

CONFIDENTIAL

**GEOLOGICAL REPORT
GULF CANADA RESOURCES INC.**

**Wapiti Project
Phase IV Exploration Program**

**March, 1981
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**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

00 685

C.L.:

4972-4974, 4976-4984, 4993, 4998, 5002
5003, 5007, 5008, 5049, 5054, 5070, 5071, 5072
5358-5360, 5376, 5377, 6525, 6526, 6527

LAT 55° 22' N LONG 120° 46' 30"

NTS 93P

TABLE OF CONTENTS

	<u>Page No.</u>
1.0 SUMMARY	1
2.0 INTRODUCTION	3
2.1 Location and Access	3
2.2 Physiography	4
2.3 Scope of Work	5
3.0 PREVIOUS WORK	12
3.1 Phase I	12
3.2 Phase II	12
3.3 Phase III	13
4.0 GEOLOGY	14
4.1 Regional Geology	14
4.2 Local Geology	14
4.2.1 Stratigraphy	14
4.2.2 Structure	16
4.3 Coal Geology	17
4.3.1 No. 1 Seam	17
4.3.2 Coal Quality	21
5.0 RESERVES	34
5.1 Description of Reserve Areas	34
5.2 Methods of Reserve Calculations	34
5.3 Reserve Summary	37
6.0 CONCLUSIONS AND RECOMMENDATIONS	38

LIST OF TABLES AND FIGURES

Page No.

TABLE NO. 1	SAMPLE COLLECTING DETAILS	7
TABLE NO. 2	DAILY AND CUMULATIVE DRILLING DATA	10
TABLE NO. 3	NO. 1 SEAM DETAILS	19
TABLE NO. 4	NO. 1 SEAM RESERVES AND OVERBURDEN QUANTITIES	36
TABLE I	RAW COAL CHEMICAL CHARACTERISTICS	27
TABLE II	SCREEN ANALYSIS	28
TABLE III	RAW COAL CHEMICAL CHARACTERISTICS	29
TABLE IV	FLOAT/SINK DATA SUMMARY	30
TABLE V	CALORIFIC VALUES	31
TABLE VI	CUMULATIVE CLEAN COAL RESULTS	32
FIGURE NO. 1	KISKATENAW BLOCK STRATIGRAPHY	15

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1.0 SUMMARY

No major stratigraphic changes were determined during Phase IV exploration. The No. 1 seam at the base of the Upper Cretaceous Wapiti Formation is the major coal seam. No other economic coal seams were encountered during drilling. The No. 1 seam is thickest in the area at the northwest end of the Kiskatenaw lease block. It thins to the north, south, and east, and is eroded away up dip to the west.

No important structural changes were determined during Phase IV drilling. Structure is generally a series of open folds trending roughly northwest to southeast and plunging gently to the southeast. There appears to be some small scale subsidiary folding in certain areas associated with the larger folds. No major faulting was encountered. Overall regional dip is gentle to the northeast.

Exploration was concentrated, for the most part, on the northwestern portion of the Kiskatenaw block where previous exploration had indicated an area of relatively thick surface mineable coal.

In this area 45 418 973 tonnes of in place coal have been determined at an overall surface mineable ratio of 11.5:1. Mining limits have been arbitrarily set at the 1.0 metre isopach of the No. 1 seam and/or the 50 metre vertical cover line over the No. 1 seam.

Additional in place reserves have been included for two areas close to the proposed mining area. Little or no control exists for these areas so the reserves must be considered as inferred. In area No. 6 immediately to the north of the proposed mining area, there are approximately 1.9 million tonnes inferred. In Area No. 9 to the south of the proposed mining area and south of Muskeg Lake, 10 million tonnes have been inferred.

Two adits were driven in the No. 1 seam and two approximately 20 ton bulk samples were collected. Channel samples were collected at intervals along the adits. Six of the drill holes were cored. All collected samples have been or are being analyzed.

2.0 INTRODUCTION

During the previous two years, Gulf Canada Resources Inc. acquired 502 coal licences, covering an area of 148 271 hectares. These licences were collectively termed the Wapiti coal property after the name of the geologic formation in which the coal is found. The Wapiti coal property is divided into two separated blocks of contiguous coal licences; the Kiskatenaw block and the Iris Lake block. These blocks are located in northeastern British Columbia, 22 to 120 kilometres south and west of the town of Dawson Creek.

Reconnaissance drilling and mapping in 1979 and 1980 identified an area of relatively near surface coal reserve in which the coal seam, known as the Discovery or No. 1 seam, attains a thickness of between 1 and 2 metres. This area is located on the northwest end of the Kiskatenaw block.

The Phase IV exploration program was designed to concentrate on this area, which has been designated as Area A (see map No. 1).

2.1 Location and Access

Area A is situated approximately 55 kilometres southwest of the town of Dawson Creek, B.C. at latitude $55^{\circ} 22'N$ and longitude $120^{\circ} 46'30''W$ on the Dawson Creek map sheet 93P (1:250 000). It is accessible from Dawson Creek via paved Highway #97 west, a distance of about 22 kilometres, thence south and west on the Heritage Highway for a distance of about 57 kilometres. The first 17 kilometres of the Heritage Highway are paved, the remainder being a gravel secondary highway used mainly by heavy logging trucks.

Access over most parts of the property is confined to seismic cut lines. Due to low swampy areas, travel over these lines is difficult except during the winter season.

2.2 Physiography

The Gulf Wapiti coal property is located on the easterly fringe of the Rocky Mountain Foothills. In this area long, low ridges trending northwest to southeast are incised by easterly and south-easterly flowing creeks and small tributaries of the Kiskatenaw River, which flows to the north. The Kiskatenaw River is the principal drainage over the northern part of the licence area. The Murray River, which is larger than the Kiskatenaw, is located a few kilometres west of the Wapiti property. The high ridge that marks the western edge of the Kiskatenaw and Iris Lake blocks forms the divide between the drainage systems of the Murray and Kiskatenaw Rivers.

Topography of the area ranges from 790 metres (2600 feet a.s.l.) in the valley of the Kiskatenaw River to 1212 metres (4000 feet a.s.l.) at the crest of the ridge that forms the divide between the Murray and Kiskatenaw systems. Salt and Oetata ridges, in the vicinity of Area A, average 1060 metres (3500 feet a.s.l.). They are relatively flat on top, and contain numerous small depressions that are wet and swampy. Drainage of these swamp areas consists mainly of groundwater percolation, much of which emerges as springs, or seeps on the flanks of the ridges. Seasonal run-off occurs through sharply incised intermittent drainage channels which may appear dry in the summer months, but carry near-surface groundwater flows through most of the year, due to the storage capacity of the numerous swamp areas on the ridge tops.

Much of the Wapiti property is heavily forested with mature stands of pine covering most of the higher ground. In the swampy

areas stands of poplar, willow, small shrubs, and swamp grasses flourish (Illustration No. 1).

Season temperatures in the area fluctuate to the extreme, from highs of $+32^{\circ}\text{C}$ in summer to -45°C in winter.

2.3 Scope and Description of Work

The Phase IV exploration program consisted of two operations:

1. A bulk sampling program
2. A drilling, coring, and geophysical logging program

These programs were coordinated simultaneously over the period November 8, 1980 to December 16, 1980.

2.3.1 The Bulk Sampling Program:

Two adits were driven on the property to obtain bulk samples from the No. 1 seam. Adit driving and bulk sampling were undertaken by Target Tunnelling Ltd.

The bulk sampling program commenced on November 26, 1980 with Adit No. 1 (see location map No. 1 and Illustration No. 2). This adit was completed on December 4, 1980. Adit No. 1 was driven a total length of 26 metres (85 feet). From 22 metres (73 feet) to 26 metres (85 feet), a bulk sample of 102 barrels was collected. This sample consisted of approximately 18 tonnes (20 tons) as each barrel weighed from 159 kg (350 lbs) to 181 kg (400 lbs). The coal was shot loose by drilling and blasting at the face and moved out by pan conveyor (Illustration No. 3). While taking the bulk sample only bottom rounds were fired and the top coal taken down by hand to prevent roof fall contamination. The barrels were double lined with plastic liners and were trucked to Edmonton.

Adit No. 2 (see location map No. 1 and Illustration No. 4) was commenced on November 29, 1980 and completed on December 7, 1980. This adit encountered bad roof conditions and excessive water. The cross-sectional dimensions of this adit were narrowed at about 4.5 metres (15 feet). From 7.6 metres (25 feet) to 11.8 metres (39 feet), 99 barrels of coal were collected. The coal was moved out of the adit by tugger and slusher in the first stages and the sample was taken out by wheel barrow. As with Adit No. 1, the barrels were double lined with plastic, sealed, and trucked to Edmonton.

Both adits were sealed by installing a section of culvert in the portal with a locked door (Illustration No. 5).

Face channel samples were taken at intervals in both adits. Details of the adit sample collecting program are outlined in Table No. 1.

Drilling and Coring Program:

Drilling and coring operations were undertaken by Hi-Rate Drilling Co. Ltd. of Stettler, Alberta. An Air-Rotary Cyclone TH-60 equipped with an Ingersoll-Rand screw-type compressor, a hydraulic top-head drive, a breakout rotary table and a hydraulic spinning chain assembly was employed for all of the work (Illustration No. 6). Surface hole was drilled with a 6½ inch rotary rock bit. Casing of 5½ inch diameter was usually set to 6.0 metres (20 feet). Holes were then completed with a 5-1/8 tricone rock bit. A standard 5-1/8 inch O.D. Christensen split-tube core barrel was employed to recover 3 inch diameter core. Core recoveries were

TABLE 1

LOCATION	SAMPLE DESC.	DATE COLLECTED	SHIPPED TO	REMARKS
80-100A	Core 70'-78.5'	Nov 9/80		
80-101	Core 97-104	Nov 10/80		
80-102	Core 68-75'	Nov 11/80		
80-106	Core 154-160'	Nov 18/80		
80-113	Core 78-85	Nov 25/80		
Adit #1	Portal Face Channel Sample	Nov 27/80		
Adit #1	34' Face Samples (1) Upper coal ply (2) Middle dirt ply (3) Lower coal ply (4) Full channel	Nov 29/81		
Adit #1	44' Face Samples as above	Nov 30/80		
Adit #1	55' Face Samples as above	Nov 30/80		
Adit #2	Portal Face Channel Sample	Nov 30/80		
Adit #1	73' Face Channel Sample	Dec 1/80		
Adit #1	73-85' Bulk Sample	Dec 1 - Dec 3/80	EMR Cloverbar	102 barrels - labelled SCORE
80-117	Core 78'-85'	Dec 1/80	Loring Lab	
Adit #1	85' Face Samples (1) Top coal ply (2) Middle dirt ply (3) Lower coal ply (4) Full channel	Dec 4/80		
Adit #2	25' Face Channel Sample	Dec 5/80		Adit very wet - face frozen and ice covered
Adit #2	25'-39' Bulk Sample	Dec 5 - Dec 7/80	Cyclone Eng. Edmonton	99 barrels - labelled MAGNA
Adit #2	39' Face Samples (1) Top coal ply (2) Middle dirt ply (3) Lower boney coal ply (4) Full channel	Dec 7/80		Adit very wet - fresh face considerable water and some ice
80-125	Core 42' - 49'	Dec 11/80		Stored w/ F. Hiebert - Dawson Creek

greater than 90% in each of the six core holes. Only the coal zone was cored in each hole. Details of core samples are contained in Table 1. All holes were geophysically logged using the standard gamma-neutron, density caliper and focussed-beam resistivity log suite on a vertical scale of 1:100, with an additional expanded scale of 1:40 through the coal seam using the density tool. The geophysical logging was carried out by Roke Oil Enterprises Ltd. of Calgary, Alberta.

The drilling and coring program was designed to meet four objectives:

1. To provide borehole control for the accurate positioning of two adit sites.
2. To provide basic seam quality control over Area "A", and also to furnish additional data relating to the degree of oxidation of the coal as a function of depth of burial of the seam.
3. To focus on Area A and provide enough borehole intersections of the coal seam which would allow the present "inferred resources" to be quantified and reclassified as "indicated" reserves.
4. To examine adjacent areas in the Kiskatenaw block that had already received some degree of investigation, and confirm previous findings so that a decision to relinquish or to continue to hold part or all of the Kiskatenaw block could be arrived at by Gulf Canada Resources Inc. management.

2

In thirty-one (31) drilling days, twenty-eight (28) holes were completed for a total of 6503 feet (1971.8 m).

Table 2 lists the number of holes drilled in the sequence in which they were completed, total depth of each hole, and daily and cumulative footage.

TABLE 2

DATE 1980		HOLE NO.	DAILY FOOTAGE METRES		HOLE T.D. FEET METRES		DAILY TOTAL FEET METRES		CUMMULATIVE FEET METRES		REMARKS
Nov 9	1	80-100	79	24.0	79	24.0					
Nov 9		80-100A	100	30.3	100	30.3	179	54.3	179	54.3	cored 70-78.5'
Nov 10	2	80-101	121	36.6	121	36.6	121	36.6	300	90.9	cored 97-104'
Nov 11	3	80-102	92	28.0	92	28.0	-	-	-	-	cored 68'-75'
Nov 11	-	80-103	109	33.0	-	-	201	61.0	501	151.8	
Nov 12	4	80-103	228	69.1	337	102.0	228	69.1	729	220.9	cemented 80-103
Nov 13	5	80-104	284	86.0	284	86.0	284	86.0	1013	306.9	
Nov 14	6	80-105	122	36.9	122	36.9	122	36.9	1135	343.8	Rig u/s 1/2 day
Nov 15	-	80-106	-	-	-	-	-	-	-	-	Rig u/s
Nov 16	-		-	-	-	-	-	-	-	-	Rig u/s
Nov 17	-		-	-	-	-	-	-	-	-	Rig u/s
Nov 18	7	80-106	180	55.5	180	55.5	-	-	-	-	cored 154'-160'
Nov 18	-	80-107	56	17.0	-	-	236	72.5	1371	416.3	
Nov 19	8	80-107	59	17.9	115	35.0	-	-	-	-	
Nov 19	-	80-108	280	84.9	-	-	339	102.7	1710	519.0	
Nov 20	9	80-108	420	127.3	700	213.0	420	127.3	2130	646.3	
Nov 21	10	80-109	440	133.3	-	-	440	133.3	2570	779.6	
Nov 22	11	80-109	220	66.7	-	-	220	66.7	2790	846.3	
Nov 23	12	80-109	50	15.0	710	215.0	-	-	-	-	
Nov 23	-	80-110	18	5.5	-	-	68	20.5	2858	866.8	
Nov 24	13	80-110	543	164.5	-	-	543	164.5	3401	1031.3	
Nov 25	14	80-110	163	48.2	724	219.4	-	-	-	-	
Nov 25	-	80-111	101	30.6	101	30.6	264	78.8	3665	1110.1	
Nov 26	15	80-112	102	30.9	-	-	102	30.9	3767	1141.0	
Nov 27	16	80-112	20	6.1	122	37.0	-	-	-	-	

TABLE 2 con't

DATE 1980		HOLE NO.	DAILY FOOTAGE METRES		HOLE T.D. FEET METRES		DAILY TOTAL FEET METRES		CUMMULATIVE FEET METRES		REMARKS
Nov 27	-	80-113	102	30.9	102	30.9	122	37.0	3889	1178.0	cored 78'-85'
Nov 28	17	80-114	174	52.8	174	52.8	174	52.8	4063	1230.8	
Nov 29	18	80-115	182	55.0	182	55.0	182	55.0	4245	1285.8	
Nov 30	19	80-116	234	71.0	234	71.0	234	71.0	4479	1356.8	
Dec 1	20	80-117	85	25.8	-	-	85	25.8	4564	1382.6	Rig u/s 1/2 day cored 78'-85'
Dec 2	21	80-117	17	5.2	102	30.9	-	-	-	-	
Dec 2	-	80-118	40	12.2	40	12.2	57	17.4	4621	1400.0	
Dec 3	22	80-119	280	84.9	-	-	280	84.9	4901	1484.9	
Dec 4	23	80-119	116	35.2	396	120.0	116	35.2	5017	1521.1	
Dec 5	24	80-120	221	67.0	221	67.0	-	-	-	-	
Dec 5	-	80-121	60	18.2	-	-	281	85.2	5298	1606.3	
Dec 6	-	80-121	-	-	-	-	-	-	-	-	Rig u/s
Dec 7	25	80-121	40	12.0	100	30.2	40	12.0	5338	1618.3	Rig u/s 1/2 day
Dec 8	-	--	-	-	-	-	-	-	-	-	Rig u/s
Dec 9	26	80-122	141	42.7	141	42.7	141	42.7	5479	1661.0	
Dec 10	27	80-123	100	30.5	100	30.5	-	-	-	-	
Dec 10	-	80-124	64	19.3	64	19.3	-	-	-	-	
Dec 10	-	80-125	39	11.8	-	-	203	61.5	5682	1722.5	Cored
Dec 11	28	80-125	21	6.4	60	18.2	-	-	-	-	
Dec 11	-	80-126	201	61.0	201	61.0	221	67.4	5903	1789.9	
Dec 12	29	80-120	-	-	-	-	-	-	-	-	Cemented 80-120
Dec 12	-	80-127	15	4.6	-	-	15	4.6	5918	1794.5	
Dec 13	30	80-127	265	80.3	280	84.8	265	80.3	6183	1874.8	
Dec 14	31	80-128	320	97.0	320	97.0	320	97.0	6503	1971.8	
Dec 15	-	80-127 & 80-128	-	-	-	-	-	-	-	-	Cemented 80-127; 80-128

3.0 PREVIOUS WORK

Previous work on the area was undertaken by Gulf Canada Resources Inc. and their consultants. Up to November, 1980, three phases of exploration had been carried out in the Dawson Creek area. The following is a description of the three phases:

3.1 Phase I

Phase I of the exploration work involved literature research by Gulf Canada Resources staff. This literature research resulted in the delineation of an area that promised to contain significant coal resources at the base of the Upper Cretaceous Wapiti Formation. Coal exploration licences covering this large area (142 980 hectares) were applied for in the first half of 1979.

3.2 Phase II

Phase II of the Gulf Wapiti coal project, as it was termed, involved the initial reconnaissance drilling and trenching program. Eight rotary drill holes and several trenches were completed, with some degree of reconnaissance geological mapping by Gulf Canada Resources personnel providing basic data for the location of drill holes and trenches. Phase II resulted in the preliminary evaluation of an exploration target known as the Discovery seam, later called the No. 1 seam. This coal seam was identified at the base of the Upper Cretaceous Wapiti sediments, resting directly on a relatively continuous, fairly competent medium-grained sandstone, which is the Chungo Member of the Puskwaskau Formation. Phase II of the Wapiti project was supervised by R.S. Verzosa, a consulting geologist, on behalf of Gulf Canada Resources Inc. It was completed on September 2, 1979.

3.3 Phase III

Phase III of the Wapiti coal project consisted of more detailed geological mapping and rotary drilling. Geological mapping was undertaken on a 1:50 000 scale, primarily to outline the contact between the Wapiti Formation and the underlying Puskwaskau Formation by identifying the Chungo sandstone member of the Upper Puskwaskau, and thus locating the stratigraphic interval of the No. 1 coal seam. The Phase III rotary drilling program consisted of 39 drill holes, two of which were cored through the coal interval, for a total of 6328 metres drilled. Most of the holes were located on the Kiskatenaw block (two were drilled on the Iris Lake block), concentrating on an area of relatively near surface coal, referred to in this report as Area "A". Phase III identified a total inferred resource base of 832 million tonnes of coal in place in seams greater than 0.5 metres on the Wapiti coal property. Of this 832 million tonnes, 30.2 million tonnes were categorized as surface mineable reserves using a limiting R.O.M. metric ratio of 10:1. Potential inferred underground reserves were calculated at 117.5 million tonnes. According to the Phase III report, these inferred resources are all contained in the No. 1 coal seam. Phase III was supervised by Mr. Brian Flynn, Project Supervisor with Gulf Canada Resources Inc., and Norwest Resource Consultants Ltd. of Calgary, Alberta.

4.0 GEOLOGY

4.1 Regional Geology

The area south and west of Dawson Creek is made up of two major geologic regions: the Rocky Mountain Foothills cover an area of structural disturbance resulting from the Rocky Mountain or Laramide Orogeny to the west. This structural disturbance is manifested in large thrust faults which cause varying degrees of bending and folding of the overlying sediments, depending on the proximity of these sediments to the mountain front; with increasing distance from the orogenic belt, structures become less complex, faulting is less common and folding tends to become more gentle, finally dying out completely.

The Interior Plains area is an area of relatively flat undisturbed sediments, chiefly marine in origin, which onlap to the west. Regional dips in this area are in the order of 3 or 4 degrees. That part of the Plains region lying south and west of Dawson Creek is underlain by Upper Cretaceous rocks of the Wapiti and Puskwaskau Formations.

4.2 Geology of the Wapiti Coal Property

Figure 1 illustrates the stratigraphy of the Wapiti coal property. The Phase III report, entitled "Wapiti Project Geological Report, 1979-1980", supplies detailed lithologic descriptions of each of the formations and formational members of importance to the Wapiti coal project.

The Lower Puskwaskau beds are made up of a uniform, monotonous series of dark marine shales or mudstones. Resting on this marine sequence is the near shore sandstone bed called the Chungo Member of the Upper Puskwaskau. The Phase III report describes the Chungo Member:

WAPITI PROJECT STRATIGRAPHY

PERIOD	FORMATION	MEMBER	THICKNESS
UPPER CRETACEOUS	WAPITI		Up to 460m
		No. 1 SEAM	Up to 2m
		CHUNGO	10m
	PUSKWASKAU	HANSON THISTLE DOWLING	200m
	BAD HEART		10m

FIGURE - 1.

"The Chungo Member...probably represents a beach or barrier bar environment. Some difficulty was encountered during the early stages of geological mapping in distinguishing the Chungo Member from sandstone units of the overlying Wapiti Formation...the exploration drilling, however, established the fact...that the Chungo Member is distinct from Wapiti sandstones in its coarsening upward nature."

Exploration drilling to date indicates that the Chungo Member averages ten metres thick and is harder and cleaner than sandstone members of the Lower Wapiti. It represents a marine regression to the southeast that generated the deposition of the No. 1 coal seam, which rests directly on the Chungo Member. Coal seam deposition in a near-shore swamp or lagoonal environment was followed by a thick sequence of clastic continental siltstones and sandstones, which make up the Wapiti Formation.

Most of the upper part of the Wapiti Formation has been eroded over the area of the Wapiti coal property, leaving the bottom section which contains the No. 1 coal seam. Area A is situated on the northwest corner of this erosional edge. Post-glacial erosion has incised deep tributary channels that have cut into the lower Puskwaskau section, leaving elongate Wapiti remnants on the topographic highs.

4.2.2 Structure:

The Wapiti coal property is situated on the easternmost fringe of the Rocky Mountain Foothills Fold Belt. It is far removed from the Rocky Mountain Orogenic Belt to the west. Structural disturbance in the area is minimal. Generally, a series of open folds trend roughly northwest to southeast and plunge gently to the southeast. There is some small scale subsidiary folding associated with the main folds

in Area "A". These smaller folds appear to die out along the plunge.

No major faulting was encountered in Area A during Phase IV drilling.

The overall regional dip is gentle to the northeast.

Structure is generally illustrated on the structure contour map constructed on the top of the No. 1 seam (Map No. 3).

4.3 Coal Geology

Only the No. 1 seam is reasonably well developed in the project area. It lies on the base of the Upper Cretaceous Wapiti Formation directly on the Chungo member of Puskwaskau Formation (see Illustration No. 7).

4.3.1 No. 1 Seam:

The No. 1 seam is best developed in the north-western portion of the Kiskatenaw block in an area that appears to be a depositional centre (see Isopach Map No. 4). Here the coal attains a thickness of slightly over 2.0 metres. It thins to the east, north and south and is eroded away up-dip to the west. Almost everywhere it has a dirt split roughly upper middle in the seam varying in thickness from 0.10 m to 1.7 m. In some holes, such as 80-109, the split thickens so that there are two separate thin seams. In holes like 80-104 there is no split but the seam is very thin (0.26 m). Cross-sections 1 to 7 inclusive illustrate the varying nature of the No. 1 seam.

The floor of the No. 1 seam is generally the Chungo sandstone, although locally it may be a thin carbonaceous mudstone. The roof rocks are quite variable, being sandstones, siltstones, shales and mudstones.

Table 3 outlines No. 1 seam thickness and parting thickness as determined from density logs for all holes utilized in northern Kiskatenaw block.

TABLE 3

HOLE NUMBER	DATE	SURFACE ELEVATION	NO. 1 SEAM — DENSITY LOG				T.D.	WATER LEVEL	REMARKS
			DEPTH	THICKNESS	PARTING THICKNESS	NON-PART THICKNESS			
7901 (R1)	17/8/79		-	-	-	-	42.0	top	no coal
7902 (R2)	19/8/79		37.8	1.74	0.70	1.04	50.5	49.2	top 0.4 m dirty
7903 (R3)	26/8/79		89.2	0.4	-	-	146.3	17.9	coal dirty; clean chungo
7904 (R4)	27/8/79		61.35	1.60	0.50	1.10	70.6	0.8	
7905 (R5)	29/8/79		27.50	1.80	0.30	1.50	36.6	6.8	
7906 (R6)	31/8/79		111.65	0.50	-	0.5			
7907 (R7)	--		-	-	-	-	-	-	no log
7908 (R8)	2/9/79		-	-	-	-	57.6	8.7	no coal
7916	7/11/79		63.6	1.35	.25/.20	0.90	68.6	-	two dirt partings
7917 A	6/2/80		106.8	1.80	.25/.30	1.25	129.6	99.0	two dirt partings
7918	13/11/79		60.5	0.60	-	0.6	86.4	-	
7919	15/11/79		24.1	1.60	0.20	1.40	56.4	44.5	
7920	13/11/79		152.2	1.05	0.10	0.95	221.1	33.5	
7921	15/11/79		208.9	0.8/0.75	1.7	-	238.5	206.0	two thin seams
7922	16/11/79		227.8	.75/0.30	1.4	-	245.2	180.0	two thin seams
7923	18/11/79		106.6	1.10	0.25	0.85	123.1	87.5	
7936	3/2/80		102.9	0.80	-	0.80	178.0	76.5	seam top dirty
7937	4/2/80		131.4	1.50	0.30	1.20	166.0	120.0	
7939 A	5/2/80		27.8	1.95	0.40	1.55	31.8	30.0	
7943	13/2/80		10.6	2.0	0.40	1.60	14.2	-	
80-100A	10/11/80	1028.3	22.05	2.15	0.27	1.88	30.5	17.0	
80-101	10/11/80	1058.4	30.00	1.75	0.26	1.49	36.6	--	
80-102	11/11/80	1018.9	20.95	1.75	0.27	1.48	28.0	--	
80-103	12/11/80	1106.9	95.34	1.35	0.40	0.95	102.1	59.0	
80-104	13/11/80	1097.5	24.43	0.26	-	0.26	86.0	--	

TABLE 3 con't

HOLE NUMBER	DATE	SURFACE ELEVATION	NO. 1 SEAM - DENSITY LOG				T.D.	WATER LEVEL	REMARKS
			DEPTH	THICKNESS	PARTING THICKNESS	NON-PART THICKNESS			
80-105	14/11/80	1103.5	9.00	0.58	-	0.58	36.9	6.2	
80-106	18/11/80	1076.8	47.50	1.65	.23/.11	1.31	55.5	-	two dirt partings
80-107	19/11/80	1022.1	28.20	1.72	0.22	1.50	35.0	32.4	
80-108	20/11/80	1101.6	196.72	0.68	-	0.68	213.0	140.0	
80-109	23/11/80	1091.7	210.0	0.80	-	0.80	216.1	29.0	top seam only; bottom very shaly
80-110	25/11/80	1104.9	204.5	.62/.38	1.5	1.0	219.4	79.0	two seams
80-111	25/11/80	1070.9	11.10	0.45	-	0.45	30.7	16.3	
80-112	27/11/80	1008.3	25.48	1.63	0.1/0.2	1.60	36.6	-	two thin partings
80-113	27/11/80	1007.8	23.62	1.68	0.30	1.38	31.1	15.0	
80-114	28/11/80	1039.0	46.15	1.62	0.20	1.42	52.8	28.5	
80-115	29/11/80	1055.6	44.00	1.50	0.30	1.20	54.9	-	
80-116	30/11/80	1064.2	63.30	1.50	.12/.14	1.24	71.0	32.2	seam top dirty
80-117	2/12/80	1001.7	24.19	1.93	0.12	1.81	30.5	-	seam bottom dirty
80-118	2/12/80	971.1	4.30	2.08	0.21	1.87	12.2	-	
80-119	4/12/80	1017.7	28.12	1.66	0.35	1.31	120.7	24.0	seam dirty
80-120	5/12/80	1035.0	60.68	1.59	0.19	1.40	67.0	15.0	
80-121	8/12/80	1113.3	23.28	1.22	0.20	1.02	30.5	-	
80-122	9/12/80	1092.2	26.72	1.37	0.15	1.22	42.7	-	
80-123	10/12/80	1089.7	16.50	0.50	-	0.50	30.5	-	
80-124	10/12/80	-	17.02	0.36	-	0.36	19.3	-	
80-125	11/12/80	-	12.86	2.02	0.4	1.62	19.0	-	
80-126	11/12/80	1083.7	43.84	0.70	-	0.70	61.0	17.0	
80-127	13/12/80	1090.3	78.82	1.36	0.22	1.14	84.0	28.7	
80-128	14/12/80	-	92.52	1.41	0.45	0.96	97.0	33.3	

4.3.2 COAL QUALITY

The No. 1 seam contains a dirt band throughout most of the project area. The seam contains a great deal of mineral matter both from the dirt band and from mineral matter distributed in the coal itself. The ply by ply make-up of the seam was carefully studied in the two adits. In Adit No., 1, the total seam thickness was 1.77 metres with ply thicknesses of 0.34 m upper, 0.42 m middle and lower 1.01 m. In Adit No. 2, the total seam thickness was 1.88 m with ply thicknesses of 1.01 m upper, 0.11 m middle and 0.76 in lower. The average ash content from all samples was 29.0% (d.b.).

Samples collected during the program included seven cores, two bulks (one from each adit) and eight channels (also from the adits). Each channel sample was separated into three units; upper, middle and lower ply. The channel and core samples were forwarded to Loring Laboratories for analyses while the bulks were analyzed at Birley Coal and Minerals Testing.

The laboratory program was designed to examine the physical and chemical characteristics of the seam throughout the deposit and to examine the characteristics of the individual lithologic units in the adits. The basic format for laboratory testwork was as follows:

(i) COAL AND CHANNEL SAMPLES (including individual
ply samples)

- Analyze the raw coal for proximate, air dried moisture, sulfur, calorific value, Free Swelling Index, specific gravity, Hardgrove Grindability Index, ultimate analysis and ash fusion temperatures (reducing and oxidizing atmospheres).
- Crush the sample to 1/4" (6 mm) topsize and screen at 28 and 100 mesh (0.6 mm and 0.15 mm). Float sink the plus 100 mesh fractions at six gravities and perform 5. stage time release froth floatation tests on the minus 100 mesh fractions.

(ii) BULK SAMPLES

- Analyze the raw coal as in (i) above plus equilibrium moisture and mineral ash analysis (10 standard determinations).
- Perform detailed washability tests and produce clean coal composite samples at 1.50, 1.60 and 1.70 specific gravities.
- Analyze the 1.50 and 1.70 clean coal composites for proximate, sulfur and calorific value and analyze the 1.60 composite as per raw coal.

- 10 tonnes of run-of-mine (ROM) coal from adit No. 2 were forwarded to the Canadian Combustion Research Laboratories in Ottawa for pilot scale combustion tests (results not available at the time of this writing).
- 1 tonne of ROM coal from Adit No. 2 and 17 tonnes from Adit No. 1 are currently in storage awaiting final selection of pilot scale processes to be tested.

Table I entitled "Raw Coal Chemical Characteristics-Overall Averages" is a comparison of the data generated from the three different types of samples. The coal from the core samples is classified as High Volatile Bituminous "C" in rank while the coal in the adits has been degraded through oxidation to sub-bituminous A. The oxidation in the adits versus the cores is apparent in the decreased calorific value on a dry mineral matter-free basis, decreased carbon and hydrogen contents, and increased oxygen content. Individual channel samples show a trend towards less oxidation as the distance from the portal increases. The d.m.m.f calorific value of the No. 2 adit sample indicates that it is altered to a greater extent than the No. 1 adit sample. This observation was also borne out by the screening analysis which showed that the size consist for Adit No. 2 was much finer than that for Adit No. 1 (see Table II).

No apparent relationship exists between the depth of cover and the degree of oxidation in the core samples. Porous drift material does not attain sufficient thickness in any of the core samples to be a significant contributing factor to oxidation. These results tend, therefore, to indicate that oxidation will be confined to the areas near the subcrop and to areas where the depth of cover is less than 15 metres.

The chemical and physical characteristics of the three plys which make up the seam are summarized on Tables III and IV. It can be seen that the high specific gravity (1.93) dirt band or middle ply has a detrimental impact on the quality of the whole seam. Complete removal of the 0.42 m middle ply would result in a decrease in the seam ash percent (d.b) from 29.1 to 20.8 and an increase in the calorific value (Btu/lb. d.b.) from 8824 to 10122, but it would also result in a decrease in the in-situ reserves by approximately 25%. The float-sinks data from the middle ply indicate that approximately 10 to 15% could be recovered at 19% ash (d.b.), if it were mined and washed with the rest of the seam. The sink material from the middle ply is primarily comprised of coarse, high ash, high density rock and would not present any significant wash plant problems.

The coal quality information generated on the bulk samples represents the full seam section in the oxidized portion of the reserves. The washability data give a reasonable indication of the theoretical yield for the entire deposit (see Figure I), but the clean coal quality

information cannot be used for the whole deposit. Regression analysis of all unoxidized ash and calorific value data shows that the following relationship exists; Calorific Value (Btu/lb. (d.b.) = 14266 - 165.4 x Ash % d.b.) with a 0.9952 correlation coefficient. This would result in a 9500 Btu/lb. product at 16% (db) ash with 18% assumed total moisture. Table V compares the calorific value for the cumulative clean coal composites from the bulk samples with the corresponding calculated unoxidized values. The remaining clean coal quality data are shown on Table VI.

FIGURE I

THEORETICAL YIELD PLUS 28 MESH MATERIAL

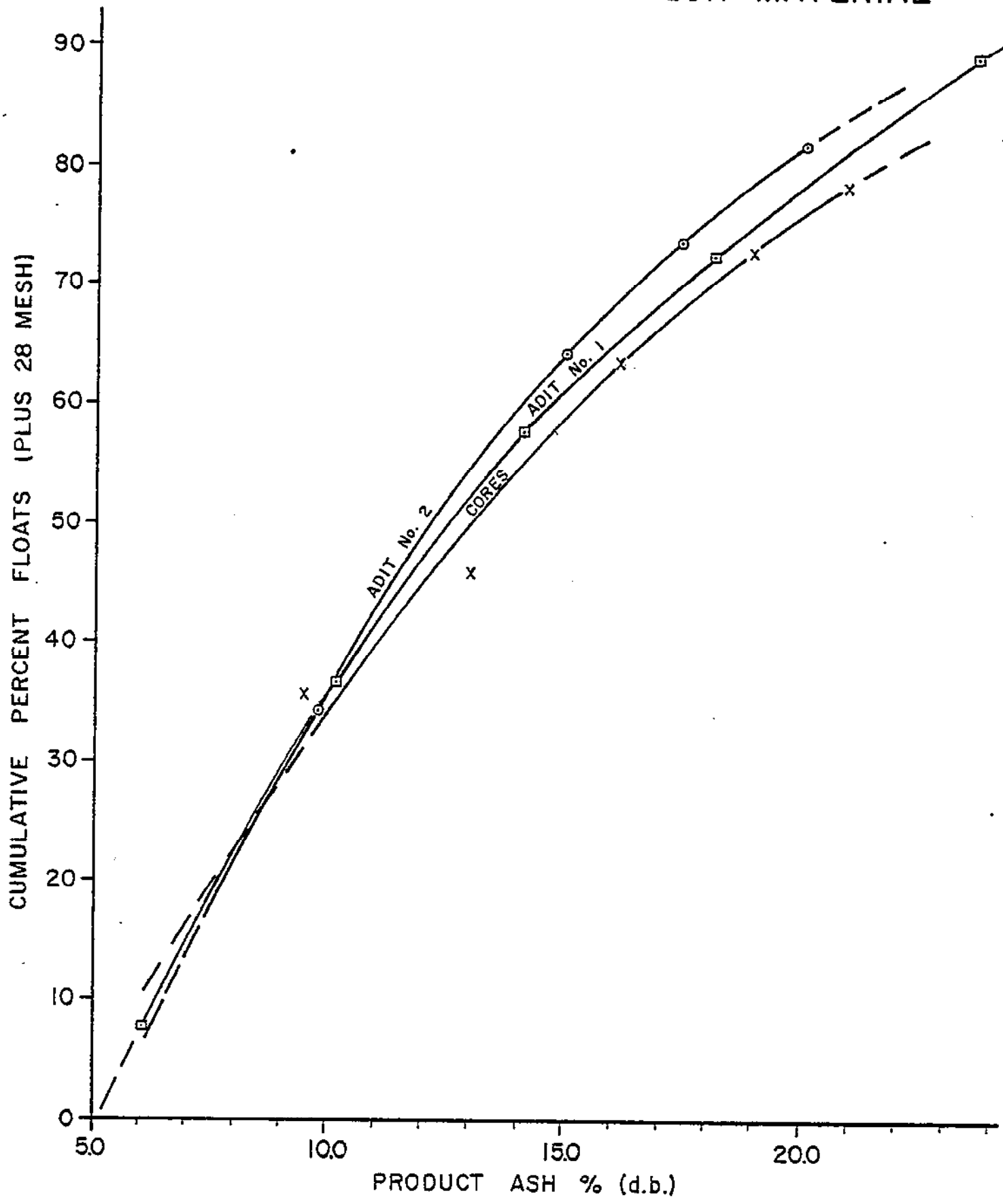


TABLE II
SCREEN ANALYSIS

Size Fraction	ADIT #1		ADIT #2	
	WT %	CUM. WT %	WT %	CUM. WT %
100 mm x 50 mm	3.3	3.3	-	-
50 x 25	6.6	9.9	1.6	1.6
25 x 12.5	7.8	17.7	6.4	8.0
12.5 x 6.0	18.6	36.3	10.0	18.0
6.0 x 3.0	18.6	54.9	24.0	42.0
3.0 x 0.5	32.5	87.4	42.9	84.9
0.5 x 0.15	8.8	96.2	9.7	94.6
0.15 x 0	3.8	100.0	5.4	100.0

WT % + 100 mm = nil

WT % + 100 mm = 0.3
 - crushed to pass 100 mm
 WT % 100 mm x 50 mm = 1.0
 - crushed to pass 50 mm

TABLE IV

Float/Sink Data Summary
Top, Middle and Lower Ply

(Plus 100 mesh material)

	Specific Gravity	Weight Percent Float	Ash Percent (dry-basis)
Top Ply	1.50	62.7	10.5
	1.60	71.7	12.6
	1.70	78.0	14.6
Middle Ply	1.50	7.2	12.1
	1.60	14.9	19.0
	1.70	23.7	25.2
Lower Ply	1.50	55.6	11.1
	1.60	73.5	14.5
	1.70	85.6	17.2

TABLE V

Calorific Values - Bulk Sample Clean Coal Composite Samples

<u>Adit</u>	<u>+100 Mesh Floats S.G.</u>	<u>Ash % (d.b.)</u>	<u>Actual Calorific Value Btu/lb (d.b.)</u>	<u>Calculated Unoxidized Calorific Value Btu/lb (d.b.)</u>
No. 1	1.50	11.4	11674	12380
	1.60	14.6	11179	11851
	1.70	17.5	10720	11372
No. 2	1.60	11.5	11446	12364
	1.70	14.2	10996	11917
	1.80	16.6	10657	11520

TABLE VI

CUMULATIVE CLEAN COAL RESULTS

<u>Adit #1</u>	<u>Ash</u>	<u>V.M.</u>	<u>F.C.</u> (dry basis)	<u>S</u>	<u>Btu/lb</u>	<u>HGI</u>
<u>+100 m Floats at</u>						
1.50	11.4	33.9	54.7	0.53	11674	-
1.60	14.6	32.2	53.2	0.52	11179	50
1.70	16.6	32.0	51.4	0.51	10657	-

Adit #2+100 m Floats at

1.50	11.5	33.8	54.7	0.50	11446	-
1.60	14.2	32.8	53.1	0.49	10996	50
1.70	16.6	32.0	51.4	0.51	10657	-

Ultimate (daf)

<u>Adit #1</u>	C	H	N	S	O	(by diff)
Head Raw	75.94	4.38	1.21	0.68	17.79	
+100 m Floats at 1.60	75.73	4.32	1.24	0.61	18.10	
<u>Adit #2</u>						
Head Raw	76.23	4.93	0.67	0.54	17.63	
+100 m Floats at \$1.60	76.29	4.65	1.65	0.57	16.84	

5.0 RESERVES

5.1 Description of Reserve Areas

The main reserve area is concentrated in the northwest portion of the Kiskatenaw block where the No. 1 seam attains maximum thickness and the cover is within surface mining limits. The area has been divided into nine separate areas in order to more easily calculate in place reserves and overburden quantities. Seven of these areas are within the main potential mining area and two are adjacent. All the reserve areas are shown on Map No. 5.

5.2 Methods of Reserve Calculation

An isopach map (Map No. 4) of the No. 1 seam was constructed using all available seam thickness data. A structure contour map (Map No. 3) on the top of the No. 1 seam was also constructed using all available data. Using the 1:5000 metric topographic map cover was determined.

Average seam thickness and average cover for each reserve area were determined by using a grid overlay with 1.25 cm intersections. Average coal thickness and average cover was determined by dividing the total grid point sum by the number of grid points. Surface mining limits were set at 50 metres of vertical cover over the No. 1 seam and/or the 1.0 metre isopach of the No. 1 seam.

The area in square metres (m^2) for each reserve area was determined by planimeter. Average coal thickness multiplied by area resulted in the coal volume expressed in cubic metres (m^3). This figure multiplied by a specific gravity of 1.5g/cc resulted in metric tons in place for each reserve area. The individual reserve areas were totalled for the main potential mining area. These reserves are reported as indicated. As well inferred reserves were calculated by the same method for reserve areas No. 6 and No. 9.

Average cover was determined for each reserve area by the same grid overlay method. The area of each reserve area as determined by planimeter was reported in square metres (m^2). This figure multiplied by the average thickness of cover in metres resulted in overburden quantities for each area expressed in cubic meters (m^3). The overburden figures for each reserve area were totalled to determine the total overburden figure for the potential mining area.

The overall ratio for the potential mining area was determined by dividing the total overburden figure by the total in place metric tons of coal.

In place reserves for the No. 1 seam are detailed in Table 4. Indicated reserves, overburden quantities and an overall mining ratio to arbitrary limits are shown for the potential surface mining area. Inferred reserves are shown for Area No. 6 and Area No. 9.

For purposes of comparison, the reserves have been determined at specific gravities of 1.5 and 1.3. A specific gravity of 1.5 is rather high for a true subbituminous coal, but the Wapiti No. 1 seam coal appears to be inherently dirty and in most areas has at least one dirt parting. Consequently the as-mined coal would have a high ash value. If this product was utilized as run of mine the recoverable reserves would be realistically expressed using a specific gravity of 1.5. The heat value of this product would be relatively low and considerable ash would be generated.

On the other hand, using a specific gravity of 1.3 gives a better indication of the "coal value" of the reserve. This is not a clean coal figure as washability and yield have not been considered. If this coal were to be cleaned, there would be an increase in heat value but probably a considerable loss in reserves.

TABLE 4
RESERVES AND OVERBURDEN

<u>Reserve Area</u>	<u>Area m²</u>	<u>Average Coal Thickness No. 1 Seam</u>	<u>Volume m³</u>	<u>Metric Tons In Place S.G. 1.3</u>	<u>Metric Tons In Place S.G. 1.5</u>	<u>Average Cover (m)</u>	<u>Overburden (m³)</u>	<u>Ratio (1.3)</u>	<u>Ratio (1.5)</u>	<u>Remarks</u>
#1	2 028 226	1.66	3 366 855	4 376 912	5 050 283	21.19	42 978 109			
#2	3 205 645	1.89	6 058 699	7 876 309	9 088 004	18.00	57 701 610			
#3	3 145 161	1.62	5 095 161	6 623 709	7 642 742	33.72	171 808 829			
#4	2 213 710	1.34	2 966 371	3 856 282	4 449 557	28.45	62 980 050			
#5	5 012 097	1.69	8 470 444	11 011 577	12 705 666	30.74	154 071 862			
#7	1 770 161	1.59	2 814 556	3 658 923	4 221 834	33.22	58 804 748			
#8	1 076 613	1.40	1 507 258	1 959 435	2 260 887	24.62	26 506 212			
Subtotal Indicated Reserves				39 363 147	45 418 973		520 268 506	13.22	11.45	Potential surface mining area
#6	1 274 194	1.00	1 274 194	1 656 452	1 911 290					No geological control
#9	5 600 000	1.18	6 608 000	8 590 400	9 912 000	20.57	115 192 000	13.41	11.62	Very little geological control
Subtotal Inferred Reserves				10 246 852	11 823 290					
Total Indicated and Inferred Reserves				49 609 999	57 242 263					

It should be noted that varying the specific gravity causes a change in the overall mining ratio.

5.3 Reserve Summary:

The following summary shows reserves for the No. 1 seam at 1.5 S.G. and 1.3 S.G. and totals in metric tons and short tons for comparison purposes:

Potential Surface Mining Area

S.G. 1.5	45418973	MT Indicated
S.G. 1.3	39363147	MT Indicated
Area #6		
S.G. 1.5	1911290	MT Inferred
S.G. 1.3	1656452	MT Inferred
Area #9		
S.G. 1.5	9912000	MT Inferred
S.G. 1.3	8590400	MT Inferred
Totals		
S.G. 1.5	57242263	MT
S.G. 1.3	49609999	MT

6.0 CONCLUSIONS AND RECOMMENDATIONS

The No. 1 seam which lies at the base of the Wapiti Formation, is the only economic seam in the project area. It attains a maximum thickness of about 2.0 metres on the northwestern end of the Kiskatenaw block of coal licences. It thins rapidly to the north, south and east, and is eroded away up-dip to the west. It contains a shaly, boney parting of varying thickness and the coal appears to be inherently dirty. Overburden cover builds rapidly away from the central area of maximum deposition and underground mining would be difficult and non-economical due to the No. 1 seam being thin, dirty and excessively deep.

On the northwestern end of the Kiskatenaw block there are 45MMT of indicated in place coal reserves which could be amenable to surface mining at an overall ratio of 11.5:1. There are an additional 11.8MMT of inferred in place reserves adjacent to the main reserve.

It is recommended that Gulf Canada Resources Inc. retain only the northwestern portion of coal licences on the Kiskatenaw block. The reserve does not appear to have any immediate potential but it should be considered as part of building a larger reserve base which may have some future utilization.

Any necessary future exploration should concentrate on gathering data for detailed mining plans and sampling for detailed analysis in Area "A".

TABLE I

Raw Coal Chemical Characteristics
Overall Average Results

	<u>DRILL HOLES</u>	<u>ADIT NO.1</u>	<u>ADIT NO.2</u>	<u>FULL FACE CHANNELS</u>
Equilibrium Moisture %			13.7	
As Rec'd Moisture %	8.65	11.3	18.5	16.06
Air Dried Moisture %	2.42	3.7	6.7	5.56
Ash % (d.b.)	27.86	28.3	30.0	31.92
VM % (d.b.)	30.20	28.8	27.9	29.97
FC % (d.b.)	41.93	42.9	42.1	38.09
S% (d.b.)	0.45	0.49	0.38	0.39
CV Btu/lb (d.b.)	9836	9173	8736	8223
CV Btu/lb (dmmf)	14086	13248	12934	12602
FSI	1/2-1 1/2			0
SG	1.51			1.63
HGI	49	49	53	55
Ultimate (daf)				
C	78.11	75.94	76.24	73.45
H	5.49	4.38	4.93	4.89
N	1.17	0.86	0.67	1.23
S	0.61	0.56	0.54	0.58
O	14.62	18.26	17.62	19.86
Ash Fusion (°F)				
Oxidizing - ID	2592	2460	2520	2642
H=W	2618	2510	2690	+2650
H=1/2 W	2625	2570	2730	+2650
F.T.	2644	2640	2750	+2650
Reducing - ID	2544	2430	2470	2591
H=W	2614	2480	2620	2642
H=1/2 W	2625	2520	2670	+2650
F.T.	2643	2600	2730	+2650
Btu/lb				
Moist, mineral matter free basis	12156	11433	11162	10875

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

00 685

TABLE III

Raw Coal Chemical Characteristics

Overall Average Results

	TOP PLY	MIDDLE PLY	LOWER PLY
As Rec'd Moist. %	14.43	10.42	16.89
Air Dried Moist. %	5.53	3.18	7.31
Ash % (db)	22.03	55.19	20.46
VM % (db)	32.77	20.31	32.28
FC % (db)	45.21	24.50	47.26
S % (db)	0.49	0.21	0.50
CV Btu/lb (db)	10186	4671	10132
(daf)	13064	10424	12738
FSI	0-1/2	0	0
S.G.	1.50	1.93	1.50
HGI	55	50	53
Ultimate (daf)			
C	77.77	67.57	78.77
H	4.91	6.33	4.52
N	1.45	1.05	1.43
S	0.64	0.47	0.62
O	15.25	24.58	14.65
Ash Fusion (^o F)			
Oxidizing - ID	2590	2631	2585
H=W	2633	+2650	+2650
H=1/2 W	+2650	+2650	+2650
F.T.	+2650	+2650	+2650
Reducing - ID	2538	2650	2544
H=W	2603	2643	2643
H=1/2 W	2614	+2650	+2650
F-T	+2650	+2650	+2650

ASH FUSION (°F)

+100 m Floats at 1.60	Adit #1	Adit #2
Oxidizing - ID	2460	2450
H=W	2510	2480
H=1/2 W	2570	2500
F.T.	2640	2530
Reducing - ID	2430	2430
H=W	2480	2470
H=1/2 W	2520	2490
F.T.	2600	2520

INTERNAL?

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu / lb.	HGI	FSI	S. G.	BASIS
	MOIST. %	ASH %	VOL. %	F. C. %						
5.06	2.75	27.89	29.33	40.03	0.40	9495	49	1	1.53	a.d.b.
	7.67	26.48	27.85	38.00	0.38	9014		-		a.r.b.
		28.68	30.16	41.16	0.41	9763		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.75	53.66	4.40	0.69	0.40	27.89	10.21	a.d.b.
-	55.18	4.52	0.71	0.41	28.68	10.50	d.b.
	77.37	6.34	1.00	0.57	-	14.72	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.59	2.24						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2523	+2650	+2650	+2650

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
8.77	2.52	32.94	28.15	36.39	0.39	8542	48	1/2	1.58	a.d.b.
	11.06	30.05	25.69	33.20	0.36	7794		-		a.r.b.
		33.79	28.88	37.33	0.40	8763		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.52	47.70	3.44	0.72	0.39	32.94	12.29	a.d.b.
-	48.93	3.53	0.74	0.40	33.79	12.61	d.b.
	73.90	5.33	1.12	0.60	-	19.05	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.22	1.76						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2562	+2650	+2650	+2650
REDUCING	2503	+2650	+2650	+2650

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
65.9	2.81	30.51	27.82	38.86	0.42	8802	47	½	1.55	a.d.b.
	9.21	28.50	25.98	36.31	0.39	8222		-		a.r.b.
		31.39	28.62	39.99	0.43	9056		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.81	50.66	2.93	0.69	0.42	30.51	11.98	a.d.b.
-	52.12	3.01	0.71	0.43	31.39	12.34	d.b.
	75.97	4.39	1.03	0.63	-	17.98	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.34	1.46						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=½W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2527	+2650	+2650	+2650

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HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH %	VOL.%	F.C. %						
9.89	1.72	17.90	33.12	47.26	0.58	11244	64	1½	1.40	a.d.b.
	11.41	16.13	29.85	42.61	0.52	10136		-		a.r.b.
		18.12	33.70	48.09	0.59	11441				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
1.72	63.90	4.30	0.99	0.58	17.90	10.61	a.d.b.
-	65.01	4.38	1.01	0.59	18.21	10.80	d.b.
	79.48	5.36	1.23	0.72	-	13.21	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.60	12.25						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=½W	F.T.
OXIDIZING	2329	2423	2477	2609
REDUCING	2306	2403	2472	2601

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
7.43	2.82	26.87	29.57	40.74	0.40	9585	55	1½	1.51	a.d.b.
	10.04	24.87	27.37	37.72	0.37	8873		-		a.r.b.
		27.65	30.43	41.92	0.41	9863		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.82	57.56	3.82	0.79	0.40	26.87	7.74	a.d.b.
-	59.23	3.93	0.81	0.41	27.64	7.98	d.b.
	81.85	5.43	1.12	0.57	-	11.03	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.26	3.96						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=½W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
1.96	2.02	26.49	29.44	42.05	0.51	9956	38	1	1.47	a.d.b.
	3.95	25.97	28.86	41.22	0.50	9760		-		a.r.b.
		27.04	30.05	42.91	0.52	10161				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.12	59.82	4.35	0.87	0.51	26.47	5.86	a.d.b.
-	61.12	4.44	0.89	0.52	27.04	5.99	d.b.
	83.77	6.09	1.22	0.71	-	8.21	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.67	3.06						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
5.00	2.31	27.68	28.85	41.16	0.35	9577	42	½	1.52	a.d.b.
	7.19	26.30	27.41	39.10	0.33	9098		-		a.r.b.
		28.33	29.53	42.14	0.36	9803		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.22	52.11	3.85	1.04	0.35	27.70	12.73	a.d.b.
-	53.29	3.94	1.06	0.36	28.33	13.02	d.b.
	74.35	5.50	1.48	0.50	-	18.17	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.53	2.53						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H = W	H = ½ W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-ADIT #1-Portal Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
15.94	8.88	32.48	32.80	25.84	0.28	5716	83	0	1.71	a.d.b.
	23.40	27.31	27.58	21.71	0.24	4805		-		a.r.b.
		35.65	36.00	28.35	0.31	6273		-		d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
8.68	39.67	2.21	0.80	0.28	32.48	15.68	a.d.b.
	43.54	2.43	0.88	0.31	35.65	17.19	d.b.
	67.66	3.78	1.37	0.48	-	26.71	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.64	11.65						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2486	2589	+2650	+2650

GULF-WAPITI-34'-Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
7.72	9.24	37.39	24.63	28.74	0.31	6034	60	0	1.74	a.d.b.
	16.24	34.51	22.73	26.52	0.28	5568		-	-	a.r.b.
		41.20	27.14	31.66	0.34	6648		-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
8.94	37.21	2.84	0.78	0.31	37.52	12.40	a.d.b.
	40.86	3.12	0.86	0.34	41.20	13.62	d.b.
	69.49	5.31	1.46	0.58	-	23.16	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.20	5.05						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2639	+2650	+2650	+2650
REDUCING	2594	+2650	+2650	+2650

GULF-WAPITI-34'-Top Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
14.46	9.14	21.33	30.41	39.12	0.37	8561	68	0	1.55	a.d.b.
	22.28	18.25	26.01	33.46	0.32	7323	-	-	-	a.r.b.
		23.48	33.47	43.05	0.41	9422	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
8.35	50.89	3.07	1.00	0.38	21.52	14.79	a.d.b.
	55.53	3.35	1.09	0.41	23.48	16.14	d.b.
	72.57	4.38	1.42	0.54	-	21.09	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.17	15.28						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2560	+2650	+2650	+2650
REDUCING	2369	2545	2570	+2650

GULF-WAPITI-34'-Middle Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
7.94	3.69	58.64	19.90	17.77	0.14	3087	54	0	2.05	a.d.b.
	11.34	53.99	18.32	16.35	0.13	2842	-	-	-	a.r.b.
		60.89	20.66	18.45	0.15	3205				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.13	22.85	2.00	0.40	0.15	58.98	12.49	a.d.b.
-	23.59	2.06	0.41	0.15	60.89	12.89	d.b.
	60.32	5.28	1.05	0.38	-	32.97	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.36	2.22						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2536	+2650	+2650	+2650
REDUCING	2488	2609	+2650	+2650

GULF-WAPITTI-34'-Lower Ply to Footwall Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH %	VOL.%	F.C. %						
9.27	10.85	19.12	30.13	39.90	0.45	8547	59	0	1.53	a.d.b.
	19.11	17.35	27.34	36.20	0.40	7755	-	-	-	a.r.b.
		21.45	33.80	44.75	0.50	9587				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
10.08	52.70	3.03	1.09	0.45	19.29	13.36	a.d.b.
	58.61	3.37	1.21	0.50	21.45	14.86	d.b.
	74.61	4.29	1.54	0.64	-	18.92	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.22	10.83						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2516	+2650	+2650	+2650
REDUCING	2493	+2650	+2650	+2650

GULF-WAPITI-45'-Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
8.09	6.41	25.84	27.26	40.49	0.40	8614	55	0	1.56	a.d.b.
	13.98	23.75	25.06	37.21	0.37	7917	-	-	-	a.r.b.
		27.61	29.13	43.26	0.43	9204				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
6.75	49.05	2.88	0.88	0.40	25.75	14.29	a.d.b.
	52.61	3.09	0.94	0.43	27.61	15.32	d.b.
	72.68	4.27	1.30	0.59	-	21.16	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.30	5.30						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2593	+2650	+2650	+2650
REDUCING	2534	+2650	+2650	+2650

GULF-WAPITI-45'-Upper Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
7.68	10.90	13.45	30.51	45.14	0.42	9798	62	0	1.44	a.d.b.
	17.74	12.42	28.17	41.67	0.39	9046	-	-	-	a.r.b.
		15.10	34.24	50.66	0.47	10997				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
10.74	60.84	3.43	1.26	0.42	13.48	9.83	a.d.b.
	68.16	3.84	1.41	0.47	15.10	11.01	d.b.
	80.28	4.52	1.66	0.55	-	12.99	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.82	16.33						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2472	2550	+2650	+2650
REDUCING	2328	2540	2575	+2650

GULF-WAPITI-45'-Middle Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
5.11	3.47	50.85	19.96	25.72	0.21	4972	51	0	1.90	a.d.b.
	8.41	48.25	18.94	24.40	0.20	4718	-	-	-	a.r.b.
		52.68	20.68	26.64	0.22	5151				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.44	31.30	2.33	0.51	0.21	50.87	11.34	a.d.b.
	32.41	2.41	0.53	0.27	52.68	11.70	d.b.
	68.49	5.09	1.12	0.57	-	24.73	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.17	1.37						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2578	+2650	+2650	+2650

GULF-WAPITI-45'-Lower Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu / lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
6.80	9.31	17.93	28.60	44.16	0.43	9462	55	0	1.49	a.d.b.
	15.47	16.71	26.66	41.16	0.40	8819	-	-	-	a.r.b.
		19.77	31.54	48.69	0.47	10433	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
8.84	59.71	3.30	0.98	0.43	18.02	8.72	a.d.b.
	65.50	3.62	1.08	0.47	19.77	9.56	d.b.
	81.64	4.51	1.35	0.59	-	11.91	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.35	7.81						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H = W	H = 1/2 W	F.T.
OXIDIZING	2554	+2650	+2650	+2650
REDUCING	2510	+2650	+2650	+2650

GULF-WAPITI-55'-Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
7.91	7.80	25.05	28.20	38.95	0.41	8495	54	0	1.53	a.d.b.
	15.10	23.07	25.97	35.86	0.37	7823	-	-	-	a.r.b.
		27.17	30.59	42.24	0.44	9214				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
7.29	50.54	3.24	0.95	0.41	25.19	12.38	a.d.b.
	54.51	3.49	1.02	0.44	27.17	13.37	d.b.
	74.85	4.79	1.40	0.60	-	18.36	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.49	6.03						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2566	+2650	+2650	+2650

GULF-WAPITI-55'-Upper Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
7.21	5.54	18.11	30.70	45.65	0.49	9979	55	0	1.48	a.d.b.
	12.34	16.80	28.49	42.37	0.46	9260	-	-	-	a.r.b.
		19.17	32.50	48.33	0.52	10564				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
5.29	58.09	3.95	1.21	0.49	18.16	12.81	a.d.b.
	61.33	4.17	1.28	0.52	19.17	13.53	d.b.
	75.88	5.16	1.58	0.64	-	16.74	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.10	11.35						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H = W	H = 1/2 W	F.T.
OXIDIZING	2555	+2650	+2650	+2650
REDUCING	2355	2477	2511	+2650

GULF-WAPITI-55'-Middle Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
7.44	6.56	53.51	19.37	20.56	0.21	3775	59	0	1.97	a.d.b.
	13.51	49.53	17.93	19.03	0.19	3494	-	-	-	a.r.b.
		57.27	20.73	22.00	0.22	4040	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
5.94	26.69	2.06	0.63	0.21	53.87	10.60	a.d.b.
	28.38	2.19	0.67	0.22	57.27	11.27	d.b.
	66.42	5.13	1.57	0.51	-	26.37	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.07	2.77						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2617	+2650	+2650	+2650

GULF-WAPITI-55'-Lower Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
6.35	13.05	19.08	29.66	38.21	0.49	8423	56	0	1.52	a.d.b.
	18.57	17.87	27.78	35.78	0.46	7888				a.r.b.
		21.94	34.11	43.95	0.56	9687				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
12.72	54.09	2.82	1.06	0.49	19.15	9.67	a.d.b.
	61.97	3.23	1.21	0.56	21.94	11.09	d.b.
	79.39	4.14	1.55	0.72	-	14.20	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.52	16.26						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2492	+2650	+2650	+2650
REDUCING	2310	2609	+2650	+2650

GULF-WAPITI-73'-Face ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
9.20	2.08	32.67	27.83	37.42	0.39	8064	46	0	1.61	a.d.b.
	11.09	29.66	25.27	33.98	0.35	7322	-	-	-	a.r.b.
		33.36	28.42	38.22	0.40	8235	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.48	48.92	3.46	0.44	0.39	32.53	11.78	a.d.b.
	50.16	3.55	0.45	0.40	33.36	12.08	d.b.
	75.27	5.33	0.68	0.60	-	18.12	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.74	2.70						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-73'-Upper Face Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
7.51	1.79	26.19	31.90	40.12	0.54	9617	48	1	1.51	a.d.b.
	9.16	24.22	29.51	37.11	0.50	8895	-	-	-	a.r.b.
		26.67	32.48	40.85	0.55	9792				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.35	55.36	3.97	0.74	0.54	26.04	11.00	a.d.b.
	56.68	4.07	0.77	0.55	26.67	11.26	d.b.
	77.29	5.55	1.05	0.75	-	15.36	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.92	2.67						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-73'-Middle Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
6.84	1.64	53.50	21.09	23.77	0.21	4783	44	0	1.91	a.d.b.
	8.37	49.84	19.65	22.14	0.20	4456				a.r.b.
		54.39	21.44	24.17	0.21	4863				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.04	31.20	2.58	0.33	0.21	53.28	10.36	a.d.b.
	31.85	2.63	0.34	0.21	54.39	10.58	d.b.
	69.83	5.77	0.75	0.46	-	23.19	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.96	0.52						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-73'-Lower Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu / lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
15.10	3.50	20.97	30.60	44.93	0.48	9566	48			a.d.b.
	18.07	17.80	25.98	38.15	0.41	8122				a.r.b.
		21.73	31.71	46.56	0.50	9913				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.84	59.81	3.62	1.13	0.48	20.90	10.22	a.d.b.
	62.20	3.76	1.18	0.50	21.73	10.63	d.b.
	79.47	4.80	1.51	0.64	-	13.58	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.80	6.87						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-84.5'-Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
8.70	2.07	33.89	27.43	36.61	0.42	8095	45	0	1.61	a.d.b.
	10.59	30.94	25.04	33.43	0.38	7391	-	-	-	a.r.b.
		34.61	28.01	37.38	0.43	8266	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.61	46.85	3.38	0.74	0.42	33.71	12.29	a.d.b.
	48.11	3.47	0.76	0.43	34.61	12.62	d.b.
	73.57	5.31	1.16	0.66	-	19.30	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.55	2.64						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-84.5'-Upper Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
7.27	1.96	23.99	31.66	42.39	0.55	10012	52	½	1.49	a.d.b.
	9.09	22.25	29.36	39.30	0.51	9284	-	-	-	a.r.b.
		24.47	32.29	43.24	0.56	10212				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
2.58	59.03	3.54	1.12	0.55	23.84	9.34	a.d.b.
	60.59	3.63	1.15	0.56	24.47	9.60	d.b.
	80.22	4.81	1.52	0.74	-	12.71	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.19	5.36						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=½W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-84.5'-Middle Ply ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
10.53	1.62	43.09	24.72	30.57	0.29	6849	45	0	1.68	a.d.b.
	11.98	38.55	22.12	27.35	0.26	6128	-	-	-	a.r.b.
		43.80	25.13	31.07	0.29	6962				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
1.81	43.32	3.13	0.64	0.28	43.01	7.81	a.d.b.
	44.12	3.19	0.65	0.29	43.80	7.95	d.b.
	78.51	5.68	1.16	0.52	-	14.13	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.56	0.52						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-84.5'-Lower Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
13.68	3.17	16.95	31.52	48.36	0.46	10540	49	0	1.46	a.d.b.
	16.42	14.63	27.21	41.74	0.40	9098	-	-	-	a.r.b.
		17.50	32.55	49.95	0.48	10885				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.18	61.59	3.90	1.06	0.46	16.94	12.87	a.d.b.
	63.61	4.03	1.09	0.48	17.50	13.29	d.b.
	77.10	4.88	1.32	0.58	-	16.12	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.37	7.68						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-25'-Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
20.84	4.21	28.32	28.81	38.66	0.35	8056	57	0	1.62	a.d.b.
	24.17	22.42	22.81	30.60	0.28	6377	-	-	-	a.r.b.
		29.56	30.08	40.36	0.37	8410				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
4.18	49.71	3.25	0.90	0.35	28.32	13.29	a.d.b.
	51.88	3.39	0.94	0.37	29.56	13.86	d.b.
	73.65	4.81	1.33	0.53	-	19.68	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.60	8.65						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2594	+2650	+2650	+2650

GULF-WAPITI-39'-Face ChannelHEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
10.54	3.76	25.30	29.29	41.65	0.39	9175	43	0	1.63	a.d.b.
	13.90	22.64	26.20	37.26	0.35	8208	-	-	-	a.r.b.
		26.29	30.43	43.28	0.41	9533	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.72	57.08	3.90	0.83	0.39	25.31	8.77	a.d.b.
	59.29	4.05	0.86	0.41	26.29	9.10	d.b.
	80.44	5.49	1.17	0.56	-	12.34	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.89	4.65						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-39'-Middle Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu / lb.	HGI	FSI	S.G.	BASIS
	MOIST. %	ASH %	VOL. %	F.C. %						
6.98	2.07	60.82	12.94	24.17	0.15	3727	49	0	2.05	a.d.b.
	8.91	56.57	12.04	22.48	0.14	3467	-	-	-	a.r.b.
		62.11	13.21	24.68	0.15	3806				d.b.

ULTIMATE:

H ₂ O	C ₁	H	N	S	ASH	O ₂ (by diff.)	BASIS
1.89	23.03	4.09	0.25	0.15	60.94	9.65	a.d.b.
	23.47	4.17	0.25	0.15	62.11	9.85	d.b.
	61.94	11.01	0.66	0.40	-	25.99	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			1.56	0.78						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-39'-Top Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
12.58	3.84	22.40	30.40	43.36	0.43	9739	43	0	1.50	a.d.b.
	15.94	19.58	26.57	37.91	0.38	8514				a.r.b.
		23.29	31.61	45.10	0.45	10128				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.64	59.38	3.71	1.09	0.43	22.44	9.31	a.d.b.
	61.62	3.85	1.13	0.45	23.29	9.66	d.b.
	80.33	5.02	1.47	0.59	-	12.59	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.10	5.81						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-39'-Bottom Ply Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
10.12	4.00	19.56	28.75	47.69	0.44	9877	41	0	1.48	a.d.b.
	13.72	17.58	25.84	42.86	0.40	8877	-	-	-	a.r.b.
		20.38	29.95	49.67	0.46	10289	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
3.72	61.63	3.46	1.02	0.44	19.62	10.11	a.d.b.
	64.01	3.59	1.06	0.46	20.38	10.50	d.b.
	80.39	4.51	1.33	0.58		13.19	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			3.03	6.94						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	+2650	+2650	+2650	+2650

GULF-WAPITI-39'-Partial Face Channel

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH %	VOL.%	F.C. %						
2.08	10.15	24.79	28.51	36.55	0.30	7360	42	0	1.63	a.d.b.
	12.01	24.28	27.92	35.79	0.29	7207	-	-	-	a.r.b.
		27.59	31.73	40.68	0.33	8191				d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
9.84	44.90	2.55	0.69	0.30	24.88	16.84	a.d.b.
	49.80	2.83	0.77	0.33	27.60	18.67	d.b.
	68.78	3.91	1.06	0.46	-	25.79	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
			2.75	9.21						

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	+2650	+2650	+2650	+2650
REDUCING	2589	+2650	+2650	+2650

GULF-WAPITI-ADIT #1 BULK SAMPLE

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
3.7	7.9	26.1	26.5	39.5	0.45	8447	49	-	9.4	a.d.b.
	11.3	25.1	25.5	38.1	0.43	8135	-	-	-	a.r.b.
		28.3	28.8	42.9	0.49	9172	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
7.93	50.08	2.89	0.80	0.45	26.13	11.72	a.d.b.
-	54.39	3.14	0.87	0.49	28.38	12.73	d.b.
	75.94	4.38	1.21	0.68	-	17.79	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
50.96	31.57	1.13	2.79	5.18	0.78	0.75	0.30	2.14	2.28	-2.12

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2800+	2800+	2800+	2800+
REDUCING	2760	2800+	2800+	2800+

GULF-WAPITI-ADIT #1 BULK SAMPLE

ULTIMATE ANALYSIS :

SAMPLE TYPE	H ₂ O	C	H	N	S	ASH	O (by diff.)	BASIS
HEAD RAW	7.93	50.08	2.89	0.80	0.45	26.13	11.72	a.d.b.
	-	54.39	3.14	0.87	0.49	28.38	12.73	d.b.
	-	75.94	4.38	1.21	0.68	-	17.79	d.a.f.
+100 MESH FLOATS AT 1.60	6.83	60.26	3.44	0.99	0.48	13.61	14.39	a.d.b.
	-	64.68	3.69	1.06	0.52	14.61	15.44	d.b.
	-	75.73	4.32	1.24	0.61	-	18.10	d.a.f.

PROXIMATE :

SAMPLE TYPE	RM %	ASH	VOL.	F.C.	S	Btu / lb.	HGI	BASIS
+100 MESH FLOATS AT 1.50	7.1	10.6	31.5	50.8	0.49	10845	-	a.d.b.
		11.4	33.9	54.7	0.53	11674		d.b.
1.60	6.8	13.6	30.0	49.6	0.48	10419	50	a.d.b.
		14.6	32.2	53.2	0.52	11179		d.b.
1.70	6.6	16.3	29.6	47.5	0.46	10012	-	a.d.b.
		17.5	31.7	50.9	0.49	10720		d.b.

ASH FUSION TEMPERATURES (°F):

SAMPLE TYPE	ATMOSPHERE	IDT	H=W	H=1/2 W	F.T.
+100 MESH FLOATS AT 1.60	OXIDIZING	2460	2510	2570	2640
	REDUCING	2430	2480	2520	2600

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MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
41.46	30.85	1.08	3.54	11.02	1.17	0.82	0.18	5.36	3.08	-1.44

GULF-WAPITI-ADIT #2 BULK SAMPLE

HEAD RAW ANALYSIS

PROXIMATE PLUS:

ADM.	PROXIMATE				S	Btu/lb.	HGI	FSI	S.G.	BASIS
	MOIST.%	ASH%	VOL.%	F.C.%						
12.6	6.7	28.0	26.0	39.3	0.35	8151	53		13.7	a.d.b.
	18.5	24.5	22.7	34.3	0.31	7124	-	-	-	a.r.b.
		30.0	27.9	42.1	0.38	8736	-	-	-	d.b.

ULTIMATE:

H ₂ O	C	H	N	S	ASH	O ₂ (by diff.)	BASIS
6.71	49.78	3.22	0.44	0.35	28.00	11.50	a.d.b.
-	53.36	3.45	0.47	0.38	30.01	12.33	d.b.
	76.23	4.93	0.67	0.54	-	17.63	d.a.f.

MINERAL ANALYSIS OF ASH:

SiO ₂	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃	Undet.
47.86	31.38	1.24	3.00	7.42	0.91	0.81	0.39	2.31	3.39	-1.29

ASH FUSION TEMPERATURES (°F):

ATMOSPHERE	IDT	H=W	H=1/2W	F.T.
OXIDIZING	2520	2690	2730	2750
REDUCING	2470	2620	2670	2730

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GULF-WAPITI-ADIT #2 BULK SAMPLE

ULTIMATE ANALYSIS :

SAMPLE TYPE	H ₂ O	C	H	N	S	ASH	O (by diff.)	BASIS
HEAD RAW	6.71	49.78	3.22	0.44	0.35	28.00	11.50	a.d.b.
	-	53.36	3.45	0.47	0.38	30.01	12.33	d.b.
	-	76.23	4.93	0.67	0.54	-	17.63	d.a.f.
+100 MESH FLOATS AT 1.60	5.36	61.98	3.78	1.34	0.46	13.40	13.68	a.d.b.
	-	65.49	3.99	1.42	0.49	14.16	14.45	d.b.
	-	76.29	4.65	1.65	0.57	-	16.84	d.a.f.

PROXIMATE :

SAMPLE TYPE	RM %	ASH	VOL.	F.C.	S	Btu / lb.	HGI	BASIS
+100 MESH FLOATS AT 1.50	5.5	10.9	31.9	51.7	0.47	10816	-	a.d.b.
		11.5	33.8	54.7	0.50	11446		d.b.
1.60	5.4	13.4	31.0	50.2	0.46	10402	50	a.d.b.
		14.2	32.8	53.1	0.49	10996		d.b.
1.70	5.3	15.7	30.3	48.7	0.48	10093		a.d.b.
		16.6	32.0	51.4	0.51	10657		d.b.

ASH FUSION TEMPERATURES (°F):

SAMPLE TYPE	ATMOSPHERE	IDT	H=W	H=1/2 W	F.T.
+ 100 MESH FLOATS AT 1.60	OXIDIZING	2450	2480	2500	2530
	REDUCING	2430	2470	2490	2520

APPENDIX V .

CORE DESCRIPTIONS .

GULF CANADA RESOURCES INC. – COAL DIVISION – DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-101 ELEV. COLLAR: 1058.44 m TOTAL DEPTH: 36.6 m DATE BEGUN: 10/11/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 10/11/80
 CO.ORD.: _____ HOLE ANGLE: 0 LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX MARKER	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
				FROM	TO	APPAR. THK.	TRUE THK.			
				29 .85	30 .00		.15			Mudstone, carbonaceous, well indurated
				30 .00	30 .46		.46			Coal, dull, with thin bright bands, thin shale partings
				.46	.72		.26			Shale, carbonaceous, with thin boney coal streaks
				30 .72	31 .75		.03			Coal, dull, thin bright bands, shale and boney coal partings
				.75	.87		.12			Sandstone, dark grey to black, fine grained, coalified plant fragments, thin bright coal stringers
				31 .87	32 .05		.12			Sandstone, dark grey, medium grained, plant fragments CHUNGO MEMBER

- 1 -

GULF CANADA RESOURCES INC. – COAL DIVISION – DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-100 A ELEV. COLLAR: 1028.28 m TOTAL DEPTH: 30.5 DATE BEGUN: 9/11/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 9/11/80
 CO.ORD.: _____ HOLE ANGLE: 0 LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
	MARKER			FROM	TO	APPAR. THK.	TRUE THK.			
				21 .60	22 .05			.45		Shale black, carbonaceous; thin siltstone streaks
				0.5	.55			.50		Coal, dull, with thin bright streaks; thin boney coal streaks
				.55	.82			.27		Mudstone, carbonaceous
				22 .82	24 .20			.38		Coal, dull, with thin bright coal streaks, thin shale intercalations; scattered thin sandstone lenses, dark grey, fine grained; increasing shale and boney coal towards bottom
				.20	.35			.15		Sandstone, medium to dark grey, well parted, medium grained CHUNGO MEMBER

GULF CANADA RESOURCES INC. – COAL DIVISION – DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-117 ELEV. COLLAR: 1001.67 m TOTAL DEPTH: 30.5 m DATE BEGUN: 1/12/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 1/12/80
 CO.ORD.: _____ HOLE ANGLE: 0 LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
	MARKER			FROM	TO	APPAR. THK.	TRUE THK.			
				24 .00	24 .19			.19		Mudstone, dark grey to black, silty, hard thin bright lenticular coal bands
				24 .19	25 .10			.91		Coal, semi-bright to bright thin dull partings, soft, iron staining on surfaces
				.10	.32			.22		Shale, dark grey to black, fissile, fragmented, coaly in part
				25 .32	26 .12			.80		Coal, bright, thin boney stringers, soft, broken, sandy band near base, iron staining
				.12	.40			.28		Sandstone, grey to black, medium grained, massive, hard CHUNGO MEMBER

131

GULF CANADA RESOURCES INC. – COAL DIVISION – DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-102 ELEV. COLLAR: 1018.87 m TOTAL DEPTH: 28.0 m DATE BEGUN: 11/11/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 11/11/80
 CO.ORD.: _____ HOLE ANGLE: _____ LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX MARKER	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
				FROM	TO	APPAR. THK.	TRUE THK.			
				20 .80	20 .95		.15			Mudstone, carbonaceous, hard
				20 .95	21 .58		.63			Coal, dull, with thin bright stringers thin shale-mudstone partings, coal micro-blocky, core badly broken
				.58	.85		.27			Mudstone, carbonaceous
				21 .85	22 .70		.85			Coal, dull, with thin bright stringers, thin shale partings
				.70	.76		.06			Sandstone, dark grey to black, medium grained

- 4 -

GULF CANADA RESOURCES INC. – COAL DIVISION – DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-106 ELEV. COLLAR: 1076.77 m TOTAL DEPTH: 55.5 DATE BEGUN: 14/11/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 18/11/80
 CO.ORD.: _____ HOLE ANGLE: 0 LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX MARKER	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
				FROM	TO	APPAR. THK.	TRUE THK.			
				47 .43	47 .50		.07			Mudstone, carbonaceous, hard
				.50	.85		.35			Coal, dull, with thin bright bands thin shaly intervals
				47 .85	48 .08		.23			Mudstone, carbonaceous, shaly in part
				.08	.58		.50			Coal, dull, with thin bright partings
				.58	.69		.11			Mudstone, carbonaceous, boney coal partings
				48 .69	49 .15		.46			Coal, dull, with thin bright partings
				.15	.30		.15			Sandstone, black, medium grained CHUNGO MEMBER

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GULF CANADA RESOURCES INC. - COAL DIVISION - DRILL CORE LOG

SHEET NO.:

HOLE NO.: 80-113 ELEV. COLLAR: _____ TOTAL DEPTH: 31.1 m DATE BEGUN: 27/11/80
 PROJECT: Wapiti BEARING: _____ CORE SIZE: 7.6 cm DATE COMPL.: 27/11/80
 CO.ORD.: _____ HOLE ANGLE: _____ LOGGED BY: Roke CONTRACTOR: Hi-Rate

BCA	BOX MARKER	INTERVAL THK.	CORE LOSS	LITHOLOGICAL UNIT				% REC	SAMPLE NO.	DESCRIPTION
				FROM	TO	APPAR. THK.	TRUE THK.			
				23 .62	23 .65		.03			Sandstone, black, very fine grained
				.65	.75		.10			Coal, dull-semibright, shiny surfaces, very thin bright stringers of coal, hard with conchoidal fracture in part
				23 .75	24 .15		.40			Coal, dull, thin bright stringers, soft
				.15	.27		.12			Bone, dull, scattered thin coaly stringers
				.27	.37		.10			Coal, dull-semi bright
				.37	.75		.38			Bone, dull, thin stringers bright coal, thin stringers of shale
				.75	.85		.10			Coal, dull, thin bright stringers, thin lenses of sandstone, black, fine grained
				.85	.95		.10			Coal, dull, boney
				24 .95	25 .28		.33			Coal, dull, very thin bright stringers, thin boney partings
				.28	.30		.02			Sandstone, black, medium grained, coaly inclusions
										CHUNGO MEMBER

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APPENDIX VI

LIST OF PERSONNEL AND CONTRACTORS

LIST OF PERSONNEL AND CONTRACTORS

D.K. Sharma	Gulf Canada Resources Inc.	Project Supervisor
D.W. MacFarlane		Project Geologist
S. Gardner		Project Geologist
R. Mayer		Field Assistant
E. Swindenberg		Assistant Geologist
J. Hiebert		Field Bookkeeper

Hi-Rate Drilling	Drilling
Roke Oil Enterprises	Geophysical Logging
P. Demeulemeester	Cat Work
Target Tunnelling	Adits
D. Watson Surveys	Survey

APPENDIX VII

**SURVEY DATA - HOLE ELEVATIONS
AND COORDINATES PHASE IV**

GULF CANADA RESOURCES INC. - WAPITI KISKATENAW COAL PROJECT

SUMMARY

<u>STATION</u>	<u>TAG NO.</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>GROUND ELEV.</u>	<u>ELEV.</u>
DH-80-100 ^A	130	6,141,755.670	640,584.666	1028.276	Tag-1029.08
DH-80-101	122	6,143,205.974	640,754.870	1058.435	Tag-1059.52
DH-80-102	132	6,141,261.278	640,836.749	1018.87	Tag-1019.67
DH-80-103	79	6,145,952.429	642,975.040	1106.88	Tag-1107.38
DH-80-104	77	6,149,934.154	641,477.324	1097.47	Tag-1097.87
DH-80-105	137	6,152,452.220	642,534.549	1103.46	Tag-1105.06
DH-80-106	119	6,144,199.364	641,625.047	1076.77	Tag-1077.41
DH-80-107	157	6,138,157.676	640,696.518	1022.09	Tag-1023.49
DH-80-108	813	6,138,327.875	647,285.225	1101.55	Tag-1102.03
DH-80-109	818	6,136,555.079	647,947.312	1091.66	
DH-80-110	822	6,136,497.759	646,472.629	1104.896	
DH-80-111	135	6,149,092.534	641,894.887	1070.87	
DH-80-126	136	6,147,965.453	642,405.080	1083.67	Tag-1084.52
DH-80-112		6,141,184.033	642,623.046	1008.34	
DH-80-113	163	6,141,916.906	643,228.214	1007.79	
DH-80-114	185	6,141,849.681	642,329.289	1039.00	
DH-80-115	799	6,143,588.865	642,521.399	1055.623	Tag-1056.39
DH-80-116	798	6,142,963.714	642,519.560	1064.205	Tag-1064.61
DH-80-117	181	6,140,499.512	642,392.191	1001.673	Tag-1002.54
DH-80-118	177	6,139,615.497	641,875.612	971.069	
DH-80-119	161	6,143,090.823	643,601.218	1017.681	Tag-1018.73
DH-80-120	806	6,144,526.596	645,252.808	1035.94	Tag-1036.59
DH-80-121	825	6,134,009.270	635,846.851	1113.30	Tag-1114.04
DH-80-122	828	6,133,067.671	636,816.727	1092.15	Tag-1093.25
DH-80-123		6,149,776.220	641,060.053	1089.68	
DH-80-127	801	6,145,513.718	642,529.540	1090.31	Tag-1091.46
Adit #1	125 (front)	6,143,467.364	640,762.362	1030.09	Roof=1032.04
	126 (back)	6,143,450.291	640,783.322	1029.40	Roof=1031.52
Adit #2	Mouth of Culvert	6,140,083.954	641,677.658	973.0	Beam=974.94
	Back	6,140,079.235	641,691.047		

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 6145367
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