PR-WAPITI 79 (4) A

Coal Analysis Data

CONFIDENTIAL

1/5 683

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Te

GULF CANADA RESOURCES INC.

REPORT OF ANALYSIS

WAPITI DRILL CORES

CONFIDENTIAL

SUBMITTED MARCH 25, 1980

John Kay

JOHN KAY, C.ENG., M.INST.E.
LABORATORY MANAGER

GULF CANADA RESOURCES INC.

WAPITI CORE SAMPLES

SAMPLE I.D. W.R.D.H. 7943 - 0001

LAB. NO. 80 - 3005

RAW ANALYSIS

	RAW HEAD	+ 28	- 28
AS ANALYZED BASIS			
MOISTURE % (INHERENT)	11.0	10.5	11.9
ASH %	22.2	23.1	18.4
VOLATILE MATTER %	29.0	28.2	29.9
FIXED CARBON %	37.8	38.2	39.8
TOTAL	100.0	100.0	100.0
SULPEUR %	0.38	0.40	0.35
B.T.U./LB.	7,976	7,927	8,174
H.G.I.	62.2		
DRY BASIS			
ASH %	24.9	25.8	20.9
VOLATILE MATTER %	32.5	31.6	34.0
B.T.U./LB.	8,965	8,861	9,281

SCREEN ANALYSIS

	WEIGHT %
+ 28 M	92.2
- 28 M	7.8
TOTAL	100.0

GULF CANADA RESOURCES INC.

WAPITI CORE SAMPLES

SAMPLE I.D. W.R.D.H. 7943 - 0001

LAB. NO. 80 - 3005

COMPOSITE ANALYSIS

	CLEAN COAL COMP. @ 1.50 S.G.	MIDDLINGS COMP. @ 1.50 - 1.80 S.G.
AS ANALYZED BASIS		
MOISTURE %	7.4	4.7
ASH %	10.2	26.3
VOLATILE MATTER %	32.6	27.7
FIXED CARBON %	49.8	41.3
TOTAL	100.0	100.0
SULPHUR %	0.44	0.33
B.T.U./LB.	9,859	8,068
H.G.I.	69.1	56.7
DRY BASIS		
ASH %	11.0	27.6
VOLATILE MATTER %	35.2	29.0
B.T.U./LB.	10,645	8,469

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 276-9138

Sample Identification: W.R.D.H. 7943 - 0001
Size fraction: + 28 M
Lab. No. (s): 80 - 3005
Wt % of head sample: 92.2

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity		Elementary				Cumulative Float				Cumulative Sink			
Sink	Float	Weight	Ash	Sulphur	B.T.U./LB.	Weight	Ash	Sulphur	B.T.U./LB.	Weight	Ash	Sulphur	B.T.U./LB.
	1.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.30	1.40	10.5	7.0	0.46	11,432	10.5	7.0	0.46	11,432	100.0	24.1	0.37	8,745
1.40	1.50	35.6	11.7	0.44	10,376	46.1	10.6	0.44	10,617	89.5	26.2	0.36	8,430
1.50	1.60	22.0	22.4	0.36	9,054	68.1	14.4	0.42	10,112	53.9	35.7	0.30	7,145
1.60	1.70	16.0	33.3	0.32	7,760	84.1	18.0	0.40	9,664	31.9	44.9	0.26	5,829
1.70	1.80	1.6	40.5	0.26	6,670	85.7	18.4	0.40	9,608	15.9	56.6	0.20	3,885
1.80	1.90	8.3	51.1	0.21	4,611	94.0	21.3	0.38	9,167	14.3	58.4	0.20	3,573
1.90		6.0	68.4	0.18	2,138	100.0	24.1	0.37	8,745	6.0	68.4	0.18	2,138
TOTAL		100.0	24.1	0.37	8,745								

FORM 342

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification – W.R.D.H. 7943 - 0001 Lab. No. 80 - 3005

RAW HEAD

ANALYSIS %

SiO_2 –	43.72	Na_2O –	.70
Al_2O_3 –	33.20	K_2O –	.22
SO_3 –	3.28	MgO –	.84
P_2O_5 –	2.37	CaO –	5.12
TiO_2 –	1.79	Fe_2O_3 –	7.08

ASH FUSION TEMPERATURE – °C

	Oxidizing atm.	Reducing atm.
Initial Deformation –	1449 +	1449 +
Spherical Temperature –		
Hemispherical –		
Fluid Temperature –		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification – W.R.D.H. 7943 - 0001 Lab. No. 80 - 3005

- 28 HEAD

ANALYSIS %

SiO_2 –	39.90	Na_2O –	.69
Al_2O_3 –	30.11	K_2O –	.24
SO_3 –	4.91	MgO –	1.21
P_2O_5 –	2.73	CaO –	7.28
TiO_2 –	1.84	Fe_2O_3 –	10.01

ASH FUSION TEMPERATURE – °C

	Oxidizing atm.	Reducing atm.
Initial Deformation –	1412	1329
Spherical Temperature –	1449 +	1339
Hemispherical –		1351
Fluid Temperature –		1380

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7943 - 0001 Lab. No. 80 - 3005

+ 28 HEAD 1.30 - 1.50 COMP.

ANALYSIS %

SiO_2 -	31.12	Na_2O -	.80
Al_2O_3 -	27.79	K_2O -	.14
SO_3 -	5.30	MgO -	1.87
P_2O_5 -	5.84	CaO -	12.03
TiO_2 -	1.70	Fe_2O_3 -	11.44

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1323
Spherical Temperature -		1449 +
Hemispherical -		
Fluid Temperature -		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7943 - 0001 Lab. No. 80 - 3005

+ 28 HEAD 1.50 - 1.80 COMP.

ANALYSIS %

SiO_2 -	47.78	Na_2O -	.65
Al_2O_3 -	33.65	K_2O -	.22
SO_3 -	1.58	MgO -	.60
P_2O_5 -	1.70	CaO -	3.83
TiO_2 -	1.88	Fe_2O_3 -	6.94

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1449 +
Spherical Temperature -		
Hemispherical -		
Fluid Temperature -		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7943 - 0001 Lab. No. 80 - 3005
+ 28 HEAD 1.90 SINK

ANALYSIS %

SiO_2 -	51.02	Na_2O -	.69
Al_2O_3 -	39.13	K_2O -	.22
SO_3 -	.23	MgO -	.26
P_2O_5 -	.53	CaO -	1.20
TiO_2 -	1.86	Fe_2O_3 -	5.72

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1449 +
Spherical Temperature -		
Hemispherical -		
Fluid Temperature -		

GULF CANADA RESOURCES

WAPITI CORE SAMPLES

SAMPLE I.D. W.R .D.H. 7939 A - 0001

LAB. NO. 80 - 3004

RAW ANALYSIS

	RAW HEAD	+ 28	- 28
AS ANALYZED BASIS			
MOISTURE % (INHERENT)	4.1	4.0	3.6
ASH %	25.0	26.0	25.3
VOLATILE MATTER %	29.1	28.9	29.5
FIXED CARBON %	41.8	41.1	41.6
TOTAL	100.0	100.0	100.0
SULPHUR %	0.50	0.50	0.56
B.T.U./LB.	9,800	9,631	9,973
H.G.I.	52.5		
DRY BASIS			
ASH %	26.1	27.0	26.2
VOLATILE MATTER %	30.3	30.1	30.6
B.T.U./LB.	10,214	10,028	10,344

SCREEN ANALYSIS

	WEIGHT %
+ 28 M	92.9
- 28 M	7.1
TOTAL	100.0

Warnock Hersey Professional Services Ltd.

GULF CANADA RESOURCES

WAPITI CORE SAMPLES

SAMPLE I.D. W.R.D.H. 7939 A - 0001

LAB. NO. 80 - 3004

COMPOSITE ANALYSIS

	CLEAN COAL COMP. @ 1.50 S.G.	MIDDLINGS COMP. @ 1.50 - 1.80 S.G.
AS ANALYZED BASIS		
MOISTURE %	2.0	1.4
ASH %	14.3	38.3
VOLATILE MATTER %	33.6	26.5
FIXED CARBON %	50.1	33.8
TOTAL	100.0	100.0
SULPHUR %	0.61	0.41
B.T.U./LB.	11,840	8,023
H.G.I.	56.0	44.2
DRY BASIS		
ASH %	14.6	38.9
VOLATILE MATTER %	34.3	26.9
B.T.U./LB.	12,087	8,136

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 276-9138

Sample Identification: W.R.D.H. 7939 A - 0001
Size fraction: + 28 M
Lab. No. (s): 79 - 3004
Wt % of head sample: 92.9

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity		Elementary				Cumulative Float				Cumulative Sink			
Sink	Float	Weight	Ash	Sulphur	B.T.U./LB.	Weight	Ash	Sulphur	B.T.U./LB.	Weight	Ash	Sulphur	B.T.U./LB.
	1.30	4.8	5.3	0.66	13,685	4.8	5.3	0.66	13,685	100.0	26.6	0.50	10,066
1.30	1.40	33.8	12.7	0.62	12,423	38.6	11.8	0.62	12,580	95.2	27.7	0.49	9,884
1.40	1.50	17.3	20.6	0.44	11,139	55.9	14.5	0.57	12,134	61.4	36.0	0.42	8,486
1.50	1.60	12.6	29.9	0.43	9,394	68.5	17.3	0.54	11,630	44.1	42.0	0.41	7,446
1.60	1.70	20.5	42.4	0.44	7,474	89.0	23.1	0.52	10,673	31.5	46.9	0.40	6,666
1.70	1.80	4.2	48.3	0.37	6,358	93.2	24.2	0.51	10,478	11.0	55.1	0.34	5,160
1.80	1.90	4.6	54.2	0.33	5,283	97.8	25.7	0.50	10,234	6.8	59.4	0.31	4,420
1.90		2.2	70.1	0.28	2,615	100.0	26.6	0.50	10,066	2.2	70.1	0.28	2,615
	TOTAL	100.0	26.6	0.50	10,066								

FORM 342

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7939A - 0001 Lab. No. 80 - 3004

RAW HEAD

ANALYSIS %

SiO_2 -	49.94	Na_2O -	.63
Al_2O_3 -	32.70	K_2O -	.24
SO_3 -	.26	MgO -	.28
P_2O_5 -	3.24	CaO -	2.94
TiO_2 -	1.62	Fe_2O_3 -	7.15

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1449 +
Spherical Temperature -		
Hemispherical -		
Fluid Temperature -		

Womock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification – W.R.D.H. 7939A - 0001 Lab. No. 80 - 3004 - 28 HEAD

ANALYSIS %

SiO_2 –	50.70	Na_2O –	.61
Al_2O_3 –	29.68	K_2O –	.24
SO_3 –	.69	MgO –	.29
P_2O_5 –	3.22	CaO –	3.36
TiO_2 –	1.66	Fe_2O_3 –	7.65

ASH FUSION TEMPERATURE – °C

	Oxidizing atm.	Reducing atm.
Initial Deformation –	1449 +	1449 +
Spherical Temperature –		
Hemispherical –		
Fluid Temperature –		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue NE Calgary Alberta T2E 2P3 Tel 276-9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification – W.R.D.H. 7939A - 0001 Lab. No. 80 - 3004

+ 28 HEAD 1.30-1.50 COMP.

ANALYSIS %

SiO_2 –	40.26	Na_2O –	.71
Al_2O_3 –	32.66	K_2O –	.16
SO_3 –	.39	MgO –	.29
P_2O_5 –	7.29	CaO –	5.99
TiO_2 –	1.64	Fe_2O_3 –	8.79

ASH FUSION TEMPERATURE – °C

	Oxidizing atm.	Reducing atm.
Initial Deformation –	1449 +	1449 +
Spherical Temperature –		
Hemispherical –		
Fluid Temperature –		

Womock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7939A - 0001 Lab. No. 80 - 3004

+ 28 HEAD 1.50 - 1.80 COMP.

ANALYSIS %

SiO_2 -	53.48	Na_2O -	.67
Al_2O_3 -	33.15	K_2O -	.24
SO_3 -	.12	MgO -	.25
P_2O_5 -	1.95	CaO -	2.15
TiO_2 -	1.68	Fe_2O_3 -	6.20

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1449 +
Spherical Temperature -		
Hemispherical -		
Fluid Temperature -		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT CALGARY

PROJECT: WAPITI

REPORTED TO: GLENN E. SEVE

FILE NO. AFE # 89113

DATE MARCH 25, 1980

REPORT NO. 780 - 0519

ORDER NO.

Sample Identification - W.R.D.H. 7939A - 0001 Lab. No. 80 - 3004

+ 28 HEAD 1.90 SINK

ANALYSIS %

SiO_2 -	59.30	Na_2O -	.57
Al_2O_3 -	28.54	K_2O -	.36
SO_3 -	.29	MgO -	.26
P_2O_5 -	1.31	CaO -	1.96
TiO_2 -	.73	Fe_2O_3 -	6.22

ASH FUSION TEMPERATURE - °C

	Oxidizing atm.	Reducing atm.
Initial Deformation -	1449 +	1449 +
Spherical Temperature -		
Hemispherical -		
Fluid Temperature -		

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel.276-9138

GULF CANADA RESOURCES INC.

WAPITTI TRENCH SAMPLES

SUBMITTED DECEMBER 6, 1979

JOHN KAY, C.ENG.,M.INST.E.

LABORATORY MANAGER

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 276-9138

Sample Identification: WAPITTI TRENCH 6 — Size fraction: + 28 MESH

Lab. No. (s): 79 - 9034 — Wt % of head sample: 79.7

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity Sink	Specific Gravity Float	Elementary Weight	Elementary Ash	Elementary Sulphur	Elementary BTU/lb.	Cumulative Float Weight	Cumulative Float Ash	Cumulative Float Sulphur	Cumulative Float BTU/lb.
	1.30	0.1	4.6	0.49	12,866	0.1	4.6	0.49	12,866
1.30	1.40	0.8	7.7	0.45	12,176	0.9	7.4	0.45	12,253
1.40	1.50	39.7	10.4	0.46	10,082	40.6	10.3	0.46	10,130
1.50	1.60	18.6	18.9	0.41	9,083	59.2	13.0	0.44	9,801
1.60	1.70	12.1	31.4	0.30	7,753	71.3	16.1	0.42	9,454
1.70	1.80	6.8	42.8	0.24	6,005	78.1	18.5	0.40	9,153
1.80	1.90	7.3	49.3	0.25	5,093	85.4	21.1	0.39	8,806
1.90		14.6	68.8	0.22	2,536	100.0	28.1	0.37	7,891
TOTAL		100.0	28.1	0.37	7,891				

SCREEN ANALYSIS

PASSING	RETAINED	WT.%
	28	79.7
28	0	20.3
TOTAL		100.0

FORM 342

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WARITTI TRENCH 6

LAB. NO. - 79 - 9034 RAW HEAD

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	14.5	
ASH -	23.5	27.5
VOLATILE MATTER -	29.0	33.9
FIXED CARBON -	33.0	38.6
TOTAL	100.0	100.0
BTU/lb. -	6931	8106
SULPHUR -	0.34	0.40
FREE MOISTURE -	3.8	
HARDGROVE GRINDABILITY -	108.0	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 6

LAB. NO. - 79 - 9034 + 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	10.9	
ASH -	24.6	27.6
VOLATILE MATTER -	28.2	31.7
FIXED CARBON -	36.3	40.7
TOTAL	100.0	100.0
BTU/lb. -	6980	7832
SULPHUR -	0.33	0.37

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -		
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 6

LAB. NO. - 79 - 9034 - 28 MESH

ANALYSIS %

	AS ANALYZED		DRY BASIS
INHERENT MOISTURE -	12.8		
ASH -	24.9		28.6
VOLATILE MATTER -	28.9		33.1
FIXED CARBON -	33.4		38.3
TOTAL	100.0	100.0	
BTU/lb. -	6965		7987
SULPHUR -	0.35		0.40

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1392	1336
SPHERICAL -	1449 +	1406
HEMISPHERICAL -		1432
FLUID -		1449 +

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 6

LAB. NO. - 79 - 9034 CLEAN COAL COMP. 150 FLOAT

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	9.5	
ASH -	9.9	10.9
VOLATILE MATTER -	36.7	40.6
FIXED CARBON -	43.9	48.5
TOTAL	100.0	100.0
BTU/lb. -	9014	9959
SULPHUR -	0.44	0.49
HARDGROVE GRINDABILITY -	89.2	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449+
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

Womock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – RAW HEAD TRENCH 6 Lab. No. 79 - 9034

ANALYSIS %

SiO_2 –	50.4	Na_2O –	0.17
Al_2O_3 –	33.0	K_2O –	1.6
SO_3 –	2.8	MgO –	1.1
P_2O_5 –	0.86	CaO –	4.8
TiO_2 –	1.3	Fe_2O_3 –	3.1
V_2O_5 –		Mn_3O_4 –	0.01

Womack Hersey Professional Services Ltd.
1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9138

-7-

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - - 28 HEAD TRENCH 6 Lab. No. 79 - 9034

ANALYSIS %

SiO_2 -	54.1	Na_2O -	0.15
Al_2O_3 -	25.0	K_2O -	2.0
SO_3 -	3.2	MgO -	1.5
P_2O_5 -	1.2	CaO -	6.7
TiO_2 -	1.0	Fe_2O_3 -	4.1
V_2O_5 -		Mn_3O_4 -	0.02

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – 1.50 COMP. TRENCH 6 Lab. No. 79 - 9034

ANALYSIS %

SiO_2 –	49.7	Na_2O –	0.06
Al_2O_3 –	34.7	K_2O –	0.40
SO_3 –	2.9	MgO –	1.1
P_2O_5 –	0.86	CaO –	5.2
TiO_2 –	1.3	Fe_2O_3 –	3.1
V_2O_5 –		Mn_3O_4 –	0.01

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Sample Identification: WAPITTI TRENCH 7 — Size fraction: + 28 MESH

Lab. No. (s): 79 - 9038 — Wt % of head sample: 82.9

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity Sink	Specific Gravity Float	Elementary Weight	Elementary Ash	Elementary Sulphur	Elementary BTU/lb.	Cumulative Float Weight	Cumulative Float Ash	Cumulative Float Sulphur	Cumulative Float BTU/lb.
	1.30	0.2	4.7	0.49	12,763	0.2	4.7	0.49	12,763
1.30	1.40	0.4	9.8	0.40	10,777	0.6	8.1	0.43	11,439
1.40	1.50	15.5	14.5	0.38	9,654	16.1	14.3	0.38	9,721
1.50	1.60	30.3	19.7	0.34	8,834	46.4	17.8	0.35	9,142
1.60	1.70	13.7	30.2	0.29	7,453	60.1	20.6	0.34	8,757
1.70	1.80	8.6	39.3	0.23	6,396	68.7	23.0	0.33	8,461
1.80	1.90	26.6	49.6	0.21	4,506	95.3	30.4	0.29	7,357
1.90		4.7	65.2	0.17	2,633	100.0	32.0	0.29	7,135
TOTAL		100.0	32.0	0.29	7,135				

SCREEN ANALYSIS

PASSING	RETAINED	WT.%
	28	82.9
28	0	17.1
TOTAL		100.0

FORM 342

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 7

LAB. NO. - 79 - 9038 RAW HEAD

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	14.4	
ASH -	27.8	32.5
VOLATILE MATTER -	27.6	32.3
FIXED CARBON -	30.2	35.2
TOTAL	100.0	100.0
BTU/lb. -	6168	7204
SULPHUR -	0.27	0.32
FREE MOISTURE -	9.7	
HARDGROVE GRINDABILITY -	111.4	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPPITTI TRENCH 7

LAB. NO. - 79 - 9038 + 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	11.8	
ASH -	29.4	33.3
VOLATILE MATTER -	28.7	32.5
FIXED CARBON -	30.1	34.2
TOTAL	100.0	100.0
BTU/lb. -	6322	7166
SULPHUR -	0.28	0.32

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -		
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 7

LAB. NO. - 79 - 9038 -28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	12.0	
ASH -	27.9	31.7
VOLATILE MATTER -	28.5	32.4
FIXED CARBON -	31.6	35.9
TOTAL	100.0	100.0
BTU/lb. -	6415	7291
SULPHUR -	0.27	0.31

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1432
SPHERICAL -		1449 +
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI TRENCH 7

LAB. NO. - 79 - 9038 CLEAN COAL COMP. 1.50 FLOAT

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	8.0	
ASH -	12.2	13.3
VOLATILE MATTER -	36.5	39.6
FIXED CARBON -	43.3	47.1
TOTAL	100.0	100.0
BTU/lb. -	8945	9721
SULPHUR -	0.38	0.41
HARDGROVE GRINDABILITY -	96.2	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

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REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – RAW HEAD TRENCH 7 Lab. No. 79 - 9038

ANALYSIS %

SiO_2 –	46.2	Na_2O –	0.05
Al_2O_3 –	33.6	K_2O –	0.42
SO_3 –	2.3	MgO –	1.6
P_2O_5 –	0.72	CaO –	9.2
TiO_2 –	1.3	Fe_2O_3 –	3.7
V_2O_5 –		Mn_3O_4 –	0.01

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1423 D 45th Avenue NE Calgary Alberta T2E 2P3 Tel 276 - 9138

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - - 28 HEAD TRENCH 7 Lab. No. 79 - 9038

ANALYSIS %

SiO_2 -	47.3	Na_2O -	0.09
Al_2O_3 -	30.2	K_2O -	1.3
SO_3 -	2.1	MgO -	1.8
P_2O_5 -	0.84	CaO -	8.3
TiO_2 -	1.1	Fe_2O_3 -	4.9
V_2O_5 -		Mn_3O_4 -	0.02

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REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – 1.50 COMP. TRENCH 7 Lab. No. 79 - 9038

ANALYSIS %

SiO_2 –	47.6	Na_2O –	0.21
Al_2O_3 –	31.9	K_2O –	1.4
SO_3 –	2.2	MgO –	1.5
P_2O_5 –	0.73	CaO –	8.4
TiO_2 –	1.2	Fe_2O_3 –	3.2
V_2O_5 –		Mn_3O_4 –	0.01

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 276-9138

Sample Identification: WAPITTI PILLAR 1 — Size fraction: + 28 MESH

Lab. No. (s): 79 - 9041 — Wt % of head sample: 89.2

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity Sink	Specific Gravity Float	Elementary Weight	Elementary Ash	Elementary Sulphur	Elementary BTU/lb.	Cumulative Float Weight	Cumulative Float Ash	Cumulative Float Sulphur	Cumulative Float BTU/lb.
	1.30	0.1	4.5	0.45	12,853	0.1	4.5	0.45	12,853
1.30	1.40	0.5	8.2	0.43	11,835	0.6	7.6	0.43	12,005
1.40	1.50	33.6	13.4	0.38	9,625	34.2	13.3	0.38	9,667
1.50	1.60	21.2	21.8	0.36	8,321	55.4	16.6	0.37	9,152
1.60	1.70	17.1	33.6	0.31	6,844	72.5	20.6	0.36	8,607
1.70	1.80	8.2	41.6	0.29	5,552	80.7	22.7	0.35	8,297
1.80	1.90	6.9	52.0	0.30	4,218	87.6	25.0	0.35	7,976
1.90		12.4	70.2	0.23	1,773	100.0	30.6	0.33	7,207
TOTAL		100.0	30.6	0.33					

SCREEN ANALYSIS

PASSING	RETAINED	WT.%
	28	89.2
28	0	10.8
TOTAL		100.0

FORM 342

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 1

LAB. NO. - 79 - 9041 RAW HEAD

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	18.0	
ASH -	25.6	31.2
VOLATILE MATTER -	28.4	34.6
FIXED CARBON -	28.0	34.2
TOTAL	100.0	100.0
BTU/lb. -	6245	7616
SULPHUR -	0.31	0.38
FREE MOISTURE -	8.0	
HARDGROVE GRINDABILITY -	87.8	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 1

LAB. NO. - 79 - 9041 + 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	11.6	
ASH -	28.3	32.0
VOLATILE MATTER -	27.6	31.2
FIXED CARBON -	32.5	36.8
TOTAL	100.0	100.0
BTU/lb. -	6656	7526
SULPHUR -	0.34	0.38

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -		
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 1

LAB. NO. - 79 - 9041 - 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	13.1	
ASH -	26.2	30.1
VOLATILE MATTER -	29.2	33.6
FIXED CARBON -	21.5	36.3
TOTAL	100.0	100.0
BTU/lb. -	6669	7673
SULPHUR -	0.28	0.32

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 1

LAB. NO. - 79 - 9041 CLEAN COAL COMP. 1.50 FLOAT

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	9.6	
ASH -	12.2	13.5
VOLATILE MATTER -	34.4	38.0
FIXED CARBON -	43.8	48.5
TOTAL	100.0	100.0
BTU/lb. -	8799	9729
SULPHUR -	0.42	0.46
HARDGROVE GRINDABILITY -	96.2	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1416
SPHERICAL -		1449 +
HEMISPHERICAL -		
FLUID -		

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REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - RAW HEAD PILLAR 1 Lab. No. 79 - 9041

ANALYSIS %

SiO_2 -	47.8	Na_2O -	0.26
Al_2O_3 -	32.8	K_2O -	0.70
SO_3 -	2.6	MgO -	1.2
P_2O_5 -	1.1	CaO -	8.3
TiO_2 -	1.2	Fe_2O_3 -	2.7
V_2O_5 -		Mn_3O_4 -	0.01

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1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9136

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - - 28 HEAD PILLAR 1 Lab. No. 79 - 9041

ANALYSIS %

SiO_2 -	45.8	Na_2O -	0.29
Al_2O_3 -	24.4	K_2O -	1.9
SO_3 -	3.4	MgO -	2.1
P_2O_5 -	1.6	CaO -	13.8
TiO_2 -	1.1	Fe_2O_3 -	4.3
V_2O_5 -		Mn_3O_4 -	0.02

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1423 D 45th Avenue NE Calgary Alberta T2E 2P3 Tel 276 - 9136

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – 1.50 COMP. PILLAR 1 Lab. No. 79 - 9041

ANALYSIS %

SiO_2 –	47.0	Na_2O –	0.24
Al_2O_3 –	32.4	K_2O –	1.6
SO_3 –	2.6	MgO –	1.3
P_2O_5 –	1.1	CaO –	8.8
TiO_2 –	1.4	Fe_2O_3 –	2.8
V_2O_5 –		Mn_3O_4 –	0.02

Warnock Hersey Professional Services Ltd.
1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. 276-9138

Sample Identification: WAPITTI PILLAR 2 — Size fraction: + 28 MESH

Lab. No. (s): 79 - 9046 — Wt % of head sample: 77.9

FLOAT AND SINK ANALYSIS % - DRY BASIS

Specific Gravity Sink	Specific Gravity Float	Elementary Weight	Elementary Ash	Elementary Sulphur	Elementary BTU/lb.	Cumulative Float Weight	Cumulative Float Ash	Cumulative Float Sulphur	Cumulative Float BTU/lb.
	1.30	0.2	4.9	0.40	14,408	0.2	4.9	0.40	14,408
1.30	1.40	0.3	6.9	0.41	12,915	0.5	6.1	0.41	13,512
1.40	1.50	17.6	13.8	0.37	9,716	18.1	13.6	0.37	9,821
1.50	1.60	34.7	21.8	0.35	8,314	52.8	19.0	0.36	8,831
1.60	1.70	22.0	29.3	0.31	7,377	74.8	22.0	0.34	8,403
1.70	1.80	8.2	41.1	0.28	5,582	83.0	23.9	0.34	8,124
1.80	1.90	11.4	50.5	0.24	4,513	94.4	27.1	0.33	7,688
1.90		5.6	66.0	0.19	2,716	100.0	29.3	0.32	7,410
TOTAL		100.0	29.3	0.32	7,410				

SCREEN ANALYSIS

PASSING	RETAINED	WT.%
	28	77.9
28	0	22.1
TOTAL		100.0

FORM 342

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 2

LAB. NO. - 79 - 9046 RAW HEAD

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	14.2	
ASH -	25.8	30.1
VOLATILE MATTER -	30.8	35.9
FIXED CARBON -	29.2	34.0
TOTAL	100.0	100.0
BTU/lb. -	6594	7688
SULPHUR -	0.30	0.35
FREE MOISTURE -	11.2	
HARDGROVE GRINDABILITY -	104.5	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1449 +
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 2

LAB. NO. - 79 - 9046 + 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	11.5	
ASH -	26.0	29.4
VOLATILE MATTER -	30.3	34.2
FIXED CARBON -	32.2	36.4
TOTAL	100.0	100.0
BTU/lb. -	6803	7686
SULPHUR -	0.32	0.36

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -		
SPHERICAL -		
HEMISPHERICAL -		
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 2

LAB. NO. - 79 - 9046 - 28 MESH

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	13.9	
ASH -	26.1	30.3
VOLATILE MATTER -	30.1	34.9
FIXED CARBON -	29.9	34.8
TOTAL	100.0	100.0
BTU/lb. -	6438	7474
SULPHUR -	0.30	0.35

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1416	1416
SPHERICAL -	1449 +	1428
HEMISPHERICAL -		1449 +
FLUID -		

CLIENT - GULF CANADA RESOURCES

SAMPLE I.D. - WAPITTI PILLAR 2

LAB. NO. - 79 - 9046 RAW HEAD

ANALYSIS %

	AS ANALYZED	DRY BASIS
INHERENT MOISTURE -	9.0	
ASH -	12.6	13.8
VOLATILE MATTER -	34.1	37.5
FIXED CARBON -	44.3	48.7
TOTAL	100.0	100.0
BTU/lb. -	8875	9755
SULPHUR -	0.41	0.45
HARDGROVE GRINDABILITY -	94.7	

ASH FUSION TEMPERATURES

	OXIDIZING	REDUCING
INITIAL DEFORMATION -	1449 +	1428
SPHERICAL -		1449 +
HEMISPHERICAL -		
FLUID -		

Warnock Hersey Professional Services Ltd.
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REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - RAW HEAD PILLAR 2 Lab. No. 79 - 9046

ANALYSIS %

SiO_2 -	42.7	Na_2O -	0.20
Al_2O_3 -	28.9	K_2O -	1.4
SO_3 -	3.3	MgO -	1.2
P_2O_5 -	3.0	CaO -	13.6
TiO_2 -	1.1	Fe_2O_3 -	2.6
V_2O_5 -		Mn_3O_4 -	0.03

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1423 D 45th Avenue N.E Calgary Alberta T2E 2P3 Tel 276 - 9136

REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification - - 28 HEAD PILLAR 2 Lab. No. 79 - 9046

ANALYSIS %

SiO_2 -	42.7	Na_2O -	0.28
Al_2O_3 -	27.2	K_2O -	1.7
SO_3 -	3.8	MgO -	1.5
P_2O_5 -	3.4	CaO -	13.5
TiO_2 -	0.97	Fe_2O_3 -	3.0
V_2O_5 -		Mn_3O_4 -	0.04

Warnock Hersey Professional Services Ltd.
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REPORT OF: Mineral Analysis of Ash

AT Calgary

PROJECT: Wapitti Trench Samples

REPORTED TO: Gulf Canada Resources

FILE NO.

DATE December 7, 1979

REPORT NO. 780 - 0471

ORDER NO.

Sample Identification – 1.50 COMP. PILLAR 2 Lab. No. 79 - 9046

ANALYSIS %

SiO_2 –	42.7	Na_2O –	0.19
Al_2O_3 –	29.1	K_2O –	1.6
SO_3 –	3.1	MgO –	1.2
P_2O_5 –	3.0	CaO –	13.7
TiO_2 –	1.1	Fe_2O_3 –	2.6
V_2O_5 –		Mn_3O_4 –	0.03

NorWest

Gulf Canada Resources, Inc.
Wapiti Project

COAL QUALITY EVALUATION

1. Introduction

This preliminary assessment of the quality of the coal in the Wapiti deposit is, essentially, based on the information derived from the following trench and borehole core samples:

I.D.	Lab No.
Trench 3	79-9034
Trench 4	79-9038
Trench A	79-9041
Trench B	79-9046
Borehole 7939	80-3004
Borehole 7943	80-3005

The analytical programme for the above samples was sufficiently detailed to provide good information with regard to raw coal quality, washability characteristics and possible clean coal qualities. However, the geological report has shown that the samples were collected from locations which were very close to the surface. In fact, all of the trench samples were collected from outcrop samples at the surface and borehole 7943 intersected the seam about 10 metres below the surface. Only borehole 7939 intersected the seam at any depth (30 metres below the surface).

It is very likely, therefore, that the only sample that had not been oxidized was 7939.

We would expect the sample from 7943 to be less oxidized than the trench samples. However the geologist's report stated that water was present in the hole where the core from 7943 was extracted, which indicates that the sample could be oxidized to some degree.

Oxidation most seriously affects moisture content and calorific value, both of which are indicators of coal rank. It is likely, therefore, that the apparent rank of the oxidized sample will be less than the rank of the non, or partially, oxidized samples.

However, oxidation should not affect the sink-float characteristics of the coal nor the characteristics of the ash (ash fusion temperature and mineral analyses of the ash).

2. Raw Coal Quality

A summary of the raw coal values is shown in Table 1.

The raw ash content of all of the samples is quite consistent at about 25%. Overall, the quality of the trench samples does not appear to vary very considerably. However, the inherent moisture, Hardgrove grindability and calorific value levels between the trench samples and core samples do vary considerably. Since the geologists assure us that all of the samples are from the same coal seam, we can only deduce that these variations are attributable to oxidation.

3. Coal Rank

According to ASTM D388, low rank coals are classified according to their moist, mineral matter-free Btu content. "Moist," however, refers to coal containing its natural inherent or bed moisture, but not including water adhering to the surface of the coal.

Normally, in low rank coals, " equilibrium moisture" contents are performed and they are considered to be equivalent to the bed moisture described above.

Equilibrium moisture contents were performed on raw and clean coal samples from holes 7943 and 7939 as follows:

Hole No.	Fraction	Equilibrium Moisture%
7939	Raw Coal	7.5%
7939	Floats @ 1.50 s.g.	19.0%
7943	Raw Coal	25.9%
7943	Floats @ 1.50 s.g.	19.1%

The results, again, are somewhat erratic. In particular, the equilibrium moisture level for the raw coal fraction from hole 7939 appears to be anomalous. Therefore, for the purpose of calculating the coal rank, we have assumed an equilibrium moisture level of 19% for all of the samples. The indicated rank values are shown in Table 2.

It can be seen that the indicated moist mineral matter-free Btu contents vary from 8900--11230. These results suggest that the unoxidized coal (as represented by hole 7939) will be in the subbituminous A class and the oxidized coals (say within 10 metres of the surface) will be in the sub B and sub C classes depending upon the degree of oxidation.

In future drilling and sampling programmes, serious consideration should be given to determining the degree and extent of the oxidized, partially oxidized and unoxidized coals, since the calorific value of the saleable product will be directly related to the degree of oxidation in a project such as this, where much of the coal is close to the surface.

4. Washability Characteristics and Clean Coal Values

Although the washability characteristics of the coal samples varied slightly, certain general trends could be seen.

It was initially hoped that a good clean product could be "creamed" off at a low s.g. cut. All of the sink-float results, however, show that this would not be possible, since there is very little float coal at 1.40 s.g. Indeed, most of the coal occurs in what would normally be referred to as the "middlings" fraction, i.e. 1.50--1.80 s.g.

This coal definitely has difficult washability characteristics and significant yield losses can be expected from conventional washing circuits (particularly jigs and water-only cyclones).

Figures 1 and 2 show the yield-ash and yield-s.g. relationships for the six samples.

If we consider 70% an economic yield level for such a coal, then the clean coal ash level (dry) will be between 15 and 23%. Figure 2 shows that this would correspond to a cut point between 1.60 and 1.70 s.g. (the Trench 4 yield--s.g. results appear to be anomalous).

It is difficult to predict clean coal quality (particularly in terms of "as received" calorific value) due to oxidation levels throughout the property. Thus, Table 3 shows the predicted clean coal quality levels for oxidized and unoxidized samples.

We have also calculated the assumed "as received" raw coal quality for oxidized and unoxidized coal with 18% total moisture included (Table 4).

A comparison of Tables 3 and 4 reveals that washing this coal will probably only increase the Btu level by 1000 Btu/lb at the expense of loosing about 30% of the coal. Experience suggests that such a trade-off would not be beneficial and thus, washing does not appear to be an attractive proposition for this particular deposit.

The summary of the mineral analyses of the ash, shown in Table 5, shows that the ash characteristics of the coal samples are acceptable and consistent.

5. Conclusions

It has been difficult to assess the true quality of the coal in the Wapiti deposit, since the majority of the samples were collected from trenches or boreholes that were close to the surface. The result was that these samples were oxidized and their corresponding calorific value levels were depressed.

In future exploration programmes it will be necessary to determine the degree and extent of oxidized coal in this deposit.

The raw coal appears to have a dry ash content of about 25% and an "as received" moisture level of about 18--20%. The "as received" calorific value of the raw coal will vary from 6200--8350 Btu/lb depending upon the degree of oxidation.

A very substantial proportion of the coal exists in the 1.50--1.80 s.g. range and relatively small proportions in the floats at 1.40 s.g. and sinks at 1.80 s.g. This coal, therefore, would be very difficult to wash. We predict that the calorific value of the clean product would only be about 1000 Btu/lb higher than the raw coal, at a yield level of 70%. Such results do not indicate that washing would be an attractive economic proposition.

NorWest

Gulf Canada Resources, Inc.
Wapiti Project

TABLE 1.

Summary of Raw Coal Values (as sampled)

Sample I.D.	Inherent Moisture%	Ash%	S%	Free Moisture%	HGI	Btu/lb.
Trench 3	14.5	23.5	0.34	3.8	108	6931
Trench 4	14.4	27.8	0.27	9.7	114	6168
Trench A	18.0	25.6	0.31	8.0	88	6245
Trench B	14.2	25.8	0.30	11.2	105	6594
Core 7943	11.0	22.2	0.38	—	62.2	7976
Core 7939	4.1	25.0	0.50	—	52.5	9800

TABLE 2.

Indicated ASTM Coal Rank Values

Sample I.D.	Dry Ash%	Dry Btu/lb.	Moist, Mmf Btu	ASTM Rank
Trench 3	10.9	9959	8916	sub C
Trench 4	13.3	9721	8913	sub C
Trench A	13.5	9729	8931	sub C
Trench B	13.8	9755	8987	sub C
Core 7943	11.0	10,645	9580	sub B
Core 7939	14.6	12,087	11230	sub A

TABLE 3

Predicted "As Received" Clean Coal Quality Values

Sample	Total Moisture%	Ash%	S%	Btu/lb	Yield%
Oxidized Samples	20	14.0	0.30	7350	70
Unoxidized Samples	20	14.0	0.30	9300	70

TABLE 4

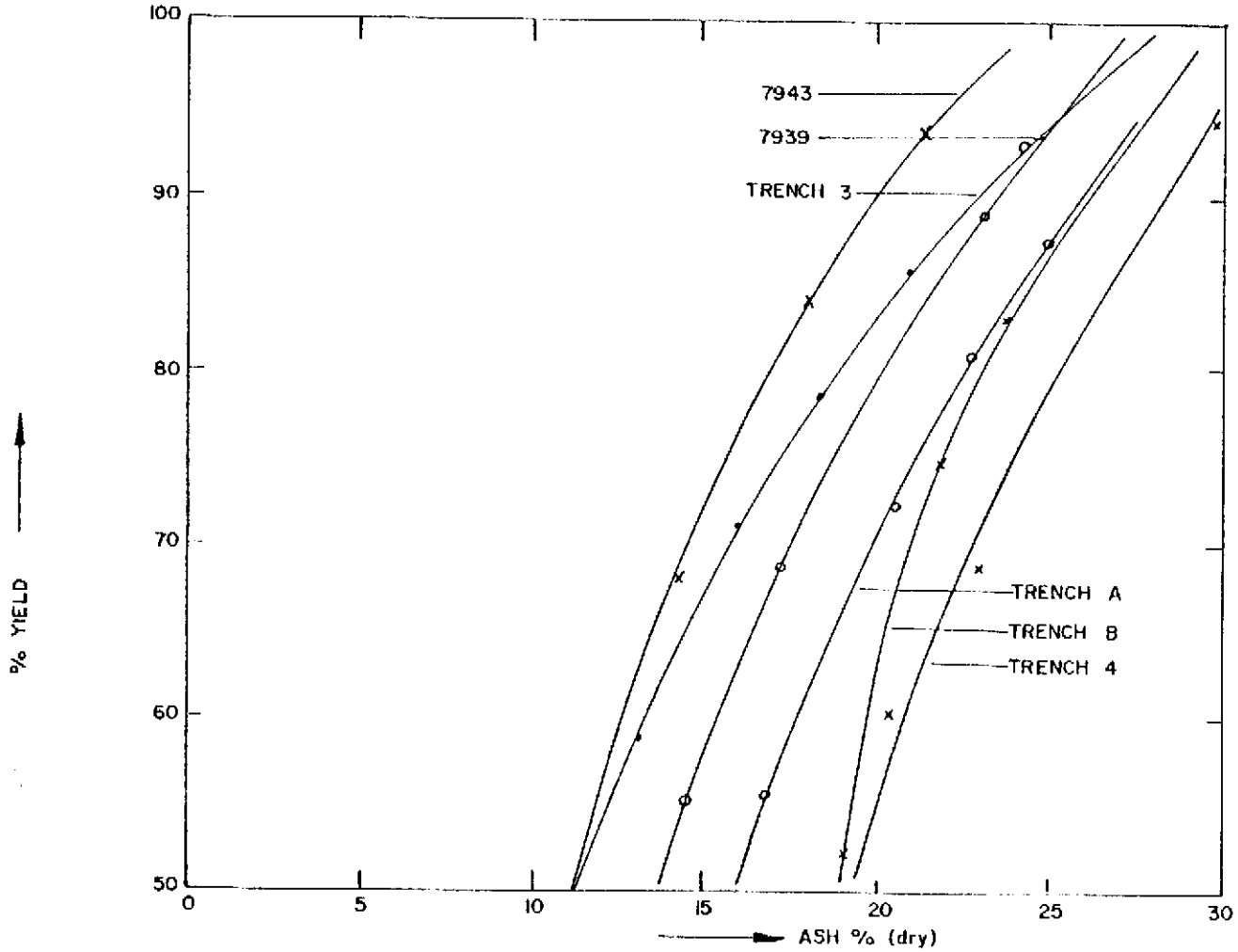
Predicted "As Received" Raw Coal Quality Values

Sample	Total Moisture%	Ash%	S%	Btu/lb	Yield%
Oxidized Samples	18	21	0.29	6200	100
Unoxidized Samples	18	21	0.29	8350	100

TABLE 5

Comparative Information on Mineral Analyses of Ash (1.50 s.g. floats)

Sample	Initial Deformation Temp °C(R)	Base/Acid	$\frac{Fe_2O_3}{CaO}$	$\frac{SiO_2}{Al_2O_3}$
Trench 3	+1449	0.12	0.60	1.43
Trench 4	+1449	0.18	0.38	1.49
Trench A	1416	0.18	0.32	1.45
Trench B	1428	0.26	0.19	1.47
7943	1323	0.43	0.95	1.12
7939	1449	0.21	1.47	1.23



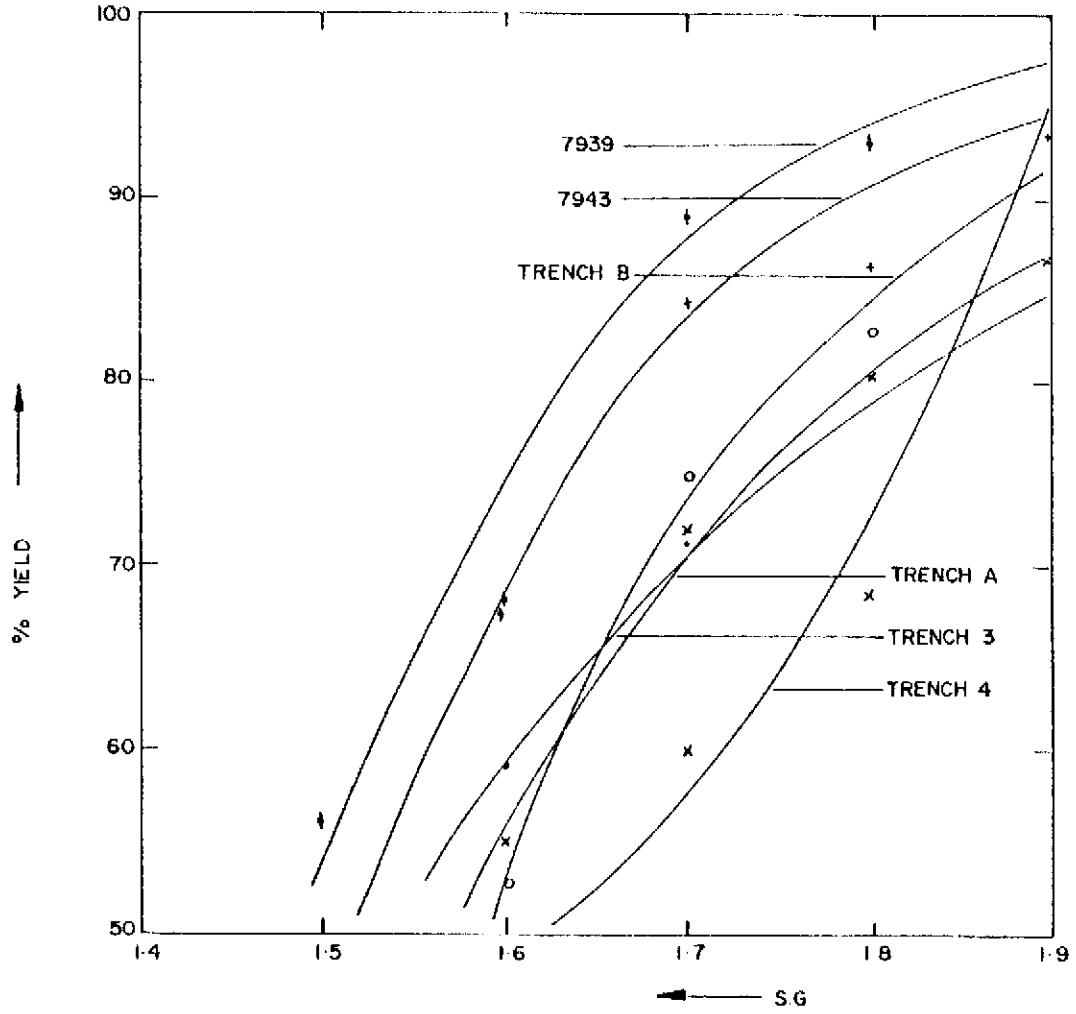
GULF CANADA RESOURCES INC

SCALE: NTS	APPROVED BY:	DRAWN BY
DATE: APRIL 24th 1980		REVISED

YIELD - ASH CURVES
WAPITI PROJECT

NorWest Resource Consultants Ltd

DRAWING NUMBER
FIG 1.



GULF CANADA RESOURCES INC.

SCALE: NTS	APPROVED BY:	DRAWN BY
DATE: APRIL 24th 1980		REVISED

YIELD - SG CURVES
WAPITI PROJECT

NorWest Resource Consultants Ltd.

DRAWING NUMBER
FIG 2

PR-WAPITI 79 (1) A

"WAPITI PROJECT GEOLOGICAL REPORT"

C.L. NOS. 4758-5156, 5314-5398.

2/5 683

GULF CANADA RESOURCES INC.

Wapiti Project Geological Report

1979 - 1980

Coal Licence Numbers

5314 to 5398 inclusive

4758 to 5156 inclusive

Dawson Creek Land District

NTS Map Nos. 93I and P

Latitudes between 55° 32' and 54° 43'

Longitudes 120° 15' and 120° 54'

Gulf Canada Resources Inc.
Norwest Resource Consultants Ltd.
80-04-29

by Brian Flynn

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APPENDICES

1.0 SUMMARY

Gulf Canada Resources Inc. acquired a block of 484 coal licences covering an area of 142 980 hectares located 22 to 120 kilometres south of Dawson Creek, British Columbia. The licences cover a large area of Upper Cretaceous Wapiti Formation strata. A few reports of coal occurrences in this area of the Wapiti Formation had been made in the past but no definitive work had been undertaken to investigate the extent or development of these coals.

Three phases of exploration have been carried out to the present time including mapping, trenching and the drilling of 47 rotary drill holes. This exploration has shown that an area which might be suitable for surface mining operations is located in the northwest portion of the property, while an adjacent area, in the central northern portion of the property, might be mineable by underground methods.

A total resource base of 832 million tonnes of coal in place in seams greater than 0.5 m has been calculated for the Wapiti Coal Project. Of this figure, 30.2 million tonnes in place of inferred reserves have been calculated for the surface mining prospect at a limiting R.O.M. metric ratio of 10/1 while 117.5 million tonnes of inferred reserves have been calculated for the potential underground mining area. These reserves are located in a single seam referred to as Seam No. 1, which is located at the base of the Wapiti Formation.

2.0 INTRODUCTION

The Upper Cretaceous Wapiti Formation and its equivalents are a known thermal coal-bearing unit in areas of the Alberta Plains. In central and southern Alberta, various companies are currently conducting exploration and developing mine plans with a view to mining economic coal deposits in this formation. The initial information leading to those mine developments was usually gained from old reports of mining operations, water well data, and surface outcrops.

Gulf Canada Resources Inc. acquired coal licences which overlie Wapiti Formation strata in an extensive area of northeastern British Columbia. Unlike many of the equivalent Upper Cretaceous coal occurrences in central and southern Alberta, no past records of mining activities or water well data were available. In fact, a few verbal reports of surface exposures of coal and the logs of nearby gas wells were the only sources of information on the development of coal in this area, prior to Gulf Canada's exploration program. Consequently, licences were acquired covering a large area so that all potentially economic deposits of coal in this formation could be evaluated.

The following report describes the results of the exploration carried out to date within that area which is referred to as the Wapiti Coal Property.

The raw coal from the analyzed drill hole and trench samples on the Wapiti Project appears to have a dry ash content of about 25% and an "as received" moisture level of about 18 - 20%. The "as received" calorific value of the raw coal will vary from 6200 - 8350 Btu/lb depending upon the degree of oxidation.

A very substantial proportion of the coal exists in the 1.50 - 1.80 s.g. range and relatively small proportions in the floats at 1.40 s.g. and sinks at 1.80 s.g. This coal, therefore, would be very difficult to wash. It is predicted that the calorific value of the clean product would only be about 1000 Btu/lb higher than the raw coal, at a yield level of 70%. Such results do not indicate that washing would be an attractive economic proposition.

3.0 LOCATION AND ACCESS

The Wapiti Coal Property consists of 484 coal licences covering an area of 142 980 hectares, including licences which were issued during the course of the 1979 exploration program. The licences are wholly owned by Gulf Canada Resources Inc. and are located in northeastern British Columbia 22 to 120 kilometres south of the town of Dawson Creek. A portion of this area will be retained for further exploration. The location of the Wapiti coal licences is illustrated by Figures 1 and 2, and the legal description of each licence is included in Appendix I. The coal licences are summarized on Table 1 below.

The Wapiti Coal Property has been divided into two exploration areas, the Kiskatinaw Block and the Iris Lake Block. Both blocks cover areas of the coal-bearing Upper Cretaceous Wapiti Formation strata lying on the Alberta Plateau. The Plateau has been dissected by erosion and the relief of the property varies from 730 to 1 265 metres.

The area is covered by forest and contains some muskeg swamps. Logging activities and exploration for oil and gas have resulted in the construction of a network of roads and seismic lines which provide good access to most parts of the property. Several major gravel roads suitable for hauling heavy equipment are located within the western part of the Kiskatinaw Block. Two roads cross the northern portion of the Iris Lake Block. The seismic lines

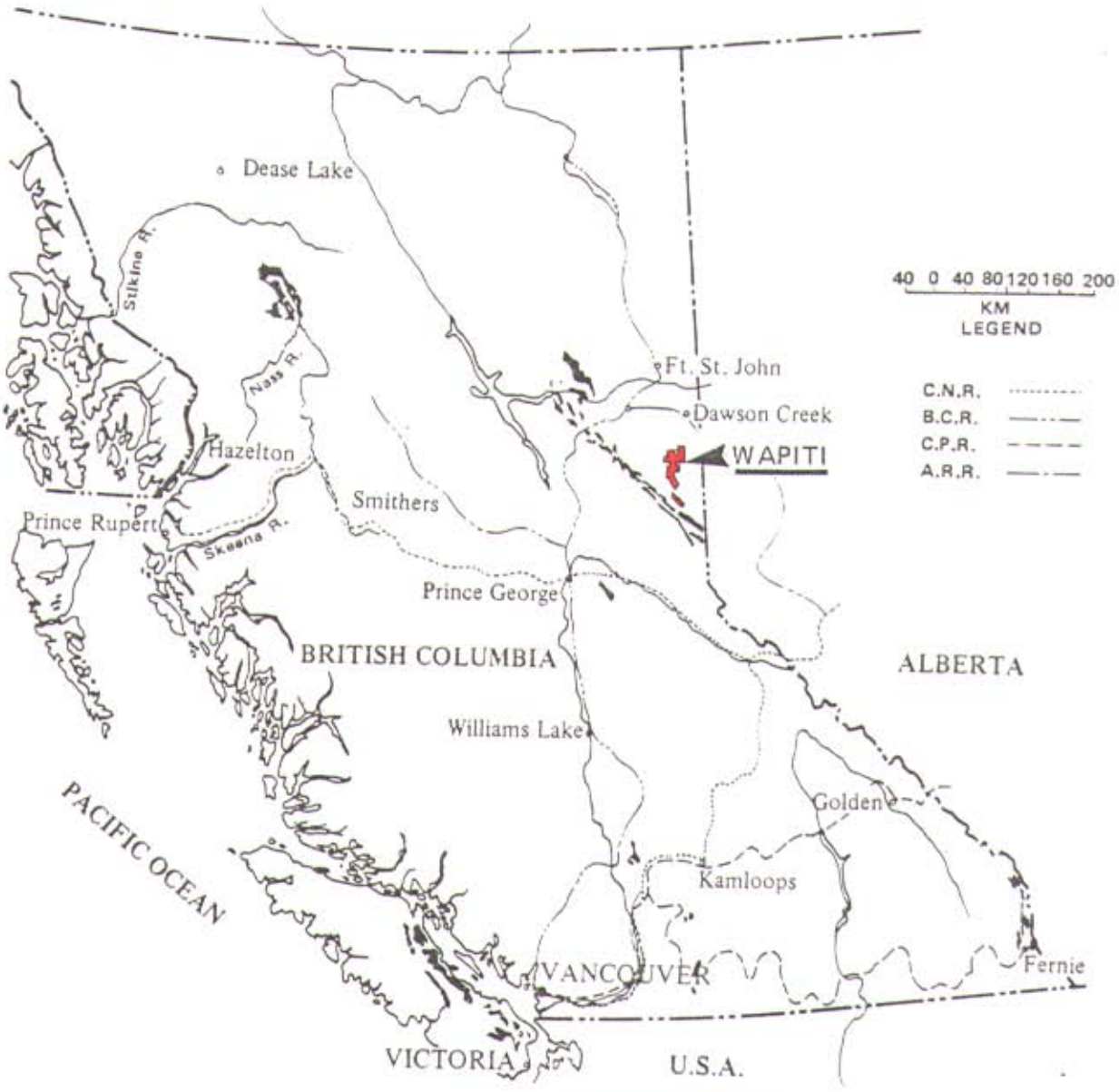
in both blocks provide good access in winter when the muskeg is frozen.

The British Columbia Railway and Northern Alberta Railway pass through Dawson Creek as indicated on Figure 1. The distance by road from the northern portion of the Kiskatinaw Block to Dawson Creek is 50 kilometres.

TABLE NO. I

Summary of Wapiti Project
Coal Licences

Map Sheet	Blocks	Hectares	Licence Nos.
93-I-9	K, L	5 383	4758 - 4774
			5156
93-I-15	H, I	3 575	4775 - 4785
			4801
93-I-16	C-E	4 484	4786 - 4800
93-P-2	A-C, E-L	45 337	4802 - 4927
			5314 - 5340
93-P-7	A-D, F-K	54 493	4928 - 5074
			5341 - 5378
93-P-8	D-F, K, L	21 192	5075 - 5126
			5379 - 5398
93-P-9	C, D	4 400	5127 - 5141
93-P-10	A-C	4 115	5142 - 5155



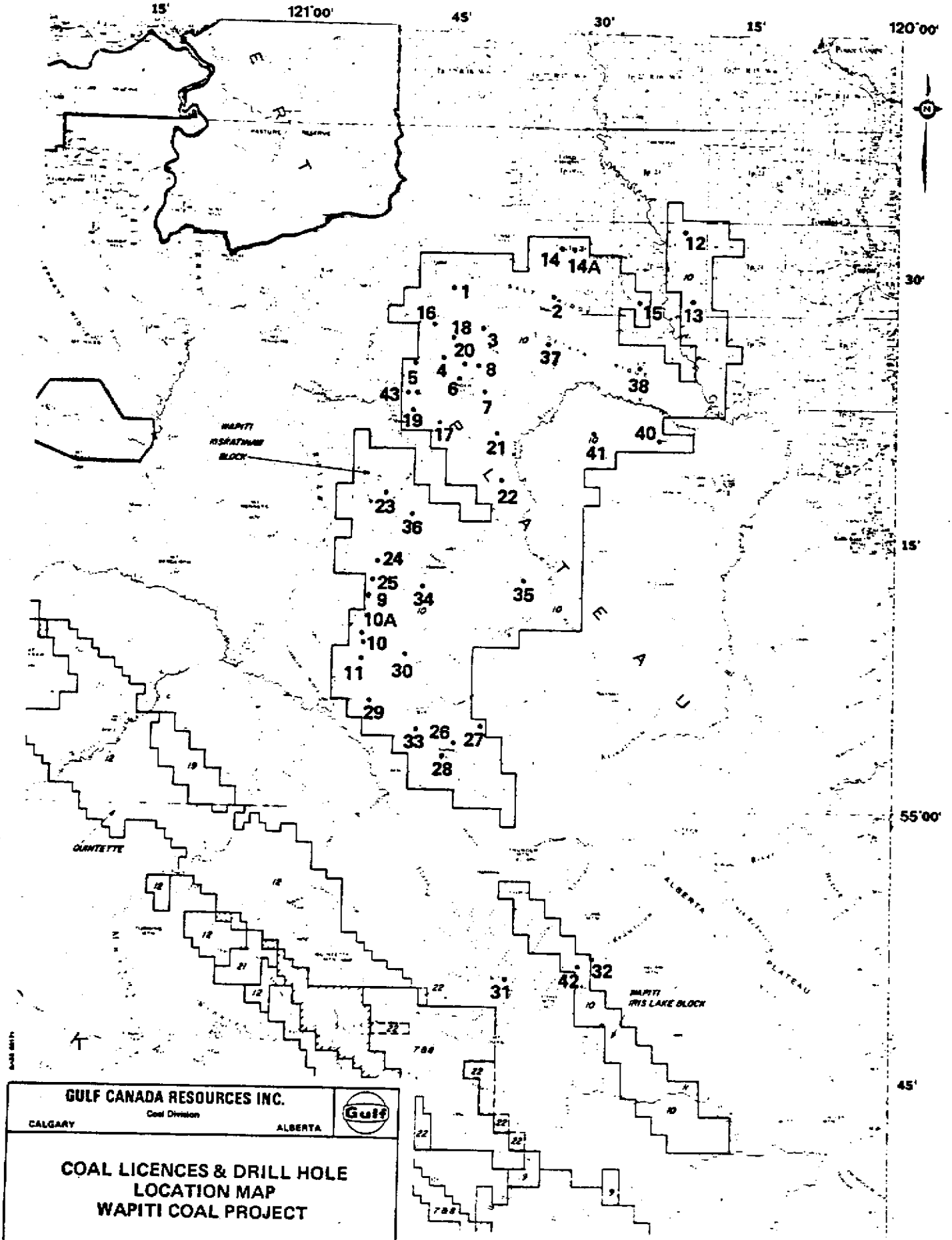
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

LOCATION MAP OF THE WAPITI COAL PROJECT

DRAWN BY:	DATE:	SCALE
PREPARED BY:		DRAWING No. FIG. 1
APPROVED BY:	DATE: APR. 80	

FILE No. 79452-1



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

COAL LICENCES & DRILL HOLE LOCATION MAP WAPITI COAL PROJECT

DRAWN BY:	DATE:	SCALE 1:500 000
PREPARED BY:		DRAWING No.
APPROVED BY:	DATE: APR.80	FIG. 2

FILE No. 79452-2

area were first initiated by Gulf Canada Resources Inc. during January, 1979 on the basis of information obtained from the Phase I study.

Phase II exploration was accomplished between August 13 and September 2, 1979. Of the initial Wapiti Project licences, rotary drill holes W RDH-7901 through 7908, totalling 593 metres were drilled in the northern portion of the Kiskatinaw Block. A bulldozer was used to construct two trenches in existing quarries, one of which is near Muskeg Lake, and the second is located at mile 44 on the Feller's Heights road. Five additional trenches were dug by hand in the same area.

Phase II also included an aerial photographic survey designed to provide photographic coverage of the entire property. The survey was conducted during September, 1979, at an altitude of 25 000 feet. These photographs have been used to prepare a new metric topographic map for a small area north of Muskeg Lake at Salt Creek. R.M. Hardy and Associates Ltd. of Calgary carried out the aerial photography and prepared the new topographic maps.

Bertram Drilling Ltd. of Carbon, Alberta, carried out the Phase II drilling program using a Nodwell-mounted Mayhew 1000 drill rig. Roke Oil Enterprises of Calgary

4.0 EXPLORATION WORK

Exploration by Gulf Canada Resources Inc. in the Wapiti Project area consisted of three phases. Phase I was a program of literature research on the geology of the area. That study culminated in the application for licences during the months of January and June, 1979. Phase II involved the construction of several trenches and the drilling of eight rotary drill holes. Published geological maps and limited reconnaissance geological mapping by Gulf personnel provided the data sources used to direct the Phase II drilling and trenching. Phase III included additional geological mapping and the completion of a further thirty-nine rotary drill holes.

Exploration commenced on August 13, 1979, and ceased on February 14, 1980 at the close of Phase III. The exploration work undertaken in all three phases is summarized by coal licence on Table 2, and is illustrated on the coal licence and exploration work map (Drawing Nos. Wp-Dwg. 7901 and Wp-Dwg. 7902) included with this report. Field personnel were accomodated in a motel in Dawson Creek, B.C., consequently no field camp was required.

4.1 Phase I and II Exploration

Applications for coal licences in the Wapiti project

provided geophysical logs of the drill holes, and Borek Construction Ltd. of Dawson Creek supplied the bulldozer for trench construction. Both airborne and road support were employed during the drilling program.

TABLE NO. 2

Exploration Work on the
Wapiti Coal Project

Licence No.	Drill Holes	Trenches	Mapping
5137	W RDH-7912		Reconnaissance
5147	W RDH-14A & 14B		Mapping on
5068	01		all Licences
5106	13		
5121	15		
5037	02		
5027	37		
5051	03		
5053	18		
5071	16		
5047	08		
5049	04		
5083	38		
5007	20		
4984	05		
5002	06		
4982	39, 39A, 43	Tr.1	
		Tr.2	
		Tr.3	
		Tr.A	
4995	07		
4998		Tr.4	
4980	19		
4993	17, 17A		
5397	40		
5386	41		
4979		Tr.5	
4952	21		
4937	22		
4969	23		
4956	36		
4921	21		
4875	35		
4894	34		
4917	25	Tr.B	
4913	09		
4855	10, 10A		
4841	30		
4845	11		
4839	29		
4822	27		
4828	33		
4819	26		
4820	28		
4800	42, 32		

The Phase II exploration program was supervised by Mr. R.S. Verzosa, P.Eng., a consulting geologist. Mr. Verzosa's report is included as Appendix II.

4.2 Phase III Exploration

4.2.1 Summary

Phase III comprised both helicopter and road supported geological mapping and rotary drilling. The dominant portion of the exploration work was directed towards the Kiskatinaw block; however, two rotary holes were drilled along the Kinuseo Creek road on the Iris Lake block. The site of a third drill hole (W RDH-7931), selected during a snowstorm was incorrectly located west of the Iris Lake licence block.

4.2.2 Geological Mapping

Phase III reconnaissance geological mapping at 1:50 000 scale, provided information for the whole of the Wapiti project area and was carried out during the months of October and November, 1979. The objectives of the mapping program were to locate the coal zone at the contact between the Wapiti and Puskwaskau Formations, and define the stratigraphy of those formations. This work was undertaken using a Bell 206 Jet Ranger supplied by Maple Leaf Helicopters Ltd. of Chetwynd, B.C.

lines, to assist the truck-mounted rig, and to plow snow. A Caterpillar D6 tractor owned by W. & J. Schilling of Chetwynd was also used toward the end of Phase III.

Project Supervisor for Phase I was Brian Flynn of Gulf Canada Resources Inc. Reporting to Mr. Flynn, but directly responsible for field operations, preparation and writing of reports were senior personnel of Norwest Resource Consultants Ltd. of Calgary. Staff on the project reporting to the Norwest supervisor included both Gulf and Norwest personnel.

4.2.4 Reclamation

Careful planning prior to and during field activities resulted in a minimal amount of land disturbance. Consequently, the requirements for reclamation are small. To minimize land disturbance, slashers were employed to cut windfall and coarse secondary growth into four foot sections. The bulldozer then scraped the remaining light brush from the frozen ground, which left the shrub roots and grasses undisturbed. The bulldozer stacked all the slash along the margins of the access routes and drill sites. A very small amount of new line was cut where soft ground conditions were encountered on the existing seismic lines. The impact on the environment, resulting from

The geology maps included with this report (Wp-Dwg 7903 to Wp-Dwg. 7911 inclusive) are a compilation of the data obtained from the reconnaissance mapping and from the drill holes.

4.2.3 Rotary Drilling

The Phase III program included thirty-nine drill holes for a total of 6 328 metres. Two drill rigs were employed during this part of the program. Drill holes W RDH-7909 through 7919 were drilled by Bertram Drilling's Mayhew 1000 drill rig. Alberta Southern Exploration Drilling Ltd. drilled W RDH-7920 through 7943, as well as the holes designated 7910A, 7917A, and 7939A. Alberta Southern's rig is a truck-mounted Ingersoll Rand Cyclone 60, which has the capacity to drill to depths in excess of 300 metres. Drill holes W RDH-7939A and 7943 were cored through the coal seam interval. Helicopter and road support were provided for the Phase III drilling program.

Cutting samples were collected from the rotary drill holes and geophysical logs were run by Roke Oil Enterprises. Those logs are included in Appendix VI.

All drill holes were located on existing roads and seismic lines. A Caterpillar D7 tractor, owned and operated by P. Demeulemeester of Chetwynd, B.C., was used to clear and stack brush along the seismic

the Phase II and III exploration programs was minimal and the amount of reclamation work completed and proposed is detailed in a report entitled "Annual Report of Reclamation 1979 - 1980 - Wapiti Licences, Permit N°C-125", submitted to the Senior Reclamation Inspector in March, 1980.

4.2.5 List of Personnel

The following Gulf personnel, consultants, and contracting companies participated in the exploration work on the Wapiti project:

GULF PERSONNEL

B.P. Flynn	Project Supervisor
G.E. Seve	Geologist
P. Bolton	Geologist
G. Gosson	Geologist
G. Davison	Geologist
S. Barron	Geological Assistant
G. Hellyer	Field Assistant
D. McVicar	Field Assistant
M. Miller	Field Bookkeeper

CONSULTANTS

Norwest Resource Consultants Ltd.	G.R. Jordan P. Geol.
	G.L. Hoffman P. Geol.
	D.F. Symonds P. Eng.
Independent Geological Consultant	R.S. Verzosa P. Eng.

CONTRACTING COMPANIES

Bertram Drilling Ltd.	Rotary Drilling
Alberta Southern Exploration Drilling Ltd.	Rotary Drilling
Roke Oil Enterprises	Geophysical Logging
Maple Leaf Helicopters Limited	Helicopter
R.M. Hardy & Associates Ltd.	Cartography & Survey
Warnock Hersey Professional Services Ltd.	Coal Analysis
P. Demeulemeester	Heavy Equipment
W & J Schilling	Heavy Equipment
E.V.L. Joint Ventures	Slashers
Trail Inn, Dawson Creek	Field Accommodation
Gulf Canada Ltd.	Bulk Fuel Supply
Bassini's Shothole Plug & Control Services Ltd.	Reclamation
Lynden Transport Inc.	Heavy Equipment

5.0 STRATIGRAPHY

The Wapiti Coal Property overlies areas of coal-bearing Upper Cretaceous Wapiti Formation, which is the youngest formation in the Dawson Creek area. The exploration drilling program was designed to intersect the coal zone located at the base of the Wapiti Formation. Several drill holes also penetrated portions of the underlying Puskwaskau and Bad Heart Formations. The stratigraphy of the Wapiti, Puskwaskau, and Bad Heart Formations is summarized in Table 3 and these formations are described in detail below.

5.1 Bad Heart Formation

The Bad Heart Formation was intersected by drill holes W RDH-7930 and 7932, and found to be approximately ten metres thick. The upper portion of the Bad Heart Formation consists of clean, fine to medium-grained, well-sorted lithic sandstone and probably represents a beach or barrier bar environment of deposition. The formation becomes progressively silty in its lower portions, and its contact with the marine mudstone of the underlying Muskiki Formation has a gradational character.

5.2 Puskwaskau Formation: Dowling, Thistle, and Hanson Members

The contact between the mudstone of the lower Puskwaskau Formation and the sandstone of the underlying

WAPITI COAL PROJECT

Table of Formations

TABLE 3

PERIOD	FORMATION	MEMBER	LITHOLOGY	AVERAGE THICKNESS
UPPER CRETACEOUS	Wapiti		Fine- to coarse-grained sandstone, siltstone, carbonaceous mudstone, coal, and conglomerate. A fairly continuous coal seam marks the base of this formation throughout the project area. Other seams appear to be discontinuous.	up to 460 m
	Puskwaskau	Chungo	Medium-grained lithic sandstone, usually well-sorted and massive, containing occasional pebbles. Silt content increases toward base. Gradational contact with Hanson Member.	10 m
		Hanson, Thistle, & Dowling	Dark grey concretionary marine siltstone and mudstone. A 1 m bentonitic bed occurs 43 m below the top of the Chungo Member. The Hanson, Thistle, and Dowling Members were not differentiated during the exploration program.	200 m
	Bad Heart		Fine- to medium-grained, well-sorted sandstone, becoming silty towards base. Gradational contact with underlying Muskiki Fm. mudstones.	10 m

Bad Heart Formation is conformable but abrupt. The dark grey mudstone of the Puskwaskau Formation is marine in origin and contains frequent sideritic concretions. This portion of the formation is sometimes divided into the Hanson, Thistle, and Dowling Members, with the central Thistle Member being calcareous, compared with the Hanson and Dowling Members, but no attempt to differentiate these three members was made during the 1979 - 1980 exploration program.

5.3 Chungo Member, Puskwaskau Formation

The Chungo Member of the Puskwaskau Formation is almost identical to the Bad Heart Formation. Both units consist of a coarsening upward sandstone sequence about ten metres thick, culminating in several metres of clean, well-sorted lithic sandstone at the top. Both units are also characterized by gradational lower contacts with underlying mudstone formations, and by abrupt upper contacts with the overlying strata.

The Chungo Member, like the Bad Heart Formation, probably represents a beach or barrier bar environment. The Chungo Member is overlain by the marginal marine and nonmarine sediments of the Wapiti Formation, whereas the Bad Heart Formation is overlain by marine mudstone.

Some difficulty was encountered during the early stages of geological mapping in distinguishing the Chungo Member from sandstone units of the overlying Wapiti Formation in areas with limited outcrop; the exploration drilling, however, established the fact that the Chungo Member is quite consistent in nature throughout the Wapiti Project area, and that the Chungo Member is distinct from Wapiti sandstones in its coarsening upward nature.

5.4 Wapiti Formation

An eroded sequence of Wapiti Formation strata lies at the top of the stratigraphic section in the project area. The Wapiti Formation consists of nonmarine clastic sediments, particularly sandstone and siltstone, and is estimated to be in excess of 400 metres thick.

Although the Wapiti Formation and equivalent strata contain coal seams in both British Columbia and Alberta, the stratigraphy of these formations has not been studied in detail because no persistent marker horizons have been identified in this thick sequence of continental sediments. The Wapiti Project drilling confirmed the fact that, within the Wapiti Formation, there is little lateral continuity of lithostratigraphic units over large distances (Wapiti Project - General Stratigraphic Correlation Chart; Drawing Nos. Wp-Dwg 7928 and Wp-Dwg 7929). Numerous fining upward

sedimentary cycles can be seen on the geophysical logs, and marine sediments have not been positively identified in outcrop or drill cuttings. These observations support the hypothesis that the Wapiti Formation sediments were deposited in a deltaic environment.

5.4.1 Seam No. 1

The most persistent coal seam in the Wapiti Project area lies at the base of the Wapiti Formation, and is referred to as Seam No. 1 in this report. Seam No. 1, where present, lies directly on top of the Chungo Member sandstone. The top one or two centimetres of the sandstone are sometimes carbonaceous.

Seam No. 1 attains its maximum development in drill hole W RDH-7904 near Muskeg Lake and Hidden Hill (Wapiti Project, Seam No. 1 Isopach Map; Drawing No. Wp-Dwg 7917 through 7921 inclusive) where it is 1.98 metres thick. The seam is continuous throughout the western portion of the Kiskatinaw Block but decreases in thickness towards the east. In drill holes near the Kiskatinaw River and One Island Lake the seam has been replaced by siltstone. On the Iris Lake block a thickness of 0.49 metres was measured in drill hole W RDH-7942 at the north end of

the block. In the vicinity of the Wapiti River near the south end of the block, surface mapping indicates that the same interval is occupied by silty claystone.

The Chungo Member forms the floor of Seam No. 1, with the coal, or sometimes carbonaceous claystone, resting directly on medium-grained sandstone. The roof sediments are variable, consisting of carbonaceous claystone, siltstone, and sandstone. The roof and floor sediments as well as rock partings within the seam are illustrated by the Seam No. 1 Correlation Chart (Drawing No. Wp-Dwg 7930).

5.4.2 Other Coal Seams

Two other coal seams (Seam Nos. 2 and 3) were intersected in the Wapiti Formation by drill holes in the vicinity of Bearhole Lake. Seam No. 2 lies 54 metres and Seam No. 3 lies 152 metres above Seam No. 1.

Very little information is currently available concerning these seams, except that they appear to be discontinuous and of uneconomic thickness. In fact, although the stratigraphic interval containing these seams was drilled in the northern half of the Kiskatinaw Block, the seams have not been found to be present in any area north of Muskeg Lake. The

maximum thickness intersected for Seam No. 2 is 0.42 metres in drill hole W RDH-7926. The maximum thickness for Seam No. 3 is 1.19 metres in drill hole W RDH-7928.

6.0 GEOLOGICAL STRUCTURE

The structural geology of the Kiskatinaw and Iris Lake Blocks of the Wapiti Coal Property are described separately, because the intensity of deformation is significantly different in each block.

6.1 Kiskatinaw Block

The Kiskatinaw Block is located to cover an area of broadly folded strata forming an extremely large, southeasterly plunging synclinorium. The individual folds within this structure trend in a southeasterly to east-southeasterly direction and have a very shallow plunge in that direction. The dip of the strata along the limbs of the folds increases towards the outcrop line on the southwestern edge of the block where the average dip is approximately six degrees, although localized dips as great as twenty degrees have been reported. At the north end of the block the average dip is one degree. The folds have an average plunge of one degree.

The style of the folding in this area is concentric and, in fact, represents broad warping under the influence of the compressive stresses of the nearby fold mountain belt. It is worthy of note that the trend of all the structures in this block appears to have a significantly different orientation to the trend of the fold mountain belt. The main trend of the

Inner Foothills in this area is approximately North 35° West, while individual structures in the Kiskatinaw Block appear to trend approximately North 45° West.

At the present time two faults have been defined in the Kiskatinaw Block. The first is located in the vicinity of Hourglass Lake and the second fault is located further south near Hanbrook Creek. The first fault is believed to have a maximum throw in the order of 100 metres, whereas the second is a major structure which may have a throw of 500 metres or more. Both structures are believed to be high angle reverse faults. The structure contour maps and the relevant cross-sections (Drawing Nos. Wp-Dwg 7912 through 7914 and 7927) included with this report illustrate the geological structure of the Kiskatinaw Block.

6.2 Iris Lake Block

The Iris Lake Block covers the northwest portion of a large syncline. The trend of the syncline is approximately North 45° West, and the structure has a shallow southeasterly plunge. Drill holes W RDH-7932 and 7942 indicate that the dip of the northeast limb of the fold is in the order of 9 degrees. At present, no faults have been identified within the Iris Lake Block.

7.0 COAL QUALITY

At the present time only a limited amount of information is available concerning the quality of the coal on the Wapiti Coal Project. Coal analyses for the cored holes W RDH-7939A and 7943 have been completed, as well as a number of trench samples. The location of the sampled trenches Nos. 3, 4, A and B are shown on Drawing No. Wp-Dwg 7902 and are illustrated as a text figure in Appendix II. The laboratory results from those analyses are included in Appendix III.

Norwest Resource Consultants Ltd. have carried out an evaluation of the coal analyses available from the Wapiti Project. That report is included as Appendix IV. The conclusions from that report are simply restated below for completeness.

"It has been difficult to assess the true quality of the coal in the Wapiti deposit, since the majority of the samples were collected from trenches or boreholes that were close to the surface. The result was that these samples were oxidized and their corresponding calorific value levels were depressed.

In furture exploration programmes, it will be necessary to determine the degree and extent of oxidized coal in this deposit.

The raw coal appears to have a dry ash content of about 25% and an "as received" moisture level of about 18 - 20%. The "as received" calorific value of the raw coal will vary from 6200 - 8350 Btu/lb depending upon the degree of oxidation.

A very substantial proportion of the coal exists in the 1.50 - 1.80 s.g. range and relatively small proportions in the floats at 1.40 s.g. and sinks at 1.80 s.g. This coal, therefore, would be very difficult to wash. We predict that the calorific value of the clean product would only be about 1000 Btu/lb higher than the raw coal, at a yield level of 70%. Such results do not indicate that washing would be an attractive economic proposition."

8.0 RESERVE AND RESOURCES

8.1 Summary

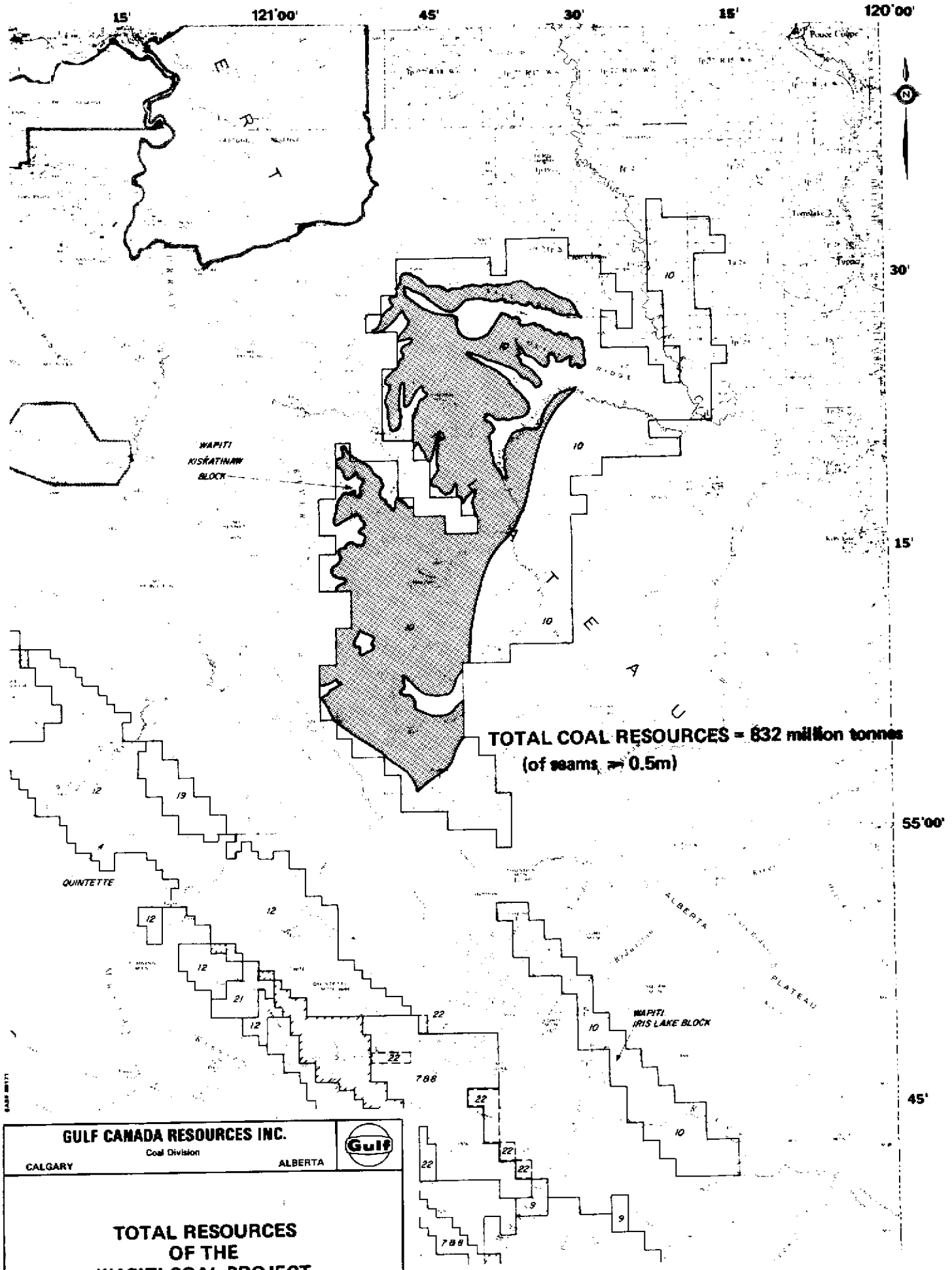
A reserve and resource calculation has been made for the Kiskatinaw Block of the Wapiti Coal Property. The methods of calculation are fully described in the section of this report entitled "Reserve and Resource Calculation Methodology." Insufficient data are available at present to warrant calculation of resources for the Iris Lake Block.

8.2 In Situ Resources

The total coal resources of the Wapiti licence blocks are 832 million tonnes (Table 4). These resources represent the total in situ tonnes contained within Seam No. 1 for thicknesses greater than 0.5 metres. The resource figure includes all coal and rock bands present within each seam section. Figure No. 3 illustrates this calculation.

8.3 Potential Surface Mineable Coal In Place

A reserve calculation for selected areas underlain by Seam No. 1 in the northern part of the Kiskatinaw Block has also been made and the results are shown on Table 5. These figures show that a total of 30.2 million tonnes might be available for mining by any suitable surface mining method at a limiting metric R.O.M. ratio of 10/1. A total of 65.2 million tonnes in this selected area are estimated to underlie the area between the line of outcrop and a highwall which has



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

TOTAL RESOURCES OF THE WAPITI COAL PROJECT

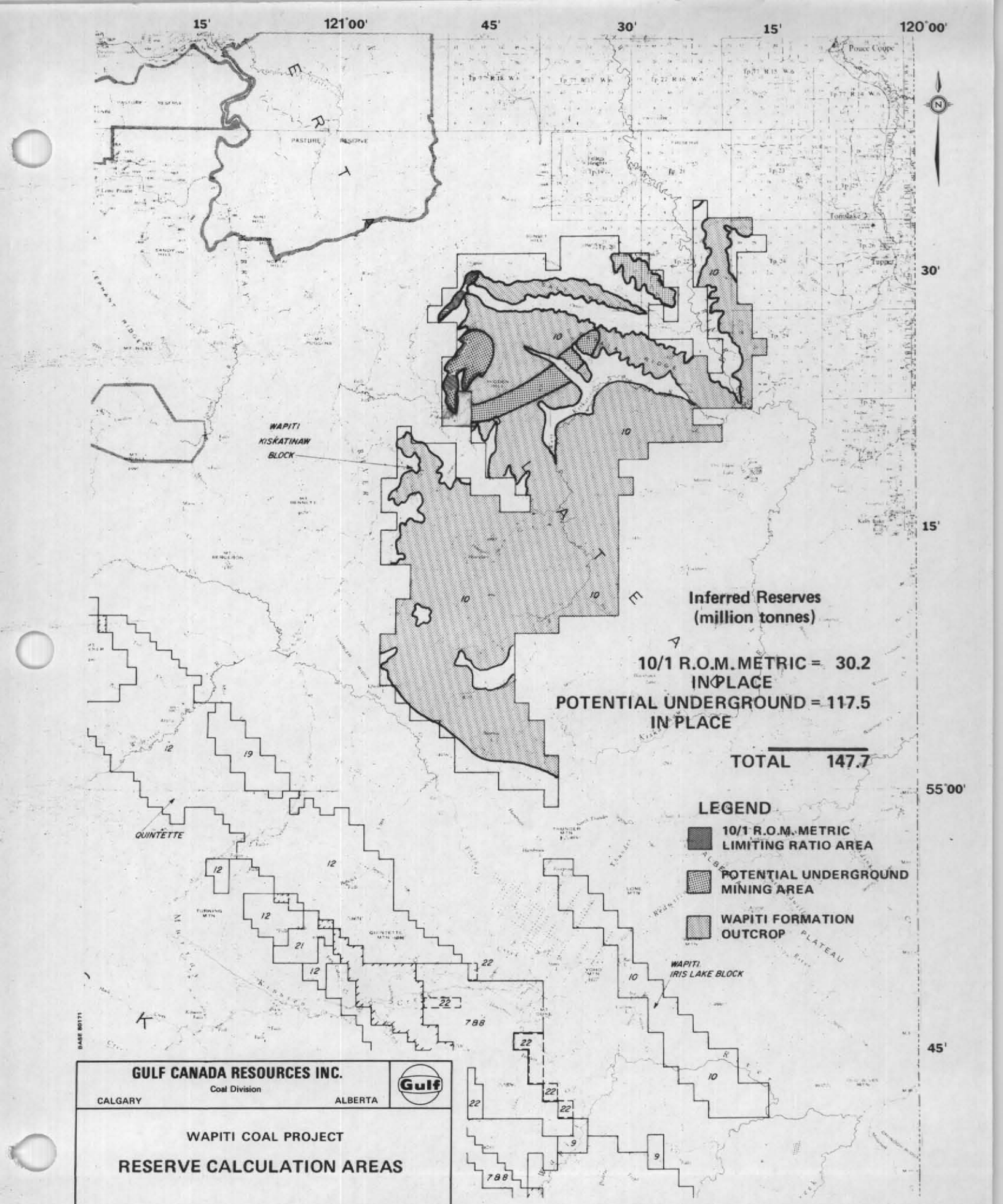
DRAWN BY:	DATE:	SCALE 1:800 000
PREPARED BY: EB GJ		DRAWING No. FIG. 3
APPROVED BY:	DATE: APR.80	

FILE No. 79452-3

an average height of 60 metres. These reserves are placed in an inferred category. The reserve calculation areas are illustrated on Figure No. 4 and Drawing Nos. Wp-Dwg 7917 through 7921 at the end of this report. Appendix No. V includes the tables of results prepared during the reserve calculations.

8.4 Potential Underground Mineable Coal In Place

Inferred reserves of 117.5 million tonnes of coal in place were estimated for the area in which the No. 1 seam is 1.5 metres or greater in thickness and for which the R.O.M. metric stripping ratio on the No. 1 seam exceeds an R.O.M. metric stripping ratio of 10/1. The maximum depth to the coal in the area is 220 metres. This coal may be mineable by underground methods.



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WAPITI COAL PROJECT

RESERVE CALCULATION AREAS

DRAWN BY:	DATE:	SCALE 1:500 000
PREPARED BY: ES		DRAWING No. FIG. 4
APPROVED BY:	DATE: APR. 80	

FILE No. 79452—4

0 1 2 3 4 5 10 15 20 MILES
0 5 10 15 20 25 30 KILOMETERS

TABLE NO. 4

Total Coal Resources

Wapiti Coal Project

Seam Thickness (Metres)	Tonnes In Place (Millions)
0.50 - 0.99	489.9
1.00 - 1.49	199.5
1.50 and greater	142.9
TOTAL	832.3

TABLE NO. 5
Potential Surface Mineable Coal

	Tonnes (Millions)
In Situ Limiting 10/1 Metric Strip Ratio	30.2
Metric Strip Ratio In Excess of 10:1 To An Average Highwall Height of 60 Metres	35.1
TOTAL	65.3

TABLE NO. 6
Potential Underground Mineable Coal

Seam Thickness	Tonnes (Millions)
1.5 metres and greater	117.5

8.5 Reserve and Resource Calculation Methodology

8.5.1 Summary

The resource base for the Kiskatinaw Block of the Wapiti Coal Property was calculated by first preparing an isopach map for Seam No. 1 which occurred throughout most of the property. The data used to prepare the isopach map was derived from the geophysical logs of the rotary drill holes and from logged trench sections. In all cases, true seam thicknesses have been used.

8.5.2 In Situ Resource Calculation

For the resource calculation, a coal thickness limit of 0.5 metres has been used and the area between succeeding 0.5 metre isopach contour intervals was measured by planimetry. The coal volume within each of these areas was determined by applying the mean value of adjacent isopach contours, and the sum of these volumes provides the total coal resource volume. A specific gravity of 1.5 was applied to the volume calculated above to determine the resource base in tonnes. The specific gravity used is believed to be representative of the raw coal from this area and certainly falls within the order of accuracy of this calculation.

8.5.3 Potential In Situ Surface Mineable Inferred Reserve Calculations

Coal resources have only been calculated for Seam No. 1 in the northern part of the Kiskatinaw Block. A thickness limit of 1.0 metres was applied to this calculation. The total coal volume was determined in a manner similar to that described above, and the reserves are considered to fall within an inferred category. It was considered unnecessary to make a correction to the drilled interval for true thickness since the dip of the strata is extremely small. Again, an in situ specific gravity of 1.5 was applied to this volume to determine in situ inferred tonnes. A vertical limiting overburden ratio of 10/1 metric was used to define one of the reserve areas, and an average highwall height of sixty metres forms the limit to the second area of calculation.

8.5.4 In Situ Underground Mineable Inferred Reserve Calculation

Reserve calculations for potential underground mineable coal were determined in a similar manner to that described in section 8.2, except that the minimum seam thickness included was 1.5 metres. The areas

previously outlined in section 8.3.1 as surface mineable reserves were excluded from the underground inferred reserve figure.

9.0 RECOMMENDATIONS FOR LICENCE RETENTION

The following schedule of licences includes all those for the Wapiti coal project which are recommended to be retained. The total area for these licences is 47 408 hectares.

Licence No.	Hectares	Licence No.	Hectares	Licence No.	Hectares
5155	294	5049	294	5021	294
5154	294	5048	294	5020	294
5153	294	5047	294	5019	294
5152	294	5046	294	5018	294
5151	294	5045	294	5017	294
5150	294	5044	294	5016	294
5074	294	5043	294	5015	294
5073	294	5042	294	5014	294
5072	294	5041	294	5013	294
5071	294	5040	294	5012	295
5070	294	5039	294	5011	295
5069	294	5038	294	5010	295
5068	294	5037	294	5009	295
5067	294	5036	294	5008	294
5066	294	5035	294	5007	294
5065	294	5034	294	5006	294
5064	294	5033	294	5005	294
5063	294	5032	294	5004	294
5062	294	5031	294	5003	294
5061	294	5030	294	5002	294
5060	294	5029	294	5001	294
5059	294	5028	294	5000	294
5058	294	5027	294	4999	294
5057	294	5026	294	4998	295
5056	294	5025	294	4997	295
5055	294	5024	294	4996	295
5054	294	5023	294	4995	295
5053	294	5022	294	4994	295
5052	294	4993	295	4964	295
5051	294	4992	295	4963	295
5050	294	4991	295	4962	295
	9114		9117		9126

Licence No.	Hectares	Licence No.	Hectares	Licence No.	Hectares
4990	295	4961	295	4936	295
4989	295	4960	295	4931	295
4988	295	-	-	5378	294
4987	295	4959	295	5377	294
4986	295	4958	295	5376	294
4985	295	4957	295	5375	294
4984	294	4956	295	5374	294
4983	294	4955	295	5372	295
4982	294	4954	295	5369	295
4981	294	4953	295	5360	295
4980	295	4952	295	5359	295
4979	295	4951	295	5358	295
4978	295	4950	295	5361	295
4977	295	4949	295	5355	295
4976	295	4948	295	5350	295
4975	295	4947	295	5357	295
4974	295	4946	295	5356	295
4973	295	4945	295		5010
4972	295	4944	295		
4971	295	4943	295		47 408
4970	295	4942	295		
4969	295	4941	295		
4968	295	4940	295		
4967	295	4939	295		
4966	295	4938	295		
4965	295	4937	295		
	7666		7375		

10.0 CONCLUSIONS

The well known and well exposed coal deposits of the Foothills and Plains have long been under the control of competitor companies and thus these areas are not available to Gulf Canada Resources Inc. for "grass roots" exploration. The Wapiti Project was based on sparse and poorly documented coal occurrences, consequently Gulf selected a large block of coal licences and by rapidly and economically exploring this block was able to quickly identify a specific area which contained all the potentially surface or underground mineable coal resources and reserves. Only the licences covering this smaller area will be retained for more detailed investigation. The results of the Wapiti Project suggest this approach could be effective in other areas where, although coal is not exposed at the surface, economically viable coal deposits could be pesent.

APPENDIX II

REPORT ON THE PHASE II EXPLORATION PROGRAM OF GULF CANADA RESOURCES INC. SOUTHWEST OF DAWSON CREEK, B.C.

Report on the Phase II Exploration Programme of Gulf Canada Resources Inc. Southwest of Dawson Creek, B. C.

By:

R. S. Verzosa

September, 1979

Langley, B. C.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

This report covers a drilling and trenching programme known as Phase II on the Wapiti coal property of Gulf Canada Resources Inc. southwest of Dawson Creek, B. C. The programme was primarily aimed to obtain information on the coal seam that rests on the Chungo sandstone member and in general to explore for coal the Upper Cretaceous Puskwaskau Formation. The programme started on August 13, 1979 and was completed on September 2, 1979.

Rotary drilling was confined to shallow widely-spaced holes on Salt and Oetata ridges and around Hidden Hill, figure 1. Seam trenching by bulldozer and by hand was carried out on previously known outcrops from which coal samples were cut and sent for analysis.

A Bell Jet Ranger was the chief means of transportation between Dawson Creek and the work area.

An absurd arrangement of bric-a-brac comprised Roke's airborne logging outfit which required two trips by helicopter of at least the 205 class to complete a move.

ROTARY DRILLING

The drilling was carried out by Bertram Drilling Ltd. of Carbon, Alberta using a Nodwell-mounted Mayhew 1000 and supported by a Nodwell water carrier with a capacity of 1000 gallons. The drilling operations went smoothly with no appreciable down time. At the end of the programme a total of 592.97 metres in 8 holes were drilled as follows:

Hole No.	Total Depth (metres)
R-1	42.68
R-2	51.82
R-3	146.34
R-4	74.69
R-5	41.16
R-6	131.10
R-7	45.73
R-8	59.45

The main problems encountered during the drilling operations were access and water supply. A crew of two slashers were kept busy on access and drill site preprations. A spare water carrier would have saved considerable standby time.

The ditch sampling procedure of scooping chip samples every now and then is not recommended for future programmes. A much improved arrangement would require the installation of an automatic sampler. The addition of a drilling-time logger ('geolog') is a must should a more precise lithologic log be desired. The lack of adequate control in this programme limited the presentation of hole lithology as percentage logs.

BORE HOLE LOGGING

All the drill holes, except for No. R-7 were surveyed by Roke Oil Enterprises Ltd. of Calgary for gamma ray-neutron, sidewall desity -caliper and resistivity. Hole No. R-7 having been the only hole drilled with air caved near the top and, therefore was not logged. The log records were excellent providing almost the sole means of guiding the drilling programme from each hole to the next. Some holes were only partially logged with

the resistivity tool due to severe loss of drilling fluid.

TRENCHING AND COAL SAMPLING

The known coal exposures of the same seam on the property are shown in Figure 1. The trenches dug on the coal seams and coal sample localities are shown in Figure 2.

Coal outcrops S-1, also known as the discovery seam, and S-5 on mile 44 were side cut along strike with a D-7 Bulldozer provided by Borek Construction Ltd. of Dawson Creek. The S-1 outcrop was cut along a strike length of approximately 30 meters and the S-5 outcrop, 15 meters. In addition, hand trenches were dug across the full thickness of the seam on outcrops S-1, S-2 and S-4 (Figure 2).

Coal samples from trench A and B were taken from a pillar left between two parallel channels cut 30 cm. apart and 3 cm. deep across the full thickness of the seam. From Trench A two such pillar samples were taken. Sample No. 1 is a composite sample representing the whole seam thickness and includes all rock bands. Sample Nos. 3a, 3b and 3c are discrete samples of one pillar, 3a (53 cm.) being the upper split, 3b (38 cm.) the rock band and 3c (105 cm.) the lower split (Figure 3). Sample 3a includes a 7 cm. coaly shale. A composite pillar sample (No. 2) that included a 20 cm. carbonaceous shale was taken from Trench B. Sample Nos. 4, 5, 6 and 7 are composite channel samples taken across the full thickness of the seams from the trenches dug by hand. The channels were dug 10 cm. wide and 7 cm. deep.

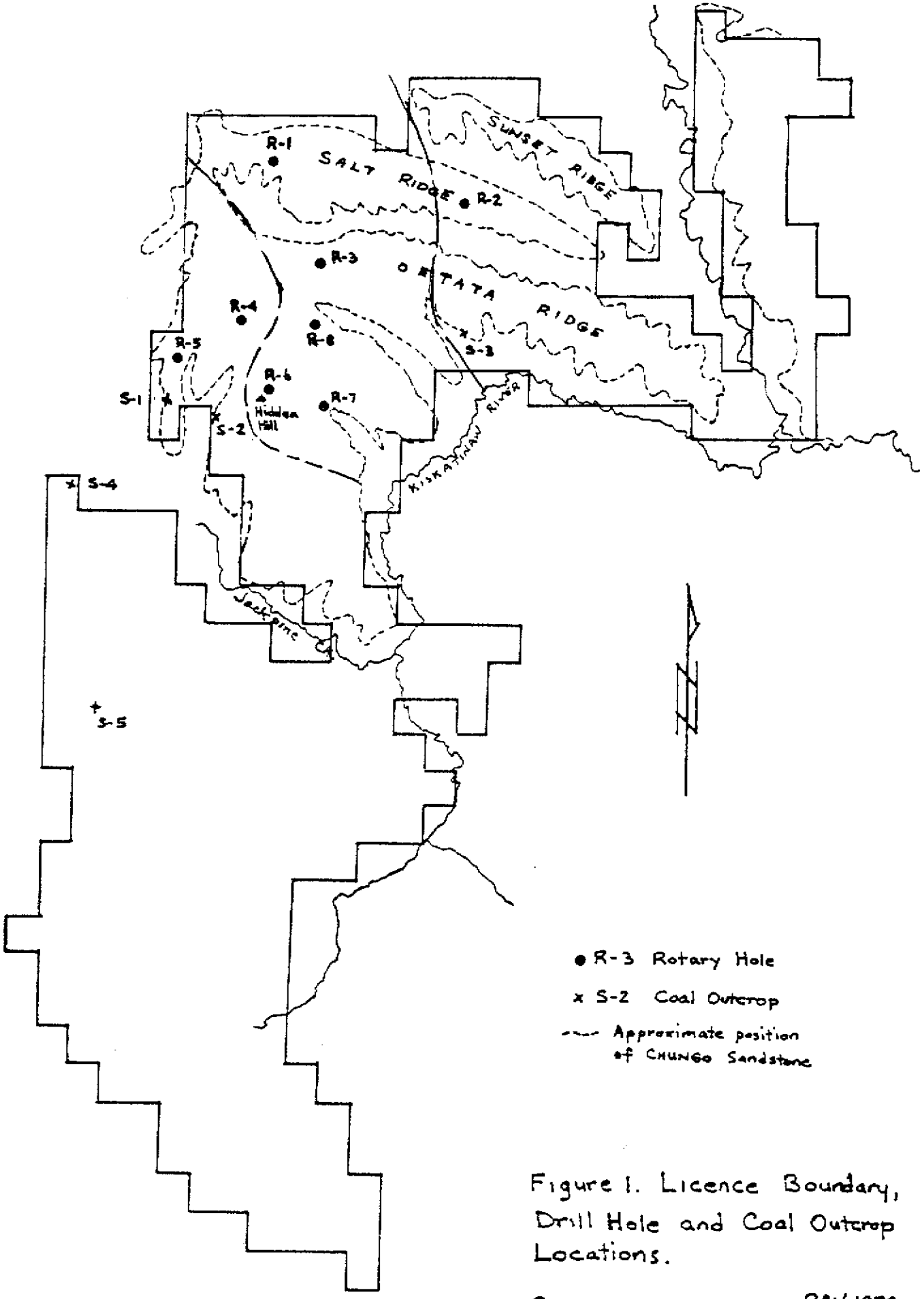


Figure 1. Licence Boundary, Drill Hole and Coal Outcrop Locations.

Scale 1:250,000 RSV 1979

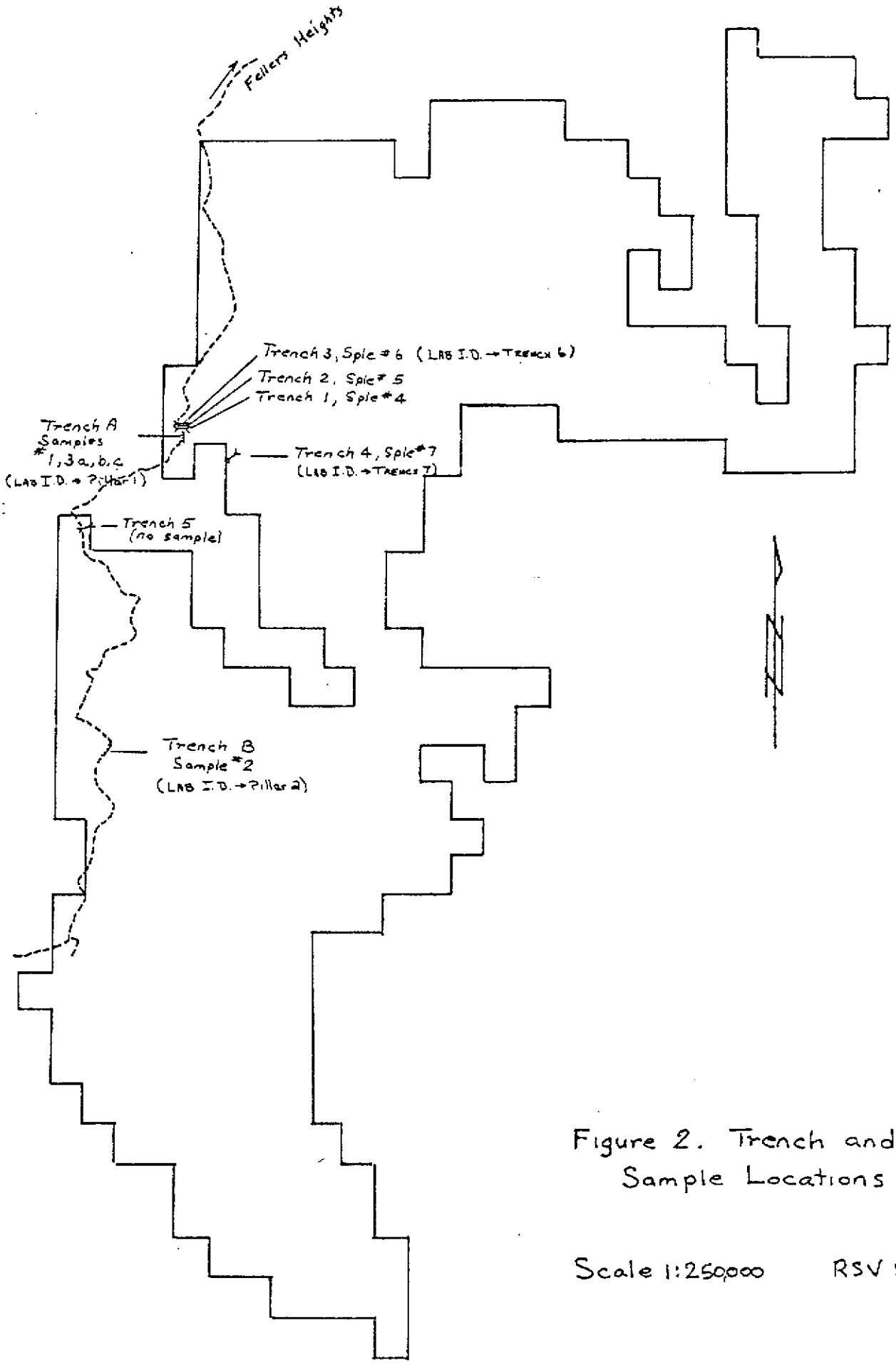


Figure 2. Trench and Sample Locations

Scale 1:250,000 RSV 1979

COAL SEAMS

The most prominent coal seam known so far on the property is that one directly resting on the Chungo sandstone member of the Puskwaskau Formation. For purposes of this report this seam will be referred to as the Discovery Seam. A second seam some 105 meters above the Chungo sandstone may be present as indicated by a very coaly interval of less than 30 cm. at a depth of 7.5 meters in hole No. R-6.

The Discovery Seam is well exposed in trenches dug on outcrops S-1, S-2, S-4 and S-5 whose measured sections are shown in Figure 3. In Trench A (Figure 1) the seam is 1.96 metres thick. The coal is generally dull although in parts include several semi-bright bands that are parallel to the bedding. Cleating is not discernible and if any only one component can be recognized as being parallel to the bedding. The Discovery Seam comprises a lower split, a middle shale band and a thinner upper split. The shale band in the trenches vary in thickness from 15 cm. to 38 cm. and in the rotary holes show a maximum thickness of 250 cm. Eastward from holes R-4 and R-5 the seam deterioriates, each split becoming either thinner or shaly with an attendant increase in the thickness of the rock band. This features are well shown in holes R-1, R-3, R-6 and R-8 (Fig. 4).

It may be worthy to note that the Chungo sandstone becomes more shaly eastward and that the deterioriated seam becomes roofed by sandstone units rather than the usual carbonaceous shale. Further eastward in hole R-2 the rock band thins down to 65 cm. with the coal apparently improving in quality.

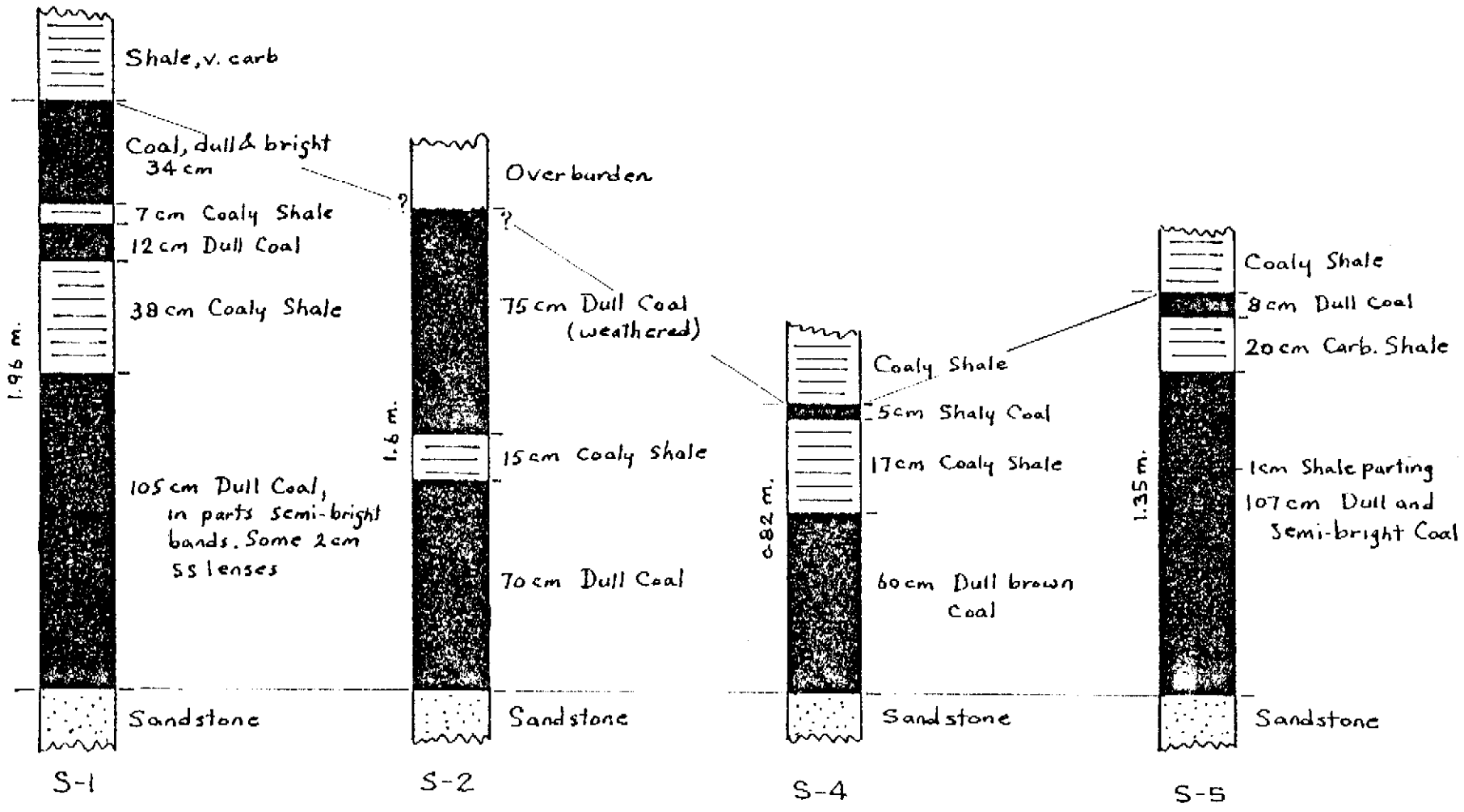


Figure 3. Trenched Coal Seam Sections of the Discovery Seam.

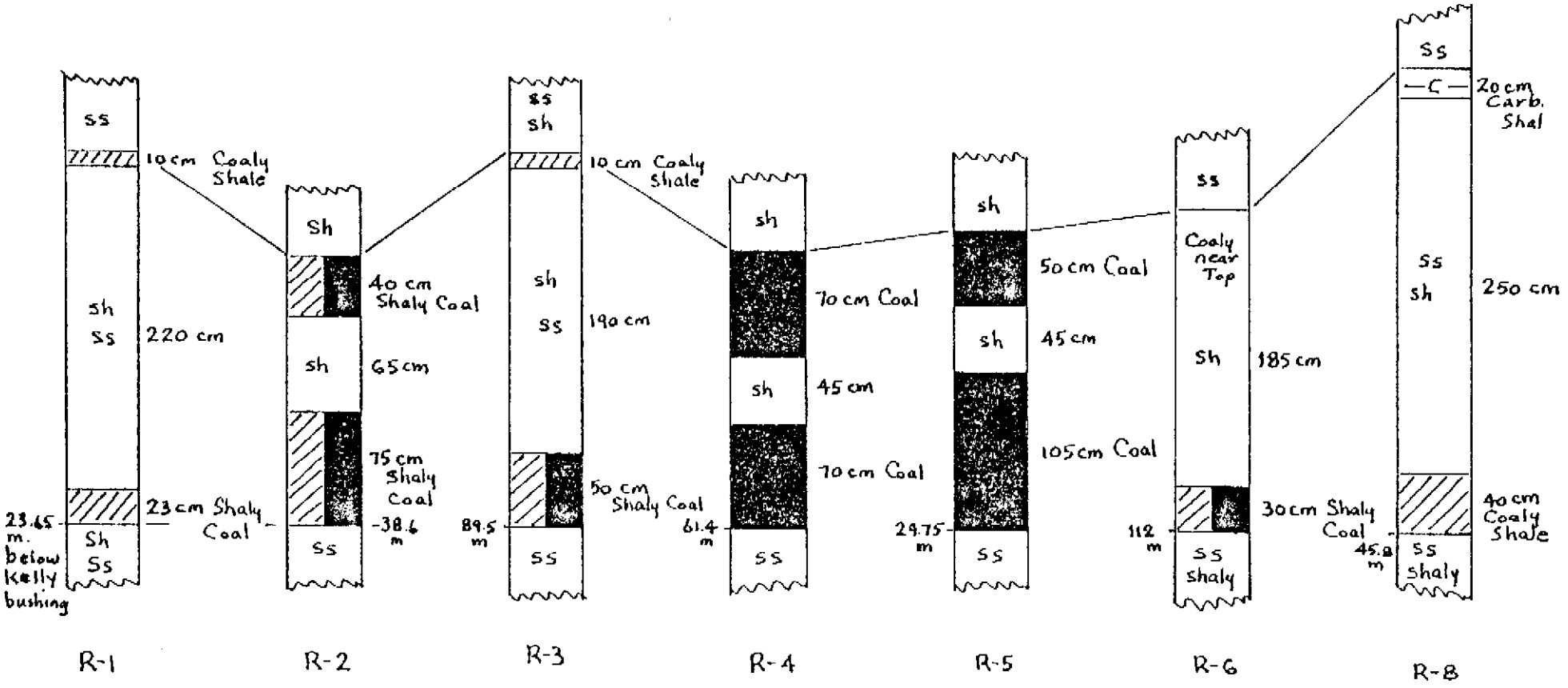


Figure 4. Interpretive correlated sections of the Discovery Seam intersected in rotary holes.

The Discovery Seam exposed in S-5 although thinner is of the same quality as that in S-1. It appears to be an improvement from that exposed in S-4 where the seam is only 82 cm. thick with the lower split consisting mainly of dull brown coal. The seam in S-5 is flat-lying although may have a 3 - 5 degree component to the southwest.

SUMMARY AND CONCLUSIONS

Eight rotary drill holes, two seam tracings by bulldozer and five trenches dug by hand were completed during the month of August, 1979 on the Wapiti Project of Gulf Canada Resources Inc. The results of the programme indicate that a large area east of an arbitrary line drawn between S-2 and R-6 thence northward between R-4 and R-1 and R-3 is not prospective for coal. However, a reported 1.9 metre coal seam in S-3 and the apparent improvement of the Discovery Seam in R-2 opens the east halves of Oefata and Salt ridges, as well as Sunset Ridge for further exploration.

The coal seam exposed in S-5 only indicates that the Discovery Seam extends into the south half of the property. As it appears, the occurrence of the S-5 outcrop above the 3500-foot elevation indicate that a flat-lying Chungo sandstone may underlie only limited areas of topographic highs. Considerable work will be required to verify whether or not the Chungo sandstone indeed outcrops at lower elevations, as shown in some maps along Jackpine Creek and West Kiskatinaw River.

Respectfully submitted:

R. S. Verzosa, P. Eng.
Geologist

APPENDIX I

ROTARY DRILL HOLE DATA

Hole No.	Coordinates Lat.	Long.	Collar Elev.	Total Depth	Seam Thickness Discovery	Other	Seam Floor Elev. Discovery	Other
R-1	55-29-45	120-42-45	1088 m.	42.68 m.	2.53 m.		1064	
R-2	55-28-36	120-33-13	1013	51.82	1.80		974	
R-3	55-26-43	120-40-00	1095	146.34	2.50		1005	
R-4	55-25-18	120-43-50	1051	74.69	1.85		989	
R-5	55-24-44	120-45-26	1044	41.16	2.00		1014	
R-6	55-23-45	120-42-40	1088	131.10	2.15	<0.30 m.	976	1080
R-7	55-23-07	120-39-48	1006	45.73				
R-8	55-25-11	120-40-08	1024	59.45	3.10		978	

Note: 1. Collar is taken to be at Kelly floor.

2. Elevations and coordinates are estimated from 1:50,000 military topographic maps.

APPENDIX V

RESERVE CALCULATION TABLES

RESOURCES

0.50 - 0.99	1.00 - 1.49	1.50 & greater
423.59	25.31	26.12
3.44	55.48	16.07
5.17	27.74	12.05
19.53	3.35	11.48
26.69	74.62	55.71
8.32	2.30	8.57
2.30	2.68	12.86
0.86	5.74	
	2.30	
489.90	199.52	142.86

TOTAL COAL RESOURCES

WAPITI COAL PROPERTY

Planimeter Area	True Area (Million Sq. Metres)	Seam Thickness (Metres)	Volume (Million Cu. Metres)	S.G.	In Situ (Million Tonnes)
1476	376.53	0.75	282.40	1.5	423.59
12	3.06	0.75	2.30	1.5	3.44
18	4.59	0.75	3.44	1.5	5.17
81	20.66	0.63	13.02	1.5	19.53
93	23.72	0.75	17.79	1.5	26.69
63	16.07	1.05	16.87	1.5	25.31
116	29.59	1.25	36.99	1.5	55.48
58	14.80	1.25	18.49	1.5	27.74
7	1.79	1.25	2.23	1.5	3.35
156	39.80	1.25	49.74	1.5	74.62
39	9.94	1.75	17.41	1.5	26.12
24	6.12	1.75	10.71	1.5	16.07
18	4.59	1.75	8.04	1.5	12.05
15	3.83	2.00	7.65	1.5	11.48
29	7.40	0.75	5.55	1.5	8.32
8	2.04	0.75	1.53	1.5	2.30
3	0.77	0.75	0.57	1.5	0.86
6	1.53	1.00	1.53	1.5	2.30
7	1.79	1.00	1.79	1.5	2.68
15	3.83	1.00	3.83	1.5	5.74
6	1.53	1.00	1.53	1.5	2.30
91	23.21	1.60	37.14	1.5	55.71
14	3.57	1.60	5.71	1.5	8.57
21	5.36	1.60	8.57	1.5	12.88
					832.28

SELECTED AREA WITH
IN-SITU LIMITING RATIO 10/1
(Bank Cum/Metric Tons)

Seam Thickness (Metres)	Planimeter Area	Planimeter Factor	True Area (Million Sq Metres)	Volume (Million Cu Metres)	Specific Gravity	In-Situ Tonnes (Million)
1.25	0045	0042.5	1.06	1.32	1.5	1.99
1.75	0122	0042.5	2.87	5.02	1.5	7.54
1.25	0018	0042.5	0.42	0.53	1.5	0.79
1.25	0047	0042.5	1.11	1.38	1.5	2.07
1.75	0010	0042.5	0.25	0.41	1.5	0.62
2.00	0029	0042.5	0.68	1.36	1.5	2.05
1.75	0148	0042.5	3.48	6.09	1.5	9.14
2.00	0011	0042.5	0.26	0.52	1.5	0.78
1.75	0084	0042.5	1.98	3.46	1.5	5.19
						30.17

SELECTED AREA WITH
AVERAGE MAXIMUM LIMIT
OF 200' COVER

Seam Thickness (Metres)	Planimeter Area	Planimeter Factor	True Area (Million Sq Metres)	Volume (Million Cu Metres)	Specific Gravity	In-Situ Tonnes (Million)
1.50	0009	0042.5	0.21	0.32	1.5	0.48
1.75	0034	0042.5	0.80	1.40	1.5	2.10
1.75	0101	0042.5	2.38	4.16	1.5	6.24
1.90	0028	0042.5	0.66	1.25	1.5	1.88
2.00	0005	0042.5	0.12	0.24	1.5	0.35
2.00	0123	0042.5	2.89	5.79	1.5	8.68
1.75	0048	0042.5	1.13	1.98	1.5	2.96
1.25	0143	0042.5	3.36	4.21	1.5	6.31
1.40	0016	0042.5	0.38	0.53	1.5	0.79
1.50	0057	0042.5	1.34	2.01	1.5	3.02
1.50	0022	0042.5	0.52	0.78	1.5	1.16
1.20	0026	0042.5	0.61	0.73	1.5	1.10
						35.07
					+ Tonnage @ 10/1	30.17
						65.24

UNDERGROUND RESERVES
(BEYOND 10/1 LIMIT SEAMS
1.5 m OR GREATER)

Area	Total Tonnage	Less 10/1 Limit	U/G Tonnes (Millions)
28	55.71	0	55.71
29	8.57	0	8.57
30	12.86	0	12.86
14	16.07	7.54	8.53
13	26.12	0.62 + 5.19	20.31
17	11.48	2.05 + 0.78	8.65
15	12.05	9.14	2.91
			117.54

APPENDIX I

LEGAL DESCRIPTION OF THE WAPITI COAL LICENCES

LEGAL DESCRIPTION OF THE WAPITI COAL LICENCES

MAP SHEET	BLOCK	UNITS	HECTARES	LICENCE NO.
93-I-9	K	21, 22, 31, 32	300	4758
		23, 24, 33, 34	299	4759
		25, 26, 35, 36	299	4760
		27, 28, 37, 38	299	4761
		41, 42, 51, 52	299	4762
		43, 44, 53, 54,	299	4763
		45, 46, 55, 56	299	4764
		47, 48, 57, 58	299	4765
		49, 50, 59, 60	299	4766
		65, 66, 75, 76	299	4767
		67, 68, 77, 78	299	4768
		69, 70, 79, 80	299	4769
		85, 86, 95, 96	299	4770
		87, 88, 97, 98	299	4771
		89, 90, 99, 100	299	4772
93-I-9	L	61, 62, 71, 72	299	5156
		81, 82, 91, 92	299	4773
		83, 84, 93, 94	299	4774
93-I-15	H	21, 22, 31, 32	298	4775
		41, 42, 51, 52	298	4776
		43, 44, 53, 54	298	4777
		45, 46, 55, 56	298	4778
		63, 64, 73, 74	298	4779
		65, 66, 75, 76	298	4780
		67, 68, 77, 78	298	4781
		85, 86, 95, 96	298	4782
		87, 88, 97, 98	298	4783
93-I-15	I	7, 8, 17, 18	298	4784
		9, 10, 19, 20	298	4785
		89, 90, 99, 100	297	4801

93-I-16	C	9, 10, 19, 20	299	4786
93-I-16	D	1, 2, 11, 12	299	4787
		3, 4, 13, 14	299	4788
		21, 22, 31, 32	299	4789
		23, 24, 33, 34	299	4790
		25, 26, 35, 36	299	4791
		43, 44, 53, 54	299	4792
		45, 46, 55, 56	299	4793
		65, 66, 75, 76	299	4794
		67, 68, 77, 78	299	4795
		69, 70, 79, 80	299	4796
		87, 88, 97, 98	299	4797
		89, 90, 99, 100	299	4798
93-I-16	E	9, 10, 19, 20	299	4799
		29, 30, 39, 40	298	4800
93-P-2	A	9, 10, 19, 20	297	4802
		29, 30, 39, 40	297	4803
93-P-2	B	1, 2, 11, 12	297	4804
		3, 4, 13, 14	297	4805
		5, 6, 15, 16	297	4806
		21, 22, 31, 32	297	4807
		23, 24, 33, 34	297	4808
		25, 26, 35, 36	297	4809
		27, 28, 37, 38	297	4810
		29, 30, 39, 40	297	4811
		41, 42, 51, 52	297	4812
		43, 44, 53, 54	297	4813
		45, 46, 55, 56	297	4814
		47, 48, 57, 58	297	4815
		49, 50, 59, 60	297	4816
		61, 62, 71, 72	297	4817
		63, 64, 73, 74	297	4818
		65, 66, 75, 76	297	4819
		67, 68, 77, 78	297	4820
		69, 70, 79, 80	297	4821
		83, 84, 93, 94	297	4822

93-P-2	B	85, 86, 95, 96	297	4823
		87, 88, 97, 98	297	4824
		89, 90, 99, 100	297	4825
93-P-2	C	21, 22, 31, 32	297	5314
		41, 42, 51, 52	297	4826
		61, 62, 71, 72	297	4827
		63, 64, 73, 74	297	5315
		81, 82, 91, 92	297	4828
		83, 84, 93, 94	297	4829
		85, 86, 95, 96	297	4830
		87, 88, 97, 98	297	5316
93-P-2	E	21, 22, 31, 32	297	5317
		41, 42, 51, 52	296	5318
		61, 62,.71, 72	296	4831
93-P-2	F	1, 2, 11, 12	297	4832
		3, 4, 13, 14	297	4833
		5, 6, 15, 16	297	4834
		7, 8, 17, 18	297	4835
		9, 10, 19, 20	297	5319
		21, 22, 31, 32	297	4836
		23, 24, 33, 34	297	4837
		25, 26, 35, 36	297	4838
		27, 28, 37, 38	297	4839
		29, 30, 39, 40	297	4840
		41, 42, 51, 52	296	4841
		43, 44, 53, 54	296	4842
		45, 46, 55, 56	296	4843
		47, 48, 57, 58	296	4844
		49, 50, 59, 60	296	4845
		61, 62, 71, 72	296	4846
		63, 64, 73, 74	296	4847
		65, 66, 75, 76	296	4848
		67, 68, 77, 78	296	4849
		69, 70, 79, 80	296	4850

93-P-2	F	81, 82, 91, 92	296	4851
		83, 84, 93, 94	296	4852
		85, 86, 95, 96	296	4853
		87, 88, 97, 98	296	4854
		89, 90, 99, 100	296	4855
93-P-2	G	5, 6, 15, 16	297	4856
		7, 8, 17, 18	297	4857
		9, 10, 19, 20	297	4858
		25, 26, 35, 36	297	4859
		27, 28, 37, 38	297	4860
		29, 30, 39, 40	297	4861
		45, 46, 55, 56	296	4862
		47, 48, 57, 58	296	4863
		49, 50, 59, 60	296	4864
		65, 66, 75, 76	296	4865
		67, 68, 77, 78	296	4866
		69, 70, 79, 80	296	4867
		81, 82, 91, 92	296	5320
		83, 84, 93, 94	296	5321
		85, 86, 95, 96	296	4868
		87, 88, 97, 98	296	4869
		89, 90, 99, 100	296	4870
93-P-2	H	89, 90, 99, 100	296	5322
93-P-2	I	1, 2, 11, 12	296	5323
		3, 4, 13, 14	296	5324
		5, 6, 15, 16	296	5325
		7, 8, 17, 18	296	5326
		9, 10, 19, 20	296	5327
		21, 22, 31, 32	296	5328
		23, 24, 33, 34	296	5329
		25, 26, 35, 36	296	5330
		27, 28, 37, 38	296	4871
		29, 30, 39, 40	296	4872
		41, 42, 51, 52	296	5331

93-P-2	I	43, 44, 53, 54	296	5332
		45, 46, 55, 56	296	4873
		47, 48, 57, 58	296	4874
		49, 50, 59, 60	296	4875
		61, 62, 71, 72	296	5333
		63, 64, 73, 74	296	5334
		65, 66, 75, 76	296	5335
		67, 68, 77, 78	296	4876
		69, 70, 79, 80	296	4877
		81, 82, 91, 92	296	5336
		83, 84, 93, 94	296	4878
		85, 86, 95, 96	296	5337
		87, 88, 97, 98	296	5338
		89, 90, 99, 100	296	4879
93-P-2	J	1, 2, 11, 12	296	4880
		3, 4, 13, 14	296	4881
		5, 6, 15, 16	296	4882
		7, 8, 17, 18	296	4883
		9, 10, 19, 20	296	4884
		21, 22, 31, 32	296	4885
		23, 24, 33, 34	296	4886
		25, 26, 35, 36	296	4887
		27, 28, 37, 38	296	4888
		29, 30, 39, 40	296	4889
		41, 42, 51, 52	296	4890
		43, 44, 53, 54	296	4891
		45, 46, 55, 56	296	4892
		47, 48, 57, 58	296	4893
		49, 50, 59, 60	296	4894
		61, 62, 71, 72	296	4895
		63, 64, 73, 74	296	4896
		65, 66, 75, 76	296	4897
		67, 68, 77, 78	296	4898
		69, 70, 79, 80	296	4899

93-P-2	J	81, 82, 91, 92	296	4900
		83, 84, 93, 94	296	4901
		85, 86, 95, 96	296	4902
		87, 88, 97, 98	296	4903
		89, 90, 99, 100	296	4904
93-P-2	K	1, 2, 11, 12	296	4905
		3, 4, 13, 14	296	4906
		5, 6, 15, 16	296	4907
		7, 8, 17, 18	296	4908
		9, 10, 19, 20	296	4909
		21, 22, 31, 32	296	4910
		23, 24, 33, 34	296	4911
		25, 26, 35, 36	296	4912
		27, 28, 37, 38	296	4913
		41, 42, 51, 52	296	4914
		43, 44, 53, 54	296	4915
		45, 46, 55, 56	296	4916
		47, 48, 57, 58	296	4917
		61, 62, 71, 72	296	4918
		63, 64, 73, 74	296	4919
		65, 66, 75, 76	296	4920
		67, 68, 77, 78	296	4921
		69, 70, 79, 80	296	4922
		81, 82, 91, 92	296	4923
		83, 84, 93, 94	296	4924
		85, 86, 95, 96	296	4925
		87, 88, 97, 98	296	4926
		89, 90, 99, 100	296	4927
93-P-2	L	61, 62, 71, 72	296	5339
		81, 82, 91, 92	296	5340
93-P-7	A	1, 2, 11, 12	295	5341
		3, 4, 13, 14	295	4928
		5, 6, 15, 16	295	4929
		7, 8, 17, 18	295	4930

93-P-7	A	9, 10, 19, 20	295	4931
		21, 22, 31, 32	295	4932
		23, 24, 33, 34	295	4933
		25, 26, 35, 36	295	4934
		27, 28, 37, 38	295	4935
		29, 30, 39, 40	295	4936
		41, 42, 51, 52	295	5342
		43, 44, 53, 54	295	5343
		45, 46, 55, 56	295	5344
		47, 48, 57, 58	295	5345
		49, 50, 59, 60	295	4937
		61, 62, 71, 72	295	5346
		63, 64, 73, 74	295	5347
		65, 66, 75, 76	295	5348
		67, 68, 77, 78	295	5349
		69, 70, 79, 80	295	5350
		81, 82, 91, 92	295	5351
		83, 84, 93, 94	295	5352
		85, 86, 95, 96	295	5353
		87, 88, 97, 98	295	5354
		89, 90, 99, 100	295	5355
93-P-7	B	1, 2, 11, 12	295	4938
		3, 4, 13, 14	295	4939
		5, 6, 15, 16	295	4940
		7, 8, 17, 18	295	4941
		9, 10, 19, 20	295	4942
		21, 22, 31, 32	295	4943
		27, 28, 37, 38	295	4944
		29, 30, 39, 40	295	4945
		41, 42, 51, 52	295	4946
		43, 44, 53, 54	295	4947
		61, 62, 71, 72	295	4948
		63, 64, 73, 74	295	4949
		65, 66, 75, 76	295	4950
		67, 68, 77, 78	295	4951

93-P-7	B	81, 82, 91, 92	295	4952
		83, 84, 93, 94	295	4953
		85, 86, 95, 96	295	4954
		87, 88, 97, 98	295	4955
93-P-7	C	1, 2, 11, 12	295	4956
		3, 4, 13, 14	295	4957
		5, 6, 15, 16	295	4958
		7, 8, 17, 18	295	4959
		9, 10, 19, 20	295	4960
		21, 22, 31, 32	295	4961
		23, 24, 33, 34	295	4962
		25, 26, 35, 36	295	4963
		27, 28, 37, 38	295	4964
		29, 30, 39, 40	295	4965
		41, 42, 51, 52	295	4966
		43, 44, 53, 54	295	4967
		45, 46, 55, 56	295	4968
		47, 48, 57, 58	295	4969
		49, 50, 59, 60	295	4970
		63, 64, 73, 74	295	4971
		65, 66, 75, 76	295	4972
		67, 68, 77, 78	295	4973
		69, 70, 79, 80	295	4974
		83, 84, 93, 94	295	4975
		85, 86, 95, 96	295	4976
		87, 88, 97, 98	295	4977
		89, 90, 99, 100	295	4978
93-P-7	D	21, 22, 31, 32	295	5356
		41, 42, 51, 52	295	5357
93-P-7	F	9, 10, 19, 20	295	4979
		21, 22, 31, 32	295	5358
		23, 24, 33, 34	295	5359
		41, 42, 51, 52	295	5360
		43, 44, 53, 54	295	4980

93-P-7	F	61, 62, 71, 72	294	4981
		63, 64, 73, 74	294	4982
		81, 82, 91, 92	294	4983
		83, 84, 93, 94	294	4984
93-P-7	G	1, 2, 11, 12	295	4985
		3, 4, 13, 14	295	4986
		5, 6, 15, 16	295	4987
		7, 8, 17, 18	295	4988
		9, 10, 19, 20	295	5361
		21, 22, 31, 32	295	4989
		23, 24, 33, 34	295	4990
		25, 26, 35, 36	295	4991
		27, 28, 37, 38	295	4992
		29, 30, 39, 40	295	4993
		41, 42, 51, 52	295	4994
		43, 44, 53, 54	295	4995
		45, 46, 55, 56	295	4996
		47, 48, 57, 58	295	4997
		49, 50, 59, 60	295	4998
		61, 62, 71, 72	294	4999
		63, 64, 73, 74	294	5000
		65, 66, 75, 76	294	5001
		67, 68, 77, 78	294	5002
		69, 70, 79, 80	294	5003
		81, 82, 91, 92	294	5004
		83, 84, 93, 94	294	5005
		85, 86, 95, 96	294	5006
		87, 88, 97, 98	294	5007
		89, 90, 99, 100	294	5008
93-P-7	H	1, 2, 11, 12	295	5362
		3, 4, 13, 14	295	5363
		5, 6, 15, 16	295	5364
		7, 8, 17, 18	295	5365

93-P-7	H	9, 10, 19, 20	295	5009
		21, 22, 31, 32	295	5366
		23, 24, 33, 34	295	5367
		25, 26, 35, 36	295	5368
		27, 28, 37, 38	295	5369
		29, 30, 39, 40	295	5010
		41, 42, 51, 52	295	5370
		43, 44, 53, 54	295	5371
		45, 46, 55, 56	295	5372
		47, 48, 57, 58	295	5011
		49, 50, 59, 60	295	5012
		61, 62, 71, 72	294	5373
		63, 64, 73, 74	294	5374
		65, 66, 75, 76	294	5375
		67, 68, 77, 78	294	5013
		69, 70, 79, 80	294	5014
		81, 82, 91, 92	294	5015
		83, 84, 93, 94	294	5016
		85, 86, 95, 96	294	5017
		87, 88, 97, 98	294	5018
		89, 90 99, 100	294	5019
93-P-7	I	1, 2, 11, 12	294	5020
		3, 4, 13, 14	294	5021
		5, 6, 15, 16	294	5022
		7, 8, 17, 18	294	5023
		9, 10, 19, 20	294	5024
		21, 22, 31, 32	294	5025
		23, 24, 33, 34	294	5026
		25, 26, 35, 36	294	5027
		27, 28, 37, 38	294	5028
		29, 30, 39, 40	294	5029
		41, 42, 51, 52	294	5030
		43, 44, 53, 54	294	5031
		45, 46, 55, 56	294	5032
		47, 48, 57, 58	294	5033
		49, 50, 59, 60	294	5034

93-P-7	I	61, 62, 71, 72	294	5035
		63, 64, 73, 74	294	5036
		65, 66, 75, 76	294	5037
		67, 68, 77, 78	294	5038
		69, 70, 79, 80	294	5039
		81, 82, 91, 92	294	5040
		83, 84, 93, 94	294	5041
		85, 86, 95, 96	294	5042
		87, 88, 97, 98	294	5043
		89, 90, 99, 100	294	5044
93-P-7	J	1, 2, 11, 12	294	5045
		3, 4, 13, 14	294	5046
		5, 6, 15, 16	294	5047
		7, 8, 17, 18	294	5048
		9, 10, 19, 20	294	5049
		21, 22, 31, 32	294	5050
		23, 24, 33, 34	294	5051
		25, 26, 35, 36	294	5052
		27, 28, 37, 38	294	5053
		29, 30, 39, 40	294	5054
		41, 42, 51, 52	294	5055
		43, 44, 53, 54	294	5056
		45, 46, 55, 56	294	5057
		47, 48, 57, 58	294	5058
		49, 50, 59, 60	294	5059
		61, 62, 71, 72	294	5060
		63, 64, 73, 74	294	5061
		65, 66, 75, 76	294	5062
		67, 68, 77, 78	294	5063
		79, 70, 79, 80	294	5064
		81, 82, 91, 92	294	5065
		83, 84, 93, 94	294	5066
		85, 86, 95, 96	294	5067
		87, 88, 97, 98	294	5068
		89, 90, 99, 100	294	5069

93-P-7	K	1, 2, 11, 12	294	5070
		21, 22, 31, 32	294	5071
		41, 42, 51, 52	294	5072
		43, 44, 53, 54	294	5376
		45, 46, 55, 56	294	5377
		61, 62, 71, 72	294	5073
		63, 64, 73, 74	294	5378
		81, 82, 91, 92	294	5074
93-P-8	D	49, 50, 59, 60	295	5379
		87, 88, 97, 98	295	5380
		89, 90, 99, 100	295	5381
93-P-8	E	1, 2, 11, 12	295	5382
		3, 4, 13, 14	295	5383
		5, 6, 15, 16	295	5384
		7, 8, 17, 18	295	5385
		9, 10, 19, 20	295	5386
		21, 22, 31, 32	295	5387
		23, 24, 33, 34	295	5388
		25, 26, 35, 36	295	5389
		27, 28, 37, 38	295	5390
		29, 30, 49, 40	295	5391
		41, 42, 51, 52	295	5392
		43, 44, 53, 54	295	5393
		45, 46, 55, 56	295	5394
		47, 48, 57, 58	295	5395
		49, 50, 59, 60	295	5396
		61, 62, 71, 72	294	5075
		63, 64, 73, 74	294	5076
		65, 66, 75, 76	294	5077
		67, 68, 77, 78	294	5078
		69, 70, 79, 80	294	5079
		81, 82, 91, 92	294	5080
		83, 84, 93, 94	294	5081

93-P-8	E	85, 86, 95, 96	294	5082
		87, 88, 97, 98	294	5083
		89, 90, 99, 100	294	5084
93-P-8	F	7, 8, 17, 18	295	5397
		9, 10, 19, 20	295	5398
		43, 44, 53, 54	295	5085
		45, 46, 55, 56	295	5086
		47, 48, 57, 58	295	5087
		49, 50, 59, 60	295	5088
		63, 64, 73, 74	294	5089
		65, 66, 75, 76	294	5090
		67, 68, 77, 78	294	5091
		69, 70, 79, 80	294	5092
		83, 84, 93, 94	294	5093
		85, 86, 95, 96	294	5094
		89, 90, 99, 100	294	5095
93-P-8	K	1, 2, 11, 12	294	5096
		3, 4, 13, 14	294	5097
		5, 6, 15, 16	294	5098
		23, 24, 33, 34	294	5099
		25, 26, 35, 36	294	5100
		27, 28, 37, 38	294	5101
		43, 44, 53, 54	294	5102
		45, 46, 55, 56	294	5103
		47, 48, 57, 58	294	5104
		65, 66, 75, 76	294	5105
		67, 68, 77, 78	294	5106
		85, 86, 95, 96	294	5107
		87, 88, 97, 98	294	5108
		89, 90, 99, 100	294	5109
93-P-8	L	1, 2, 11, 12	294	5110
		3, 4, 13, 14	294	5111
		5, 6, 15, 16	294	5112
		7, 8, 17, 18	294	5113

93-P-8	L	9, 10, 19, 20	294	5114
		27, 28, 37, 38	294	5115
		29, 30, 39, 40	294	5116
		43, 44, 53, 54	294	5117
		47, 48, 57, 58	294	5118
		49, 50, 59, 60	294	5119
		63, 64, 73, 74	294	5120
		65, 66, 75, 76	294	5121
		67, 68, 77, 78	294	5122
		69, 70, 79, 80	294	5123
		85, 86, 95, 96	294	5124
		87, 88, 97, 98	294	5125
		89, 90, 99, 100	294	5126
93-P-9	C	5, 6, 15, 16	294	5127
		7, 8, 17, 18	294	5128
		9, 10, 19, 20	294	5129
		21, 22, 31, 32	293	5130
		23, 24, 33, 34	293	5131
		25, 26, 35, 36	293	5132
		27, 28, 37, 38	293	5133
		29, 30, 39, 40	293	5134
		43, 44, 53, 54	293	5135
		45, 46, 55, 56	293	5136
		47, 48, 57, 58	293	5137
		49, 50, 59, 60	293	5138
		69, 70, 79, 80	293	5139
93-P-9	D	7, 8, 17, 18	294	5140
		9, 10, 19, 20	294	5141
93-P-10	A	1, 2, 11, 12	294	5142
		3, 4, 13, 14	294	5143
		5, 6, 15, 16	294	5144
		7, 8, 17, 18	294	5145
		21, 22, 31, 32	294	5146
		23, 24, 33, 34	294	5147

93-P-10	A	25, 26, 35, 36	294	5148
		27, 28, 37, 38	294	5149
93-P-10	B	1, 2, 11, 12	294	5150
		3, 4, 13, 14	294	5151
		5, 6, 15, 16	294	5152
		7, 8, 17, 18	294	5153
		9, 10, 19, 20	294	5154
93-P-10	C	1, 2, 11, 12	294	5155

E. Swanbergson
G. Seve
80-04-02

PR-WAPITI 79(3)A
(2 of 2)

Borehole Data

3/5
683

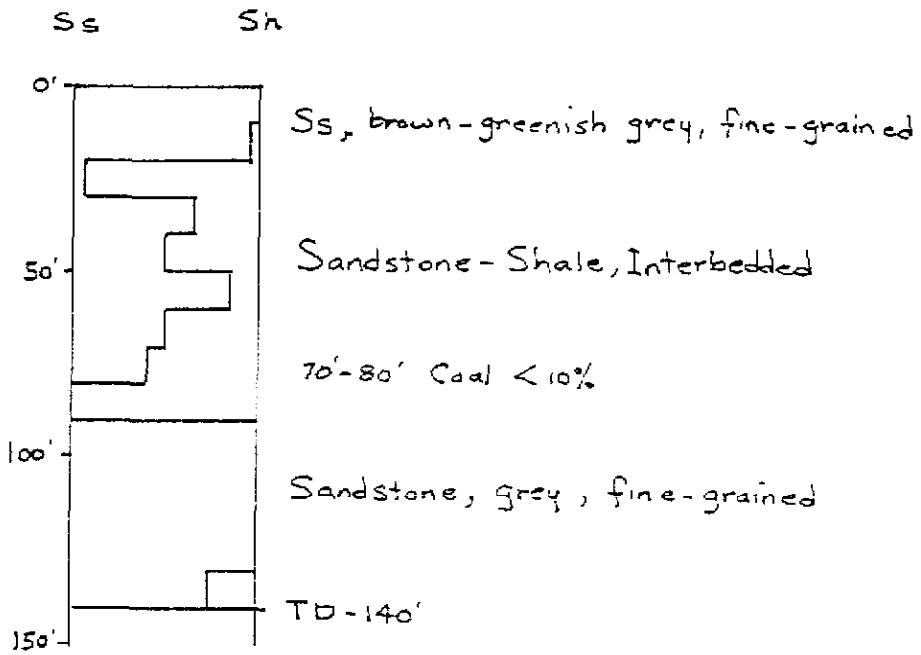
APPENDIX II

of Phase II Report

R S. Verzosa

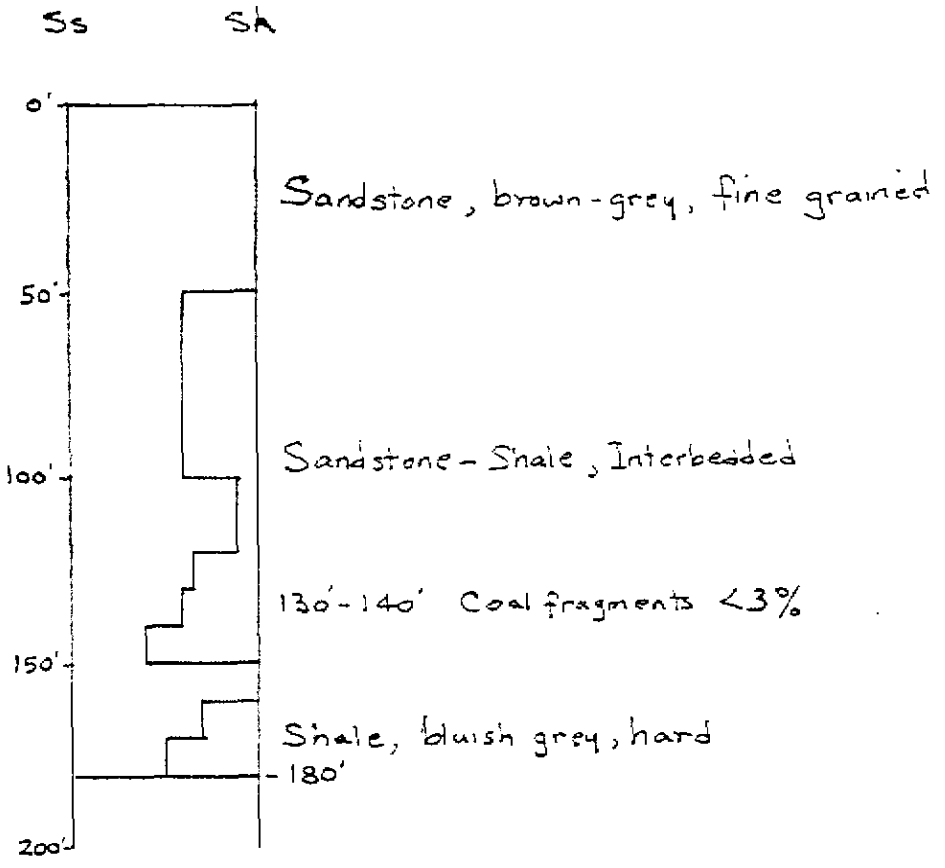
HOLE NO. R-1 (ROTARY)

Percentage Log of Cuttings



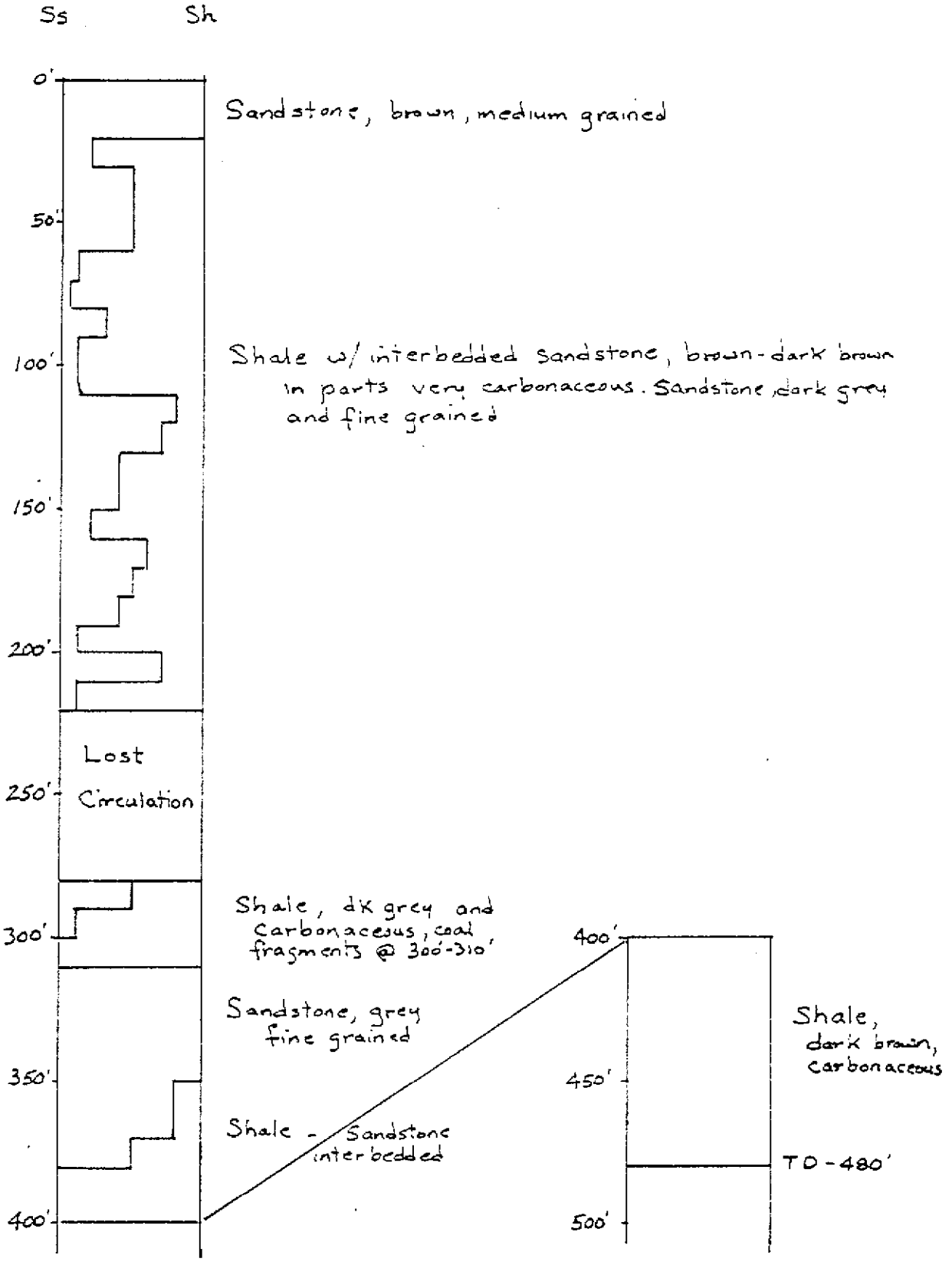
HOLE NO. R-2 (ROTARY)

Percentage Log of Cuttings



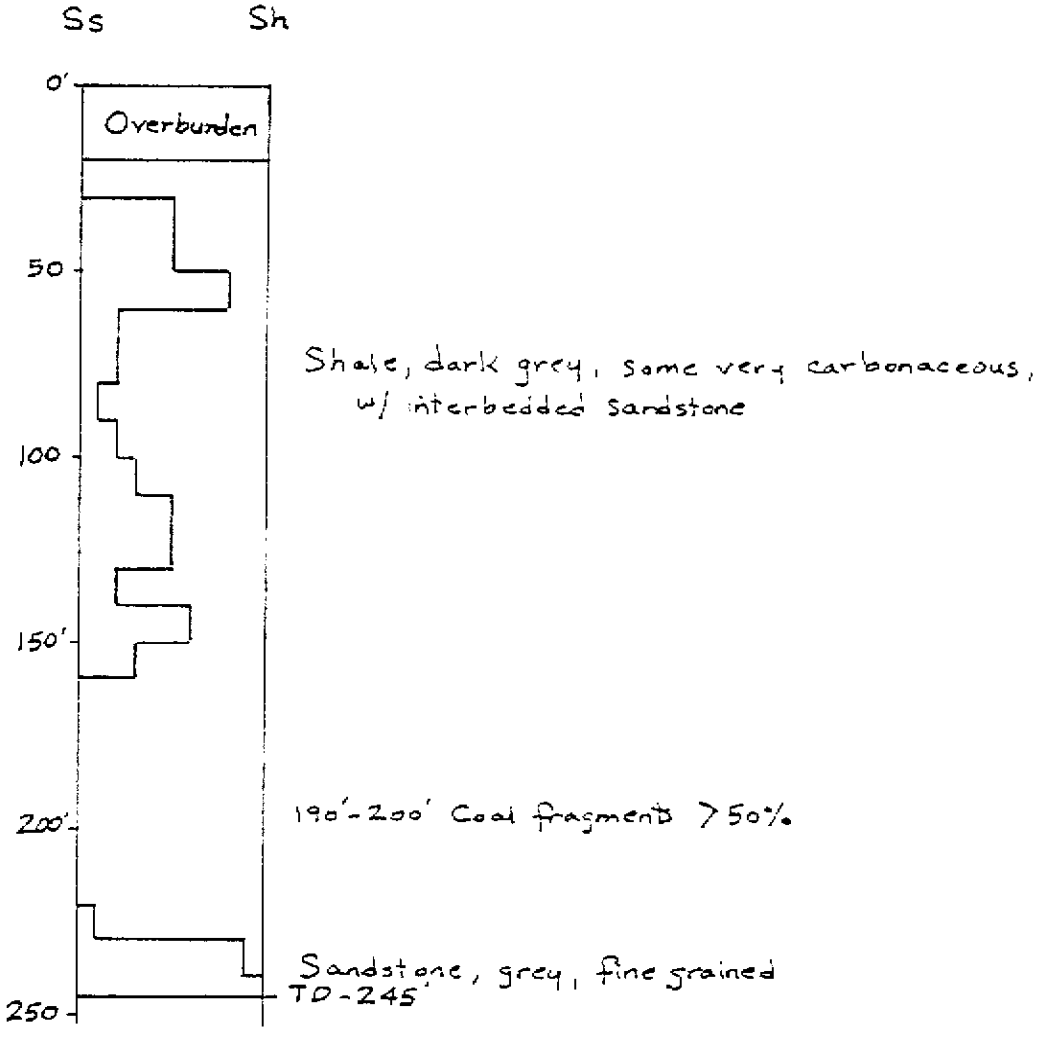
HOLE NO. R-3 (ROTARY)

Percentage Log of Cuttings



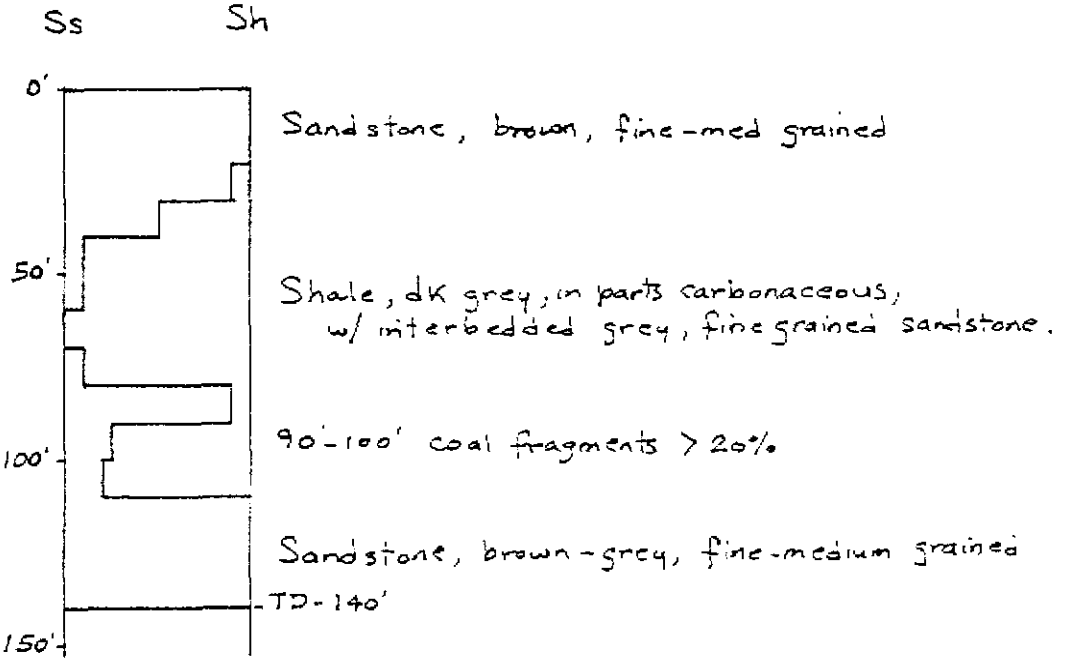
HOLE No. R-4 (ROTARY)

Percentage Log of Cuttings



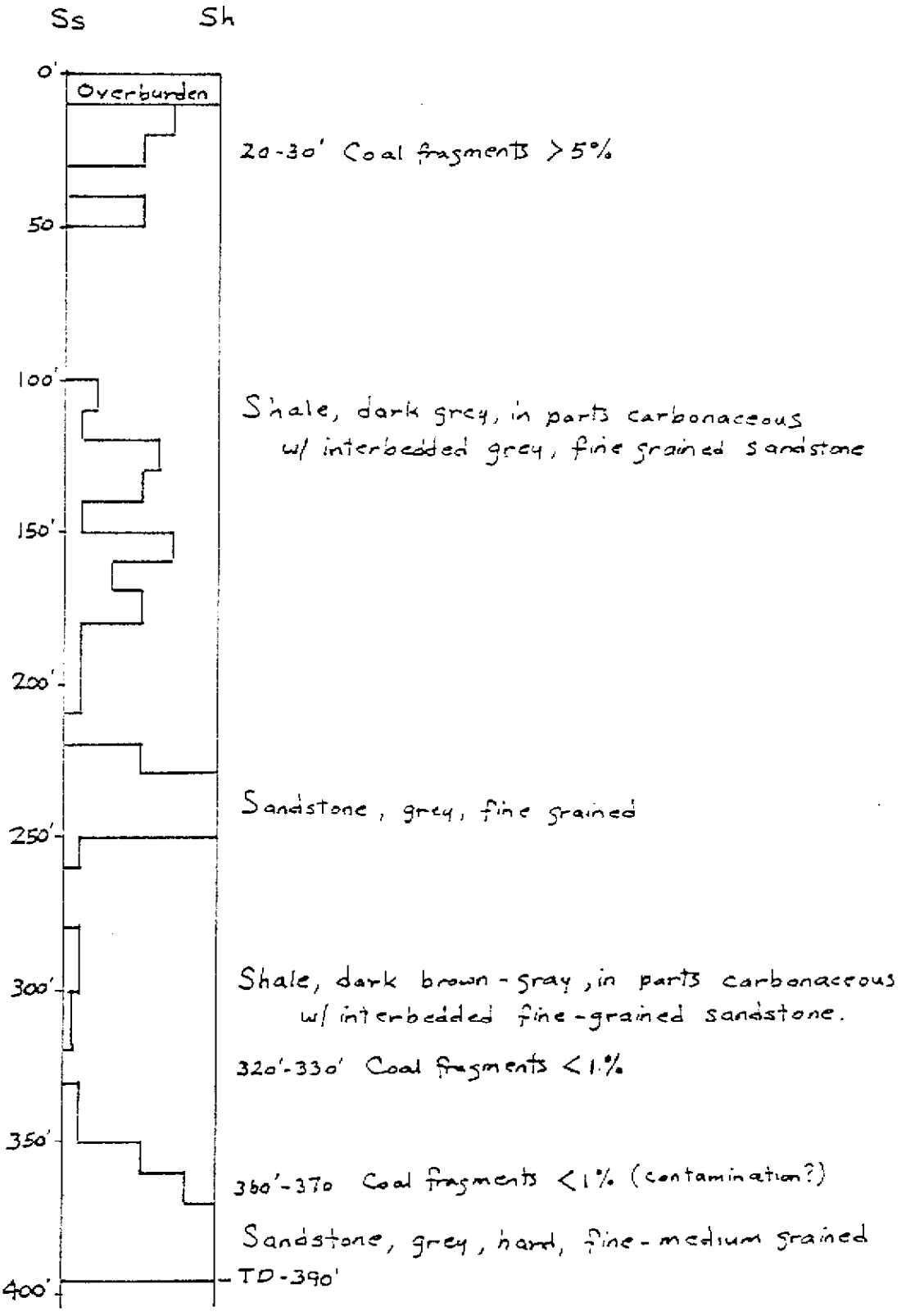
Hole No. R-5 (Rotary)

Percentage Log of Cuttings



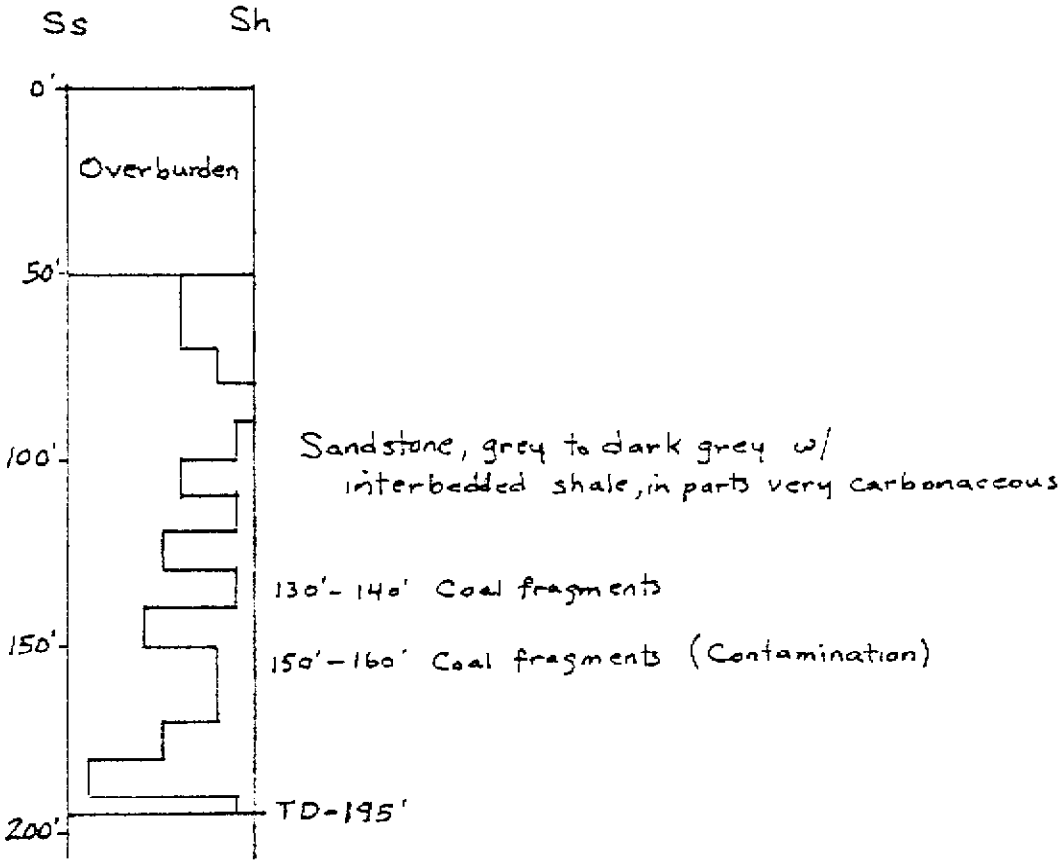
Hole No. R-6 (Rotary)

Percentage Log of Cuttings



HOLE NO. R-8 (ROTARY)

Percentage Log of Cuttings



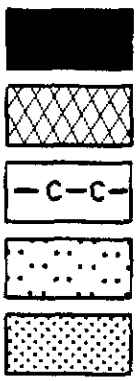
APPENDIX III

LABORATORY ANALYSIS RESULTS

FOR DRILL HOLE AND TRENCH SAMPLES

LEGEND

COAL SEAM LOG



COAL

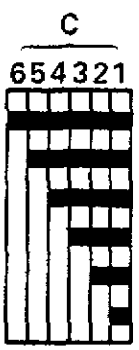
BONE OR STONE COAL

CARBONACEOUS CLAYSTONE

SILTSTONE

SANDSTONE

SEAM COMPOSITE



C1	80% TO 100% BRIGHT
C2	60% – 80% BRIGHT
C3	40% – 60% BRIGHT
C4	20% – 40% BRIGHT
C5	0% – 20% BRIGHT
C6	BONE COAL

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

WAPITI PROJECT

LEGEND FOR VISUAL
CORE DESCRIPTION LOGS

DRAWN BY	DATE	SCALE
PREPARED BY		DRAWING No.
APPROVED BY	DATE:	

FILE No. 80253

GULF CANADA RESOURCES INC. – COAL DIVISION

DIAMOND DRILL CORE LOG

HOLE NO.: W-RDH-7943
PROJECT:
LOCATION:
CO. ORDS.:
ELEV. COLLAR: Unsurveyed
BEARING: N/A
HOLE ANGLE: 90°
TOTAL DEPTH: 14.25 m
CORE SIZE:
LOGGED BY: G. Hoffman
SHEET NO.: 1 of 2
DATE BEGUN: Feb. 13/80
DATE COMPL.: Feb. 13/80
CONTRACTOR

BCN	BOX MARKER	INTERVAL FROM	INTERVAL TO	INTERVAL THICK	CORE LOSS	LITHOLOGICAL UNIT FROM	LITHOLOGICAL UNIT TO	LITHOLOGICAL UNIT APPAR. THK	LITHOLOGICAL UNIT TRUE THK	% REC	DESCRIPTION AND SAMPLE NO.	RECOV. m Rec.
		10	10	0								
		.49	.57	.08							SANDSTONE - medium grey, medium-grained, with silty layers and coaly inclusions; micaceous; core strongly broken	0.080
		.57	.63	.06							SILTSTONE - medium grey, coaly inclusions, sandy lenses; core unbroken, no core loss at contact with coal	0.060
		.63	.74	.11							COAL - dull banded, unbroken	0.110
		.74	.75	.01							SILTSTONE - medium grey	0.010
		.75	.77	.02							COAL - dull banded	0.020
		.77	.81	.04							COAL - stoney	0.040
		.81	.91	.10							COAL - dull banded	0.100
		.91	.92	.01							CLAYSTONE - carbonaceous	0.010
		.92	.97	.05							COAL - dull and bright	0.050
			11									
		.97	.04	.07							COAL - dull	0.070
		11										
		.04	.24	.20							COAL - dull banded	0.200
		.24	.40	.16							CLAYSTONE - carbonaceous	0.160
		.40	.42	.02							SILTSTONE - light grey with iron staining	0.020
		.42	.52	.10							COAL - stoney	0.100

FILE NO. 7944

GULF CANADA RESOURCES INC.

COAL SEAM DATA SHEET

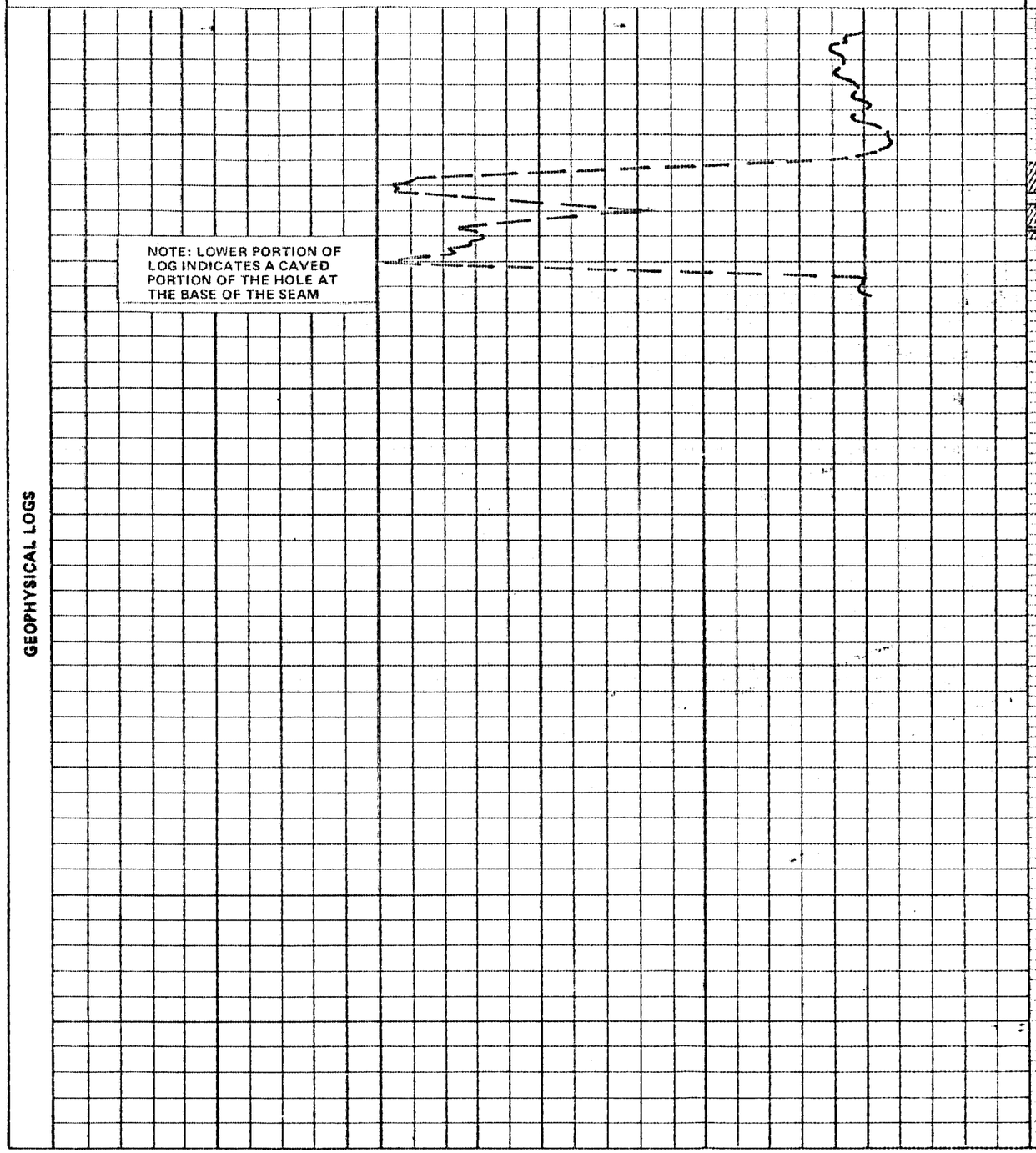
FILE NO. B0252-2

COAL DIVISION

DENSITY ——— RESISTIVITY - - - - -

DENSITY SCALE 1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80

RESISTIVITY SCALE



GEOPHYSICAL LOGS

DRILL NO. W-RDH-7943 SEAM NO.1 SEAM INTERVAL 10.63-12.25m

SCALE 1:100

SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	BTU
	10.00m												
	10.63m			0.610		W.R.D.H.	W.R.D.H.						
	11.00m		0.180			7943	7943	11.0	22.2	29.0	37.8	0.38	7976
				0.385									
	12.25m		0.030	0.310		0001	0001						
	13.00m												

GULF CANADA RESOURCES INC. – COAL DIVISION

DIAMOND DRILL CORE LOG

HOLE NO.: W-RDH-7943
PROJECT:
LOCATION:
CO. ORDS.:
ELEV. COLLAR: Unsurveyed
BEARING: N/A
HOLE ANGLE: 90°
TOTAL DEPTH: 14.25 m
CORE SIZE:
LOGGED BY: G. Hoffman
SHEET NO.: 2 of 2
DATE BEGUN: Feb. 13/80
DATE COMPL.: Feb. 13/80
CONTRACTOR

BCN	BOX MARKER	INTERVAL FROM	INTERVAL TO	INTERVAL THICK	CORE LOSS	LITHOLOGICAL UNIT FROM	LITHOLOGICAL UNIT TO	LITHOLOGICAL UNIT APPAR. THK	LITHOLOGICAL UNIT TRUE THK	% REC	DESCRIPTION AND SAMPLE NO.	RECOV. m Rec.
		11	11	0								
		.52	.65	.13							COAL - dull banded	0.130
		.65	.715	.065							COAL - dull and bright	0.065
		.715	.795	.08							COAL - dull banded	0.080
		.795	.855	.06							COAL - stoney	0.060
		.855	.895	.04							COAL - dull	0.040
		.895	.905	.01							COAL - dull and bright	0.010
		.905	.935	.03							CLAYSTONE - carbonaceous	0.030
		.935	.955	.02							COAL - dull and brighter	0.020
			12									
		.955	.095	.14							COAL - dull, minor calcite veinlets	0.140
		12										
		.095	.105	.01							COAL - dull banded	0.010
		.105	.125	.02							COAL - dull	0.020
		.125	.245	.012							COAL - dull banded, weathered; core broken, but no apparent core loss	0.120
		.245	.265	.02							CLAYSTONE - carbonaceous, heavily iron stained; core broken	0.020
		.265	.355	.09							SANDSTONE - black, coaly, friable; heavily weathered and iron stained	0.090
		.355	.540	.99							SANDSTONE - light grey, medium-grained, lithic, massive; Chungo Member. Last 0.250 m core strongly broken base of hole at 15.25 m. Open hole below cored interval.	0.990

FILE NO. 7944

GULF CANADA RESOURCES INC.

COAL SEAM DATA SHEET

FILE NO. 80252-1

COAL DIVISION

DENSITY — — — RESISTIVITY ———

DRILL NO. W-RDH-7939A SEAM NO.1 SEAM INTERVAL 27.87-29.66 m

SCALE 1:50

DENSITY SCALE 1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80

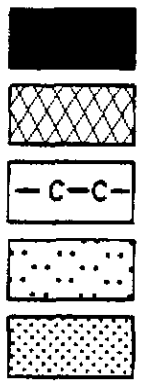
RESISTIVITY SCALE

GEOPHYSICAL LOGS

SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S'	BTU
	27.87m				TOTAL SEAMS	W.R.D.H. 7939A 0001	W.R.D.H. 7939A 0001	4.1	25.0	29.1	41.8	0.50	9800
	28.97m					CORE LOSS							
	29.66m												

LEGEND

COAL SEAM LOG



COAL

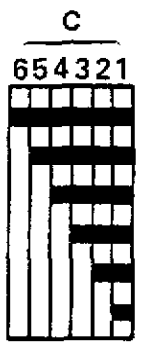
BONE OR STONE COAL

CARBONACEOUS CLAYSTONE

SILTSTONE

SANDSTONE

SEAM COMPOSITE



C1	80% TO 100% BRIGHT
C2	60% – 80% BRIGHT
C3	40% – 60% BRIGHT
C4	20% – 40% BRIGHT
C5	0% – 20% BRIGHT
C6	BONE COAL

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WAPITI PROJECT

LEGEND FOR VISUAL
CORE DESCRIPTION LOGS

DRAWN BY	DATE:	SCALE
PREPARED BY		DRAWING No.
APPROVED BY	DATE.	

FILE No 80253

GULF CANADA RESOURCES INC. – COAL DIVISION

DIAMOND DRILL CORE LOG

HOLE NO.: W-RDH-7939A
PROJECT: ____
LOCATION: ____
CO. ORDS.: ____
ELEV. COLLAR: Unsurveyed
BEARING: N/A
HOLE ANGLE: 90°
TOTAL DEPTH: 31.70 m
CORE SIZE: ____
LOGGED BY: G. Hoffman
SHEET NO.: 1 of 2
DATE BEGUN: Feb. 5/80
DATE COMPL.: Feb. 5/80
CONTRACTOR ____

BCN	BOX MARKER	INTERVAL FROM	INTERVAL TO	INTERVAL THICK	CORE LOSS	LITHOLOGICAL UNIT FROM	LITHOLOGICAL UNIT TO	APPAR. THK	TRUE THK	% REC	DESCRIPTION AND SAMPLE NO.	
		27	27								SANDSTONE - medium grey, fine-grained, silty	
		.87	.97	.10							COAL - bright banded, pyrite; core and roof contact unbroken	0.100
		27	28									
		.97	.02	.05							COAL - bright, pyrite	0.050
		28										
		.02	.05	.03							COAL - bright banded, pyrite	0.030
		.05	.11	.06							COAL - dull banded, pyrite	0.060
		.11	.14	.03							COAL - bright banded, pyrite	0.030
		.14	.21	.07							COAL - dull banded, pyrite	0.070
		.21	.25	.04							COAL - dull and bright, pyrite	0.040
											Top of Box 4	
		.25	.31	.06							COAL - dull banded, pyrite	0.060
		.31	.37	.06							COAL - bright banded, pyrite	0.060
		.37	.47	.10							COAL - dull, pyrite	0.100
		.47	.53	.06							COAL - dull banded, pyrite	0.060
		.53	.56	.03							COAL - bright, pyrite	0.030
		.56	.70	.14							COAL - dull banded, pyrite	0.140
		.70	.73	.03							COAL - dull and bright, pyrite	0.030

GULF CANADA RESOURCES INC. – COAL DIVISION

DIAMOND DRILL CORE LOG

HOLE NO.: W-RDH-7939A
PROJECT:
LOCATION:
CO. ORDS.:
ELEV. COLLAR: Unsurveyed
BEARING: N/A
HOLE ANGLE: 90°
TOTAL DEPTH: 31.70 m
CORE SIZE:
LOGGED BY: G. Hoffman
SHEET NO.: 2 of 2
DATE BEGUN: Feb. 5/80
DATE COMPL.: Feb. 5/80
CONTRACTOR

BCN	BOX MARKER	INTERVAL FROM	INTERVAL TO	INTERVAL THICK	CORE LOSS	LITHOLOGICAL UNIT FROM	LITHOLOGICAL UNIT TO	APPAR. THK	TRUE THK	% REC	DESCRIPTION AND SAMPLE NO.	
		28	28	0								
		.73	.76	.03							COAL - dull banded, pyrite	0.030
		.76	.81	.05							COAL - dull, pyrite	0.050
		.81	.83	.02							COAL - dull and bright, pyrite	0.020
		.83	.85	.02							COAL - bright, pyrite	0.020
		.85	.91	.06							MUDSTONE - dark grey, carbonaceous, bright coal inclusions; core broken, probable core loss	0.060
		.91	.97	.06							COAL - bright banded, pyrite - rich; core broken, core loss probable; end of coring run	0.060
			29									
		.97	.66	.67							CORE LOSS - coal	0.000
		29	29									
		.66	.72	.06							SANDSTONE - black, coaly, with bright coal inclusions; core broken	0.060
			31	1								
		.72	.48	.76							SANDSTONE - light grey, medium-grained, lithic, massive; Chungo Member	1.760
		31		0								
		.48	.70	.22							CORE LOSS - base of hole at 31.7 m	