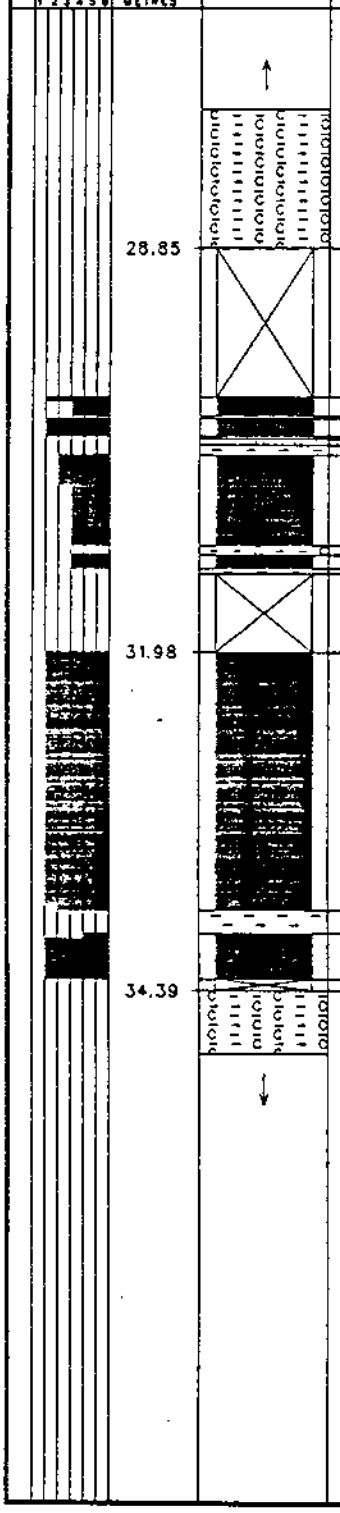
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87010 SEAM : H INTERVAL(M) : 28.85 – 34.39 ELEVATION(M) : 1705.4

GEOLOGIST : LEDOA SCALE: 1:40 DATE : FEB 23/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	28.85			(0.94)											
			0.02	0.12											
			0.02	0.11											
			0.02		43.9	6869	52	2.32 / 0.23		0.98	48.98	9.29	42.75	0.29	15.08
				0.57				2.55							
			0.06												
			0.02	0.06											
				(0.49)					4.30 / 0.38						
	31.98								4.68						
				1.62											
					96.6	6870	53	1.98 / 0.14		1.10	23.79	6.63	68.48	0.41	23.56
			0.14					2.13							
				0.29											
	34.39			(0.07)											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87010
Coal zone:	H		
Field sample no.:	06869	Composite sample no.:	52
Lab sample no.:	30646		
True sample thickness:	2.553 meters	Drill core recovery(%):	43.45 %
Coal/Rock:	2.322 / 0.231 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	30.92	22.77	17.16	22.09	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	4.00	3.06			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.98	
Ash(%):	46.98	47.45
Volatile matter(%):	9.29	9.38
Fixed carbon(%):	42.75	43.17
Total sulphur(%):	0.29	0.29
Combustible sulphur(%):	0.11	
Net calorific value(cal/g):	3604.00	3640.00
Gross calorific value(cal/g):	3604.00	3640.00
Volatile matter(dmmf%):	11.30	
Hardgrove index:	64.00	
Specific gravity:	1.78	
Carbon dioxide(%):	5.07	
Phosphorous in coal(%):	0.092	
Chlorine in coal(ppm):	64.00	
Forms of Sulphur(%):	PYRITE 00.08	SULPHATE 00.00 ORGANIC 00.21

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	46.24	46.70
Hydrogen(%):	1.51	1.52
Nitrogen(%):	0.48	0.48
Oxygen(%):	3.52	3.56

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1216.00
Softening temperature(°C):	1262.00	1232.00
Hemispherical temperature(°C):	1281.00	1246.00
Final temperature(°C):	1332.00	1315.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.92	TiO2(%):	0.70
Al2O3(%):	17.62	Na2O(%):	1.40
Fe2O3(%):	4.23	K2O(%):	1.04
CaO(%):	6.17	SO3(%):	0.97
MgO(%):	4.44	P2O5(%):	0.45

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87010
Coal zone:	H		
Field sample no.:	06870	Composite sample no.:	53
Lab sample no.:	30646		
True sample thickness:	2.127 meters	Drill core recovery(%):	96.68 %
Coal/Rock:	1.983 / 0.144 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.27	25.43	18.57	23.47
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	3.22	2.04		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.10	
Ash(%):	23.79	24.05
Volatile matter(%):	6.63	6.70
Fixed carbon(%):	68.48	69.25
Total sulphur(%):	0.41	0.41
Combustible sulphur(%):	0.07	
Net calorific value(cal/g):	5631.00	5693.00
Gross calorific value(cal/g):	5631.00	5693.00
Volatile matter(dmmf%):	6.30	
Hardgrove index:	46.00	
Specific gravity:	1.55	
Carbon dioxide(%):	3.31	
Phosphorous in coal(%):	0.082	

Forms of Sulphur(%): PYRITE 00.04 SULPHATE 00.00 ORGANIC 00.37

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	68.75	69.51
Hydrogen(%):	1.93	1.95
Nitrogen(%):	0.71	0.72
Oxygen(%):	3.31	3.36

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1227.00	1192.00
Softening temperature(°C):	1240.00	1208.00
Hemispherical temperature(°C):	1246.00	1213.00
Final temperature(°C):	1342.00	1297.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	55.93	TiO2(%):	1.02
Al2O3(%):	15.31	Na2O(%):	1.40
Fe2O3(%):	4.60	K2O(%):	0.55
CaO(%):	9.49	SO3(%):	3.57
MgO(%):	2.72	P2O5(%):	0.79

gcri coal division ash fusion proj KFN BLK LR DB DDH870

sample id 00052
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1281.0	initial temp.(C)	1278.0
softening temp.(C)	1326.0	softening temp.(C)	1283.0
hemispherical temp.(C)	1334.0	hemispherical temp.(C)	1317.0
fluid temp.(C)	1428.0	fluid temp.(C)	1420.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH870

sample id 00052
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.04
aluminium oxide %	(al2o3)	25.19
ferric oxide %	(fe2o3)	2.84
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.70
calcium oxide %	(cao)	3.92
magnesium oxide %	(mgo)	3.33
sulphur trioxide %	(so3)	0.99
sodium oxide %	(na2o)	1.87
potassium oxide %	(k2o)	1.48

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR DB DDH87010

sample id 00052
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1267.0
softening temp.(C)	1310.0	softening temp.(C)	1272.0
hemispherical temp.(C)	1326.0	hemispherical temp.(C)	1286.0
fluid temp.(C)	1434.0	fluid temp.(C)	1432.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87010

sample id 00052
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	53.60
aluminium oxide %	(al2o3)	26.01
ferric oxide %	(fe2o3)	3.07
titanium dioxide %	(tio2)	1.03
phosphorous pentoxide %	(p2o5)	0.67
calcium oxide %	(cao)	4.37
magnesium oxide %	(mgo)	3.43
sulphur trioxide %	(so3)	0.88
sodium oxide %	(na2o)	2.03
potassium oxide %	(k2o)	1.67

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87010

sample id 00053
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1297.0	initial temp.(C)	1160.0
softening temp.(C)	1302.0	softening temp.(C)	1246.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1364.0	fluid temp.(C)	1342.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87010

sample id 00053
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.64
aluminium oxide %	(al2o3)	20.66
ferric oxide %	(fe2o3)	4.60
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.56
calcium oxide %	(cao)	5.49
magnesium oxide %	(mgo)	4.06
sulphur trioxide %	(so3)	1.99
sodium oxide %	(na2o)	1.85
potassium oxide %	(k2o)	0.73

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87010

sample id 00053
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1240.0	initial temp.(C)	1227.0
softening temp.(C)	1337.0	softening temp.(C)	1286.0
hemispherical temp.(C)	1369.0	hemispherical temp.(C)	1297.0
fluid temp.(C)	1450.0	fluid temp.(C)	1445.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87010

sample id 00053
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	55.34
aluminium oxide %	(al2o3)	23.88
ferric oxide %	(fe2o3)	3.52
titanium dioxide %	(tio2)	0.82
phosphorous pentoxide %	(p2o5)	0.61
calcium oxide %	(cao)	4.17
magnesium oxide %	(mgo)	3.22
sulphur trioxide %	(so3)	1.40
sodium oxide %	(na2o)	1.97
potassium oxide %	(k2o)	0.81

90.0 <= total <= 100.0

KPNLRDDH87011

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87011 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/09/87
END DATE - 09/12/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SEAMS INTERSECTED: H, PH. HOLE STARTED ADJACENT TO ABANDONED DDH87010.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1705.28
ZONE - 9
NORTHING - 6342980.77
EASTING - 505254.96

LICENCE/LEASE NUMBER -

LATITUDE - 571354
LONGITUDE - 1285447

- O R I E N T A T I O N -

LENGTH - 93.27
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 4.27
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87011										
		6872	27.41	28.85	100.00		1.199			0.000- 1.199
	H	6873	28.85	32.00	55.87	1.085	0.459	1.219		2.304- 0.459
	H	6874	32.00	34.39	72.80	1.473	0.140	0.591		2.064- 0.140
		6875	34.39	34.54	100.00		0.141			0.000- 0.141
		6876	67.08	68.53	100.00		1.290			0.000- 1.290
	PH	6877	68.53	69.10	100.00	0.338	0.170			0.338- 0.170
		6878	69.10	71.07	100.00		1.707			0.000- 1.707

GULF CANADA CORPORATION - COAL DIVISION

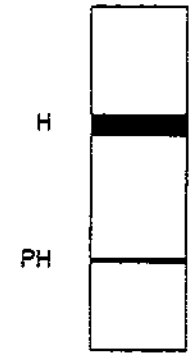
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87011												
	H	54	6873	6873	28.85	32.00	55.87	1.24	0.52	1.39	0.00	2.63- 0.52
	H	55	6874	6874	32.00	34.39	72.80	1.59	0.15	0.65	0.00	2.24- 0.15
	PH	56	6877	6877	68.53	69.10	100.00	0.38	0.19	0.00	0.00	0.38- 0.19
	H	227	6873	6874	28.85	34.39	63.17	2.83	0.67	2.04	0.00	4.87- 0.67
	H	421	6873	6874	28.85	34.39	63.17	2.83	0.67	2.04	0.00	4.87- 0.67

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87011

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057)880072012.LG

COAL SEAM DATA SHEETS

AND

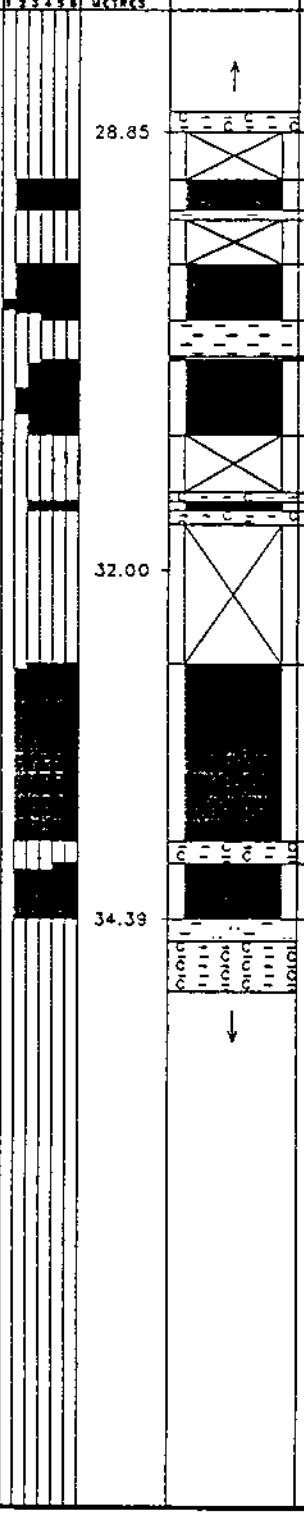
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87011 SEAM : H INTERVAL(M) : 28.85 – 34.39 ELEVATION(M) : 1705.3

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 23/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	28.85			(0.30)	55.9	6873	54	2.30/ 0.46		1.68	53.73	8.33	36.28	0.38	10.85
				0.19				2.76							
			0.84												
				(0.28)											
				0.36											
			0.23												
			0.42												
				0.49											
				(0.36)											
			0.68	0.05											
			0.09						4.37 / 0.60						
	32.00			(0.88)					4.97						
				1.12	73.2	6874	55	2.06/ 0.14		1.43	23.38	7.29	67.90	0.37	24.18
			0.14					2.20							
				0.36											
	34.39														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87011
Coal zone:	H		
Field sample no.:	06873	Composite sample no.:	54
Lab sample no.:	30646		
True sample thickness:	2.763 meters	Drill core recovery (%):	55.87 %
Coal/Rock:	2.304 / 0.459 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	34.42	22.21	15.12	22.31
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.97	1.97		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.68	
Ash (%):	53.73	54.65
Volatile matter (%):	8.33	8.47
Fixed carbon (%):	36.26	36.88
Total sulphur (%):	0.36	0.37
Combustible sulphur (%):	0.05	
Net calorific value (cal/g):	2593.00	2637.00
Gross calorific value (cal/g):	2593.00	2637.00
Volatile matter (dmmf%):	9.70	
Hardgrove index:	63.00	
Specific gravity:	1.88	
Carbon dioxide (%):	4.64	
Phosphorous in coal (%):	0.063	
Chlorine in coal (ppm):	870.00	

Forms of Sulphur (%): PYRITE 00.30 SULPHATE 00.00 ORGANIC 00.06

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	38.31	38.97
Hydrogen (%):	1.41	1.43
Nitrogen (%):	0.45	0.46
Oxygen (%):	4.06	4.12

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1256.00	1221.00
Softening temperature (°C):	1316.00	1278.00
Hemispherical temperature (°C):	1326.00	1283.00
Final temperature (°C):	1439.00	1366.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	57.40	TiO2 (%):	1.15
Al2O3 (%):	19.28	Na2O (%):	1.79
Fe2O3 (%):	4.17	K2O (%):	1.07
CaO (%):	4.81	SO3 (%):	1.43
MgO (%):	3.66	P2O5 (%):	0.27

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87011
Coal zone:	H		
Field sample no.:	06874	Composite sample no.:	55
Lab sample no.:	30646		
True sample thickness:	2.204 meters	Drill core recovery(%):	72.80 %
Coal/Rock:	2.064 / 0.140 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	35.70	28.71	14.68	15.84
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	2.95	2.12		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.43	
Ash(%):	23.38	23.72
Volatile matter(%):	7.29	7.40
Fixed carbon(%):	67.90	68.88
Total sulphur(%):	0.37	0.38
Combustible sulphur(%):	0.04	
Net calorific value(cal/g):	5779.00	5863.00
Gross calorific value(cal/g):	5779.00	5863.00
Volatile matter(dmmf%):	7.30	
Hardgrove index:	58.00	
Specific gravity:	1.52	
Carbon dioxide(%):	2.20	
Phosphorous in coal(%):	0.091	
Chlorine in coal(ppm):	950.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.01 ORGANIC 00.34

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	68.35	69.34
Hydrogen(%):	1.75	1.78
Nitrogen(%):	0.72	0.73
Oxygen(%):	4.00	4.05

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1268.00	1192.00
Softening temperature(°C):	1281.00	1211.00
Hemispherical temperature(°C):	1300.00	1235.00
Final temperature(°C):	1340.00	1332.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	52.14	TiO2(%):	1.33
Al2O3(%):	21.04	Na2O(%):	2.13
Fe2O3(%):	5.72	K2O(%):	0.72
CaO(%):	4.70	SO3(%):	3.58
MgO(%):	3.39	P2O5(%):	0.89

gcri coal division ash fusion proj KPN BLK LR DS DDH87011

sample id 00054
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1273.0	initial temp.(C)	1334.0
softening temp.(C)	1353.0	softening temp.(C)	1323.0
hemispherical temp.(C)	1407.0	hemispherical temp.(C)	1364.0
fluid temp.(C)	1472.0	fluid temp.(C)	1471.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87011

sample id 00054
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	60.09
aluminium oxide %	(al2o3)	23.03
ferric oxide %	(fe2o3)	2.79
titanium dioxide %	(tio2)	0.95
phosphorous pentoxide %	(p2o5)	0.16
calcium oxide %	(cao)	2.75
magnesium oxide %	(mgo)	2.84
sulphur trioxide %	(so3)	1.54
sodium oxide %	(na2o)	1.09
potassium oxide %	(k2o)	1.23

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87011

sample id 00054
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1302.0	initial temp.(C)	1233.0
softening temp.(C)	1345.0	softening temp.(C)	1300.0
hemispherical temp.(C)	1378.0	hemispherical temp.(C)	1332.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87011

sample id 00054
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.24
aluminium oxide %	(al2o3)	22.93
ferric oxide %	(fe2o3)	2.83
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.03
calcium oxide %	(cao)	3.13
magnesium oxide %	(mgo)	3.03
sulphur trioxide %	(so3)	1.24
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	1.33

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87011

sample id 00055
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1305.0	initial temp.(C)	1263.0
softening temp.(C)	1337.0	softening temp.(C)	1289.0
hemispherical temp.(C)	1378.0	hemispherical temp.(C)	1335.0
fluid temp.(C)	1450.0	fluid temp.(C)	1442.0

normal ranges all temps.
1000.0)= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87011

sample id 00055
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	56.44
aluminium oxide %	(al2o3)	23.06
ferric oxide %	(fe2o3)	3.24
titanium dioxide %	(tio2)	1.26
phosphorous pentoxide %	(p2o5)	0.82
calcium oxide %	(cao)	3.58
magnesium oxide %	(mgo)	2.68
sulphur trioxide %	(so3)	1.52
sodium oxide %	(na2o)	2.80
potassium oxide %	(k2o)	0.87

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87011

sample id 00053
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1300.0	initial temp.(C)	1273.0
softening temp.(C)	1396.0	softening temp.(C)	1354.0
hemispherical temp.(C)	1405.0	hemispherical temp.(C)	1396.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87011

sample id 00055
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.08
aluminium oxide %	(al2o3)	24.44
ferric oxide %	(fe2o3)	2.64
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	0.75
calcium oxide %	(cao)	3.30
magnesium oxide %	(mgo)	2.29
sulphur trioxide %	(so3)	1.16
sodium oxide %	(na2o)	2.94
potassium oxide %	(k2o)	0.96

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87011 SEAM : PH INTERVAL(M) : 68.53 – 69.10 ELEVATION(M) : 1705.3

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 23/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	68.53		0.85 / 0.11												
				0.30	100.0	6877	58	0.34 / 0.17 / 0.51	0.34 / 0.17 / 0.51	0.91	71.99	8.25	18.85	—	7.12
	69.10														

KPNLRDDH87012

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87012 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/11/87
END DATE - 09/13/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SEAMS INTERSECTED: J, I, H/I, H. UPRIGHT.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1466.40
ZONE - 9
NORTHING - 6345680.44
EASTING - 507950.35

LICENCE/LEASE NUMBER -

LATITUDE - 571522
LONGITUDE - 1285206

- O R I E N T A T I O N -

LENGTH - 132.06
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 4.57
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87012										
		6879	73.67	74.45	32.05		0.238		0.503	0.000- 0.741
	I	6880	74.45	76.05	60.00	0.837	0.066	0.433	0.169	1.270- 0.235
		6881	76.05	76.50	100.00		0.421			0.000- 0.421
		6882	117.97	119.45	100.00		1.436			0.000- 1.436
	H	6883	119.45	122.05	70.00	1.339	0.413	0.444	0.307	1.783- 0.720
	H	6884	122.05	125.00	78.64	2.089	0.114	0.534	0.066	2.623- 0.180
		6885	125.00	126.33	100.00		1.250			0.000- 1.250

GULF CANADA CORPORATION - COAL DIVISION

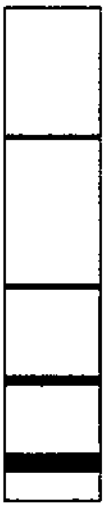
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87012												
	I	57	6880	6880	74.45	76.05	60.00	0.89	0.07	0.46	0.18	1.35- 0.25
	H	58	6883	6883	119.45	122.05	70.00	1.39	0.43	0.46	0.32	1.85- 0.75
	H	59	6884	6884	122.05	125.00	78.64	2.20	0.12	0.56	0.07	2.76- 0.19
	I	228	6880	6880	74.45	76.05	60.00	0.89	0.07	0.46	0.18	1.35- 0.25
	H	229	6883	6884	119.45	125.00	74.59	3.59	0.55	1.02	0.39	4.61- 0.94
	I	422	6880	6880	74.45	76.05	60.00	0.89	0.07	0.46	0.18	1.35- 0.25
	H	423	6883	6884	119.45	125.00	74.59	3.59	0.55	1.02	0.39	4.61- 0.94

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
J	1.80m
I	1.51m
H/I	3.27m
H	5.31m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87012

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

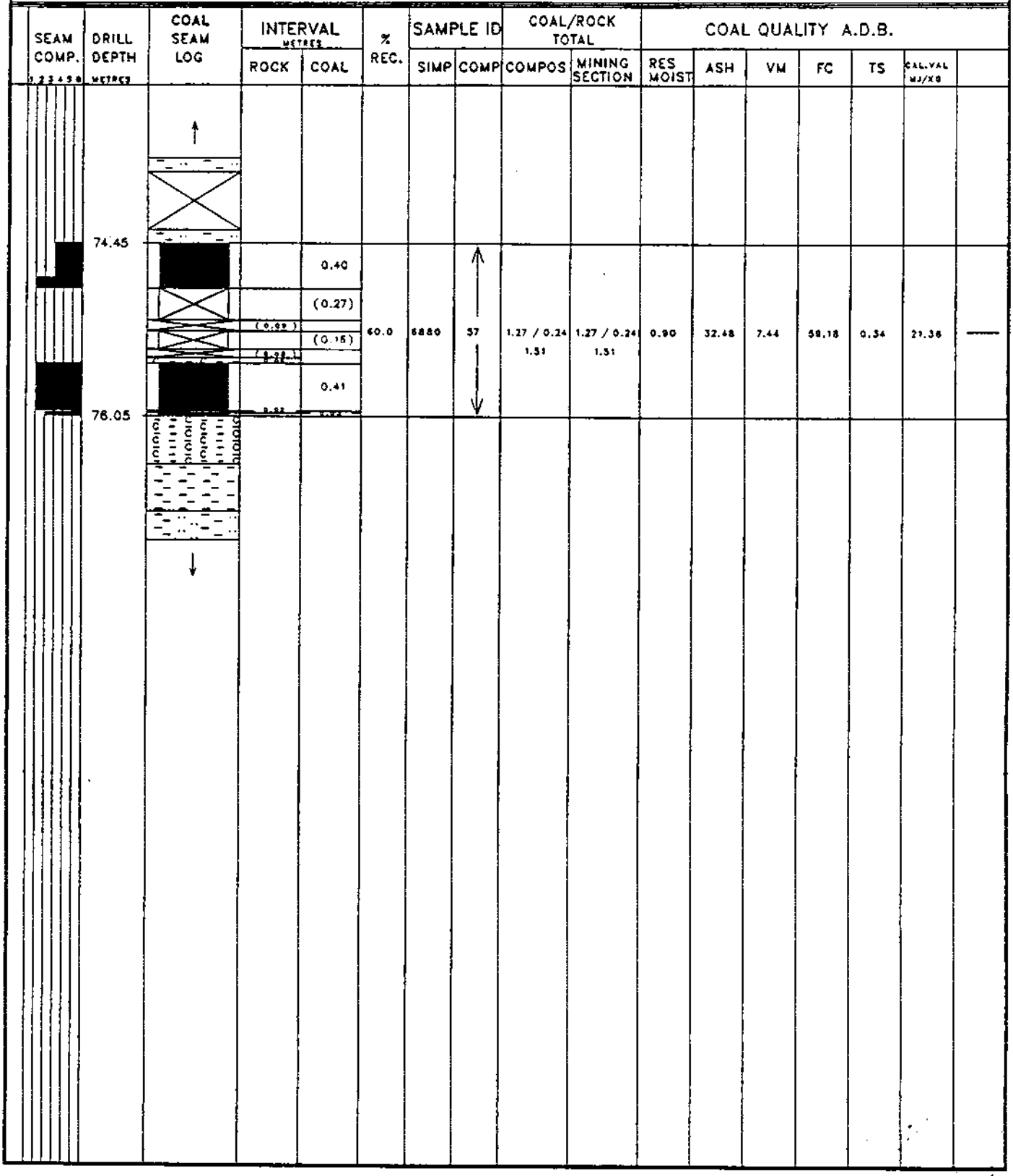
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87012 SEAM : 1 INTERVAL(M) : 74.45 - 76.05 ELEVATION(M) : 1466.4

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
1 2 3 4 5 6																
	74.45			0.40												
				(0.27)												
				(0.09)												
				(0.15)	60.0	6880	57	1.27 / 0.24 1.51	1.27 / 0.24 1.51	0.90	32.48	7.44	59.18	0.34	21.36	—
				(0.02)												
				0.41												
	76.05															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87012
Coal zone:	I		
Field sample no.:	06880	Composite sample no.:	57
Lab sample no.:	30646		
True sample thickness:	1.505 meters	Drill core recovery(%):	60.00 %
Coal/Rock:	1.270 / 0.235 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	22.42	13.27	15.21	32.19
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	9.33	7.58		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	32.48	32.78
Volatile matter(%):	7.44	7.51
Fixed carbon(%):	59.18	59.71
Total sulphur(%):	0.34	0.34
Combustible sulphur(%):	0.06	
Net calorific value(cal/g):	5105.00	5151.00
Gross calorific value(cal/g):	5105.00	5151.00
Volatile matter(dmmf%):	7.40	
Hardgrove index:	64.00	
Specific gravity:	1.60	
Carbon dioxide(%):	1.70	
Phosphorous in coal(%):	0.041	
Chlorine in coal(ppm):	1832.00	
Forms of Sulphur(%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.31	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	60.52	61.07
Hydrogen(%):	2.06	2.08
Nitrogen(%):	0.76	0.77
Oxygen(%):	2.94	2.96

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1243.00	1157.00
Softening temperature(°C):	1324.00	1268.00
Hemispherical temperature(°C):	1343.00	1289.00
Final temperature(°C):	1431.00	1396.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.88	TiO2(%):	1.32
Al2O3(%):	19.90	Na2O(%):	2.35
Fe2O3(%):	3.58	K2O(%):	1.01
CaO(%):	2.60	SO3(%):	2.17
MgO(%):	2.69	P2O5(%):	0.29

gcri coal division ash fusion proj KPN BLK LR DS DDH87012

sample id 00057
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1268.0	initial temp.(C)	1160.0
softening temp.(C)	1300.0	softening temp.(C)	1241.0
hemispherical temp.(C)	1316.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1394.0	fluid temp.(C)	1392.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87012

sample id 00057
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.52
aluminium oxide %	(al2o3)	18.52
ferric oxide %	(fe2o3)	4.69
titanium dioxide %	(tio2)	1.32
phosphorous pentoxide %	(p2o5)	0.56
calcium oxide %	(cao)	3.86
magnesium oxide %	(mgo)	3.36
sulphur trioxide %	(so3)	2.76
sodium oxide %	(na2o)	1.85
potassium oxide %	(k2o)	0.74

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87012

sample id 00057
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1235.0	initial temp.(C)	1139.0
softening temp.(C)	1294.0	softening temp.(C)	1230.0
hemispherical temp.(C)	1327.0	hemispherical temp.(C)	1243.0
fluid temp.(C)	1402.0	fluid temp.(C)	1386.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87012

sample id 00057
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	59.18
aluminium oxide %	(al2o3)	19.28
ferric oxide %	(fe2o3)	4.78
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	0.60
calcium oxide %	(cao)	3.13
magnesium oxide %	(mgo)	3.13
sulphur trioxide %	(so3)	2.50
sodium oxide %	(na2o)	1.71
potassium oxide %	(k2o)	0.69

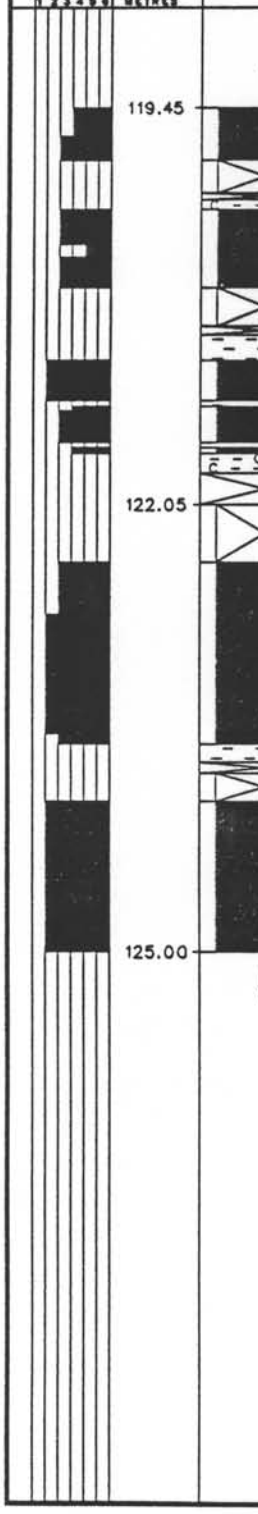
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87012 SEAM : H INTERVAL(M) : 119.45 – 125.00 ELEVATION(M) : 1466.4

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	119.45			0.33												
				(0.20)												
			(0.33) 0.68													
				0.49												
				(0.24)	70.0	6883	58	1.78 / 0.72 2.50		1.00	52.15	8.10	38.75	0.24	13.30	—
			(0.38) 0.16													
				0.25												
			0.04													
				0.23												
			0.03	0.04												
			0.13													
			(0.20)													
	122.05			(0.36)					4.41 / 0.90 5.31							
				1.14												
			0.11		78.6	6884	59	2.62 / 0.18 2.80		0.99	24.10	7.42	67.49	0.42	23.75	—
			(0.97)													
				(0.17)												
				0.95												
	125.00															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87012
Coal zone:	H		
Field sample no.:	06883	Composite sample no.:	58
Lab sample no.:	30646		
True sample thickness:	2.503 meters	Drill core recovery (%):	70.00 %
Coal/Rock:	1.783 / 0.720 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	37.81	24.41	14.04	18.54
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.27	1.93		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.00	
Ash (%):	52.15	52.68
Volatile matter (%):	8.10	8.18
Fixed carbon (%):	38.75	39.14
Total sulphur (%):	0.24	0.24
Net calorific value (cal/g):	3179.00	3211.00
Gross calorific value (cal/g):	3179.00	3211.00
Volatile matter (dmmf%):	9.10	
Hardgrove index:	61.00	
Specific gravity:	1.82	
Carbon dioxide (%):	3.78	
Phosphorous in coal (%):	0.102	
Chlorine in coal (ppm):	1270.00	
Forms of Sulphur (%):	PYRITE 00.02 SULPHATE 00.01 ORGANIC 00.21	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	40.77	41.18
Hydrogen (%):	1.56	1.58
Nitrogen (%):	0.50	0.51
Oxygen (%):	3.78	3.81

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1308.00	1171.00
Softening temperature (°C):	1332.00	1246.00
Hemispherical temperature (°C):	1345.00	1270.00
Final temperature (°C):	1423.00	1421.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	60.78	TiO2 (%):	1.00
Al2O3 (%):	18.90	Na2O (%):	1.85
Fe2O3 (%):	4.30	K2O (%):	0.98
CaO (%):	3.50	SO3 (%):	1.13
MgO (%):	2.97	P2O5 (%):	0.45

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87012
Coal zone:	H		
Field sample no.:	06884	Composite sample no.:	59
Lab sample no.:	30646		
True sample thickness:	2.803 meters	Drill core recovery (%):	78.64 %
Coal/Rock:	2.623 / 0.180 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	32.68	23.69	13.48	21.64
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	5.16	3.35		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.99	
Ash (%):	24.10	24.34
Volatile matter (%):	7.42	7.49
Fixed carbon (%):	67.49	68.17
Total sulphur (%):	0.42	0.42
Combustible sulphur (%):	0.04	
Net calorific value (cal/g):	5675.00	5732.00
Gross calorific value (cal/g):	5676.00	5733.00
Volatile matter (dmmf%):	7.40	
Hardgrove index:	48.00	
Specific gravity:	1.53	
Carbon dioxide (%):	2.74	
Phosphorous in coal (%):	0.190	
Chlorine in coal (ppm):	1030.00	

Forms of Sulphur (%): PYRITE 00.01 SULPHATE 00.01 ORGANIC 00.40

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	69.09	69.78
Hydrogen (%):	2.40	2.42
Nitrogen (%):	0.72	0.73
Oxygen (%):	2.28	2.31

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1229.00	1187.00
Softening temperature (°C):	1275.00	1240.00
Hemispherical temperature (°C):	1283.00	1251.00
Final temperature (°C):	1305.00	1301.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	46.40	TiO2 (%):	1.60
Al2O3 (%):	21.04	Na2O (%):	2.40
Fe2O3 (%):	5.41	K2O (%):	0.73
CaO (%):	7.98	SO3 (%):	3.99
MgO (%):	4.15	P2O5 (%):	1.81

gcri coal division ash fusion proj KFN BLK LR DS DDH87012

sample id 00058
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1345.0	initial temp.(C)	1351.0
softening temp.(C)	1378.0	softening temp.(C)	1289.0
hemispherical temp.(C)	1394.0	hemispherical temp.(C)	1316.0
fluid temp.(C)	1439.0	fluid temp.(C)	1434.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87012

sample id 00058
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	53.88
aluminium oxide %	(al2o3)	21.93
ferric oxide %	(fe2o3)	5.29
titanium dioxide %	(tio2)	1.40
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	3.11
sulphur trioxide %	(so3)	1.44
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	0.88

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87012

sample id 00058
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1367.0	initial temp.(C)	1284.0
softening temp.(C)	1396.0	softening temp.(C)	1327.0
hemispherical temp.(C)	1426.0	hemispherical temp.(C)	1383.0
fluid temp.(C)	1472.0	fluid temp.(C)	1450.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87012

sample id 00058
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.62
aluminium oxide %	(al2o3)	22.30
ferric oxide %	(fe2o3)	5.16
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	0.35
calcium oxide %	(cao)	2.57
magnesium oxide %	(mgo)	2.90
sulphur trioxide %	(so3)	1.28
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	0.84

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR DS DDH87012

sample id 00059
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1213.0	initial temp.(C)	1144.0
softening temp.(C)	1299.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1385.0	fluid temp.(C)	1380.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87012

sample id 00059
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	50.80
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	5.50
titanium dioxide %	(tio2)	1.65
phosphorous pentoxide %	(p2o5)	1.35
calcium oxide %	(cao)	3.99
magnesium oxide %	(mgo)	3.21
sulphur trioxide %	(so3)	2.15
sodium oxide %	(na2o)	1.92
potassium oxide %	(k2o)	0.82

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87012

sample id 00059
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1345.0	initial temp.(C)	1170.0
softening temp.(C)	1369.0	softening temp.(C)	1270.0
hemispherical temp.(C)	1409.0	hemispherical temp.(C)	1326.0
fluid temp.(C)	1439.0	fluid temp.(C)	1430.0

normal ranges all temps.
1000.0)= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87012

sample id 00059
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	52.23
aluminium oxide %	(al2o3)	24.96
ferric oxide %	(fe2o3)	5.63
titanium dioxide %	(tio2)	1.28
phosphorous pentoxide %	(p2o5)	1.03
calcium oxide %	(cao)	3.18
magnesium oxide %	(mgo)	3.15
sulphur trioxide %	(so3)	1.66
sodium oxide %	(na2o)	1.82
potassium oxide %	(k2o)	0.84

90.0 <= total <= 100.0

KPNLRDDH87013

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87013 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/12/87
END DATE - 09/14/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE P. SEAMS J, I, H, PH.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1674.21

ZONE - 9
NORTHING - 6342487.49
EASTING - 504339.18

LICENCE/LEASE NUMBER -

LATITUDE - 571339
LONGITUDE - 1285541

- O R I E N T A T I O N -

LENGTH - 138.26

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 3.05
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87013										
		6891	13.28	14.36	100.00		0.990			0.000- 0.990
	J	6892	14.36	15.36	88.00	0.762	0.066	0.114		0.876- 0.066
		6893	15.36	16.52	81.03		0.908		0.210	0.000- 1.118
		6894	61.40	61.83	100.00		0.356			0.000- 0.356
	I	6895	61.83	63.27	88.19	0.845	0.217	0.142		0.987- 0.217
	I	6896	63.27	67.43	90.38	3.224		0.343		3.567- 0.000
		6897	67.43	68.50	100.00		0.938			0.000- 0.938
		6898	96.21	97.42	100.00		0.973			0.000- 0.973
	H	6899	97.42	99.06	76.83	1.036		0.317		1.353- 0.000
		6900	99.06	100.52	100.00		1.235			0.000- 1.235
		7051	128.61	128.87	100.00		0.223			0.000- 0.223
	PH	7052	128.87	130.45	79.75	1.025	0.060	0.276		1.301- 0.060
		7053	130.45	130.57	100.00		0.104			0.000- 0.104

GULF CANADA CORPORATION - COAL DIVISION

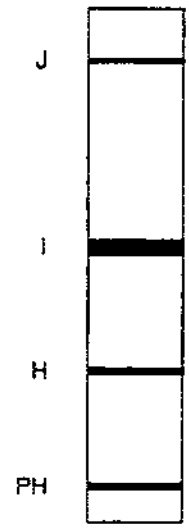
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87013												
	J	60	6892	6892	14.36	15.36	88.00	0.81	0.07	0.12	0.00	0.93- 0.07
	I	61	6895	6895	61.83	63.27	88.19	1.01	0.26	0.17	0.00	1.18- 0.26
	I	62	6896	6896	63.27	67.43	90.38	3.76	0.00	0.40	0.00	4.16- 0.00
	H	63	6899	6899	97.42	99.06	76.82	1.26	0.00	0.38	0.00	1.64- 0.00
	PH	64	7052	7052	128.87	130.45	79.74	1.19	0.07	0.32	0.00	1.51- 0.07
	J	230	6892	6892	14.36	15.36	88.00	0.81	0.07	0.12	0.00	0.93- 0.07
	I	231	6895	6895	61.83	63.27	88.19	1.01	0.26	0.17	0.00	1.18- 0.26
	I	232	6896	6896	63.27	67.43	90.38	3.76	0.00	0.40	0.00	4.16- 0.00
	H	233	6899	6899	97.42	99.06	76.82	1.26	0.00	0.38	0.00	1.64- 0.00
	Ph	234	7052	7052	128.87	130.45	79.74	1.19	0.07	0.32	0.00	1.51- 0.07
	J	424	6892	6892	14.36	15.36	88.00	0.81	0.07	0.12	0.00	0.93- 0.07
	I	425	6895	6896	61.83	67.43	89.82	4.77	0.26	0.57	0.00	5.34- 0.26
	H	426	6899	6899	97.42	99.06	76.82	1.26	0.00	0.38	0.00	1.64- 0.00
	Ph	427	7052	7052	128.87	130.45	79.74	1.19	0.07	0.32	0.00	1.51- 0.07

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
J	0.94m
I	4.77m
H	1.35m
PH	1.36m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87013

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057188007201 2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

COAL DIVISION

MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87013 SEAM : J INTERVAL(M) : 14.36 - 15.36 ELEVATION(M) : 1674.2

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	14.36			0.07 0.14 0.08 0.48 (0.11)	87.9	6892	60	0.88/ 0.07 0.84	0.88/ 0.07 0.94	1.14	28.16	8.09	61.61	0.49	21.87
	15.36														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87013
Coal zone:	J		
Field sample no.:	06892	Composite sample no.:	60
Lab sample no.:	30667		
True sample thickness:	0.942 meters	Drill core recovery (%):	88.00 %
Coal/Rock:	0.876 / 0.066 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	20.21	15.49	14.96	38.92
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	6.94	3.48		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.14	
Ash (%):	29.16	29.50
Volatile matter (%):	8.09	8.18
Fixed carbon (%):	61.61	62.32
Total sulphur (%):	0.49	0.50
Combustible sulphur (%):	0.10	
Net calorific value (cal/g):	5227.00	5287.00
Gross calorific value (cal/g):	5227.00	5287.00
Volatile matter (dmmf%):	8.30	
Hardgrove index:	61.00	
Specific gravity:	1.60	
Carbon dioxide (%):	3.04	
Phosphorous in coal (%):	0.178	
Chlorine in coal (ppm):	3010.00	
Forms of Sulphur (%):	PYRITE 00.08	SULPHATE 00.00 ORGANIC 00.41

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	62.30	63.02
Hydrogen (%):	1.93	1.95
Nitrogen (%):	0.70	0.71
Oxygen (%):	4.28	4.32

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1275.00	1240.00
Softening temperature (°C):	1283.00	1256.00
Hemispherical temperature (°C):	1291.00	1262.00
Final temperature (°C):	1329.00	1305.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	49.49	TiO2 (%):	1.23
Al2O3 (%):	21.49	Na2O (%):	1.26
Fe2O3 (%):	5.16	K2O (%):	1.48
CaO (%):	6.12	SO3 (%):	3.36
MgO (%):	4.83	P2O5 (%):	1.40

gcri coal division ash fusion proj KPN BLK LR DS DDH87013

sample id 00060
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1248.0	initial temp.(C)	1229.0
softening temp.(C)	1267.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1275.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1307.0	fluid temp.(C)	1272.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87013

sample id 00060
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	43.92
aluminium oxide %	(al2o3)	21.04
ferric oxide %	(fe2o3)	5.23
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	3.53
calcium oxide %	(cao)	9.24
magnesium oxide %	(mgo)	6.13
sulphur trioxide %	(so3)	3.11
sodium oxide %	(na2o)	1.00
potassium oxide %	(k2o)	1.01

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR D8 DDH87013

sample id 00060
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1229.0	initial temp.(C)	1187.0
softening temp.(C)	1281.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1294.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1310.0	fluid temp.(C)	1294.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87013

sample id 00060
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	44.50
aluminium oxide %	(al2o3)	21.41
ferric oxide %	(fe2o3)	5.39
titanium dioxide %	(tio2)	0.93
phosphorous pentoxide %	(p2o5)	3.04
calcium oxide %	(cao)	9.01
magnesium oxide %	(mgo)	6.28
sulphur trioxide %	(so3)	2.68
sodium oxide %	(na2o)	1.06
potassium oxide %	(k2o)	1.06

90.0 <= total <= 100.0

GULF CANADA CORPORATION

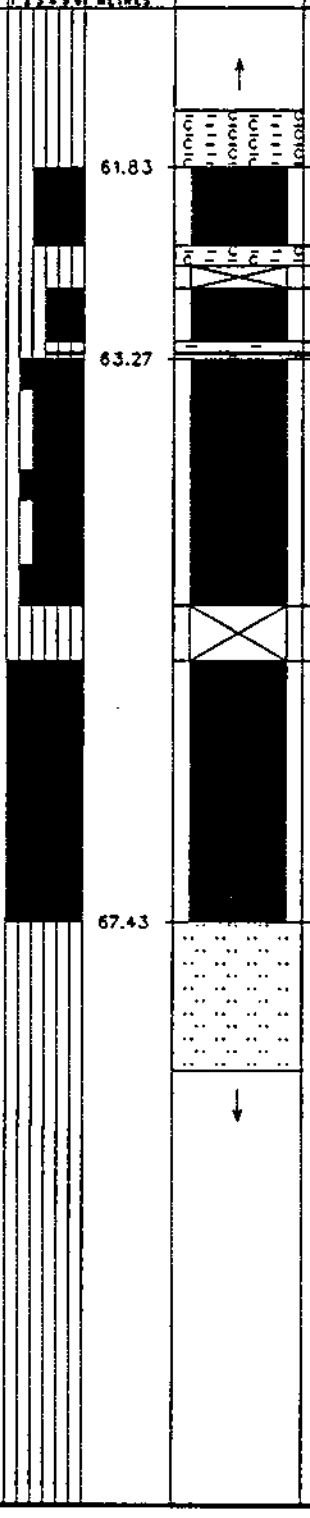
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87013 SEAM : 1 INTERVAL(M) : 61.83 – 67.43 ELEVATION(M) : 1674.2

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	61.83			0.49											
			0.13												
				(0.14)	88.2	5895	61	0.99 / 0.22 1.20		1.11	40.66	7.16	51.07	0.32	17.51
				0.34											
	63.27		0.03	0.03											
				1.56											
									4.33 / 0.22 4.77						
				(0.34)	90.4	5896	62	3.57 / 0.00 3.57		1.09	13.28	6.01	79.62	0.46	28.01
				1.66											
	67.43														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87013
Coal zone:	I		
Field sample no.:	06895	Composite sample no.:	61
Lab sample no.:	30667		
True sample thickness:	1.204 meters	Drill core recovery(%):	88.19 %
Coal/Rock:	0.987 / 0.217 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	29.87	20.26	16.55	26.63	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	4.27	2.42			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.11	
Ash(%):	40.66	41.12
Volatile matter(%):	7.16	7.24
Fixed carbon(%):	51.07	51.64
Total sulphur(%):	0.32	0.32
Combustible sulphur(%):	0.04	
Net calorific value(cal/g):	4185.00	4232.00
Gross calorific value(cal/g):	4185.00	4232.00
Volatile matter(dmmf%):	6.90	
Hardgrove index:	73.00	
Specific gravity:	1.71	
Carbon dioxide(%):	3.14	
Phosphorous in coal(%):	0.012	
Chlorine in coal(ppm):	3070.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.29

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	51.68	52.26
Hydrogen(%):	1.75	1.77
Nitrogen(%):	0.53	0.54
Oxygen(%):	3.95	3.99

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1219.00	1216.00
Softening temperature(°C):	1289.00	1229.00
Hemispherical temperature(°C):	1307.00	1246.00
Final temperature(°C):	1350.00	1346.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.52	TiO2(%):	1.32
Al2O3(%):	17.39	Na2O(%):	2.10
Fe2O3(%):	4.68	K2O(%):	0.93
CaO(%):	3.58	SO3(%):	1.72
MgO(%):	4.06	P2O5(%):	0.07

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87013
Coal zone:	I		
Field sample no.:	06896	Composite sample no.:	62
Lab sample no.:	30667		
True sample thickness:	3.567 meters	Drill core recovery (%):	90.38 %
Coal/Rock:	3.567 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	16.59	18.75	19.60	32.66	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.87	4.53			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.09	
Ash (%):	13.28	13.43
Volatile matter (%):	6.01	6.08
Fixed carbon (%):	79.62	80.49
Total sulphur (%):	0.46	0.47
Combustible sulphur (%):	0.27	
Net calorific value (cal/g):	6694.00	6768.00
Gross calorific value (cal/g):	6694.00	6768.00
Volatile matter (dmmf%):	5.70	
Hardgrove index:	46.00	
Specific gravity:	1.44	
Carbon dioxide (%):	1.80	
Phosphorous in coal (%):	0.162	
Chlorine in coal (ppm):	2910.00	
Forms of Sulphur (%):	PYRITE 00.01 SULPHATE 00.01 ORGANIC 00.44	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	79.08	79.95
Hydrogen (%):	1.91	1.93
Nitrogen (%):	0.82	0.83
Oxygen (%):	3.36	3.39

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1229.00	1197.00
Softening temperature (°C):	1273.00	1203.00
Hemispherical temperature (°C):	1289.00	1216.00
Final temperature (°C):	1326.00	1324.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	47.82	TiO2 (%):	0.93
Al2O3 (%):	17.77	Na2O (%):	1.52
Fe2O3 (%):	8.39	K2O (%):	1.22
CaO (%):	8.42	SO3 (%):	3.62
MgO (%):	5.24	P2O5 (%):	2.79

gcri coal division ash fusion proj KPN BLK LR DB DDH87013

sample id 00061
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1232.0	initial temp.(C)	1230.0
softening temp.(C)	1307.0	softening temp.(C)	1281.0
hemispherical temp.(C)	1315.0	hemispherical temp.(C)	1272.0
fluid temp.(C)	1375.0	fluid temp.(C)	1372.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87013

sample id 00061
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.40
aluminium oxide %	(al2o3)	20.04
ferric oxide %	(fe2o3)	4.85
titanium dioxide %	(tio2)	1.32
phosphorous pentoxide %	(p2o5)	0.15
calcium oxide %	(cao)	5.68
magnesium oxide %	(mgo)	4.56
sulphur trioxide %	(so3)	2.14
sodium oxide %	(na2o)	1.71
potassium oxide %	(k2o)	1.28

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR D8 DDH87013

sample id 00061
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1238.0	initial temp.(C)	1235.0
softening temp.(C)	1315.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1342.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1401.0	fluid temp.(C)	1385.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87013

sample id 00061
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	57.62
aluminium oxide %	(al2o3)	18.66
ferric oxide %	(fe2o3)	4.33
titanium dioxide %	(tio2)	1.32
phosphorous pentoxide %	(p2o5)	0.13
calcium oxide %	(cao)	8.70
magnesium oxide %	(mgo)	4.10
sulphur trioxide %	(so3)	1.86
sodium oxide %	(na2o)	1.56
potassium oxide %	(k2o)	1.20

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87013

sample id 00062
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1229.0	initial temp.(C)	1220.0
softening temp.(C)	1262.0	softening temp.(C)	1240.0
hemispherical temp.(C)	1270.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1316.0	fluid temp.(C)	1287.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87013

sample id 00062
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	46.86
aluminium oxide %	(al2o3)	19.28
ferric oxide %	(fe2o3)	5.15
titanium dioxide %	(tio2)	1.20
phosphorous pentoxide %	(p2o5)	3.55
calcium oxide %	(cao)	7.92
magnesium oxide %	(mgo)	5.44
sulphur trioxide %	(so3)	3.59
sodium oxide %	(na2o)	1.39
potassium oxide %	(k2o)	1.05

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87013

sample id 00062
sample product id SP1 data type (rea.,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1229.0	initial temp.(C)	1220.0
softening temp.(C)	1254.0	softening temp.(C)	1246.0
hemispherical temp.(C)	1270.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1305.0	fluid temp.(C)	1263.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87013

sample id 00062
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	48.04
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.62
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	3.82
calcium oxide %	(cao)	8.34
magnesium oxide %	(mgo)	5.06
sulphur trioxide %	(so3)	3.26
sodium oxide %	(na2o)	1.23
potassium oxide %	(k2o)	1.08

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87013 SEAM : H INTERVAL(M) : 97.42 - 99.06 ELEVATION(M) : 1674.2

GEOLOGIST : PENMAN SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	97.42			1.04	76.6	8888	83	1.38 / 0.00 1.38	1.38 / 0.00 1.38	0.68	18.86	5.74	74.70	0.47	28.38	—
				(0.32)												
	99.06															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87013
Coal zone:	H		
Field sample no.:	06899	Composite sample no.:	63
Lab sample no.:	30667		
True sample thickness:	1.353 meters	Drill core recovery(%):	76.82 %
Coal/Rock:	1.353 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	4.57	10.50	14.71	46.84
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	15.38	8.00		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.68	
Ash(%):	18.88	19.01
Volatile matter(%):	5.74	5.78
Fixed carbon(%):	74.70	75.21
Total sulphur(%):	0.47	0.47
Combustible sulphur(%):	0.17	
Net calorific value(cal/g):	6297.00	6339.00
Gross calorific value(cal/g):	6298.00	6340.00
Volatile matter(dmmf%):	5.20	
Hardgrove index:	73.00	
Specific gravity:	1.50	
Carbon dioxide(%):	1.71	
Phosphorous in coal(%):	0.279	
Chlorine in coal(ppm):	3080.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.45

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	73.08	73.58
Hydrogen(%):	2.40	2.42
Nitrogen(%):	0.79	0.80
Oxygen(%):	3.70	3.72

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1224.00	1216.00
Softening temperature(°C):	1248.00	1222.00
Hemispherical temperature(°C):	1254.00	1229.00
Final temperature(°C):	1313.00	1286.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	49.84	TiO2(%):	1.15
Al2O3(%):	17.26	Na2O(%):	1.31
Fe2O3(%):	5.51	K2O(%):	1.25
CaO(%):	7.61	SO3(%):	3.96
MgO(%):	5.32	P2O5(%):	3.39

gcri coal division ash fusion proj KFN BLK LR D8 DDH87013

sample id 00063
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1240.0
softening temp.(C)	1267.0	softening temp.(C)	1248.0
hemispherical temp.(C)	1273.0	hemispherical temp.(C)	1254.0
fluid temp.(C)	1313.0	fluid temp.(C)	1291.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR D8 DDH87013

sample id 00063
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	47.82
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.10
titanium dioxide %	(tio2)	1.45
phosphorous pentoxide %	(p2o5)	4.63
calcium oxide %	(cao)	8.06
magnesium oxide %	(mgo)	4.52
sulphur trioxide %	(so3)	3.76
sodium oxide %	(na2o)	1.00
potassium oxide %	(k2o)	1.32

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DS DDH87013

sample id 00063
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1224.0	initial temp.(C)	1221.0
softening temp.(C)	1254.0	softening temp.(C)	1238.0
hemispherical temp.(C)	1262.0	hemispherical temp.(C)	1248.0
fluid temp.(C)	1289.0	fluid temp.(C)	1278.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87013

sample id 00063
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	46.60
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.63
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	4.61
calcium oxide %	(cao)	8.12
magnesium oxide %	(mgo)	4.82
sulphur trioxide %	(so3)	3.55
sodium oxide %	(na2o)	0.90
potassium oxide %	(k2o)	1.28

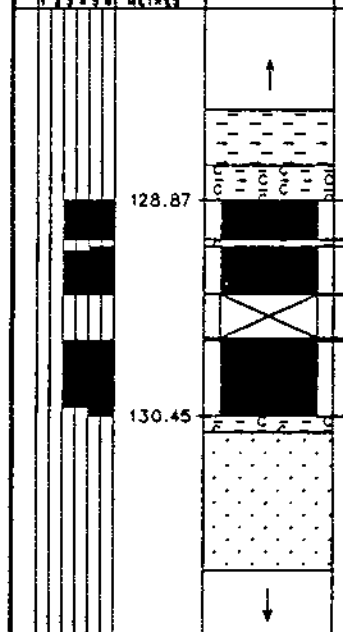
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87013 SEAM : PH INTERVAL(M) : 128.87 - 130.45 ELEVATION(M) : 1674.2

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	128.87			0.25											
				0.30											
				(0.28)	79.7	7052	84	1.30 / 0.06 1.36	1.30 / 0.06 1.36	0.62	35.30	8.92	55.16	0.31	19.78
				0.47											
	130.45														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87013
Coal zone:	PH		
Field sample no.:	07052	Composite sample no.:	64
Lab sample no.:	30667		
True sample thickness:	1.361 meters	Drill core recovery (%):	79.74 %
Coal/Rock:	1.301 / 0.060 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	21.48	22.25	15.73	29.49	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.14	3.91			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.62	
Ash (%):	35.30	35.52
Volatile matter (%):	8.92	8.98
Fixed carbon (%):	55.16	55.50
Total sulphur (%):	0.31	0.31
Combustible sulphur (%):	0.02	
Net calorific value (cal/g):	4727.00	4757.00
Gross calorific value (cal/g):	4727.00	4757.00
Volatile matter (dmmf%):	9.80	
Hardgrove index:	71.00	
Specific gravity:	1.67	
Carbon dioxide (%):	5.45	
Phosphorous in coal (%):	0.091	
Chlorine in coal (ppm):	2150.00	
Forms of Sulphur (%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.28	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	57.36	57.72
Hydrogen (%):	1.70	1.71
Nitrogen (%):	0.52	0.52
Oxygen (%):	4.19	4.22

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1216.00	1192.00
Softening temperature (°C):	1227.00	1208.00
Hemispherical temperature (°C):	1235.00	1216.00
Final temperature (°C):	1299.00	1289.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	57.98	TiO2 (%):	0.65
Al2O3 (%):	14.61	Na2O (%):	1.42
Fe2O3 (%):	5.31	K2O (%):	0.70
CaO (%):	8.90	SO3 (%):	2.06
MgO (%):	5.55	P2O5 (%):	0.59

gcri coal division ash fusion proj KPN BLK LR DB DDH87013

sample id 00064
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1286.0	initial temp.(C)	1240.0
softening temp.(C)	1294.0	softening temp.(C)	1246.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1267.0
fluid temp.(C)	1369.0	fluid temp.(C)	1364.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87013

sample id 00064
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	55.38
aluminium oxide %	(al2o3)	20.79
ferric oxide %	(fe2o3)	4.98
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	0.47
calcium oxide %	(cao)	4.03
magnesium oxide %	(mgo)	4.10
sulphur trioxide %	(so3)	2.84
sodium oxide %	(na2o)	1.57
potassium oxide %	(k2o)	1.04

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87013

sample id 00064
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1222.0	initial temp.(C)	1216.0
softening temp.(C)	1318.0	softening temp.(C)	1259.0
hemispherical temp.(C)	1348.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1415.0	fluid temp.(C)	1401.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87013

sample id 00064
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	54.18
aluminium oxide %	(al2o3)	22.30
ferric oxide %	(fe2o3)	5.61
titanium dioxide %	(tio2)	1.20
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	3.22
magnesium oxide %	(mgo)	4.09
sulphur trioxide %	(so3)	2.46
sodium oxide %	(na2o)	1.52
potassium oxide %	(k2o)	1.12

90.0 <= total <= 100.0

KPNLRDDH87014

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87014 DATE - 03/04/88

- H I S T O R Y -

START DATE - 09/14/87
END DATE - 09/16/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SAVOIE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED K, J, I, H/I, H/I(2). COULD NOT DRILL ANY DEEPER DUE TO DRILL CROWN STUCK IN HOLE.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1473.80
ZONE - 9
NORTHING - 6345653.48
EASTING - 507707.30

LICENCE/LEASE NUMBER -

LATITUDE - 571521
LONGITUDE - 1285220

- O R I E N T A T I O N -

LENGTH - 104.68
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 7.62
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87014										
		5989	57.00	57.15	100.00		0.106			0.000- 0.106
		7054	29.88	30.60	100.00		0.650			0.000- 0.650
	K	7055	30.60	32.67	40.58	0.685	0.072	1.112		1.797- 0.072
		7056	57.15	57.40	100.00		0.177			0.000- 0.177
	I	7057	57.40	61.63	58.16	1.589	0.179	1.068	0.201	2.657- 0.380
		7058	61.63	61.75	100.00		0.087			0.000- 0.087
	H/I2	7059	104.17	104.68	100.00	0.216				0.216- 0.000

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87014												
	K	65	7055	7055	30.60	32.67	40.57	0.76	0.08	1.23	0.00	1.99- 0.08
	I	66	7057	7057	57.40	61.63	58.15	2.21	0.25	1.49	0.28	3.70- 0.53
	I	235	7057	7057	57.40	61.63	58.15	2.21	0.25	1.49	0.28	3.70- 0.53
	I	428	7057	7057	57.40	61.63	58.15	2.21	0.25	1.49	0.28	3.70- 0.53
		7092					0.00					-
		7094										-

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
K	1.87m
J	0.77m
I	3.04m
H/I	1.60m
H/I	

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87014

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(20505718800720I2.LG

COAL SEAM DATA SHEETS

AND

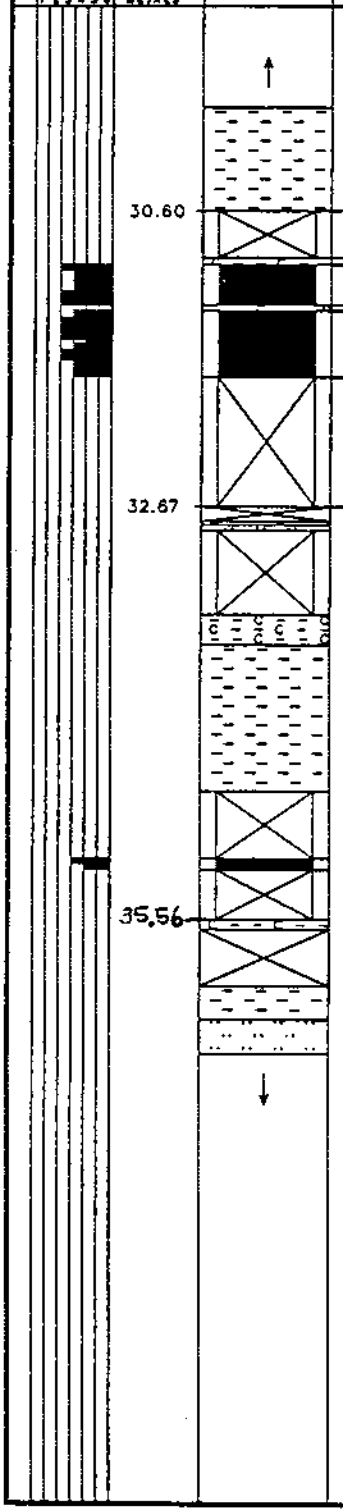
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87014 SEAM : K INTERVAL(M) : 30.60 – 32.67 ELEVATION(M) : 1473.8

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : MAR 01/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	30.60			(0.30)	40.0	7058	65	1.80 / 0.07	1.80 / 0.07	0.62	21.33	7.78	70.27	—	26.93	—
				0.25				1.87	1.87							
				0.42												
	32.67			(0.82)												
	35.56															

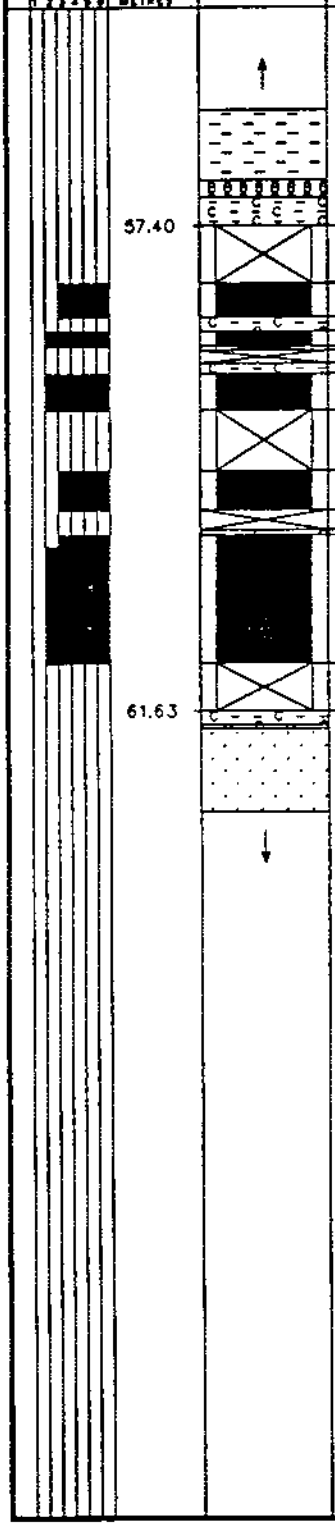
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87014 SEAM : 1 INTERVAL(M) : 57.40 - 61.63 ELEVATION(M) : 1473.8

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : MAR 01/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	57.40			(0.36)												
				0.21												
			0.09	(0.22)												
			(0.05) 0.82													
				0.23												
				(0.38)												
				0.25	38.2	7057	66	2.66 / 0.38 3.04	2.66 / 0.38 3.04	0.81	21.35	6.67	71.17	0.48	25.74	—
			(0.12) 0.42													
				0.80												
				(0.30)												
	61.63															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87014
Coal zone:	I		
Field sample no.:	07057	Composite sample no.:	66
Lab sample no.:	30667		
True sample thickness:	3.037 meters	Drill core recovery(%):	58.15 %
Coal/Rock:	2.657 / 0.380 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	12.44	16.31	13.13	39.75
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	11.48	6.89		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.81	
Ash(%):	21.35	21.53
Volatile matter(%):	6.67	6.72
Fixed carbon(%):	71.17	71.75
Total sulphur(%):	0.48	0.48
Combustible sulphur(%):	0.24	
Net calorific value(cal/g):	6152.00	6202.00
Gross calorific value(cal/g):	6152.00	6202.00
Volatile matter(dmmf%):	6.30	
Hardgrove index:	66.00	
Specific gravity:	1.53	
Carbon dioxide(%):	1.95	
Phosphorous in coal(%):	0.065	
Chlorine in coal(ppm):	2320.00	
Forms of Sulphur(%):	PYRITE 00.02 SULPHATE 00.01 ORGANIC 00.45	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	70.51	71.09
Hydrogen(%):	2.04	2.06
Nitrogen(%):	0.82	0.83
Oxygen(%):	3.99	4.01

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1219.00	1138.00
Softening temperature(°C):	1273.00	1235.00
Hemispherical temperature(°C):	1299.00	1256.00
Final temperature(°C):	1383.00	1337.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	58.86	TiO2(%):	0.85
Al2O3(%):	18.52	Na2O(%):	2.00
Fe2O3(%):	4.56	K2O(%):	1.19
CaO(%):	3.50	SO3(%):	2.78
MgO(%):	3.10	P2O5(%):	0.70

gcri coal division ash fusion proj KPN BLK LR DS DDH87014

sample id 00066
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1273.0	initial temp.(C)	1187.0
softening temp.(C)	1281.0	softening temp.(C)	1235.0
hemispherical temp.(C)	1294.0	hemispherical temp.(C)	1254.0
fluid temp.(C)	1353.0	fluid temp.(C)	1326.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87014

sample id 00066
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	53.10
aluminium oxide %	(al2o3)	20.66
ferric oxide %	(fe2o3)	4.19
titanium dioxide %	(tio2)	1.22
phosphorous pentoxide %	(p2o5)	1.82
calcium oxide %	(cao)	4.90
magnesium oxide %	(mgo)	3.26
sulphur trioxide %	(so3)	3.06
sodium oxide %	(na2o)	1.83
potassium oxide %	(k2o)	1.04

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87014

sample id 00066
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1254.0	initial temp.(C)	1170.0
softening temp.(C)	1289.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1310.0	hemispherical temp.(C)	1273.0
fluid temp.(C)	1388.0	fluid temp.(C)	1369.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87014

sample id 00066
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	54.54
aluminium oxide %	(al2o3)	21.79
ferric oxide %	(fe2o3)	3.79
titanium dioxide %	(tio2)	0.90
phosphorous pentoxide %	(p2o5)	1.85
calcium oxide %	(cao)	4.14
magnesium oxide %	(mgo)	2.90
sulphur trioxide %	(so3)	2.62
sodium oxide %	(na2o)	1.62
potassium oxide %	(k2o)	0.91

90.0 <= total <= 100.0

KPNLRDDH87015

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87015 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/14/87
END DATE - 09/16/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - WEST RIDGE HOLE INTERSECTED L, K, J, I, H, PH. SIT E S.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1632.47

ZONE - 9
NORTHING - 6342109.47
EASTING - 504253.22

LICENCE/LEASE NUMBER -

LATITUDE - 571326
LONGITUDE - 1285546

- O R I E N T A T I O N -

LENGTH - 122.22

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 3.66
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

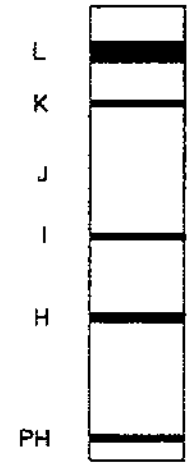
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87015												
	L	67	7090	7090	8.80	14.72	57.43	2.56	0.84	2.34	0.18	4.90- 1.02
	K	68	7093	7093	25.51	27.68	80.64	1.53	0.22	0.30	0.12	1.83- 0.34
	H	69	7096	7096	81.80	85.59	74.14	1.88	0.93	0.98	0.00	2.86- 0.93
	L	236	7090	7090	8.80	14.72	57.43	2.56	0.84	2.34	0.18	4.90- 1.02
	K	237	7093	7093	25.51	27.68	80.64	1.53	0.22	0.30	0.12	1.83- 0.34
	H	238	7096	7096	81.80	85.59	74.14	1.88	0.93	0.98	0.00	2.86- 0.93
	L	429	7090	7090	8.80	14.72	57.43	2.56	0.84	2.34	0.18	4.90- 1.02
	K	430	7093	7093	25.51	27.68	80.64	1.53	0.22	0.30	0.12	1.83- 0.34
	H	431	7096	7096	81.80	85.59	74.14	1.88	0.93	0.98	0.00	2.86- 0.93

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
L	4.85m
K	1.92m
J	
I	2.38m
H	3.33m
PH	1.98m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87015

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:{205057}880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87015 SEAM : L INTERVAL(M) : 8.80 – 14.72 ELEVATION(M) : 1632.5

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
1 2 3 4 5 6																
	8.80			(0.03)												
				0.24												
				(0.12)												
				0.14												
			0.63	(0.06)												
				0.74												
				(0.19)												
			0.19													
			0.63	0.07												
				0.32												
			0.11													
				(0.41)												
				0.22												
			0.07		57.2	7090	67	4.01 / 0.84	4.01 / 0.84	0.79	41.09	8.81	49.31	0.65	17.28	—
				0.26				4.84	4.84							
				(0.61)												
			0.37													
			(0.37)													
				(0.12)												
				0.12												
			0.08													
				(0.13)												
			(0.03)													
			0.03	0.12												
			0.03													
			(0.03)													
				0.14												
				(0.03)												
			0.13													
				0.17												
	14.72			(0.19)												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87015
Coal zone:	L		
Field sample no.:	07090	Composite sample no.:	67
Lab sample no.:	30667		
True sample thickness:	4.845 meters	Drill core recovery (%):	57.43 %
Coal/Rock:	4.008 / 0.837 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	28.25	23.56	15.79	26.40
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.99	2.01		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.79	
Ash (%):	41.09	41.42
Volatile matter (%):	8.81	8.88
Fixed carbon (%):	49.31	49.70
Total sulphur (%):	0.65	0.66
Combustible sulphur (%):	0.24	
Net calorific value (cal/g):	4130.00	4163.00
Gross calorific value (cal/g):	4130.00	4163.00
Volatile matter (dmmf%):	9.70	
Hardgrove index:	71.00	
Specific gravity:	1.70	
Carbon dioxide (%):	3.93	
Phosphorous in coal (%):	0.084	
Chlorine in coal (ppm):	2340.00	
Forms of Sulphur (%):	PYRITE 00.29 SULPHATE 00.01 ORGANIC 00.35	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	51.00	51.41
Hydrogen (%):	1.65	1.66
Nitrogen (%):	0.62	0.62
Oxygen (%):	4.20	4.23

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1206.00	1176.00
Softening temperature (°C):	1275.00	1187.00
Hemispherical temperature (°C):	1283.00	1219.00
Final temperature (°C):	1332.00	1305.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	55.70	TiO2 (%):	1.42
Al2O3 (%):	17.77	Na2O (%):	1.85
Fe2O3 (%):	7.25	K2O (%):	1.03
CaO (%):	3.97	SO3 (%):	2.49
MgO (%):	3.63	P2O5 (%):	0.47

gcri coal division ash fusion proj KPN BLK LR DB DDH87015

sample id 00067
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1219.0	initial temp.(C)	1106.0
softening temp.(C)	1315.0	softening temp.(C)	1224.0
hemispherical temp.(C)	1342.0	hemispherical temp.(C)	1267.0
fluid temp.(C)	1396.0	fluid temp.(C)	1391.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87015

sample id 00067
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	56.16
aluminium oxide %	(al2o3)	20.66
ferric oxide %	(fe2o3)	5.92
titanium dioxide %	(tio2)	1.34
phosphorous pentoxide %	(p2o5)	0.55
calcium oxide %	(cao)	3.39
magnesium oxide %	(mgo)	2.87
sulphur trioxide %	(so3)	2.44
sodium oxide %	(na2o)	1.50
potassium oxide %	(k2o)	1.01

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87015

sample id 00067
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1273.0	initial temp.(C)	1246.0
softening temp.(C)	1348.0	softening temp.(C)	1273.0
hemispherical temp.(C)	1385.0	hemispherical temp.(C)	1310.0
fluid temp.(C)	1453.0	fluid temp.(C)	1439.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87015

sample id 00067
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.64
aluminium oxide %	(al2o3)	21.55
ferric oxide %	(fe2o3)	5.28
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.53
calcium oxide %	(cao)	3.41
magnesium oxide %	(mgo)	2.68
sulphur trioxide %	(so3)	2.22
sodium oxide %	(na2o)	1.60
potassium oxide %	(k2o)	0.99

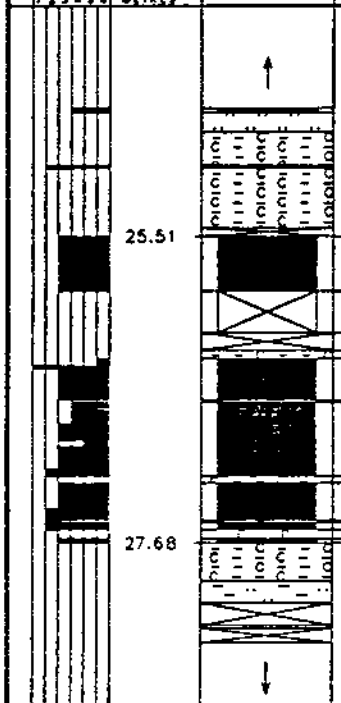
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87015 | SEAM : K | INTERVAL(M) : 25.51 – 27.68 | ELEVATION(M) : 1632.5

GEOLOGIST : LEE | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	25.51			0.34	80.8	7093	68	1.62 / 0.30	1.62 / 0.30	0.55	24.09	7.72	67.64	0.49	23.88	—
				(0.26)				1.92	1.92							
				0.26												
				0.46												
				0.23												
	27.68															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87015
Coal zone:	K		
Field sample no.:	07093	Composite sample no.:	68
Lab sample no.:	30667		
True sample thickness:	1.919 meters	Drill core recovery(%):	80.64 %
Coal/Rock:	1.616 / 0.303 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	13.65	13.90	13.51	43.39
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	10.31	5.24		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.55	
Ash(%):	24.09	24.22
Volatile matter(%):	7.72	7.76
Fixed carbon(%):	67.64	68.02
Total sulphur(%):	0.49	0.49
Combustible sulphur(%):	0.14	
Net calorific value(cal/g):	5703.00	5734.00
Gross calorific value(cal/g):	5703.00	5734.00
Volatile matter(dmmf%):	7.70	
Hardgrove index:	56.00	
Specific gravity:	1.55	
Carbon dioxide(%):	2.74	
Phosphorous in coal(%):	0.186	
Chlorine in coal(ppm):	3080.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.46

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	67.72	68.09
Hydrogen(%):	1.98	1.99
Nitrogen(%):	0.75	0.75
Oxygen(%):	4.42	4.46

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1235.00	1187.00
Softening temperature(°C):	1291.00	1246.00
Hemispherical temperature(°C):	1305.00	1251.00
Final temperature(°C):	1348.00	1334.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	50.78	TiO2(%):	1.49
Al2O3(%):	17.77	Na2O(%):	1.27
Fe2O3(%):	6.91	K2O(%):	1.07
CaO(%):	6.49	SO3(%):	3.62
MgO(%):	4.34	P2O5(%):	1.77

(1)

gcri coal division | ash fusion | proj KPN | BLK LR | DE DEH87015

sample id 00068
sample product id SP1 | date type (real,boro,aver,calc) REAL
split sample id AP3 | date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1267.0	initial temp.(C)	1224.0
softening temp.(C)	1273.0	softening temp.(C)	1246.0
hemispherical temp.(C)	1283.0	hemispherical temp.(C)	1262.0
fluid temp.(C)	1332.0	fluid temp.(C)	1321.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division | ash mineral | proj KPN | BLK LR | DE DEH87015

sample id 00068
sample product id SP1 | date type (real,boro,aver,calc) REAL
split sample id AM3 | date analysed 31/12/87

silicon dioxide %	(sio2)	48.82
aluminium oxide %	(al2o3)	22.17
ferric oxide %	(fe2o3)	6.08
titanium dioxide %	(tio2)	1.40
phosphorous pentoxide %	(p2o5)	1.90
calcium oxide %	(cao)	5.32
magnesium oxide %	(mgo)	4.23
sulphur trioxide %	(so3)	2.92
sodium oxide %	(na2o)	1.29
potassium oxide %	(k2o)	0.99

90.0 <= total <= 100.0

gcri-coal division ash fusion proj KPN BLK LR DB DDH87015

sample id 00068
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1278.0
softening temp.(C)	1321.0	softening temp.(C)	1286.0
hemispherical temp.(C)	1385.0	hemispherical temp.(C)	1305.0
fluid temp.(C)	1409.0	fluid temp.(C)	1399.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87015

sample id 00068
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

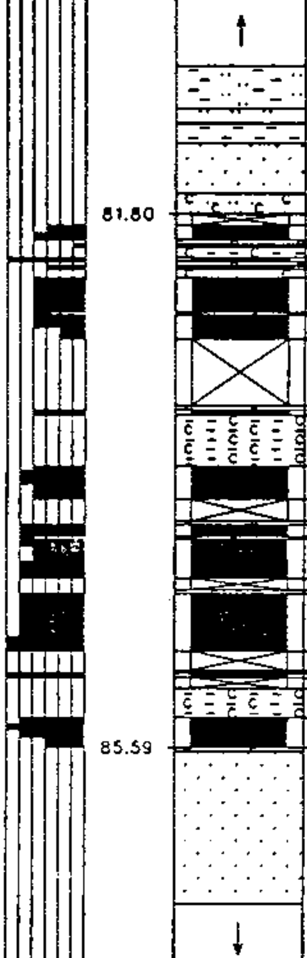
silicon dioxide %	(sio2)	51.12
aluminium oxide %	(al2o3)	24.44
ferric oxide %	(fe2o3)	5.43
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	1.39
calcium oxide %	(cao)	4.00
magnesium oxide %	(mgo)	3.81
sulphur trioxide %	(so3)	2.35
sodium oxide %	(na2o)	1.21
potassium oxide %	(k2o)	0.93

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE:	KPN LR DDH87015	SEAM : H	INTERVAL(M) : 81.80 – 85.59	ELEVATION(M) :	1632.5
GEOLOGIST :	LEE	SCALE: 1:40	DATE : FEB 24/88	DRAWING NO. :	



SEAM COMP.	DRILL DEPTH (METRES)	COAL SEAM LOG	INTERVAL (METRES) ROCK	INTERVAL (METRES) COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	81.80			(0.07)												
				0.09												
			0.03	[illegible]												
			[illegible]	[illegible]												
				0.22												
			0.03													
				0.19												
				(0.42)												
			0.03	[illegible]												
			0.32													
				0.21	73.6	7096	69	2.51 / 0.82 3.33	2.51 / 0.82 3.33	1.37	36.71	8.30	53.62	0.31	18.55	—
				(0.13)												
			0.03													
			0.03	0.07												
				0.25												
			0.03	(0.07)												
				0.36												
				(0.12)												
			0.03	[illegible]												
				(0.07)												
			0.18													
	85.59			0.19												

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87015
Coal zone:	H		
Field sample no.:	07096	Composite sample no.:	69
Lab sample no.:	30680		
True sample thickness:	3.335 meters	Drill core recovery(%):	74.14 %
Coal/Rock:	2.515 / 0.820 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	30.75	21.87	16.53	23.79
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.49	2.57		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.37	
Ash(%):	36.71	37.22
Volatile matter(%):	8.30	8.42
Fixed carbon(%):	53.62	54.36
Total sulphur(%):	0.31	0.31
Combustible sulphur(%):	0.13	
Net calorific value(cal/g):	4433.00	4495.00
Gross calorific value(cal/g):	4433.00	4495.00
Volatile matter(dmmf%):	9.00	
Hardgrove index:	66.00	
Specific gravity:	1.66	
Carbon dioxide(%):	4.45	
Phosphorous in coal(%):	0.133	
Chlorine in coal(ppm):	3360.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.28

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	55.25	56.02
Hydrogen(%):	2.09	2.12
Nitrogen(%):	0.57	0.58
Oxygen(%):	3.70	3.75

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1176.00
Softening temperature(°C):	1256.00	1219.00
Hemispherical temperature(°C):	1267.00	1238.00
Final temperature(°C):	1299.00	1289.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	55.48	TiO2(%):	1.01
Al2O3(%):	16.63	Na2O(%):	2.00
Fe2O3(%):	4.98	K2O(%):	0.78
CaO(%):	7.64	SO3(%):	3.00
MgO(%):	4.32	P2O5(%):	0.83

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87013

sample id 00069
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1273.0	initial temp.(C)	1246.0
softening temp.(C)	1278.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1289.0	hemispherical temp.(C)	1270.0
fluid temp.(C)	1340.0	fluid temp.(C)	1321.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87013

sample id 00069
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.24
aluminium oxide %	(al2o3)	20.41
ferric oxide %	(fe2o3)	4.38
titanium dioxide %	(tio2)	1.34
phosphorous pentoxide %	(p2o5)	1.22
calcium oxide %	(cao)	4.98
magnesium oxide %	(mgo)	3.35
sulphur trioxide %	(so3)	2.94
sodium oxide %	(na2o)	1.86
potassium oxide %	(k2o)	1.05

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DB DDH87015

sample id 00069
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1251.0	initial temp.(C)	1246.0
softening temp.(C)	1289.0	softening temp.(C)	1264.0
hamispherical temp.(C)	1307.0	hamispherical temp.(C)	1270.0
fluid temp.(C)	1333.0	fluid temp.(C)	1310.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87015

sample id 00069
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	54.28
aluminium oxide %	(al2o3)	21.79
ferric oxide %	(fe2o3)	4.28
titanium dioxide %	(tio2)	0.41
phosphorous pentoxide %	(p2o5)	1.12
calcium oxide %	(cao)	5.46
magnesium oxide %	(mgo)	2.98
sulphur trioxide %	(so3)	2.39
sodium oxide %	(na2o)	1.87
potassium oxide %	(k2o)	1.07

90.0 <= total <= 100.0

KPNLRDDH87016

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87016 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/16/87
END DATE - 09/17/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SAVOIE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - TWINNED KPNLRDDH85022. SEAMS J, I.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1679.17
ZONE - 9
NORTHING - 6343561.68
EASTING - 506631.20

LICENCE/LEASE NUMBER -

LATITUDE - 571413
LONGITUDE - 1285325

- O R I E N T A T I O N -

LENGTH - 66.18
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - C.O

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) -	3.66
AQUIFER DEPTHS (M) -	0.00
	0.00
LOST CIRC. DEPTHS (M) -	0.00
	0.00

*** NOTE *** O INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87016										
		5987	15.99	16.02	100.00		0.030			0.000- 0.030
		5988	44.25	44.29	100.00		0.039			0.000- 0.039
		6886	48.08	48.60	100.00		0.515			0.000- 0.515
	I	6887	48.60	50.16	76.92	1.161	0.030	0.357		1.518- 0.030
	I	6888	50.16	51.80	82.32	1.261	0.079	0.239	0.050	1.500- 0.129
	I	6889	51.80	53.55	100.00	1.741				1.741- 0.000
		6890	53.55	54.54	100.00		0.986			0.000- 0.986

GULF CANADA CORPORATION - COAL DIVISION

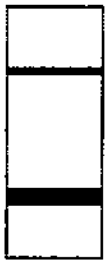
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87016												
	I	70	6887	6887	48.60	50.16	76.92	1.17	0.03	0.36	0.00	1.53- 0.03
	I	71	6888	6888	50.16	51.80	82.31	1.27	0.08	0.24	0.05	1.51- 0.13
	I	72	6889	6889	51.80	53.55	100.00	1.75	0.00	0.00	0.00	1.75- 0.00
	I	239	6887	6887	48.60	50.16	76.92	1.17	0.03	0.36	0.00	1.53- 0.03
	I	240	6888	6888	50.16	51.80	82.31	1.27	0.08	0.24	0.05	1.51- 0.13
	I	241	6889	6889	51.80	53.55	100.00	1.75	0.00	0.00	0.00	1.75- 0.00
	I	432	6887	6889	48.60	53.55	86.86	4.19	0.11	0.60	0.05	4.79- 0.16

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
J	1.83m
I	4.92m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87016

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057)880072012.LG

COAL SEAM DATA SHEETS

AND

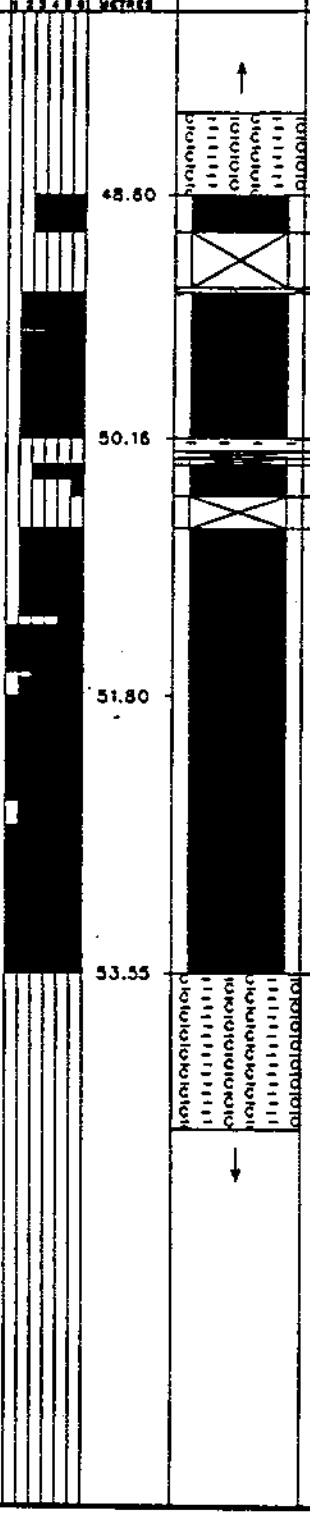
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87016 SEAM : 1 INTERVAL(M) : 48.60 – 53.55 ELEVATION(M) : 1679.2

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 23/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6				0.24											
	48.60			(0.36)											
				0.92	76.9	6887	70	1.32 / 0.03 1.55		1.03	20.96	8.31	69.67	0.41	28.33
	50.16			0.20											
				(0.20)											
				2.80	82.3	6888	71	1.50 / 0.13 1.63	4.76 / 0.16 4.92	1.24	28.81	7.63	62.32	0.37	22.66
	51.80				100.0	6889	72	1.74 / 0.00 1.74		1.30	10.49	5.90	82.41	0.48	30.50
	53.55														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87016
Coal zone:	I		
Field sample no.:	06887	Composite sample no.:	70
Lab sample no.:	30608		
True sample thickness:	1.548 meters	Drill core recovery (%):	76.92 %
Coal/Rock:	1.518 / 0.030 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	24.03	22.26	21.58	25.67	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	4.12	2.34			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.03	
Ash (%):	20.99	21.21
Volatile matter (%):	8.31	8.40
Fixed carbon (%):	69.67	70.39
Total sulphur (%):	0.41	0.41
Combustible sulphur (%):	0.01	
Net calorific value (cal/g):	6293.00	6358.00
Gross calorific value (cal/g):	6293.00	6358.00
Volatile matter (dmmf%):	8.60	
Hardgrove index:	52.00	
Specific gravity:	1.51	
Carbon dioxide (%):	4.27	
Phosphorous in coal (%):	0.023	
Chlorine in coal (ppm):	2000.00	
Forms of Sulphur (%):	PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.39	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	70.31	71.04
Hydrogen (%):	2.20	2.22
Nitrogen (%):	0.72	0.73
Oxygen (%):	4.34	4.39

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1235.00	1187.00
Softening temperature (°C):	1238.00	1195.00
Hemispherical temperature (°C):	1243.00	1200.00
Final temperature (°C):	1283.00	1275.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	51.61	TiO2 (%):	0.87
Al2O3 (%):	15.72	Na2O (%):	1.23
Fe2O3 (%):	10.03	K2O (%):	0.74
CaO (%):	5.11	SO3 (%):	4.76
MgO (%):	6.91	P2O5 (%):	0.25

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87016
Coal zone:	1		
Field sample no.:	06888	Composite sample no.:	71
Lab sample no.:	30608		
True sample thickness:	1.629 meters	Drill core recovery(%):	82.31 %
Coal/Rock:	1.500 / 0.129 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	28.81	26.22	18.43	20.45
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	3.37	2.72		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.24	
Ash(%):	28.81	29.17
Volatile matter(%):	7.63	7.73
Fixed carbon(%):	62.32	63.10
Total sulphur(%):	0.37	0.37
Combustible sulphur(%):	0.06	
Net calorific value(cal/g):	5487.00	5557.00
Gross calorific value(cal/g):	5487.00	5557.00
Volatile matter(dmmf%):	7.70	
Hardgrove index:	51.00	
Specific gravity:	1.58	
Carbon dioxide(%):	3.33	
Phosphorous in coal(%):	0.026	
Chlorine in coal(ppm):	1120.00	

Forms of Sulphur(%): PYRITE 00.05 SULPHATE 00.00 ORGANIC 00.32

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	63.24	64.04
Hydrogen(%):	2.20	2.23
Nitrogen(%):	0.71	0.72
Oxygen(%):	3.43	3.47

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1267.00	1171.00
Softening temperature(°C):	1289.00	1203.00
Hemispherical temperature(°C):	1305.00	1248.00
Final temperature(°C):	1372.00	1321.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	50.26	TiO2(%):	1.09
Al2O3(%):	20.54	Na2O(%):	2.31
Fe2O3(%):	10.89	K2O(%):	0.87
CaO(%):	3.00	SO3(%):	2.71
MgO(%):	4.71	P2O5(%):	0.21

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87016
Coal zone:	I		
Field sample no.:	06889	Composite sample no.:	72
Lab sample no.:	30608		
True sample thickness:	1.741 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	1.741 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.65	25.56	17.64	23.39
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	3.59	2.17		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.30	
Ash(%):	10.49	10.63
Volatile matter(%):	5.80	5.88
Fixed carbon(%):	82.41	83.49
Total sulphur(%):	0.48	0.49
Combustible sulphur(%):	0.31	
Net calorific value(cal/g):	7289.00	7385.00
Gross calorific value(cal/g):	7290.00	7386.00
Volatile matter(dmmf%):	5.50	
Hardgrove index:	43.00	
Specific gravity:	1.41	
Carbon dioxide(%):	1.48	
Phosphorous in coal(%):	0.081	
Chlorine in coal(ppm):	1200.00	

Forms of Sulphur(%): PYRITE 00.01 SULPHATE 00.00 ORGANIC 00.47

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	82.32	83.41
Hydrogen(%):	2.46	2.49
Nitrogen(%):	0.83	0.84
Oxygen(%):	2.12	2.14

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1166.00
Softening temperature(°C):	1272.00	1195.00
Hemispherical temperature(°C):	1286.00	1213.00
Final temperature(°C):	1310.00	1270.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	42.18	TiO2(%):	1.31
Al2O3(%):	21.61	Na2O(%):	1.85
Fe2O3(%):	9.12	K2O(%):	0.86
CaO(%):	8.72	SO3(%):	4.10
MgO(%):	4.92	P2O5(%):	1.76

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00070
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1283.0	initial temp.(C)	1246.0
softening temp.(C)	1310.0	softening temp.(C)	1270.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1272.0
fluid temp.(C)	1380.0	fluid temp.(C)	1371.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87016

sample id 00070
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	53.75
aluminium oxide %	(al2o3)	25.44
ferric oxide %	(fe2o3)	4.70
titanium dioxide %	(tio2)	0.95
phosphorous pentoxide %	(p2o5)	0.29
calcium oxide %	(cao)	3.90
magnesium oxide %	(mgo)	4.03
sulphur trioxide %	(so3)	1.96
sodium oxide %	(na2o)	1.58
potassium oxide %	(k2o)	1.33

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00070
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1262.0
softening temp.(C)	1329.0	softening temp.(C)	1283.0
hemispherical temp.(C)	1369.0	hemispherical temp.(C)	1326.0
fluid temp.(C)	147.2	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87016

sample id 00070
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	54.02
aluminium oxide %	(al2o3)	25.72
ferric oxide %	(fe2o3)	4.06
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.28
calcium oxide %	(cao)	3.37
magnesium oxide %	(mgo)	3.51
sulphur trioxide %	(so3)	2.00
sodium oxide %	(na2o)	1.47
potassium oxide %	(k2o)	1.25

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00071
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1375.0	initial temp.(C)	1243.0
softening temp.(C)	1444.0	softening temp.(C)	1326.0
hemispherical temp.(C)	1458.0	hemispherical temp.(C)	1407.0
fluid temp.(C)	147.2	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87016

sample id 00071
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	51.99
aluminium oxide %	(al2o3)	29.30
ferric oxide %	(fe2o3)	5.39
titanium dioxide %	(tio2)	0.95
phosphorous pentoxide %	(p2o5)	0.21
calcium oxide %	(cao)	1.34
magnesium oxide %	(mgo)	3.34
sulphur trioxide %	(so3)	1.63
sodium oxide %	(na2o)	0.78
potassium oxide %	(k2o)	1.43

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00071
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1316.0	initial temp.(C)	1308.0
softening temp.(C)	1472.0	softening temp.(C)	1404.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1453.0
fluid temp.(C)	147.2	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87016

sample id 00071
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	57.82
aluminium oxide %	(al2o3)	28.73
ferric oxide %	(fe2o3)	3.01
titanium dioxide %	(tio2)	1.19
phosphorous pentoxide %	(p2o5)	0.21
calcium oxide %	(cao)	1.29
magnesium oxide %	(mgo)	2.33
sulphur trioxide %	(so3)	1.68
sodium oxide %	(na2o)	0.69
potassium oxide %	(k2o)	1.58

90.0 <= total <= 100.0

(1)

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00072
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1243.0	initial temp.(C)	1208.0
softening temp.(C)	1254.0	softening temp.(C)	1211.0
hemispherical temp.(C)	1267.0	hemispherical temp.(C)	1221.0
fluid temp.(C)	1310.0	fluid temp.(C)	1307.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH8701

sample id 00072
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	42.26
aluminium oxide %	(al2o3)	17.62
ferric oxide %	(fe2o3)	7.28
titanium dioxide %	(tio2)	1.02
phosphorous pentoxide %	(p2o5)	1.68
calcium oxide %	(cao)	13.61
magnesium oxide %	(mgo)	6.25
sulphur trioxide %	(so3)	4.63
sodium oxide %	(na2o)	1.59
potassium oxide %	(k2o)	0.81

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87016

sample id 00072
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1264.0	initial temp.(C)	1219.0
softening temp.(C)	1321.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1326.0	hemispherical temp.(C)	1259.0
fluid temp.(C)	1375.0	fluid temp.(C)	1348.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87016

sample id 00072
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	43.92
aluminium oxide %	(al2o3)	22.88
ferric oxide %	(fe2o3)	5.81
titanium dioxide %	(tio2)	0.56
phosphorous pentoxide %	(p2o5)	3.80
calcium oxide %	(cao)	10.16
magnesium oxide %	(mgo)	4.62
sulphur trioxide %	(so3)	2.13
sodium oxide %	(na2o)	1.71
potassium oxide %	(k2o)	1.23

90.0 <= total <= 100.0

KPNLRDDH87017

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87017 DATE - 03/04/88

- H I S T O R Y -

START DATE - 09/16/87
END DATE - 09/18/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE E. SEAMS K, J, I, H/I, H/I(2) INTERSECTED.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1472.00

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6345801.44
EASTING - 507505.26

LATITUDE - 571526
LONGITUDE - 1285232

- O R I E N T A T I O N -

LENGTH - 118.19

CORE SIZE - 0.0

INCLINATION - 90.0
AZIMUTH - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 4.57
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87017										
		5990	25.29	25.31	100.00		0.018			0.000- 0.018
		7067	24.85	25.34	100.00		0.425			0.000- 0.425
	K	7068	25.34	28.80	50.00	1.030	0.334	1.348	0.104	2.378- 0.438
	K	7069	28.80	31.02	72.97	0.463	0.825	0.344	0.180	0.807- 1.005
		7070	31.02	31.27	100.00		0.234			0.000- 0.234
		7071	59.46	60.67	84.30		1.016		0.189	0.000- 1.205
	I	7072	60.67	62.93	77.43	1.598	0.150	0.509		2.107- 0.150
		7073	62.93	63.38	100.00		0.450			0.000- 0.450
		7074	95.01	95.37	100.00		0.343			0.000- 0.343
	H/I2	7075	95.37	96.92	63.23	0.749	0.128	0.463	0.044	1.212- 0.172
		7076	96.92	97.19	100.00		0.207			0.000- 0.207

GULF CANADA CORPORATION - COAL DIVISION

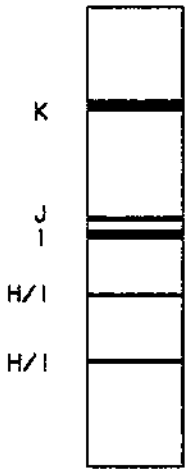
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87017												
	K	73	7068	7068	25.34	28.80	50.00	1.30	0.43	1.61	0.12	2.91- 0.55
	K	74	7069	7069	28.80	31.02	72.97	0.53	1.09	0.38	0.22	0.91- 1.31
	I	75	7072	7072	60.67	62.93	77.43	1.60	0.15	0.51	0.00	2.11- 0.15
	H/I	76	7075	7075	95.37	96.92	63.22	0.83	0.15	0.52	0.05	1.35- 0.20
	K	242	7068	7068	25.34	28.80	50.00	1.30	0.43	1.61	0.12	2.91- 0.55
	I	243	7072	7072	60.67	62.93	77.43	1.60	0.15	0.51	0.00	2.11- 0.15
	H/I	244	7075	7075	95.37	96.92	63.22	0.83	0.15	0.52	0.05	1.35- 0.20
	K	433	7068	7068	25.34	28.80	50.00	1.30	0.43	1.61	0.12	2.91- 0.55
	I	434	7072	7072	60.67	62.93	77.43	1.60	0.15	0.51	0.00	2.11- 0.15
	H/I	435	7075	7075	95.37	96.92	63.22	0.83	0.15	0.52	0.05	1.35- 0.20

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
K	2.82m
J	0.97m
I	2.26m
H/I	1.11m
H/I	1.38m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87017

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87017 SEAM : K INTERVAL(M) : 25.34 – 31.02 ELEVATION(M) : 1472.0

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	25.34			(0.23)											
				0.23											
				(1.06)	48.6	7068	73	2.38/ 0.44 / 2.82	2.38/ 0.44 / 2.82	1.16	31.78	7.43	59.65	0.62	21.06
				0.40											
				0.17											
	28.80		0.72												
			(0.18)												
				0.30	71.1	7069	74	0.81/ 1.00 / 1.81		1.16	74.83	9.71	14.32	—	5.51
				(0.29)											
	31.02														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87017
Coal zone:	K		
Field sample no.:	07068	Composite sample no.:	73
Lab sample no.:	30640		
True sample thickness:	2.816 meters	Drill core recovery(%):	50.00 %
Coal/Rock:	2.378 / 0.438 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.04	23.90	15.19	25.17
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.77	3.93		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.14	
Ash(%):	31.78	32.15
Volatile matter(%):	7.43	7.52
Fixed carbon(%):	59.65	60.33
Total sulphur(%):	0.62	0.63
Combustible sulphur(%):	0.17	
Net calorific value(cal/g):	5033.00	5091.00
Gross calorific value(cal/g):	5033.00	5091.00
Volatile matter(dmmf%):	7.30	
Hardgrove index:	66.00	
Specific gravity:	1.61	
Carbon dioxide(%):	3.10	
Phosphorous in coal(%):	0.043	
Chlorine in coal(ppm):	3600.00	

Forms of Sulphur(%): PYRITE 00.22 SULPHATE 00.02 ORGANIC 00.38

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	60.81	61.51
Hydrogen(%):	1.77	1.79
Nitrogen(%):	0.79	0.80
Oxygen(%):	3.09	3.12

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1262.00	1195.00
Softening temperature(°C):	1270.00	1203.00
Hemispherical temperature(°C):	1278.00	1213.00
Final temperature(°C):	1321.00	1281.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.04	TiO2(%):	1.25
Al2O3(%):	17.01	Na2O(%):	1.92
Fe2O3(%):	7.04	K2O(%):	1.23
CaO(%):	4.76	SO3(%):	3.53
MgO(%):	3.70	P2O5(%):	0.31

gcri coal division ash fusion proj KPN BLK LR DB DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1260.0
softening temp.(C)	1307.0	softening temp.(C)	1291.0
hemispherical temp.(C)	1372.0	hemispherical temp.(C)	1332.0
fluid temp.(C)	1445.0	fluid temp.(C)	1441.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	61.36
aluminium oxide %	(al2o3)	21.68
ferric oxide %	(fe2o3)	4.07
titanium dioxide %	(tio2)	0.72
phosphorous pentoxide %	(p2o5)	0.45
calcium oxide %	(cao)	3.22
magnesium oxide %	(mgo)	2.57
sulphur trioxide %	(so3)	2.22
sodium oxide %	(na2o)	1.97
potassium oxide %	(k2o)	1.23

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1240.0	initial temp.(C)	1173.0
softening temp.(C)	1375.0	softening temp.(C)	1342.0
hemispherical temp.(C)	1471.0	hemispherical temp.(C)	1415.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	61.92
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	3.39
titanium dioxide %	(tio2)	0.64
phosphorous pentoxide %	(p2o5)	0.42
calcium oxide %	(cao)	2.52
magnesium oxide %	(mgo)	2.29
sulphur trioxide %	(so3)	1.68
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	1.15

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87017 | SEAM : 1 | INTERVAL(M) : 60.67 – 62.93 | ELEVATION(M) : 1472.0

GEOLOGIST : LEE | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	60.67			0.10												
			0.38													
				0.47												
			0.07													
				0.19												
				(0.51)	77.4	7072	75	2.11 / 0.15 2.26	2.11 / 0.15 2.26	0.96	22.84	6.36	69.64	0.42	24.51	—
				0.84												
	62.93															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87017
Coal zone:	I		
Field sample no.:	07072	Composite sample no.:	75
Lab sample no.:	30680		
True sample thickness:	2.257 meters	Drill core recovery(%):	77.43 %
Coal/Rock:	2.107 / 0.150 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	4.34	8.19	13.45	46.74
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	16.51	10.77		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.96	
Ash(%):	22.84	23.06
Volatile matter(%):	6.56	6.62
Fixed carbon(%):	69.64	70.32
Total sulphur(%):	0.42	0.42
Combustible sulphur(%):	0.24	
Net calorific value(cal/g):	5858.00	5915.00
Gross calorific value(cal/g):	5858.00	5915.00
Volatile matter(dmmf%):	6.20	
Hardgrove index:	85.00	
Specific gravity:	1.55	
Carbon dioxide(%):	1.62	
Phosphorous in coal(%):	0.118	
Chlorine in coal(ppm):	2800.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.39

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	71.06	71.75
Hydrogen(%):	2.27	2.29
Nitrogen(%):	0.85	0.86
Oxygen(%):	1.60	1.62

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1310.00	1229.00
Softening temperature(°C):	1315.00	1240.00
Hemispherical temperature(°C):	1342.00	1273.00
Final temperature(°C):	1409.00	1399.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	56.64	TiO2(%):	1.14
Al2O3(%):	19.15	Na2O(%):	1.74
Fe2O3(%):	5.89	K2O(%):	1.07
CaO(%):	2.91	SO3(%):	1.98
MgO(%):	3.51	P2O5(%):	1.18

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1181.0	initial temp.(C)	1179.0
softening temp.(C)	1251.0	softening temp.(C)	1222.0
hemispherical temp.(C)	1281.0	hemispherical temp.(C)	1229.0
fluid temp.(C)	1332.0	fluid temp.(C)	1283.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87017

sample id 00073
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 31/12/87

silicon dioxide %	(sio2)	57.06
aluminium oxide %	(al2o3)	18.53
ferric oxide %	(fe2o3)	4.89
titanium dioxide %	(tio2)	1.24
phosphorous pentoxide %	(p2o5)	2.29
calcium oxide %	(cao)	4.00
magnesium oxide %	(mgo)	3.08
sulphur trioxide %	(so3)	1.93
sodium oxide %	(na2o)	1.63
potassium oxide %	(k2o)	0.82

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDHST017

sample id 00075
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/97

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1181.0	initial temp.(C)	1179.0
softening temp.(C)	1262.0	softening temp.(C)	1206.0
hemispherical temp.(C)	1302.0	hemispherical temp.(C)	1222.0
fluid temp.(C)	1353.0	fluid temp.(C)	1302.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDHST017

sample id 00075
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/97

silicon dioxide %	(sio2)	54.72
aluminium oxide %	(al2o3)	19.66
ferric oxide %	(fe2o3)	5.31
titanium dioxide %	(tio2)	1.48
phosphorous pentoxide %	(p2o5)	2.53
calcium oxide %	(cao)	4.00
magnesium oxide %	(mgo)	3.56
sulphur trioxide %	(so3)	2.04
sodium oxide %	(na2o)	1.58
potassium oxide %	(k2o)	0.67

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87017 SEAM : H/I INTERVAL(M) : 95.37 - 96.92 ELEVATION(M) : 1472.0

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	95.37			0.47											
				(0.40)	63.4	7075	76	1.21 / 0.17 1.38	1.21 / 0.17 1.38	1.11	43.13	8.04	47.72	0.27	18.77
				0.10											
				0.19											
	96.92			0.09											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87017
Coal zone:	H/I		
Field sample no.:	07075	Composite sample no.:	76
Lab sample no.:	30680		
True sample thickness:	1.384 meters	Drill core recovery (%):	63.22 %
Coal/Rock:	1.212 / 0.172 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	37.27	26.29	15.24	15.60
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.00	2.60		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.11	
Ash (%):	43.13	43.61
Volatile matter (%):	8.04	8.13
Fixed carbon (%):	47.72	48.26
Total sulphur (%):	0.27	0.27
Combustible sulphur (%):	0.03	
Net calorific value (cal/g):	4008.00	4053.00
Gross calorific value (cal/g):	4008.00	4053.00
Volatile matter (dmmf%):	8.60	
Hardgrove index:	57.00	
Specific gravity:	1.72	
Carbon dioxide (%):	4.92	
Phosphorous in coal (%):	0.056	
Chlorine in coal (ppm):	3200.00	

Forms of Sulphur (%): PYRITE 00.06 SULPHATE 00.00 ORGANIC 00.21

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	49.19	49.74
Hydrogen (%):	1.41	1.43
Nitrogen (%):	0.54	0.55
Oxygen (%):	4.35	4.40

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1213.00	1195.00
Softening temperature (°C):	1251.00	1208.00
Hemispherical temperature (°C):	1275.00	1219.00
Final temperature (°C):	1342.00	1286.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	59.28	TiO2 (%):	0.90
Al2O3 (%):	15.37	Na2O (%):	1.61
Fe2O3 (%):	7.61	K2O (%):	0.51
CaO (%):	4.03	SO3 (%):	1.74
MgO (%):	4.73	P2O5 (%):	0.30

gcri coal division ash fusion proj KFN BLK LR DB DDH87017

sample id 00076
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1197.0	initial temp.(C)	1185.0
softening temp.(C)	1342.0	softening temp.(C)	1294.0
hemispherical temp.(C)	1391.0	hemispherical temp.(C)	1313.0
fluid temp.(C)	1417.0	fluid temp.(C)	1394.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87017

sample id 00076
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.39
aluminium oxide %	(al2o3)	21.72
ferric oxide %	(fe2o3)	7.22
titanium dioxide %	(tio2)	0.78
phosphorous pentoxide %	(p2o5)	0.20
calcium oxide %	(cao)	1.51
magnesium oxide %	(mgo)	3.73
sulphur trioxide %	(so3)	1.03
sodium oxide %	(na2o)	1.75
potassium oxide %	(k2o)	0.65

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87017

sample id 00076
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1213.0	initial temp.(C)	1207.0
softening temp.(C)	1375.0	softening temp.(C)	1297.0
hemispherical temp.(C)	1409.0	hemispherical temp.(C)	1353.0
fluid temp.(C)	1453.0	fluid temp.(C)	1428.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87017

sample id 00076
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.49
aluminium oxide %	(al2o3)	23.67
ferric oxide %	(fe2o3)	5.90
titanium dioxide %	(tio2)	0.78
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	1.65
magnesium oxide %	(mgo)	3.39
sulphur trioxide %	(so3)	1.02
sodium oxide %	(na2o)	1.92
potassium oxide %	(k2o)	0.71

90.0 <= total <= 100.0

KPNLRDDH87018

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87018 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/17/87
END DATE - 09/20/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - SAVOIE
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - WASTE DUMP HOLE, SITE B'. PIEZOMETER AND THERMISTE
R. 2 UNIDENTIFIED SEAMS INTERSECTED.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1629.34
ZONE - 9
NORTHING - 6342328.11
EASTING - 508842.56

LICENCE/LEASE NUMBER -

LATITUDE - 571333
LONGITUDE - 1285113

- O R I E N T A T I O N -

LENGTH - 152.43
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 10.67
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87018										
		7060	28.31	29.18	100.00		0.858			0.000- 0.858
	?.	7061	29.18	30.35	40.17	0.443	0.020	0.689		1.132- 0.020
		7062	30.35	30.93	48.28		0.275		0.294	0.000- 0.569
		7063	53.44	53.78	100.00		0.334			0.000- 0.334
	?	7064	53.78	55.35	73.89	0.993	0.126	0.342	0.058	1.335- 0.184
	?	7065	55.35	57.86	76.10	0.238	1.536	0.546		0.784- 1.536
		7066	57.86	58.24	100.00		0.341			0.000- 0.341

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87018												
	?	77	7061	7061	29.18	30.35	40.17	0.45	0.02	0.70	0.00	1.15- 0.02
	?	78	7064	7064	53.78	55.35	73.88	1.03	0.13	0.35	0.06	1.38- 0.19
	?	79	7065	7065	55.35	57.86	76.09	0.26	1.65	0.60	0.00	0.86- 1.65
	?	245	7064	7064	53.78	55.35	73.88	1.03	0.13	0.35	0.06	1.38- 0.19
	?	436	7064	7064	53.78	55.35	73.88	1.03	0.13	0.35	0.06	1.38- 0.19

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
?	1.16m
?	1.51m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87018

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

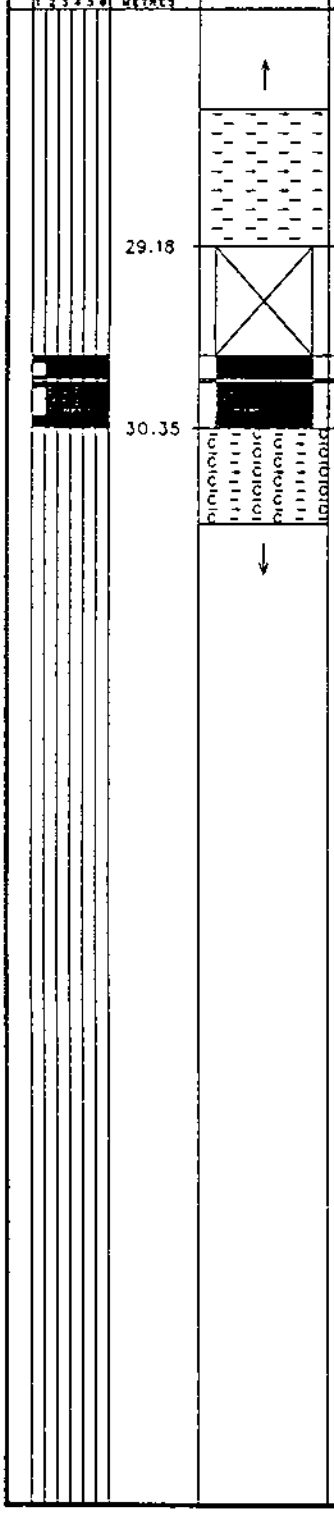
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87018 SEAM : ? INTERVAL(M) : 29.18 – 30.35 ELEVATION(M) : 1629.3

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 23/89 DRAW NO NO. :



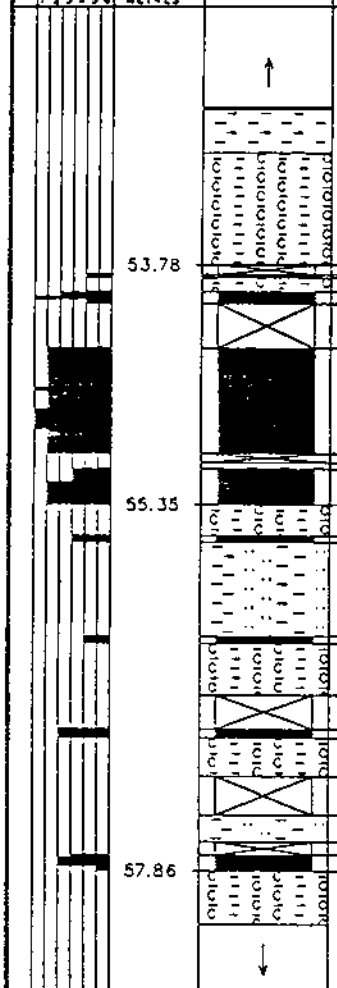
SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	29.18			(0.69)	40.1	7061	77	1.14 / 0.02	1.14 / 0.02	1.00	24.81	9.19	65.00	—	24.84	—
			0.03	0.15				1.16	1.16							
				0.30												
	30.35															

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87018 SEAM : ? INTERVAL(M) : 53.78 – 57.86 ELEVATION(M) : 1523.3

GEOLOGIST : SAVOIE SCALE: 1:40 DATE : FEB 23/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	53.78			(0.28)												
				0.66	73.7	7064	78	1.33 / 0.18 1.51	1.33 / 0.18 1.51	1.07	36.24	8.79	53.90	0.68	18.74	—
				0.23												
	55.35		0.20													
			0.60													
			0.32		76.7	7065	79	0.77 / 1.52 2.30		1.11	27.67	8.65	12.57	—	4.72	—
				(0.21)												
			0.24													
				(0.24)												
			0.17													
	57.86															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87018
Coal zone:	?		
Field sample no.:	07064	Composite sample no.:	78
Lab sample no.:	30680		
True sample thickness:	1.519 meters	Drill core recovery(%):	73.88 %
Coal/Rock:	1.335 / 0.184 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	18.22	22.94	17.86	32.43
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.76	2.79		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.07	
Ash(%):	36.24	36.63
Volatile matter(%):	8.79	8.88
Fixed carbon(%):	53.90	54.49
Total sulphur(%):	0.68	0.69
Combustible sulphur(%):	0.05	
Net calorific value(cal/g):	4479.00	4527.00
Gross calorific value(cal/g):	4479.00	4527.00
Volatile matter(dmmf%):	9.50	
Hardgrove index:	59.00	
Specific gravity:	1.67	
Carbon dioxide(%):	3.42	
Phosphorous in coal(%):	0.215	
Chlorine in coal(ppm):	2640.00	

Forms of Sulphur(%): PYRITE 00.44 SULPHATE 00.01 ORGANIC 00.23

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	56.05	56.66
Hydrogen(%):	1.97	1.99
Nitrogen(%):	0.82	0.83
Oxygen(%):	3.17	3.20

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1238.00	1184.00
Softening temperature(°C):	1283.00	1200.00
Hemispherical temperature(°C):	1291.00	1208.00
Final temperature(°C):	1332.00	1286.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	49.14	TiO2(%):	1.08
Al2O3(%):	18.77	Na2O(%):	1.78
Fe2O3(%):	7.41	K2O(%):	1.17
CaO(%):	6.49	SO3(%):	4.35
MgO(%):	3.50	P2O5(%):	1.36

(1)

gcri coal division ash fusion proj KFN BLK LR DS DDH87018

sample id 00078
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1278.0
softening temp.(C)	1332.0	softening temp.(C)	1287.0
hemispherical temp.(C)	1375.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1450.0	fluid temp.(C)	1446.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87018

sample id 00078
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	50.05
aluminium oxide %	(al2o3)	24.84
ferric oxide %	(fe2o3)	3.89
titanium dioxide %	(tio2)	1.35
phosphorous pentoxide %	(p2o5)	1.52
calcium oxide %	(cao)	4.80
magnesium oxide %	(mgo)	3.01
sulphur trioxide %	(so3)	2.47
sodium oxide %	(na2o)	2.23
potassium oxide %	(k2o)	1.27

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87018

sample id 00078
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1307.0
softening temp.(C)	1434.0	softening temp.(C)	1342.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1407.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87018

sample id 00078
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	51.82
aluminium oxide %	(al2o3)	26.40
ferric oxide %	(fe2o3)	3.46
titanium dioxide %	(tio2)	1.11
phosphorous pentoxide %	(p2o5)	1.40
calcium oxide %	(cao)	3.93
magnesium oxide %	(mgo)	2.56
sulphur trioxide %	(so3)	1.83
sodium oxide %	(na2o)	2.23
potassium oxide %	(k2o)	1.08

90.0 (= total (= 100.0

KPNLRDDH87019

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87019 DATE - 03/04/88

- H I S T O R Y -

START DATE - 09/19/87
END DATE - 09/22/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE/BARKER
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE D. SEAMS I (FOLDED), H/1, H/I(2), H (FOLDED).

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1486.65
ZONE - 9
NORTHING - 6345555.91
EASTING - 507468.12

LICENCE/LEASE NUMBER -

LATITUDE - 571518
LONGITUDE - 1285234

- O R I E N T A T I O N -

LENGTH - 210.21
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 12.19
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87019										
		6901	113.72	114.39	100.00		0.457			0.000- 0.457
	I FLD	6902	114.39	117.87	83.05	1.907	0.027	0.394		2.301- 0.027
	I FLD	6903	117.87	134.92	57.71	7.385	1.261	5.720	0.802	13.105- 2.063
		6904	134.92	135.00	100.00		0.076			0.000- 0.076
		6905	197.16	197.64	100.00		0.345			0.000- 0.345
	H FLD	6906	197.64	200.52	73.96	0.702	0.760	0.521		1.223- 0.760
		7098	165.39	166.02	100.00		0.595			0.000- 0.595
	H/I	7099	166.02	167.92	41.58	0.612	0.132	1.047		1.659- 0.132
		7100	167.92	168.48	19.64		0.104		0.423	0.000- 0.527

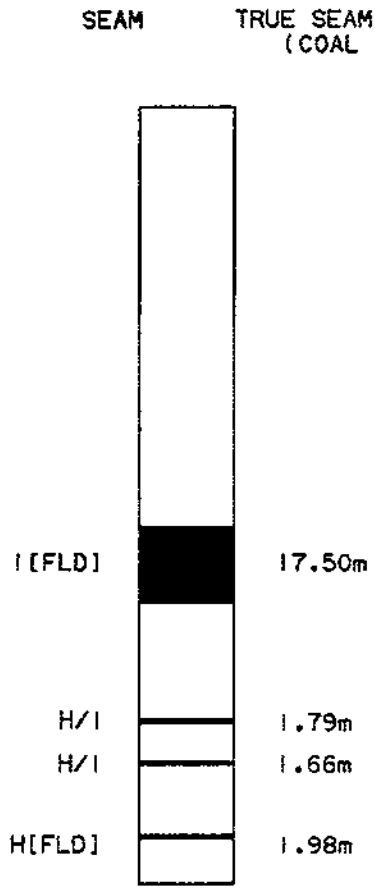
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87019												
	I FLD	80	6902	6902	114.39	117.87	83.04	2.85	0.04	0.59	0.00	3.44- 0.04
	I FLD	81	6903	6903	117.87	134.92	57.71	8.39	1.45	6.32	0.89	14.71- 2.34
	H/I	82	7099	7099	166.02	167.92	41.57	0.65	0.14	1.11	0.00	1.76- 0.14
	H FLD	83	6906	6906	197.64	200.52	73.95	1.03	1.10	0.75	0.00	1.78- 1.10
	I	246	6902	6902	114.39	117.87	83.04	2.85	0.04	0.59	0.00	3.44- 0.04
	I	247	6903	6903	117.87	134.92	57.71	8.39	1.45	6.32	0.89	14.71- 2.34
	H	248	6906	6906	197.64	200.52	73.95	1.03	1.10	0.75	0.00	1.78- 1.10
	I	437	6902	6903	114.39	134.92	62.00	11.24	1.49	6.91	0.89	18.15- 2.38
	H	438	6906	6906	197.64	200.52	73.95	1.03	1.10	0.75	0.00	1.78- 1.10



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87019

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:I20505718800720I2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

PAGE :

DATA SOURCE: KPN LR DDH87019 SEAM : 1 FLD TOTAL INTERVAL(M) : 114.39 – 134.92 ELEVATION(M) : 1486.7
INTERVAL(M) : 114.39 – 117.87
GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	114.39			(0.03)												
				0.86												
				(0.15)	83.1	6902	80	2.30/0.03		1.05	12.27	5.57	81.11	0.45	28.57	—
								2.33								
				1.02												
	117.87			(0.18)												

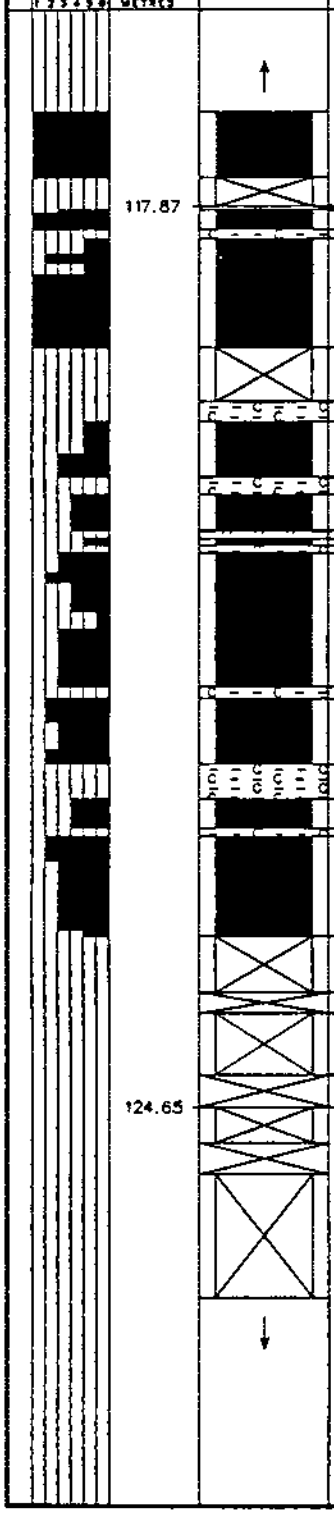
GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87019 SEAM : 1 FLD TOTAL INTERVAL(M) : 114.39 – 134.92 ELEVATION(M) : 1486.7
INTERVAL(M) : 117.87 – 124.65
GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	117.87			0.12											
				0.68											
				(0.34)											
			0.12												
				0.36											
			0.11												
				0.23											
				0.86	75.0	6903	81								
			0.07												
				0.41											
			0.22												
				0.19											
				0.64											
				(0.36)											
			(0.13)												
				(0.39)											
	124.65		(0.21)												

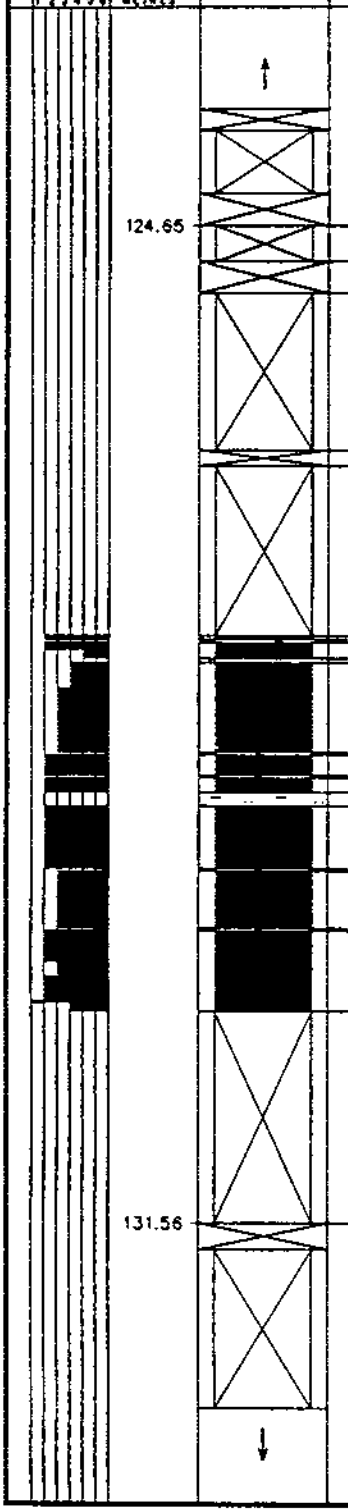
GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87019 SEAM : 1 FLD TOTAL INTERVAL(M) : 114.39 – 134.92
INTERVAL(M) : 124.65 – 131.56
ELEVATION(M) : 1436.7
GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	124.65			(0.22)											
			(0.20)												
				(0.99)											
			(0.16)												
				(1.08)											
				0.10											
				0.37	37.6	6903	81								
				0.13											
				0.09											
				0.40											
				0.36											
				0.51											
				(1.35)											
	131.56														

GULF CANADA CORPORATION

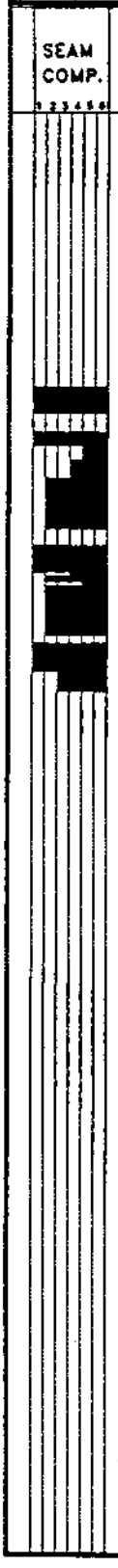
PAGE : 4 / 4

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87019 SEAM : 1 FLD TOTAL INTERVAL(M) : 114.39 – 134.92 ELEVATION(M) : 1495.7
INTERVAL(M) : 131.56 – 134.92
GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	131.56		(0.17)													
				(0.99)												
				0.17												
			0.13													
				0.63	63.3	6903	81	13.11/ 2.06 15.17	15.41/ 2.09 17.50	1.23	25.92	6.77	66.08	0.33	23.44	—
			0.11													
				0.59												
			0.18													
				0.31												
	134.92															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87019
Coal zone:	I FLD		
Field sample no.:	06902	Composite sample no.:	80
Lab sample no.:	30688		
True sample thickness:	2.328 meters	Drill core recovery (%):	83.04 %
Coal/Rock:	2.301 / 0.027 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	39.02	27.59	13.10	16.23	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	2.70	1.36			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.05	
Ash (%):	12.27	12.40
Volatile matter (%):	5.57	5.63
Fixed carbon (%):	81.11	81.97
Total sulphur (%):	0.45	0.45
Combustible sulphur (%):	0.30	
Net calorific value (cal/g):	6827.00	6900.00
Gross calorific value (cal/g):	6828.00	6901.00
Volatile matter (dmmf%):	5.20	
Hardgrove index:	40.00	
Specific gravity:	1.41	
Carbon dioxide (%):	1.01	
Phosphorous in coal (%):	0.161	
Chlorine in coal (ppm):	2240.00	
Forms of Sulphur (%):	PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.43	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	80.80	81.66
Hydrogen (%):	2.65	2.68
Nitrogen (%):	0.95	0.96
Oxygen (%):	1.83	1.85

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1205.00	1204.00
Softening temperature (°C):	1275.00	1240.00
Hemispherical temperature (°C):	1283.00	1254.00
Final temperature (°C):	1315.00	1313.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	49.48	TiO2 (%):	1.34
Al2O3 (%):	21.49	Na2O (%):	2.31
Fe2O3 (%):	5.22	K2O (%):	0.89
CaO (%):	5.72	SO3 (%):	3.00
MgO (%):	3.04	P2O5 (%):	3.01

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87019
Coal zone:	I FLD		
Field sample no.:	06903	Composite sample no.:	81
Lab sample no.:	30688		
True sample thickness:	15.168 meters	Drill core recovery(%):	57.71 %
Coal/Rock:	13.105 / 2.063 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	15.54	16.41	18.29	33.38
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	10.18	6.20		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.23	
Ash(%):	25.92	26.24
Volatile matter(%):	6.77	6.85
Fixed carbon(%):	66.08	66.91
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.04	
Net calorific value(cal/g):	5602.00	5672.00
Gross calorific value(cal/g):	5602.00	5672.00
Volatile matter(dmmf%):	6.50	
Hardgrove index:	60.00	
Specific gravity:	1.58	
Carbon dioxide(%):	2.05	
Phosphorous in coal(%):	0.038	
Chlorine in coal(ppm):	3120.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.30

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	67.09	67.93
Hydrogen(%):	1.82	1.84
Nitrogen(%):	0.80	0.81
Oxygen(%):	2.81	2.85

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1235.00	1179.00
Softening temperature(°C):	1299.00	1248.00
Hemispherical temperature(°C):	1310.00	1289.00
Final temperature(°C):	1380.00	1375.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	58.02	TiO2(%):	0.85
Al2O3(%):	19.15	Na2O(%):	1.97
Fe2O3(%):	5.05	K2O(%):	0.93
CaO(%):	2.99	SO3(%):	2.79
MgO(%):	3.32	P2O5(%):	0.34

gcri coal division ash fusion proj KPN BLK LR DS DDH87019

sample id 00080
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AP3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1211.0	initial temp.(C)	1205.0
softening temp.(C)	1291.0	softening temp.(C)	1259.0
hemispherical temp.(C)	1299.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1380.0	fluid temp.(C)	1377.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87019

sample id 00080
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	50.16
aluminium oxide %	(al2o3)	24.18
ferric oxide %	(fe2o3)	5.47
titanium dioxide %	(tio2)	1.46
phosphorous pentoxide %	(p2o5)	1.89
calcium oxide %	(cao)	4.29
magnesium oxide %	(mgo)	2.99
sulphur trioxide %	(so3)	2.52
sodium oxide %	(na2o)	2.12
potassium oxide %	(k2o)	1.06

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87019

sample id 00080
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1297.0	initial temp.(C)	1187.0
softening temp.(C)	1299.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1337.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1391.0	fluid temp.(C)	1389.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87019

sample id 00080
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	51.32
aluminium oxide %	(al2o3)	23.42
ferric oxide %	(fe2o3)	5.58
titanium dioxide %	(tio2)	1.10
phosphorous pentoxide %	(p2o5)	1.83
calcium oxide %	(cao)	3.97
magnesium oxide %	(mgo)	2.84
sulphur trioxide %	(so3)	1.97
sodium oxide %	(na2o)	2.12
potassium oxide %	(k2o)	0.98

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN ELK LR DB DDH87019

sample id 00081
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1233.0	initial temp.(C)	1228.0
softening temp.(C)	1305.0	softening temp.(C)	1289.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1302.0
fluid temp.(C)	1393.0	fluid temp.(C)	1390.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87019

sample id 00081
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.20
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.44
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	0.77
calcium oxide %	(cao)	3.30
magnesium oxide %	(mgo)	3.20
sulphur trioxide %	(so3)	2.78
sodium oxide %	(na2o)	1.64
potassium oxide %	(k2o)	0.87

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87019

sample id 00081
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1289.0
softening temp.(C)	1315.0	softening temp.(C)	1302.0
hemispherical temp.(C)	1337.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1423.0	fluid temp.(C)	1409.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87019

sample id 00081
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.06
aluminium oxide %	(al2o3)	19.90
ferric oxide %	(fe2o3)	4.65
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	0.79
calcium oxide %	(cao)	2.97
magnesium oxide %	(mgo)	3.17
sulphur trioxide %	(so3)	2.16
sodium oxide %	(na2o)	1.75
potassium oxide %	(k2o)	0.84

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87019 SEAM : H/I INTERVAL(M) : 166.02 – 167.92 ELEVATION(M) : 1486.7

GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	166.02			0.37												
				(1.05)	41.5	7029	82	1.66 / 0.13 1.79	1.66 / 0.13 1.79	1.45	34.99	6.86	56.70	—	21.40	—
			0.11													
				0.35												
	167.92		0.03	0.20												

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87019 SEAM : H FLD INTERVAL(M) : 197.64 - 200.52 ELEVATION(M) : 1435.7

GEOLOGIST : LEE/BARKER SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	197.64														
			0.24	(0.29)											
			0.10	0.14	73.4	5906	83	1.22 / 0.76	1.22 / 0.76	1.30	49.26	6.32	43.12	1.03	14.66
			0.17	0.14				1.98	1.98						
				(0.13)											
	200.52			0.13											
				0.10											
	203.74														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87019
Coal zone:	H FLD		
Field sample no.:	06906	Composite sample no.:	83
Lab sample no.:	30688		
True sample thickness:	1.983 meters	Drill core recovery (%):	73.95 %
Coal/Rock:	1.223 / 0.760 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	19.97	21.94	19.61	28.38	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.06	3.04			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.30	
Ash (%):	49.26	49.91
Volatile matter (%):	6.32	6.40
Fixed carbon (%):	43.12	43.69
Total sulphur (%):	1.03	1.04
Combustible sulphur (%):	0.80	
Net calorific value (cal/g):	3504.00	3550.00
Gross calorific value (cal/g):	3504.00	3550.00
Volatile matter (dmmf%):	4.40	
Hardgrove index:	70.00	
Specific gravity:	1.77	
Carbon dioxide (%):	0.10	
Phosphorous in coal (%):	0.011	
Chlorine in coal (ppm):	1750.00	
Forms of Sulphur (%):	PYRITE 00.53 SULPHATE 00.01 ORGANIC 00.49	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	42.81	43.38
Hydrogen (%):	1.42	1.44
Nitrogen (%):	0.54	0.55
Oxygen (%):	3.64	3.68

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1332.00	1152.00
Softening temperature (°C):	1361.00	1278.00
Hemispherical temperature (°C):	1409.00	1326.00
Final temperature (°C):	1450.00	1443.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	59.24	TiO2 (%):	0.99
Al2O3 (%):	20.28	Na2O (%):	1.40
Fe2O3 (%):	5.51	K2O (%):	2.02
CaO (%):	1.34	SO3 (%):	1.19
MgO (%):	2.45	P2O5 (%):	0.05

```
gcri coal division  ash fusion     proj  KPN    BLK  LR     DS  DDH87019
==================  ==========     ====================================

sample id              00083
sample product id        SP1         data type (real,boro,aver,calc)  REAL
split sample id          AF3         data analysed  31/12/87

        oxidizing atmosphere                           reducing atmosphere
        ====================                           ===================

         initial temp.(C)  1291.0                      initial temp.(C)  1152.0
      softening temp.(C)  1373.0                     softening temp.(C)  1256.0
 hemispherical temp.(C)  1423.0               hemispherical temp.(C)  1315.0
          fluid temp.(C)  1458.0                          fluid temp.(C)  1442.0

                                   normal ranges all temps.
                                 1000.0 >= values <= 1500.0
                                 oxidation temps >= reduction temps



gcri coal division  ash mineral       proj  KPN    BLK  LR     DS  DDH87019
==================  ===========       ====================================

sample id              00083
sample product id        SP1         data type (real,boro,aver,calc)  REAL
split sample id          AM3         data analysed   31/12/87

    silicon dioxide %          (sio2)        50.84
    aluminium oxide %          (al2o3)       25.19
    ferric oxide    %          (fe2o3)        7.59
    titanium dioxide %         (tio2)         1.50
    phosphorous pentoxide %    (p2o5)         0.18
    calcium oxide %            (cao)          1.62
    magnesium oxide %          (mgo)          3.48
    sulphur trioxide %         (so3)          1.45
    sodium oxide %             (na2o)         1.64
    potassium oxide %          (k2o)          2.09

                            90.0 <= total <= 100.0
```

gcri coal division ash fusion proj KPN BLK LR DS DDH87019

sample id 00083
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1192.0
softening temp.(C)	1417.0	softening temp.(C)	1273.0
hemispherical temp.(C)	1428.0	hemispherical temp.(C)	1310.0
fluid temp.(C)	1453.0	fluid temp.(C)	1420.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87019

sample id 00083
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	52.14
aluminium oxide %	(al2o3)	24.82
ferric oxide %	(fe2o3)	6.16
titanium dioxide %	(tio2)	1.48
phosphorous pentoxide %	(p2o5)	0.10
calcium oxide %	(cao)	1.34
magnesium oxide %	(mgo)	3.49
sulphur trioxide %	(so3)	1.47
sodium oxide %	(na2o)	1.21
potassium oxide %	(k2o)	1.78

90.0 <= total <= 100.0

MOUNT KLAPPAN ANTHRACITE PROJECT

LOST - FOX AREA

GEOLOGICAL REPORT

1987

APPENDIX IV

DIAMOND DRILL HOLE COAL QUALITY

VOLUME II

KPNLRDDH 87020

TO

KPNLRDDH 87034

GULF CANADA RESOURCES LIMITED

COAL DIVISION

740

APPENDIX IV

LOST-FOX AREA

DIAMOND DRILL HOLE

COAL QUALITY

VOLUME II

KPNLRDDH87020

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87020

DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/21/87
END DATE - 09/23/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED M/N, ?, M, L, K/L. SITE A'. STAND PIPE & PNEUMATIC PIEZOMETERS INSTALLED

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1582.83

ZONE - 9
NORTHING - 6343087.65
EASTING - 508244.57

LICENCE/LEASE NUMBER -

LATITUDE - 571358
LONGITUDE - 1285148

- O R I E N T A T I O N -

LENGTH - 163.67

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - Y

CASING DEPTH(M) - 6.71
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87020										
		7077	66.02	66.57	100.00		0.531			0.000- 0.531
	?	7078	66.57	68.06	65.10	0.575	0.339	0.487		1.062- 0.339
		7079	68.06	68.65	100.00		0.537			0.000- 0.537
		7080	82.02	82.46	100.00		0.413			0.000- 0.413
	M	7081	82.46	86.32	70.21	1.026	1.505	0.972	0.103	1.998- 1.608
		7082	86.32	86.71	100.00		0.363			0.000- 0.363
		7083	95.22	95.90	100.00		0.624			0.000- 0.624
	L	7084	95.90	100.70	70.00	2.320	0.748	1.225	0.091	3.545- 0.839
		7085	100.70	101.17	100.00		0.427			0.000- 0.427
		7086	146.96	147.85	100.00		0.775			0.000- 0.775
	K/L	7087	147.85	153.68	78.56	2.399	1.208	1.029		3.428- 1.208
		7088	153.68	153.69	100.00		0.007			0.000- 0.007

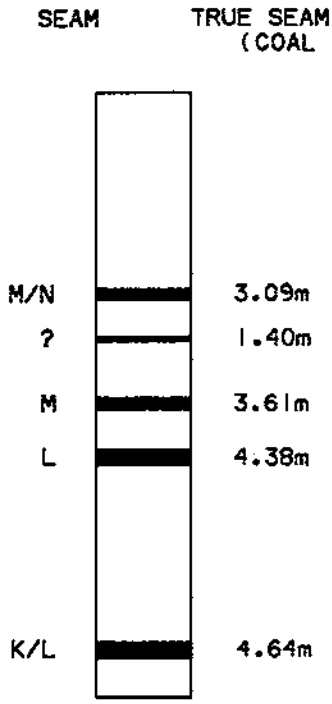
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87020												
	?	84	7078	7078	66.57	68.06	65.10	0.61	0.36	0.52	0.00	1.13- 0.36
	M	85	7081	7081	82.46	86.32	70.20	1.10	1.61	1.04	0.11	2.14- 1.72
	L	86	7084	7084	95.90	100.70	70.00	2.54	0.82	1.34	0.10	3.88- 0.92
	K/L	87	7087	7087	147.85	153.68	78.55	3.06	1.52	1.25	0.00	4.31- 1.52
	M	249	7081	7081	82.46	86.32	70.20	1.10	1.61	1.04	0.11	2.14- 1.72
	L	250	7084	7084	95.90	100.70	70.00	2.54	0.82	1.34	0.10	3.88- 0.92
	K/L	251	7087	7087	147.85	153.68	78.55	3.06	1.52	1.25	0.00	4.31- 1.52
	M	439	7081	7081	82.46	86.32	70.20	1.10	1.61	1.04	0.11	2.14- 1.72
	L	440	7084	7084	95.90	100.70	70.00	2.54	0.82	1.34	0.10	3.88- 0.92
	K/L	441	7087	7087	147.85	153.68	78.55	3.06	1.52	1.25	0.00	4.31- 1.52



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87020

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:I205057I880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — TRUE THICKNESS

MOUNT KLAPPAN PROJECT

DATA SOURCE: KPN LR DDH87020 SEAM : ? INTERVAL(M) : 66.57 – 68.06 ELEVATION(M) : 1582.8

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	66.57			0.17											
				(0.13)											
				0.05											
			0.19												
				(0.11)											
				0.25	65.2	7078	84	1.06 / 0.34	1.06 / 0.34	1.22	60.60	8.52	29.66	—	10.75
			0.07					1.40	1.40						
				(0.11)											
			0.04												
			0.07												
	68.06			(0.14)											

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — TRUE THICKNESS

MOUNT KLAPPAN PROJECT

DATA SOURCE: KPN LR DDH87020 SEAM : M INTERVAL(M) : 82.46 – 86.32 ELEVATION(M) : 1582.8

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	82.46			0.11											
			0.83												
				(0.29)											
				0.14											
				(0.10)											
			0.69		70.2	7081	85	2.00/ 1.61 3.61	2.00/ 1.61 3.61	1.35	66.46	7.80	24.39	0.35	6.17
				(0.36)											
				0.28											
				(0.10)											
				0.09											
				0.42											
				(0.17)											
	86.32														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87020
Coal zone:	M		
Field sample no.:	07081	Composite sample no.:	85
Lab sample no.:	30688		
True sample thickness:	3.606 meters	Drill core recovery(%):	70.20 %
Coal/Rock:	1.998 / 1.608 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	26.36	22.49	16.13	22.76
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.32	4.94		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.35	
Ash(%):	66.46	67.37
Volatile matter(%):	7.80	7.91
Fixed carbon(%):	24.39	24.72
Total sulphur(%):	0.35	0.35
Combustible sulphur(%):	0.11	
Net calorific value(cal/g):	1475.00	1495.00
Gross calorific value(cal/g):	1475.00	1495.00
Volatile matter(dmmf%):	8.80	
Hardgrove index:	64.00	
Specific gravity:	2.08	
Carbon dioxide(%):	3.37	
Phosphorous in coal(%):	0.075	
Chlorine in coal(ppm):	2740.00	

Forms of Sulphur(%): PYRITE 00.16 SULPHATE 00.00 ORGANIC 00.19

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	27.40	27.78
Hydrogen(%):	1.52	1.54
Nitrogen(%):	0.47	0.48
Oxygen(%):	2.45	2.48

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1184.00	1162.00
Softening temperature(°C):	1332.00	1286.00
Hemispherical temperature(°C):	1375.00	1310.00
Final temperature(°C):	1434.00	1428.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.52	TiO2(%):	1.31
Al2O3(%):	20.04	Na2O(%):	1.62
Fe2O3(%):	5.38	K2O(%):	2.07
CaO(%):	1.37	SO3(%):	0.91
MgO(%):	3.04	P2O5(%):	0.26

ecri coal division ash fusion proj KFN BLK LR DS DDH87020

sample id 00085
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1439.0	initial temp.(C)	1302.0
softening temp.(C)	1458.0	softening temp.(C)	1332.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1407.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

ecri coal division ash mineral proj KFN BLK LR DS DDH87020

sample id 00085
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	56.52
aluminium oxide %	(al2o3)	24.82
ferric oxide %	(fe2o3)	4.45
titanium dioxide %	(tio2)	1.58
phosphorous pentoxide %	(p2o5)	0.45
calcium oxide %	(cao)	1.54
magnesium oxide %	(mgo)	2.20
sulphur trioxide %	(so3)	0.99
sodium oxide %	(na2o)	1.61
potassium oxide %	(k2o)	1.70

90.0 <= total <= 100.0

(2)

qcri coal division ash fusion proj KPN BLK LR DS DDH87020

sample id 00085
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1401.0	initial temp.(C)	1278.0
softening temp.(C)	1472.0	softening temp.(C)	1407.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1471.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DS DDH87020

sample id 00085
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	55.58
aluminium oxide %	(al2o3)	26.08
ferric oxide %	(fe2o3)	4.30
titanium dioxide %	(tio2)	1.57
phosphorous pentoxide %	(p2o5)	0.31
calcium oxide %	(cao)	1.29
magnesium oxide %	(mgo)	2.20
sulphur trioxide %	(so3)	0.78
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	1.54

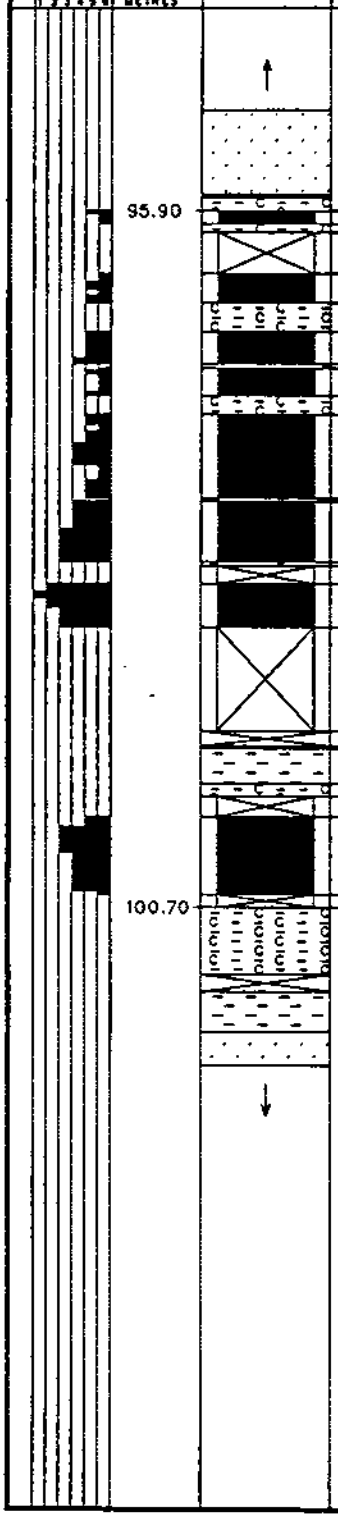
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87020 SEAM : L INTERVAL(M) : 95.90 – 100.70 ELEVATION(M) : 582.8

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	95.90			0.04											
				(0.26)											
				0.18											
			0.18												
				0.20											
				0.17											
			0.12												
				0.53											
				0.38											
				(0.11)	70.0	7084	86	3.54/0.84 4.38	3.54/0.84 4.38	1.04	51.27	9.65	38.04	1.10	13.60
				0.25											
				(0.65)											
			(0.09)												
			0.22												
			0.08												
				(0.13)											
				0.49											
	100.70			(0.08)											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87020
Coal zone:	L		
Field sample no.:	07084	Composite sample no.:	86
Lab sample no.:	30688		
True sample thickness:	4.384 meters	Drill core recovery(%):	70.00 %
Coal/Rock:	3.545 / 0.839 meters		

RAW HEAD ANALYSIS (HDI)

Standard: ASTM
Size analysis: SZI

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	25.59	19.55	15.52	26.65
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.98	4.71		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.04	
Ash(%):	51.27	51.81
Volatile matter(%):	9.65	9.75
Fixed carbon(%):	38.04	38.44
Total sulphur(%):	1.10	1.11
Combustible sulphur(%):	0.25	
Net calorific value(cal/g):	3250.00	3285.00
Gross calorific value(cal/g):	3250.00	3285.00
Volatile matter(dmmf%):	11.90	
Hardgrove index:	66.00	
Specific gravity:	1.84	
Carbon dioxide(%):	5.65	
Phosphorous in coal(%):	0.175	
Chlorine in coal(ppm):	2910.00	

Forms of Sulphur(%): PYRITE 01.04 SULPHATE 00.00 ORGANIC 00.06

ULTIMATE ANALYSIS (ULI)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	42.98	43.43
Hydrogen(%):	1.75	1.77
Nitrogen(%):	0.63	0.64
Oxygen(%):	1.23	1.24

ASH FUSION ANALYSIS (AFI)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1251.00	1145.00
Softening temperature(°C):	1318.00	1211.00
Hemispherical temperature(°C):	1332.00	1224.00
Final temperature(°C):	1391.00	1286.00

ASH MINERAL ANALYSIS (AMI)

Si02(%):	53.26	Ti02(%):	0.90
Al203(%):	15.50	Na20(%):	1.31
Fe203(%):	10.27	K20(%):	1.30
CaO(%):	5.35	S03(%):	4.13
MgO(%):	3.63	P205(%):	0.78

gcri coal division ash fusion proj KPN BLK LR DS DDH87020

sample id 00086
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1375.0	initial temp.(C)	1259.0
softening temp.(C)	1391.0	softening temp.(C)	1291.0
hemispherical temp.(C)	1428.0	hemispherical temp.(C)	1353.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87020

sample id 00086
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	52.56
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	5.75
titanium dioxide %	(tio2)	1.22
phosphorous pentoxide %	(p2o5)	1.05
calcium oxide %	(cao)	2.88
magnesium oxide %	(mgo)	2.96
sulphur trioxide %	(so3)	1.89
sodium oxide %	(na2o)	1.91
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87020

sample id 00086
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1466.0	initial temp.(C)	1229.0
softening temp.(C)	1472.0	softening temp.(C)	1364.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1431.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87020

sample id 00086
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	52.20
aluminium oxide %	(al2o3)	27.46
ferric oxide %	(fe2o3)	4.72
titanium dioxide %	(tio2)	1.14
phosphorous pentoxide %	(p2o5)	1.00
calcium oxide %	(cao)	2.35
magnesium oxide %	(mgo)	1.08
sulphur trioxide %	(so3)	1.26
sodium oxide %	(na2o)	2.02
potassium oxide %	(k2o)	1.09

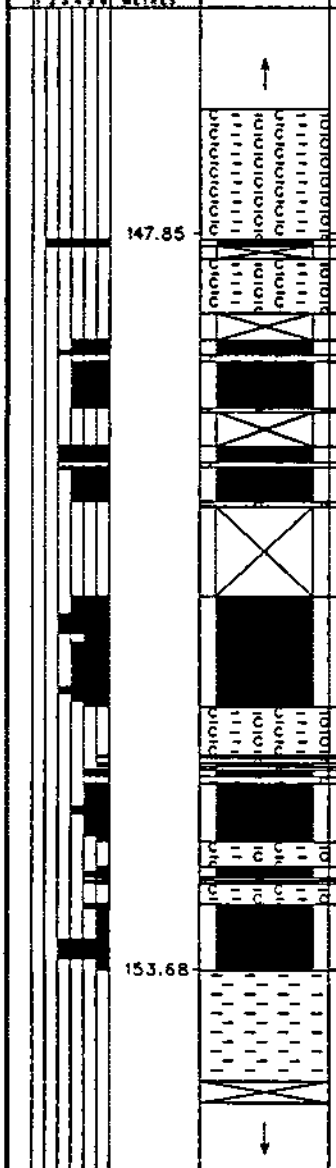
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87020 SEAM : K/L INTERVAL(M) : 147.85 – 153.68 ELEVATION(M) : 1592.3

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	147.85			(0.09)											
			0.34												
				(0.17)											
				0.08											
				0.29											
				(0.22)											
				0.10											
				0.22											
				(0.57)											
				0.70	77.8	7087	87	3.43/ 1.21 4.64	3.43/ 1.21 4.64	1.10	45.35	7.88	45.67	0.43	15.77
			0.30												
				0.36											
			0.16												
			0.13												
				0.42											
	153.68														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87020
Coal zone:	K/L		
Field sample no.:	07087	Composite sample no.:	87
Lab sample no.:	30688		
True sample thickness:	4.636 meters	Drill core recovery(%):	78.55 %
Coal/Rock:	3.428 / 1.208 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	18.74	19.44	14.61	29.80
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	10.34	7.07		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.10	
Ash(%):	45.35	45.85
Volatile matter(%):	7.88	7.97
Fixed carbon(%):	45.67	46.18
Total sulphur(%):	0.43	0.43
Combustible sulphur(%):	0.08	
Net calorific value(cal/g):	3769.00	3811.00
Gross calorific value(cal/g):	3769.00	3811.00
Volatile matter(dmmf%):	8.30	
Hardgrove index:	71.00	
Specific gravity:	1.76	
Carbon dioxide(%):	3.04	
Phosphorous in coal(%):	0.103	
Chlorine in coal(ppm):	3080.00	

Forms of Sulphur(%): PYRITE 00.08 SULPHATE 00.00 ORGANIC 00.35

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	47.31	47.84
Hydrogen(%):	1.78	1.80
Nitrogen(%):	0.70	0.71
Oxygen(%):	3.33	3.37

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1235.00	1227.00
Softening temperature(°C):	1278.00	1240.00
Hemispherical temperature(°C):	1294.00	1259.00
Final temperature(°C):	1348.00	1339.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	63.14	TiO2(%):	1.08
Al2O3(%):	16.63	Na2O(%):	1.47
Fe2O3(%):	5.68	K2O(%):	1.52
CaO(%):	3.72	SO3(%):	1.94
MgO(%):	2.58	P2O5(%):	0.52

qcri coal division ash fusion proj KPN BLK LR DB DDH87020

sample id 00087
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1235.0	initial temp.(C)	1093.0
softening temp.(C)	1307.0	softening temp.(C)	1259.0
hemispherical temp.(C)	1334.0	hemispherical temp.(C)	1294.0
fluid temp.(C)	1401.0	fluid temp.(C)	1400.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DB DDH87020

sample id 00087
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	60.22
aluminium oxide %	(al2o3)	21.55
ferric oxide %	(fe2o3)	3.52
titanium dioxide %	(tio2)	1.08
phosphorous pentoxide %	(p2o5)	1.13
calcium oxide %	(cao)	3.53
magnesium oxide %	(mgo)	3.11
sulphur trioxide %	(so3)	2.03
sodium oxide %	(na2o)	1.64
potassium oxide %	(k2o)	1.42

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87020

sample id 00087
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1396.0	initial temp.(C)	1104.0
softening temp.(C)	1420.0	softening temp.(C)	1310.0
hemispherical temp.(C)	1466.0	hemispherical temp.(C)	1391.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87020

sample id 00087
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide	%	(sio2)	59.60
aluminium oxide	%	(al2o3)	23.82
ferric oxide	%	(fe2o3)	3.27
titanium dioxide	%	(tio2)	0.94
phosphorous pentoxide	%	(p2o5)	1.00
calcium oxide	%	(cao)	2.85
magnesium oxide	%	(mgo)	2.94
sulphur trioxide	%	(so3)	1.67
sodium oxide	%	(na2o)	1.74
potassium oxide	%	(k2o)	1.15

90.0 <= total <= 100.0

KPNLRDDH87021

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87021 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/22/87
END DATE - 09/25/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE C. SEAMS INTERSECTED I, H.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1501.42

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6345236.49
EASTING - 507990.43

LATITUDE - 571507
LONGITUDE - 1285203

- O R I E N T A T I O N -

LENGTH - 96.15

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 4.57
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87021										
		6951	28.55	28.93	100.00		0.363			0.000- 0.363
	I	6952	28.93	31.60	59.55	1.104	0.407	1.027		2.131- 0.407
	I	6953	31.60	32.96	100.00	1.258	0.027			1.258- 0.027
		6954	32.96	34.68	100.00		1.622			0.000- 1.622
		6955	83.97	84.27	100.00		0.238			0.000- 0.238
	H	6956	84.27	88.65	53.20	1.081	0.555	1.261	0.083	2.342- 0.638
	H	6957	88.65	90.53	100.00		0.949			0.000- 0.949
	H	6958	90.53	92.78	32.89	0.288	0.016	0.481	0.053	0.769- 0.069
		6959	92.78	93.69	100.00		0.242			0.000- 0.242

GULF CANADA CORPORATION - COAL DIVISION

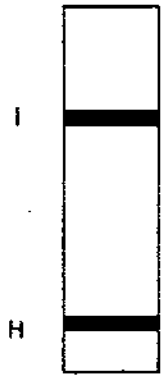
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87021												
	I	88	6952	6952	28.93	31.60	59.55	1.16	0.43	1.08	0.00	2.24- 0.43
	I	89	6953	6953	31.60	32.96	100.00	1.33	0.03	0.00	0.00	1.33- 0.03
	H	90	6956	6956	84.27	88.65	53.19	1.52	0.81	1.91	0.14	3.43- 0.95
	H	91	6957	6957	88.65	90.53	100.00	0.00	1.88	0.00	0.00	0.00- 1.88
	H	92	6958	6958	90.53	92.78	32.88	0.70	0.04	1.38	0.13	2.08- 0.17
	I	252	6952	6952	28.93	31.60	59.55	1.16	0.43	1.08	0.00	2.24- 0.43
	I	253	6953	6953	31.60	32.96	100.00	1.33	0.03	0.00	0.00	1.33- 0.03
	H	254	6956	6958	84.27	92.78	46.30	2.22	0.85	3.29	0.27	5.51- 1.12
	I	442	6952	6953	28.93	32.96	73.20	2.49	0.46	1.08	0.00	3.57- 0.46
	H	443	6956	6958	84.27	92.78	46.30	2.22	0.85	3.29	0.27	5.51- 1.12

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
I	3.82m
H	3.82m



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87021

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

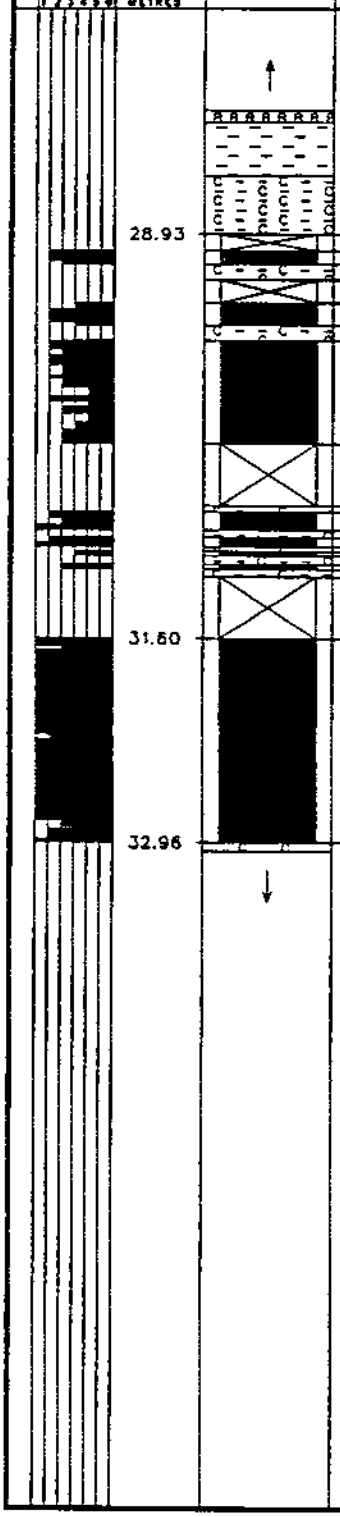
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: XPN LR DDH87021 SEAM : 1 INTERVAL(M) : 28.93 – 32.96 ELEVATION(M) : 1501.4

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	28.93			(0.11) 0.09												
			0.10													
				(0.14) 0.14												
			0.10													
				0.65												
				(0.39)	59.5	6952	88	2.13 / 0.41 2.54	3.39/ 0.43 3.82	1.02	28.01	7.28	63.69	0.30	21.96	—
			0.84													
				0.11												
			0.04	0.03												
			0.03	0.02												
			0.03	0.02												
			0.08													
				(0.39)												
	31.60			1.29	100.0	6953	89	1.28 / 0.03 1.29		1.14	11.92	5.88	81.06	0.44	28.03	—
	32.96															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87021
Coal zone:	I		
Field sample no.:	06952	Composite sample no.:	88
Lab sample no.:	30689		
True sample thickness:	2.538 meters	Drill core recovery(%):	59.55 %
Coal/Rock:	2.131 / 0.407 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	11.08	14.63	17.00	37.99
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	13.66	5.64		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.02	
Ash(%):	28.01	28.30
Volatile matter(%):	7.28	7.35
Fixed carbon(%):	63.69	64.35
Total sulphur(%):	0.30	0.30
Combustible sulphur(%):	0.07	
Net calorific value(cal/g):	5248.00	5302.00
Gross calorific value(cal/g):	5248.00	5302.00
Volatile matter(dmmf%):	7.20	
Hardgrove index:	67.00	
Specific gravity:	1.58	
Carbon dioxide(%):	4.45	
Phosphorous in coal(%):	0.105	
Chlorine in coal(ppm):	1950.00	

Forms of Sulphur(%): PYRITE 00.07 SULPHATE 00.00 ORGANIC 00.23

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	64.20	64.86
Hydrogen(%):	1.85	1.87
Nitrogen(%):	0.79	0.80
Oxygen(%):	3.83	3.87

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1227.00	1184.00
Softening temperature(°C):	1273.00	1216.00
Hemispherical temperature(°C):	1294.00	1235.00
Final temperature(°C):	1353.00	1299.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	50.17	TiO2(%):	0.95
Al2O3(%):	15.87	Na2O(%):	1.87
Fe2O3(%):	10.10	K2O(%):	0.89
CaO(%):	6.23	SO3(%):	3.33
MgO(%):	5.67	P2O5(%):	0.86

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87021
Coal zone:	1		
Field sample no.:	06953	Composite sample no.:	89
Lab sample no.:	30689		
True sample thickness:	1.285 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	1.258 / 0.027 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.44	20.59	15.62	24.75
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	8.33	3.27		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.14	
Ash(%):	11.92	12.06
Volatile matter(%):	5.88	5.95
Fixed carbon(%):	81.06	81.99
Total sulphur(%):	0.44	0.45
Combustible sulphur(%):	0.34	
Net calorific value(cal/g):	6937.00	7017.00
Gross calorific value(cal/g):	6938.00	7018.00
Volatile matter(dmmf%):	5.60	
Hardgrove index:	46.00	
Specific gravity:	1.43	
Carbon dioxide(%):	1.16	
Phosphorous in coal(%):	0.237	
Chlorine in coal(ppm):	3100.00	
Forms of Sulphur(%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.41	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	79.36	80.27
Hydrogen(%):	2.49	2.52
Nitrogen(%):	0.97	0.98
Oxygen(%):	3.68	3.72

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1154.00	1144.00
Softening temperature(°C):	1267.00	1213.00
Hemispherical temperature(°C):	1278.00	1224.00
Final temperature(°C):	1302.00	1278.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	44.53	TiO2(%):	1.51
Al2O3(%):	22.35	Na2O(%):	1.99
Fe2O3(%):	7.89	K2O(%):	1.18
CaO(%):	5.93	SO3(%):	2.01
MgO(%):	3.55	P2O5(%):	4.55

gcri coal division ash fusion proj KPN BLK LR DS DDH87021

sample id 00088
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1238.0	initial temp.(C)	1232.0
softening temp.(C)	1305.0	softening temp.(C)	1273.0
hemispherical temp.(C)	1318.0	hemispherical temp.(C)	1278.0
fluid temp.(C)	1372.0	fluid temp.(C)	1341.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87021

sample id 00088
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.60
aluminium oxide %	(al2o3)	20.71
ferric oxide %	(fe2o3)	3.72
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	1.34
calcium oxide %	(cao)	4.63
magnesium oxide %	(mgo)	3.39
sulphur trioxide %	(so3)	3.90
sodium oxide %	(na2o)	1.70
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87021

sample id 00088
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1235.0	initial temp.(C)	1234.0
softening temp.(C)	1289.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1299.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1348.0	fluid temp.(C)	1343.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87021

sample id 00088
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	57.13
aluminium oxide %	(al2o3)	20.71
ferric oxide %	(fe2o3)	3.47
titanium dioxide %	(tio2)	1.01
phosphorous pentoxide %	(p2o5)	1.15
calcium oxide %	(cao)	4.00
magnesium oxide %	(mgo)	3.09
sulphur trioxide %	(so3)	2.92
sodium oxide %	(na2o)	1.70
potassium oxide %	(k2o)	0.86

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87021

sample id 00089
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1168.0	initial temp.(C)	1167.0
softening temp.(C)	1299.0	softening temp.(C)	1283.0
hemispherical temp.(C)	1315.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1369.0	fluid temp.(C)	1362.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87021

sample id 00089
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	47.78
aluminium oxide %	(al2o3)	25.73
ferric oxide %	(fe2o3)	3.96
titanium dioxide %	(tio2)	1.74
phosphorous pentoxide %	(p2o5)	2.76
calcium oxide %	(cao)	4.94
magnesium oxide %	(mgo)	2.87
sulphur trioxide %	(so3)	2.49
sodium oxide %	(na2o)	2.04
potassium oxide %	(k2o)	1.28

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87021

sample id 00089
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1154.0	initial temp.(C)	1143.0
softening temp.(C)	1267.0	softening temp.(C)	1241.0
hemispherical temp.(C)	1348.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1401.0	fluid temp.(C)	1393.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87021

sample id 00089
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	50.41
aluminium oxide %	(al2o3)	26.11
ferric oxide %	(fe2o3)	3.50
titanium dioxide %	(tio2)	1.51
phosphorous pentoxide %	(p2o5)	2.47
calcium oxide %	(cao)	4.66
magnesium oxide %	(mgo)	2.55
sulphur trioxide %	(so3)	1.66
sodium oxide %	(na2o)	2.01
potassium oxide %	(k2o)	1.28

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — TRUE THICKNESS

MOUNT KLAPPAN PROJECT

DATA SOURCE: KPN LR 00H87021 | SEAM : H | INTERVAL(M) : 84.27 – 92.78 | ELEVATION(M) : 1501.4

GEOLOGIST : PARRY | SCALE: 1:40 | DATE : MAR 07/88 | DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	84.27			0.13												
				(0.12)												
			0.18													
				0.11												
				0.29												
				0.16												
				(0.63)	54.8	6958	90	2.34 / 0.64 2.98	2.34 / 0.64 2.98	1.08	38.64	8.26	51.02	0.32	18.05	—
				0.11												
				(0.23)												
				(0.28)												
	88.65		0.62		100.0	6957	91	0.00/ 0.95 0.85		1.03	88.86	7.38	2.32	—	1.13	—
			0.26													
	90.53			0.13												
				0.11												
				(0.43)	34.4	6958	92	0.77 / 0.07 0.84	0.77 / 0.07 0.84	0.93	28.87	7.25	62.95	0.40	22.28	—
	92.78															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87021
Coal zone:	H		
Field sample no.:	06956	Composite sample no.:	90
Lab sample no.:	30689		
True sample thickness:	2.980 meters	Drill core recovery (%):	53.19 %
Coal/Rock:	2.342 / 0.638 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	17.02	17.70	16.23	32.62	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	11.07	5.36			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.08	
Ash (%):	39.64	40.07
Volatile matter (%):	8.26	8.35
Fixed carbon (%):	51.02	51.58
Total sulphur (%):	0.32	0.32
Combustible sulphur (%):	0.13	
Net calorific value (cal/g):	4314.00	4361.00
Gross calorific value (cal/g):	4314.00	4361.00
Volatile matter (dmmf%):	8.90	
Hardgrove index:	74.00	
Specific gravity:	1.68	
Carbon dioxide (%):	3.94	
Phosphorous in coal (%):	0.035	
Chlorine in coal (ppm):	2160.00	
Forms of Sulphur (%):	PYRITE 00.04 SULPHATE 00.00 ORGANIC 00.28	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	52.02	52.59
Hydrogen (%):	1.60	1.62
Nitrogen (%):	0.62	0.63
Oxygen (%):	4.72	4.77

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1219.00	1192.00
Softening temperature (°C):	1267.00	1203.00
Hemispherical temperature (°C):	1289.00	1224.00
Final temperature (°C):	1332.00	1330.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	61.88	TiO2 (%):	0.73
Al2O3 (%):	13.61	Na2O (%):	1.30
Fe2O3 (%):	8.08	K2O (%):	0.68
CaO (%):	4.06	SO3 (%):	2.82
MgO (%):	3.64	P2O5 (%):	0.20

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87021
Coal zone:	H		
Field sample no.:	06958	Composite sample no.:	92
Lab sample no.:	30689		
True sample thickness:	0.838 meters	Drill core recovery (%):	32.88 %
Coal/Rock:	0.769 / 0.069 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	11.94	10.31	13.64	40.46
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	14.99	8.66		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.93	
Ash (%):	28.87	29.14
Volatile matter (%):	7.25	7.32
Fixed carbon (%):	62.95	63.54
Total sulphur (%):	0.40	0.40
Combustible sulphur (%):	0.07	
Net calorific value (cal/g):	5325.00	5375.00
Gross calorific value (cal/g):	5325.00	5375.00
Volatile matter (dmmf%):	7.10	
Hardgrove index:	31.00	
Specific gravity:	1.60	
Carbon dioxide (%):	2.91	
Phosphorous in coal (%):	0.013	
Chlorine in coal (ppm):	3120.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.38

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	63.11	63.70
Hydrogen (%):	1.69	1.71
Nitrogen (%):	0.76	0.77
Oxygen (%):	4.24	4.28

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1283.00	1195.00
Softening temperature (°C):	1299.00	1203.00
Hemispherical temperature (°C):	1323.00	1224.00
Final temperature (°C):	1353.00	1326.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	55.52	TiO2 (%):	1.22
Al2O3 (%):	17.39	Na2O (%):	1.48
Fe2O3 (%):	9.91	K2O (%):	1.33
CaO (%):	2.60	SO3 (%):	2.83
MgO (%):	3.61	P2O5 (%):	0.10

gcri coal division ash fusion proj KPN BLK LR DB DDH87021

sample id 00090
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1246.0	initial temp.(C)	1144.0
softening temp.(C)	1383.0	softening temp.(C)	1315.0
hemispherical temp.(C)	1439.0	hemispherical temp.(C)	1375.0
fluid temp.(C)	1469.0	fluid temp.(C)	1460.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87021

sample id 00090
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.82
aluminium oxide %	(al2o3)	21.17
ferric oxide %	(fe2o3)	4.46
titanium dioxide %	(tio2)	1.12
phosphorous pentoxide %	(p2o5)	0.30
calcium oxide %	(cao)	2.15
magnesium oxide %	(mgo)	2.61
sulphur trioxide %	(so3)	2.18
sodium oxide %	(na2o)	1.58
potassium oxide %	(k2o)	0.70

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87021

sample id 00090
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1278.0	initial temp.(C)	1270.0
softening temp.(C)	1383.0	softening temp.(C)	1369.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1460.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87021

sample id 00090
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	58.70
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	4.23
titanium dioxide %	(tio2)	1.49
phosphorous pentoxide %	(p2o5)	0.26
calcium oxide %	(cao)	1.85
magnesium oxide %	(mgo)	2.48
sulphur trioxide %	(so3)	2.06
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	0.62

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87021

sample id 00092
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1267.0	initial temp.(C)	1144.0
softening temp.(C)	1396.0	softening temp.(C)	1192.0
hemispherical temp.(C)	1436.0	hemispherical temp.(C)	1356.0
fluid temp.(C)	1466.0	fluid temp.(C)	1423.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87021

sample id 00092
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	55.48
aluminium oxide %	(al2o3)	23.06
ferric oxide %	(fe2o3)	7.46
titanium dioxide %	(tio2)	1.46
phosphorous pentoxide %	(p2o5)	0.14
calcium oxide %	(cao)	1.88
magnesium oxide %	(mgo)	3.08
sulphur trioxide %	(so3)	1.86
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	1.25

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87021

sample id 00092
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1243.0	initial temp.(C)	1192.0
softening temp.(C)	1471.0	softening temp.(C)	1375.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1404.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87021

sample id 00092
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	53.62
aluminium oxide %	(al2o3)	24.95
ferric oxide %	(fe2o3)	7.32
titanium dioxide %	(tio2)	1.40
phosphorous pentoxide %	(p2o5)	0.12
calcium oxide %	(cao)	1.46
magnesium oxide %	(mgo)	3.06
sulphur trioxide %	(so3)	2.00
sodium oxide %	(na2o)	1.51
potassium oxide %	(k2o)	1.16

90.0 <= total <= 100.0

KPNLRDDH87022

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87022

DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/23/87
END DATE - 09/25/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE C. INTERSECTED SEAMS P, O, N, M/N, ?. THERMISTOR INSTALLED

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1554.94

ZONE - 9
NORTHING - 6343789.84
EASTING - 508630.40

LICENCE/LEASE NUMBER -

LATITUDE - 571420
LONGITUDE - 1285125

- O R I E N T A T I O N -

LENGTH - 146.85

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 6.10
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87022										
		5991	74.78	74.80	100.00		0.019			0.000- 0.019
		6937	14.73	15.23	100.00		0.388			0.000- 0.388
	P	6938	15.23	15.65	85.71	0.281		0.047		0.328- 0.000
		6939	15.65	16.08	100.00		0.338			0.000- 0.338
		6940	62.50	62.87	100.00		0.346			0.000- 0.346
	O	6941	62.87	65.53	85.34	1.622	0.494	0.317	0.047	1.939- 0.541
		6942	65.53	66.50	100.00		0.902			0.000- 0.902
		6943	97.62	98.16	100.00		0.450			0.000- 0.450
	N	6944	98.16	101.45	95.44	2.408	0.173	0.122		2.530- 0.173
		6945	101.45	101.50	100.00		0.041			0.000- 0.041
		6946	123.71	124.93	100.00		1.070			0.000- 1.070
	M/N	6947	124.93	127.09	80.09	1.268	0.266	0.312	0.071	1.580- 0.337
		6948	127.09	127.52	100.00		0.386			0.000- 0.386
		7008	135.79	137.35	100.00		1.229			0.000- 1.229
	?	7009	137.35	138.13	57.69	0.266	0.033	0.232		0.498- 0.033
		7010	138.13	138.46	100.00		0.206			0.000- 0.206

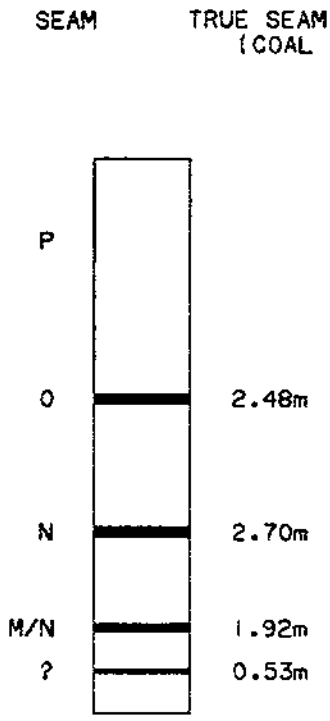
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87022												
	P	93	6938	6938	15.23	15.65	85.71	0.36	0.00	0.06	0.00	0.42- 0.00
	0	94	6941	6941	62.87	65.53	85.33	1.74	0.53	0.34	0.05	2.08- 0.58
	N	95	6944	6944	98.16	101.45	95.44	2.93	0.21	0.15	0.00	3.08- 0.21
	M/N	96	6947	6947	124.93	127.09	80.09	1.43	0.30	0.35	0.08	1.78- 0.38
	?	97	7009	7009	137.35	138.13	57.69	0.40	0.05	0.33	0.00	0.73- 0.05
	0	255	6941	6941	62.87	65.53	85.33	1.74	0.53	0.34	0.05	2.08- 0.58
	N	256	6944	6944	98.16	101.45	95.44	2.93	0.21	0.15	0.00	3.08- 0.21
	M/N	257	6947	6947	124.93	127.09	80.09	1.43	0.30	0.35	0.08	1.78- 0.38
	0	444	6941	6941	62.87	65.53	85.33	1.74	0.53	0.34	0.05	2.08- 0.58
	N	445	6944	6944	98.16	101.45	95.44	2.93	0.21	0.15	0.00	3.08- 0.21
	M/N	446	6947	6947	124.93	127.09	80.09	1.43	0.30	0.35	0.08	1.78- 0.38



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87022

GULF CANADA RESOURCES LTD.
:9/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION, MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87022 | SEAM : P | INTERVAL(M) : 15.23 – 15.65 | ELEVATION(M) : 1554.9

GEOLOGIST : PENMAN | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :

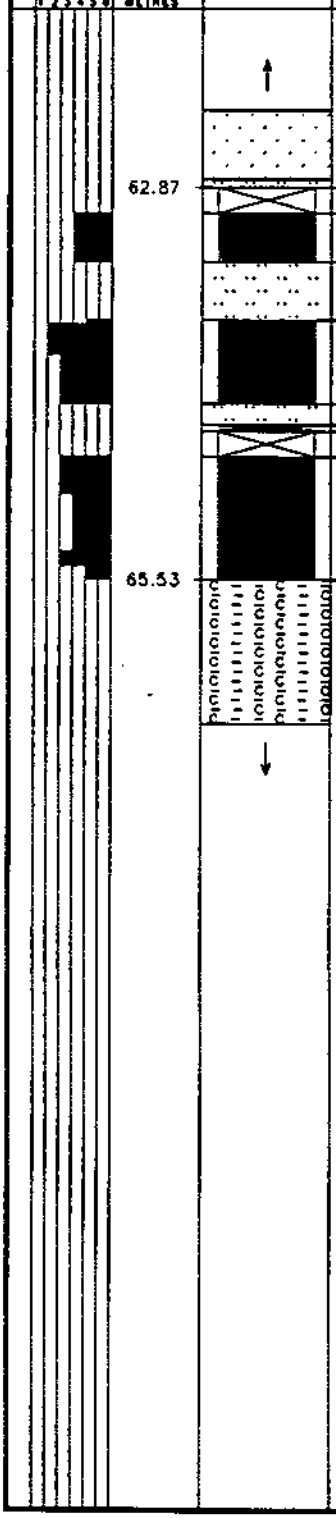
SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	15.23			0.28	85.7	5938	53	0.33/ 0.00		0.48	20.86	8.08	70.58	—	26.96	—
	15.65							0.33								

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87022 SEAM : 0 INTERVAL(M) : 62.87 – 65.53 ELEVATION(M) : 1554.9

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	62.87			(0.10)												
				0.31												
			0.38													
				0.33	85.3	6841	94	1.84 / 0.54	1.84 / 0.54	0.82	48.02	8.04	45.12	0.44	15.37	—
			0.13					2.48	2.48							
				(0.14)												
				0.78												
	65.53															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87022
Coal zone:	0		
Field sample no.:	06941	Composite sample no.:	94
Lab sample no.:	30690		
True sample thickness:	2.480 meters	Drill core recovery(%):	85.33 %
Coal/Rock:	1.939 / 0.541 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	39.29	23.80	12.02	17.88
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.41	2.60		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.82	
Ash(%):	46.02	46.40
Volatile matter(%):	8.04	8.11
Fixed carbon(%):	45.12	45.49
Total sulphur(%):	0.44	0.44
Combustible sulphur(%):	0.01	
Net calorific value(cal/g):	3721.00	3752.00
Gross calorific value(cal/g):	3721.00	3752.00
Volatile matter(dmmf%):	8.50	
Hardgrove index:	50.00	
Specific gravity:	1.77	
Carbon dioxide(%):	4.49	
Phosphorous in coal(%):	0.195	
Chlorine in coal(ppm):	1760.00	

Forms of Sulphur(%): PYRITE 00.08 SULPHATE 00.00 ORGANIC 00.36

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	46.55	46.94
Hydrogen(%):	1.71	1.72
Nitrogen(%):	0.63	0.64
Oxygen(%):	3.83	3.86

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1227.00	1203.00
Softening temperature(°C):	1251.00	1238.00
Hemispherical temperature(°C):	1278.00	1251.00
Final temperature(°C):	1350.00	1342.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.44	TiO2(%):	0.76
Al2O3(%):	14.37	Na2O(%):	1.81
Fe2O3(%):	2.34	K2O(%):	0.68
CaO(%):	7.28	SO3(%):	2.35
MgO(%):	5.44	P2O5(%):	0.97

qcri coal division ash fusion proj KPN BLK LR DS DDH87022

sample id 00094
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1246.0	initial temp.(C)	1241.0
softening temp.(C)	1291.0	softening temp.(C)	1259.0
hemispherical temp.(C)	1315.0	hemispherical temp.(C)	1273.0
fluid temp.(C)	1364.0	fluid temp.(C)	1345.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DS DDH87022

sample id 00094
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.08
aluminium oxide %	(al2o3)	16.37
ferric oxide %	(fe2o3)	2.73
titanium dioxide %	(tio2)	0.74
phosphorous pentoxide %	(p2o5)	2.18
calcium oxide %	(cao)	7.84
magnesium oxide %	(mgo)	4.46
sulphur trioxide %	(so3)	4.64
sodium oxide %	(na2o)	1.41
potassium oxide %	(k2o)	1.07

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87022

sample id 00094
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1232.0	initial temp.(C)	1219.0
softening temp.(C)	1305.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1383.0	fluid temp.(C)	1364.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87022

sample id 00094
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	55.52
aluminium oxide %	(al2o3)	19.17
ferric oxide %	(fe2o3)	2.71
titanium dioxide %	(tio2)	0.70
phosphorous pentoxide %	(p2o5)	1.87
calcium oxide %	(cao)	6.51
magnesium oxide %	(mgo)	4.12
sulphur trioxide %	(so3)	3.57
sodium oxide %	(na2o)	1.51
potassium oxide %	(k2o)	1.13

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87022 SEAM : N INTERVAL(M) : 98.16 – 101.45 ELEVATION(M) : 1554.9

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	98.16			0.69											
			0.17												
				1.08	95.2	6944	95	2.53 / 0.17 2.70	2.53 / 0.17 2.70	1.26	29.63	6.96	62.15	1.43	23.38
				(0.13)											
				0.17											
				0.47											
	101.45														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87022
Coal zone:	N		
Field sample no.:	06944	Composite sample no.:	95
Lab sample no.:	30690		
True sample thickness:	2.703 meters	Drill core recovery(%):	95.44 %
Coal/Rock:	2.530 / 0.173 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	23.47	18.04	16.71	31.80
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.67	3.31		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.26	
Ash(%):	29.63	30.01
Volatile matter(%):	6.96	7.05
Fixed carbon(%):	62.15	62.94
Total sulphur(%):	1.43	1.45
Combustible sulphur(%):	0.85	
Net calorific value(cal/g):	5588.00	5659.00
Gross calorific value(cal/g):	5588.00	5659.00
Volatile matter(dmmf%):	6.10	
Hardgrove index:	58.00	
Specific gravity:	1.60	
Carbon dioxide(%):	2.04	
Phosphorous in coal(%):	0.166	
Chlorine in coal(ppm):	2560.00	

Forms of Sulphur(%): PYRITE 00.82 SULPHATE 00.01 ORGANIC 00.60

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	62.64	63.44
Hydrogen(%):	2.21	2.24
Nitrogen(%):	0.82	0.83
Oxygen(%):	2.01	2.03

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1273.00	1203.00
Softening temperature(°C):	1278.00	1213.00
Hemispherical temperature(°C):	1299.00	1235.00
Final temperature(°C):	1345.00	1305.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.80	TiO2(%):	0.94
Al2O3(%):	15.50	Na2O(%):	1.57
Fe2O3(%):	5.98	K2O(%):	1.07
CaO(%):	6.16	SO3(%):	4.90
MgO(%):	2.90	P2O5(%):	1.28

gcri coal division ash fusion proj KPN BLK LR DB DDH87022

sample id 00095
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1184.0
softening temp.(C)	1299.0	softening temp.(C)	1205.0
hemispherical temp.(C)	1313.0	hemispherical temp.(C)	1254.0
fluid temp.(C)	1353.0	fluid temp.(C)	1321.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87022

sample id 00095
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	51.60
aluminium oxide %	(al2o3)	20.04
ferric oxide %	(fe2o3)	4.06
titanium dioxide %	(tio2)	1.34
phosphorous pentoxide %	(p2o5)	2.26
calcium oxide %	(cao)	6.02
magnesium oxide %	(mgo)	2.98
sulphur trioxide %	(so3)	4.69
sodium oxide %	(na2o)	1.63
potassium oxide %	(k2o)	1.16

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB IDH87022

sample id 00095
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1229.0	initial temp.(C)	1225.0
softening temp.(C)	1315.0	softening temp.(C)	1289.0
hemispherical temp.(C)	1348.0	hemispherical temp.(C)	1310.0
fluid temp.(C)	1407.0	fluid temp.(C)	1405.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB IDH87022

sample id 00095
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	52.62
aluminium oxide %	(al2o3)	23.06
ferric oxide %	(fe2o3)	3.27
titanium dioxide %	(tio2)	1.14
phosphorous pentoxide %	(p2o5)	1.51
calcium oxide %	(cao)	5.01
magnesium oxide %	(mgo)	2.48
sulphur trioxide %	(so3)	3.63
sodium oxide %	(na2o)	1.69
potassium oxide %	(k2o)	1.22

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87022 SEAM : M/N INTERVAL(M) : 124.93 – 127.09 ELEVATION(M) : 1554.9

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	124.93			0.74											
			0.11												
			(5.87)												
				(5.87)	80.0	6947	98	1.58 / 0.34	1.58 / 0.34	1.15	57.94	8.13	32.78	0.41	10.79
				0.29				1.92	1.92						
			0.16												
				0.23											
				(0.24)											
	127.09														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87022
Coal zone:	M/N		
Field sample no.:	06947	Composite sample no.:	96
Lab sample no.:	30689		
True sample thickness:	1.917 meters	Drill core recovery(%):	80.09 %
Coal/Rock:	1.580 / 0.337 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	15.39	26.92	23.08	27.58
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.50	2.53		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.15	
Ash(%):	57.94	58.61
Volatile matter(%):	8.13	8.22
Fixed carbon(%):	32.78	33.17
Total sulphur(%):	0.41	0.41
Combustible sulphur(%):	0.07	
Net calorific value(cal/g):	2579.00	2609.00
Gross calorific value(cal/g):	2579.00	2609.00
Volatile matter(dmmf%):	9.30	
Hardgrove index:	69.00	
Specific gravity:	1.89	
Carbon dioxide(%):	2.31	
Phosphorous in coal(%):	0.038	
Chlorine in coal(ppm):	2800.00	

Forms of Sulphur(%): PYRITE 00.17 SULPHATE 00.00 ORGANIC 00.24

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	35.37	35.78
Hydrogen(%):	1.48	1.50
Nitrogen(%):	0.52	0.53
Oxygen(%):	3.13	3.17

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1364.00	1267.00
Softening temperature(°C):	1401.00	1299.00
Hemispherical temperature(°C):	1439.00	1364.00
Final temperature(°C):	1472.00	1472.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	57.74	TiO2(%):	1.77
Al2O3(%):	21.93	Na2O(%):	1.87
Fe2O3(%):	3.95	K2O(%):	1.31
CaO(%):	2.01	SO3(%):	2.07
MgO(%):	2.34	P2O5(%):	0.15

gcri coal division ash fusion proj KPN BLK LR DB DDH87022

sample id 00096
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1472.0	initial temp.(C)	1407.0
softening temp.(C)	1472.0	softening temp.(C)	1445.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1472.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87022

sample id 00096
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	52.42
aluminium oxide %	(al2o3)	27.22
ferric oxide %	(fe2o3)	4.25
titanium dioxide %	(tio2)	1.92
phosphorous pentoxide %	(p2o5)	0.40
calcium oxide %	(cao)	1.60
magnesium oxide %	(mgo)	2.29
sulphur trioxide %	(so3)	1.80
sodium oxide %	(na2o)	2.05
potassium oxide %	(k2o)	1.25

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87022

sample id. 00096
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1321.0	initial temp.(C)	1240.0
softening temp.(C)	1472.0	softening temp.(C)	1472.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1472.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87022

sample id 00096
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	51.22
aluminium oxide %	(al2o3)	29.11
ferric oxide %	(fe2o3)	4.04
titanium dioxide %	(tio2)	1.77
phosphorous pentoxide %	(p2o5)	0.36
calcium oxide %	(cao)	1.54
magnesium oxide %	(mgo)	2.28
sulphur trioxide %	(so3)	1.82
sodium oxide %	(na2o)	1.99
potassium oxide %	(k2o)	1.09

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DB DDH87023

sample id 00098
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1270.0	initial temp.(C)	1208.0
softening temp.(C)	1289.0	softening temp.(C)	1224.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1256.0
fluid temp.(C)	1364.0	fluid temp.(C)	1348.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87023

sample id 00098
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	51.26
aluminium oxide %	(al2o3)	20.79
ferric oxide %	(fe2o3)	7.71
titanium dioxide %	(tio2)	1.41
phosphorous pentoxide %	(p2o5)	0.62
calcium oxide %	(cao)	3.30
magnesium oxide %	(mgo)	4.10
sulphur trioxide %	(so3)	2.58
sodium oxide %	(na2o)	1.48
potassium oxide %	(k2o)	1.76

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87023

sample id 00098
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1240.0	initial temp.(C)	1206.0
softening temp.(C)	1246.0	softening temp.(C)	1235.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1256.0
fluid temp.(C)	1396.0	fluid temp.(C)	1334.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87023

sample id 00098
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	52.50
aluminium oxide %	(al2o3)	21.41
ferric oxide %	(fe2o3)	7.64
titanium dioxide %	(tio2)	1.34
phosphorous pentoxide %	(p2o5)	0.59
calcium oxide %	(cao)	2.60
magnesium oxide %	(mgo)	3.98
sulphur trioxide %	(so3)	2.74
sodium oxide %	(na2o)	1.41
potassium oxide %	(k2o)	1.67

90.0 <= total <= 100.0

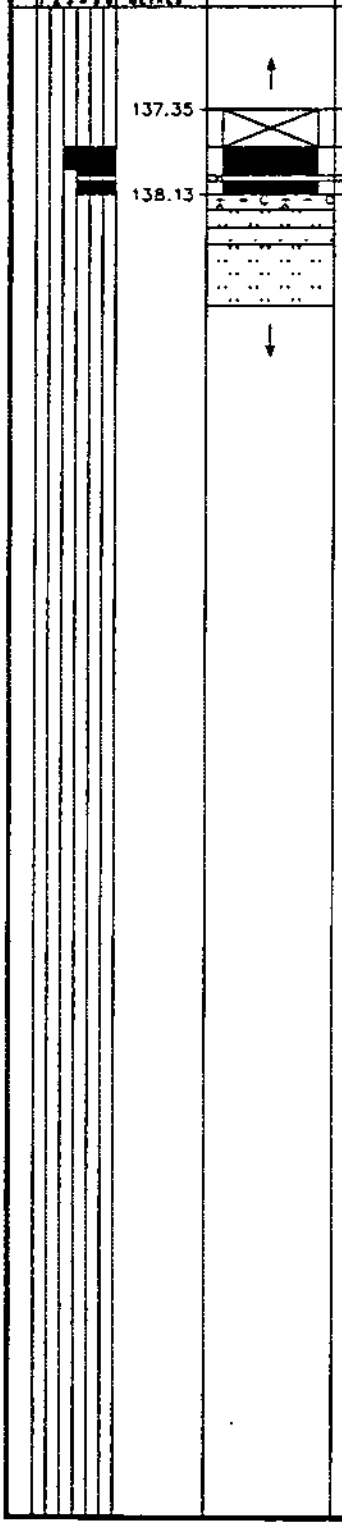
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87022 | SEAM : ? | INTERVAL(M) : 137.35 – 138.13 | ELEVATION(M) : 1554.9

GEOLOGIST : PENMAN | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	137.35			(0.23)												
				0.18	56.3	7009	87	0.50/ 0.03	0.50/ 0.03	0.85	55.88	10.54	32.83	—	12.19	—
			0.53	0.53				0.53	0.53							
	138.13															

KPNLRDDH87023

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87023 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/29/87
END DATE - 10/01/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE N, SEAMS K/L, K (PART), K/L (OVT). TOP IS UPR IGHT, BASAL HALF OVERTURNED. MINOR FAULTING.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1460.79
ZONE - 9
NORTHING - 6345709.44
EASTING - 508573.13

LICENCE/LEASE NUMBER -

LATITUDE - 571523
LONGITUDE - 1285128

- O R I E N T A T I O N -

LENGTH - 188.06
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 18.29
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87023										
		6949	102.70	104.42	100.00		1.408			0.000- 1.408
	K PART	6950	104.42	105.10	54.41	0.170	0.116	0.240		0.410- 0.116
		7001	105.10	106.88	74.72		0.941		0.336	0.000- 1.277
		7002	177.17	177.95	100.00		0.443			0.000- 0.443
	K/L OVT	7003	177.95	180.29	46.15	0.455	0.326	0.974		1.429- 0.326
		7004	180.29	181.22	100.00		0.836			0.000- 0.836
		7005	20.33	20.47	100.00		0.108			0.000- 0.108
	K/L	7006	20.47	22.25	69.10	0.721	0.332	0.418	0.081	1.139- 0.413
		7007	22.25	22.64	100.00		0.373			0.000- 0.373

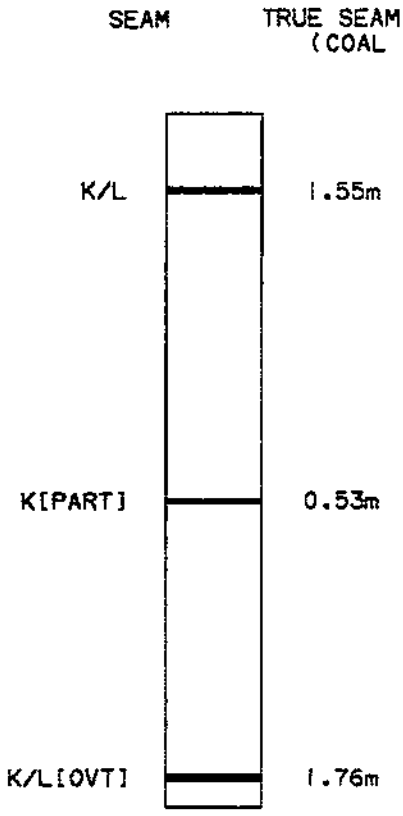
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87023												
	K/L	98	7006	7006	20.47	22.25	69.10	0.85	0.38	0.46	0.09	1.31- 0.47
	K PART	99	6950	6950	104.42	105.10	54.41	0.22	0.15	0.31	0.00	0.53- 0.15
	K/L OVT	100	7003	7003	177.95	180.29	46.15	0.61	0.47	1.26	0.00	1.87- 0.47
	K/L	258	7006	7006	20.47	22.25	69.10	0.85	0.38	0.46	0.09	1.31- 0.47
	K/L (ovt)	259	7003	7003	177.95	180.29	46.15	0.61	0.47	1.26	0.00	1.87- 0.47
	K/L	447	7006	7006	20.47	22.25	69.10	0.85	0.38	0.46	0.09	1.31- 0.47
	K/L (ovt)	448	7003	7003	177.95	180.29	46.15	0.61	0.47	1.26	0.00	1.87- 0.47



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87023

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1(2050571880072012.LG

COAL SEAM DATA SHEETS

AND

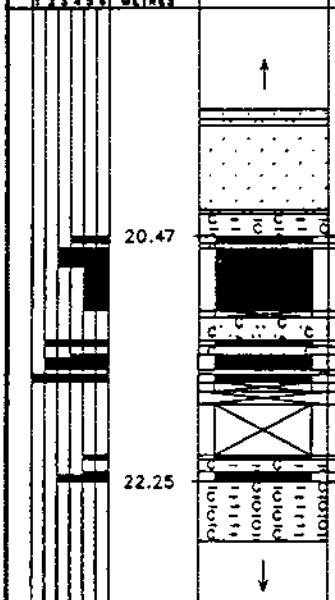
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87023 SEAM : K/L INTERVAL(M) : 20.47 – 22.25 ELEVATION(M) : 1460.8

GEOLOGIST : LEDDA SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	20.47			0.39											
			0.18	0.44											
			0.43	0.16	67.8	7008	98	1.14 / 0.41	1.14 / 0.41	0.72	58.16	7.68	33.44	0.89	10.97
			(0.08)	(0.32)				1.55	1.55						
	22.25		0.08												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87023
Coal zone:	K/L		
Field sample no.:	07006	Composite sample no.:	98
Lab sample no.:	30689		
True sample thickness:	1.552 meters	Drill core recovery(%):	69.10 %
Coal/Rock:	1.139 / 0.413 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	20.31	21.52	18.06	31.62
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.95	2.54		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.72	
Ash(%):	58.16	58.58
Volatile matter(%):	7.68	7.74
Fixed carbon(%):	33.44	33.68
Total sulphur(%):	0.89	0.90
Combustible sulphur(%):	0.48	
Net calorific value(cal/g):	2622.00	2641.00
Gross calorific value(cal/g):	2622.00	2641.00
Volatile matter(dmmf%):	7.50	
Hardgrove index:	58.00	
Specific gravity:	1.89	
Carbon dioxide(%):	3.09	
Phosphorous in coal(%):	0.180	
Chlorine in coal(ppm):	2320.00	

Forms of Sulphur(%): PYRITE 00.49 SULPHATE 00.01 ORGANIC 00.39

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	35.34	35.60
Hydrogen(%):	1.43	1.44
Nitrogen(%):	0.48	0.48
Oxygen(%):	2.98	3.00

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1305.00	1229.00
Softening temperature(°C):	1313.00	1240.00
Hemispherical temperature(°C):	1323.00	1256.00
Final temperature(°C):	1372.00	1364.00

ASH MINERAL ANALYSIS (AM1)

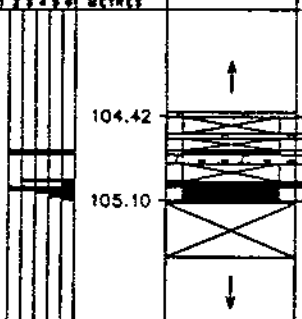
SiO2(%):	57.56	TiO2(%):	1.02
Al2O3(%):	18.78	Na2O(%):	1.61
Fe2O3(%):	6.66	K2O(%):	1.96
CaO(%):	3.05	SO3(%):	1.76
MgO(%):	3.51	P2O5(%):	0.71

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87023 SEAM : K PART INTERVAL(M) : 104.42 – 105.10 ELEVATION(M) : 1460.8

GEOLOGIST : LEDDA SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	104.42															
				(0.10)	46.8	6930	89	0.41 / 0.12	0.41 / 0.12	0.45	35.10	8.14	36.31	—	13.79	—
				(0.85)				0.53	0.53							
	105.10															

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87023 SEAM : K/L OVT INTERVAL(M) : 177.95 - 180.29 ELEVATION(M) : 1460.8

GEOLOGIST : LEDDA SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6	177.95			(0.09)											
			0.12	(0.09)											
			0.12	0.24											
				(0.14)											
			0.02	0.04											
				0.26	44.0	7003	100	1.43 / 0.33	1.43 / 0.33	0.82	53.40	5.94	39.84	1.15	12.90
				0.01				1.76	1.76						
				(0.17)											
			0.32	0.01											
				(0.52)											
	180.29			0.02											

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH8/023
Coal zone:	K/L OVT		
Field sample no.:	07003	Composite sample no.:	100
Lab sample no.:	30689		
True sample thickness:	1.755 meters	Drill core recovery(%):	46.15 %
Coal/Rock:	1.429 / 0.326 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	15.10	27.99	18.19	31.77
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.62	2.33		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.82	
Ash(%):	53.40	53.84
Volatile matter(%):	5.94	5.99
Fixed carbon(%):	39.84	40.17
Total sulphur(%):	1.15	1.16
Combustible sulphur(%):	0.59	
Net calorific value(cal/g):	3083.00	3109.00
Gross calorific value(cal/g):	3083.00	3109.00
Volatile matter(dmmf%):	3.00	
Hardgrove index:	69.00	
Specific gravity:	1.86	
Carbon dioxide(%):	1.21	
Phosphorous in coal(%):	0.096	
Chlorine in coal(ppm):	2880.00	

Forms of Sulphur(%): PYRITE 00.51 SULPHATE 00.01 ORGANIC 00.63

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	39.32	39.65
Hydrogen(%):	1.47	1.48
Nitrogen(%):	0.55	0.55
Oxygen(%):	3.29	3.32

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1299.00	1168.00
Softening temperature(°C):	1332.00	1281.00
Hemispherical temperature(°C):	1391.00	1332.00
Final temperature(°C):	1471.00	1460.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	56.64	TiO2(%):	1.22
Al2O3(%):	21.17	Na2O(%):	1.50
Fe2O3(%):	3.80	K2O(%):	2.50
CaO(%):	2.69	SO3(%):	2.61
MgO(%):	2.49	P2O5(%):	0.41

gcri coal division ash fusion proj KPN BLK LR D8 DDH87023

sample id 00100
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1187.0	initial temp.(C)	1135.0
softening temp.(C)	1323.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1385.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1453.0	fluid temp.(C)	1447.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87023

sample id 00100
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	50.68
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	6.51
titanium dioxide %	(tio2)	1.56
phosphorous pentoxide %	(p2o5)	1.40
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	2.87
sulphur trioxide %	(so3)	1.76
sodium oxide %	(na2o)	1.38
potassium oxide %	(k2o)	2.33

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87023

sample id 00100
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1353.0	initial temp.(C)	1299.0
softening temp.(C)	1375.0	softening temp.(C)	1326.0
hemispherical temp.(C)	1423.0	hemispherical temp.(C)	1353.0
fluid temp.(C)	1471.0	fluid temp.(C)	1465.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87023

sample id 00100
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	53.50
aluminium oxide %	(al2o3)	24.82
ferric oxide %	(fe2o3)	5.09
titanium dioxide %	(tio2)	1.41
phosphorous pentoxide %	(p2o5)	1.38
calcium oxide %	(cao)	2.60
magnesium oxide %	(mgo)	2.69
sulphur trioxide %	(so3)	1.01
sodium oxide %	(na2o)	1.47
potassium oxide %	(k2o)	2.48

90.0 <= total <= 100.0

KPNLRDDH87024

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87024 DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/26/87
END DATE - 09/28/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE N. SEAMS INTERSECTED O, N, M/N, ?, M, L, ?, K /L. STAND PIPE & NEUMATIC PIEZOMETERS INSTALLED

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1536.18
ZONE - 9
NORTHING - 6344342.82
EASTING - 509312.57

LICENCE/LEASE NUMBER -

LATITUDE - 571438
LONGITUDE - 1285045

- O R I E N T A T I O N -

LENGTH - 161.60
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - Y

CASING DEPTH (M) - 12.80
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87024										
		6907	15.03	15.17	100.00		0.090			0.000- 0.090
	D	6908	15.17	16.19	44.12	0.289		0.366		0.655- 0.000
		6909	16.19	16.38	100.00		0.122			0.000- 0.122
		6910	41.19	41.87	63.24		0.396		0.233	0.000- 0.629
	M/N	6911	41.87	43.10	75.61	0.762	0.125	0.286		1.048- 0.125
		6912	43.10	43.33	100.00		0.223			0.000- 0.223
		6913	68.51	70.09	100.00		1.464			0.000- 1.464
	?	6914	70.09	71.35	82.54	0.947		0.198		1.145- 0.000
		6915	71.35	72.72	19.71		0.240		0.980	0.000- 1.220
		6916	85.10	86.45	100.00		1.269			0.000- 1.269
	M	6917	86.45	89.02	73.93	1.710	0.065	0.560	0.066	2.270- 0.131
		6918	89.02	89.66	100.00		0.595			0.000- 0.595
		6919	117.00	117.50	100.00		0.439			0.000- 0.439
	L	6920	117.50	119.80	72.17	1.437	0.044	0.575		2.012- 0.044
		6921	119.80	120.60	100.00		0.730			0.000- 0.730
		6922	133.60	134.50	100.00		0.834			0.000- 0.834
	?	6923	134.50	134.90	55.00	0.204		0.168		0.372- 0.000
		6924	134.90	135.60	100.00		0.654			0.000- 0.654
		6925	151.71	152.00	100.00		0.254			0.000- 0.254
	K/L	6926	152.00	153.40	85.00	0.964	0.088		0.186	0.964- 0.274
	K/L	6927	153.40	155.21	74.59	0.848	0.366		0.413	0.848- 0.779
		6928	155.21	155.51	100.00		0.273			0.000- 0.273

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87024												
	O	101	6908	6908	15.17	16.19	44.11	0.45	0.00	0.57	0.00	1.02- 0.00
	M/N	102	6911	6911	41.87	43.10	75.60	0.80	0.13	0.30	0.00	1.10- 0.13
	?	103	6914	6914	70.09	71.35	82.53	1.04	0.00	0.22	0.00	1.26- 0.00
	M	104	6917	6917	86.45	89.02	73.92	1.83	0.07	0.60	0.07	2.43- 0.14
	L	105	6920	6920	117.50	119.80	72.17	1.61	0.05	0.64	0.00	2.25- 0.05
	K/L	106	6926	6927	152.00	155.21	79.12	2.03	0.51	0.00	0.67	2.03- 1.18
	M/N	260	6911	6911	41.87	43.10	75.60	0.80	0.13	0.30	0.00	1.10- 0.13
	?	261	6914	6914	70.09	71.35	82.53	1.04	0.00	0.22	0.00	1.26- 0.00
	M	262	6917	6917	86.45	89.02	73.92	1.83	0.07	0.60	0.07	2.43- 0.14
	L	263	6920	6920	117.50	119.80	72.17	1.61	0.05	0.64	0.00	2.25- 0.05
	K/L	264	6926	6927	152.00	155.21	79.12	2.03	0.51	0.00	0.67	2.03- 1.18
	M/N	449	6911	6911	41.87	43.10	75.60	0.80	0.13	0.30	0.00	1.10- 0.13
	?	450	6914	6914	70.09	71.35	82.53	1.04	0.00	0.22	0.00	1.26- 0.00
	M	451	6917	6917	86.45	89.02	73.92	1.83	0.07	0.60	0.07	2.43- 0.14
	L	452	6920	6920	117.50	119.80	72.17	1.61	0.05	0.64	0.00	2.25- 0.05
	K/L	453	6926	6927	152.00	155.21	79.12	2.03	0.51	0.00	0.67	2.03- 1.18

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
O	0.66m
N	1.91m
M/N	1.17m
?	1.15m
M	2.40m
L	2.06m
?	
K/L	2.86m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87024

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057)8800720:2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : 0 INTERVAL(M) : 15.17 – 16.19 ELEVATION(M) : 1536.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	15.17			0.29												
				(0.37)	44.1	6908	101	0.66/ 0.00 0.66	0.66/ 0.00 0.66	0.48	23.45	7.44	68.83	—	26.38	—
	16.19															

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : M/N INTERVAL(M) : 41.87 – 43.10 ELEVATION(M) : 1536.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	41.87			(0.14)												
				0.68	75.8	8911	102	1.05 / 0.13 1.17	1.05 / 0.13 1.17	0.87	52.24	7.34	39.55	0.48	13.38	——
			0.13													
				0.88												
	43.10			(0.19)												

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87024
Coal zone:	M/N		
Field sample no.:	06911	Composite sample no.:	102
Lab sample no.:	30690		
True sample thickness:	1.173 meters	Drill core recovery(%):	75.60 %
Coal/Rock:	1.048 / 0.125 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	19.07	13.41	19.22	38.95
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.23	3.12		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.87	
Ash(%):	52.24	52.70
Volatile matter(%):	7.34	7.40
Fixed carbon(%):	39.55	39.90
Total sulphur(%):	0.49	0.49
Combustible sulphur(%):	0.02	
Net calorific value(cal/g):	3191.00	3219.00
Gross calorific value(cal/g):	3191.00	3219.00
Volatile matter(dmmf%):	7.00	
Hardgrove index:	68.00	
Specific gravity:	1.80	
Carbon dioxide(%):	3.91	
Phosphorous in coal(%):	0.114	
Chlorine in coal(ppm):	2560.00	
Forms of Sulphur(%):	PYRITE 00.45 SULPHATE 00.01 ORGANIC 00.03	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	40.88	41.24
Hydrogen(%):	1.48	1.49
Nitrogen(%):	0.55	0.55
Oxygen(%):	3.49	3.53

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1259.00	1195.00
Softening temperature(°C):	1278.00	1213.00
Hemispherical temperature(°C):	1299.00	1240.00
Final temperature(°C):	1340.00	1299.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	57.60	TiO2(%):	0.80
Al2O3(%):	18.15	Na2O(%):	1.40
Fe2O3(%):	6.03	K2O(%):	1.85
CaO(%):	4.56	SO3(%):	2.25
MgO(%):	2.82	P2O5(%):	0.50

(1)

gcri coal division ash;fusion proj KPN BLK LR DS DDH87024

sample id 00102
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1241.0
softening temp.(C)	1450.0	softening temp.(C)	1342.0
hemispherical temp.(C)	1471.0	hemispherical temp.(C)	1434.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87024

sample id 00102
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 31/12/87

silicon dioxide %	(sio2)	59.00
aluminium oxide %	(al2o3)	24.95
ferric oxide %	(fe2o3)	4.52
titanium dioxide %	(tio2)	0.66
phosphorous pentoxide %	(p2o5)	0.91
calcium oxide %	(cao)	2.52
magnesium oxide %	(mgo)	2.34
sulphur trioxide %	(so3)	1.17
sodium oxide %	(na2o)	1.85
potassium oxide %	(k2o)	1.84

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87024

sample id 00102
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1358.0	initial temp.(C)	1389.0
softening temp.(C)	1472.0	softening temp.(C)	1388.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1471.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87024

sample id 00102
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	59.02
aluminium oxide %	(al2o3)	25.84
ferric oxide %	(fe2o3)	4.33
titanium dioxide %	(tio2)	0.60
phosphorous pentoxide %	(p2o5)	0.76
calcium oxide %	(cao)	2.29
magnesium oxide %	(mgo)	2.29
sulphur trioxide %	(so3)	1.00
sodium oxide %	(na2o)	1.92
potassium oxide %	(k2o)	1.69

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : ? INTERVAL(M) : 70.09 – 71.35 ELEVATION(M) : 1536.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg
	70.09			0.95	82.7	8914	103	1.15 / 0.00 1.15	1.15 / 0.00 1.15	0.91	38.08	6.78	56.23	2.85	19.88
	71.35			(0.20)											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87024
Coal zone:	?		
Field sample no.:	06914	Composite sample no.:	103
Lab sample no.:	30690		
True sample thickness:	1.145 meters	Drill core recovery(%):	82.53 %
Coal/Rock:	1.145 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	1.11	3.68	12.62	55.36
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	18.38	8.85		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.91	
Ash(%):	36.08	36.41
Volatile matter(%):	6.78	6.84
Fixed carbon(%):	56.23	56.75
Total sulphur(%):	2.85	2.88
Combustible sulphur(%):	2.41	
Net calorific value(cal/g):	4750.00	4794.00
Gross calorific value(cal/g):	4751.00	4795.00
Volatile matter(dmmf%):	4.80	
Hardgrove index:	80.00	
Specific gravity:	1.68	
Carbon dioxide(%):	1.54	
Phosphorous in coal(%):	0.134	
Chlorine in coal(ppm):	2680.00	

Forms of Sulphur(%): PYRITE 02.13 SULPHATE 00.04 ORGANIC 00.68

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	53.24	53.73
Hydrogen(%):	2.37	2.39
Nitrogen(%):	0.55	0.56
Oxygen(%):	4.00	4.03

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1283.00	1154.00
Softening temperature(°C):	1291.00	1162.00
Hemispherical temperature(°C):	1313.00	1184.00
Final temperature(°C):	1364.00	1334.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	52.31	TiO2(%):	1.70
Al2O3(%):	20.32	Na2O(%):	1.95
Fe2O3(%):	8.85	K2O(%):	1.17
CaO(%):	3.51	SO3(%):	3.07
MgO(%):	2.01	P2O5(%):	0.85

gcri coal division ash fusion proj KFN BLK LR D8 DDH87024

sample id 00103
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1238.0	initial temp.(C)	1134.0
softening temp.(C)	1353.0	softening temp.(C)	1187.0
hemispherical temp.(C)	1375.0	hemispherical temp.(C)	1273.0
fluid temp.(C)	1407.0	fluid temp.(C)	1364.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR D8 DDH87024

sample id 00103
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	45.10
aluminium oxide %	(al2o3)	23.67
ferric oxide %	(fe2o3)	13.38
titanium dioxide %	(tio2)	0.97
phosphorous pentoxide %	(p2o5)	1.21
calcium oxide %	(cao)	3.36
magnesium oxide %	(mgo)	1.95
sulphur trioxide %	(so3)	2.94
sodium oxide %	(na2o)	1.95
potassium oxide %	(k2o)	1.02

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN SLK LR DB DDH87024

sample id 00103
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1208.0	initial temp.(C)	1170.0
softening temp.(C)	1385.0	softening temp.(C)	1219.0
hemispherical temp.(C)	1417.0	hemispherical temp.(C)	1310.0
fluid temp.(C)	1450.0	fluid temp.(C)	1407.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN SLK LR DB DDH87024

sample id 00103
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	47.10
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	10.98
titanium dioxide %	(tio2)	1.56
phosphorous pentoxide %	(p2o5)	1.21
calcium oxide %	(cao)	3.33
magnesium oxide %	(mgo)	2.04
sulphur trioxide %	(so3)	2.94
sodium oxide %	(na2o)	1.83
potassium oxide %	(k2o)	0.87

90.0 <= total <= 100.0

GULF CANADA CORPORATION

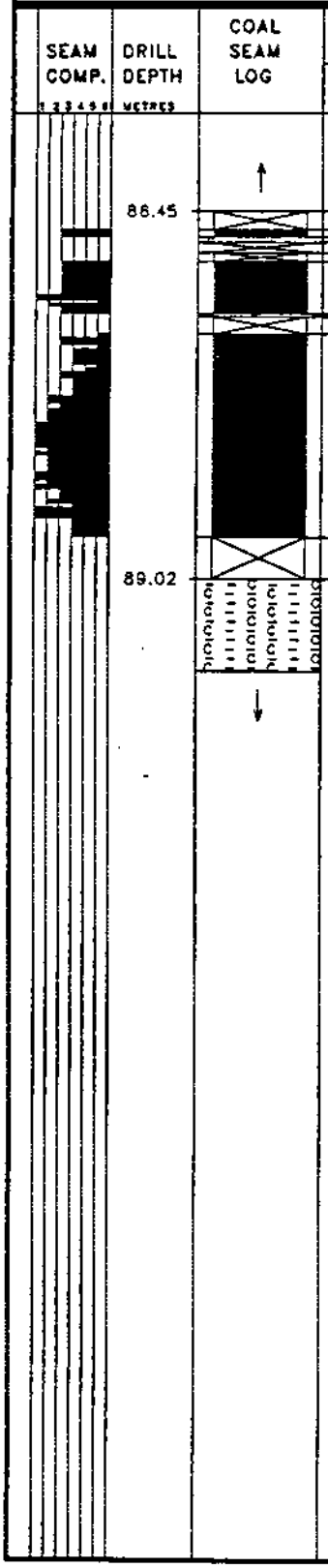
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : M INTERVAL(M) : 86.45 – 89.02 ELEVATION(M) : 1536.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	86.45			(0.12)											
			0.84	0.33											
			(0.07)												
				(0.08)											
				0.35											
			0.02												
				(0.11)											
				1.33	73.9	6917	104	2.27 / 0.13 2.40	2.27 / 0.13 2.40	0.87	34.28	7.84	57.13	2.68	20.89
				(0.27)											
	89.02														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87024
Coal zone:	M		
Field sample no.:	06917	Composite sample no.:	104
Lab sample no.:	30690		
True sample thickness:	2.401 meters	Drill core recovery (%):	73.92 %
Coal/Rock:	2.270 / 0.131 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	26.45	23.39	17.52	24.74
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	4.53	3.37		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.97	
Ash (%):	34.26	34.60
Volatile matter (%):	7.64	7.71
Fixed carbon (%):	57.13	57.69
Total sulphur (%):	2.68	2.71
Combustible sulphur (%):	1.95	
Net calorific value (cal/g):	4993.00	5042.00
Gross calorific value (cal/g):	4993.00	5042.00
Volatile matter (dmmf%):	6.40	
Hardgrove index:	48.00	
Specific gravity:	1.63	
Carbon dioxide (%):	2.12	
Phosphorous in coal (%):	0.118	
Chlorine in coal (ppm):	2030.00	

Forms of Sulphur (%): PYRITE 02.39 SULPHATE 00.02 ORGANIC 00.27

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	57.02	57.58
Hydrogen (%):	1.50	1.51
Nitrogen (%):	0.60	0.61
Oxygen (%):	2.97	2.99

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1315.00	1219.00
Softening temperature (°C):	1323.00	1229.00
Hemispherical temperature (°C):	1334.00	1259.00
Final temperature (°C):	1391.00	1385.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	50.58	TiO2 (%):	1.01
Al2O3 (%):	18.15	Na2O (%):	1.77
Fe2O3 (%):	9.41	K2O (%):	1.20
CaO (%):	4.37	SO3 (%):	5.34
MgO (%):	3.30	P2O5 (%):	0.79

gcri coal division ash fusion proj KPN BLK LR DS DCH87024

sample id 00104
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1364.0	initial temp.(C)	1281.0
softening temp.(C)	1401.0	softening temp.(C)	1294.0
hemispherical temp.(C)	1470.0	hemispherical temp.(C)	1380.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DCH87024

sample id 00104
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	48.56
aluminium oxide %	(al2o3)	25.71
ferric oxide %	(fe2o3)	7.81
titanium dioxide %	(tio2)	1.66
phosphorous pentoxide %	(p2o5)	0.64
calcium oxide %	(cao)	2.29
magnesium oxide %	(mgo)	3.08
sulphur trioxide %	(so3)	2.35
sodium oxide %	(na2o)	1.92
potassium oxide %	(k2o)	1.25

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87024

sample id 00104
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1238.0	initial temp.(C)	1231.0
softening temp.(C)	1401.0	softening temp.(C)	1375.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1417.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87024

sample id 00104
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 31/12/87

silicon dioxide %	(sio2)	49.59
aluminium oxide %	(al2o3)	27.66
ferric oxide %	(fe2o3)	6.11
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	0.61
calcium oxide %	(cao)	2.08
magnesium oxide %	(mgo)	3.06
sulphur trioxide %	(so3)	2.45
sodium oxide %	(na2o)	1.91
potassium oxide %	(k2o)	1.17

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : L INTERVAL(M) : 117.50 – 119.80 ELEVATION(M) : 1536.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	117.50			0.16											
				0.48											
				(0.35)											
				0.80	72.0	6920	105	2.01 / 0.04 2.06	2.01 / 0.04 2.06	0.86	22.56	6.53	70.05	0.43	25.08
				(0.23)											
	119.80														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87024
Coal zone:	L		
Field sample no.:	06920	Composite sample no.:	105
Lab sample no.:	30690		
True sample thickness:	2.056 meters	Drill core recovery (%):	72.17 %
Coal/Rock:	2.012 / 0.044 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	18.96	14.99	15.45	38.37
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	8.69	3.54		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.86	
Ash (%):	22.56	22.76
Volatile matter (%):	6.53	6.59
Fixed carbon (%):	70.05	70.65
Total sulphur (%):	0.43	0.43
Combustible sulphur (%):	0.02	
Net calorific value (cal/g):	5993.00	6045.00
Gross calorific value (cal/g):	5994.00	6046.00
Volatile matter (dmmf%):	6.20	
Hardgrove index:	50.00	
Specific gravity:	1.52	
Carbon dioxide (%):	1.14	
Phosphorous in coal (%):	0.350	
Chlorine in coal (ppm):	2560.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.41

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	71.13	71.75
Hydrogen (%):	2.38	2.40
Nitrogen (%):	0.86	0.87
Oxygen (%):	1.78	1.79

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1299.00	1192.00
Softening temperature (°C):	1310.00	1278.00
Hemispherical temperature (°C):	1321.00	1294.00
Final temperature (°C):	1348.00	1310.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	39.20	TiO2 (%):	1.66
Al2O3 (%):	25.57	Na2O (%):	1.87
Fe2O3 (%):	5.80	K2O (%):	1.01
CaO (%):	8.39	SO3 (%):	5.04
MgO (%):	3.32	P2O5 (%):	3.55

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87014

sample id 00105
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1308.0
softening temp.(C)	1471.0	softening temp.(C)	1453.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1471.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87014

sample id 00105
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	46.00
aluminium oxide %	(al2o3)	28.35
ferric oxide %	(fe2o3)	3.85
titanium dioxide %	(tio2)	1.66
phosphorous pentoxide %	(p2o5)	1.80
calcium oxide %	(cao)	4.84
magnesium oxide %	(mgo)	2.72
sulphur trioxide %	(so3)	3.33
sodium oxide %	(na2o)	1.61
potassium oxide %	(k2o)	1.01

90.0 <= total <= 100.0

(2)

gcri coal division | ash fusion | proj KPN | BLK LR | DS DDH87024

sample id 00105
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1299.0	initial temp.(C)	1291.0
softening temp.(C)	1472.0	softening temp.(C)	1472.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1472.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division | ash mineral | proj KPN | BLK LR | DS DDH87024

sample id 00105
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed __/__/__

silicon dioxide %	(sio2)	47.20
aluminium oxide %	(al2o3)	29.11
ferric oxide %	(fe2o3)	4.18
titanium dioxide %	(tio2)	1.22
phosphorous pentoxide %	(p2o5)	1.91
calcium oxide %	(cao)	4.37
magnesium oxide %	(mgo)	2.73
sulphur trioxide %	(so3)	2.48
sodium oxide %	(na2o)	1.65
potassium oxide %	(k2o)	0.90

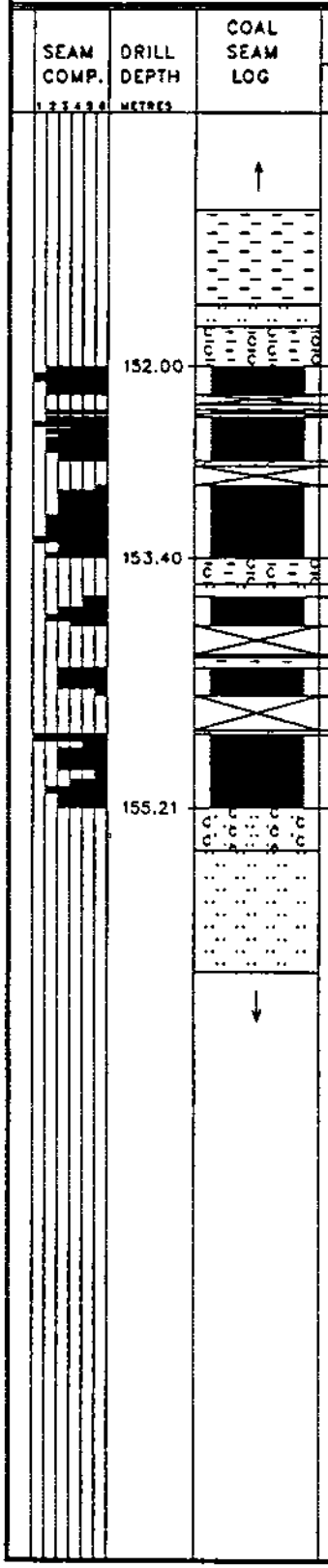
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87024 SEAM : K/L INTERVAL(M) : 152.00 – 155.21 ELEVATION(M) : 1538.2

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	152.00			0.19												
			(0.08)	0.04												
				0.28												
			0.40		85.0	6926										
			(0.12)													
				0.47												
	153.40		0.17													
			0.08													
				0.19												
			(0.19)				106	1.81 / 1.05	1.81 / 1.05	0.92	43.81	5.63	49.64	0.31	17.30	—
			0.07					2.86	2.86							
				0.18	74.6	6927										
			(0.23)													
			0.02													
				0.48												
	155.21															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87024
Coal zone:	K/L		
Field sample no.:	06926 - 06927	Composite sample no.:	106
Lab sample no.:	30690		
True sample thickness:	2.865 meters	Drill core recovery (%):	79.12 %
Coal/Rock:	1.812 / 1.053 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	38.63	23.49	14.89	17.98
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	3.24	1.77		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.92	
Ash (%):	43.81	44.22
Volatile matter (%):	5.63	5.68
Fixed carbon (%):	49.64	50.10
Total sulphur (%):	0.31	0.31
Combustible sulphur (%):	0.04	
Net calorific value (cal/g):	4135.00	4173.00
Gross calorific value (cal/g):	4135.00	4173.00
Volatile matter (dmmf%):	3.90	
Hardgrove index:	53.00	
Specific gravity:	1.73	
Carbon dioxide (%):	1.42	
Phosphorous in coal (%):	0.061	
Chlorine in coal (ppm):	2720.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.29

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	49.42	49.88
Hydrogen (%):	1.49	1.50
Nitrogen (%):	0.53	0.53
Oxygen (%):	3.52	3.56

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1299.00	1216.00
Softening temperature (°C):	1332.00	1246.00
Hemispherical temperature (°C):	1353.00	1278.00
Final temperature (°C):	1404.00	1385.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	63.40	TiO2 (%):	1.02
Al2O3 (%):	17.01	Na2O (%):	1.81
Fe2O3 (%):	4.35	K2O (%):	1.23
CaO (%):	2.04	SO3 (%):	1.53
MgO (%):	2.45	P2O5 (%):	0.32

(1)

scri coal division ash fusion proj KFN BLK LR DS DDH87024

sample id 00106
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1310.0	initial temp.(C)	1229.0
softening temp.(C)	1321.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1383.0	hemispherical temp.(C)	1305.0
fluid temp.(C)	1424.0	fluid temp.(C)	1417.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KFN BLK LR DS DDH87024

sample id 00106
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	60.66
aluminium oxide %	(al2o3)	20.04
ferric oxide %	(fe2o3)	4.96
titanium dioxide %	(tio2)	1.02
phosphorous pentoxide %	(p2o5)	0.59
calcium oxide %	(cao)	1.88
magnesium oxide %	(mgo)	2.75
sulphur trioxide %	(so3)	1.19
sodium oxide %	(na2o)	1.81
potassium oxide %	(k2o)	1.10

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87024

sample id 00106
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1353.0	initial temp.(C)	1197.0
softening temp.(C)	1377.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1434.0	hemispherical temp.(C)	1348.0
fluid temp.(C)	1471.0	fluid temp.(C)	1460.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87024

sample id 00106
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	60.48
aluminium oxide %	(al2o3)	21.55
ferric oxide %	(fe2o3)	4.36
titanium dioxide %	(tio2)	0.87
phosphorous pentoxide %	(p2o5)	0.50
calcium oxide %	(cao)	1.76
magnesium oxide %	(mgo)	2.52
sulphur trioxide %	(so3)	1.05
sodium oxide %	(na2o)	2.05
potassium oxide %	(k2o)	1.17

90.0 <= total <= 100.0

KPNLRDDH87025

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87025

DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/29/87
END DATE - 10/01/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - 85011 TWIN HOLE. SEAMS INTERSECTED K, J, I.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1525.32

ZONE - 9
NORTHING - 6344833.23
EASTING - 507123.79

LICENCE/LEASE NUMBER -

LATITUDE - 571454
LONGITUDE - 1285255

- O R I E N T A T I O N -

LENGTH - 112.59

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 18.90
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY

TRUE 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
DDH87025										
		6929	34.50	35.69	100.00		1.030			0.000- 1.030
	K	6930	35.69	36.89	100.00	0.365	0.676			0.365- 0.676
	K	6931	36.89	41.44	91.21	3.248	0.347	0.208	0.139	3.456- 0.486
		6932	41.44	42.00	100.00		0.485			0.000- 0.485
		6933	102.33	102.67	100.00		0.294			0.000- 0.294
	I	6934	102.67	105.71	97.70	2.312	0.261	0.061		2.373- 0.261
	I	6935	105.71	107.97	91.15	1.784		0.173		1.957- 0.000
		6936	107.97	108.34	100.00		0.320			0.000- 0.320

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87025												
	K	107	6930	6930	35.69	36.89	100.00	0.42	0.78	0.00	0.00	0.42- 0.78
	K	108	6931	6931	36.89	41.44	91.20	3.75	0.40	0.24	0.16	3.99- 0.56
	I	109	6934	6934	102.67	105.71	97.69	2.67	0.30	0.07	0.00	2.74- 0.30
	I	110	6935	6935	105.71	107.97	91.15	2.06	0.00	0.20	0.00	2.26- 0.00
	K	265	6930	6930	35.69	36.89	100.00	0.42	0.78	0.00	0.00	0.42- 0.78
	K	266	6931	6931	36.89	41.44	91.20	3.75	0.40	0.24	0.16	3.99- 0.56
	I	267	6934	6934	102.67	105.71	97.69	2.67	0.30	0.07	0.00	2.74- 0.30
	I	268	6935	6935	105.71	107.97	91.15	2.06	0.00	0.20	0.00	2.26- 0.00
	K	454	6930	6931	35.69	41.44	93.04	4.17	1.18	0.24	0.16	4.41- 1.34
	I	455	6934	6935	102.67	107.97	94.90	4.73	0.30	0.27	0.00	5.00- 0.30

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
K	4.98m
J	0.71m
I	4.59m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87025

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87025 SEAM : K INTERVAL(M) : 35.69 – 41.44 ELEVATION(M) : 1525.3

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	35.69		0.23		100.0	6930	107	0.37 / 0.68		0.90	37.64	9.10	32.36	0.25	10.95
				0.09				1.04							
			0.13												
				0.17											
			0.11												
				0.09											
			0.21												
	36.89			0.70	91.4	6931	108	3.46 / 0.49	3.82 / 1.16	0.82	24.88	7.15	67.37	0.50	24.36
				(0.00)				3.94	4.98						
				0.23											
				(0.09)											
				(0.18)											
				0.25											
			0.98												
				0.17											
			0.16												
				1.15											
			0.19												
				(0.05)											
				0.76											
	41.44														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87025
Coal zone:	K		
Field sample no.:	06930	Composite sample no.:	107
Lab sample no.:	30690		
True sample thickness:	1.041 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	0.365 / 0.676 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.63	27.49	29.23	8.11
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.26	3.28		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	57.64	58.16
Volatile matter(%):	9.10	9.18
Fixed carbon(%):	32.36	32.66
Total sulphur(%):	0.25	0.25
Combustible sulphur(%):	0.05	
Net calorific value(cal/g):	2617.00	2641.00
Gross calorific value(cal/g):	2617.00	2641.00
Volatile matter(dmmf%):	12.00	
Hardgrove index:	91.00	
Specific gravity:	1.89	
Carbon dioxide(%):	4.54	
Phosphorous in coal(%):	0.023	
Chlorine in coal(ppm):	1200.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.23

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	35.63	35.95
Hydrogen(%):	1.57	1.58
Nitrogen(%):	0.48	0.48
Oxygen(%):	3.53	3.58

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1269.00	1234.00
Softening temperature(°C):	1282.00	1237.00
Hemispherical temperature(°C):	1303.00	1248.00
Final temperature(°C):	1403.00	1337.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.72	TiO2(%):	1.25
Al2O3(%):	20.38	Na2O(%):	2.22
Fe2O3(%):	3.60	K2O(%):	1.10
CaO(%):	4.90	SO3(%):	1.30
MgO(%):	2.74	P2O5(%):	0.09

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87025
Coal zone:	K		
Field sample no.:	06931	Composite sample no.:	108
Lab sample no.:	30690		
True sample thickness:	3.942 meters	Drill core recovery(%):	91.20 %
Coal/Rock:	3.456 / 0.486 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	28.86	22.71	16.74	21.37
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.02	4.30		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.82	
Ash(%):	24.66	24.86
Volatile matter(%):	7.15	7.21
Fixed carbon(%):	67.37	67.93
Total sulphur(%):	0.50	0.50
Combustible sulphur(%):	0.22	
Net calorific value(cal/g):	5821.00	5869.00
Gross calorific value(cal/g):	5822.00	5870.00
Volatile matter(dmmf%):	6.90	
Hardgrove index:	51.00	
Specific gravity:	1.53	
Carbon dioxide(%):	1.80	
Phosphorous in coal(%):	0.122	
Chlorine in coal(ppm):	2640.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.48

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	67.39	67.95
Hydrogen(%):	2.55	2.57
Nitrogen(%):	0.91	0.92
Oxygen(%):	3.17	3.20

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1242.00	1127.00
Softening temperature(°C):	1263.00	1208.00
Hemispherical temperature(°C):	1290.00	1216.00
Final temperature(°C):	1400.00	1263.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	57.74	TiO2(%):	1.30
Al2O3(%):	18.86	Na2O(%):	1.67
Fe2O3(%):	4.96	K2O(%):	1.16
CaO(%):	4.24	SO3(%):	2.87
MgO(%):	2.52	P2O5(%):	1.13

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87025

sample id 00107
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1303.0	initial temp.(C)	1024.0
softening temp.(C)	1333.0	softening temp.(C)	1248.0
hemispherical temp.(C)	1400.0	hemispherical temp.(C)	1269.0
fluid temp.(C)	1440.0	fluid temp.(C)	1419.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87025

sample id 00107
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	57.12
aluminium oxide %	(al2o3)	22.91
ferric oxide %	(fe2o3)	3.83
titanium dioxide %	(tio2)	1.90
phosphorous pentoxide %	(p2o5)	0.13
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	2.20
sulphur trioxide %	(so3)	2.70
sodium oxide %	(na2o)	2.25
potassium oxide %	(k2o)	1.01

90.0 <= total <= 100.0

(2)

scri coal division ash fusion proj KPN BLK LR DB DDH87025

sample id 00107
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1311.0	initial temp.(C)	1240.0
softening temp.(C)	1333.0	softening temp.(C)	1253.0
hamispherical temp.(C)	1398.0	hamispherical temp.(C)	1277.0
fluid temp.(C)	1406.0	fluid temp.(C)	1329.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DB DDH87025

sample id 00107
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	56.12
aluminium oxide %	(al2o3)	22.61
ferric oxide %	(fe2o3)	4.25
titanium dioxide %	(tio2)	1.52
phosphorous pentoxide %	(p2o5)	0.12
calcium oxide %	(cao)	3.85
magnesium oxide %	(mgo)	2.35
sulphur trioxide %	(so3)	2.36
sodium oxide %	(na2o)	2.16
potassium oxide %	(k2o)	1.02

90.0 <= total <= 100.0

(1)

scri coal division ash fusion proj KPN BLK LR DS DDH87023

sample id 00108
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1282.0	initial temp.(C)	1208.0
softening temp.(C)	1327.0	softening temp.(C)	1224.0
hemispherical temp.(C)	1340.0	hemispherical temp.(C)	1240.0
fluid temp.(C)	1371.0	fluid temp.(C)	1335.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87023

sample id 00108
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	54.38
aluminium oxide %	(al2o3)	23.14
ferric oxide %	(fe2o3)	5.00
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	1.64
calcium oxide %	(cao)	3.64
magnesium oxide %	(mgo)	2.26
sulphur trioxide %	(so3)	1.91
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.03

90.0 <= total <= 100.0

(2)

tri coal division ash fusion proj KFN BLK LR DB DDH87025

sample id 00108
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1358.0	initial temp.(C)	1121.0
softening temp.(C)	1400.0	softening temp.(C)	1253.0
hemispherical temp.(C)	1406.0	hemispherical temp.(C)	1313.0
fluid temp.(C)	1472.0	fluid temp.(C)	1437.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KFN BLK LR DB DDH87025

sample id 00108
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	54.54
aluminium oxide %	(al2o3)	23.97
ferric oxide %	(fe2o3)	4.93
titanium dioxide %	(tio2)	1.24
phosphorous pentoxide %	(p2o5)	1.27
calcium oxide %	(cao)	3.43
magnesium oxide %	(mgo)	2.21
sulphur trioxide %	(so3)	1.95
sodium oxide %	(na2o)	1.88
potassium oxide %	(k2o)	0.97

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87025 SEAM : 1 INTERVAL(M) : 102.67 – 107.97 ELEVATION(M) : 1525.3

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	102.67			0.34											
			0.03	0.51											
			0.05	0.22											
			0.14												
				1.01	97.7	6934	108	2.37 / 0.26 2.63		1.17	25.73	8.12	66.98	0.38	25.27
			0.43	(0.08)					4.33 / 0.26 4.59						
	105.71			0.24											
				(0.17)											
				1.78	91.2	8933	110	1.96 / 0.00 1.96		1.20	8.30	5.38	85.12	0.49	32.01
	107.97														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT: KLAPPAN
DATA SOURCE: KPNLRDDH87025
Coal zone: I
Field sample no.: 06934
Composite sample no.: 109
Lab sample no.: 30608
True sample thickness: 2.634 meters
Drill core recovery (%): 97.69 %
Coal/Rock: 2.373 / 0.261 meters

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm)	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%)	17.91	19.60	18.22	35.19

Fraction size (mm)	0.50 X 0.15	0.15 X 0.00
Relative weight (%)	6.05	3.03

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%)	1.17	
Ash (%)	25.73	26.03
Volatile matter (%)	6.12	6.19
Fixed carbon (%)	66.98	67.78
Total sulphur (%)	0.38	0.38
Combustible sulphur (%)	0.24	
calorific value (cal/g)	6040.00	6111.00
Gross calorific value (cal/g)	6040.00	6111.00
Volatile matter (dmmf%)	5.60	
Hardgrove index	56.00	
Specific gravity	1.56	
Carbon dioxide (%)	1.44	
Phosphorous in coal (%)	0.025	
Chlorine in coal (ppm)	2080.00	

Forms of Sulphur (%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.36

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%)	67.54	68.34
Hydrogen (%)	2.30	2.33
Nitrogen (%)	0.83	0.84
Oxygen (%)	2.05	2.08

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C)	1323.00	1267.00
Softening temperature (°C)	1348.00	1283.00
Hemispherical temperature (°C)	1369.00	1326.00
Final temperature (°C)	1471.00	1439.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%)	59.83	TiO2 (%)	0.99
Al2O3 (%)	21.86	Na2O (%)	2.34
Fe2O3 (%)	3.91	K2O (%)	1.11
CaO (%)	2.08	SO3 (%)	1.40
MgO (%)	2.64	P2O5 (%)	0.22

tri coal division ash fusion proj KPN BLK LR DB DDH87025

mple id 00109
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AF3 data analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1270.0	initial temp.(C)	1229.0
softening temp.(C)	1286.0	softening temp.(C)	1237.0
hemispherical temp.(C)	1299.0	hemispherical temp.(C)	1246.0
fluid temp.(C)	1409.0	fluid temp.(C)	1337.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KPN BLK LR DB DDH87025

mple id 00109
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AM3 data analysed 30/11/87

silicon dioxide %	(sio2)	58.80
aluminium oxide %	(al2o3)	19.52
ferric oxide %	(fe2o3)	4.68
titanium dioxide %	(tio2)	0.70
phosphorous pentoxide %	(p2o5)	0.20
calcium oxide %	(cao)	3.81
magnesium oxide %	(mgo)	3.65
sulphur trioxide %	(so3)	1.85
sodium oxide %	(na2o)	1.65
potassium oxide %	(k2o)	0.98

90.0 <= total <= 100.0

(2)

ri coal division ash fusion proj KPN BLK LR DB DDH87025

mple id 00109
mple product id SP1 data type (real,boro,aver,calc) REAL
.it sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1272.0	initial temp.(C)	1235.0
softening temp.(C)	1290.0	softening temp.(C)	1242.0
emispherical temp.(C)	1299.0	hemispherical temp.(C)	1246.0
fluid temp.(C)	1385.0	fluid temp.(C)	1299.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

ri coal division ash mineral proj KPN BLK LR DB DDH87025

mple id 00109
mple product id SP1 data type (real,boro,aver,calc) REAL
.it sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	59.27
aluminium oxide %	(al2o3)	20.66
ferric oxide %	(fe2o3)	4.73
titanium dioxide %	(tio2)	0.62
phosphorous pentoxide %	(p2o5)	0.38
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	3.43
sulphur trioxide %	(so3)	1.61
sodium oxide %	(na2o)	1.62
potassium oxide %	(k2o)	0.99

90.0 <= total <= 100.0

tri coal division ash fusion proj KPN BLK LR DE DDH87025

mple id 00110
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AF3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1267.0
softening temp.(C)	1294.0	softening temp.(C)	1272.0
hemispherical temp.(C)	1297.0	hemispherical temp.(C)	1275.0
fluid temp.(C)	1310.0	fluid temp.(C)	1303.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KPN BLK LR DE DDH87025

mple id 00110
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	38.53
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	5.60
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	5.57
calcium oxide %	(cao)	9.95
magnesium oxide %	(mgo)	4.09
sulphur trioxide %	(so3)	3.53
sodium oxide %	(na2o)	1.75
potassium oxide %	(k2o)	1.13

90.0 <= total <= 100.0

(2)

tri coal division ash fusion proj KPN BLK LR DS DDH87025
========== ========== ==========

mple id 00110
mple product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1297.0	initial temp.(C)	1262.0
softening temp.(C)	1299.0	softening temp.(C)	1272.0
hemispherical temp.(C)	1302.0	hemispherical temp.(C)	1275.0
fluid temp.(C)	1310.0	fluid temp.(C)	1302.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

tri coal division ash mineral proj KPN BLK LR DS DDH87025
========== ========== ==========

ample id 00110
ample product id SP1 data type (real,boro,aver,calc) REAL
lit sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	40.10
aluminium oxide %	(al2o3)	24.96
ferric oxide %	(fe2o3)	6.15
titanium dioxide %	(tio2)	0.96
phosphorous pentoxide %	(p2o5)	5.27
calcium oxide %	(cao)	9.55
magnesium oxide %	(mgo)	3.11
sulphur trioxide %	(so3)	3.13
sodium oxide %	(na2o)	1.75
potassium oxide %	(k2o)	1.11

90.0 <= total <= 100.0

KPNLRDDH87026

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87026

DATE - 03/01/88

- H I S T O R Y -

START DATE - 09/30/87
END DATE - 10/02/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED H (OVT), H/I (OVT), I (PART), I (PART), H/I, H, PH

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1444.09

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6346044.95
EASTING - 508677.41

LATITUDE - 571533
LONGITUDE - 1285122

- O R I E N T A T I O N -

LENGTH - 181.45

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) -	7.62
AQUIFER DEPTHS (M) -	0.00
	0.00
LOST CIRC. DEPTHS (M) -	0.00
	0.00

*** NOTE *** 0 INDICATES NO VALUE

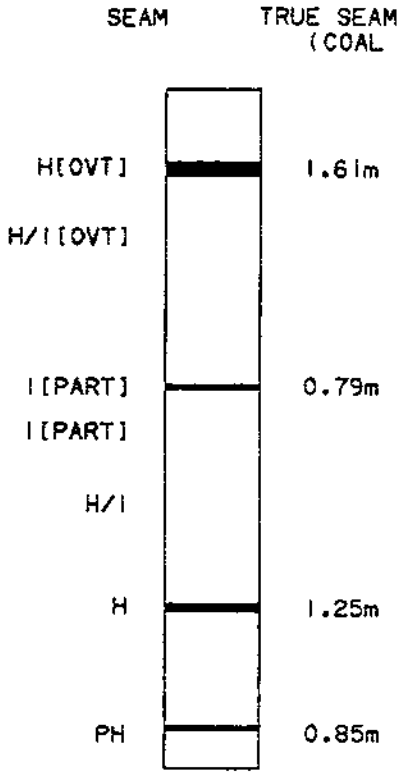
GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87026										
		6960	18.55	18.93	100.00		0.122			0.000- 0.122
	H OVT	6961	18.93	23.05	58.98	0.878	0.086	0.514	0.137	1.392- 0.223
		6962	23.05	23.73	100.00		0.317			0.000- 0.317
		6963	47.40	48.69	100.00		0.684			0.000- 0.684
	H/I OVT	6964	48.69	49.35	74.24	0.286		0.097		0.383- 0.000
		6965	49.35	49.72	100.00		0.223			0.000- 0.223
		6966	78.39	79.06	95.52		0.510		0.023	0.000- 0.533
	I PART.	6967	79.06	80.17	88.29	0.688	0.015	0.091		0.779- 0.015
		6968	80.17	80.67	100.00		0.314			0.000- 0.314
		6969	136.81	138.26	100.00		1.094			0.000- 1.094
	H	6970	138.26	139.97	73.68	0.525	0.393	0.328		0.853- 0.393
		6971	139.97	140.55	100.00		0.415			0.000- 0.415
	PH	6972	171.87	172.84	100.00	0.136	0.746			0.136- 0.746
	PH	6973	172.84	173.78	84.04	0.623	0.090		0.136	0.623- 0.226
		6974	173.78	174.21	100.00		0.388			0.000- 0.388



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87026

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]88007201.LG

COAL SEAM DATA SHEETS

AND

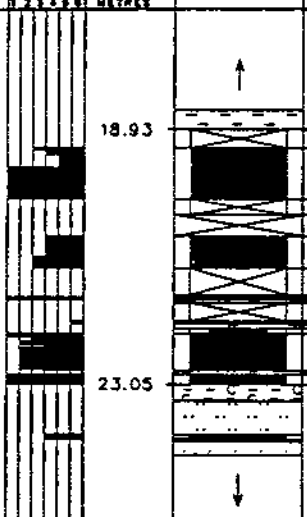
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : H OVT INTERVAL(M) : 18.93 – 23.05 ELEVATION(M) : 1444.1

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL. VAL MJ/KG
	18.93			(0.11)											
				0.33											
				(0.09)											
			(0.14)												
				0.21	59.7	6961	111	1.39 / 0.22 1.61	1.39 / 0.22 1.61	0.75	34.93	6.74	57.58	0.89	20.24
				(0.17)											
				(0.21)											
				0.24											
	23.05														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87026
Coal zone:	H OVT		
Field sample no.:	06961	Composite sample no.:	111
Lab sample no.:	30691		
True sample thickness:	1.615 meters	Drill core recovery(%):	58.98 %
Coal/Rock:	1.392 / 0.223 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	30.58	21.95	15.62	23.83
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.01	3.01		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.75	
Ash(%):	34.93	35.20
Volatile matter(%):	6.74	6.79
Fixed carbon(%):	57.58	58.01
Total sulphur(%):	0.89	0.90
Combustible sulphur(%):	0.41	
Net calorific value(cal/g):	4837.00	4874.00
Gross calorific value(cal/g):	4837.00	4874.00
Volatile matter(dmmf%):	5.90	
Hardgrove index:	51.00	
Specific gravity:	1.63	
Carbon dioxide(%):	3.22	
Phosphorous in coal(%):	0.128	
Chlorine in coal(ppm):	3390.00	

Forms of Sulphur(%): PYRITE 00.48 SULPHATE 00.02 ORGANIC 00.39

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	57.09	57.52
Hydrogen(%):	1.78	1.79
Nitrogen(%):	0.68	0.69
Oxygen(%):	3.88	3.90

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1246.00	1195.00
Softening temperature(°C):	1305.00	1229.00
Hemispherical temperature(°C):	1321.00	1254.00
Final temperature(°C):	1385.00	1323.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.44	TiO2(%):	1.10
Al2O3(%):	16.63	Na2O(%):	1.56
Fe2O3(%):	6.46	K2O(%):	1.39
CaO(%):	6.13	SO3(%):	3.47
MgO(%):	3.89	P2O5(%):	0.84

(1)

cri coal division   ash fusion   proj KPN   BLK LR   DS DDH87026

sample id	00111		
sample product id	SP1	data type (real,boro,aver,calc)	REAL
split sample id	AF3	date analysed	21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1149.0
softening temp.(C)	1337.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1369.0	hemispherical temp.(C)	1299.0
fluid temp.(C)	1426.0	fluid temp.(C)	1407.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division   ash mineral   proj KPN   BLK LR   DS DDH87026

sample id	00111		
sample product id	SP1	data type (real,boro,aver,calc)	REAL
split sample id	AM3	date analysed	21/01/88

silicon dioxide %	(sio2)	53.68
aluminium oxide %	(al2o3)	22.17
ferric oxide %	(fe2o3)	5.69
titanium dioxide %	(tio2)	1.41
phosphorous pentoxide %	(p2o5)	1.05
calcium oxide %	(cao)	3.30
magnesium oxide %	(mgo)	3.19
sulphur trioxide %	(so3)	2.45
sodium oxide %	(na2o)	1.63
potassium oxide %	(k2o)	1.31

90.0 <= total <= 100.0

qcri coal division ash fusion proj KPN BLK LR DB DDH87026

sample id 00111
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1219.0	initial temp.(C)	1251.0
softening temp.(C)	1346.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1412.0	hemispherical temp.(C)	1358.0
fluid temp.(C)	1442.0	fluid temp.(C)	1440.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DB DDH87026

sample id 00111
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	53.82
aluminium oxide %	(al2o3)	23.44
ferric oxide %	(fe2o3)	5.08
titanium dioxide %	(tio2)	1.41
phosphorous pentoxide %	(p2o5)	1.01
calcium oxide %	(cao)	2.71
magnesium oxide %	(mgo)	2.98
sulphur trioxide %	(so3)	2.14
sodium oxide %	(na2o)	1.61
potassium oxide %	(k2o)	1.23

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87026 SEAM : H/I OVT INTERVAL(M) : 48.69 – 49.35 ELEVATION(M) : 1444.1

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	48.69			0.38 (0.15) 0.23	74.7	6984	112	0.38/ 0.00 0.38	0.38/ 0.00 0.38	0.67	28.54	7.33	63.46	3.32	22.49
	49.35														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87026
Coal zone:	H/I OVT		
Field sample no.:	06964	Composite sample no.:	112
Lab sample no.:	30691		
True sample thickness:	0.383 meters	Drill core recovery (%):	74.24 %
Coal/Rock:	0.383 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	2.18	9.75	12.93	38.54
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	19.04	17.56		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.67	
Ash (%):	28.54	28.73
Volatile matter (%):	7.33	7.38
Fixed carbon (%):	63.46	63.89
Total sulphur (%):	3.32	3.34
Combustible sulphur (%):	2.70	
Net calorific value (cal/g):	5375.00	5411.00
Gross calorific value (cal/g):	5375.00	5411.00
Volatile matter (dmmf%):	5.60	
Hardgrove index:	58.00	
Specific gravity:	1.57	
Carbon dioxide (%):	1.75	
Phosphorous in coal (%):	0.294	
Chlorine in coal (ppm):	3520.00	
Forms of Sulphur (%):	PYRITE 03.20 SULPHATE 00.02 ORGANIC 00.10	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	61.02	61.43
Hydrogen (%):	1.87	1.88
Nitrogen (%):	0.64	0.64
Oxygen (%):	3.94	3.98

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1256.00	1138.00
Softening temperature (°C):	1315.00	1149.00
Hemispherical temperature (°C):	1326.00	1157.00
Final temperature (°C):	1348.00	1203.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	38.50	TiO2 (%):	1.10
Al2O3 (%):	18.01	Na2O (%):	1.75
Fe2O3 (%):	17.84	K2O (%):	0.95
CaO (%):	6.94	SO3 (%):	5.47
MgO (%):	2.47	P2O5 (%):	2.36

gcri coal division ash fusion proj KPN BLK LR DB DDH87024

sample id 00112
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1235.0	initial temp.(C)	1138.0
softening temp.(C)	1299.0	softening temp.(C)	1157.0
hemispherical temp.(C)	1315.0	hemispherical temp.(C)	1181.0
fluid temp.(C)	1348.0	fluid temp.(C)	1206.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87024

sample id 00112
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/87

silicon dioxide %	(sio2)	36.64
aluminium oxide %	(al2o3)	21.04
ferric oxide %	(fe2o3)	18.64
titanium dioxide %	(tio2)	1.66
phosphorous pentoxide %	(p2o5)	3.32
calcium oxide %	(cao)	5.99
magnesium oxide %	(mgo)	1.77
sulphur trioxide %	(so3)	3.77
sodium oxide %	(na2o)	1.65
potassium oxide %	(k2o)	0.82

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87026

sample id 00112
sample product id SP1 data type (real,boro,ever,calc) REAL
split sample id AF4 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1208.0	initial temp.(C)	1154.0
softening temp.(C)	1324.0	softening temp.(C)	1176.0
hemispherical temp.(C)	1338.0	hemispherical temp.(C)	1192.0
fluid temp.(C)	1383.0	fluid temp.(C)	1216.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87026

sample id 00112
sample product id SP1 data type (real,boro,ever,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	38.12
aluminium oxide %	(al2o3)	22.68
ferric oxide %	(fe2o3)	18.19
titanium dioxide %	(tio2)	1.85
phosphorous pentoxide %	(p2o5)	2.97
calcium oxide %	(cao)	4.84
magnesium oxide %	(mgo)	1.51
sulphur trioxide %	(so3)	2.85
sodium oxide %	(na2o)	1.63
potassium oxide %	(k2o)	0.71

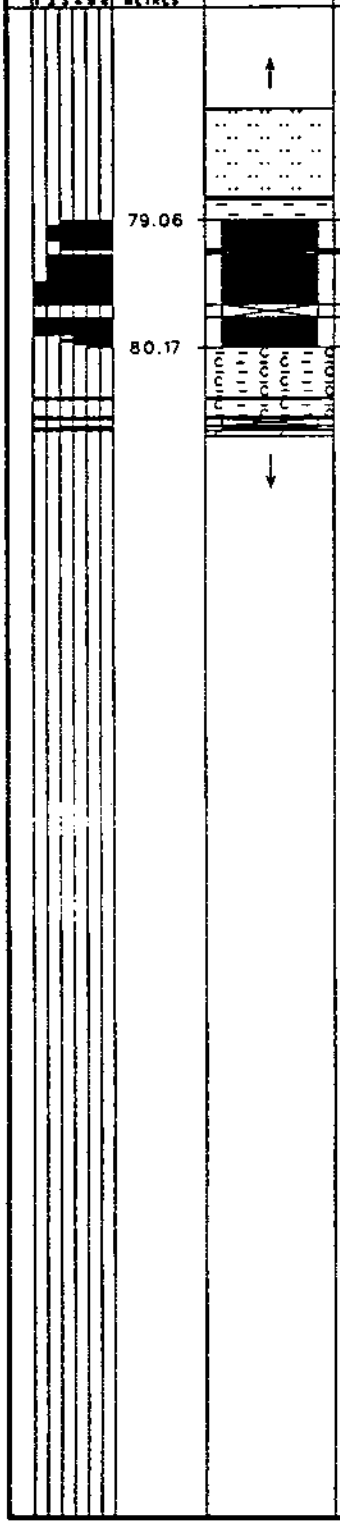
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION, MOUNT KLAPPAN PROJECT — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87026 | SEAM : 1 PART | INTERVAL(M) : 79.06 – 80.17 | ELEVATION(M) : 1444.1

GEOLOGIST : LEE | SCALE: 1:40 | DATE : MAR 02/88 | DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	79.06			0.16												
				0.32	88.5	6967	113	0.78 / 0.02	0.78 / 0.02	0.71	26.04	6.94	66.29	0.64	23.25	—
				(0.04)				0.78	0.78							
	80.17			0.19												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87026
Coal zone:	1 PART		
Field sample no.:	06967	Composite sample no.:	113
Lab sample no.:	30691		
True sample thickness:	0.794 meters	Drill core recovery(%):	88.28 %
Coal/Rock:	0.779 / 0.015 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	15.12	19.36	18.30	37.44
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.50	3.28		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.71	
Ash(%):	26.06	26.25
Volatile matter(%):	6.94	6.99
Fixed carbon(%):	66.29	66.76
Total sulphur(%):	0.64	0.64
Combustible sulphur(%):	0.21	
Net calorific value(cal/g):	5557.00	5597.00
Gross calorific value(cal/g):	5557.00	5597.00
Volatile matter(dmmf%):	6.50	
Hardgrove index:	51.00	
Specific gravity:	1.56	
Carbon dioxide(%):	1.91	
Phosphorous in coal(%):	0.174	
Chlorine in coal(ppm):	2800.00	

Forms of Sulphur(%): PYRITE 00.24 SULPHATE 00.01 ORGANIC 00.39

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	66.23	66.71
Hydrogen(%):	1.78	1.79
Nitrogen(%):	0.83	0.84
Oxygen(%):	3.75	3.77

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1290.00	1219.00
Softening temperature(°C):	1295.00	1224.00
Hemispherical temperature(°C):	1324.00	1234.00
Final temperature(°C):	1369.00	1298.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	52.68	TiO2(%):	0.82
Al2O3(%):	18.83	Na2O(%):	1.38
Fe2O3(%):	5.92	K2O(%):	1.61
CaO(%):	6.09	SO3(%):	4.11
MgO(%):	3.37	P2O5(%):	1.53

gcri coal division ash fusion proj KFN BLK LR DB DDH87024

sample id 00113
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1298.0	initial temp.(C)	1169.0
softening temp.(C)	1327.0	softening temp.(C)	1248.0
hemispherical temp.(C)	1342.0	hemispherical temp.(C)	1277.0
fluid temp.(C)	1400.0	fluid temp.(C)	1332.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87024

sample id 00113
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	50.12
aluminium oxide %	(al2o3)	21.89
ferric oxide %	(fe2o3)	6.33
titanium dioxide %	(tio2)	0.70
phosphorous pentoxide %	(p2o5)	1.57
calcium oxide %	(cao)	5.23
magnesium oxide %	(mgo)	3.83
sulphur trioxide %	(so3)	3.29
sodium oxide %	(na2o)	1.37
potassium oxide %	(k2o)	1.21

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DB DDH87026

sample id 00113
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AP4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1382.0	initial temp.(C)	1303.0
softening temp.(C)	1441.0	softening temp.(C)	1316.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1337.0
fluid temp.(C)	1472.0	fluid temp.(C)	1462.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87026

sample id 00113
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	49.74
aluminium oxide %	(al2o3)	25.03
ferric oxide %	(fe2o3)	6.26
titanium dioxide %	(tio2)	0.52
phosphorous pentoxide %	(p2o5)	1.14
calcium oxide %	(cao)	3.72
magnesium oxide %	(mgo)	3.64
sulphur trioxide %	(so3)	2.83
sodium oxide %	(na2o)	1.46
potassium oxide %	(k2o)	1.04

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — **COAL DIVISION** — **MOUNT KLAPPAN PROJECT** — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87026 SEAM : H INTERVAL(M) : 138.26 – 139.97 ELEVATION(M) : 1444.1

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 02/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	138.26			(0.11) 0.13 0.03 0.13 0.18 (0.03)	73.7	6970	114	0.85/ 0.39 1.23	0.85/ 0.39 1.23	0.78	30.84	7.77	40.83	1.17	14.54
			0.26												
	139.97			(0.14)											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87026
Coal zone:	H		
Field sample no.:	06970	Composite sample no.:	114
Lab sample no.:	30691		
True sample thickness:	1.246 meters	Drill core recovery(%):	73.68 %
Coal/Rock:	0.853 / 0.393 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	29.91	25.19	14.82	19.27
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.89	3.92		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.76	
Ash(%):	50.84	51.23
Volatile matter(%):	7.77	7.83
Fixed carbon(%):	40.63	40.94
Total sulphur(%):	1.17	1.18
Combustible sulphur(%):	0.74	
Net calorific value(cal/g):	3475.00	3502.00
Gross calorific value(cal/g):	3475.00	3502.00
Volatile matter(dmmf%):	7.50	
Hardgrove index:	64.00	
Specific gravity:	1.79	
Carbon dioxide(%):	1.09	
Phosphorous in coal(%):	0.047	
Chlorine in coal(ppm):	3470.00	

Forms of Sulphur(%): PYRITE 00.69 SULPHATE 00.02 ORGANIC 00.46

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	42.25	42.58
Hydrogen(%):	1.78	1.79
Nitrogen(%):	0.57	0.57
Oxygen(%):	2.63	2.65

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1315.00	1246.00
Softening temperature(°C):	1332.00	1259.00
Hemispherical temperature(°C):	1383.00	1289.00
Final temperature(°C):	1412.00	1404.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	64.10	TiO2(%):	1.01
Al2O3(%):	16.26	Na2O(%):	1.04
Fe2O3(%):	4.83	K2O(%):	1.86
CaO(%):	1.76	SO3(%):	2.12
MgO(%):	2.30	P2O5(%):	0.21

scri coal division ash fusion proj KFN BLK LR DS DDH87024

sample id 00114
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1259.0	initial temp.(C)	1133.0
softening temp.(C)	1315.0	softening temp.(C)	1219.0
hemispherical temp.(C)	1353.0	hemispherical temp.(C)	1270.0
fluid temp.(C)	1401.0	fluid temp.(C)	1356.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KFN BLK LR DS DDH87024

sample id 00114
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 21/01/87

silicon dioxide %	(sio2)	54.78
aluminium oxide %	(al2o3)	21.17
ferric oxide %	(fe2o3)	6.51
titanium dioxide %	(tio2)	1.34
phosphorous pentoxide %	(p2o5)	0.81
calcium oxide %	(cao)	2.63
magnesium oxide %	(mgo)	3.14
sulphur trioxide %	(so3)	2.33
sodium oxide %	(na2o)	1.31
potassium oxide %	(k2o)	1.54

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR D8 DIH87026

sample id 00114
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1256.0
softening temp.(C)	1369.0	softening temp.(C)	1278.0
hemispherical temp.(C)	1401.0	hemispherical temp.(C)	1334.0
fluid temp.(C)	1439.0	fluid temp.(C)	1434.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DIH87026

sample id 00114
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	52.46
aluminium oxide %	(al2o3)	24.44
ferric oxide %	(fe2o3)	6.49
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	0.78
calcium oxide %	(cao)	2.29
magnesium oxide %	(mgo)	3.18
sulphur trioxide %	(so3)	1.98
sodium oxide %	(na2o)	1.33
potassium oxide %	(k2o)	1.30

90.0 <= total <= 100.0

GULF CANADA CORPORATION

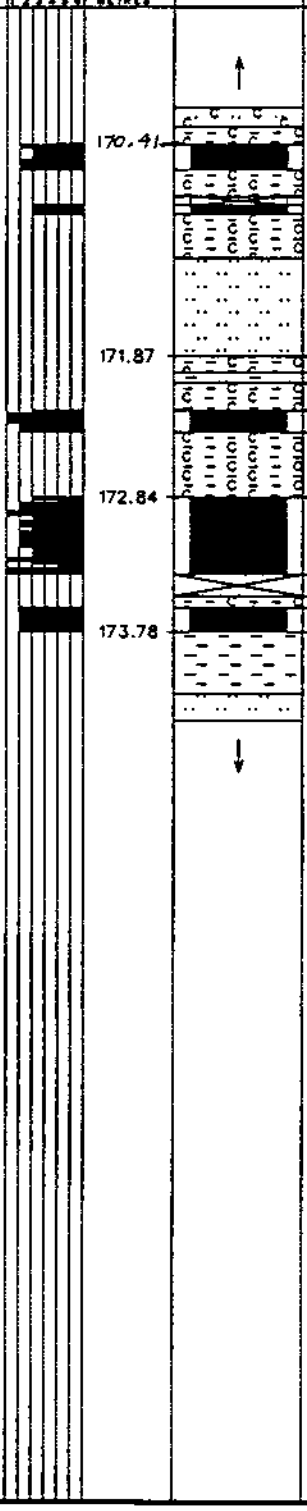
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87026 SEAM : PH INTERVAL(M) : 171.87 – 173.78 ELEVATION(M) : 1444.1

GEOLOGIST : LEE SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	170.41															
	171.87		0.19 0.17													
				0.14	100.0	6972										
			0.41													
	172.84			0.49												
			(0.14) 0.37		84.0	6973	115	0.82/0.23 0.85	0.82/0.23 0.85	0.90	35.24	7.35	56.51	0.53	19.55	—
				0.15												
	173.78															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87026
Coal zone:	PH		
Field sample no.:	06973	Composite sample no.:	115
Lab sample no.:	30691		
True sample thickness:	0.849 meters	Drill core recovery(%):	84.04 %
Coal/Rock:	0.623 / 0.226 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	14.84	24.03	21.73	30.38	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	6.52	2.50			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	35.24	35.56
Volatile matter(%):	7.35	7.42
Fixed carbon(%):	56.51	57.02
Total sulphur(%):	0.53	0.53
Combustible sulphur(%):	0.07	
Net calorific value(cal/g):	4672.00	4715.00
Gross calorific value(cal/g):	4672.00	4715.00
Volatile matter(dmmf%):	7.20	
Hardgrove index:	49.00	
Specific gravity:	1.62	
Carbon dioxide(%):	2.70	
Phosphorous in coal(%):	0.083	
Chlorine in coal(ppm):	2850.00	
Forms of Sulphur(%):	PYRITE 00.15 SULPHATE 00.02 ORGANIC 00.36	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	57.61	58.13
Hydrogen(%):	2.32	2.34
Nitrogen(%):	0.70	0.71
Oxygen(%):	2.70	2.73

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1294.00	1235.00
Softening temperature(°C):	1299.00	1240.00
Hemispherical temperature(°C):	1313.00	1256.00
Final temperature(°C):	1375.00	1337.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.58	TiO2(%):	1.01
Al2O3(%):	19.28	Na2O(%):	1.58
Fe2O3(%):	4.53	K2O(%):	1.92
CaO(%):	5.29	SO3(%):	3.29
MgO(%):	3.45	P2O5(%):	0.54

gcri coal division ash fusion proj KPN BLK LR DE DDH87026

sample id 00115
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1229.0
softening temp.(C)	1299.0	softening temp.(C)	1233.0
hemispherical temp.(C)	1318.0	hemispherical temp.(C)	1247.0
fluid temp.(C)	1383.0	fluid temp.(C)	1380.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DE DDH87026

sample id 00115
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	49.00
aluminium oxide %	(al2o3)	22.68
ferric oxide %	(fe2o3)	6.32
titanium dioxide %	(tio2)	1.10
phosphorous pentoxide %	(p2o5)	0.72
calcium oxide %	(cao)	4.28
magnesium oxide %	(mgo)	3.94
sulphur trioxide %	(so3)	4.04
sodium oxide %	(na2o)	1.59
potassium oxide %	(k2o)	1.63

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87026

sample id 00115
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 21/01/89

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1262.0	initial temp.(C)	1189.0
softening temp.(C)	1337.0	softening temp.(C)	1256.0
hemispherical temp.(C)	1391.0	hemispherical temp.(C)	1329.0
fluid temp.(C)	1439.0	fluid temp.(C)	1435.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87026

sample id 00115
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 21/01/88

silicon dioxide %	(sio2)	50.26
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	5.50
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.59
calcium oxide %	(cao)	3.47
magnesium oxide %	(mgo)	3.60
sulphur trioxide %	(so3)	3.27
sodium oxide %	(na2o)	1.72
potassium oxide %	(k2o)	1.52

90.0 <= total <= 100.0

KPNLRDDH87027

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87027

DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/02/87
END DATE - 10/05/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE W. INTERSECTED H, H-1, PH, G, G (OVT).

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1441.03

ZONE - 9
NORTHING - 6346025.03
EASTING - 508322.85

LICENCE/LEASE NUMBER -

LATITUDE - 571533
LONGITUDE - 1285143

- O R I E N T A T I O N -

LENGTH - 127.07

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 21.34
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY

TRUE 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
DDH87027										
		6996	68.87	69.10	100.00		0.196			0.000- 0.196
		6997	49.00	49.79	59.49		0.407		0.277	0.000- 0.684
	H-1	6998	49.79	51.30	64.90	0.606	0.243	0.459		1.065- 0.243
		6999	51.30	51.55	100.00	0.017	0.199			0.017- 0.199
		7044	30.54	31.33	100.00		0.770			0.000- 0.770
	H	7045	31.33	33.55	41.44	0.628	0.262	1.263		1.891- 0.262
	H	7046	33.55	37.37	76.44	0.577	2.232	0.516	0.344	1.093- 2.576
	H	7047	37.37	40.32	72.20	1.694	0.321	0.694	0.086	2.388- 0.407
		7048	40.32	40.54	100.00		0.207			0.000- 0.207
		7049	66.97	67.65	100.00		0.481			0.000- 0.481
	PH	7050	67.65	68.87	51.64	0.485		0.485		0.970- 0.000

GULF CANADA CORPORATION - COAL DIVISION

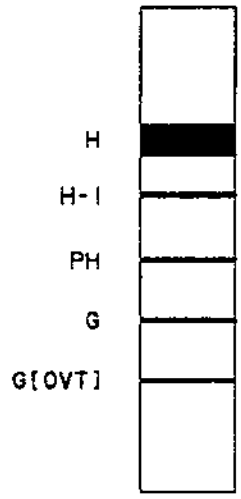
15/MAR/88 COMPOSITE SAMPLE SUMMARY

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
DDH87027												
	H	116	7045	7045	31.33	33.55	41.44	0.65	0.27	1.30	0.00	1.95- 0.27
	H	117	7046	7046	33.55	37.37	76.43	0.60	2.32	0.54	0.36	1.14- 2.68
	H	118	7047	7047	37.37	40.32	72.20	1.79	0.34	0.73	0.09	2.52- 0.43
	H-1	119	6998	6998	49.79	51.30	64.90	0.70	0.28	0.53	0.00	1.23- 0.28
	PH	120	7050	7050	67.65	68.87	51.63	0.63	0.00	0.59	0.00	1.22- 0.00
	Ph	267	7050	7050	67.65	68.87	51.63	0.63	0.00	0.59	0.00	1.22- 0.00
	H	274	7045	7047	31.33	40.32	66.40	3.04	2.93	2.57	0.45	5.61- 3.38
	H (-1)	275	6998	6998	49.79	51.30	64.90	0.70	0.28	0.53	0.00	1.23- 0.28
	PH	276	7050	7050	67.65	68.87	51.63	0.63	0.00	0.59	0.00	1.22- 0.00
	H	461	7045	7047	31.33	40.32	66.40	3.04	2.93	2.57	0.45	5.61- 3.38
	H (-1)	462	6998	6998	49.79	51.30	64.90	0.70	0.28	0.53	0.00	1.23- 0.28
	PH	463	7050	7050	67.65	68.87	51.63	0.63	0.00	0.59	0.00	1.22- 0.00

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87027

GULF CANADA RESOURCES LTD.
:9/04/88
KLAP:[2050571880072O:2.LO

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

PAGE :

DATA SOURCE: KPN LR DDH87027 SEAM : H TOTAL INTERVAL(M) : 31.33 – 40.32 ELEVATION(M) : 1441.0
INTERVAL(M) : 31.33 – 33.55
GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	31.33			(0.90)												
				0.16												
				0.07												
				0.01												
				0.13												
				0.38												
				(0.37)												
	33.55															

41.3 7045 116 1.89 / 0.26 2.15 0.90 33.61 6.76 38.53 0.51 12.84

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87027 SEAM : H TOTAL INTERVAL(M) : 31.33 – 40.32 ELEVATION(M) : 1441.0
INTERVAL(M) : 33.55 – 37.37
GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	33.55		1.18	0.23	76.6	7048	117	1.09 / 2.58		0.60	25.63	7.19	66.58	0.44	23.58	—
				0.21				3.67								
				0.19												
				0.14												
				0.19												
				(0.52)												
			(0.34)													
	37.37															

GULF CANADA CORPORATION

COAL DIVISION

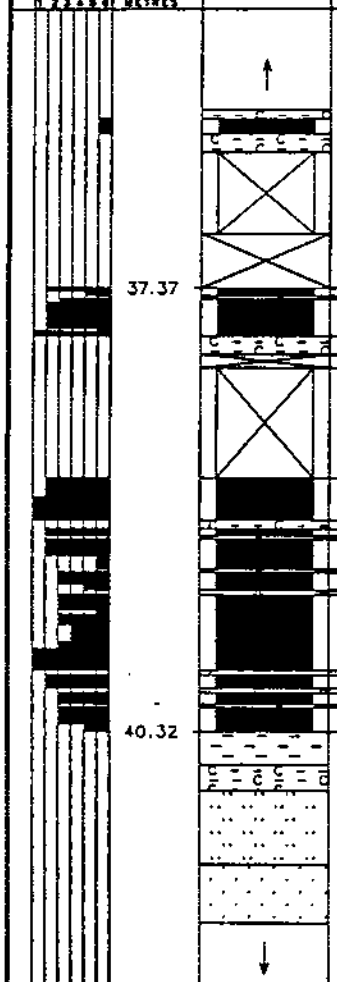
MOUNT KLAPPAN PROJECT

SEAM DETAIL

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87027 SEAM : H TOTAL INTERVAL(M) : 31.33 – 40.32
INTERVAL(M) : 37.37 – 40.32
ELEVATION(M) : 1441.0

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 07/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	37.37			0.24												
				(0.69)												
				0.27	72.1	7047	118	2.39 / 0.41 2.79	5.37 / 3.24 8.62	0.48	24.45	7.98	67.09	0.31	23.76	—
				0.19												
				0.47												
	40.32															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87027
Coal zone:	H		
Field sample no.:	07045	Composite sample no.:	116
Lab sample no.:	30691		
True sample thickness:	2.153 meters	Drill core recovery(%):	41.44 %
Coal/Rock:	1.891 / 0.262 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	24.63	32.28	16.75	19.95
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.05	2.34		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	53.81	54.30
Volatile matter(%):	6.76	6.82
Fixed carbon(%):	38.53	38.88
Total sulphur(%):	0.51	0.51
Combustible sulphur(%):	0.09	
Net calorific value(cal/g):	3021.00	3048.00
Gross calorific value(cal/g):	3021.00	3048.00
Volatile matter(dmmf%):	5.60	
Hardgrove index:	52.00	
Specific gravity:	1.85	
Carbon dioxide(%):	2.71	
Phosphorous in coal(%):	0.078	
Chlorine in coal(ppm):	2840.00	

Forms of Sulphur(%): PYRITE 00.28 SULPHATE 00.02 ORGANIC 00.21

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	38.66	39.01
Hydrogen(%):	1.80	1.82
Nitrogen(%):	0.54	0.54
Oxygen(%):	3.78	3.82

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1307.00	1224.00
Softening temperature(°C):	1318.00	1248.00
Hemispherical temperature(°C):	1364.00	1310.00
Final temperature(°C):	1431.00	1427.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	60.32	TiO2(%):	1.17
Al2O3(%):	19.90	Na2O(%):	1.52
Fe2O3(%):	4.00	K2O(%):	2.53
CaO(%):	2.35	SO3(%):	1.93
MgO(%):	2.25	P2O5(%):	0.33

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87027
Coal zone:	H		
Field sample no.:	07046	Composite sample no.:	117
Lab sample no.:	30691		
True sample thickness:	3.669 meters	Drill core recovery(%):	76.43 %
Coal/Rock:	1.093 / 2.576 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	8.48	17.99	16.98	42.58
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	9.66	4.31		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.60	
Ash(%):	25.63	25.78
Volatile matter(%):	7.19	7.23
Fixed carbon(%):	66.58	66.99
Total sulphur(%):	0.44	0.44
Combustible sulphur(%):	0.16	
Net calorific value(cal/g):	5635.00	5668.00
Gross calorific value(cal/g):	5636.00	5669.00
Volatile matter(dmmf%):	7.00	
Hardgrove index:	65.00	
Specific gravity:	1.56	
Carbon dioxide(%):	2.06	
Phosphorous in coal(%):	0.148	
Chlorine in coal(ppm):	2550.00	
Forms of Sulphur(%):	PYRITE 00.06 SULPHATE 00.01 ORGANIC 00.37	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	67.62	68.03
Hydrogen(%):	2.68	2.70
Nitrogen(%):	0.85	0.86
Oxygen(%):	2.18	2.19

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1235.00	1224.00
Softening temperature(°C):	1299.00	1235.00
Hemispherical temperature(°C):	1313.00	1256.00
Final temperature(°C):	1423.00	1380.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	49.76	TiO2(%):	1.07
Al2O3(%):	22.02	Na2O(%):	1.96
Fe2O3(%):	6.83	K2O(%):	1.58
CaO(%):	4.53	SO3(%):	2.77
MgO(%):	4.06	P2O5(%):	1.32

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87027
Coal zone:	H		
Field sample no.:	07047	Composite sample no.:	118
Lab sample no.:	30691		
True sample thickness:	2.795 meters	Drill core recovery(%):	72.20 %
Coal/Rock:	2.388 / 0.407 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	19.93	16.55	16.52	34.53
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	8.28	4.19		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.48	
Ash(%):	24.45	24.57
Volatile matter(%):	7.98	8.02
Fixed carbon(%):	67.09	67.41
Total sulphur(%):	0.51	0.51
Combustible sulphur(%):	0.05	
Net calorific value(cal/g):	5679.00	5706.00
Gross calorific value(cal/g):	5679.00	5706.00
Volatile matter(dmmf%):	8.00	
Hardgrove index:	63.00	
Specific gravity:	1.54	
Carbon dioxide(%):	3.32	
Phosphorous in coal(%):	0.266	
Chlorine in coal(ppm):	2220.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.49

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	68.90	69.23
Hydrogen(%):	2.23	2.24
Nitrogen(%):	0.75	0.75
Oxygen(%):	2.68	2.70

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1206.00	1190.00
Softening temperature(°C):	1214.00	1195.00
Hemispherical temperature(°C):	1222.00	1201.00
Final temperature(°C):	1295.00	1288.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	48.82	TiO2(%):	1.06
Al2O3(%):	15.12	Na2O(%):	1.69
Fe2O3(%):	5.56	K2O(%):	0.99
CaO(%):	11.25	SO3(%):	4.71
MgO(%):	4.16	P2O5(%):	2.49

gcri coal division ash fusion proj KPN BLK LR DB DDH87027

sample id 00116
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1326.0	initial temp.(C)	1278.0
softening temp.(C)	1377.0	softening temp.(C)	1310.0
hemispherical temp.(C)	1471.0	hemispherical temp.(C)	1407.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87027

sample id 00116
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	57.24
aluminium oxide %	(al2o3)	23.06
ferric oxide %	(fe2o3)	3.71
titanium dioxide %	(tio2)	1.28
phosphorous pentoxide %	(p2o5)	0.16
calcium oxide %	(cao)	1.96
magnesium oxide %	(mgo)	2.35
sulphur trioxide %	(so3)	1.47
sodium oxide %	(na2o)	1.78
potassium oxide %	(k2o)	2.32

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DS DDH87027

sample id 00116
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1342.0	initial temp.(C)	1336.0
softening temp.(C)	1472.0	softening temp.(C)	1380.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1453.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87027

sample id 00116
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.10
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	3.68
titanium dioxide %	(tio2)	1.16
phosphorous pentoxide %	(p2o5)	0.16
calcium oxide %	(cao)	1.74
magnesium oxide %	(mgo)	2.23
sulphur trioxide %	(so3)	1.18
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	2.11

90.0 <= total <= 100.0

(1)

gcri coal division ash fusion proj KPN BLK LR DB DDH87027

sample id 00117
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1187.0	initial temp.(C)	1169.0
softening temp.(C)	1277.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1327.0	hemispherical temp.(C)	1269.0
fluid temp.(C)	1385.0	fluid temp.(C)	1359.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87027

sample id 00117
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed __/__/__

silicon dioxide %	(sio2)	51.68
aluminium oxide %	(al2o3)	22.68
ferric oxide %	(fe2o3)	6.08
titanium dioxide %	(tio2)	1.16
phosphorous pentoxide %	(p2o5)	0.66
calcium oxide %	(cao)	3.44
magnesium oxide %	(mgo)	3.78
sulphur trioxide %	(so3)	2.39
sodium oxide %	(na2o)	1.78
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR D8 DDH87027

sample id 00117
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1164.0	initial temp.(C)	1161.0
softening temp.(C)	1356.0	softening temp.(C)	1260.0
hemispherical temp.(C)	1401.0	hemispherical temp.(C)	1322.0
fluid temp.(C)	1430.0	fluid temp.(C)	1427.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87027

sample id 00117
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 01/01/88

silicon dioxide %	(sio2)	53.72
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	6.16
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	0.63
calcium oxide %	(cao)	2.41
magnesium oxide %	(mgo)	3.44
sulphur trioxide %	(so3)	1.61
sodium oxide %	(na2o)	1.80
potassium oxide %	(k2o)	1.12

90.0 <= total <= 100.0

(1)

qcri coal division ashyfusion proj KPN BLK LR DB DDH87027

sample id 00118
sample product id BP1 data type (real,boro,aver,calc) REAL
split sample id AP3 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1219.0	initial temp.(C)	1136.0
softening temp.(C)	1253.0	softening temp.(C)	1232.0
hemispherical temp.(C)	1264.0	hemispherical temp.(C)	1248.0
fluid temp.(C)	1285.0	fluid temp.(C)	1279.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DB DDH87027

sample id 00118
sample product id BP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed __/__/__

silicon dioxide %	(sio2)	48.84
aluminium oxide %	(al2o3)	20.28
ferric oxide %	(fe2o3)	4.03
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	2.87
calcium oxide %	(cao)	8.14
magnesium oxide %	(mgo)	3.26
sulphur trioxide %	(so3)	5.25
sodium oxide %	(na2o)	1.58
potassium oxide %	(k2o)	0.92

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87027

sample id 00118
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1185.0	initial temp.(C)	1161.0
softening temp.(C)	1269.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1277.0	hemispherical temp.(C)	1269.0
fluid temp.(C)	1338.0	fluid temp.(C)	1322.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87027

sample id 00118
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed __/__/__

silicon dioxide %	(sio2)	51.56
aluminium oxide %	(al2o3)	21.55
ferric oxide %	(fe2o3)	3.42
titanium dioxide %	(tio2)	1.30
phosphorous pentoxide %	(p2o5)	2.46
calcium oxide %	(cao)	6.52
magnesium oxide %	(mgo)	2.88
sulphur trioxide %	(so3)	4.18
sodium oxide %	(na2o)	1.65
potassium oxide %	(k2o)	0.89

90.0 <= total <= 100.0

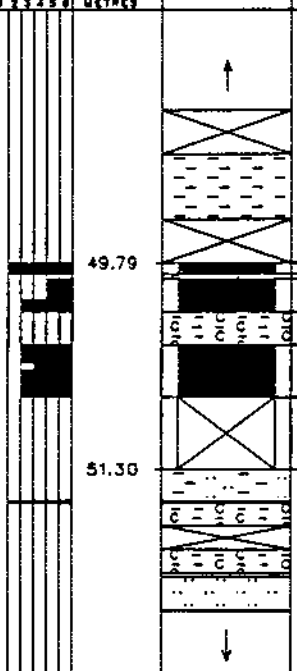
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87027 | SEAM : H-1 | INTERVAL(M) : 49.79 – 51.30 | ELEVATION(M) : 1441.0

GEOLOGIST : PARRY | SCALE: 1:40 | DATE : MAR 01/88 | DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	49.79			0.07											
			0.21	0.21											
				0.33	84.8	6988	119	1.07 / 0.24 1.31	1.07 / 0.24 1.31	0.61	60.58	7.07	31.73	0.54	10.23
				(0.46)											
	51.30														

qcri coal division ash fusion proj KPN BLK LR DS DDH87027

sample id 00119
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1295.0	initial temp.(C)	1232.0
softening temp.(C)	1380.0	softening temp.(C)	1259.0
hemispherical temp.(C)	1395.0	hemispherical temp.(C)	1298.0
fluid temp.(C)	1432.0	fluid temp.(C)	1430.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DS DDH87027

sample id 00119
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed __/__/__

silicon dioxide %	(sio2)	57.34
aluminium oxide %	(al2o3)	21.55
ferric oxide %	(fe2o3)	6.09
titanium dioxide %	(tio2)	1.16
phosphorous pentoxide %	(p2o5)	0.48
calcium oxide %	(cao)	1.82
magnesium oxide %	(mgo)	2.74
sulphur trioxide %	(so3)	1.19
sodium oxide %	(na2o)	1.56
potassium oxide %	(k2o)	1.87

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87027

sample id 00119
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1261.0	initial temp.(C)	1164.0
softening temp.(C)	1377.0	softening temp.(C)	1282.0
hemispherical temp.(C)	1403.0	hemispherical temp.(C)	1314.0
fluid temp.(C)	1448.0	fluid temp.(C)	1438.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87027

sample id 00119
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed __/__/__

silicon dioxide %	(sio2)	53.78
aluminium oxide %	(al2o3)	22.30
ferric oxide %	(fe2o3)	6.61
titanium dioxide %	(tio2)	1.30
phosphorous pentoxide %	(p2o5)	0.48
calcium oxide %	(cao)	1.82
magnesium oxide %	(mgo)	2.84
sulphur trioxide %	(so3)	1.18
sodium oxide %	(na2o)	1.48
potassium oxide %	(k2o)	1.57

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87027 SEAM : PH INTERVAL(M) : 67.65 – 68.87 ELEVATION(M) : 1441.0

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 01/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg	
	67.65			0.49												
					50.0	7050	120	0.97 / 0.00	0.97 / 0.00	0.54	70.55	9.33	19.58	0.84	5.24	—
				(0.49)				0.97	0.97							
	68.87															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87027
Coal zone:	PH		
Field sample no.:	07050	Composite sample no.:	120
Lab sample no.:	30691		
True sample thickness:	0.970 meters	Drill core recovery(%):	51.63 %
Coal/Rock:	0.970 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	25.13	26.34	21.41	22.20

Fraction size(mm):	0.50 X 0.15	0.15 X 0.00
Relative weight(%):	2.20	2.72

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.54	
Ash(%):	70.55	70.93
Volatile matter(%):	9.33	9.38
Fixed carbon(%):	19.58	19.69
Total sulphur(%):	0.64	0.64
Combustible sulphur(%):	0.10	
Net calorific value(cal/g):	1252.00	1259.00
Gross calorific value(cal/g):	1252.00	1259.00
Volatile matter(dmmf%):	15.00	
Hardgrove index:	61.00	
Specific gravity:	2.16	
Carbon dioxide(%):	4.29	
Phosphorous in coal(%):	0.089	
Chlorine in coal(ppm):	2830.00	

Forms of Sulphur(%): PYRITE 00.51 SULPHATE 00.01 ORGANIC 00.12

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	23.03	23.15
Hydrogen(%):	1.39	1.40
Nitrogen(%):	0.38	0.38
Oxygen(%):	3.47	3.50

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1266.00	1159.00
Softening temperature(°C):	1303.00	1240.00
Hemispherical temperature(°C):	1330.00	1253.00
Final temperature(°C):	1372.00	1370.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	58.12	TiO2(%):	0.88
Al2O3(%):	19.52	Na2O(%):	1.73
Fe2O3(%):	6.39	K2O(%):	1.94
CaO(%):	2.78	SO3(%):	1.93
MgO(%):	2.86	P2O5(%):	0.29

gcri coal division ash fusion proj KFN BLK LR DB DDH87027

sample id 00120
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1324.0	initial temp.(C)	1280.0
softening temp.(C)	1427.0	softening temp.(C)	1328.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1331.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87027

sample id 00120
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed __/__/__

silicon dioxide %	(sio2)	57.26
aluminium oxide %	(al2o3)	23.06
ferric oxide %	(fe2o3)	4.33
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	0.37
calcium oxide %	(cao)	1.74
magnesium oxide %	(mgo)	2.29
sulphur trioxide %	(so3)	1.41
sodium oxide %	(na2o)	1.82
potassium oxide %	(k2o)	2.02

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87027

sample id 00120
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 01/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1356.0	initial temp.(C)	1319.0
softening temp.(C)	1472.0	softening temp.(C)	1385.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1411.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87027

sample id 00120
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed __/__/__

silicon dioxide %	(sio2)	56.90
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	3.85
titanium dioxide %	(tio2)	1.48
phosphorous pentoxide %	(p2o5)	0.32
calcium oxide %	(cao)	1.62
magnesium oxide %	(mgo)	2.25
sulphur trioxide %	(so3)	1.37
sodium oxide %	(na2o)	1.80
potassium oxide %	(k2o)	1.93

90.0 <= total <= 100.0

KPNLRDDH87028

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87028

DATE - 03/04/88

- H I S T O R Y -

START DATE - 10/07/87
END DATE - 10/09/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE M. INTERSECTED O, N, M/N, ?, M, L, ?, K/L, ?, K, ?, ?.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1418.86

ZONE - 9
NORTHING - 6346510.17
EASTING - 508643.92

LICENCE/LEASE NUMBER -

LATITUDE - 571548
LONGITUDE - 1285124

- O R I E N T A T I O N -

LENGTH - 224.58

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) -	18.90
AQUIFER DEPTHS (M) -	0.00
	0.00
LOST CIRC. DEPTHS (M) -	0.00
	0.00

*** NOTE *** O INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY

TRUE 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
DDH87028										
		7011	40.65	40.90	100.00		0.242			0.000- 0.242
	N	7012	40.90	41.81	89.01	0.787		0.097		0.884- 0.000
		7013	41.81	42.50	100.00		0.675			0.000- 0.675
		7014	61.36	61.55	100.00		0.190			0.000- 0.190
	M/N	7015	61.55	62.43	84.09	0.400	0.340	0.090	0.050	0.490- 0.390
		7016	62.43	62.74	100.00		0.309			0.000- 0.309
		7017	76.11	76.43	100.00		0.310			0.000- 0.310
	?	7018	76.43	77.00	100.00	0.553				0.553- 0.000
		7019	77.00	77.25	100.00	0.068	0.175			0.068- 0.175
		7020	88.50	89.74	100.00		1.187			0.000- 1.187
	M	7021	89.74	91.30	92.95	1.082	0.293	0.104		1.186- 0.293
		7022	91.30	91.58	100.00		0.264			0.000- 0.264
		7023	108.23	108.67	100.00		0.381			0.000- 0.381
	L	7024	108.67	109.50	100.00	0.681	0.053			0.681- 0.053
		7025	109.50	109.78	100.00		0.252			0.000- 0.252
		7026	122.49	123.47	100.00		0.975			0.000- 0.975
	?	7027	123.47	123.77	100.00	0.259	0.040			0.259- 0.040
		7028	123.77	124.36	100.00		0.588			0.000- 0.588
		7029	138.53	139.94	100.00		1.331			0.000- 1.331
	K/L	7030	139.94	150.95	89.28	3.539	5.196	0.399	0.607	3.938- 5.803
		7031	150.95	151.24	100.00		0.238			0.000- 0.238
	?	7033	190.21	191.40	100.00	0.308	0.175			0.308- 0.175
	?	7034	191.40	193.80	87.92	0.858		0.118		0.976- 0.000
		7035	193.80	194.16	100.00		0.146			0.000- 0.146
		7036	199.58	200.09	100.00		0.233			0.000- 0.233
	K	7037	200.09	201.85	100.00	0.898	0.066			0.898- 0.066
	K	7038	201.85	202.33	100.00		0.304			0.000- 0.304
	K	7039	202.33	203.79	66.44	0.663		0.264	0.053	0.927- 0.053

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 2

TRUE 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
		7040	203.79	204.17	100.00		0.217			0.000- 0.217
		7041	212.41	213.22	100.00		0.521			0.000- 0.521
	?.	7042	213.22	213.87	84.62	0.346			0.063	0.346- 0.063
		7043	213.87	214.38	100.00		0.315			0.000- 0.315

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87028												
	N	121	7012	7012	40.90	41.81	89.01	0.81	0.00	0.10	0.00	0.91- 0.00
	M/N	122	7015	7015	61.55	62.43	84.09	0.40	0.34	0.09	0.05	0.49- 0.39
	?	123	7018	7018	76.43	77.00	100.00	0.57	0.00	0.00	0.00	0.57- 0.00
	M	124	7021	7021	89.74	91.30	92.94	1.14	0.31	0.11	0.00	1.25- 0.31
	L	125	7024	7024	108.67	109.50	100.00	0.77	0.06	0.00	0.00	0.77- 0.06
	?	126	7027	7027	123.47	123.77	100.00	0.26	0.04	0.00	0.00	0.26- 0.04
	K/L	127	7030	7030	139.94	150.95	89.28	3.97	5.86	0.47	0.71	4.44- 6.57
	?	128	7033	7033	190.21	191.40	100.00	0.76	0.43	0.00	0.00	0.76- 0.43
	?	129	7034	7034	191.40	193.80	87.91	2.11	0.00	0.29	0.00	2.40- 0.00
	K	130	7037	7039	200.09	203.79	86.75	2.61	0.60	0.41	0.08	3.02- 0.68
	?	131	7042	7042	213.22	213.87	84.61	0.55	0.00	0.00	0.10	0.55- 0.10
	N	277	7012	7012	40.90	41.81	89.01	0.81	0.00	0.10	0.00	0.91- 0.00
	M/N	278	7015	7015	61.55	62.43	84.09	0.40	0.34	0.09	0.05	0.49- 0.39
	?	279	7018	7018	76.43	77.00	100.00	0.57	0.00	0.00	0.00	0.57- 0.00
	M	280	7021	7021	89.74	91.30	92.94	1.14	0.31	0.11	0.00	1.25- 0.31
	L	281	7024	7024	108.67	109.50	100.00	0.77	0.06	0.00	0.00	0.77- 0.06
	K/L	282	7030	7030	139.94	150.95	89.28	3.97	5.86	0.47	0.71	4.44- 6.57
	?	283	7033	7033	190.21	191.40	100.00	0.76	0.43	0.00	0.00	0.76- 0.43
	?	284	7034	7034	191.40	193.80	87.91	2.11	0.00	0.29	0.00	2.40- 0.00
	K	285	7037	7039	200.09	203.79	86.75	2.61	0.60	0.41	0.08	3.02- 0.68
	N	464	7012	7012	40.90	41.81	89.01	0.81	0.00	0.10	0.00	0.91- 0.00
	M/N	465	7015	7015	61.55	62.43	84.09	0.40	0.34	0.09	0.05	0.49- 0.39
	?	466	7018	7018	76.43	77.00	100.00	0.57	0.00	0.00	0.00	0.57- 0.00
	M	467	7021	7021	89.74	91.30	92.94	1.14	0.31	0.11	0.00	1.25- 0.31
	L	468	7024	7024	108.67	109.50	100.00	0.77	0.06	0.00	0.00	0.77- 0.06
	K/L	469	7030	7030	139.94	150.95	89.28	3.97	5.86	0.47	0.71	4.44- 6.57
	?	470	7033	7033	190.21	191.40	100.00	0.76	0.43	0.00	0.00	0.76- 0.43
	?	471	7034	7034	191.40	193.80	87.91	2.11	0.00	0.29	0.00	2.40- 0.00

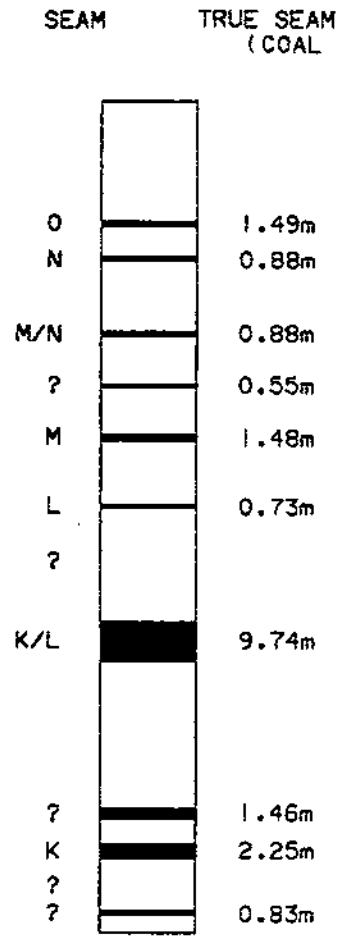
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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	TOTAL ROCK
K		472	7037	7039	200.09	203.79	86.75	2.61	0.60	0.41	0.08	3.02	0.68



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87028

GULF CANADA RESOURCES LTD.
9/04/88
KLAP:12050718800720I2.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : N INTERVAL(M) : 40.90 - 41.81 ELEVATION(M) : 1418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	40.90			0.27											
				(0.10)											
				0.52	89.0	7012	121	0.88/ 0.00 0.88	0.88/ 0.00 0.88	0.48	41.40	7.04	51.08	0.42	17.98
	41.81														

sample id 00121
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1198.0	initial temp.(C)	1116.0
softening temp.(C)	1314.0	softening temp.(C)	1206.0
hemispherical temp.(C)	1330.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1411.0	fluid temp.(C)	1409.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

sample id 00121
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/87

silicon dioxide %	(sio2)	56.40
aluminium oxide %	(al2o3)	20.79
ferric oxide %	(fe2o3)	5.61
titanium dioxide %	(tio2)	1.36
phosphorous pentoxide %	(p2o5)	1.87
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	2.54
sulphur trioxide %	(so3)	1.41
sodium oxide %	(na2o)	1.24
potassium oxide %	(k2o)	1.43

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR DB DDH87028

sample id 00121
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1214.0	initial temp.(C)	1187.0
softening temp.(C)	1338.0	softening temp.(C)	1241.0
hemispherical temp.(C)	1430.0	hemispherical temp.(C)	1301.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87028

sample id 00121
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	56.82
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	5.49
titanium dioxide %	(tio2)	1.28
phosphorous pentoxide %	(p2o5)	1.14
calcium oxide %	(cao)	2.38
magnesium oxide %	(mgo)	2.59
sulphur trioxide %	(so3)	1.30
sodium oxide %	(na2o)	0.57
potassium oxide %	(k2o)	1.32

90.0 <= total <= 100.0

CLEAN SIMULATED PRODUCT

COMPOSITE SAMPLE #277 SEAM N 35 X 6 MM

NOT AVAILABLE DUE TO INSUFFICIENT SAMPLE

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : M/N INTERVAL(M) : 61.55 – 62.43 ELEVATION(M) : 1418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/Kg	
	61.55			0.07 0.08 0.10 (0.05) 0.21	84.1	7015	122	0.48/0.39 0.88	0.49/0.39 0.88	0.82	62.37	8.72	28.09	0.33	8.74	—
	62.43			0.11												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	M/N		
Field sample no.:	07015	Composite sample no.:	122
Lab sample no.:	30692		
True sample thickness:	0.880 meters	Drill core recovery(%):	84.09 %
Coal/Rock:	0.490 / 0.390 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	20.86	22.63	15.83	30.15
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.23	3.30		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.82	
Ash(%):	62.37	62.89
Volatile matter(%):	8.72	8.79
Fixed carbon(%):	28.09	28.32
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.09	
Net calorific value(cal/g):	2089.00	2106.00
Gross calorific value(cal/g):	2089.00	2106.00
Volatile matter(dmmf%):	11.40	
Hardgrove index:	66.00	
Specific gravity:	1.98	
Carbon dioxide(%):	4.04	
Phosphorous in coal(%):	0.103	
Chlorine in coal(ppm):	2830.00	

Forms of Sulphur(%): PYRITE 00.07 SULPHATE 00.00 ORGANIC 00.26

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	31.00	31.26
Hydrogen(%):	1.05	1.06
Nitrogen(%):	0.44	0.44
Oxygen(%):	3.99	4.02

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1174.00	1170.00
Softening temperature(°C):	1261.00	1195.00
Hemispherical temperature(°C):	1269.00	1209.00
Final temperature(°C):	1327.00	1319.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	56.54	TiO2(%):	0.75
Al2O3(%):	19.66	Na2O(%):	0.78
Fe2O3(%):	5.93	K2O(%):	1.93
CaO(%):	4.06	SO3(%):	1.67
MgO(%):	3.43	P2O5(%):	0.38

(1)

gcri coal division ash fusion proj KPN BLK LR DE DDH87023

sample id 00122
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1298.0	initial temp.(C)	1190.0
softening temp.(C)	1330.0	softening temp.(C)	1232.0
hemispherical temp.(C)	1354.0	hemispherical temp.(C)	1241.0
fluid temp.(C)	1393.0	fluid temp.(C)	1280.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DE DDH87023

sample id 00122
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	54.41
aluminium oxide %	(al2o3)	23.42
ferric oxide %	(fe2o3)	6.98
titanium dioxide %	(tio2)	1.31
phosphorous pentoxide %	(p2o5)	0.47
calcium oxide %	(cao)	2.11
magnesium oxide %	(mgo)	3.45
sulphur trioxide %	(so3)	1.52
sodium oxide %	(na2o)	0.83
potassium oxide %	(k2o)	1.86

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR D8 DDH87028

sample id 00122
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1301.0	initial temp.(C)	1193.0
softening temp.(C)	1351.0	softening temp.(C)	1241.0
hemispherical temp.(C)	1390.0	hemispherical temp.(C)	1290.0
fluid temp.(C)	1430.0	fluid temp.(C)	1409.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87028

sample id 00122
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.20
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	6.28
titanium dioxide %	(tio2)	1.01
phosphorous pentoxide %	(p2o5)	0.39
calcium oxide %	(cao)	2.24
magnesium oxide %	(mgo)	3.27
sulphur trioxide %	(so3)	1.37
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	1.65

90.0 <= total <= 100.0

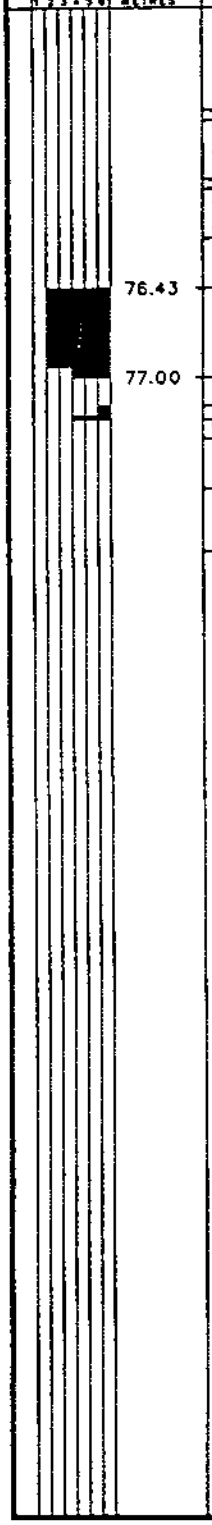
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87028 SEAM : ? INTERVAL(M) : 76.43 – 77.00 ELEVATION(M) : 1418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	76.43			0.55	100.0	7018	123	0.55 / 0.00 0.55	0.55 / 0.00 0.55	0.49	18.23	7.10	74.18	3.89	28.13
	77.00														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	?		
Field sample no.:	07018	Composite sample no.:	123
Lab sample no.:	30692		
True sample thickness:	0.553 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	0.553 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	4.24	16.16	16.93	38.09
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	16.94	7.64		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.49	
Ash (%):	18.23	18.32
Volatile matter (%):	7.10	7.13
Fixed carbon (%):	74.18	74.55
Total sulphur (%):	3.69	3.71
Combustible sulphur (%):	3.33	
Net calorific value (cal/g):	6244.00	6275.00
Gross calorific value (cal/g):	6245.00	6276.00
Volatile matter (dmmf%):	5.40	
Hardgrove index:	60.00	
Specific gravity:	1.47	
Carbon dioxide (%):	1.20	
Phosphorous in coal (%):	0.233	
Chlorine in coal (ppm):	1590.00	
Forms of Sulphur (%):	PYRITE 02.85 SULPHATE 00.06 ORGANIC 00.78	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	73.27	73.63
Hydrogen (%):	2.39	2.40
Nitrogen (%):	0.81	0.81
Oxygen (%):	1.12	1.13

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1174.00	1130.00
Softening temperature (°C):	1272.00	1137.00
Hemispherical temperature (°C):	1311.00	1153.00
Final temperature (°C):	1390.00	1327.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	33.38	TiO2 (%):	1.03
Al2O3 (%):	16.08	Na2O (%):	1.61
Fe2O3 (%):	24.36	K2O (%):	0.82
CaO (%):	8.01	SO3 (%):	4.90
MgO (%):	2.75	P2O5 (%):	2.93

gcri coal division ash fusion proj KFN BLK LR DB DDH87028

sample id 00123
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1272.0	initial temp.(C)	1137.0
softening temp.(C)	1338.0	softening temp.(C)	1161.0
hemispherical temp.(C)	1353.0	hemispherical temp.(C)	1185.0
fluid temp.(C)	1398.0	fluid temp.(C)	1359.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87028

sample id 00123
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	33.91
aluminium oxide %	(al2o3)	19.94
ferric oxide %	(fe2o3)	24.18
titanium dioxide %	(tio2)	1.30
phosphorous pentoxide %	(p2o5)	2.62
calcium oxide %	(cao)	6.04
magnesium oxide %	(mgo)	2.43
sulphur trioxide %	(so3)	3.02
sodium oxide %	(na2o)	1.67
potassium oxide %	(k2o)	0.75

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87028

sample id 00123
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1127.0
softening temp.(C)	1295.0	softening temp.(C)	1140.0
hemispherical temp.(C)	1348.0	hemispherical temp.(C)	1190.0
fluid temp.(C)	1388.0	fluid temp.(C)	1364.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87028

sample id 00123
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	40.32
aluminium oxide %	(al2o3)	22.55
ferric oxide %	(fe2o3)	16.47
titanium dioxide %	(tio2)	1.06
phosphorous pentoxide %	(p2o5)	2.06
calcium oxide %	(cao)	5.18
magnesium oxide %	(mgo)	2.46
sulphur trioxide %	(so3)	2.84
sodium oxide %	(na2o)	1.76
potassium oxide %	(k2o)	0.76

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : M INTERVAL(M) : 89.74 – 91.30 ELEVATION(M) : 1418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	89.74			0.45	93.0	7021	124	1.19 / 0.29 1.48	1.19 / 0.29 1.48	0.81	34.76	7.86	56.67	0.99	20.76
			0.13	0.37											
			0.07	0.17											
			0.08	(0.10)											
	91.30			0.38											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	M		
Field sample no.:	07021	Composite sample no.:	124
Lab sample no.:	30692		
True sample thickness:	1.479 meters	Drill core recovery(%):	92.94 %
Coal/Rock:	1.186 / 0.293 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	12.87	22.90	17.60	32.42
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	8.96	5.25		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.61	
Ash(%):	34.76	34.97
Volatile matter(%):	7.96	8.01
Fixed carbon(%):	56.67	57.02
Total sulphur(%):	0.99	1.00
Combustible sulphur(%):	0.51	
Net calorific value(cal/g):	4962.00	4992.00
Gross calorific value(cal/g):	4962.00	4992.00
Volatile matter(dmmf%):	7.90	
Hardgrove index:	58.00	
Specific gravity:	1.63	
Carbon dioxide(%):	2.61	
Phosphorous in coal(%):	0.117	
Chlorine in coal(ppm):	2590.00	
Forms of Sulphur(%):	PYRITE 00.60 SULPHATE 00.01 ORGANIC 00.38	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	57.17	57.52
Hydrogen(%):	1.91	1.92
Nitrogen(%):	0.68	0.68
Oxygen(%):	3.88	3.91

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1190.00	1156.00
Softening temperature(°C):	1251.00	1174.00
Hemispherical temperature(°C):	1264.00	1195.00
Final temperature(°C):	1290.00	1285.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	57.36	TiO2(%):	0.87
Al2O3(%):	18.15	Na2O(%):	1.50
Fe2O3(%):	6.58	K2O(%):	1.29
CaO(%):	4.34	SO3(%):	3.43
MgO(%):	2.93	P2O5(%):	0.77

gcri coal division ash fusion proj KPN BLK LR DB DDH87023

sample id 00124
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1241.0	initial temp.(C)	1148.0
softening temp.(C)	1306.0	softening temp.(C)	1282.0
hemispherical temp.(C)	1345.0	hemispherical temp.(C)	1372.0
fluid temp.(C)	1409.0	fluid temp.(C)	1407.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87023

sample id 00124
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	56.86
aluminium oxide %	(al2o3)	23.44
ferric oxide %	(fe2o3)	5.36
titanium dioxide %	(tio2)	1.56
phosphorous pentoxide %	(p2o5)	0.59
calcium oxide %	(cao)	3.25
magnesium oxide %	(mgo)	2.79
sulphur trioxide %	(so3)	2.15
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	1.39

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR D8 DDH87028

sample id 00124
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1214.0	initial temp.(C)	1127.0
softening temp.(C)	1251.0	softening temp.(C)	1232.0
hemispherical temp.(C)	1306.0	hemispherical temp.(C)	1251.0
fluid temp.(C)	1374.0	fluid temp.(C)	1348.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR D8 DDH87028

sample id 00124
sample product id EP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.62
aluminium oxide %	(al2o3)	21.17
ferric oxide %	(fe2o3)	5.65
titanium dioxide %	(tio2)	0.82
phosphorous pentoxide %	(p2o5)	0.39
calcium oxide %	(cao)	3.41
magnesium oxide %	(mgo)	3.22
sulphur trioxide %	(so3)	2.61
sodium oxide %	(na2o)	1.76
potassium oxide %	(k2o)	1.22

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87028 SEAM : L INTERVAL(M) : 108.67 – 109.50 ELEVATION(M) : 1418.9

GEOLOGIST : LEDOA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	108.67			0.46	100.0	7024	125	0.68/ 0.05	0.68/ 0.05	0.58	24.50	8.02	66.89	0.48	22.79	—
			0.05					0.73	0.73							
	109.50			0.22												

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	L		
Field sample no.:	07024	Composite sample no.:	125
Lab sample no.:	30692		
True sample thickness:	0.734 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	0.681 / 0.053 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	7.78	6.74	7.76	43.29
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	22.60	11.83		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.59	
Ash (%):	24.50	24.64
Volatile matter (%):	8.02	8.07
Fixed carbon (%):	66.89	67.29
Total sulphur (%):	0.49	0.49
Combustible sulphur (%):	0.01	
Net calorific value (cal/g):	5446.00	5478.00
Gross calorific value (cal/g):	5447.00	5479.00
Volatile matter (dmmf%):	8.10	
Hardgrove index:	71.00	
Specific gravity:	1.53	
Carbon dioxide (%):	6.33	
Phosphorous in coal (%):	0.170	
Chlorine in coal (ppm):	2140.00	

Forms of Sulphur (%): PYRITE 00.04 SULPHATE 00.00 ORGANIC 00.45

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	67.86	68.26
Hydrogen (%):	2.35	2.36
Nitrogen (%):	0.74	0.74
Oxygen (%):	3.47	3.51

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1232.00	1151.00
Softening temperature (°C):	1240.00	1161.00
Hemispherical temperature (°C):	1243.00	1164.00
Final temperature (°C):	1256.00	1206.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	36.08	TiO2 (%):	1.06
Al2O3 (%):	13.23	Na2O (%):	1.54
Fe2O3 (%):	9.90	K2O (%):	0.71
CaO (%):	18.69	SO3 (%):	4.88
MgO (%):	7.33	P2O5 (%):	1.59

gcri coal division ash fusion proj KFN BLK LR DB DDH87028

sample id 00125
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1193.0	initial temp.(C)	1132.0
softening temp.(C)	1285.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1295.0	hemispherical temp.(C)	1241.0
fluid temp.(C)	1369.0	fluid temp.(C)	1336.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87028

sample id 00125
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	49.82
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	4.78
titanium dioxide %	(tio2)	1.27
phosphorous pentoxide %	(p2o5)	2.34
calcium oxide %	(cao)	5.51
magnesium oxide %	(mgo)	2.90
sulphur trioxide %	(so3)	2.69
sodium oxide %	(na2o)	1.50
potassium oxide %	(k2o)	1.05

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR D8 DDH87028

sample id 00125
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1327.0	initial temp.(C)	1267.0
softening temp.(C)	1358.0	softening temp.(C)	1286.0
hemispherical temp.(C)	1384.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1421.0	fluid temp.(C)	1395.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87028

sample id 00125
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	49.82
aluminium oxide %	(al2o3)	26.08
ferric oxide %	(fe2o3)	5.01
titanium dioxide %	(tio2)	1.59
phosphorous pentoxide %	(p2o5)	1.12
calcium oxide %	(cao)	5.32
magnesium oxide %	(mgo)	3.20
sulphur trioxide %	(so3)	2.53
sodium oxide %	(na2o)	1.79
potassium oxide %	(k2o)	0.98

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87028 | SEAM : ? | INTERVAL(M) : 123.47 - 123.77 | ELEVATION(M) : 1418.9

GEOLOGIST : LEDOA | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	123.47															
	123.77			0.22	100.0	7027	104	0.28 / 0.04	0.30	0.74	35.85	8.55	54.86	—	19.37	—

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

PAGE : 1 / 1

DATA SOURCE: KPN LR DDH87028 SEAM : K/L TOTAL INTERVAL(M) : 139.94 – 150.95 ELEVATION(M) : 1418.9
INTERVAL(M) : 139.94 – 146.93
GEOLOGIST : LEDOA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	139.94			0.23											
			0.03												
			0.09												
			0.16												
				0.27											
			0.18												
				0.19											
			0.16												
				0.43											
			0.77												
			0.09												
				0.23											
			0.14												
				0.16											
			0.30		98.6	7030	127								
				0.16											
			0.48												
				0.20											
			0.13												
				0.18											
			0.23												
				0.13											
			0.13												
			0.03												
				0.14											
			0.03												
				0.13											
			0.15												
				0.13											
			0.03												
				0.11											
			0.46												
	146.93		0.03												

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

PAGE : 1 / 1

DATA SOURCE: KPN LR DDH87028 SEAM : K/L TOTAL INTERVAL(M) : 139.94 – 150.95 ELEVATION(M) : 1418.9
INTERVAL(M) : 146.93 – 150.35
GEOLOGIST : LEDDA SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	146.93		0.81												
				(0.32)											
			(0.38)						3.84/5.80 9.74						
				0.20											
			0.13		73.1	7030	127	3.84/5.80 9.74		1.32	68.34	8.61	23.73	0.29	6.69
				0.12											
			0.15												
				0.22											
			0.23												
				0.14											
			0.30												
			(0.13)												
				(0.03)											
				0.18											
	150.95														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	K/L		
Field sample no.:	07030	Composite sample no.:	127
Lab sample no.:	30692		
True sample thickness:	9.741 meters	Drill core recovery(%):	89.28 %
Coal/Rock:	3.938 / 5.803 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.00	27.13	16.33	20.28

Fraction size(mm):	0.50 X 0.15	0.15 X 0.00
Relative weight(%):	6.26	3.00

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.32	
Ash(%):	68.34	69.26
Volatile matter(%):	6.61	6.70
Fixed carbon(%):	23.73	24.04
Total sulphur(%):	0.29	0.29
Combustible sulphur(%):	0.02	
Net calorific value(cal/g):	1599.00	1620.00
Gross calorific value(cal/g):	1599.00	1620.00
Volatile matter(dmmf%):	4.20	
Hardgrove index:	72.00	
Specific gravity:	2.12	
Carbon dioxide(%):	2.44	
Phosphorous in coal(%):	0.066	
Chlorine in coal(ppm):	830.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.26

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	24.57	24.90
Hydrogen(%):	1.45	1.47
Nitrogen(%):	0.38	0.39
Oxygen(%):	3.65	3.69

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1285.00	1219.00
Softening temperature(°C):	1330.00	1243.00
Hemispherical temperature(°C):	1359.00	1295.00
Final temperature(°C):	1438.00	1434.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	62.82	TiO2(%):	1.06
Al2O3(%):	20.41	Na2O(%):	2.21
Fe2O3(%):	3.52	K2O(%):	1.58
CaO(%):	2.21	SO3(%):	0.99
MgO(%):	2.28	P2O5(%):	0.22

gcri coal division ash fusion proj KPN BLK LR DB DDH87028

sample id 00127
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1306.0	initial temp.(C)	1301.0
softening temp.(C)	1472.0	softening temp.(C)	1372.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1411.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87028

sample id 00127
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	57.50
aluminium oxide %	(al2o3)	23.82
ferric oxide %	(fe2o3)	4.85
titanium dioxide %	(tio2)	1.59
phosphorous pentoxide %	(p2o5)	0.34
calcium oxide %	(cao)	1.79
magnesium oxide %	(mgo)	2.54
sulphur trioxide %	(so3)	0.89
sodium oxide %	(na2o)	2.08
potassium oxide %	(k2o)	1.51

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87028

sample id 00127
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1359.0	initial temp.(C)	1272.0
softening temp.(C)	1432.0	softening temp.(C)	1353.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1383.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87028

sample id 00127
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.10
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	4.56
titanium dioxide %	(tio2)	1.17
phosphorous pentoxide %	(p2o5)	0.31
calcium oxide %	(cao)	1.62
magnesium oxide %	(mgo)	2.42
sulphur trioxide %	(so3)	0.79
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	1.42

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87028 SEAM : ? INTERVAL(M) : 190.21 - 193.80 ELEVATION(M) : 1418.9

GEOLOGIST : LEDOA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	190.21			0.31	100.0	7033	128	0.31/0.18		1.01	66.12	7.57	25.30	4.88	7.82	—
			0.18					0.48								
	191.40			0.86	87.9	7034	129	0.98/0.00	1.28/0.18	1.01	46.17	7.37	45.45	2.70	15.34	—
								0.98	1.46							
	193.80			(0.12)												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	?		
Field sample no.:	07033	Composite sample no.:	128
Lab sample no.:	30692		
True sample thickness:	0.483 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	0.308 / 0.175 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	49.97	24.84	10.63	11.04
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	2.25	1.27		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.01	
Ash (%):	66.12	66.79
Volatile matter (%):	7.57	7.65
Fixed carbon (%):	25.30	25.56
Total sulphur (%):	4.88	4.93
Combustible sulphur (%):	3.82	
Net calorific value (cal/g):	1869.00	1888.00
Gross calorific value (cal/g):	1869.00	1888.00
Volatile matter (dmmf%):	1.40	
Hardgrove index:	62.00	
Specific gravity:	2.07	
Carbon dioxide (%):	3.11	
Phosphorous in coal (%):	0.052	
Chlorine in coal (ppm):	1870.00	
Forms of Sulphur (%):	PYRITE 02.86 SULPHATE 00.06 ORGANIC 01.96	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	24.42	24.67
Hydrogen (%):	1.46	1.47
Nitrogen (%):	0.38	0.38
Oxygen (%):	1.73	1.76

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1264.00	1201.00
Softening temperature (°C):	1324.00	1211.00
Hemispherical temperature (°C):	1338.00	1219.00
Final temperature (°C):	1382.00	1314.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	59.78	TiO2 (%):	0.82
Al2O3 (%):	13.99	Na2O (%):	1.80
Fe2O3 (%):	8.54	K2O (%):	1.05
CaO (%):	3.64	SO3 (%):	4.01
MgO (%):	2.58	P2O5 (%):	0.18

gcri coal division ash fusion proj KPN BLK LR DS DDH87028

sample id 00128
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1269.0	initial temp.(C)	1206.0
softening temp.(C)	1330.0	softening temp.(C)	1216.0
hemispherical temp.(C)	1340.0	hemispherical temp.(C)	1230.0
fluid temp.(C)	1406.0	fluid temp.(C)	1256.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87028

sample id 00128
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	60.02
aluminium oxide %	(al2o3)	16.26
ferric oxide %	(fe2o3)	8.28
titanium dioxide %	(tio2)	1.17
phosphorous pentoxide %	(p2o5)	0.37
calcium oxide %	(cao)	3.44
magnesium oxide %	(mgo)	2.80
sulphur trioxide %	(so3)	2.59
sodium oxide %	(na2o)	1.60
potassium oxide %	(k2o)	1.04

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87028

sample id 00128
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1216.0	initial temp.(C)	1166.0
softening temp.(C)	1274.0	softening temp.(C)	1180.0
hemispherical temp.(C)	1303.0	hemispherical temp.(C)	1209.0
fluid temp.(C)	1348.0	fluid temp.(C)	1339.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87028

sample id 00128
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	60.00
aluminium oxide %	(al2o3)	18.15
ferric oxide %	(fe2o3)	7.36
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	0.28
calcium oxide %	(cao)	3.02
magnesium oxide %	(mgo)	2.90
sulphur trioxide %	(so3)	2.35
sodium oxide %	(na2o)	1.62
potassium oxide %	(k2o)	1.09

90.0 <= total <= 100.0

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	?		
Field sample no.:	07034	Composite sample no.:	129
Lab sample no.:	30692		
True sample thickness:	0.976 meters	Drill core recovery(%):	87.91 %
Coal/Rock:	0.976 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	27.81	27.10	19.12	20.10
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	4.10	1.77		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.01	
Ash(%):	46.17	46.64
Volatile matter(%):	7.37	7.45
Fixed carbon(%):	45.45	45.91
Total sulphur(%):	2.70	2.73
Combustible sulphur(%):	2.01	
Net calorific value(cal/g):	3666.00	3704.00
Gross calorific value(cal/g):	3666.00	3704.00
Volatile matter(dmmf%):	5.50	
Hardgrove index:	58.00	
Specific gravity:	1.74	
Carbon dioxide(%):	2.77	
Phosphorous in coal(%):	0.159	
Chlorine in coal(ppm):	1550.00	

Forms of Sulphur(%): PYRITE 02.01 SULPHATE 00.04 ORGANIC 00.65

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	44.24	44.69
Hydrogen(%):	1.76	1.78
Nitrogen(%):	0.65	0.66
Oxygen(%):	3.47	3.50

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1180.00	1153.00
Softening temperature(°C):	1259.00	1169.00
Hemispherical temperature(°C):	1266.00	1177.00
Final temperature(°C):	1303.00	1243.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	53.98	TiO2(%):	1.17
Al2O3(%):	16.63	Na2O(%):	1.68
Fe2O3(%):	8.92	K2O(%):	1.61
CaO(%):	4.90	SO3(%):	3.76
MgO(%):	3.08	P2O5(%):	0.79

gcri coal division ash fusion proj KPN BLK LR DS IDH87028

sample id 00129
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1232.0	initial temp.(C)	1154.0
softening temp.(C)	1261.0	softening temp.(C)	1174.0
hemispherical temp.(C)	1269.0	hemispherical temp.(C)	1180.0
fluid temp.(C)	1295.0	fluid temp.(C)	1253.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS IDH87028

sample id 00129
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	45.02
aluminium oxide %	(al2o3)	18.31
ferric oxide %	(fe2o3)	10.39
titanium dioxide %	(tio2)	1.54
phosphorous pentoxide %	(p2o5)	1.46
calcium oxide %	(cao)	6.50
magnesium oxide %	(mgo)	4.72
sulphur trioxide %	(so3)	4.90
sodium oxide %	(na2o)	1.35
potassium oxide %	(k2o)	1.29

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87028

sample id 00129
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1177.0
softening temp.(C)	1269.0	softening temp.(C)	1182.0
hemispherical temp.(C)	1274.0	hemispherical temp.(C)	1190.0
fluid temp.(C)	1317.0	fluid temp.(C)	1306.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87028

sample id 00129
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	46.43
aluminium oxide %	(al2o3)	19.59
ferric oxide %	(fe2o3)	9.55
titanium dioxide %	(tio2)	1.24
phosphorous pentoxide %	(p2o5)	1.22
calcium oxide %	(cao)	5.55
magnesium oxide %	(mgo)	4.87
sulphur trioxide %	(so3)	4.38
sodium oxide %	(na2o)	1.33
potassium oxide %	(k2o)	1.28

90.0 <= total <= 100.0

GULF CANADA CORPORATION

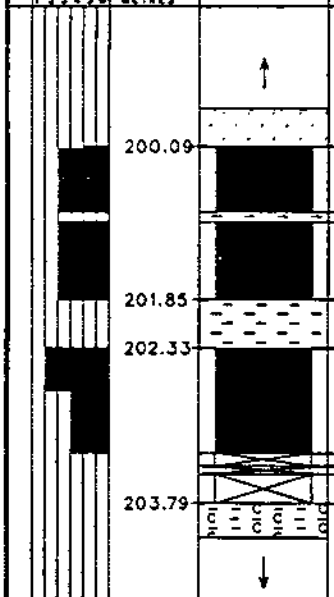
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : K INTERVAL(M) : 200.09 – 203.79 ELEVATION(M) : +418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	200.09			0.41												
			0.07		100.0	7037										
				0.49												
	201.85		0.30		100.0	7038	130	1.83/ 0.42	1.83/ 0.42	0.81	46.50	9.33	41.36	1.32	15.34	—
	202.33							2.25	2.25							
				0.66	67.7	7039										
			0.08	(0.08)												
				(0.18)												
	203.79															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87028
Coal zone:	K		
Field sample no.:	07037 - 07039	Composite sample no.:	130
Lab sample no.:	30692		
True sample thickness:	2.248 meters	Drill core recovery(%):	86.75 %
Coal/Rock:	1.825 / 0.423 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	22.97	22.57	14.48	21.45
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	9.80	8.73		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.81	
Ash(%):	48.50	48.90
Volatile matter(%):	9.33	9.41
Fixed carbon(%):	41.36	41.69
Total sulphur(%):	1.32	1.33
Combustible sulphur(%):	0.53	
Net calorific value(cal/g):	3666.00	3696.00
Gross calorific value(cal/g):	3666.00	3696.00
Volatile matter(dmmf%):	10.70	
Hardgrove index:	82.00	
Specific gravity:	1.77	
Carbon dioxide(%):	5.56	
Phosphorous in coal(%):	0.186	
Chlorine in coal(ppm):	2510.00	

Forms of Sulphur(%): PYRITE 01.17 SULPHATE 00.03 ORGANIC 00.12

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	43.17	43.52
Hydrogen(%):	1.86	1.88
Nitrogen(%):	0.50	0.50
Oxygen(%):	3.84	3.87

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1209.00	1153.00
Softening temperature(°C):	1232.00	1159.00
Hemispherical temperature(°C):	1240.00	1161.00
Final temperature(°C):	1274.00	1224.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	54.28	TiO2(%):	0.76
Al2O3(%):	12.74	Na2O(%):	1.22
Fe2O3(%):	10.54	K2O(%):	0.96
CaO(%):	5.86	SO3(%):	4.05
MgO(%):	4.44	P2O5(%):	0.88

gcri coal division ash fusion proj KFN BLK LR DB DDH87028

sample id 00130
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1180.0	initial temp.(C)	1145.0
softening temp.(C)	1253.0	softening temp.(C)	1174.0
hemispherical temp.(C)	1266.0	hemispherical temp.(C)	1187.0
fluid temp.(C)	1306.0	fluid temp.(C)	1277.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87028

sample id 00130
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	53.07
aluminium oxide %	(al2o3)	15.25
ferric oxide %	(fe2o3)	7.46
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	2.27
calcium oxide %	(cao)	6.25
magnesium oxide %	(mgo)	4.13
sulphur trioxide %	(so3)	3.85
sodium oxide %	(na2o)	1.46
potassium oxide %	(k2o)	1.21

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87028

sample id 00130
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1232.0	initial temp.(C)	1156.0
softening temp.(C)	1264.0	softening temp.(C)	1209.0
hemispherical temp.(C)	1274.0	hemispherical temp.(C)	1232.0
fluid temp.(C)	1319.0	fluid temp.(C)	1317.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87028

sample id 00130
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	52.21
aluminium oxide %	(al2o3)	19.59
ferric oxide %	(fe2o3)	5.95
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	2.20
calcium oxide %	(cao)	5.97
magnesium oxide %	(mgo)	3.63
sulphur trioxide %	(so3)	3.84
sodium oxide %	(na2o)	1.41
potassium oxide %	(k2o)	1.09

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

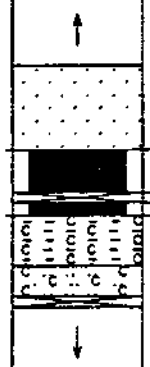
COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87028 SEAM : ? INTERVAL(M) : 213.22 – 213.87 ELEVATION(M) : 1418.9

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	213.22			0.27	84.8	7042	(3)	0.35/ 0.06		0.88	54.50	8.05	36.57	—	12.60
	213.87			9.56				0.41							



KPNLRDDH87029

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87029 DATE - 03/04/88

- H I S T O R Y -

START DATE - 10/05/87
END DATE - 10/07/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE V. INTERSECTED H, H (REP), H (OVT) (PART), H/I(2) (OVT), H/I(2), H, H-1, PH, G, F.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1420.71
ZONE - 9
NORTHING - 6346467.17
EASTING - 508209.75

LICENCE/LEASE NUMBER -

LATITUDE - 571547
LONGITUDE - 1285150

- O R I E N T A T I O N -

LENGTH - 211.76
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 12.19
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
ODH87029										
		6975	19.73	20.65	100.00		0.834			0.000- 0.834
	H	6976	20.65	24.28	61.71	1.794	0.236	1.187	0.073	2.981- 0.309
		6977	24.28	24.65	100.00		0.335			0.000- 0.335
		6978	48.94	49.30	100.00		0.188			0.000- 0.188
	H REP	6979	49.30	50.81	46.36	0.319	0.071	0.419	0.040	0.738- 0.111
		6980	50.81	51.89	100.00		0.664			0.000- 0.664
		6981	82.34	83.15	100.00		0.557			0.000- 0.557
	H/I2 OVT	6982	83.15	84.70	52.26	0.452	0.080	0.451	0.039	0.903- 0.119
		6983	84.70	85.17	100.00		0.298			0.000- 0.298
		6984	109.15	109.84	100.00		0.618			0.000- 0.618
	H/I2	6985	109.84	110.60	88.16	0.553	0.045		0.080	0.553- 0.125
		6986	110.60	111.08	100.00		0.426			0.000- 0.426
		6987	137.99	138.28	100.00		0.197			0.000- 0.197
	H	6988	138.28	139.62	73.13	0.578	0.097	0.068	0.178	0.646- 0.275
		6989	139.62	140.40	100.00		0.544			0.000- 0.544
		6990	160.65	161.31	100.00		0.631			0.000- 0.631
	PH	6991	161.31	162.72	95.04	1.167	0.104	0.067		1.234- 0.104
		6992	162.72	162.98	100.00		0.245			0.000- 0.245
		6993	204.36	204.73	100.00		0.304			0.000- 0.304
	F	6994	204.73	206.47	98.28	1.075	0.353	0.025		1.100- 0.353
		6995	206.47	207.78	100.00		1.125			0.000- 1.125

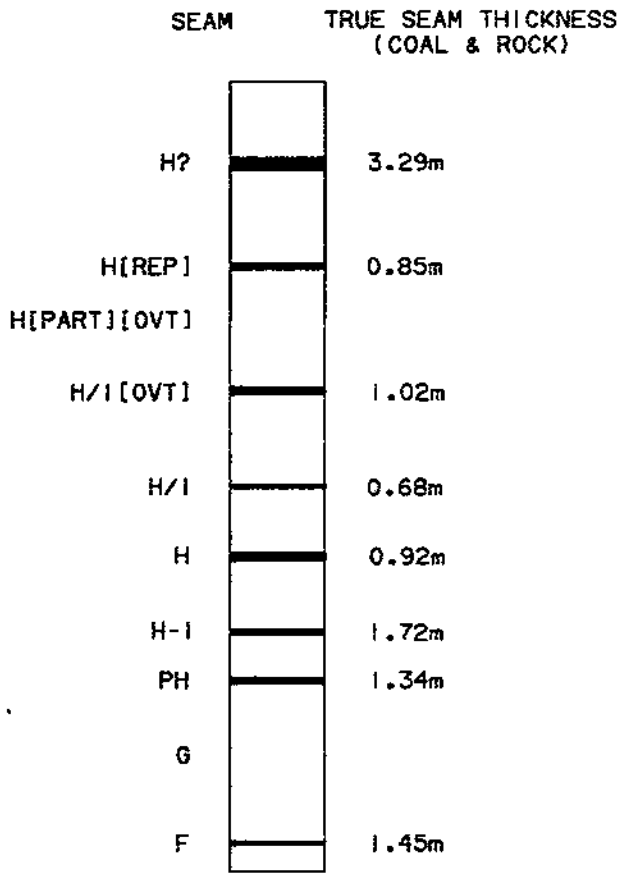
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87029												
	H	132	6976	6976	20.65	24.28	61.70	1.98	0.26	1.31	0.08	3.29- 0.34
	H REP	133	6979	6979	49.30	50.81	46.35	0.57	0.13	0.74	0.07	1.31- 0.20
	H/I OVT	134	6982	6982	83.15	84.70	52.25	0.69	0.12	0.68	0.06	1.37- 0.18
	H/I	135	6985	6985	109.84	110.60	88.15	0.62	0.05	0.00	0.09	0.62- 0.14
	H	136	6988	6988	138.28	139.62	73.13	0.84	0.14	0.10	0.26	0.94- 0.40
	PH	137	6991	6991	161.31	162.72	95.03	1.23	0.11	0.07	0.00	1.30- 0.11
	F	138	6994	6994	204.73	206.47	98.27	1.29	0.42	0.03	0.00	1.32- 0.42
	H	286	6976	6976	20.65	24.28	61.70	1.98	0.26	1.31	0.08	3.29- 0.34
	H/I (ovt)	287	6982	6982	83.15	84.70	52.25	0.69	0.12	0.68	0.06	1.37- 0.18
	H	288	6988	6988	138.28	139.62	73.13	0.84	0.14	0.10	0.26	0.94- 0.40
	Ph	289	6991	6991	161.31	162.72	95.03	1.23	0.11	0.07	0.00	1.30- 0.11
	F	290	6994	6994	204.73	206.47	98.27	1.29	0.42	0.03	0.00	1.32- 0.42
	H	473	6976	6976	20.65	24.28	61.70	1.98	0.26	1.31	0.08	3.29- 0.34
	H/I (ovt)	474	6982	6982	83.15	84.70	52.25	0.69	0.12	0.68	0.06	1.37- 0.18
	H	475	6988	6988	138.28	139.62	73.13	0.84	0.14	0.10	0.26	0.94- 0.40
	Ph	476	6991	6991	161.31	162.72	95.03	1.23	0.11	0.07	0.00	1.30- 0.11
	F	477	6994	6994	204.73	206.47	98.27	1.29	0.42	0.03	0.00	1.32- 0.42



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87029

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[2050571880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

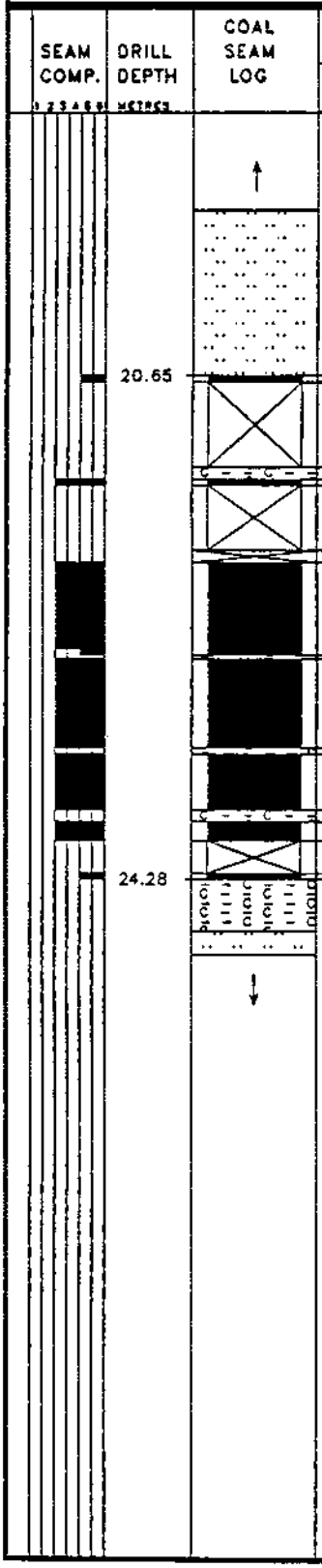
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87029 SEAM : H INTERVAL(M) : 20.65 – 24.28 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6	20.65			(0.55)											
			0.08	0.04											
				(0.43)											
			0.08												
				0.61	61.4	6978	132	2.98/0.31 3.29	2.98/0.31 3.29	0.48	23.15	7.75	68.62	0.48	25.32
			0.02	0.58											
				0.36											
			0.07												
				0.13											
				(0.21)											
	24.28			0.04											

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	H		
Field sample no.:	06976	Composite sample no.:	132
Lab sample no.:	30720		
True sample thickness:	3.290 meters	Drill core recovery (%):	61.70 %
Coal/Rock:	2.981 / 0.309 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	5.31	11.65	14.18	40.87
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	16.84	11.15		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.48	
Ash (%):	23.15	23.26
Volatile matter (%):	7.75	7.79
Fixed carbon (%):	68.62	68.95
Total sulphur (%):	0.49	0.49
Combustible sulphur (%):	0.14	
Net calorific value (cal/g):	6051.00	6081.00
Gross calorific value (cal/g):	6051.00	6081.00
Volatile matter (dmmf%):	7.70	
Hardgrove index:	87.00	
Specific gravity:	1.52	
Carbon dioxide (%):	2.44	
Phosphorous in coal (%):	0.069	
Chlorine in coal (ppm):	1070.00	

Forms of Sulphur (%): PYRITE 00.01 SULPHATE 00.00 ORGANIC 00.48

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	69.72	70.05
Hydrogen (%):	2.23	2.24
Nitrogen (%):	0.82	0.82
Oxygen (%):	3.11	3.14

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1243.00	1174.00
Softening temperature (°C):	1306.00	1285.00
Hemispherical temperature (°C):	1317.00	1295.00
Final temperature (°C):	1369.00	1364.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	54.16	TiO2 (%):	1.02
Al2O3 (%):	20.03	Na2O (%):	1.53
Fe2O3 (%):	3.37	K2O (%):	1.29
CaO (%):	5.78	SO3 (%):	3.80
MgO (%):	3.36	P2O5 (%):	0.68

gcri coal division ash fusion proj KPN BLK LR DS DDH87029

sample id 00132
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1274.0	initial temp.(C)	1180.0
softening temp.(C)	1380.0	softening temp.(C)	1322.0
hemispherical temp.(C)	1422.0	hemispherical temp.(C)	1367.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87029

sample id 00132
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 21/01/88

silicon dioxide %	(sio2)	53.64
aluminium oxide %	(al2o3)	23.81
ferric oxide %	(fe2o3)	3.15
titanium dioxide %	(tio2)	1.48
phosphorous pentoxide %	(p2o5)	1.07
calcium oxide %	(cao)	3.96
magnesium oxide %	(mgo)	2.59
sulphur trioxide %	(so3)	2.55
sodium oxide %	(na2o)	1.55
potassium oxide %	(k2o)	1.30

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87029

sample id 00132
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1180.0	initial temp.(C)	1159.0
softening temp.(C)	1419.0	softening temp.(C)	1359.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1411.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87029

sample id 00132
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 21/01/88

silicon dioxide %	(sio2)	53.30
aluminium oxide %	(al2o3)	26.70
ferric oxide %	(fe2o3)	2.89
titanium dioxide %	(tio2)	1.29
phosphorous pentoxide %	(p2o5)	0.97
calcium oxide %	(cao)	3.37
magnesium oxide %	(mgo)	2.31
sulphur trioxide %	(so3)	1.82
sodium oxide %	(na2o)	1.45
potassium oxide %	(k2o)	1.34

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87029 SEAM : H (REP) INTERVAL(M) : 49.30 – 50.81 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	49.30			(0.09)												
			8.07	(0.09)												
				0.30	45.9	6079	133	0.74 / 0.11	0.74 / 0.11	5.16	47.41	8.02	43.41	—	15.34	—
								0.85	0.85							
	50.81			(0.24)												

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87029 SEAM : H/I (OVT) INTERVAL(M) : 83.15 – 84.70 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	83.15			(0.19)											
				0.21											
				(0.17)	52.1	6982	134	0.90/ 0.12	0.90/ 0.12	0.26	51.86	8.37	39.51	0.40	14.40
								1.02	1.02						
				0.13											
	84.70			0.09											

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	H/I OVT		
Field sample no.:	06982	Composite sample no.:	134
Lab sample no.:	30720		
True sample thickness:	1.022 meters	Drill core recovery(%):	52.25 %
Coal/Rock:	0.903 / 0.119 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	21.68	24.22	17.21	24.00
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.95	4.94		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.26	
Ash(%):	51.86	51.99
Volatile matter(%):	8.37	8.39
Fixed carbon(%):	39.51	39.62
Total sulphur(%):	0.40	0.40
Combustible sulphur(%):	0.06	
Net calorific value(cal/g):	3442.00	3451.00
Gross calorific value(cal/g):	3442.00	3451.00
Volatile matter(dmmf%):	9.40	
Hardgrove index:	66.00	
Specific gravity:	1.82	
Carbon dioxide(%):	3.24	
Phosphorous in coal(%):	0.202	
Chlorine in coal(ppm):	2750.00	

Forms of Sulphur(%): PYRITE 00.08 SULPHATE 00.00 ORGANIC 00.32

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	42.69	42.80
Hydrogen(%):	1.28	1.28
Nitrogen(%):	0.46	0.46
Oxygen(%):	3.05	3.07

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1298.00	1178.00
Softening temperature(°C):	1316.00	1189.00
Hemispherical temperature(°C):	1342.00	1216.00
Final temperature(°C):	1384.00	1337.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	62.92	TiO2(%):	0.71
Al2O3(%):	12.85	Na2O(%):	0.47
Fe2O3(%):	8.89	K2O(%):	1.22
CaO(%):	2.94	SO3(%):	1.65
MgO(%):	3.02	P2O5(%):	0.89

gcri coal division ash fusion proj KFN BLK LR DS DDH87029

sample id 00134
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1334.0	initial temp.(C)	1204.0
softening temp.(C)	1355.0	softening temp.(C)	1232.0
hemispherical temp.(C)	1377.0	hemispherical temp.(C)	1256.0
fluid temp.(C)	1427.0	fluid temp.(C)	1353.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87029

sample id 00134
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/87

silicon dioxide %	(sio2)	52.98
aluminium oxide %	(al2o3)	20.79
ferric oxide %	(fe2o3)	7.75
titanium dioxide %	(tio2)	1.59
phosphorous pentoxide %	(p2o5)	1.57
calcium oxide %	(cao)	3.89
magnesium oxide %	(mgo)	3.36
sulphur trioxide %	(so3)	1.94
sodium oxide %	(na2o)	1.26
potassium oxide %	(k2o)	1.44

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87029

sample id 00134
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1248.0	initial temp.(C)	1387.0
softening temp.(C)	1267.0	softening temp.(C)	1436.0
hemispherical temp.(C)	1321.0	hemispherical temp.(C)	1472.0
fluid temp.(C)	1382.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87029

sample id 00134
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	51.48
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	7.71
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	1.32
calcium oxide %	(cao)	3.08
magnesium oxide %	(mgo)	3.44
sulphur trioxide %	(so3)	1.27
sodium oxide %	(na2o)	1.33
potassium oxide %	(k2o)	1.28

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL | **TRUE THICKNESS**

DATA SOURCE: KPN LR DDH87029 | SEAM : H/1 | INTERVAL(M) : 109.84 – 110.60 | ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN | SCALE: 1:40 | DATE : FEB 24/88 | DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES		% REC.	SAMPLE ID		COAL/ROCK TOTAL		COAL QUALITY A.D.B.						
			ROCK	COAL		SIMP	COMP	COMPOS	MINING SECTION	RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	109.84	↑		0.20												
			(0.08)		88.2	6985	135	0.55 / 0.13 0.68	0.55 / 0.13 0.68	0.51	48.41	7.83	43.25	0.32	16.62	—
	110.60	↓		0.36												

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	H/I		
Field sample no.:	06985	Composite sample no.:	135
Lab sample no.:	30720		
True sample thickness:	0.678 meters	Drill core recovery (%):	88.15 %
Coal/Rock:	0.553 / 0.125 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	25.01	28.78	14.70	20.12	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.83	3.56			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.51	
Ash (%):	48.41	48.66
Volatile matter (%):	7.83	7.87
Fixed carbon (%):	43.25	43.47
Total sulphur (%):	0.52	0.52
Combustible sulphur (%):	0.21	
Net calorific value (cal/g):	3972.00	3992.00
Gross calorific value (cal/g):	3972.00	3992.00
Volatile matter (dmmf%):	8.00	
Hardgrove index:	69.00	
Specific gravity:	1.77	
Carbon dioxide (%):	1.91	
Phosphorous in coal (%):	0.046	
Chlorine in coal (ppm):	2920.00	
Forms of Sulphur (%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.49	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	45.29	45.52
Hydrogen (%):	1.47	1.48
Nitrogen (%):	0.55	0.55
Oxygen (%):	3.25	3.27

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1148.00	1114.00
Softening temperature (°C):	1301.00	1238.00
Hemispherical temperature (°C):	1314.00	1256.00
Final temperature (°C):	1351.00	1348.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	64.08	TiO2 (%):	0.73
Al2O3 (%):	14.69	Na2O (%):	0.91
Fe2O3 (%):	5.40	K2O (%):	2.03
CaO (%):	2.53	SO3 (%):	1.59
MgO (%):	2.93	P2O5 (%):	0.22

gcri coal division ash fusion proj KPN BLK LR DS DDH87029

sample id 00135
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1137.0	initial temp.(C)	1116.0
softening temp.(C)	1353.0	softening temp.(C)	1264.0
hemispherical temp.(C)	1380.0	hemispherical temp.(C)	1275.0
fluid temp.(C)	1414.0	fluid temp.(C)	1403.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87029

sample id 00135
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	56.86
aluminium oxide %	(al2o3)	21.41
ferric oxide %	(fe2o3)	6.66
titanium dioxide %	(tio2)	1.19
phosphorous pentoxide %	(p2o5)	0.66
calcium oxide %	(cao)	1.79
magnesium oxide %	(mgo)	2.87
sulphur trioxide %	(so3)	0.94
sodium oxide %	(na2o)	1.15
potassium oxide %	(k2o)	1.61

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87029

sample id 00135
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1335.0	initial temp.(C)	1148.0
softening temp.(C)	1424.0	softening temp.(C)	1327.0
hemispherical temp.(C)	1435.0	hemispherical temp.(C)	1356.0
fluid temp.(C)	1472.0	fluid temp.(C)	1451.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87029

sample id 00135
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	54.74
aluminium oxide %	(al2o3)	24.44
ferric oxide %	(fe2o3)	6.09
titanium dioxide %	(tio2)	1.19
phosphorous pentoxide %	(p2o5)	0.70
calcium oxide %	(cao)	1.60
magnesium oxide %	(mgo)	2.82
sulphur trioxide %	(so3)	0.85
sodium oxide %	(na2o)	1.24
potassium oxide %	(k2o)	1.48

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87029 SEAM : H INTERVAL(M) : 138.28 – 139.62 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	138.28			0.10												
			(0.18)	0.07												
				0.35	73.3	6988	136	0.65/0.28 0.92	0.65/0.28 0.92	0.67	44.33	8.45	48.55	0.50	17.03	
				0.10												
	139.62			0.13												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	H		
Field sample no.:	06988	Composite sample no.:	136
Lab sample no.:	30720		
True sample thickness:	0.921 meters	Drill core recovery(%):	73.13 %
Coal/Rock:	0.646 / 0.275 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	26.05	17.02	11.56	29.17	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	11.74	4.46			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.67	
Ash(%):	44.33	44.63
Volatile matter(%):	6.45	6.49
Fixed carbon(%):	48.55	48.88
Total sulphur(%):	0.50	0.50
Combustible sulphur(%):	0.28	
Net calorific value(cal/g):	4070.00	4097.00
Gross calorific value(cal/g):	4070.00	4097.00
Volatile matter(dmmf%):	5.30	
Hardgrove index:	80.00	
Specific gravity:	1.72	
Carbon dioxide(%):	1.18	
Phosphorous in coal(%):	0.134	
Chlorine in coal(ppm):	2480.00	

Forms of Sulphur(%): PYRITE 00.05 SULPHATE 00.00 ORGANIC 00.45

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	48.92	49.25
Hydrogen(%):	1.82	1.83
Nitrogen(%):	0.58	0.58
Oxygen(%):	3.18	3.21

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1153.00	1124.00
Softening temperature(°C):	1322.00	1235.00
Hemispherical temperature(°C):	1335.00	1253.00
Final temperature(°C):	1388.00	1356.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	64.77	TiO2(%):	0.98
Al2O3(%):	15.47	Na2O(%):	0.99
Fe2O3(%):	5.39	K2O(%):	1.68
CaO(%):	2.13	SO3(%):	1.25
MgO(%):	2.37	P2O5(%):	0.69

gcri coal division ash fusion proj KFN BLK LR DB DDH87029

sample id 00136
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1216.0	initial temp.(C)	1120.0
softening temp.(C)	1301.0	softening temp.(C)	1209.0
hemispherical temp.(C)	1322.0	hemispherical temp.(C)	1243.0
fluid temp.(C)	1330.0	fluid temp.(C)	1327.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDH87029

sample id 00136
sample product id 8P1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 21/01/88

silicon dioxide %	(sio2)	51.96
aluminium oxide %	(al2o3)	23.68
ferric oxide %	(fe2o3)	6.35
titanium dioxide %	(tio2)	1.08
phosphorous pentoxide %	(p2o5)	1.51
calcium oxide %	(cao)	3.48
magnesium oxide %	(mgo)	2.72
sulphur trioxide %	(so3)	1.43
sodium oxide %	(na2o)	1.37
potassium oxide %	(k2o)	1.51

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR D8 DDH87029

sample id 00136
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1301.0	initial temp.(C)	1116.0
softening temp.(C)	1327.0	softening temp.(C)	1227.0
hemispherical temp.(C)	1353.0	hemispherical temp.(C)	1253.0
fluid temp.(C)	1417.0	fluid temp.(C)	1398.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87029

sample id 00136
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	53.10
aluminium oxide %	(al2o3)	23.55
ferric oxide %	(fe2o3)	5.87
titanium dioxide %	(tio2)	1.09
phosphorous pentoxide %	(p2o5)	1.59
calcium oxide %	(cao)	3.71
magnesium oxide %	(mgo)	2.64
sulphur trioxide %	(so3)	1.27
sodium oxide %	(na2o)	1.47
potassium oxide %	(k2o)	1.37

90.0 <= total <= 100.0

CLEAN SIMULATED PRODUCT

COMPOSITE SAMPLE #288 SEAM H 35 X 6 MM

NOT AVAILABLE DUE TO INSUFFICIENT SAMPLE

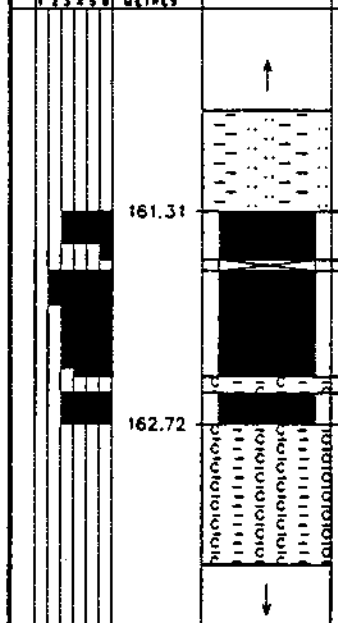
GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 0DH87029 SEAM : PH INTERVAL(M) : 161.31 – 162.72 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	161.31			0.31											
				(0.07)											
				0.66	95.0	6981	137	1.23 / 0.10 1.34	1.23 / 0.10 1.34	0.80	38.06	7.00	54.14	0.58	19.80
			0.10												
				0.20											
	162.72														



GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	PH		
Field sample no.:	06991	Composite sample no.:	137
Lab sample no.:	30720		
True sample thickness:	1.338 meters	Drill core recovery (%):	95.03 %
Coal/Rock:	1.234 / 0.104 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	20.83	16.38	12.96	30.25	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	13.03	6.55			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.80	
Ash (%):	38.06	38.37
Volatile matter (%):	7.00	7.06
Fixed carbon (%):	54.14	54.57
Total sulphur (%):	0.59	0.59
Combustible sulphur (%):	0.15	
Net calorific value (cal/g):	4732.00	4771.00
Gross calorific value (cal/g):	4732.00	4771.00
Volatile matter (dmmf%):	6.50	
Hardgrove index:	68.00	
Specific gravity:	1.66	
Carbon dioxide (%):	2.48	
Phosphorous in coal (%):	0.133	
Chlorine in coal (ppm):	1860.00	

Forms of Sulphur (%): PYRITE 00.15 SULPHATE 00.00 ORGANIC 00.44

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	54.41	54.85
Hydrogen (%):	1.97	1.99
Nitrogen (%):	0.59	0.59
Oxygen (%):	3.58	3.61

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1238.00	1156.00
Softening temperature (°C):	1311.00	1222.00
Hemispherical temperature (°C):	1324.00	1240.00
Final temperature (°C):	1369.00	1330.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	61.01	TiO2 (%):	0.77
Al2O3 (%):	13.79	Na2O (%):	0.78
Fe2O3 (%):	6.46	K2O (%):	1.46
CaO (%):	4.58	SO3 (%):	2.88
MgO (%):	3.28	P2O5 (%):	0.80

gcri coal division ash fusion proj KPN BLK LR DB DDH87029

sample id 00137
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1145.0	initial temp.(C)	1137.0
softening temp.(C)	1259.0	softening temp.(C)	1201.0
hemispherical temp.(C)	1269.0	hemispherical temp.(C)	1227.0
fluid temp.(C)	1311.0	fluid temp.(C)	1285.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87029

sample id 00137
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	55.40
aluminium oxide %	(al2o3)	18.01
ferric oxide %	(fe2o3)	6.55
titanium dioxide %	(tio2)	1.08
phosphorous pentoxide %	(p2o5)	1.45
calcium oxide %	(cao)	4.41
magnesium oxide %	(mgo)	3.28
sulphur trioxide %	(so3)	2.60
sodium oxide %	(na2o)	1.06
potassium oxide %	(k2o)	1.16

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87029

sample id 00137
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1243.0	initial temp.(C)	1082.0
softening temp.(C)	1317.0	softening temp.(C)	1243.0
hemispherical temp.(C)	1343.0	hemispherical temp.(C)	1269.0
fluid temp.(C)	1383.0	fluid temp.(C)	1351.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87029

sample id 00137
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 data analysed 21/01/88

silicon dioxide %	(sio2)	54.86
aluminium oxide %	(al2o3)	21.79
ferric oxide %	(fe2o3)	5.72
titanium dioxide %	(tio2)	0.95
phosphorous pentoxide %	(p2o5)	1.59
calcium oxide %	(cao)	3.47
magnesium oxide %	(mgo)	3.13
sulphur trioxide %	(so3)	1.64
sodium oxide %	(na2o)	1.13
potassium oxide %	(k2o)	1.00

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87029 SEAM : F INTERVAL(M) : 204.73 – 206.47 ELEVATION(M) : 1420.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : MAR 09/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	204.73			0.15												
			0.02	0.49												
			0.09	1.93	96.3	8984	138	1.10 / 0.35 1.45	1.10 / 0.35 1.45	0.77	56.84	9.37	33.02	0.78	11.89	—
			0.03	0.16												
			0.02	0.13												
			0.13													
	206.47			0.13												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87029
Coal zone:	F		
Field sample no.:	06994	Composite sample no.:	138
Lab sample no.:	30720		
True sample thickness:	1.453 meters	Drill core recovery (%):	98.27 %
Coal/Rock:	1.100 / 0.353 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	26.12	26.91	17.26	20.92
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	5.86	2.93		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.77	
Ash (%):	56.84	57.28
Volatile matter (%):	9.37	9.44
Fixed carbon (%):	33.02	33.28
Total sulphur (%):	0.78	0.79
Combustible sulphur (%):	0.28	
Net calorific value (cal/g):	2842.00	2864.00
Gross calorific value (cal/g):	2842.00	2864.00
Volatile matter (dmmf%):	12.10	
Hardgrove index:	68.00	
Specific gravity:	1.89	
Carbon dioxide (%):	5.36	
Phosphorous in coal (%):	0.060	
Chlorine in coal (ppm):	2910.00	

Forms of Sulphur (%): PYRITE 00.49 SULPHATE 00.01 ORGANIC 00.28

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	35.97	36.25
Hydrogen (%):	1.29	1.30
Nitrogen (%):	0.43	0.43
Oxygen (%):	3.92	3.95

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1219.00	1124.00
Softening temperature (°C):	1285.00	1209.00
Hemispherical temperature (°C):	1295.00	1216.00
Final temperature (°C):	1353.00	1350.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	56.56	TiO2 (%):	1.05
Al2O3 (%):	15.86	Na2O (%):	1.51
Fe2O3 (%):	7.46	K2O (%):	1.56
CaO (%):	4.74	SO3 (%):	2.18
MgO (%):	3.91	P2O5 (%):	0.24

gcri coal division ash fusion proj KPN BLK LR D8 DDH87029

sample id 00138
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1248.0	initial temp.(C)	1151.0
softening temp.(C)	1427.0	softening temp.(C)	1301.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1327.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR D8 DDH87029

sample id 00138
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	55.02
aluminium oxide %	(al2o3)	24.57
ferric oxide %	(fe2o3)	4.31
titanium dioxide %	(tio2)	1.35
phosphorous pentoxide %	(p2o5)	0.36
calcium oxide %	(cao)	2.18
magnesium oxide %	(mgo)	2.52
sulphur trioxide %	(so3)	1.45
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	1.73

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR DS DDH87029

sample id 00138
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1324.0	initial temp.(C)	1154.0
softening temp.(C)	1472.0	softening temp.(C)	1367.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1398.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87029

sample id 00138
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	54.72
aluminium oxide %	(al2o3)	27.22
ferric oxide %	(fe2o3)	4.46
titanium dioxide %	(tio2)	1.35
phosphorous pentoxide %	(p2o5)	0.17
calcium oxide %	(cao)	1.65
magnesium oxide %	(mgo)	2.47
sulphur trioxide %	(so3)	1.37
sodium oxide %	(na2o)	1.60
potassium oxide %	(k2o)	1.47

90.0 <= total <= 100.0

KPNLRDDH87030

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87030 DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/08/87
END DATE - 10/12/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PARRY
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE T. INTERSECTED SEAMS: ?, M, L, ?, K/L, ?, ?, K, ?, J, I.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1376.50
ZONE - 9
NORTHING - 6347236.20
EASTING - 508236.46

LICENCE/LEASE NUMBER -

LATITUDE - 571612
LONGITUDE - 1285148

- O R I E N T A T I O N -

LENGTH - 250.10
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 21.34
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY

TRUE 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
DDH87030										
		5851	58.66	59.98	100.00		1.319			0.000- 1.319
	L	5852	59.98	61.96	66.67	1.320		0.660		1.980- 0.000
		5853	61.96	62.33	100.00		0.370			0.000- 0.370
		5854	74.62	75.25	90.48		0.561		0.059	0.000- 0.620
	?	5855	75.25	75.73	97.92	0.461		0.010		0.471- 0.000
		5856	75.73	76.18	100.00		0.440			0.000- 0.440
		5857	86.14	86.60	100.00		0.375			0.000- 0.375
	K/L	5858	86.60	89.32	61.40	0.905	0.252	0.444	0.318	1.349- 0.570
	K/L	5859	89.32	91.62	92.61	0.268	1.163	0.150		0.418- 1.163
		5860	91.62	92.04	100.00		0.387			0.000- 0.387
		5861	184.78	185.12	100.00		0.241			0.000- 0.241
	K	5862	185.12	189.15	53.60	1.404	0.368	1.175	0.313	2.579- 0.681
		5863	189.15	189.81	69.70		0.419		0.181	0.000- 0.600
	I	5865	241.29	244.57	71.65	1.799	0.262	0.810		2.609- 0.262
		5866	244.57	244.67	100.00		0.083			0.000- 0.083
		5867	33.16	34.42	100.00		1.241			0.000- 1.241
	M	5868	34.42	36.68	78.32	1.359	0.385	0.483		1.842- 0.385
		5869	36.68	37.16	100.00		0.473			0.000- 0.473

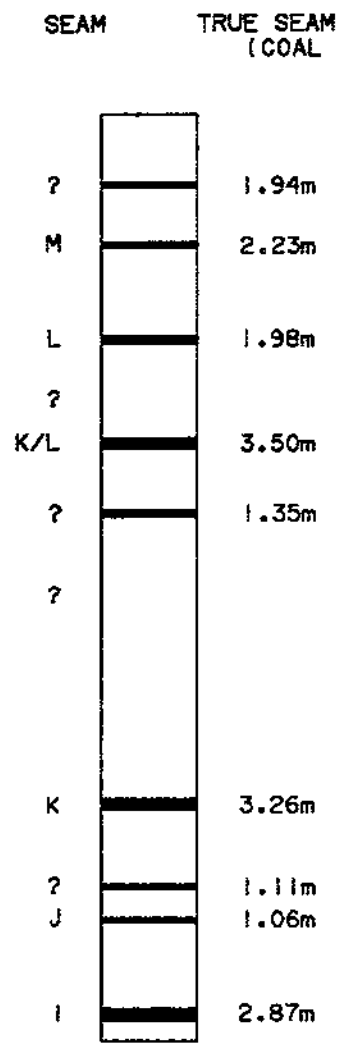
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87030												
	M	139	5868	5868	34.42	36.68	78.31	1.38	0.39	0.49	0.00	1.87- 0.39
	L	140	5852	5852	59.98	61.96	66.66	1.32	0.00	0.66	0.00	1.98- 0.00
	?	141	5855	5855	75.25	75.73	97.91	0.47	0.00	0.01	0.00	0.48- 0.00
	K/L	142	5858	5859	86.60	91.62	75.69	1.66	2.14	0.78	0.44	2.44- 2.58
	K	143	5862	5862	185.12	189.15	53.59	1.71	0.45	1.48	0.39	3.19- 0.84
	I	144	5865	5865	241.29	244.57	71.64	2.05	0.30	0.93	0.00	2.98- 0.30
	M	291	5868	5868	34.42	36.68	78.31	1.38	0.39	0.49	0.00	1.87- 0.39
	L	292	5852	5852	59.98	61.96	66.66	1.32	0.00	0.66	0.00	1.98- 0.00
	?	293	5855	5855	75.25	75.73	97.91	0.47	0.00	0.01	0.00	0.48- 0.00
	K/L	294	5858	5858	86.60	89.32	61.39	1.29	0.38	0.61	0.44	1.90- 0.82
	K	295	5862	5862	185.12	189.15	53.59	1.71	0.45	1.48	0.39	3.19- 0.84
	I	296	5865	5865	241.29	244.57	71.64	2.05	0.30	0.93	0.00	2.98- 0.30
	M	478	5868	5868	34.42	36.68	78.31	1.38	0.39	0.49	0.00	1.87- 0.39
	L	479	5852	5852	59.98	61.96	66.66	1.32	0.00	0.66	0.00	1.98- 0.00
	?	480	5855	5855	75.25	75.73	97.91	0.47	0.00	0.01	0.00	0.48- 0.00
	K/L	481	5858	5858	86.60	89.32	61.39	1.29	0.38	0.61	0.44	1.90- 0.82
	K	482	5862	5862	185.12	189.15	53.59	1.71	0.45	1.48	0.39	3.19- 0.84
	I	483	5865	5865	241.29	244.57	71.64	2.05	0.30	0.93	0.00	2.98- 0.30



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87030

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:(205057)880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

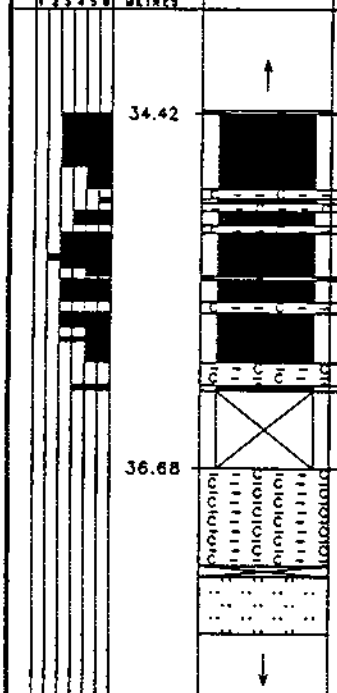
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87030 SEAM : M INTERVAL(M) : 34.42 – 36.68 ELEVATION(M) : 1376.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	34.42			0.47												
				0.28												
				0.16	78.3	5868	138	1.84 / 0.38 2.23	1.84 / 0.38 2.23	1.71	41.82	7.04	49.43	0.72	17.80	—
				0.32												
				(0.48)												
	36.68															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	M		
Field sample no.:	05868	Composite sample no.:	139
Lab sample no.:	30723		
True sample thickness:	2.227 meters	Drill core recovery (%):	78.31 %
Coal/Rock:	1.842 / 0.385 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	22.98	24.95	16.36	25.65
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	7.08	2.98		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.71	
Ash (%):	41.82	42.55
Volatile matter (%):	7.04	7.16
Fixed carbon (%):	49.43	50.29
Total sulphur (%):	0.72	0.73
Combustible sulphur (%):	0.42	
Net calorific value (cal/g):	4254.00	4328.00
Gross calorific value (cal/g):	4254.00	4328.00
Volatile matter (dmmf%):	6.50	
Hardgrove index:	56.00	
Specific gravity:	1.70	
Carbon dioxide (%):	2.13	
Phosphorous in coal (%):	0.119	
Chlorine in coal (ppm):	2040.00	

Forms of Sulphur (%): PYRITE 00.26 SULPHATE 00.01 ORGANIC 00.45

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	49.72	50.59
Hydrogen (%):	1.68	1.71
Nitrogen (%):	0.66	0.67
Oxygen (%):	3.69	3.75

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1185.00	1119.00
Softening temperature (°C):	1309.00	1227.00
Hemispherical temperature (°C):	1322.00	1253.00
Final temperature (°C):	1390.00	1359.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	55.32	TiO2 (%):	1.22
Al2O3 (%):	21.17	Na2O (%):	1.69
Fe2O3 (%):	5.71	K2O (%):	1.89
CaO (%):	2.98	SO3 (%):	1.77
MgO (%):	3.30	P2O5 (%):	0.65

gcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00139
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AP3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1185.0	initial temp.(C)	1127.0
softening temp.(C)	1422.0	softening temp.(C)	1327.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1385.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00139
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	53.06
aluminium oxide %	(al2o3)	24.95
ferric oxide %	(fe2o3)	6.55
titanium dioxide %	(tio2)	1.07
phosphorous pentoxide %	(p2o5)	0.39
calcium oxide %	(cao)	1.47
magnesium oxide %	(mgo)	3.43
sulphur trioxide %	(so3)	0.72
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00139
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1206.0	initial temp.(C)	1190.0
softening temp.(C)	1448.0	softening temp.(C)	1377.0
hemispherical temp.(C)	1472.0	hemispherical temp.(C)	1401.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00139
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.12
aluminium oxide %	(al2o3)	26.46
ferric oxide %	(fe2o3)	5.79
titanium dioxide %	(tio2)	0.67
phosphorous pentoxide %	(p2o5)	0.35
calcium oxide %	(cao)	1.40
magnesium oxide %	(mgo)	3.08
sulphur trioxide %	(so3)	0.93
sodium oxide %	(na2o)	1.65
potassium oxide %	(k2o)	1.29

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87030 SEAM : L INTERVAL(M) : 59.98 – 61.96 ELEVATION(M) : 1376.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	59.98			1.32	66.7	5852	140	1.98 / 0.00 1.98	1.98 / 0.00 1.98	1.28	17.42	6.82	74.38	0.56	28.22	—
				(0.66)												
	61.96															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	L		
Field sample no.:	05852	Composite sample no.:	140
Lab sample no.:	30720		
True sample thickness:	1.980 meters	Drill core recovery (%):	66.66 %
Coal/Rock:	1.980 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	20.46	21.93	17.82	30.77	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	6.49	2.53			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.28	
Ash (%):	17.42	17.65
Volatile matter (%):	6.92	7.01
Fixed carbon (%):	74.38	75.34
Total sulphur (%):	0.56	0.57
Combustible sulphur (%):	0.23	
Net calorific value (cal/g):	6744.00	6831.00
Gross calorific value (cal/g):	6745.00	6832.00
Volatile matter (dmmf%):	6.70	
Hardgrove index:	48.00	
Specific gravity:	1.46	
Carbon dioxide (%):	1.67	
Phosphorous in coal (%):	0.177	
Chlorine in coal (ppm):	630.00	

Forms of Sulphur (%): PYRITE 00.10 SULPHATE 00.00 ORGANIC 00.46

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	74.40	75.37
Hydrogen (%):	2.51	2.54
Nitrogen (%):	0.86	0.87
Oxygen (%):	2.97	3.00

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1195.00	1127.00
Softening temperature (°C):	1269.00	1232.00
Hemispherical temperature (°C):	1280.00	1243.00
Final temperature (°C):	1301.00	1298.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	49.45	TiO2 (%):	1.07
Al2O3 (%):	20.79	Na2O (%):	1.86
Fe2O3 (%):	5.81	K2O (%):	1.08
CaO (%):	7.31	SO3 (%):	4.77
MgO (%):	3.81	P2O5 (%):	2.33

(1)

gcri coal division ash fusion proj KPN BLK LR DB DDH87030

sample id 00140
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1245.0	initial temp.(C)	1180.0
softening temp.(C)	1299.0	softening temp.(C)	1253.0
hemispherical temp.(C)	1319.0	hemispherical temp.(C)	1292.0
fluid temp.(C)	1380.0	fluid temp.(C)	1378.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87030

sample id 00140
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	52.82
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	5.03
titanium dioxide %	(tio2)	1.07
phosphorous pentoxide %	(p2o5)	1.57
calcium oxide %	(cao)	4.35
magnesium oxide %	(mgo)	3.17
sulphur trioxide %	(so3)	2.44
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	1.10

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DS DDH87030

sample id 00140
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1177.0	initial temp.(C)	1153.0
softening temp.(C)	1374.0	softening temp.(C)	1301.0
hemispherical temp.(C)	1411.0	hemispherical temp.(C)	1351.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87030

sample id 00140
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	53.36
aluminium oxide %	(al2o3)	26.46
ferric oxide %	(fe2o3)	4.45
titanium dioxide %	(tio2)	0.82
phosphorous pentoxide %	(p2o5)	1.35
calcium oxide %	(cao)	3.44
magnesium oxide %	(mgo)	2.91
sulphur trioxide %	(so3)	1.61
sodium oxide %	(na2o)	1.81
potassium oxide %	(k2o)	1.13

90.0 <= total <= 100.0

GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87030 SEAM : ? INTERVAL(M) : 75.25 – 75.73 ELEVATION(M) : 1376.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	75.25			0.46	97.8	5833	141	0.47 / 0.00		1.20	22.13	7.34	69.33	5.62	28.42	—
	75.73			(0.46)				0.47								

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	?		
Field sample no.:	05855	Composite sample no.:	141
Lab sample no.:	30723		
True sample thickness:	0.471 meters	Drill core recovery (%):	97.91 %
Coal/Rock:	0.471 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	16.64	26.35	17.53	29.75
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	6.65	3.08		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.20	
Ash (%):	22.13	22.40
Volatile matter (%):	7.34	7.43
Fixed carbon (%):	69.33	70.17
Total sulphur (%):	5.62	5.69
Combustible sulphur (%):	5.42	
Net calorific value (cal/g):	6313.00	6390.00
Gross calorific value (cal/g):	6314.00	6391.00
Volatile matter (dmmf%):	4.70	
Hardgrove index:	52.00	
Specific gravity:	1.51	
Carbon dioxide (%):	0.76	
Phosphorous in coal (%):	0.329	
Chlorine in coal (ppm):	1030.00	

Forms of Sulphur (%): PYRITE 03.59 SULPHATE 00.14 ORGANIC 01.89

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	65.80	66.60
Hydrogen (%):	2.40	2.43
Nitrogen (%):	0.79	0.80
Oxygen (%):	2.06	2.08

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1227.00	1080.00
Softening temperature (°C):	1295.00	1101.00
Hemispherical temperature (°C):	1311.00	1117.00
Final temperature (°C):	1338.00	1253.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	37.24	TiO2 (%):	0.82
Al2O3 (%):	16.12	Na2O (%):	1.44
Fe2O3 (%):	25.23	K2O (%):	0.79
CaO (%):	6.37	SO3 (%):	2.25
MgO (%):	1.84	P2O5 (%):	3.40

gcri coal division ash fusion proj KPN BLK LR DB DDH87030

sample id 00141
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1135.0	initial temp.(C)	1082.0
softening temp.(C)	1288.0	softening temp.(C)	1106.0
hemispherical temp.(C)	1298.0	hemispherical temp.(C)	1127.0
fluid temp.(C)	1343.0	fluid temp.(C)	1256.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87030

sample id 00141
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	38.58
aluminium oxide %	(al2o3)	15.36
ferric oxide %	(fe2o3)	21.56
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	3.73
calcium oxide %	(cao)	7.68
magnesium oxide %	(mgo)	2.13
sulphur trioxide %	(so3)	3.35
sodium oxide %	(na2o)	1.44
potassium oxide %	(k2o)	0.85

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00141
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1232.0	initial temp.(C)	1103.0
softening temp.(C)	1343.0	softening temp.(C)	1232.0
hemispherical temp.(C)	1359.0	hemispherical temp.(C)	1261.0
fluid temp.(C)	1395.0	fluid temp.(C)	1392.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00141
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	49.46
aluminium oxide %	(al2o3)	23.44
ferric oxide %	(fe2o3)	9.64
titanium dioxide %	(tio2)	0.61
phosphorous pentoxide %	(p2o5)	1.87
calcium oxide %	(cao)	4.11
magnesium oxide %	(mgo)	2.35
sulphur trioxide %	(so3)	2.02
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

GULF CANADA CORPORATION

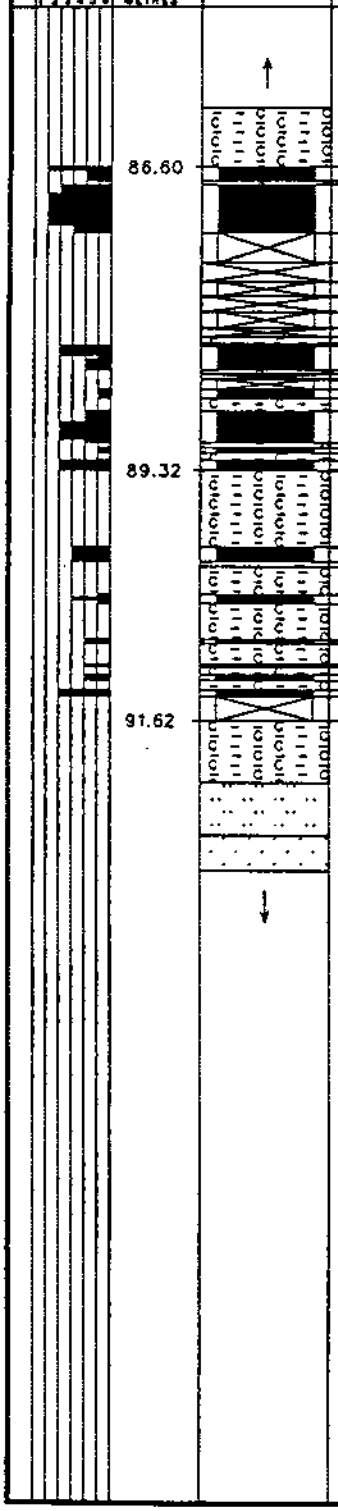
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87030 SEAM : K/L INTERVAL(M) : 86.60 – 91.62 ELEVATION(M) : 1378.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	86.60			0.09	60.3	5858	142	1.77 / 1.73	1.77 / 1.73	0.90	60.52	7.40	31.18	0.31	10.43
				0.30				3.50	3.50						
				(0.18)											
			(0.13)												
				(0.08)											
			(0.16)												
				(0.19)											
				(0.02)											
				0.18											
			(0.03)												
				(0.05)											
				(0.02)											
			0.08												
				0.20											
			0.02												
				0.03											
	89.32														
			0.48		60.5	5859									
				0.09											
			0.03												
			0.18												
				0.05											
			0.23												
				0.03											
			0.13												
			0.05												
			0.02												
				(0.19)											
	91.62														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	K/L		
Field sample no.:	05858 - 05859	Composite sample no.:	142
Lab sample no.:	30723		
True sample thickness:	3.500 meters	Drill core recovery(%):	75.69 %
Coal/Rock:	1.767 / 1.733 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	25.66	27.54	17.66	20.20
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.79	3.15		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.90	
Ash(%):	60.52	61.07
Volatile matter(%):	7.40	7.47
Fixed carbon(%):	31.18	31.46
Total sulphur(%):	0.31	0.31
Combustible sulphur(%):	0.07	
Net calorific value(cal/g):	2493.00	2515.00
Gross calorific value(cal/g):	2493.00	2515.00
Volatile matter(dmmf%):	7.30	
Hardgrove index:	62.00	
Specific gravity:	1.94	
Carbon dioxide(%):	2.86	
Phosphorous in coal(%):	0.048	
Chlorine in coal(ppm):	1270.00	

Forms of Sulphur(%): PYRITE 00.06 SULPHATE 00.00 ORGANIC 00.25

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	32.82	33.12
Hydrogen(%):	1.26	1.27
Nitrogen(%):	0.46	0.46
Oxygen(%):	3.73	3.77

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1269.00	1180.00
Softening temperature(°C):	1330.00	1266.00
Hemispherical temperature(°C):	1343.00	1290.00
Final temperature(°C):	1409.00	1390.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	64.62	TiO2(%):	0.98
Al2O3(%):	16.25	Na2O(%):	1.78
Fe2O3(%):	4.83	K2O(%):	1.46
CaO(%):	2.35	SO3(%):	1.00
MgO(%):	2.44	P2O5(%):	0.18

scri coal division ash fusion proj KFN BLK LR DE DDH87030

sample id 00142
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1340.0	initial temp.(C)	1239.0
softening temp.(C)	1369.0	softening temp.(C)	1266.0
hemispherical temp.(C)	1401.0	hemispherical temp.(C)	1317.0
fluid temp.(C)	1443.0	fluid temp.(C)	1440.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KFN BLK LR DE DDH87030

sample id 00142
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 data analysed 21/01/88

silicon dioxide %	(sio2)	59.60
aluminium oxide %	(al2o3)	20.79
ferric oxide %	(fe2o3)	5.81
titanium dioxide %	(tio2)	1.36
phosphorous pentoxide %	(p2o5)	0.46
calcium oxide %	(cao)	1.74
magnesium oxide %	(mgo)	2.64
sulphur trioxide %	(so3)	1.03
sodium oxide %	(na2o)	1.77
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

;cri coal division ash fusion proj KPN BLK LR DB DDH87030

;ample id 00142
;ample product id SP1 data type (real,boro,aver,calc) REAL
;plit sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1227.0
softening temp.(C)	1390.0	softening temp.(C)	1311.0
hemispherical temp.(C)	1427.0	hemispherical temp.(C)	1353.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

;cri coal division ash mineral proj KPN BLK LR DB DDH87030

;ample id 00142
;ample product id SP1 data type (real,boro,aver,calc) REAL
;plit sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	59.86
aluminium oxide %	(al2o3)	21.92
ferric oxide %	(fe2o3)	4.90
titanium dioxide %	(tio2)	1.27
phosphorous pentoxide %	(p2o5)	0.43
calcium oxide %	(cao)	1.50
magnesium oxide %	(mgo)	2.56
sulphur trioxide %	(so3)	0.89
sodium oxide %	(na2o)	1.83
potassium oxide %	(k2o)	1.29

90.0 <= total <= 100.0

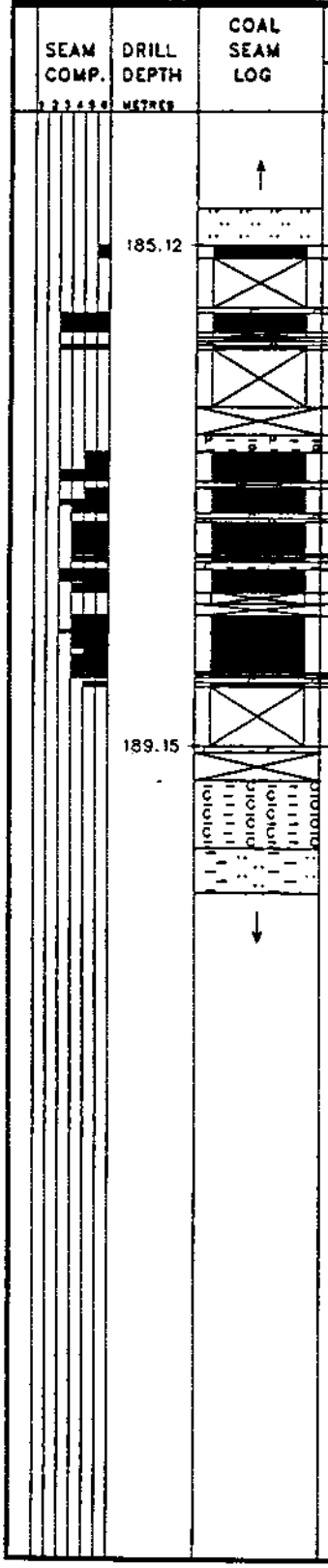
GULF CANADA CORPORATION

COAL DIVISION
MOUNT KLAPPAN PROJECT

SEAM DETAIL — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87030 SEAM : K INTERVAL(M) : 185.12 – 189.15 ELEVATION(M) : 1376.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	185.12			(0.32)												
				(0.38)												
			(0.18)													
				0.19												
				0.16	53.8	5862	143	2.58 / 0.68	2.58 / 0.68	1.17	46.31	6.96	43.36	4.79	16.08	—
				0.21				3.26	3.26							
				0.15												
				0.37												
				(0.38)												
	189.15															

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	K		
Field sample no.:	05862	Composite sample no.:	143
Lab sample no.:	30723		
True sample thickness:	3.260 meters	Drill core recovery (%):	53.59 %
Coal/Rock:	2.579 / 0.681 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight (%):	18.77	24.26	16.41	29.22	
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight (%):	7.17	4.17			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.17	
Ash (%):	48.51	49.08
Volatile matter (%):	6.96	7.04
Fixed carbon (%):	43.36	43.88
Total sulphur (%):	4.79	4.85
Combustible sulphur (%):	4.35	
Net calorific value (cal/g):	3843.00	3888.00
Gross calorific value (cal/g):	3843.00	3888.00
Volatile matter (dmmf%):	2.70	
Hardgrove index:	67.00	
Specific gravity:	1.78	
Carbon dioxide (%):	1.56	
Phosphorous in coal (%):	0.275	
Chlorine in coal (ppm):	2100.00	
Forms of Sulphur (%):	PYRITE 04.07 SULPHATE 00.07 ORGANIC 00.65	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	41.41	41.90
Hydrogen (%):	1.20	1.21
Nitrogen (%):	0.50	0.51
Oxygen (%):	2.42	2.45

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1180.00	1103.00
Softening temperature (°C):	1290.00	1114.00
Hemispherical temperature (°C):	1303.00	1137.00
Final temperature (°C):	1348.00	1230.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	53.04	TiO2 (%):	1.15
Al2O3 (%):	16.50	Na2O (%):	2.10
Fe2O3 (%):	12.96	K2O (%):	0.88
CaO (%):	3.69	SO3 (%):	2.29
MgO (%):	1.53	P2O5 (%):	1.30

(1)

qcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00143
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1248.0	initial temp.(C)	1148.0
softening temp.(C)	1324.0	softening temp.(C)	1198.0
hemispherical temp.(C)	1345.0	hemispherical temp.(C)	1238.0
fluid temp.(C)	1411.0	fluid temp.(C)	1406.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00143
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	52.80
aluminium oxide %	(al2o3)	23.30
ferric oxide %	(fe2o3)	7.87
titanium dioxide %	(tio2)	1.22
phosphorous pentoxide %	(p2o5)	1.08
calcium oxide %	(cao)	2.90
magnesium oxide %	(mgo)	1.48
sulphur trioxide %	(so3)	1.53
sodium oxide %	(na2o)	2.08
potassium oxide %	(k2o)	1.11

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00143
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1216.0
softening temp.(C)	1364.0	softening temp.(C)	1343.0
hemispherical temp.(C)	1438.0	hemispherical temp.(C)	1377.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00143
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	50.88
aluminium oxide %	(al2o3)	27.84
ferric oxide %	(fe2o3)	5.81
titanium dioxide %	(tio2)	1.15
phosphorous pentoxide %	(p2o5)	0.99
calcium oxide %	(cao)	2.72
magnesium oxide %	(mgo)	1.47
sulphur trioxide %	(so3)	1.43
sodium oxide %	(na2o)	1.97
potassium oxide %	(k2o)	1.19

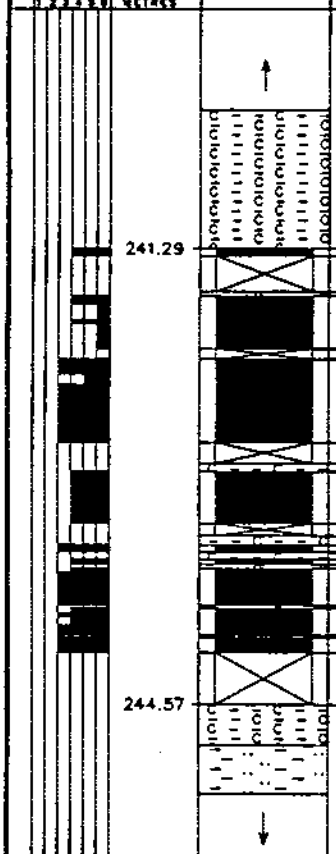
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87030 SEAM : 1 INTERVAL(M) : 241.29 – 244.57 ELEVATION(M) : 1378.5

GEOLOGIST : PARRY SCALE: 1:40 DATE : MAR 04/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	241.29			(0.23)											
				0.33											
				0.53											
				0.32	71.2	5865	144	2.61 / 0.26 2.87	2.61 / 0.28 2.87	1.25	34.37	8.78	55.40	0.64	19.98
				0.23											
				0.17											
				(0.33)											
	244.57														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87030
Coal zone:	I		
Field sample no.:	05865	Composite sample no.:	144
Lab sample no.:	30723		
True sample thickness:	2.871 meters	Drill core recovery(%):	71.64 %
Coal/Rock:	2.609 / 0.262 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	23.35	18.31	17.69	30.10
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	6.29	4.26		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.25	
Ash(%):	34.57	35.01
Volatile matter(%):	8.78	8.89
Fixed carbon(%):	55.40	56.10
Total sulphur(%):	0.64	0.65
Combustible sulphur(%):	0.23	
Net calorific value(cal/g):	4775.00	4836.00
Gross calorific value(cal/g):	4775.00	4836.00
Volatile matter(dmmf%):	9.50	
Hardgrove index:	64.00	
Specific gravity:	1.64	
Carbon dioxide(%):	3.97	
Phosphorous in coal(%):	0.121	
Chlorine in coal(ppm):	2700.00	

Forms of Sulphur(%): PYRITE 00.07 SULPHATE 00.00 ORGANIC 00.57

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	57.65	58.38
Hydrogen(%):	1.47	1.49
Nitrogen(%):	0.68	0.69
Oxygen(%):	3.74	3.78

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1180.00	1169.00
Softening temperature(°C):	1280.00	1216.00
Hemispherical temperature(°C):	1290.00	1232.00
Final temperature(°C):	1345.00	1339.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	51.14	TiO2(%):	0.98
Al2O3(%):	21.17	Na2O(%):	2.10
Fe2O3(%):	6.78	K2O(%):	1.29
CaO(%):	5.08	SO3(%):	2.93
MgO(%):	3.37	P2O5(%):	0.80

(1)

gcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00144
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1182.0	initial temp.(C)	1172.0
softening temp.(C)	1285.0	softening temp.(C)	1238.0
hemispherical temp.(C)	1301.0	hemispherical temp.(C)	1259.0
fluid temp.(C)	1356.0	fluid temp.(C)	1350.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00144
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	49.12
aluminium oxide %	(al2o3)	23.81
ferric oxide %	(fe2o3)	5.36
titanium dioxide %	(tio2)	1.49
phosphorous pentoxide %	(p2o5)	1.75
calcium oxide %	(cao)	4.88
magnesium oxide %	(mgo)	3.26
sulphur trioxide %	(so3)	2.94
sodium oxide %	(na2o)	1.71
potassium oxide %	(k2o)	1.12

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87030

sample id 00144
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1182.0	initial temp.(C)	1172.0
softening temp.(C)	1330.0	softening temp.(C)	1327.0
hemispherical temp.(C)	1432.0	hemispherical temp.(C)	1364.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87030

sample id 00144
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	50.28
aluminium oxide %	(al2o3)	27.08
ferric oxide %	(fe2o3)	4.69
titanium dioxide %	(tio2)	0.89
phosphorous pentoxide %	(p2o5)	1.97
calcium oxide %	(cao)	3.43
magnesium oxide %	(mgo)	2.86
sulphur trioxide %	(so3)	1.97
sodium oxide %	(na2o)	1.71
potassium oxide %	(k2o)	0.86

90.0 <= total <= 100.0

KPNLRDDH87031

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87031 DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/08/87
END DATE - 10/12/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEE

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED SEAMS M, L, ?, ?, K/L (PART), L (REP), K/L (REP), K. SITE X.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1393.83

LICENCE/LEASE NUMBER -

ZONE - 9
NORTHING - 6346975.89
EASTING - 508782.51

LATITUDE - 571603
LONGITUDE - 1285116

- O R I E N T A T I O N -

LENGTH - 205.24

CORE SIZE - 0.0

INCLINATION - 90.0
AZIMUTH - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 15.85
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87031										
		5804	29.62	30.45	100.00		0.772			0.000- 0.772
	M	5805	30.45	32.72	66.52	1.329	0.055	0.701		2.030- 0.055
		5806	32.72	32.97	100.00		0.227			0.000- 0.227
		5807	45.78	46.37	100.00	0.054	0.379			0.054- 0.379
	L	5808	46.37	47.91	38.96	0.572		0.874		1.446- 0.000
		5809	47.91	48.70	100.00		0.767			0.000- 0.767
		5810	59.44	60.11	100.00		0.661			0.000- 0.661
	?.	5811	60.11	60.70	100.00	0.491	0.088			0.491- 0.088
		5812	60.70	61.38	100.00		0.663			0.000- 0.663
		5813	65.57	66.46	100.00		0.800			0.000- 0.800
	?	5814	66.46	67.25	93.67	0.459	0.193	0.044		0.503- 0.193
		5815	67.25	67.48	100.00		0.200			0.000- 0.200
		5816	81.47	81.71	75.00	0.071	0.088		0.053	0.071- 0.141
	K/L PART	5817	81.71	82.53	93.90	0.657		0.044		0.701- 0.000
		5818	82.53	82.76	100.00		0.190			0.000- 0.190
		5819	94.28	94.89	100.00		0.586			0.000- 0.586
	L REP	5820	94.89	96.59	85.29	0.793	0.610	0.241		1.034- 0.610
		5821	96.59	97.16	100.00		0.555			0.000- 0.555
		5822	132.50	132.80	100.00		0.254			0.000- 0.254
	K/L REP	5823	132.80	136.92	72.82	2.366	0.283	0.711	0.293	3.077- 0.576
		5825	136.92	137.37	57.78		0.240		0.175	0.000- 0.415
		5826	182.06	182.60	100.00		0.507			0.000- 0.507
	K	5827	182.60	183.80	76.67	0.664	0.196	0.261		0.925- 0.196
	K	5828	183.80	185.96	91.67	1.692	0.139	0.046	0.121	1.738- 0.260
	K	5829	185.96	187.11	59.13	0.255	0.365	0.256	0.174	0.511- 0.539
		5830	187.11	187.45	100.00		0.309			0.000- 0.309
		5992	192.35	192.41	100.00		0.053			0.000- 0.053

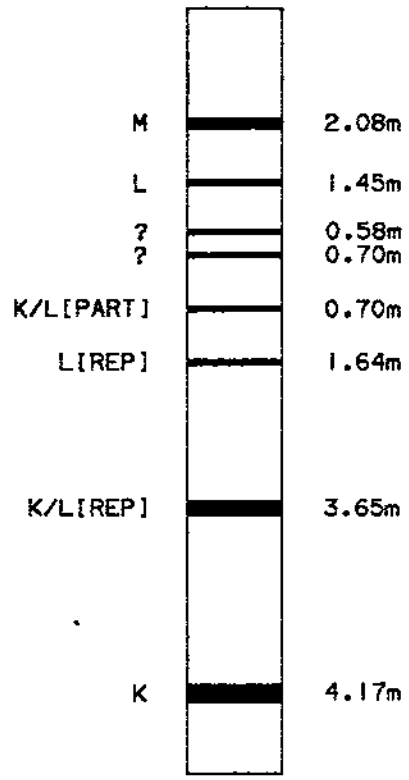
GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87031												
	M	145	5805	5805	30.45	32.72	66.51	1.45	0.06	0.76	0.00	2.21- 0.06
	L	146	5808	5808	46.37	47.91	38.96	0.60	0.00	0.94	0.00	1.54- 0.00
	?	147	5811	5811	60.11	60.70	100.00	0.50	0.09	0.00	0.00	0.50- 0.09
	?	148	5814	5814	66.46	67.25	93.67	0.52	0.22	0.05	0.00	0.57- 0.22
	K/L PART	149	5817	5817	81.71	82.53	93.90	0.77	0.00	0.05	0.00	0.82- 0.00
	L REP	150	5820	5820	94.89	96.59	85.29	0.82	0.63	0.25	0.00	1.07- 0.63
	K/L REP	151	5823	5823	132.80	136.92	72.81	2.68	0.32	0.80	0.32	3.48- 0.64
	K	152	5827	5829	182.60	187.11	79.37	2.82	0.76	0.61	0.32	3.43- 1.08
	M	297	5805	5805	30.45	32.72	66.51	1.45	0.06	0.76	0.00	2.21- 0.06
	?	298	5811	5811	60.11	60.70	100.00	0.50	0.09	0.00	0.00	0.50- 0.09
	?	299	5814	5814	66.46	67.25	93.67	0.52	0.22	0.05	0.00	0.57- 0.22
	K/L (part)	300	5817	5817	81.71	82.53	93.90	0.77	0.00	0.05	0.00	0.82- 0.00
	K/L (rep)	301	5823	5823	132.80	136.92	72.81	2.68	0.32	0.80	0.32	3.48- 0.64
	K	302	5827	5829	182.60	187.11	79.37	2.82	0.76	0.61	0.32	3.43- 1.08
	M	484	5805	5805	30.45	32.72	66.51	1.45	0.06	0.76	0.00	2.21- 0.06
	?	485	5811	5811	60.11	60.70	100.00	0.50	0.09	0.00	0.00	0.50- 0.09
	?	486	5814	5814	66.46	67.25	93.67	0.52	0.22	0.05	0.00	0.57- 0.22
	K/L (part)	487	5817	5817	81.71	82.53	93.90	0.77	0.00	0.05	0.00	0.82- 0.00
	K/L (rep)	488	5823	5823	132.80	136.92	72.81	2.68	0.32	0.80	0.32	3.48- 0.64
	K	489	5827	5829	182.60	187.11	79.37	2.82	0.76	0.61	0.32	3.43- 1.08



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87031

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1(205057)680072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87031 SEAM : M INTERVAL(M) : 30.45 – 32.72 ELEVATION(M) : 1393.8

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	30.45			0.28	68.4	5805	145	2.03/ 0.06	2.03/ 0.06	1.07	40.23	7.49	51.21	0.61	18.44	—
				(0.34)				2.08	2.08							
				0.28												
				(0.17)												
				0.77												
	32.72															

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87031
Coal zone:	M		
Field sample no.:	05805	Composite sample no.:	145
Lab sample no.:	30723		
True sample thickness:	2.085 meters	Drill core recovery(%):	66.51 %
Coal/Rock:	2.030 / 0.055 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	4.42	17.61	18.57	45.64
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	8.95	4.81		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.07	
Ash(%):	40.23	40.66
Volatile matter(%):	7.49	7.57
Fixed carbon(%):	51.21	51.77
Total sulphur(%):	0.61	0.62
Combustible sulphur(%):	0.15	
Net calorific value(cal/g):	4407.00	4455.00
Gross calorific value(cal/g):	4407.00	4455.00
Volatile matter(dmmf%):	7.40	
Hardgrove index:	66.00	
Specific gravity:	1.68	
Carbon dioxide(%):	2.06	
Phosphorous in coal(%):	0.030	
Chlorine in coal(ppm):	1890.00	

Forms of Sulphur(%): PYRITE 00.23 SULPHATE 00.00 ORGANIC 00.38

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	51.64	52.20
Hydrogen(%):	2.09	2.11
Nitrogen(%):	0.70	0.71
Oxygen(%):	3.66	3.70

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1238.00	1201.00
Softening temperature(°C):	1319.00	1256.00
Hemispherical temperature(°C):	1330.00	1285.00
Final temperature(°C):	1380.00	1380.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	61.50	TiO2(%):	1.03
Al2O3(%):	18.26	Na2O(%):	1.78
Fe2O3(%):	4.25	K2O(%):	1.87
CaO(%):	3.92	SO3(%):	2.87
MgO(%):	3.11	P2O5(%):	0.17

gcri coal division ash fusion proj KPN BLK LR DS DDH87031

sample id 00145
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1224.0	initial temp.(C)	1209.0
softening temp.(C)	1348.0	softening temp.(C)	1254.0
hemispherical temp.(C)	1388.0	hemispherical temp.(C)	1295.0
fluid temp.(C)	1472.0	fluid temp.(C)	1370.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87031

sample id 00145
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	62.06
aluminium oxide %	(al2o3)	20.54
ferric oxide %	(fe2o3)	5.75
titanium dioxide %	(tio2)	0.72
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	2.43
magnesium oxide %	(mgo)	3.03
sulphur trioxide %	(so3)	1.84
sodium oxide %	(na2o)	1.46
potassium oxide %	(k2o)	1.53

90.0 <= total <= 100.0

scri coal division ash fusion proj KFN BLK LR DS DDH87031

sample id 00145
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1253.0	initial temp.(C)	1164.0
softening temp.(C)	1336.0	softening temp.(C)	1266.0
hemispherical temp.(C)	1395.0	hemispherical temp.(C)	1317.0
fluid temp.(C)	1424.0	fluid temp.(C)	1419.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KFN BLK LR DS DDH87031

sample id 00145
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	59.36
aluminium oxide %	(al2o3)	23.02
ferric oxide %	(fe2o3)	5.71
titanium dioxide %	(tio2)	0.57
phosphorous pentoxide %	(p2o5)	0.31
calcium oxide %	(cao)	2.71
magnesium oxide %	(mgo)	3.07
sulphur trioxide %	(so3)	1.75
sodium oxide %	(na2o)	1.91
potassium oxide %	(k2o)	1.42

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87031 SEAM : L INTERVAL(M) : 46.37 - 47.91 ELEVATION(M) : 1393.8

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	46.37			(0.87)	39.6	5808	146	1.45 / 0.00	1.45 / 0.00	0.79	19.75	8.11	73.35	—	27.94	—
								1.45	1.45							
				0.57												
	47.91															

GULF CANADA CORPORATION

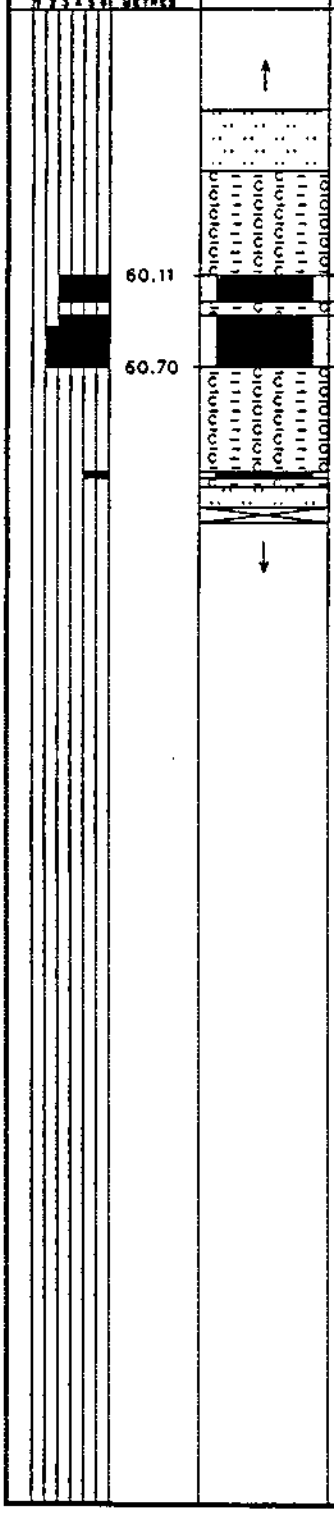
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR 00H87031 SEAM : ? INTERVAL(M) : 60.11 – 60.70 ELEVATION(M) : 1393.8

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6															
	60.11			0.17											
			0.09												
				0.32	100.0	5811	147	0.49 / 0.09 = 0.58	0.49 / 0.09 = 0.58	1.04	41.34	7.73	49.89	1.66	18.52
	60.70														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87031
Coal zone:	?		
Field sample no.:	05811	Composite sample no.:	147
Lab sample no.:	30746		
True sample thickness:	0.579 meters	Drill core recovery(%):	100.00 %
Coal/Rock:	0.491 / 0.088 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	30.47	15.36	13.49	29.63
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	7.51	3.54		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.04	
Ash(%):	41.34	41.77
Volatile matter(%):	7.73	7.81
Fixed carbon(%):	49.89	50.42
Total sulphur(%):	1.66	1.68
Combustible sulphur(%):	1.01	
Net calorific value(cal/g):	4426.00	4473.00
Gross calorific value(cal/g):	4426.00	4473.00
Volatile matter(dmmf%):	7.10	
Hardgrove index:	67.00	
Specific gravity:	1.71	
Carbon dioxide(%):	2.72	
Phosphorous in coal(%):	0.209	
Chlorine in coal(ppm):	2620.00	

Forms of Sulphur(%): PYRITE 01.37 SULPHATE 00.01 ORGANIC 00.28

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	50.19	50.72
Hydrogen(%):	1.75	1.77
Nitrogen(%):	0.57	0.58
Oxygen(%):	3.45	3.48

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1243.00	1195.00
Softening temperature(°C):	1295.00	1209.00
Hemispherical temperature(°C):	1306.00	1227.00
Final temperature(°C):	1340.00	1317.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	51.00	TiO2(%):	1.20
Al2O3(%):	18.52	Na2O(%):	1.97
Fe2O3(%):	7.08	K2O(%):	1.89
CaO(%):	5.85	SO3(%):	3.94
MgO(%):	2.93	P2O5(%):	1.16

(1)

gcri coal division ash fusion proj KPN BLK LR DB DCH87031

sample id 00147
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1283.0	initial temp.(C)	1287.0
softening temp.(C)	1324.0	softening temp.(C)	1351.0
hemispherical temp.(C)	1382.0	hemispherical temp.(C)	1346.0
fluid temp.(C)	1401.0	fluid temp.(C)	1367.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DCH87031

sample id 00147
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	54.28
aluminium oxide %	(al2o3)	20.41
ferric oxide %	(fe2o3)	6.78
titanium dioxide %	(tio2)	1.20
phosphorous pentoxide %	(p2o5)	1.43
calcium oxide %	(cao)	5.15
magnesium oxide %	(mgo)	2.59
sulphur trioxide %	(so3)	2.70
sodium oxide %	(na2o)	1.94
potassium oxide %	(k2o)	1.90

90.0 <= total <= 100.0

scri coal division ash fusion proj KFN BLK LR DB DDH87031

sample id 00147
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1254.0	initial temp.(C)	1180.0
softening temp.(C)	1327.0	softening temp.(C)	1241.0
hemispherical temp.(C)	1340.0	hemispherical temp.(C)	1280.0
fluid temp.(C)	1409.0	fluid temp.(C)	1332.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KFN BLK LR DB DDH87031

sample id 00147
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	52.32
aluminium oxide %	(al2o3)	22.68
ferric oxide %	(fe2o3)	6.68
titanium dioxide %	(tio2)	1.20
phosphorous pentoxide %	(p2o5)	1.41
calcium oxide %	(cao)	4.20
magnesium oxide %	(mgo)	2.36
sulphur trioxide %	(so3)	2.49
sodium oxide %	(na2o)	1.78
potassium oxide %	(k2o)	1.88

90.0 <= total <= 100.0

CLEAN SIMULATED PRODUCT

SAMPLE #485 SEAM ? 6 x 0.5 MM

NOT AVAILABLE ASH TO HIGH TO PRODUCE 7.5% ASH PRODUCT

GULF CANADA CORPORATION

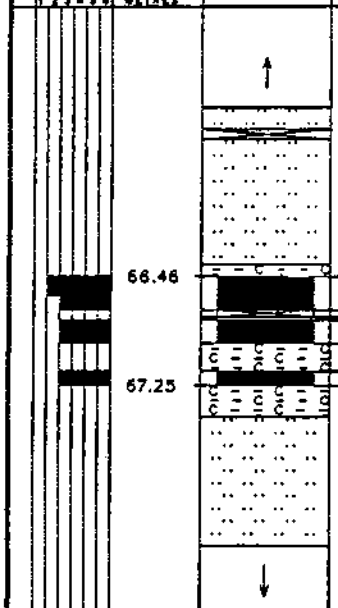
SEAM DETAIL

COAL DIVISION
MOUNT KLAPPAN PROJECT

TRUE THICKNESS

DATA SOURCE: KPN LR DDH87031 SEAM : ? INTERVAL(M) : 66.46 – 67.25 ELEVATION(M) : 1393.8

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG	
	66.46			0.21												
				0.15	93.7	5816	148	0.50/ 0.19 0.70	0.50/ 0.19 0.70	1.77	48.09	8.47	45.67	0.44	17.18	—
			0.18													
	67.25			0.76												

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87031
Coal zone:	?		
Field sample no.:	05814	Composite sample no.:	148
Lab sample no.:	30746		
True sample thickness:	0.696 meters	Drill core recovery(%):	93.67 %
Coal/Rock:	0.503 / 0.193 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	16.26	16.95	13.89	35.43
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	11.97	5.50		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.77	
Ash(%):	46.09	46.92
Volatile matter(%):	6.47	6.59
Fixed carbon(%):	45.67	46.49
Total sulphur(%):	0.44	0.45
Combustible sulphur(%):	0.05	
Net calorific value(cal/g):	4106.00	4180.00
Gross calorific value(cal/g):	4106.00	4180.00
Volatile matter(dmmf%):	5.50	
Hardgrove index:	77.00	
Specific gravity:	1.75	
Carbon dioxide(%):	1.47	
Phosphorous in coal(%):	0.183	
Chlorine in coal(ppm):	1720.00	

Forms of Sulphur(%): PYRITE 00.07 SULPHATE 00.00 ORGANIC 00.37

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	47.14	47.99
Hydrogen(%):	1.64	1.67
Nitrogen(%):	0.60	0.61
Oxygen(%):	2.32	2.36

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1358.00	1269.00
Softening temperature(°C):	1406.00	1300.00
Hemispherical temperature(°C):	1436.00	1316.00
Final temperature(°C):	1472.00	1472.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	56.90	TiO2(%):	1.03
Al2O3(%):	21.36	Na2O(%):	1.64
Fe2O3(%):	4.12	K2O(%):	2.39
CaO(%):	3.47	SO3(%):	2.09
MgO(%):	2.50	P2O5(%):	0.91

sample id 00148
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1136.0	initial temp.(C)	1148.0
softening temp.(C)	1331.0	softening temp.(C)	1341.0
hemispherical temp.(C)	1388.0	hemispherical temp.(C)	1343.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

sample id 00148
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	59.38
aluminium oxide %	(al2o3)	22.83
ferric oxide %	(fe2o3)	4.34
titanium dioxide %	(tio2)	1.30
phosphorous pentoxide %	(p2o5)	0.96
calcium oxide %	(cao)	1.86
magnesium oxide %	(mgo)	2.07
sulphur trioxide %	(so3)	0.75
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	2.37

90.0 <= total <= 100.0

geri coal division ash fusion proj KPN BLK LR DB DDH8703

sample id 00148
sample product id BP1 data type (real,bore,aver,calc) REAL
split sample id AP4 data analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1222.0	initial temp.(C)	1073.0
softening temp.(C)	1357.0	softening temp.(C)	1285.0
hemispherical temp.(C)	1370.0	hemispherical temp.(C)	1338.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

geri coal division ash mineral proj KPN BLK LR DB DDH8703

sample id 00148
sample product id BP1 data type (real,bore,aver,calc) REAL
split sample id AM4 data analysed 21/01/88

silicon dioxide %	(sio2)	59.40
aluminium oxide %	(al2o3)	22.61
ferric oxide %	(fe2o3)	4.70
titanium dioxide %	(tio2)	1.03
phosphorous pentoxide %	(p2o5)	1.16
calcium oxide %	(cao)	2.14
magnesium oxide %	(mgo)	2.22
sulphur trioxide %	(so3)	0.87
sodium oxide %	(na2o)	1.42
potassium oxide %	(k2o)	1.98

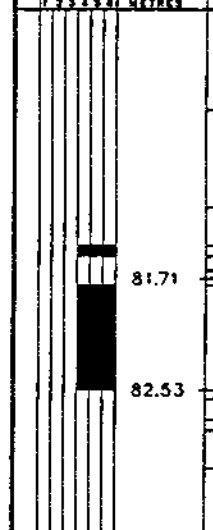
90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87031 SEAM : K/L (PART) INTERVAL(M) : 81.71 – 82.53 ELEVATION(M) : 1393.8

GEOLOGIST : LEE SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	81.71														
				0.66	93.7	5817	148	0.70/ 0.00 0.70	0.70/ 0.00 0.70	1.22	19.80	6.38	72.60	1.12	27.78
	82.53														

KPNLRDDH87032

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87032 DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/12/87
END DATE - 10/13/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - PENMAN
OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - SITE "C" TWINNED INTERSECTING SEAM "I"

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1615.67
ZONE - 9
NORTHING - 6345000.24
EASTING - 505860.97

LICENCE/LEASE NUMBER -

LATITUDE - 571500
LONGITUDE - 1285410

- O R I E N T A T I O N -

LENGTH - 57.00
INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 7.62
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87032										
	I	5801	44.46	48.76	51.40	1.740	0.250	1.615	0.262	3.355- 0.512
	I	5802	48.76	50.63	92.51	1.591		0.130		1.721- 0.000
		5803	50.63	52.30	100.00		1.555			0.000- 1.555
		7000	44.20	44.46	100.00		0.229			0.000- 0.229

GULF CANADA CORPORATION - COAL DIVISION

15/MAR/88 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
DDH87032												
	I	153	5801	5801	44.46	48.76	51.39	1.93	0.28	1.80	0.29	3.73- 0.57
	I	154	5802	5802	48.76	50.63	92.51	1.73	0.00	0.14	0.00	1.87- 0.00
	I	303	5801	5801	44.46	48.76	51.39	1.93	0.28	1.80	0.29	3.73- 0.57
	I	304	5802	5802	48.76	50.63	92.51	1.73	0.00	0.14	0.00	1.87- 0.00
	I	490	5801	5802	44.46	50.63	63.85	3.66	0.28	1.94	0.29	5.60- 0.57

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)
I	5.59m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87032

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1(205057)880072012.LG

COAL SEAM DATA SHEETS

AND

COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR 00H87032 SEAM : 1 INTERVAL(M) : 44.46 – 50.63 ELEVATION(M) : 1615.7

GEOLOGIST : PENMAN SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	44.46			(0.18)											
				0.31											
				0.27											
				(0.70)											
				(0.40)	51.5	5801	153	3.36/0.51 3.87		1.09	30.22	8.25	62.44	0.48	22.86
				(0.34)					5.08/0.51 5.59						
	48.76			2.85	92.4	5802	154	1.72/0.00 1.72		1.90	18.21	5.25	74.64	0.45	28.01
	50.63														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87032
Coal zone:	I		
Field sample no.:	05801	Composite sample no.:	153
Lab sample no.:	30608		
True sample thickness:	3.867 meters	Drill core recovery(%):	51.39 %
Coal/Rock:	3.355 / 0.512 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	20.80	24.84	21.70	22.59
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.25	4.82		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.09	
Ash(%):	30.22	30.55
Volatile matter(%):	6.25	6.32
Fixed carbon(%):	62.44	63.13
Total sulphur(%):	0.48	0.49
Combustible sulphur(%):	0.26	
Net calorific value(cal/g):	5487.00	5548.00
Gross calorific value(cal/g):	5487.00	5548.00
Volatile matter(dmmf%):	5.60	
Hardgrove index:	54.00	
Specific gravity:	1.60	
Carbon dioxide(%):	1.52	
Phosphorous in coal(%):	0.045	
Chlorine in coal(ppm):	3020.00	

Forms of Sulphur(%): PYRITE 00.12 SULPHATE 00.00 ORGANIC 00.36

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	63.62	64.32
Hydrogen(%):	1.83	1.85
Nitrogen(%):	0.81	0.82
Oxygen(%):	1.95	1.97

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1291.00	1240.00
Softening temperature(°C):	1307.00	1256.00
Hemispherical temperature(°C):	1323.00	1275.00
Final temperature(°C):	1412.00	1407.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	59.78	TiO2(%):	0.98
Al2O3(%):	21.04	Na2O(%):	1.83
Fe2O3(%):	4.20	K2O(%):	0.95
CaO(%):	2.49	SO3(%):	1.79
MgO(%):	2.86	P2O5(%):	0.34

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87032
Coal zone:	I		
Field sample no.:	05802	Composite sample no.:	154
Lab sample no.:	30608		
True sample thickness:	1.721 meters	Drill core recovery(%):	92.51 %
Coal/Rock:	1.721 / 0.000 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	40.80	27.18	13.27	14.85
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	2.34	1.56		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.90	
Ash(%):	18.21	18.56
Volatile matter(%):	5.25	5.35
Fixed carbon(%):	74.64	76.09
Total sulphur(%):	0.45	0.46
Combustible sulphur(%):	0.37	
Net calorific value(cal/g):	6693.00	6823.00
Gross calorific value(cal/g):	6694.00	6824.00
Volatile matter(dmmf%):	4.70	
Hardgrove index:	46.00	
Specific gravity:	1.48	
Carbon dioxide(%):	0.45	
Phosphorous in coal(%):	0.151	
Chlorine in coal(ppm):	1120.00	

Forms of Sulphur(%): PYRITE 00.02 SULPHATE 00.00 ORGANIC 00.43

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	73.54	74.97
Hydrogen(%):	2.46	2.51
Nitrogen(%):	0.88	0.90
Oxygen(%):	2.56	2.60

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1350.00	1275.00
Softening temperature(°C):	1383.00	1329.00
Hemispherical temperature(°C):	1407.00	1342.00
Final temperature(°C):	1466.00	1458.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	58.53	TiO2(%):	1.08
Al2O3(%):	22.68	Na2O(%):	1.71
Fe2O3(%):	3.59	K2O(%):	1.49
CaO(%):	2.24	SO3(%):	1.04
MgO(%):	1.78	P2O5(%):	1.90

geri coal division ash fusion proj KPN BLK LR DB DDH87032

sample id 00153
sample product id BP1 data type (real,boro,aver,calc) REAL
split sample id AP3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1289.0	initial temp.(C)	1245.0
softening temp.(C)	1299.0	softening temp.(C)	1275.0
hemispherical temp.(C)	1315.0	hemispherical temp.(C)	1289.0
fluid temp.(C)	1412.0	fluid temp.(C)	1291.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

geri coal division ash mineral proj KPN BLK LR DB DDH87032

sample id 00153
sample product id BP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	57.50
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	4.46
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.29
calcium oxide %	(cao)	3.33
magnesium oxide %	(mgo)	3.07
sulphur trioxide %	(so3)	2.02
sodium oxide %	(na2o)	1.49
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

(2)

qcri coal division ash fusion proj KPN BLK LR DS DDH87032

sample id 00153
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1262.0
softening temp.(C)	1321.0	softening temp.(C)	1305.0
hemispherical temp.(C)	1350.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1434.0	fluid temp.(C)	1407.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

qcri coal division ash mineral proj KPN BLK LR DS DDH87032

sample id 00153
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	57.50
aluminium oxide %	(al2o3)	24.06
ferric oxide %	(fe2o3)	4.46
titanium dioxide %	(tio2)	0.94
phosphorous pentoxide %	(p2o5)	0.29
calcium oxide %	(cao)	3.33
magnesium oxide %	(mgo)	3.07
sulphur trioxide %	(so3)	2.02
sodium oxide %	(na2o)	1.49
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87032

sample id 00154
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AP3 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1294.0	initial temp.(C)	1245.0
softening temp.(C)	1299.0	softening temp.(C)	1264.0
hemispherical temp.(C)	1307.0	hemispherical temp.(C)	1275.0
fluid temp.(C)	1407.0	fluid temp.(C)	1375.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87032

sample id 00154
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 30/11/87

silicon dioxide %	(sio2)	47.50
aluminium oxide %	(al2o3)	25.19
ferric oxide %	(fe2o3)	4.38
titanium dioxide %	(tio2)	0.96
phosphorous pentoxide %	(p2o5)	3.40
calcium oxide %	(cao)	6.30
magnesium oxide %	(mgo)	3.16
sulphur trioxide %	(so3)	2.15
sodium oxide %	(na2o)	1.66
potassium oxide %	(k2o)	1.15

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87032

sample id 00154
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 30/11/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1291.0	initial temp.(C)	1256.0
softening temp.(C)	1294.0	softening temp.(C)	1262.0
hemispherical temp.(C)	1302.0	hemispherical temp.(C)	1283.0
fluid temp.(C)	1323.0	fluid temp.(C)	1313.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87032

sample id 00154
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 30/11/87

silicon dioxide %	(sio2)	47.50
aluminium oxide %	(al2o3)	25.19
ferric oxide %	(fe2o3)	4.38
titanium dioxide %	(tio2)	0.96
phosphorous pentoxide %	(p2o5)	3.40
calcium oxide %	(cao)	6.30
magnesium oxide %	(mgo)	3.16
sulphur trioxide %	(so3)	2.15
sodium oxide %	(na2o)	1.60
potassium oxide %	(k2o)	1.15

90.0 <= total <= 100.0

KPNLRDDH87033

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87033 DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/13/87
END DATE - 10/14/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - BARKER

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED SEAMS K, J, I.

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1643.71

ZONE - 9
NORTHING - 6344798.90
EASTING - 506456.91

LICENCE/LEASE NUMBER -

LATITUDE - 571453
LONGITUDE - 1285335

- O R I E N T A T I O N -

LENGTH - 124.07

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH(M) - 27.43
AQUIFER DEPTHS(M) - 0.00
0.00
LOST CIRC. DEPTHS(M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87033										
		5873	34.80	35.96	100.00		1.133			0.000- 1.133
	K	5874	35.96	40.82	75.51	3.127	0.267	1.004	0.123	4.131- 0.390
	K	5875	40.82	41.89	90.65		0.842		0.085	0.000- 0.927
	K	5876	41.89	42.84	68.42	0.518	0.025	0.254		0.772- 0.025
		5877	42.84	43.25	100.00		0.336			0.000- 0.336
		5878	111.61	113.04	100.00		1.257			0.000- 1.257
	I	5879	113.04	114.77	67.63	1.032	0.027	0.510		1.542- 0.027
	I	5880	114.77	117.37	64.62	1.210	0.374	0.777	0.083	1.987- 0.457
	I	5881	117.37	118.97	100.00	1.545				1.545- 0.000
		5882	118.97	120.07	100.00		1.076			0.000- 1.076

GULF CANADA CORPORATION - COAL DIVISION

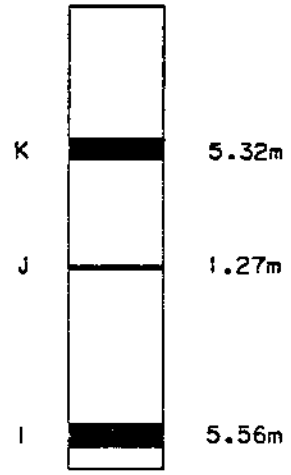
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
DDH87033												
	K	155	5874	5874	35.96	40.82	75.51	3.38	0.29	1.06	0.13	4.44- 0.42
	K	156	5875	5875	40.82	41.89	90.65	0.00	0.97	0.00	0.10	0.00- 1.07
	K	157	5876	5876	41.89	42.84	68.42	0.62	0.03	0.30	0.00	0.92- 0.03
	I	158	5879	5879	113.04	114.77	67.63	1.14	0.03	0.56	0.00	1.70- 0.03
	I	159	5880	5880	114.77	117.37	64.61	1.28	0.40	0.83	0.09	2.11- 0.49
	I	160	5881	5881	117.37	118.97	100.00	1.60	0.00	0.00	0.00	1.60- 0.00
	K	305	5874	5874	35.96	40.82	75.51	3.38	0.29	1.06	0.13	4.44- 0.42
	K	306	5876	5876	41.89	42.84	68.42	0.62	0.03	0.30	0.00	0.92- 0.03
	I	307	5879	5879	113.04	114.77	67.63	1.14	0.03	0.56	0.00	1.70- 0.03
	I	308	5880	5880	114.77	117.37	64.61	1.28	0.40	0.83	0.09	2.11- 0.49
	K	491	5874	5876	35.96	42.84	74.35	4.00	0.32	1.36	0.13	5.36- 0.45
	I	492	5879	5881	113.04	118.97	75.04	4.02	0.43	1.39	0.09	5.41- 0.52

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)



NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87033

GULF CANADA RESOURCES LTD.
19/04/88
KLAP:[205057]880720:2.LG

COAL SEAM DATA SHEETS

AND

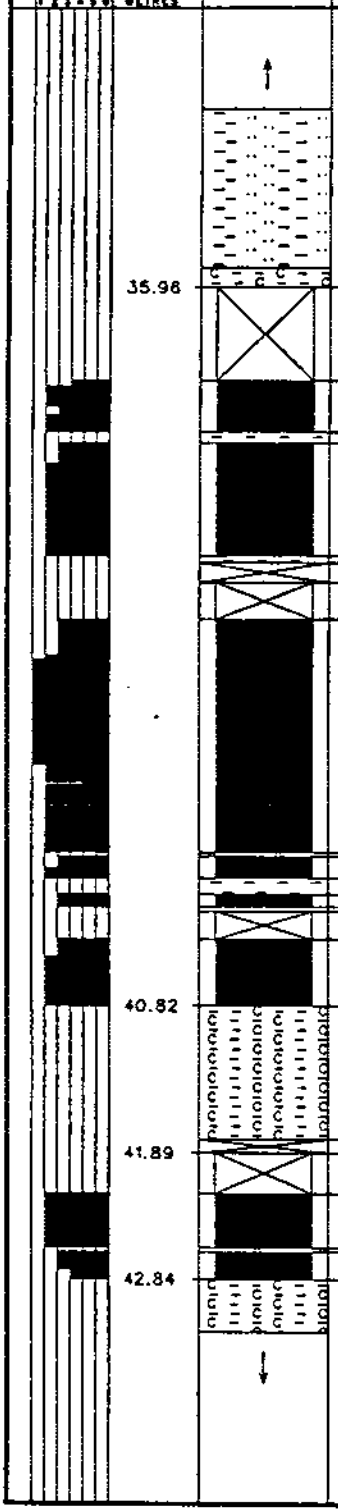
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87033 SEAM : K INTERVAL(M) : 35.96 – 42.84 ELEVATION(M) : 1643.7

GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 01/88 DRAWING NO. :



SEAM COMP.	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
1 2 3 4 5 6	35.96			(0.59)											
				0.33											
			0.07												
				0.71											
			ROCK (0.13)												
				(0.24)											
				1.46	75.1	5874	155	4.13 / 0.39 4.52	4.13 / 0.39 4.52	1.66	27.18	7.99	83.17	0.43	24.25
			0.03	0.16											
			0.10												
			0.03	0.08											
				(0.18)											
				0.42											
	40.82		0.84		90.8	5875	156	0.00/ 0.93 0.93		1.31	83.23	13.84	1.80	—	0.75
	41.89		(0.09)												
				(0.25)											
				0.34	68.1	5876	157	0.77 / 0.03 0.80	0.77 / 0.03 0.80	1.03	35.08	7.24	56.65	0.48	21.28
			0.03	0.17											
	42.84														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87033
Coal zone:	K		
Field sample no.:	05874	Composite sample no.:	155
Lab sample no.:	30746		
True sample thickness:	4.521 meters	Drill core recovery(%):	75.51 %
Coal/Rock:	4.131 / 0.390 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	34.17	22.85	17.25	20.95
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	3.10	1.68		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.66	
Ash(%):	27.18	27.64
Volatile matter(%):	7.99	8.13
Fixed carbon(%):	63.17	64.23
Total sulphur(%):	0.43	0.44
Combustible sulphur(%):	0.01	
Net calorific value(cal/g):	5796.00	5894.00
Gross calorific value(cal/g):	5796.00	5894.00
Volatile matter(dmmf%):	8.30	
Hardgrove index:	47.00	
Specific gravity:	1.56	
Carbon dioxide(%):	2.27	
Phosphorous in coal(%):	0.096	
Chlorine in coal(ppm):	1400.00	

Forms of Sulphur(%): PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.40

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	64.22	65.31
Hydrogen(%):	1.87	1.90
Nitrogen(%):	0.83	0.84
Oxygen(%):	3.81	3.87

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1156.00	1137.00
Softening temperature(°C):	1259.00	1203.00
Hemispherical temperature(°C):	1277.00	1222.00
Final temperature(°C):	1295.00	1269.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	49.82	TiO2(%):	1.20
Al2O3(%):	19.15	Na2O(%):	2.00
Fe2O3(%):	6.89	K2O(%):	1.17
CaO(%):	6.55	SO3(%):	3.89
MgO(%):	4.26	P2O5(%):	0.81

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87033
Coal zone:	K		
Field sample no.:	05876	Composite sample no.:	157
Lab sample no.:	30746		
True sample thickness:	0.797 meters	Drill core recovery(%):	68.42 %
Coal/Rock:	0.772 / 0.025 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM			
Size analysis:	SZ1			
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	13.59	26.95	21.23	30.65
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	5.23	2.35		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.03	
Ash(%):	35.08	35.44
Volatile matter(%):	7.24	7.32
Fixed carbon(%):	56.65	57.24
Total sulphur(%):	0.48	0.48
Combustible sulphur(%):	0.19	
Net calorific value(cal/g):	5086.00	5139.00
Gross calorific value(cal/g):	5086.00	5139.00
Volatile matter(dmmf%):	7.00	
Hardgrove index:	46.00	
Specific gravity:	1.63	
Carbon dioxide(%):	2.39	
Phosphorous in coal(%):	0.015	
Chlorine in coal(ppm):	2240.00	
Forms of Sulphur(%):	PYRITE 00.06 SULPHATE 00.00 ORGANIC 00.42	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	56.86	57.45
Hydrogen(%):	2.08	2.10
Nitrogen(%):	0.76	0.77
Oxygen(%):	3.71	3.76

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1274.00	1214.00
Softening temperature(°C):	1295.00	1232.00
Hemispherical temperature(°C):	1306.00	1253.00
Final temperature(°C):	1380.00	1343.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	61.46	TiO2(%):	0.89
Al2O3(%):	20.41	Na2O(%):	1.49
Fe2O3(%):	4.69	K2O(%):	1.95
CaO(%):	3.01	SO3(%):	2.09
MgO(%):	3.47	P2O5(%):	0.10

gcri coal division ash fusion proj KPN BLK LR DB IDH870GG

sample id 00155
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1269.0	initial temp.(C)	1206.0
softening temp.(C)	1301.0	softening temp.(C)	1238.0
hemispherical temp.(C)	1343.3	hemispherical temp.(C)	1272.0
fluid temp.(C)	1393.0	fluid temp.(C)	1390.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB IDH870GG

sample id 00155
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	58.06
aluminium oxide %	(al2o3)	22.23
ferric oxide %	(fe2o3)	4.32
titanium dioxide %	(tio2)	1.25
phosphorous pentoxide %	(p2o5)	1.16
calcium oxide %	(cao)	4.17
magnesium oxide %	(mgo)	2.85
sulphur trioxide %	(so3)	2.01
sodium oxide %	(na2o)	2.13
potassium oxide %	(k2o)	1.34

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KFN BLK LR DS DDH87033

sample id 00155
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1261.0	initial temp.(C)	1261.0
softening temp.(C)	1340.0	softening temp.(C)	1295.0
hemispherical temp.(C)	1398.0	hemispherical temp.(C)	1327.0
fluid temp.(C)	1472.0	fluid temp.(C)	1472.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87033

sample id 00155
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	59.30
aluminium oxide %	(al2o3)	24.61
ferric oxide %	(fe2o3)	3.80
titanium dioxide %	(tio2)	0.57
phosphorous pentoxide %	(p2o5)	0.77
calcium oxide %	(cao)	3.25
magnesium oxide %	(mgo)	2.59
sulphur trioxide %	(so3)	1.53
sodium oxide %	(na2o)	2.13
potassium oxide %	(k2o)	1.37

90.0 <= total <= 100.0

gcri coal division ash fusion proj KFN BLK LR DS DDH87033

sample id 00157
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1169.0	initial temp.(C)	1224.0
softening temp.(C)	1301.0	softening temp.(C)	1274.0
hemispherical temp.(C)	1322.0	hemispherical temp.(C)	1290.0
fluid temp.(C)	1395.0	fluid temp.(C)	1351.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DS DDH87033

sample id 00157
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 21/01/88

silicon dioxide %	(sio2)	56.80
aluminium oxide %	(al2o3)	21.53
ferric oxide %	(fe2o3)	4.89
titanium dioxide %	(tio2)	1.36
phosphorous pentoxide %	(p2o5)	0.16
calcium oxide %	(cao)	2.80
magnesium oxide %	(mgo)	3.98
sulphur trioxide %	(so3)	2.17
sodium oxide %	(na2o)	1.37
potassium oxide %	(k2o)	1.66

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87033

sample id 00157
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 21/01/88

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1148.0	initial temp.(C)	1122.0
softening temp.(C)	1380.0	softening temp.(C)	1314.0
hemispherical temp.(C)	1411.0	hemispherical temp.(C)	1327.0
fluid temp.(C)	1472.0	fluid temp.(C)	1443.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87033

sample id 00157
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 21/01/88

silicon dioxide %	(sio2)	57.10
aluminium oxide %	(al2o3)	24.19
ferric oxide %	(fe2o3)	4.66
titanium dioxide %	(tio2)	0.98
phosphorous pentoxide %	(p2o5)	0.16
calcium oxide %	(cao)	2.16
magnesium oxide %	(mgo)	3.39
sulphur trioxide %	(so3)	1.43
sodium oxide %	(na2o)	1.42
potassium oxide %	(k2o)	1.64

90.0 <= total <= 100.0

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87033 SEAM : 1 INTERVAL(M) : 113.04 – 118.97 ELEVATION(M) : 1643.7

GEOLOGIST : BARKER SCALE: 1:40 DATE : MAR 01/88 DRAWING NO. :

SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	113.04			(0.17)											
			0.33	0.06											
				0.95	87.5	5879	158	1.54 / 0.03 1.57		0.99	35.47	6.99	56.55	0.33	20.32
				(0.34)											
	114.77		(0.48) 0.12												
				0.18											
			0.18												
				(0.78)											
					84.8	5880	158	1.99 / 0.46 2.44	5.07 / 0.48 5.56	1.29	35.33	8.52	54.86	0.36	19.89
				0.32											
			0.48												
				0.35											
	117.37		0.55												
				1.91											
					100.0	5881	160	1.55 / 0.00 1.55		0.85	11.58	7.08	80.49	0.47	29.01
	118.97														

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87033
Coal zone:	I		
Field sample no.:	05879	Composite sample no.:	158
Lab sample no.:	30704		
True sample thickness:	1.569 meters	Drill core recovery(%):	67.63 %
Coal/Rock:	1.542 / 0.027 meters		

RAW HEAD ANALYSIS (HD1)

Standard:	ASTM				
Size analysis:	SZ1				
Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50	
Relative weight(%):	13.40	23.32	21.68	34.20	
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00			
Relative weight(%):	4.53	2.87			

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	0.99	
Ash(%):	35.47	35.82
Volatile matter(%):	6.99	7.06
Fixed carbon(%):	56.55	57.12
Total sulphur(%):	0.33	0.33
Combustible sulphur(%):	0.12	
Net calorific value(cal/g):	4856.00	4905.00
Gross calorific value(cal/g):	4856.00	4905.00
Volatile matter(dmmf%):	6.70	
Hardgrove index:	49.00	
Specific gravity:	1.65	
Carbon dioxide(%):	1.85	
Phosphorous in coal(%):	0.040	
Chlorine in coal(ppm):	2480.00	
Forms of Sulphur(%):	PYRITE 00.03 SULPHATE 00.00 ORGANIC 00.30	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	57.19	57.76
Hydrogen(%):	1.90	1.92
Nitrogen(%):	0.66	0.67
Oxygen(%):	3.46	3.50

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1283.00	1192.00
Softening temperature(°C):	1305.00	1273.00
Hemispherical temperature(°C):	1329.00	1289.00
Final temperature(°C):	1453.00	1396.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	63.80	TiO2(%):	1.00
Al2O3(%):	18.15	Na2O(%):	1.70
Fe2O3(%):	3.83	K2O(%):	1.52
CaO(%):	1.96	SO3(%):	1.50
MgO(%):	2.79	P2O5(%):	0.26

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87033
Coal zone:	1		
Field sample no.:	05880	Composite sample no.:	159
Lab sample no.:	30704		
True sample thickness:	2.444 meters	Drill core recovery (%):	64.61 %
Coal/Rock:	1.987 / 0.457 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	21.68	26.26	16.63	27.72
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	4.67	3.04		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	1.29	
Ash (%):	35.33	35.79
Volatile matter (%):	8.52	8.63
Fixed carbon (%):	54.86	55.58
Total sulphur (%):	0.36	0.36
Combustible sulphur (%):	0.02	
Net calorific value (cal/g):	4754.00	4816.00
Gross calorific value (cal/g):	4754.00	4816.00
Volatile matter (dmmf%):	9.20	
Hardgrove index:	52.00	
Specific gravity:	1.65	
Carbon dioxide (%):	3.83	
Phosphorous in coal (%):	0.032	
Chlorine in coal (ppm):	2320.00	

Forms of Sulphur (%): PYRITE 00.10 SULPHATE 00.00 ORGANIC 00.26

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	57.46	58.21
Hydrogen (%):	1.67	1.69
Nitrogen (%):	0.72	0.73
Oxygen (%):	3.17	3.22

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1305.00	1238.00
Softening temperature (°C):	1315.00	1251.00
Hemispherical temperature (°C):	1332.00	1291.00
Final temperature (°C):	1463.00	1369.00

ASH MINERAL ANALYSIS (AM1)

SiO2 (%):	54.66	TiO2 (%):	1.20
Al2O3 (%):	20.28	Na2O (%):	2.16
Fe2O3 (%):	7.82	K2O (%):	0.78
CaO (%):	2.52	SO3 (%):	2.39
MgO (%):	3.95	P2O5 (%):	0.21

GULF CANADA CORPORATION - COAL DIVISION

RAW COAL ANALYSIS REPORT

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87033
Coal zone:	I		
Field sample no.:	05881	Composite sample no.:	160
Lab sample no.:	30704		
True sample thickness:	1.545 meters	Drill core recovery (%):	100.00 %
Coal/Rock:	1.545 / 0.000 meters		

RAW HEAD ANALYSIS (HDI)

Standard: ASTM
Size analysis: SZI

Fraction size (mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight (%):	26.01	21.64	18.39	27.75
Fraction size (mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight (%):	4.23	1.98		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture (%):	0.85	
Ash (%):	11.58	11.68
Volatile matter (%):	7.08	7.14
Fixed carbon (%):	80.49	81.18
Total sulphur (%):	0.47	0.47
Combustible sulphur (%):	0.28	
Net calorific value (cal/g):	6933.00	6993.00
Gross calorific value (cal/g):	6933.00	6993.00
Volatile matter (dmmf%):	7.00	
Hardgrove index:	39.00	
Specific gravity:	1.42	
Carbon dioxide (%):	1.35	
Phosphorous in coal (%):	0.290	
Chlorine in coal (ppm):	3640.00	

Forms of Sulphur (%): PYRITE 00.01 SULPHATE 00.00 ORGANIC 00.46

ULTIMATE ANALYSIS (ULI)

	AIR DRY BASIS	DRY BASIS
Carbon (%):	81.53	82.23
Hydrogen (%):	2.24	2.26
Nitrogen (%):	0.94	0.95
Oxygen (%):	2.39	2.41

ASH FUSION ANALYSIS (AFI)

	OXIDIZING ATM	REDUCING ATM
Initial temperature (°C):	1248.00	1181.00
Softening temperature (°C):	1259.00	1232.00
Hemispherical temperature (°C):	1289.00	1256.00
Final temperature (°C):	1305.00	1291.00

ASH MINERAL ANALYSIS (AMI)

SiO2 (%):	41.17	TiO2 (%):	1.53
Al2O3 (%):	21.48	Na2O (%):	1.75
Fe2O3 (%):	7.09	K2O (%):	0.88
CaO (%):	8.74	SO3 (%):	4.07
MgO (%):	4.32	P2O5 (%):	5.73

(1)

gcri coal division ash fusion proj KPN BLK LR DB DDH87033

sample id 00158
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1299.0	initial temp.(C)	1262.0
softening temp.(C)	1310.0	softening temp.(C)	1281.0
hemispherical temp.(C)	1353.0	hemispherical temp.(C)	1315.0
fluid temp.(C)	1409.0	fluid temp.(C)	1401.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87033

sample id 00158
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.90
aluminium oxide %	(al2o3)	22.17
ferric oxide %	(fe2o3)	3.47
titanium dioxide %	(tio2)	1.32
phosphorous pentoxide %	(p2o5)	0.45
calcium oxide %	(cao)	2.74
magnesium oxide %	(mgo)	2.98
sulphur trioxide %	(so3)	1.66
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	1.37

90.0 <= total <= 100.0

(2)

gcri coal division ash fusion proj KPN BLK LR DS DDH87033

sample id 00158
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1305.0	initial temp.(C)	1273.0
softening temp.(C)	1310.0	softening temp.(C)	1289.0
hemispherical temp.(C)	1350.0	hemispherical temp.(C)	1321.0
fluid temp.(C)	1463.0	fluid temp.(C)	1442.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87033

sample id 00158
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	59.04
aluminium oxide %	(al2o3)	22.55
ferric oxide %	(fe2o3)	3.15
titanium dioxide %	(tio2)	1.00
phosphorous pentoxide %	(p2o5)	0.37
calcium oxide %	(cao)	3.44
magnesium oxide %	(mgo)	2.69
sulphur trioxide %	(so3)	1.08
sodium oxide %	(na2o)	1.91
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DS DDH87033

sample id 00159
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1213.0	initial temp.(C)	1107.0
softening temp.(C)	1305.0	softening temp.(C)	1227.0
hemispherical temp.(C)	1337.0	hemispherical temp.(C)	1273.0
fluid temp.(C)	1396.0	fluid temp.(C)	1391.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DS DDH87033

sample id 00159
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	58.70
aluminium oxide %	(al2o3)	20.16
ferric oxide %	(fe2o3)	5.29
titanium dioxide %	(tio2)	1.20
phosphorous pentoxide %	(p2o5)	0.33
calcium oxide %	(cao)	2.63
magnesium oxide %	(mgo)	3.19
sulphur trioxide %	(so3)	2.65
sodium oxide %	(na2o)	1.80
potassium oxide %	(k2o)	0.85

90.0 <= total <= 100.0

(2)

gcri coal division | ash fusion | proj KPN | BLK LR | DS DDH87033

sample id 00159
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1229.0	initial temp.(C)	1227.0
softening temp.(C)	1305.0	softening temp.(C)	1267.0
hemispherical temp.(C)	1332.0	hemispherical temp.(C)	1318.0
fluid temp.(C)	1409.0	fluid temp.(C)	1404.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division | ash mineral | proj KPN | BLK LR | DS DDH87033

sample id 00159
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	61.12
aluminium oxide %	(al2o3)	20.16
ferric oxide %	(fe2o3)	3.87
titanium dioxide %	(tio2)	0.67
phosphorous pentoxide %	(p2o5)	0.30
calcium oxide %	(cao)	3.05
magnesium oxide %	(mgo)	2.48
sulphur trioxide %	(so3)	2.25
sodium oxide %	(na2o)	1.83
potassium oxide %	(k2o)	0.90

90.0 <= total <= 100.0

scri coal division ash fusion proj KPN BLK LR DS DDH87033

sample id 00160
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1256.0	initial temp.(C)	1184.0
softening temp.(C)	1267.0	softening temp.(C)	1213.0
hemispherical temp.(C)	1305.0	hemispherical temp.(C)	1262.0
fluid temp.(C)	1332.0	fluid temp.(C)	1330.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87033

sample id 00160
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	36.24
aluminium oxide %	(al2o3)	19.66
ferric oxide %	(fe2o3)	5.89
titanium dioxide %	(tio2)	1.50
phosphorous pentoxide %	(p2o5)	5.73
calcium oxide %	(cao)	12.15
magnesium oxide %	(mgo)	4.86
sulphur trioxide %	(so3)	3.98
sodium oxide %	(na2o)	1.54
potassium oxide %	(k2o)	0.98

90.0 <= total <= 100.0

(2)

scri coal division ash fusion proj KPN BLK LR DS DDH87033

sample id 00160
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1345.0	initial temp.(C)	1270.0
softening temp.(C)	1348.0	softening temp.(C)	1315.0
hemispherical temp.(C)	1350.0	hemispherical temp.(C)	1326.0
fluid temp.(C)	1369.0	fluid temp.(C)	1361.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

scri coal division ash mineral proj KPN BLK LR DS DDH87033

sample id 00160
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	41.77
aluminium oxide %	(al2o3)	23.79
ferric oxide %	(fe2o3)	4.68
titanium dioxide %	(tio2)	0.92
phosphorous pentoxide %	(p2o5)	5.70
calcium oxide %	(cao)	10.74
magnesium oxide %	(mgo)	3.73
sulphur trioxide %	(so3)	1.82
sodium oxide %	(na2o)	1.89
potassium oxide %	(k2o)	1.35

90.0 <= total <= 100.0

KPNLRDDH87034

GULF CANADA CORPORATION

- D A T A S O U R C E S U M M A R Y -

DATA SOURCE - KPNLRDDH87034

DATE - 03/01/88

- H I S T O R Y -

START DATE - 10/14/87
END DATE - 10/14/87

CONTRACTOR - J.T. THOMAS
GEOLOGIST - LEDDA

OPERATOR - G.C.R.
SURVEYOR - TRONNES

REMARKS - INTERSECTED SEAM 1. SITE B+

- L O C A T I O N -

PROVINCE - BC
ELEVATION - 1620.07

ZONE - 9
NORTHING - 6344895.56
EASTING - 506207.14

LICENCE/LEASE NUMBER -

LATITUDE - 571456
LONGITUDE - 1285350

- O R I E N T A T I O N -

LENGTH - 57.00

INCLINATION - 90.0
AZIMUTH - 0.0

CORE SIZE - 0.0

CEMENT - N
PLUG - N
PIEZ - N

CASING DEPTH (M) - 6.09
AQUIFER DEPTHS (M) - 0.00
0.00
LOST CIRC. DEPTHS (M) - 0.00
0.00

*** NOTE *** 0 INDICATES NO VALUE

GULF CANADA CORPORATION - COAL DIVISION

14/MAR/88 SIMPLE SAMPLE SUMMARY PAGE 1

TRUE 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
DDH87034										
		5870	45.27	45.50	100.00		0.161			0.000- 0.161
	I	5871	45.50	52.46	44.68	1.940	0.187	2.535	0.117	4.475- 0.304
		5872	52.46	52.54	100.00		0.054			0.000- 0.054

GULF CANADA CORPORATION - COAL DIVISION

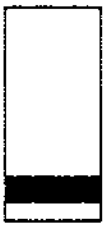
15/MAR/88 COMPOSITE SAMPLE SUMMARY PAGE 1

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
ODH87034												
	I	161	5871	5871	45.50	52.46	44.68	2.84	0.27	3.68	0.17	6.52- 0.44
	I	309	5871	5871	45.50	52.46	44.68	2.84	0.27	3.68	0.17	6.52- 0.44
	I	493	5871	5871	45.50	52.46	44.68	2.84	0.27	3.68	0.17	6.52- 0.44

SEAM	TRUE SEAM THICKNESS (COAL & ROCK)



1 4.78m

NOTE:

SCHEMATIC PROFILE.
NO THICKNESSES SHOWN
FOR SEAMS CONTAINING
LESS THAN 50cm ANTHRACITE.

SCALE 1:2000

FIGURE

MOUNT KLAPPAN ANTHRACITE PROJECT

1987 DIAMOND DRILL HOLES
DDH87034

GULF CANADA RESOURCES LTD.
19/04/88
KLAP1(205057)88007201Z.LG

COAL SEAM DATA SHEETS

AND

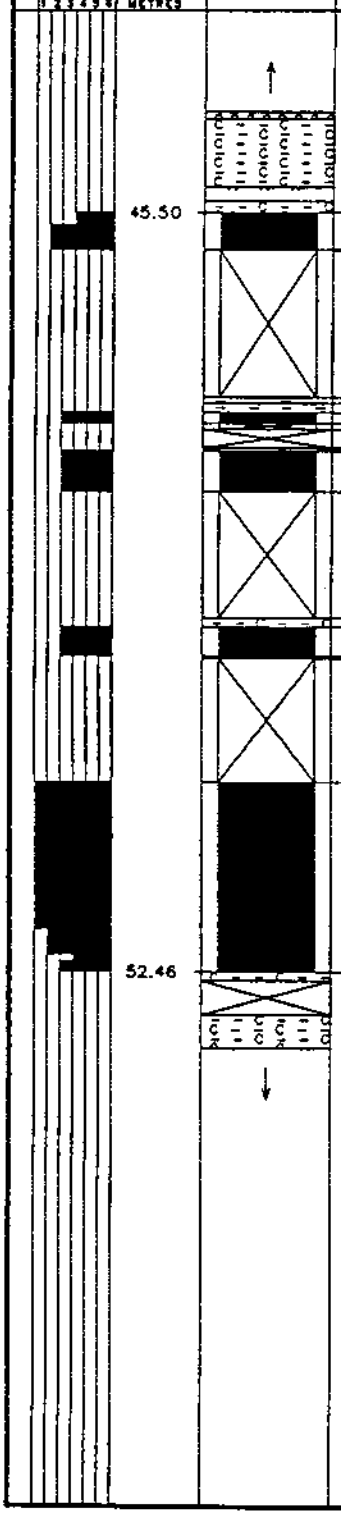
COAL QUALITY ANALYSES

GULF CANADA CORPORATION

SEAM DETAIL — COAL DIVISION — MOUNT KLAPPAN PROJECT — TRUE THICKNESS

DATA SOURCE: KPN LR DDH87034 SEAM : 1 INTERVAL(M) : 45.50 - 52.46 ELEVATION(M) : 1620.1

GEOLOGIST : LEDDA SCALE: 1:40 DATE : FEB 24/88 DRAWING NO. :



SEAM COMP. 1 2 3 4 5 6	DRILL DEPTH METRES	COAL SEAM LOG	INTERVAL METRES ROCK	INTERVAL METRES COAL	% REC.	SAMPLE ID SIMP	SAMPLE ID COMP	COAL/ROCK TOTAL COMPOS	COAL/ROCK TOTAL MINING SECTION	COAL QUALITY A.D.B. RES MOIST	ASH	VM	FC	TS	CAL.VAL MJ/KG
	45.50			0.24											
				(0.93)											
				0.26											
				(0.79)											
					44.5	5871	161	4.47 / 0.30 4.78	4.47 / 0.30 4.78	1.19	25.78	7.85	65.17	0.39	24.65
				0.19											
				(0.77)											
				1.19											
	52.46														

GULF CANADA CORPORATION - COAL DIVISION

R A W C O A L A N A L Y S I S R E P O R T

March 28, 1988.

PROJECT:	KLAPPAN	DATA SOURCE:	KPNLRDDH87034
Coal zone:	1		
Field sample no.:	05871	Composite sample no.:	161
Lab sample no.:	30704		
True sample thickness:	4.779 meters	Drill core recovery(%):	44.68 %
Coal/Rock:	4.475 / 0.304 meters		

RAW HEAD ANALYSIS (HD1)

Standard: ASTM
Size analysis: SZ1

Fraction size(mm):	35.00 X 25.00	25.00 X 12.00	12.00 X 6.00	6.00 X 0.50
Relative weight(%):	13.73	14.79	18.56	35.21
Fraction size(mm):	0.50 X 0.15	0.15 X 0.00		
Relative weight(%):	9.71	8.00		

	AIR DRY BASIS	DRY BASIS
Proximate analysis		
Residual moisture(%):	1.19	
Ash(%):	25.79	26.10
Volatile matter(%):	7.85	7.94
Fixed carbon(%):	65.17	65.96
Total sulphur(%):	0.39	0.39
Combustible sulphur(%):	0.15	
Net calorific value(cal/g):	5891.00	5962.00
Gross calorific value(cal/g):	5891.00	5962.00
Volatile matter(dmmf%):	8.00	
Hardgrove index:	56.00	
Specific gravity:	1.55	
Carbon dioxide(%):	3.94	
Phosphorous in coal(%):	0.160	
Chlorine in coal(ppm):	3960.00	
Forms of Sulphur(%):	PYRITE 00.06 SULPHATE 00.01 ORGANIC 00.32	

ULTIMATE ANALYSIS (UL1)

	AIR DRY BASIS	DRY BASIS
Carbon(%):	66.24	67.03
Hydrogen(%):	2.05	2.07
Nitrogen(%):	0.77	0.78
Oxygen(%):	3.57	3.63

ASH FUSION ANALYSIS (AF1)

	OXIDIZING ATM	REDUCING ATM
Initial temperature(°C):	1248.00	1195.00
Softening temperature(°C):	1267.00	1206.00
Hemispherical temperature(°C):	1273.00	1213.00
Final temperature(°C):	1323.00	1275.00

ASH MINERAL ANALYSIS (AM1)

SiO2(%):	52.50	TiO2(%):	0.90
Al2O3(%):	19.15	Na2O(%):	1.89
Fe2O3(%):	7.59	K2O(%):	1.17
CaO(%):	4.67	SO3(%):	2.35
MgO(%):	4.73	P2O5(%):	1.42

gcri coal division ash fusion proj KFN BLK LR DB DDHB7034

sample id 00161
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1213.0	initial temp.(C)	1211.0
softening temp.(C)	1273.0	softening temp.(C)	1251.0
hemispherical temp.(C)	1278.0	hemispherical temp.(C)	1255.0
fluid temp.(C)	1315.0	fluid temp.(C)	1281.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KFN BLK LR DB DDHB7034

sample id 00161
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM3 date analysed 31/12/87

silicon dioxide %	(sio2)	50.19
aluminium oxide %	(al2o3)	22.25
ferric oxide %	(fe2o3)	4.65
titanium dioxide %	(tio2)	1.46
phosphorous pentoxide %	(p2o5)	3.02
calcium oxide %	(cao)	5.09
magnesium oxide %	(mgo)	3.41
sulphur trioxide %	(so3)	3.04
sodium oxide %	(na2o)	1.74
potassium oxide %	(k2o)	1.03

90.0 <= total <= 100.0

gcri coal division ash fusion proj KPN BLK LR DB DDH87034

sample id 00161
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AF4 date analysed 31/12/87

oxidizing atmosphere		reducing atmosphere	
initial temp.(C)	1227.0	initial temp.(C)	1222.0
softening temp.(C)	1297.0	softening temp.(C)	1273.0
hemispherical temp.(C)	1329.0	hemispherical temp.(C)	1289.0
fluid temp.(C)	1391.0	fluid temp.(C)	1386.0

normal ranges all temps.
1000.0 >= values <= 1500.0
oxidation temps >= reduction temps

gcri coal division ash mineral proj KPN BLK LR DB DDH87034

sample id 00161
sample product id SP1 data type (real,boro,aver,calc) REAL
split sample id AM4 date analysed 31/12/87

silicon dioxide %	(sio2)	50.34
aluminium oxide %	(al2o3)	24.84
ferric oxide %	(fe2o3)	3.49
titanium dioxide %	(tio2)	1.23
phosphorous pentoxide %	(p2o5)	3.16
calcium oxide %	(cao)	4.80
magnesium oxide %	(mgo)	3.03
sulphur trioxide %	(so3)	1.92
sodium oxide %	(na2o)	1.73
potassium oxide %	(k2o)	0.98

90.0 <= total <= 100.0