GOODRICH COAL PROPERTY

1984

BRAZION CREEK
BLOCK
~~MINE AREA~~

GEOLOGICAL REPORT

1984

00535

Gulf Canada Resources Inc.
Coal Division
October 23, 1984

MAP AND LICENCE NUMBERS

Map Number: 93-0-8

Licence Numbers: 5694
5695
5696
5697
5698
5699
5700

Approximate Centre of Brazion Creek Mine Area:

Latitude: N 55° 25' Longitude: W 122°10'

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Brazion Creek Mine Area

Geology Maps

Brazion Creek Mine Area Geology Map 1:5000

Brazion Creek Mine Area Data Source Map 1:5000

Geological Cross-Sections: 1:5000

1500S
1000S
0500S
0000
0250N
0500N
0750N
1000N
1250N
1500N
1750N
2000N
2250N

PREFACE

The 1984 Goodrich Coal Property Geological Report represents Gulf Canada Resources Inc.'s sixth exploration program on their largest property in northeastern British Columbia.

The 1984 exploration season involved a limited geological mapping and trenching program within one prospect area of the Goodrich Property. That prospect area is known as the Brazion Creek Mine Area.

1.0 SUMMARY

The Goodrich coal property is one of the largest holdings in the Peace River Coalfield of northeastern British Columbia, consisting of 201 coal licences equalling (56 079 hectares).

The property is located approximately sixty kilometers west of Chetwynd, B.C., and is overlain by northwesterly trending, folded and faulted strata of Upper Jurassic to Lower Cretaceous age.

The total in-situ coal resources of the Goodrich coal property are estimated to be 2.441 billion tonnes, of which 101 million tonnes are located within the potential mine area of Brazion Creek Block. Remaining resources are located in several additional prospect areas within the Goodrich Property. Coal resources of the properties are summarized below:

Goodrich Coal Property	In-Situ Coal Resources (Million Tonnes)
Moberly	958
Table	274
South Cirque	578
Hasler Creek	271
Goodrich Central	256
Beaudette Syncline	3
Brazion Creek Mine Area	101
Total:	2441

During the 1984 exploration program, GCRI mapped and trenched in the Brazion Creek Mine Area. Coal quality analyses obtained from previous years, combined with data obtained from trench samples, indicates that in the Brazion Creek Area, the Gething coal seams are of low to high volatile bituminous ASTM rank.

Major findings resulting from the 1984 Brazion Creek exploration program are:

1. A more thorough understanding of the coal occurrences within the Gething Formation in the Brazion Creek Mine Area. The Gething section consists of 16 seams having a total aggregate coal thickness of 30.73 meters contained within a 426 meter section.

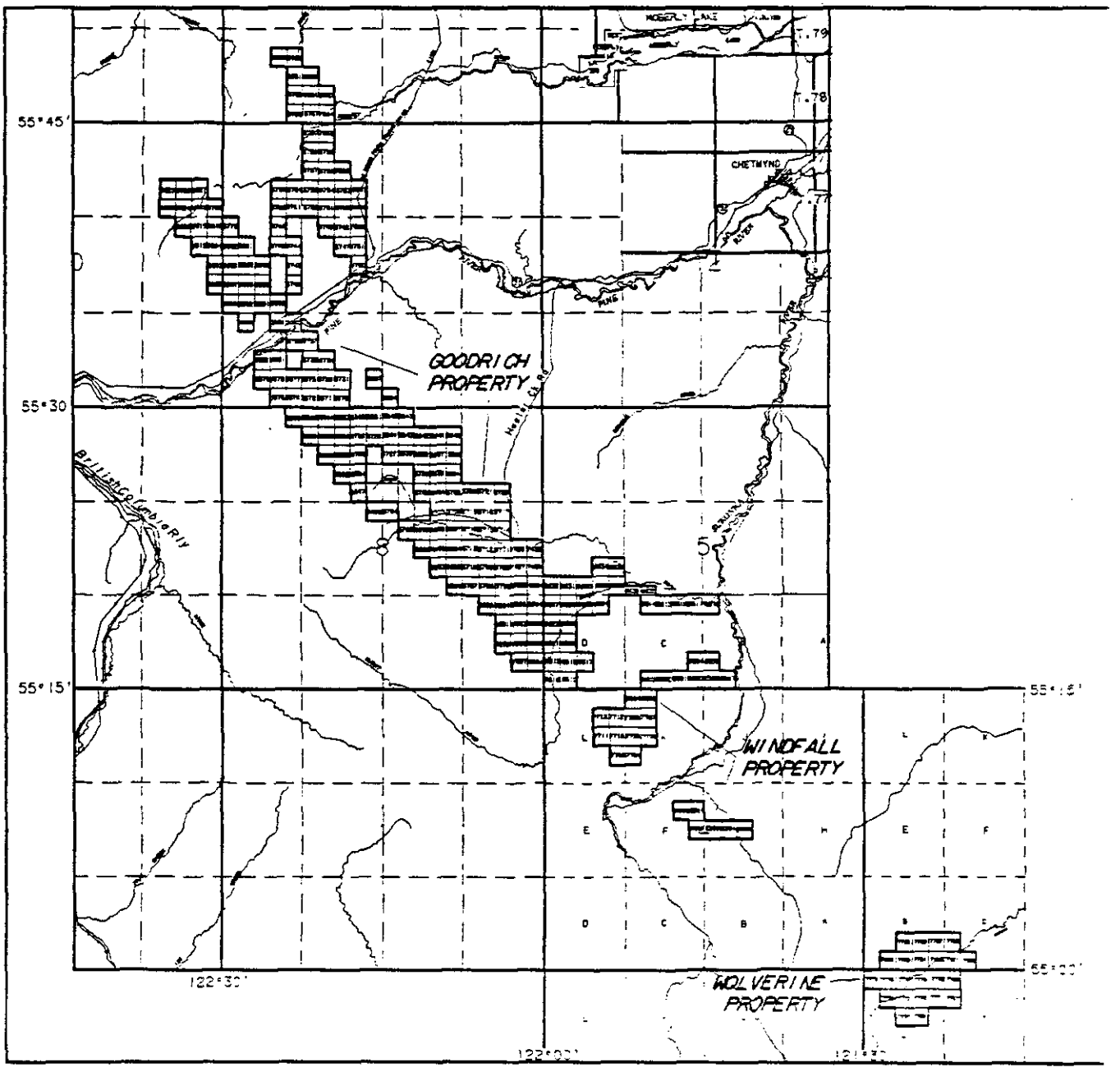
2. Additional control on the structural characteristics of the Goodrich Synclinorium resulting in an extension of the structure south.

2.0 RECOMMENDATIONS

Based on the 1984 exploration program, it is recommended that:

1. Further exploration in the way of drilling and mapping continue within the Brazion Creek Mine Area to confirm the coal resource potential of the area, to further investigate the quality of the Gething coal seams, and to bring the Brazion Creek Block up to a measured level.

FIGURE 2.0.1
LICENCE STATUS
OCTOBER 1984
GOODRICH COAL PROPERTY
COAL LICENCES



LEGEND

GULF PROPERTY BOUNDARY

7779 COAL LICENCE NUMBER

SCALE

0 MILES 5 10

0 KM 5 10 15

GULF CANADA RESOURCES INC.

24 OCT 1984

FILE NAME QS0:[205,4184.05]001.LOC

3.0 INTRODUCTION

3.1 Summary

The Goodrich Coal Project is located in northeastern British Columbia within the Peace River Coalfield, and consists of 201 coal licences covering 56 079 hectares. The property is underlain by Lower Cretaceous coal-bearing strata which are generally expressed in northwesterly trending valleys and ridges ranging in elevation from 680 metres to 2100 metres.

Exploration on the Goodrich coal property began in 1979; to date a total of 571 coal exposures have been trenched and 89 drill holes have been completed for a total of 24 169 metres of drilling. These exploration efforts have outlined seven prospect areas with potentially economic surface mineable resources with one known as the Brazion Creek Mine Area.

During the 1984 exploration program, only the seven licences (2061 ha) comprising the Brazion Creek Mine Area were investigated on the Goodrich property. These seven licences are located within the southern portion of the Brazion Creek Mine Area.

3.2 Property Location, Size and Access

The Goodrich coal licences lie within the Inner Foothills of the Rock Mountains in the northeast British Columbia Peace River Coalfield. Figure 3.2.1 shows the location of the Goodrich coal property, approximately 60 kilometers west of Chetwynd, B.C.

The Goodrich property covers approximately 599 square kilometres, extending from the Burnt River in the south to Johnson Creek in the north. It is one of the largest in the Peace River Coalfield as shown in Figure 3.2.1.

Primary access to the Goodrich coal property is provided by the paved all-weathered John Hart Highway (Hwy. No. 97) and the British Columbia Railway, with both linking Chetwynd to Prince George, B.C. The British Columbia Railway parallels the highway through the property along the Pine River Valley transportation corridor.

The all-weather gravel Hasler Creek Road, logging roads and seismic cutlines provide access to some areas south of the Pine River Valley such as the Brazion Creek Mine Area. Areas to the north are in part accessed via B.C. Hydro's power line roads and logging roads. More remote regions of the property can be accessed by rotary wing aircraft.

3.3 Property Ownership

Gulf Canada Resources Inc. wholly owns the seven coal licences known as the Brazion Creek Mine Area and the remaining 194 licences comprising the Goodrich coal property.

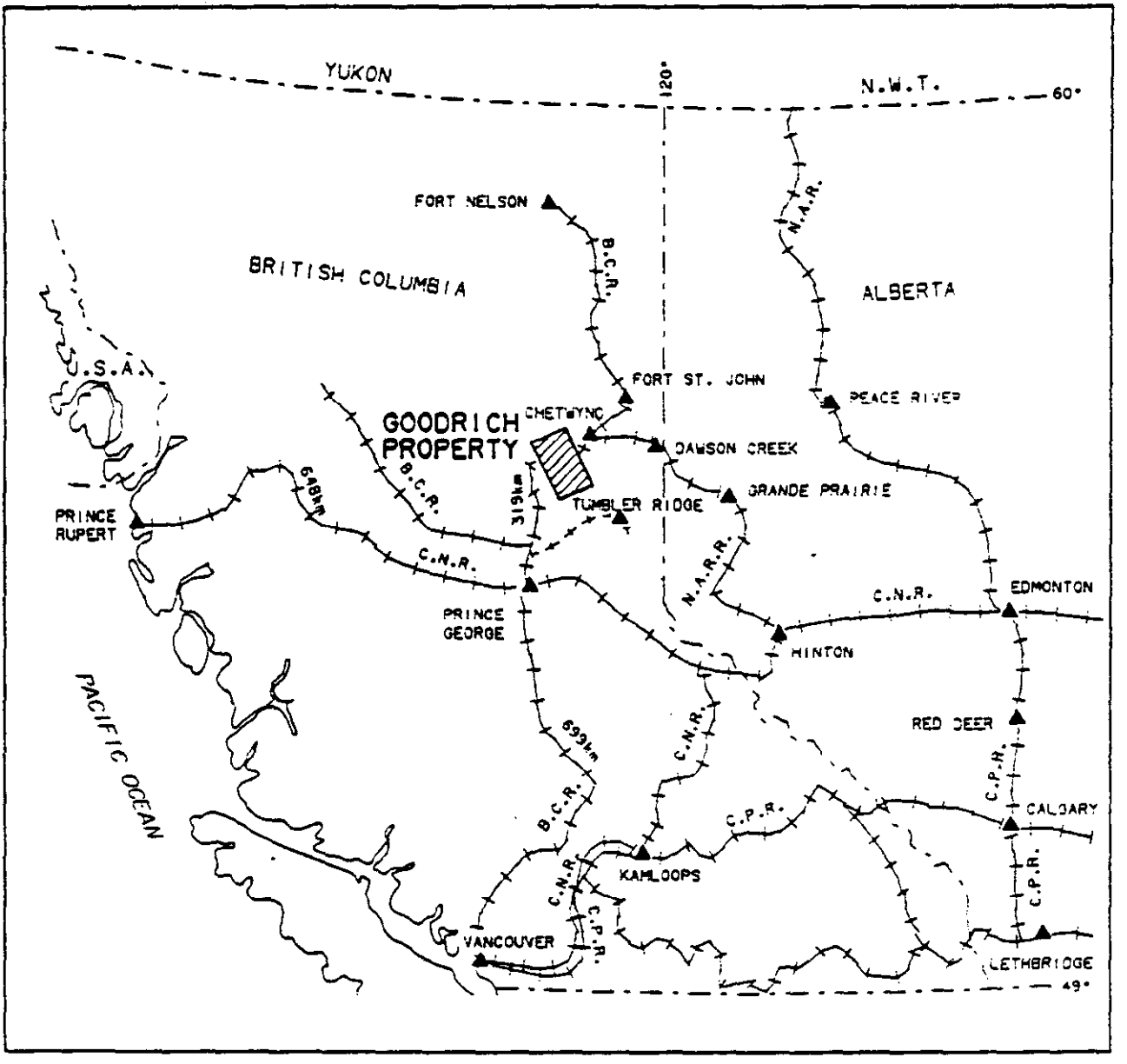
3.4 History of Land Tenure

Gulf Canada Resources Inc. initiated a reconnaissance exploration and mapping program in the Rocky Mountain Foothills of

FIGURE 3.2.1

GOODRICH COAL PROPERTY

LOCATION MAP



LEGEND

RAILROAD

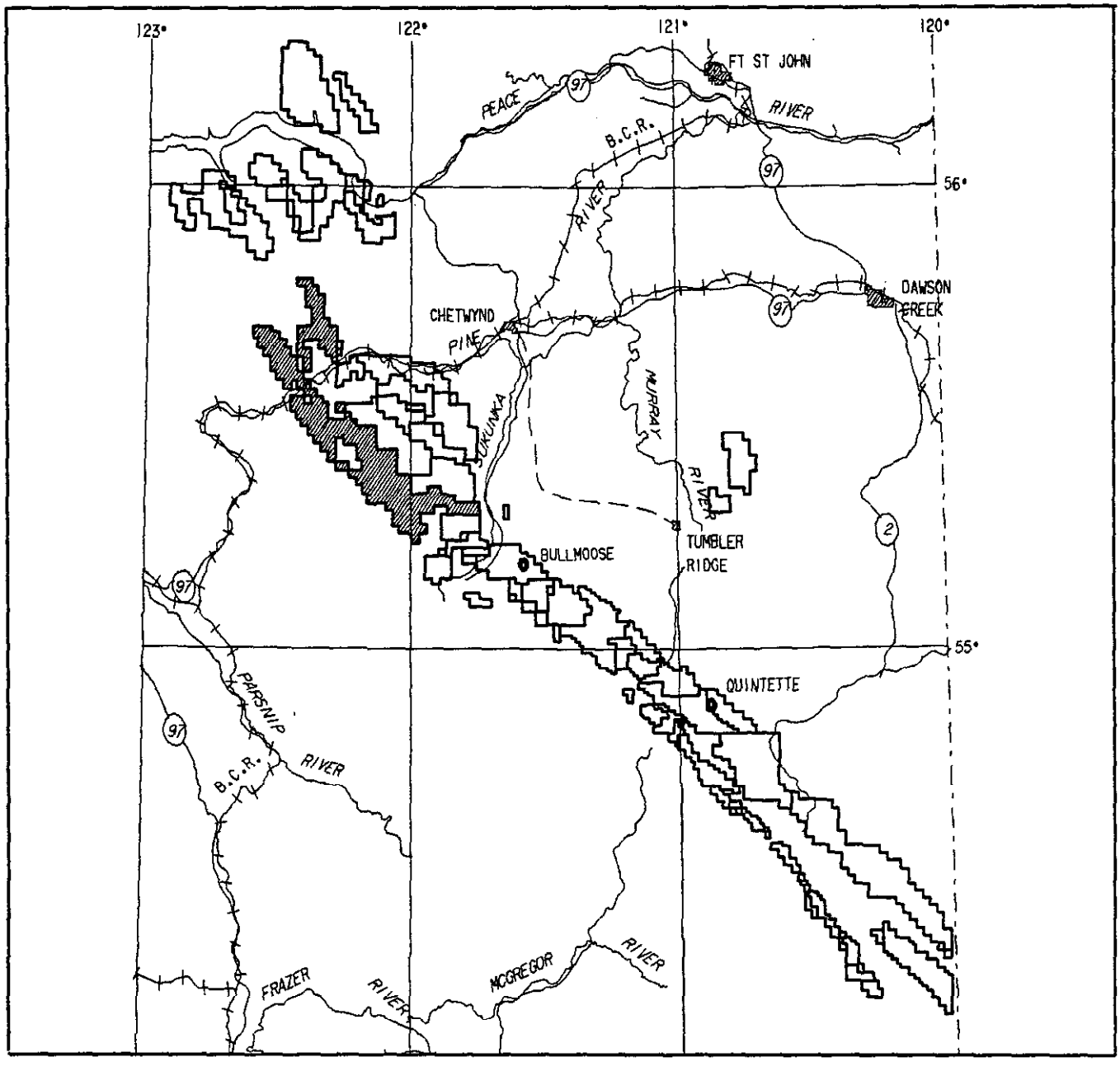
ANZAC RAILROAD

SCALE:

0 100 200 km (APPROX.)

Gulf

FIGURE 3.2.2
GOODRICH COAL PROPERTY
PEACE RIVER COALFIELD



northeastern British Columbia in 1979. This program resulted in the acquisition of 184 coal licences (53 900 hectares) in 1979.

In 1980 the Goodrich property attained its maximum size of 367 coal licences totalling 107 500 hectares when an additional 132 licences were acquired by application to the Crown, 11 licences were transferred from Gulf's Trefi Coal Property, and 38 licences were optioned from Lossan Exploration Ltd.

Despite the acquisition of a few licences in 1982 and 1983, overall exploration of the property has resulted in a net reduction of the size of the property through the surrender of generally unprospective licences. The property was reduced to 276 coal licences (80 681 hectares) in 1981, to 225 licences (66 047 hectares) in 1982, to 214 licences in 1983, and to 201 licences in late 1984. The relinquishing of nine of the thirteen licences in 1984 resulted in the Goodrich property being wholly owned by Gulf Canada Resources Inc.

3.5 History of Exploration

In 1979, Gulf Canada Resources Inc. initiated a reconnaissance exploration and mapping program, based on reported observations of Minnes Group coals in the area. This program resulted in the discovery that in the present Goodrich coal property previously interpreted Minnes' strata were actually younger strata of the Dresser-Cadomin and Gething Formations. As a result of the 1979 reconnaissance program, GCRI acquired a large group of licences and began a systematic program of exploration.

The objectives of these exploration programs are summarized below:

1. To identify and delineate regions of coal-bearing strata and consolidate the land position to cover only those areas containing economic coal deposits.
2. To identify potentially mineable areas and bring these areas to the feasiblity stage promptly.

Since the initial reconnaissance program of 1979, GCRI has completed six field programs:

In the summer field program of 1980, geological mapping and hand trenching of coal exposures resulted in the identification of several drill targets. A fall drilling program of 54 test holes totalling 14 236 metres was completed. All drill holes were geophysically logged and their elevations and locations surveyed.

Quality analyses of coal cores were completed on both raw and clean coal samples. In addition to the drilling, 3.1 km. of electrical (resistivity and gravity) surveys were run to determine the feasibility of alternate subsurface investigation techniques. *These techniques were found to be unsatisfactory due to areas of* complex structure within the property.

The 1981 field program consisted of geological mapping, hand trenching of coal exposures, and 9633 metres of drilling in 32 coal test holes adjacent to and in the Brazion Creek Area. (See Table 5.4.3.1 for a Data Source Summary within the Brazion Creek Mine Area.) Other areas were also tested by drilling: Moberly,

Goodrich Central and Goodrich East (Beaudette Syncline). Figure 3.5.1 illustrates the division of the property into "geological mapping blocks".

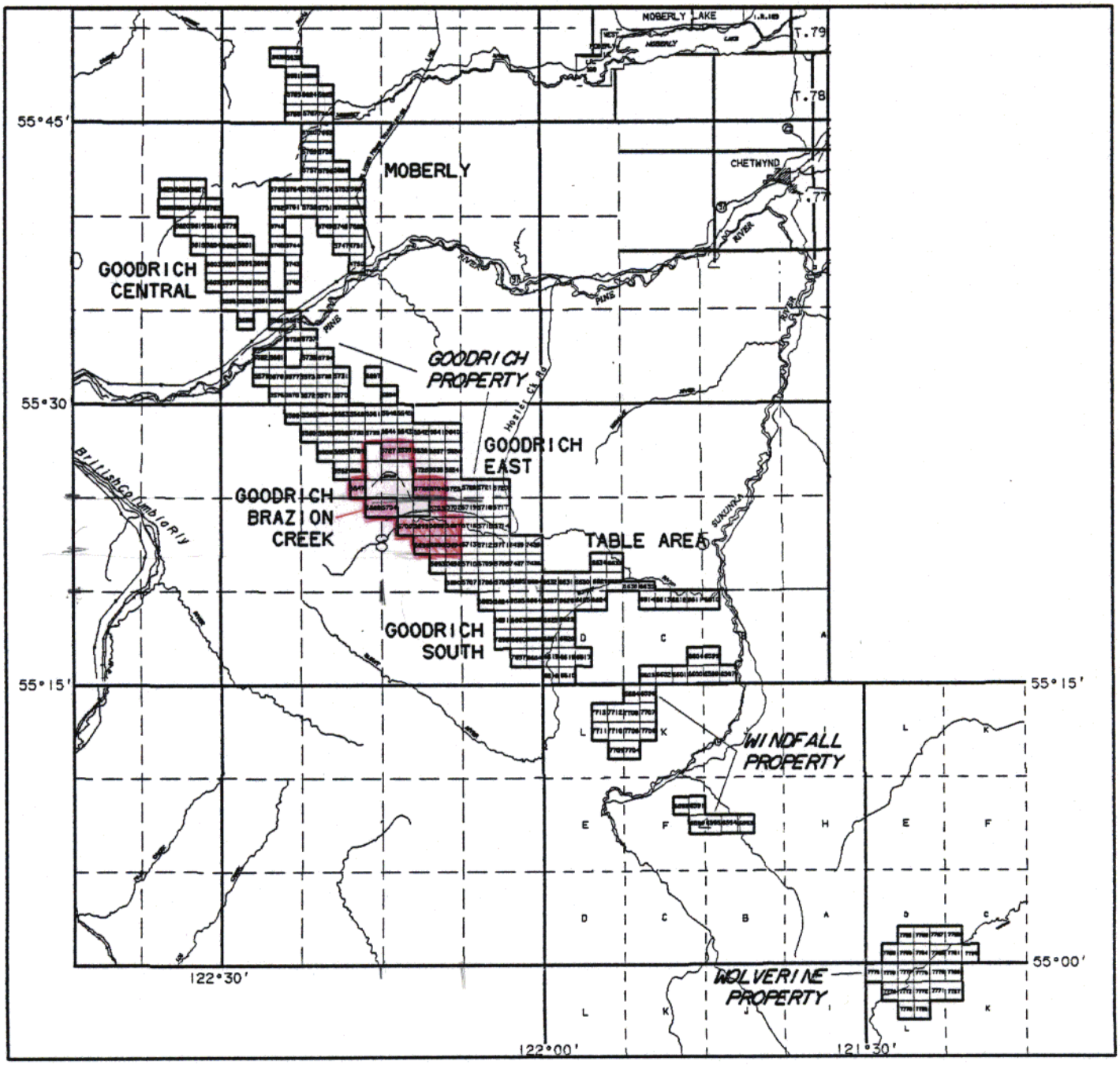
In addition to mapping and drilling, a Mini-Sosie survey was conducted. The Mini-Sosie is a new high resolution reconnaissance seismic survey. The results of this survey proved to be inconclusive due to complex near-surface structure and overburden.

The 1982 field program consisted of detailed investigation through mapping and trenching to evaluate several areas of the Goodrich coal property. To the north of the Brazion Creek Mine Area, an adit was driven into the major seam (the Gething No. 1 Seam) and a total of 84.8 tonnes of raw unoxidized coal was removed, washed, and analyzed. In addition a 3 tonne oxidized sample was taken from the seam. A preliminary feasibility study of the Brazion Creek Mine Area was conducted concurrent with the 1982 field program and completed in the fall of 1982. In addition mining and economic assessments were made of resource areas delineated as a result of the 1982 and previous exploration programs. The assessments were completed in February, 1983.

The 1983 field program concentrated on a detailed investigation of two prospect areas within the Goodrich property. These prospects were the Moberly and South Table Areas.

Both areas were geologically mapped in detail at 1:10 000 scale. A subsequent diamond drilling program was initiated on Moberly consisting of three diamond drill holes totalling 400 metres.

FIGURE 3.5.1
LICENCE STATUS
OCTOBER 1984
GOODRICH COAL PROPERTY
GEOLOGICAL MAPPING BLOCKS



LEGEND

GULF PROPERTY BOUNDARY

7779 COAL LICENCE NUMBER

SCALE

0 MILES 5 10

0 km 5 10 15

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24/10/84

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3.6 Biophysical Environment

Physiographically, the Goodrich coal propety lies within the Inner Foothills of the Rocky Mountains. Topographically, the area consists of heavily glaciated northwesterly trending ridges and valleys with elevations ranging from 2100 metres at Mt. Stephenson to 680 metres in the Pine River Valley.

The property is drained by portions of the Moberly, Pine, and Burnt River watersheds.

Vegetation ranges from alpine tundra in the higher elevations to sub-alpine spruce and fir on the uplands adjacent to river valleys. The river valley bottoms are dominated by large stands of spruce, fir, pine, and some birch.

4.0 1984 EXPLORATION PROGRAM

4.1 Summary

Field studies in 1984 concentrated on further defining the structural and stratigraphic characteristics of the Brazion Creek Mine Area situated adjacent to and south of Brazion Creek (refer to Figure 4.1.1.). Work consisted of detailed mapping and trenching on a recently timber logged out area within the licences.

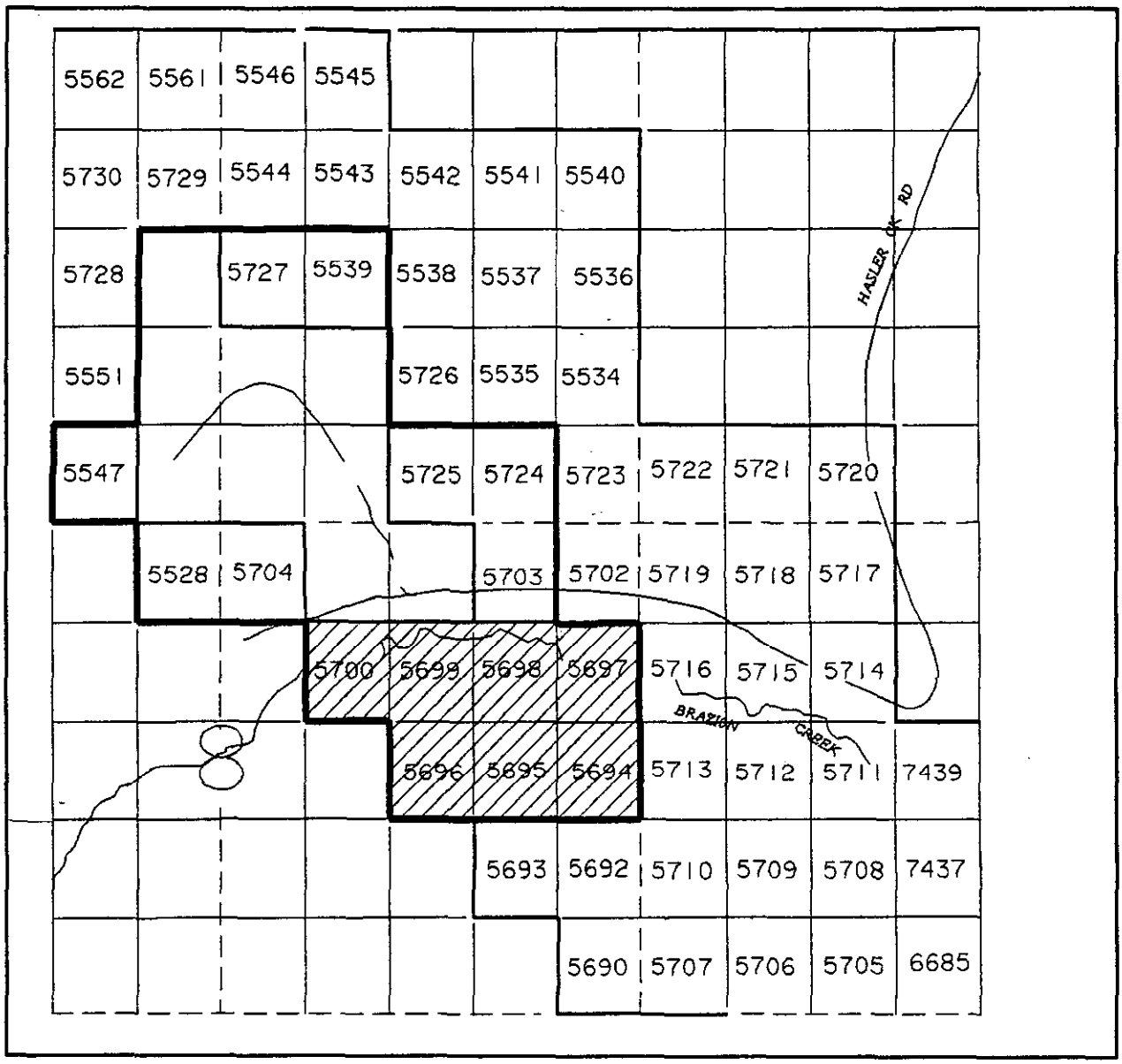
The program spanned the period of May to November, 1984, of which time 1 week was spent on the Brazion Creek site while a further 3 weeks were spent on additional Gulf properties. The remaining time was spent in field preparation, data compilation, evaluation and report writing.

4.2 Objectives

The objectives of the 1984 exploration program were to further investigate any new coal/rock occurrences which may have been exposed as a result of recent logging activity in the vicinity of Brazion Creek in order to accurately determine the structural and stratigraphic characteristics of the area. Specifically these objectives were:

1. to geologically map in detail and trench all coal exposures.

FIGURE 4.1.1
LICENCE STATUS
OCTOBER 1984
GOODRICH COAL PROPERTY
BRAZION CREEK EXPLORATION AREA



LEGEND

- 1984 EXPLORATION
- GOODRICH AREA
- BRAZION CREEK BLOCK

SCALE

0 1 2 3 4 5 km

GULF CANADA RESOURCES INC.
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2. to test current stratigraphic correlations within this area of limited data.

3. to obtain preliminary coal quality data from trenched coal seam exposures and to analyse tonstein samples as a possible aid in determining accurate stratigraphic horizons.

4. to determine a resource potential for the area using measured, indicated, and inferred categories.

4.3 Field Camp and Logistics

The 1984 Goodrich field program commenced operations in the town of Chetwynd, B.C. on July 24. Lodging and office space were supplied by a local motel and personnel obtained meals at several restaurants in town.

Field equipment was utilized from existing equipment in storage at Chetwynd. One truck was used to transport personnel during the program.

The field party comprised one two-person mapping team. Access was provided by the Hasler Creek Road and several new Canfor logging roads within the Brazion Creek Area.

Radio communication was maintained with field personnel utilizing a base station radio, hand-held portables and a radio telephone.

Field operations ceased on July 30, 1984. Field equipment was stored in a leased Chetwynd warehouse or returned to Calgary.

A list of geological and support staff is presented in Table 4.3.1. Table 4.3.2 summarizes major contractors and services used during 1984.

4.4 Cartography

During October of 1980 the Goodrich property was flown to produce 1:25 000 scale aerial photographs for geological interpretation and for the later production of 1:5 000 scale topographic map sheets over the 1984 exploration area. These maps were produced with 5 metre contour intervals and extended only to the property boundary.

4.5 Geological Mapping

The 1984 exploration program involved detailed geological mapping at a 1:5 000 scale. All data points were surveyed into known points using chain and compass and elevations were checked using an altimeter. Outcrop and trench data were then plotted onto topographic base maps in the field office. Data acquired from two previous years mapping was also incorporated within this study. The resultant geological interpretation of the mapping area is represented on maps and cross-sections at a scale of 1:5000 are included within Appendix A.

Table 4.3.1

LIST OF PERSONNEL EMPLOYED

Gulf Personnel

B.P. Flynn	Coordinator Coal Projects
C.S. Williams	Senior Geologist
R.G. Inkster	Geologist
S.M. Sparks	Technologist
C.B. Boyko	Sr. Secretary
C.D. Ireland	Secretary
P. Tsavalos	Bookkeeping and Accounting

Drafting & Reprographics

Interactive Graphics

Consultants

W.F. Carpenter	Norwest Resource Consultants Ltd.

Table 4.3.2

LIST OF CONTRACTORS AND SERVICES

Accommodations

Stagecoach Inn	Chetwynd, B.C.

Truck Rentals and Fuel

Tilden Car Rental	Dawson Creek, B.C.
Gulf	Chetwynd, B.C.
Texaco	Chetwynd, B.C.

Trucking

Canadian Freightways	Chetwynd, B.C.
Peace Dozing and Contracting Ltd.	Chetwynd, B.C.

Coal Quality and Laboratories

Loring Laboratories	Calgary, Alberta
Terramin Research Laboratories	Calgary, Alberta

Communications

West Can Electronics	Calgary, Alberta
B.C. Telephones	Chetwynd, B.C.
A.G.T. Mobile Communications	Calgary, Alberta

Supplies

Neville Crosby	Vancouver, B.C.
McLeods	Chetwynd, B.C.
Little Giant	Chetwynd, B.C.
Cansel Survey Equipment	Calgary, B.C.

Airphotos

B.C. Gov't Surveys and Mapping Branch	Victoria, B.C.

Miscellaneous

Northland Storage & Warehousing Ltd.	Chetwynd, B.C.
Economy Bookbindery	Calgary, Alberta

4.6 Trenching

Trenching in the Brazion Creek Block was enhanced by the recent timber logging operations of Canfor Ltd., as several new exposures of coal and outcroppings were uncovered. All new coal exposures within the recently logged areas were BACK HOE trenched BP and sampled (CHANNEL SAMPLES) BP in detail, six in total, and are summarized in Table 4.6.1. Figure 4.6.1 shows the location of these trenches.

All other corresponding trench data is contained within Appendix 4. Continuous sections of strata exposed were logged in detail. A large percentage of the area appears to be covered by an irregular mantle of fluvio-glacial material.

BP. Additions from verbal communication with V. Dufford (Gulf) July 11/85.

DH 8027 ⊙
755 ◊
122°11'30"
122°11'00"
122°10'30"
55°23'45"
55°23'30"
BRAZION
1025
1023.0
1022.5
1017.0
1014.0
1050
1075
1100
5 000 mE
53 000 mN
19-09
19-10
19-08
16-06
19-07
19-06
GDR-BC-TRC-84003
19-05
19-11
19-12
GDR-BC-TRC-84004
GDR-BC-TRC-84005
19-19
19-18
19-16
19-17
19-13
19-15
⊙ DH 8043
◊ 91
19-14
17-07
GDR-BC-TRC-84002
19-03
19-04
17-02
19-27
GDR-BC-TRC-84001
17-03
19-26
19-24
19-25
17-05
19-23
19-22
17-04
17-01
17-08
DH 8022 ◊ 751
19-21
19-20

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

BRAZION CREEK BLOCK
1984
TRENCH LOCATION MAP

△ STATION LOCATION ⫽ TRENCH LOCATION

PREPARED BY: B. CARPENTER, R. INKSTER	SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE: OCT./84	FIGURE 4.6.1

Table 4.6.1

1984 BRAZION CREEK MINE AREA TRENCHING SUMMARY

Data Source	Area	Location	Licence Number	Elevation	Seam No.	Thickness	Comments
* BC-TRC GDR-~~TRC-LN~~-84001	Brazion Creek	6138300N 551445E	5699	1095	01	+ 5.33/5.68	Eroded
* BC-TRC GDR-~~TRC-LN~~-84002	Brazion Creek	6138497N 55080E	5699	1080	01	+ 0.50	Severely Faulted
* BC-TRC GDR-~~TRC-LN~~-84003	Brazion Creek	6139000N 551285E	~~5698~~ * 5699 RP	1030	05	3.31/3.49	Good Section
* BC-TRC GDR-~~TRC-LN~~-84004	Brazion Creek	6138935N 551780E	~~5695~~ * 5699 RP	1057	15	4.15/4.37	Good Section
* BC-TRC GDR-~~TRC-LN~~-84005	Brazion Creek	6138961N 551782E	~~5695~~ * 5699 RP	1053	16	1.09/1.17	Good Section
* BC-TRC GDR-~~TRC-LN~~-84006	Brazion Creek	6138963N 549890E	* ~~5704~~ 5700 RP	1055	?	1.80/2.78	Brenot

* CL/changes from phonecall with V. Dufond (Yuk) July 11, 1985. R.B. Thompson
* + trench ID

4.7 Sample Analyses Tonsteins

As an aid in developing a more accurate interpretation of the structural and stratigraphic characteristics of the Brazion Creek Coal Block, four "tuff" samples were obtained for analyses from coal seams intersected in trenches GDR-BC-TRC-84001 ~~GDR-TRC-LN-84001~~ and 002. From previous work conducted by the B.C. Department of Mines, in conjunction with GCRI, on using tonsteins as a coal seam correlation tool, the analyses obtained from these samples were correlated with a number of other samples taken from known stratigraphic points in the Goodrich area and an accurate coal seam identification was possible. Samples were submitted for analyses to both an independent laboratory and to the Gulf research laboratory.

Details of analytical procedures and results are discussed further in section 8.0 of this text.

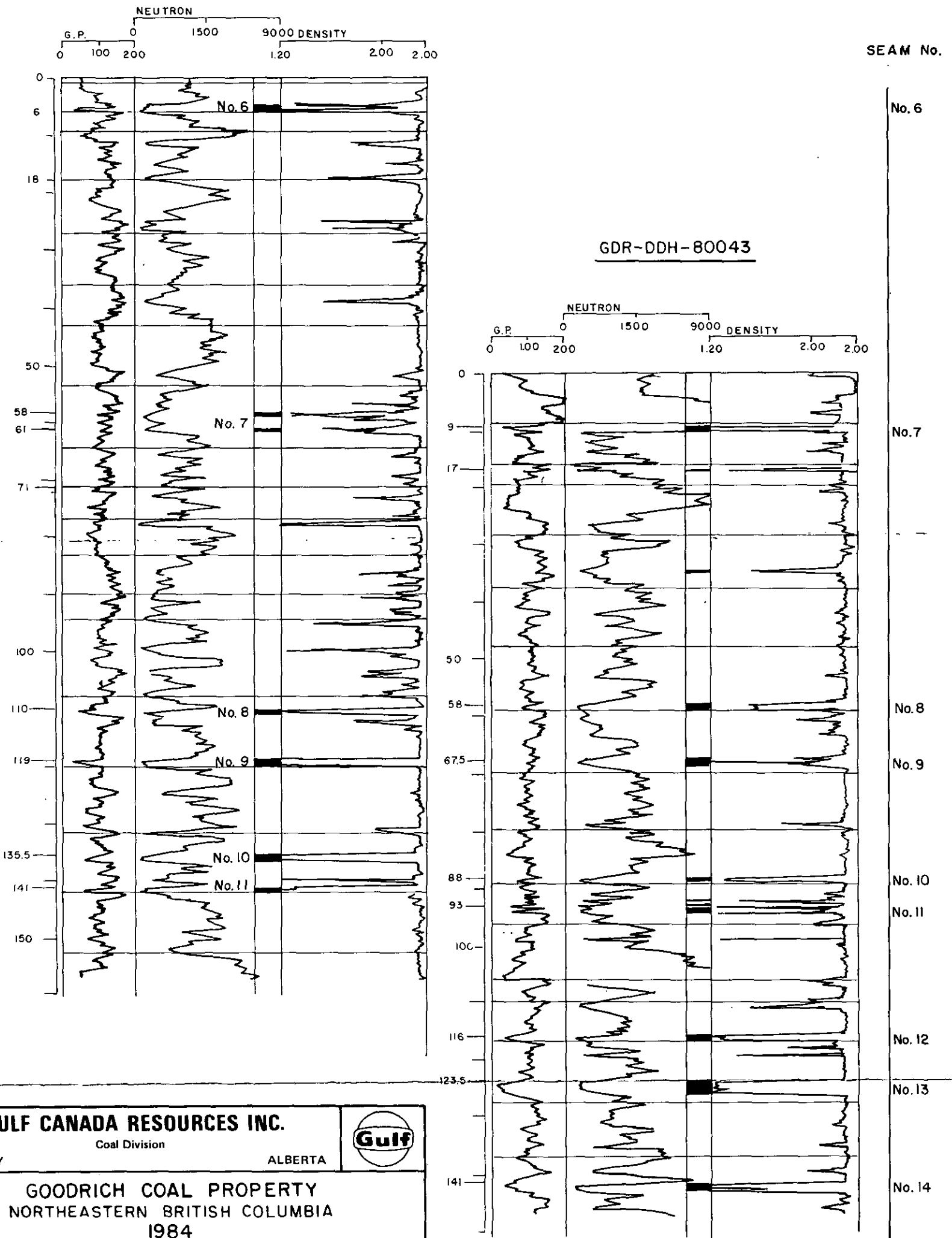
4.8 Sample Analysis Coal

All trench coal samples in excess of 0.5 metres true thickness were submitted for preliminary analyses to an independent laboratory.

Details of analytical procedures and all results are discussed further in Section 7.0 of this text. Coal Quality data are presented in Appendix 1.

4.9 Reclamation

Environmental disturbances were minimal during the 1984 exploration program and were restricted to trench sites located in the area that was recently logged and being scarified at the time of trenching. All trenches were back-filled and then seeded with grass. Any equipment or refuse associated with these locations was removed.



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
NORTHEASTERN BRITISH COLUMBIA
1984
BRAZION CREEK BLOCK
GEOPHYSICAL CORRELATION SHOWING INTERSECTION OF SEAMS No. 6 to 14

PREPARED BY: B. CARPENTER, R. INKSTER	SCALE N/A
APPROVED BY: C. WILLIAMS DATE: OCT. /84	FIGURE 5.4.3.5.1

5.0 GEOLOGY

5.1 Summary

The Goodrich coal licences are situated west of Chetwynd, B.C. and lie within the Rocky Mountain Foothills. The property extends from the Burnt River in the south to Johnson Creek in the north. The Brazion Creek Mine Area, lying within the property, is situated adjacent to, and due south of Brazion Creek.

Geologically, the Brazion Creek Block consists of an elongated, northwest trending, tectonic slice of coal-bearing and non-coal-bearing Lower Cretaceous sediments. The Brazion Creek Mine Area exposes strata of the Beaudette, Crassier, and Fort St. John Groups of the Lower Cretaceous.

Coal measures are found in the Brenot, Dresser, and Gething Formations of the Crassier Group within the Brazion Creek Mine Area.

To date the thickest coal seams found have been in the upper Gething Formation. Drilling and trenching have indicated the presence of 16 coal seams within the Gething Formation with an average aggregate thickness of 30.73 metres over a 426 metre interval.

The geology of the Brazion Creek property is illustrated in Figure 5.1.1.

LOSSAN ANTICLINE
LOSSAN SYNCLINE
GOODRICH ANTICLINE
THIRD SYNCLINE
FISH HOOK ROAD
HASLER CREEK ROAD
BRAZION CREEK ROAD
NON GULF COAL LEASES
GULF COAL LEASES
Kbs
Kmb
Kgt
Kdr
JKb
JKmc
JKmt
TABLE OF FORMATIONS
QUATERNARY
Glacial deposits and alluvium
COMMOTION FORMATION
Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top interbed, and conglomerates
MOOSEBAR FORMATION
Mudstones, minor siltstones, marine
BLUESKY
Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
GETHING FORMATION
Cyclothems, dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones, coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit. COAL
DRESSER FORMATION
Incomplete cyclothems, discontinuous coal measures in varying thicknesses, medium to very coarse grained sandstones, grits, and conglomerates
BRENOT FORMATION
Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
MONACH FORMATION
Marine lithic and quartzose sandstones with thick beds of chert, coarse grained with quartzites at top. Minor shale, siltstones and sandstones with occasional thin conglomerates
BEATTIE PEAKS FORMATION
Buff to brownish sandstones, fine to medium grained, thinly bedded black and dark grey shales, silty shales, siltstones, thin sandstones with ironstone banding
MONTEITH FORMATION
Gray and brown sandstones, fine to medium grained, fine to very coarse grained quartzite. Minor beds of shales, and shale with siltstone and sandstone partings. Occasional thin conglomerates
FERNIE FORMATION
Dark grey and black shales, mudstones, sandstones, siltstones, marine
Lower Cretaceous
Transitional
Jurassic
CRASSIER GROUP
BEAUDETTE GROUP
LEGEND
Property Boundary
Coal Seam Subcrop with identification
Geological Boundary (defined, approximate)
Anticline (defined, approximate)
Syncline (defined, approximate)
Anticline and Syncline (overturned)
Fault (defined showing dip, approx. position of fault)
Gamma Fault
Strike and Dip (bedding, overturned bedding)
Cross Section Location
Monocline
Bedding (vertical, horizontal)
Trench Location
LITHOLOGICAL SYMBOLS
Conglomerate
Sandstone
Siltstone
Quartzite
Claystone Mudstone
Coal
Silty Claystone
Carbonaceous Claystone
FEET
METRES
INDEX MAP
LEGEND
RIVER
STREAM
LAKE
SAND
TREE LINE
FORM LINES
DEPRESSION FORM LINE
SPOT HEIGHT
MAIN ROAD
SECONDARY ROAD
TRACK
TRAIL
CUT LINE
RAILROAD
BUILDING
COAL LICENCE
FORM LINE INTERVAL 10 METRES
SURVEY NOTE
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM
GULF CANADA RESOURCES INC.
Coal Division
CALGARY
ALBERTA
GOODRICH COAL PROPERTY
NORTHEASTERN BRITISH COLUMBIA
BRAZION CREEK BLOCK
1984
GEOLOGY MAP
PREPARED BY: B. CARPENTER, R. INKSTER
APPROVED BY: D. WILLIAMS
DATE: OCT. 1984
FIGURE No. 5.1.1

P.27

#535

5.2 Local Stratigraphy

Cretaceous strata are exposed along the entire Foothills Belt of the Rocky Mountains within northeastern British Columbia. These strata contain deposits of several major deltas and reveal a complex interrelationship of continental to marine sediments.

The Brazion Creek Mine Area is underlain primarily by Lower Cretaceous sediments, of the Beaudette, Crassier and Fort St. John Groups.

A table of formations is presented in Table 5.2.1. Table 5.2.2 illustrates the relationship between the system of nomenclature used by GCRI and that used by the Geological Survey of Canada. Table 5.2.3 outlines the formation thicknesses as they vary over the Brazion Creek Area.

The main emphasis of exploration on the Brazion Creek Mine Area has been within the Crassier Group which can be further subdivided into the Brenot, Dresser, and Gething Formations. The Crassier Group represents a time of major coal deposition during the Cretaceous.

The following are descriptions of each of the formations encountered on or adjacent to the Brazion Creek property.

5.2.1 Fernie Formation

The Fernie Formation of Jurassic age is the oldest unit exposed in the area, lying west of the Brazion Creek

Table 5.2.1
TABLE OF FORMATIONS

Series	Group	Formation	Approx. Thicknesss (m)	Lithology
Lower Cretaceous	Fort St. John	Goodrich	150 - 250	Sandstone, siltstone & mudstone, minor conglomerate.
		Hasler	210 - 340	Mudstone, siltstone, thin sandstone, marine.
		Commotion Walton MBR	320 - 520	Siltstone, sandstone, mudstone, COAL.
		Boulder Cr. MBR		Fine-grained, well sorted sandstone, massive conglomerates, non-marine *sandstone and mudstones.*
		Hulcross MBR		Dark grey marine shale with sideritic concretions.
		Gates MBR		Fine-grained, marine and non-marine sandstone, conglomerates, mudstones, COAL.
		Moosebar	350 - 450	Mudstone, minor siltstone, marine.
		Bluesky	2 - 15	Fine to medium-grained sandstone, mudstone, conglomerate unit at top with or without glauconite.
	Crassier	Gething	350 - 500	Cyclothems; dark grey mudstone, siltstone; very fine to medium-grained sandstone, carbonaceous silty, sandy mudstones; coalified plant debris, minor bentonite, black shale and occasional minor tuffs in upper unit. COAL.
		Dresser	250 - 300	Incomplete cyclothems, discontinuous coal measures in varying thicknesses; *medium to very coarse-grained* sandstone, grits and conglomerate.
		Brenot	150 - 500	Lithic "salt & pepper" sandstone, *siltstone, mudstone, carbonaceous* mudstone. COAL
Transitional	Beaudette	Monach	125 - 250	Marine lithic & quartzose sandstone, with thick beds of clean, coarse-grained white quartzite at top. Minor shales, siltstones and sandstones, with occasional thin conglomerate.
		Beattie Peaks	225 - 350	Buff to brownish sandstones, fine to medium-grained, thinly bedded black & dark grey shales, siltstones, thin sandstones with iron-stone banding.
		Monteith	350 - 450	Grey & brown sandstones, fine to medium-grained. Fine to very coarse-grained quartzite. Minor beds of shales, and shales with siltstone & sandstone partings, with occasional thin conglomerates.
Jurassic	*Fernie*	*Fernie*	*Incomplete Section*	*Dark grey to black shale, mudstone,* siltstone, sandstone, marine.

Table 5.2.2

STRATIGRAPHY NOMENCLATURE*

	GULF CANADA RESOURCES INC.		GEOLOGICAL SURVEY OF CANADA	
Lower Cretaceous	Fort St. John Group	GOODRICH FORMATION	Fort St. John Group	GOODRICH FORMATION
		HASLER FORMATION		HASLER FORMATION
		COMMOTION FORMATION: WALTON MEMBER		BOULDER CREEK FORMATION
		COMMOTION FORMATION: BOULDER CREEK MEMBER		
		COMMOTION FORMATION: HULCROSS MEMBER		HULCROSS FORMATION
		COMMOTION FORMATION: GATES MEMBER		GATES FORMATION
		MOOSEBAR FORMATION		MOOSEBAR FORMATION
		BLUESKY FORMATION		
	Crassier Group	GETHING FORMATION	Bullhead Group	GETHING FORMATION
		DRESSER FORMATION		CADOMIN FORMATION
Transitional		BRENOT FORMATION	Minnes Group	BICKFORD FORMATION
	Beaudette Group	MONACH FORMATION		MONACH FORMATION
		BEATTIE PEAKS FORMATION		BEATTIE PEAKS FORMATION
		MONTEITH FORMATION		*MONTEITH* FORMATION
Jurassic	FERNIE FORMATION		FERNIE FORMATION	

*Not to Scale

Table 5.2.3

FORMATION THICKNESS VARIATION
OVER THE GOODRICH PROPERTY

Area	Formation (Thickness in Metres)					
	Bluesky	Gething	Dresser	Brenot	Monach	Beattie Peaks
Moberly	7-15	390-450	300	150	150	300
GDR Central	-	450-500	300	450-200 S-N	225-150 S-N	250-350 S-N
GDR Brazion Ck	2-5	450-500	300	400-450	250	250
GDR East	2-5	450	300	500	200	300
Table	-	-	300	500	200	300
GDR South	-	-	400	500	200	300

Mine Area. It consists of dark grey to black shales, mudstones, siltstones and sandstones, although shales and mudstones are generally the predominant lithologies. The Fernie Formation was deposited under marine conditions and represents a transgressive phase (Stott, 1973). The formation thickness is indeterminate due to its recessive nature and lack of exposure on the Goodrich property.

5.2.2 Beaudette Group

The Upper Jurassic-Lower Cretaceous Beaudette Group transitionally overlies the Fernie Formation and is comprised of the Monteith, Beattie Peaks, and Monach Formations. The group, which is exposed throughout the Goodrich property, has a maximum thickness of approximately 1000 metres in the area between the Burnt and Peace Rivers. The group forms positive areas such as Mount Bickford north of the Pine Valley, Mount Stephenson and Mount Gilliland south of Pine Valley, and Mount LeHudette in the Goodrich East area. The Beaudette Group is essentially non-coal-bearing.

5.2.2.1 Monteith Formation

The Monteith Formation is the oldest of the Beaudette Group and consists of predominantly fine to medium-grained sandstones of delta-front origin (Stott, 1973). The formation is characterized by some thick intervals of fine to coarse-grained quartzites at the top. Often quartizite bed surfaces are covered with stylolitic films (Mathews, 1946). This resistant

unit is interbedded with minor recessive beds of shale and thin beds of conglomerate. The Monteith Formation is generally finer-grained than the Monach (especially the quartzites) and the two can usually be distinguished on that basis (Karst, 1980). The formation varies in thickness from 350 to 450 metres, and is predominantly exposed along the west edge of the Brazion Creek Area and in other isolated locations.

5.2.2.2 Beattie Peaks Formation

The Beattie Peaks Formation conformably overlies the Monteith. The formation consists of fine to medium-grained, brown to medium grey sandstones with minor iron stain. Tidal flat, pro-deltaic, and mid-basin deposits are represented in the thinly bedded marine shales and siltstone facies (Stott, 1973). Thin, fine-grained sandstones with ironstone banding were also found during mapping.

The formation thickness within the Brazion Creek Block is 250 metres and is exposed on the western edge of the Mine Area.

5.2.2.3 Monach Formation

The Monach Formation represents the top of the Beaudette Group and consists of marine lithic and quartzose sandstones. Thin resistant beds of clean, coarse-grained white quartzites are found at the top,

along with minor shales, siltstones and sandstones with occasional thin conglomerates and thin coals. The quartzose to argillaceous sandstone facies of the Monach Formation represents delta-front deposits (Stott, 1973).

This formation conformably overlies the Beattie Peaks Formation having a thickness of 250 metres within the 1984 study area. Exposures of the formation are widespread, due to its resistance to erosion and can be found both on the east and west flanks of the Brazion Creek Mine Area.

5.2.3 Crassier Group

The Crassier Group, of Lower Cretaceous age, represents a period of coal measure deposition. It is subdivided into three formations: the Brenot, Dresser, and Gething Formations (Hughes, 1964).

5.2.3.1 Brenot Formation

The continental strata and the coal measures that overlie the Monach Formation were first recognized by J.E. Hughes in 1964. He proposed that these strata be called the Brenot Formation.

The upper part of the Brenot Formation consists of salt and peppered, very fine to fine-grained sandstones, and coal. Carbonaceous mudstones,

dark grey siltstones, thin coals, and occasional medium- grained sandstones comprise the lower part of the formation. The Brenot differs from the overlying Gething in its greater proportion of sand and silt, thinner bedding and general lack of plant fossils.

The Brenot Formation varies in thickness from 400 to 450 metres within the Brazion Creek Mine Area. Thin coal seams occur within the upper and middle Brenot within the study area.

5.2.3.2 Dresser Formation

The Dresser Formation of the Lower Cretaceous Crassier Group conformably overlies the Brenot Formation having a gradational contact with the overlying Gething Formation.

Within the Brazion Creek Mine Area, the formation consists of medium to very coarse-grained sandstones, grits, chert pebble conglomerates and discontinuous coal measures of varying thickness. The conglomerate strata predominant in the upper part of the formation.

Stott (1965) refers to the conglomeratic strata as the Cadomin Formation and the underlying sandstones, siltstones, and coal measures as the Bickford Formation. The relationships compared to Hughes (1964), are illustrated in Table 5.2.2. The

The Cadomin is essentially equivalent to the top of the Dresser Formation as described by Hughes (1964) and the clastic sediments described by both authors have been deposited in a series of alluvial fans (Bajada-like distribution) as shown in Figure 5.2.3.2.1. According to the descriptions of these formations by both authors, the Cadomin Formation falls within the proximal to mid-fan region, whereas the Dresser Formation falls within the distal part of the fan.

The Dresser Formation is very resistant to erosion; therefore the exposures are widely distributed throughout the area. The thickness of the formation within the Brazion Creek area is estimated at 300 metres, although gradational changes to overlying and underlying formations make thickness determinations approximate only.

Coal seams in the Dresser Formation have been found and trenched within the Brazion Creek area. These generally occur throughout the formation. The seams thicken and contain fewer rock bands toward the north and east.

5.2.3.3 Gething Formation

The Gething Formation, predominantly non-marine, conformably overlies the Dresser Formation and underlies the Bluesky Formation of the Fort

St. John Group. It consists of multiple fining upward cyclothems that strongly suggest a fluvial environment.

The Gething Formation is distinguished from the Brenot Formation by its greater proportion of shales and plant fossils and more numerous coal measures. It consists of dark grey mudstones, siltstones, lithic, very fine to coarse-grained sandstones, carbonaceous, silty and sandy mudstones, coalified plant debris, minor bentonite, black shale, occasional thin tuffs in the middle and upper parts, and coals. The sandstones in the upper portion of the formation contain pebbles and coal stringers. They are cross-bedded, bioturbated, and show evidence of soft sediment deformation. Fossil bivalves and worm burrows are also found in some parts of the formation. The formation varies in thickness from 450 to 500 metres within the 1984 study area.

In the Gething Formation, coal seams have been found and trenched throughout the Brazion Creek Mine Area, many over one metre in true thickness. Figure 5.4.3.1 illustrates a section of typical Gething strata from the Brazion Creek Area.

5.2.4 Fort St. John Group

The Lower Cretaceous Fort St. John Group of the Inner Foothills includes the Bluesky, Moosebar, Commotion, Hasler,

Goodrich, and Cruiser Formations. Both marine and non-marine strata exhibit vertical and lateral facies changes which are characteristic of the group (Stott, 1960).

The Bluesky and Moosebar are the only two formations of the Fort St. John group that outcrop within the Brazion Creek area. The Commotion, Hasler, and Goodrich Formations outcrop only along the northeastern boundary of the Goodrich property in the Moberly area.

5.2.4.1 Bluesky Formation

The Bluesky Formation represents the basal unit of the Fort St. John Group in northeast British Columbia. The formation consists of fine to medium-grained glauconitic sandstone, mudstone, and thin to thickly bedded, very coarse conglomerates having well rounded quartzite pebbles up to 15 cm across. According to R.H. Karst et al. (1979), the Bluesky represents shoreline deposits formed during a rapid southward transgression of the Clearwater Sea.

The Bluesky Formation varies in thickness from 2 to 5 metres in the Brazion Creek Area. The formation is exposed in several areas along the limbs of the Lossan and Axis synclines in the Brazion Creek Mine Area.

The Bluesky has previously been considered to be equivalent to the upper beds of the Gething

Formation (Stott, 1965). In the Brazion Creek area, however, Gulf's geologists have given the Bluesky formational status as it is a surface mappable unit and maintains a consistent geophysical log response.

5.2.4.2 Moosebar Formation

The Moosebar Formation, one of the youngest formations exposed on the Brazion Creek Block, consists of dark to medium grey mudstones, grading upward to dark grey siltstones and sandstones. Highly glauconitic beds occur near the base of the formation at its contact with the Bluesky.

The upper beds of the Moosebar are gradational and the upper boundary with the Commotion Formation is drawn at the base of the first thick succession of sandstone.

North of the Brazion Creek Mine Area, one drill hole (GDR-DDH-81-02) intersected approximately 270 metres of the Moosebar. As many as six tuff bands up to 10 cm in thickness have been identified in the core and on geophysical logs. Five of these bands are contained within an interval of 20 to 30 metres above the Moosebar-Bluesky contact.

Exposure of this formation is limited due to its recessive nature. South of the Pine Valley, the

main exposure occurs in Axis Creek, a tributary of Brazion Creek.

5.3 Local Structure

The Goodrich coal licences overlie several distinct structural trends in the northeast portion of the Peace River Coalfield. The structures trend in a northwesterly direction and each major structure contains strata which have been folded and faulted into a series of synclines and anticlines. (Figure 5.3.1.).

Fold styles on the Brazion Creek Block are characterized by tight asymmetrical chevron to cuspate folding. Major stresses and pressures which originated from the west resulted in greater deformation in the western portions of the Brazion Creek Block. The thickness of interbedded competent and incompetent strata is a major factor in determining the degree of the lambate-cuspate or chevron folding.

Drilling and mapping to date has indicated that generally thicker than normal intersections of coal are found in the axes of many of the more tightly folded synclines on the Goodrich property.

Several major thrust faults on the property displace strata up to 300 metres. These are generally high-angle west-dipping faults which parallel the regional northwest structural trends. In addition, a number of relatively small scale faults (10 to 15 metres displacement) have been defined. These smaller thrust

faults are generally associated with the crests and troughs of folds and result in the repetition of coal seams.

5.4 Brazion Creek Mine Area

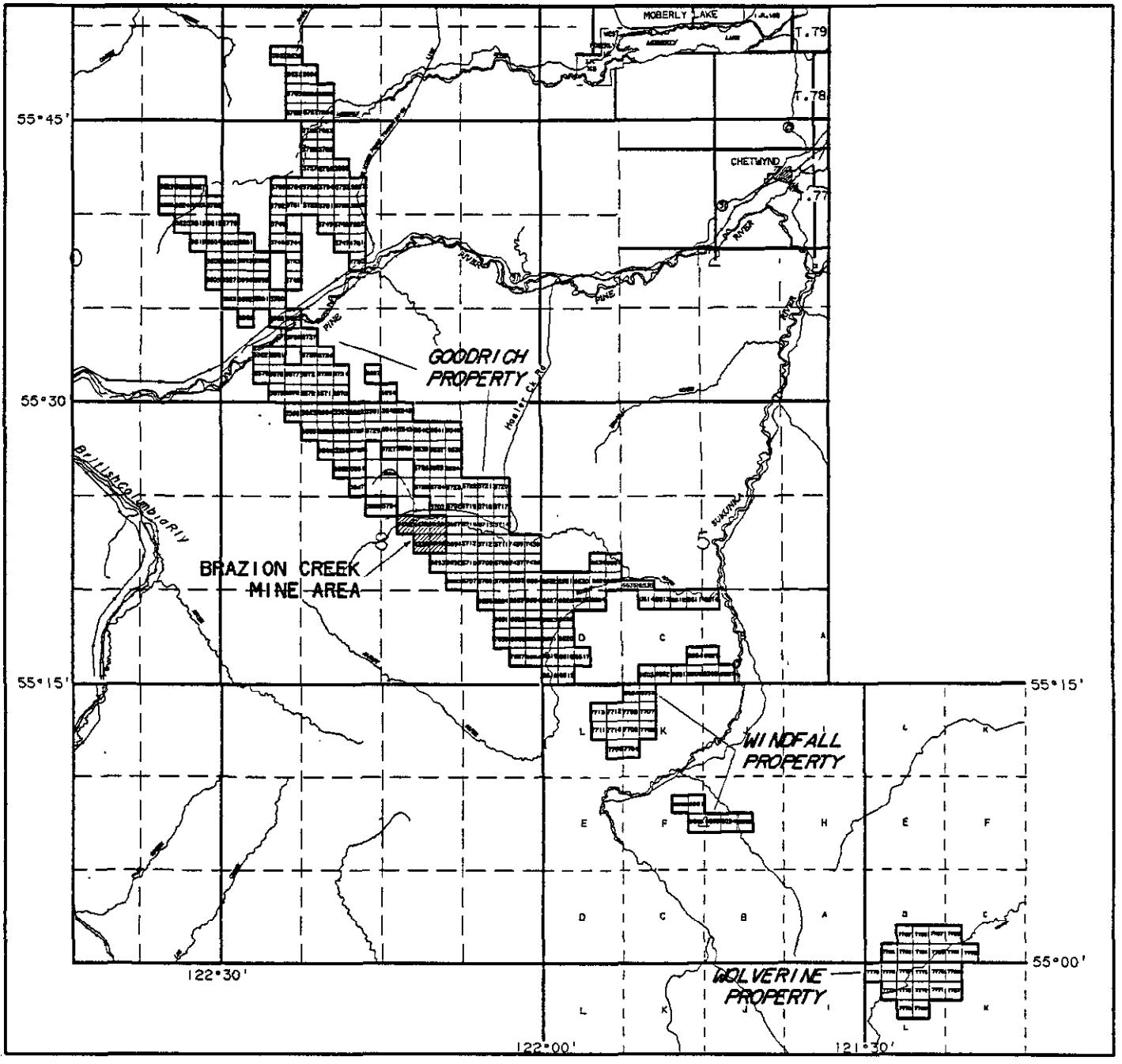
5.4.1 Summary

The proposed Brazion Creek Mine Area is located approximately central to those Goodrich licences situated south of the Pine River as shown in Figure 5.4.1. Access to the mine area is afforded by the Hasler Creek Road.

The Brazion Creek Mine Area was intially discovered as a result of field exploration work in 1979. Since its delineation as a prospect, the area has undergone intense exploration to evaluate its open pit mining potential.

The mine area consists of Gething Formation strata which has been folded into a series of anticlines and synclines. The uppermost Gething seam known as the No. 1 Seam constitutes the bulk of the open pit reserves in the mine area. The seam thickness of the No. 1 Seam averages approximately 8.0 metres within the mine area. Small scale faulting, combined with the relatively tight folds characteristic of the mine area, has in places resulted in a thickening of the coal upwards of three times its average thickness. Total in-situ geological resources for the mine area have been calculated to be 101 million tonnes. The reserves are described in more detail in the Coal Resources section of

FIGURE 5.4.1
LICENCE STATUS
OCTOBER 1984
GOODRICH COAL PROPERTY
BRAZION CREEK MINE AREA LOCATION



LEGEND

GULF PROPERTY BOUNDARY

7779 COAL LICENCE NUMBER

SCALE

0 MILES 5 10

0 km 5 10 15

GULF CANADA RESOURCES INC.
24/10/84

Gulf

FILE NAME 050:1205.4184/06/003.105

this report. Geology maps and cross-sections at a 1:5000 scale are provided in Appendix A.

5.4.2 Detailed Geology

5.4.2.1 Folds

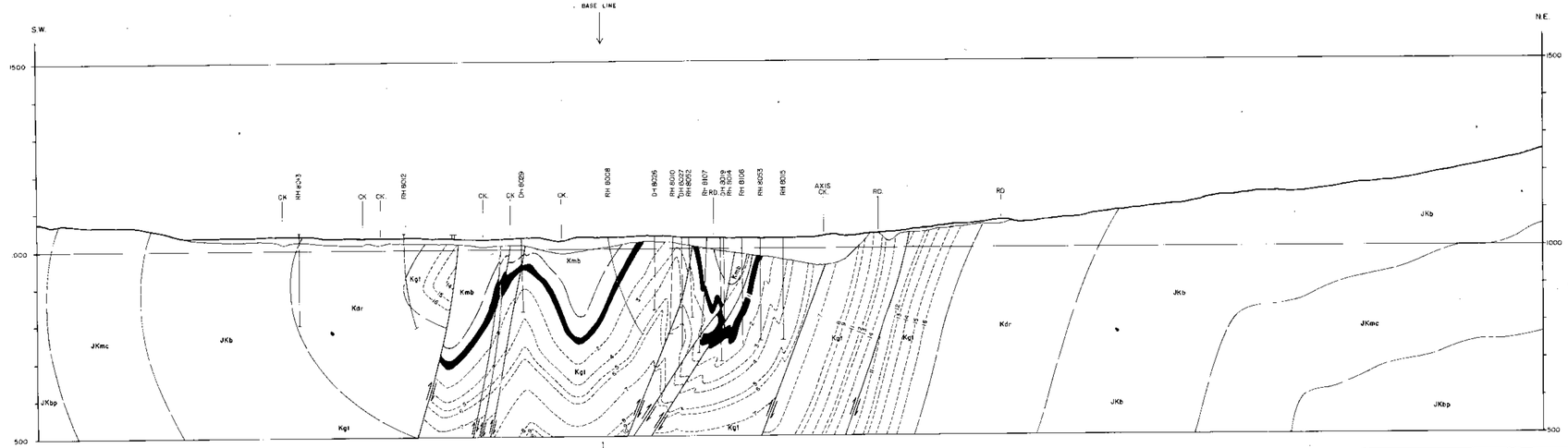
The Brazion Creek Mine Area is underlain by five northwesterly trending fold structures within a major synclinorium (the Goodrich Central Synclinorium) located within the Burnt - Mount Bickford structural trend (refer to Figure 5.4.2.1).

The fold structures underlying the mine area are from east to west, the Axis Syncline, the Goodrich Anticline, and the Lossan Syncline and Anticline. An additional syncline, named the Third Syncline, has been identified to the west of the Lossan Anticline as a result of the 1982 exploration. These folds generally have a consistent plunge of 15° to the north.

The Axis Syncline is a tightly folded and faulted syncline, the western limb of which is near vertical to overturned.

The Lossan Syncline is a simple fold structure with its east limb slightly flexed dipping from near vertical to 30° at the surface. The syncline is tightly folded and is nearly symmetrical about the

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	0.53	40
2	0.79-0.86	42
3	0.87-0.87	8
4	0.67-0.67	9
5	3.31-3.49	8
6	0.78-0.78	53
7	0.77-0.77	48
8	0.74-0.74	9
9	1.47-1.63	1
10	0.62-0.62	6
11	[illegible]	23
12	1.03-1.03	7
13	1.87-1.87	16
14	1.08-1.21	25
15	4.15-4.19	23
16	1.09-1.[illegible]	49



LEGEND

- Q — **QUATERNARY** — Glacial deposits & alluvium
- Kcm — **COMMOTION FORMATION** — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — **MOOSEBAR FORMATION** — Mudstones, minor siltstones, marine
- Kbs — **BLUESKY** — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — **GETHING FORMATION** — Cyclothems: dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones, coalified plant debris; minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — **DRESSER FORMATION** — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — **BRENOT FORMATION** — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — **MONACH FORMATION** — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- JKbp — **BEATTIE PEAKS FORMATION** — Buff to brownish sandstones, fine to medium grained, thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmt — **MONTEITH FORMATION** — Grey and brown sandstones, fine to medium grained, fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — **FERNIE FORMATION** — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS
BEAVERTAIL GROUP — CRASSIER GROUP

BASELINE LOCATION
COAL SEAM No. 1
COAL SEAM

NOTE Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:10 000
METRES 0 200 400 METRES
HORIZ 1:10 000
VERT 1:10 000

GULF CANADA RESOURCES INC
CALGARY — Operator

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
TYPICAL
GEOLOGICAL CROSS SECTION

DRAWN BY: R. CHRISTIE, K. JANSSEN | SCALE 1:10000
APPROVED BY: D. WILLIAMS | DATE OCT. 1984 | FIGURE No. 5.4.2.a

fold axis. The east limb of the Lossan Syncline is coincident with the west limb of the Goodrich Anticline which separates the Axis and Lossan Synclines. The Third Syncline, to the west of the Lossan Syncline, is relatively deeper than the Lossan Syncline, with the two synclines being separated by the Lossan Anticline. Several smaller folds are apparent within the southwest portion of the area but become indistinct as they pass into smaller fault structures to the north.

The marine Moosebar and the coal-bearing Gething Formations are contained within the Lossan, Axis, and Third Synclines (see Figure 5.4.2.1).

5.4.2.2 Faults

The Brazion Creek Mine Area contains a number of small scale faults with two major thrust faults bounding the western and eastern margins of the mine area.

The most westerly major fault, is a part of the Pyramis Thrust plate. An easterly located splay of the Pyramis Thrust, although limited in length, overrides the younger Moosebar Formation contained in the Goodrich Synclinorium. The splay is interpreted as a relatively high-angle thrust fault with a displacement in the order of 400 metres.

At least four thrust splays are interpreted in the west limb of the Axis Syncline near the northern end of the mine area (see Brazion Creek Geological Section N1500). A combination of fault repeats have resulted in tectonic thickening of coal within the core of the Axis Syncline. The east limb of the Axis Syncline appears relatively free of major thrust faulting.

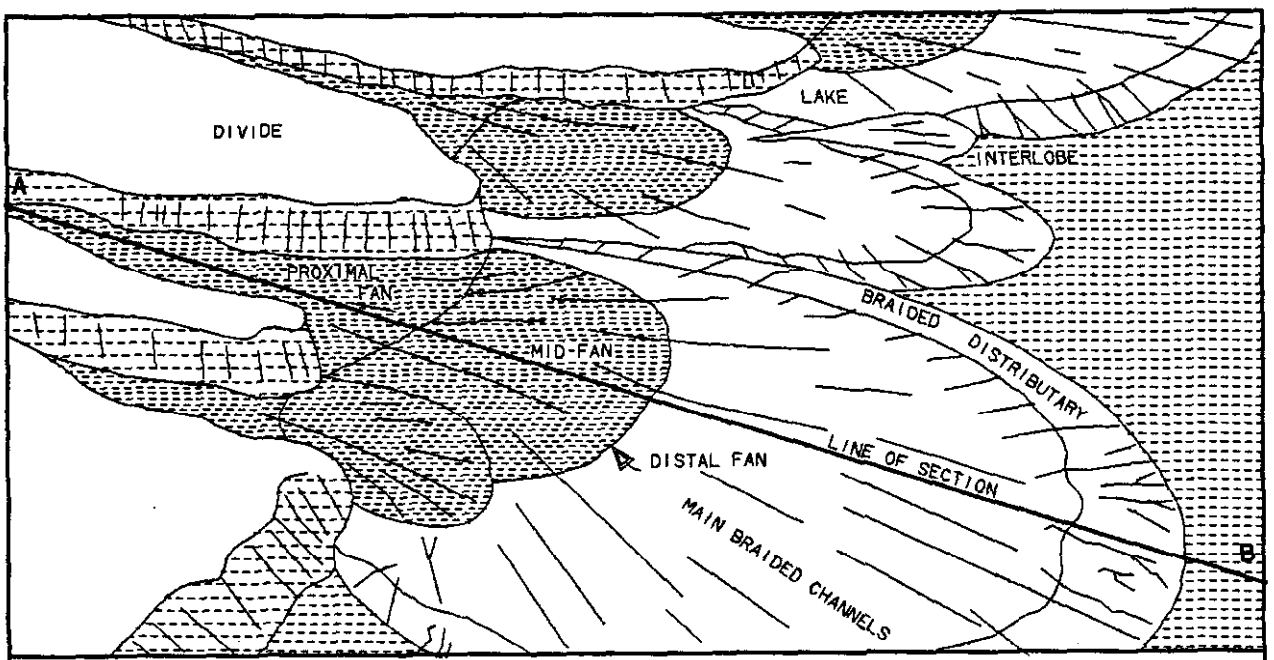
5.4.3 Coal Occurrences

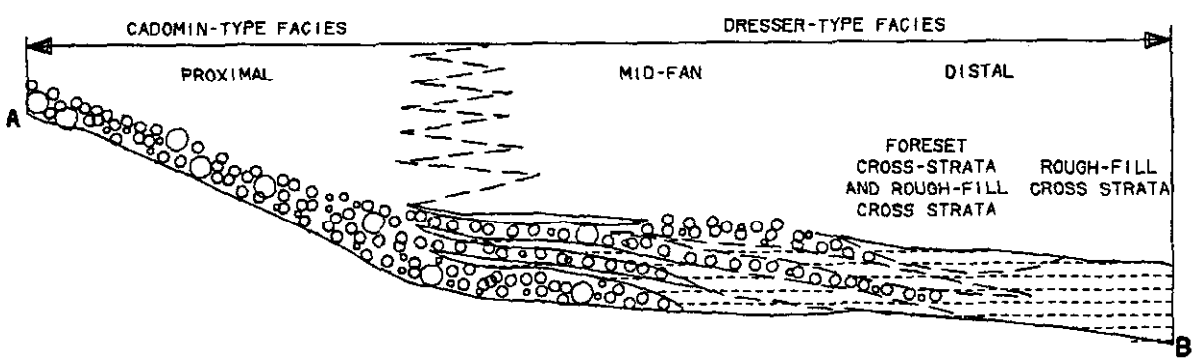
Sixteen separate coal seams have been identified within the Gething Formation in the Brazion Creek Mine Area. The majority of these coal seams lie within the upper and lower portions of the Gething Formation. Surface data and drill hole intersections of the lower half of the Gething Formation indicate that several significant coal seams are present in the Gething; however, additional drilling will be required before a definitive correlation can be made. The sixteen coal seams are described briefly below and are presented in Figure 5.4.3.1 which outlines all current coal seam correlations. Table 5.4.3.1 is a summary of all coal intersections.

5.4.3.1 Gething Seam No. 1

The Gething Seam No. 1 is the uppermost seam within the Gething Formation and is located 40 metres below the Gething - Bluesky contact. Generally the geological mining section averages 8.0 metres within

FIGURE 5.2.3.2.1
GOODRICH COAL PROPERTY
ALLUVIAL FAN MODEL





SCALE: NTS

LEGEND

- MOBERLY TREND
- EAST GOODRICH-FISHER CREEK TREND
- GOODRICH WHITERABBIT TREND
- BURNT-MOUNT BICKFORD TREND
- PYRAMIS-GILLILAND TREND

- FOLD AXIS - SYNCLINE, ANTICLINE, MONOCLINE
- FAULT
- GEOLOGICAL CONTACT
- LICENCE BOUNDARY

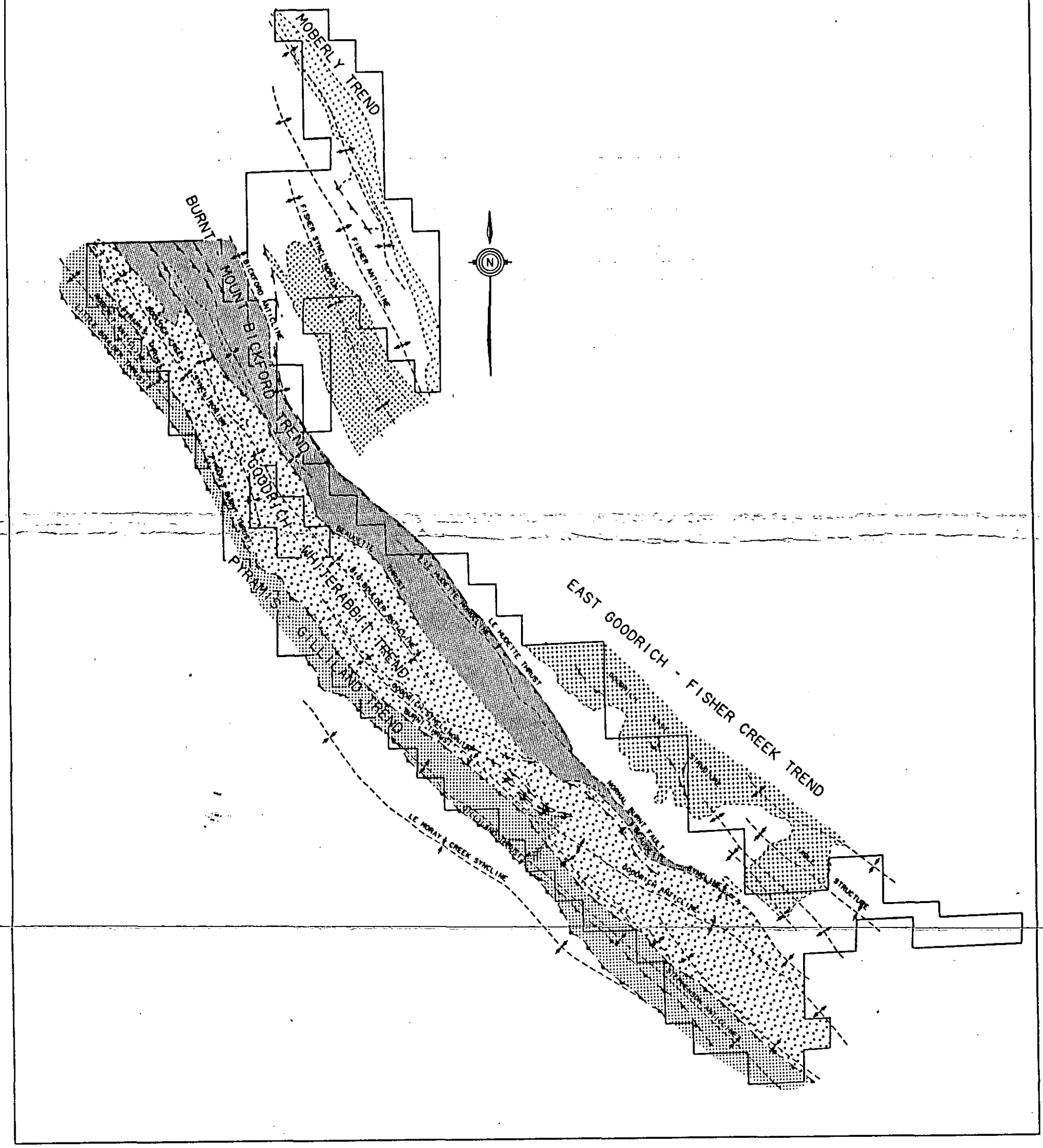
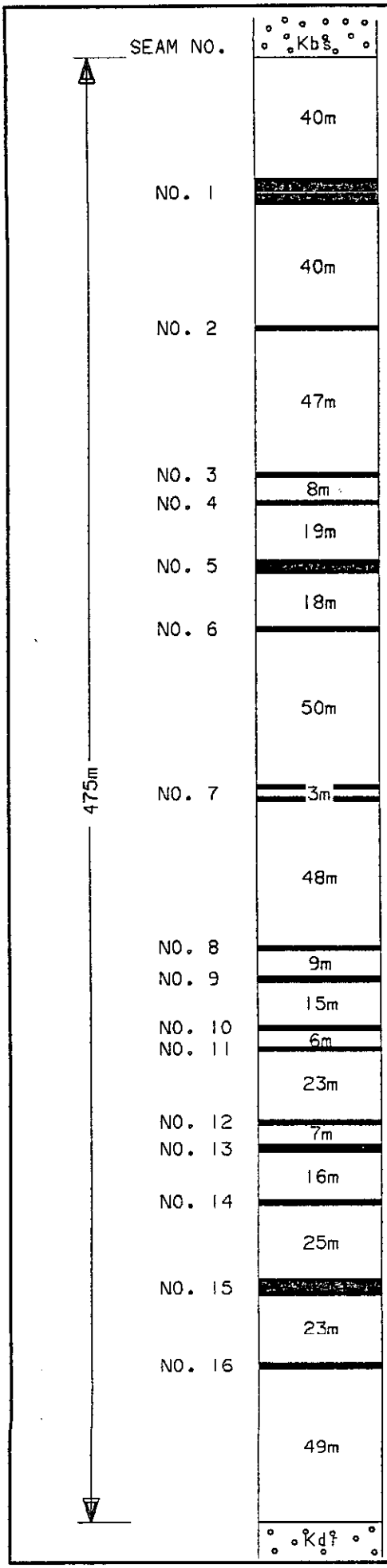


FIGURE 5.3.1

GOODRICH COAL PROPERTY

REGIONAL STRUCTURAL TRENDS



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

FIGURE 5.4.3.1
BRAZION CREEK BLOCK
TYPICAL GETHING SECTION
SHOWING INTERSECTED COAL OCCURENCES

DRAWN BY: B.CARPENTER, R.INKSTER	SCALE: 1:20
LOGGED BY:	DATE: 16/10/84
APPROVED BY: C.WILLIAMS	

QSI:[205,74]84108400I.LOG;

Table 5.4.3.1

GOODRICH COAL PROPERTY
BRAZION CREEK MINE AREA DATA SOURCE SUMMARY
NORTH AND SOUTH BLOCKS
DRILL HOLES AND TRENCHES

Section Number	Data Source	Seam No.	Coal Interval (from - to) m	Coal/Coal + Rock (true thickness)	Used in Reserve Calculations
250 N	GDR-~~TRC-LN~~-84001 (Bc-TRC)	1			
750 N	GDR-~~TRC-LN~~-84002 (Bc-TRC)	1			
*1500 N	GDR-RDH-LN-80053	1	54.50 - 60.75	0.96/ 1.41	
*1500 N	GDR-RDH-LN-81007	1	134.07 - 135.72	0.92/ 0.92	
*1500 N	GDR-RDH-LN-81007	1	138.23 - 140.20	0.82/ 1.10	
*1500 N	GDR-RDH-LN-81007	1	142.51 - 146.56	2.15/ 2.26	
				4.28	Yes
*1500 N	GDR-RDH-LN-81007	1	257.53 - 262.52	4.77/ 4.77	
*1500 N	GDR-RDH-LN-81007	1	265.40 - 278.15	9.42/12.19	
				16.96	No
1500 N	GDR-RDH-LN-8008	1	96.50 - 114.00	7.58/11.25	Yes
*1750 N	GDR-RDH-LN-80051	1	179.45 - 180.66	0.86/ 0.86	
*1750 N	GDR-RDH-LN-80051	1	181.42 - 184.25	0.86/ 2.00	
*1750 N	GDR-RDH-LN-80051	1	185.21 - 187.66	1.52/ 1.73	
*1750 N	GDR-RDH-LN-80051	1	188.03 - 198.58	7.11/ 7.46	
				12.05	Yes
*2250 N	GDR-RDH-LN-80056	1	305.20 - 309.03	3.61/ 3.81	
*2250 N	GDR-RDH-LN-80056	1	309.91 - 313.91	3.98/ 3.98	
				7.79	Yes
1500 N	GDR-DDH-LN-80029	1	82.97 - 85.78	1.65/ 1.65	
1500 N	GDR-DDH-LN-80029	1	93.13 - 96.00	1.63/ 1.63	Yes
				3.28	
1750 N	GDR-RDH-LN-8011	1	120.20 - 121.70	1.06/ 1.06	
1750 N	GDR-RDH-LN-8011	1	133.60 - 139.00	3.82/ 3.82	
1750 N	GDR-RDH-LN-8011	1	148.80 - 152.30	2.33/ 2.47	Yes
				7.35	
*1500 N	GDR-DDH-LN-81006	1	186.99 - 192.19	2.22/ 2.29	
*1500 N	GDR-DDH-LN-81006	1	193.39 - 199.99	2.72/ 2.82	
*1500 N	GDR-DDH-LN-81006	1	201.95 - 206.08	2.25/ 2.44	
				7.75	Yes
*2000 N	GDR-DDH-LN-80028	1	239.29 - 240.89	1.04/ 1.51	
*2000 N	GDR-DDH-LN-80028	1	248.20 - 256.34	5.29/ 7.40	
*2000 N	GDR-DDH-LN-80028	1	258.16 - 266.52	5.12/ 5.48	Yes
*2000 N	GDR-DDH-LN-80028	1	268.27 - 273.29	2.24/ 2.52	
*2000 N	GDR-DDH-LN-80028	1	276.39 - 286.46	6.57/ 7.38	
				24.29	Yes
*1750 N	GDR-DDH-LN-81020	1	215.91 - 220.19	3.53/ 3.67	
*1750 N	GDR-DDH-LN-81020	1	221.72 - 225.12	1.97/ 2.91	
				6.58	Yes

Table 5.4.3.1
cont'd

Section Number	Data Source	Seam No.	Coal Interval (from - to) m	Coal/Coal + Rock (true thickness)	Used in Reserve Calculations
*1750 N	GDR-DDH-LN-81021	1	151.34 - 155.86	1.82/ 3.46	
*1750 N	GDR-DDH-LN-81021	1	170.39 - 174.16	2.05/ 2.91	
*1750 N	GDR-DDH-LN-81021	1	176.27 - 177.17	0.64/ 0.64	
				7.01	Yes
1500 N	GDR-DDH-LN-80026	2	54.02 - 55.29	0.79/ 0.80	No
1500 N	GDR-DDH-LN-80026	3	125.07 - 126.13	0.87/ 0.87	No
1500 N	GDR-DDH-LN-80026	4	152.66 - 153.49	0.67/ 0.67	No
1500 N	GDR-DDH-LN-80027	4	178.70 - 182.22	1.09/ 1.09	No
0500 N	GDR-~~TRC-BC~~-84003	5	0 - 3.49	9.42/ 3.49	Yes
0000	GDR-DDH-LN-80022	6	35.60 - 39.33	0.78/ 0.78	Yes
0000	GDR-DDH-LN-80022	7	169.51 - 170.99	0.53/ 0.74	No
0000	GDR-DDH-LN-80022	7	174.25 - 175.57	0.64/ 0.79	No
0500 N	GDR-DDH-LN-80043	7	-- --	0.71/ 0.78	No
0000	GDR-DDH-LN-80022	8	303.99 - 305.49	0.72/ 0.84	No
0500 N	GDR-DDH-LN-80043	8	138.31 - 139.54	0.74/ 0.74	No
0000	GDR-DDH-LN-80022	9	318.17 - 320.10	1.05/ 1.13	Yes
0500 N	GDR-DDH-LN-80043	9	155.51 - 157.94	1.43/ 1.43	Yes
0000	GDR-DDH-LN-80022	10	348.22 - 349.89	0.86/ 0.98	No
0500 N	GDR-DDH-LN-80043	10	198.26 - 198.94	0.40/ 0.40	No
0000	GDR-DDH-LN-80022	11	358.05 - 359.61	0.69/ 0.79	No
0500 N	GDR-DDH-LN-80043	11	214.58 - 216.52	1.11/ 1.47	Yes
0500 N	GDR-DDH-LN-80043	12	257.98 - 259.91	1.03/ 1.03	Yes
0500 N	GDR-DDH-LN-80043	13	274.19 - 277.33	1.87/ 1.87	Yes
0500 N	GDR-DDH-LN-80043	14	307.94 - 310.29	1.08/ 1.27	Yes
	GDR-~~TRC-BC~~-84004	15	0 - 4.35	4.15/ 4.35	Yes
	GDR-~~TRC-BC~~-84005	16	0 - 1.17	1.09/ 1.17	Yes
	GDR-TRC-81-G01	16	0 - 2.78	2.36/ 2.78	Yes

* Data points projected from areas immediately outside of the Brazion Creek Block licence boundary. Remaining data points are found within the Brazion Creek Block.

the mine area but faulting associated with folding has thickened the No. 1 Seam to as much as 35 metres (true thickness).

overlain by a distinctive zone of regularly interbedded siltstone and mudstone and underlain by a relatively clean medium-grained sandstone. The seam itself contains at least two tuffaceous bands which aid in correlation of drill core or trench data. Within the mine area the No. 1 Seam thins in a northerly direction.

5.4.3.2 Gething Coal Zone No. 2

The second coal zone within the Gething Formation has been designated the No. 2 coal zone, which lies approximately 40 to 50 metres below the No. 1 Seam. This zone is generally one to two metres thick and consists of coal, carbonaceous mudstones, and shale. The individual coal plys within this zone are generally in the order of one metre in thickness.

5.4.3.3 Gething Seams No. 3 and No. 4

Gething seams No. 3 and No. 4 lie 90 and 100 metres respectively below Seam No. 1. The average thickness of these seams is in the order of one metre. Further drilling will be required in order to confirm the continuity of these seams within the Brazion Creek Mine Area.

5.4.3.4 Gething Seam No. 5

The Gething Seam No. 5 lies some 120 metres below the No. 1 Seam. The average thickness of Seam No. 5 is approximately 3 to 5 metres as indicated by several trenches and drill hole intersections.

5.4.3.5 Gething Seams Nos. 6 to 14

Seams Nos. 6 to 14 inclusive were intersected in GDR-DDH-80022 and GDR-DDH-80043 over approximately a 220 m interval as shown on Figure 5.4.3.5.1. The seams range in thickness from 0.63/0.69 coal/coal plus rock in Seam No. 10 to 1.87/1.87 coal/coal plus rock in Seam No. 13. Interburden thicknesses vary from 6 m to 50 m as indicated in Figure 5.4.3.1.

5.4.3.6 Gething Seam No. 15

The Gething Seam No. 15 was intersected only once in GDR-TRC-BC-84004 and lies approximately 25 m below seam No. 14. It attains a (coal/coal + rock) thickness of 4.15/4.35 m.

5.4.3.7 Gething Seam No. 16

The Gething Seam No. 16 lies some 23 metres below seam No. 15 and was intersected in trenches GDR-TRC-BC-84005 and GDR-CRT-81001. The thickness

ranges from 1.09/1.17 metres to 2.36/2.78 metres within the mine area.

All data source records including coal seam data sheets and trench logs are presented in Appendix 4 and 5 of this report.

6.0 COAL RESOURCES

6.1 Summary

Resources determined for the Brazion Creek Mine Area are in the order of 101 million tonnes with 11 million tonnes contained within a measured category, 9.5 million tonnes contained within an indicated category, and 80.5 million tonnes contained within an inferred category. Table 6.1 summarizes the results of resource calculations for coal occurrences contained within the Gething Formation of the Brazion Creek Mine Area.

Table 6.1.1

SUMMARY OF BRAZION CREEK RESOURCES

Seam No.	Measured Tonnes ($\times 10^6$)	Indicated Tonnes ($\times 10^6$)	Inferred Tonnes ($\times 10^6$)
1	8.5616	4.0232	4.7318
5	0.2879	1.1255	13.2734
9	0.423	.6052	4.4172
11	0.2205	0.4109	1.8356
12	0.1700	0.3015	5.0370
13	0.3156	0.5506	9.8237
14	0.2380	0.4002	6.6786
15	0.4894	1.0727	23.1989
16	0.2689	.9975	11.8459
Total	10 974 900	9 487 300	80 842 100

6.2 Parameters

Resources were calculated for the 1984 Brazion Creek exploration program by the geological cross-section method to a vertical depth of 500 meters. Strike length projections of 250 meters were used based on cross-section separation with the exception of the area south of cross-section 0000, which was calculated based on a 500 meter spacing. Oxidization limits were not applied to any of the resources.

Only those seams with a total true thicknesses of coal/coal plus rock greater than 1.0 meter and having not less than 66% coal contained within that unit were considered as potential in-situ resources.

Measured, indicated and inferred categories were calculated using EMRC classifications based on severely contorted areas with slight modifications. These modifications, as listed below, were used in order to facilitate ease of calculations between cross section lines as line spacing is every 250 metres, with most data points being projected minor distances to these cross-section lines. Comparison of distances used between data points is listed below:

Level	EMRC Distance Between Data Points	Gulf Distance Between Data Points
Measured	150 metres	125 metres
Indicated	300 metres	250 metres
Inferred	All areas outside of the above influences	

6.3 Method of Calculation

All intersected coal occurrences were initially correlated into their stratigraphic position within the Gething Formation and resources were calculated based on an individual seam basis. All data points were projected along strike onto the nearest cross-section and a data-point influence map was constructed for each seam showing; seam subcrop, cross-sectional areal projections for each structure, intersected seam thicknesses and the areal extent of the measured, indicated and inferred categories. Figure 6.3.1 is a data-point influence map of the Gething No. 1 seam and illustrates the method used.

Coal seam thicknesses were calculated for each cross-section based on a weighted average developed from these maps. Seams extrapolated through areas of limited data were assigned thicknesses from the nearest correlatable trench or drill hole.

Volumes were calculated by determining the cross-sectional area of each structure then muliplied by the seam length and thickness that it contained.

A specific gravity of 1.50 g/cc was used in determining coal tonnages.

Resource calculation tables are located in Appendix 4 of this report.

2250 N 2000 N 1750 N 1500 N 1250 N 1000 N 0750 N 0500 N 0250 N 0000 0500 S 1000 S 1500 S

RH8001a
RH8001b
RH8002
RH8003
6 139 000 m N
553 000 m E
No. 16 SEAM
No. 16 SEAM
No. 16 SEAM
RH8017
No. 1 SEAM
6.58m
RH8015
24.29 m
RH8053
6.58 m
GDR-TRC-BC-84105
No. 16 SEAM
CRT-TRC-81-08
GDR-TRC-BC-84004
7.70 m
DH8028
14.95 m
RH8106
RH8056
RH8016
DH 8120
DH 8121
RH8014
DH8019
RH8055
7.01 m
4.28 m
RH8107
DH8043
RH 8052
RH8010
DH8027
GDR-TRC-BC-84003
No. 16 SEAM
TR-LB-81-14
8.27m
RH8054
No. 1 SEAM
DH8026
DH8022
BASE LINE
11.25 m
RH8008
No. 1 SEAM
BASE LINE
6 138 000 m N
12.05 m
RH8051
GDR-TRC-BC-84001
3.28m
DH 8029
No. 1 SEAM
RH 8011
7.35 m
GDR-TRC-BC-84002
8.27m
No. 1 SEAM
RH8108
RH8009
RH8012
RH8013
6 137 000 m N

0 50 100 200 300 400 500

scale in metres

2250 N 2000 N 1750 N 1500 N 1250 N 1000 N 0750 N 0500 N 0250 N 0000 0500 S 1000 S 1500 S

LEGEND

- DRILL HOLE
- TRENCH
- AREAL LIMIT OF INFLUENCE
- 1.00 m SEAM THICKNESS
- COAL SEAM SUBCROP

NON-GULF COAL LICENCES
GULF COAL LICENCES
No. 1 SEAM MEASURED RESERVES
No. 1 SEAM INDICATED RESERVES
No. 1 SEAM INFERRED RESERVES

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
NORTHEASTERN BRITISH COLUMBIA
1984
BRAZION CREEK BLOCK

DRILL HOLE INFLUENCE MAP

SHOWING AERIAL EXTENT OF MEASURED, INDICATED AND INFERRED RESERVES FOR THE No. 1 SEAM

PREPARED BY: B. CARPENTER, R. INKSTER
APPROVED BY: C. WILLIAMS DATE: OCT./1984
FIGURE No. 6.3.1

7.0 COAL QUALITY

No new coal quality data was collected during the 1984 exploration program that would alter any previous predictions made for the Brazion Creek Area.

Six coal seams were intersected in trenches and were sampled in increments of 1.0 meter for preliminary coal quality analyses. In total 16 coal samples were analyzed for the following:

Proximate Analyses
Calorific Value
Sulphur
Free Swelling Index

All analyses are summarized in Table 7.0 and the sample results included in Appendix 1.

Summaries of previous years predictions are included in the following sections.

7.1 Summary of 1981 Data

7.1.1 Coal Quality Specifications - Gething Seam No. 1

The Gething Seam No. 1, as defined by the 1981 Goodrich Geological Report, is a bituminous coal with unique coking and thermal coal properties that are attractive to potential export markets. A brief summary of the coal

Table 7.0

SUMMARY OF 1984 COAL QUALITY ANALYSES
AIR DRIED BASIS

Data Source	Seam No.	Interval (m)	Total Moisture	Inherent Moisture %	Ash %	Fixed Carbon %	Volatile Matter %	Total Sulphur	Gross Calorific Value MJ/Kg	FSI
GDR-TRC-BC-84001	1	0 -1.0	28.38	14.67	8.94	49.32	27.02	0.20	21.59	0.0
GDR-TRC-BC-84001		1.0 -2.0	24.15	14.57	9.67	49.45	26.31	0.16	21.96	0.0
GDR-TRC-BC-84001		2.0 -3.07	29.10	14.19	6.58	51.05	28.18	0.10	22.25	0.0
GDR-TRC-BC-84001		3.07-4.0	26.83	14.51	9.95	48.08	27.46	0.08	21.23	0.0
GDR-TRC-BC-84001		4.0 -5.0	31.21	14.20	13.54	45.53	26.73	0.08	19.77	0.0
GDR-TRC-BC-84001		5.0 -5.48	29.17	13.00	13.00	45.80	27.61	0.10	20.31	0.0
GDR-TRC-BC-84003	5	0.0 -1.0	29.15	14.49	7.63	50.32	27.56	0.14	21.03	0.0
GDR-TRC-BC-84003		1.0 -2.0	28.46	13.35	9.65	49.83	27.17	0.09	20.99	0.0
GDR-TRC-BC-84003		2.0 -3.44	28.00	13.52	18.44	41.14	26.90	0.12	17.54	0.0
GDR-TRC-BC-84003		3.44-3.84	24.43	10.48	29.30	36.62	23.60	0.11	15.60	0.0
GDR-TRC-BC-84004	15	0.0 -1.0	28.75	14.04	9.88	49.10	26.98	0.27	20.69	0.0
GDR-TRC-BC-84004		1.0 -2.0	28.27	13.54	7.21	52.05	27.20	0.37	22.15	0.0
GDR-TRC-BC-84004		2.0 -3.0	24.85	13.07	29.19	36.61	21.13	0.26	15.79	0.0
GDR-TRC-BC-84004		3.0 -4.0	28.95	13.44	18.12	43.13	25.31	0.28	18.41	0.0
GDR-TRC-BC-84004		4.0 -5.03	23.97	7.99	31.35	38.29	22.37	0.34	17.06	0.0
GDR-TRC-BC-84005	16	0.0 -1.17	29.52	12.28	19.20	43.24	25.28	0.30	18.63	0.0

quality data from this report follows. For further details refer to 1981 report.

A good quality thermal and metallurgical coal product can be obtained from the No. 1 Seam if selectively mined. The washability data indicates that a low ash (6.5%), medium volatile (27-30% dmmf basis), and low sulphur (<0.3%) coking coal with a free swelling index of 4-6, maximum fluidity of 40-300 ddpm and dilatation of 30-100% can be produced.

Petrographic studies of fourteen Goodrich coal samples indicated that the No. 1 Seam could produce a strong metallurgical coke. The mean reflectance averages 1.15 and ranges from 1.07 to 1.28 which places the Goodrich coal in the medium to high volatile category. The total reactives average is 64.04%.

Thermal coal production from the same seam is of similar high quality readily meeting all the Japanese Coal Development Company specifications (see Table 7.1.1). The No. 1 Seam has a volatile content in the upper range for medium volatile coals with a low fuel ratio averaging 2.3. In producing a product with 14% ash the calorific value is approximately 7100 Cal/g. The ash fusion temperatures exceed the required initial deformation and fluid temperatures in an oxidizing atmosphere.

TABLE 7.1.1

PRELIMINARY SPECIFICATIONS OF COAL QUALITY

SEAM NO. 1

(air-dried basis)

Item	Coking	Thermal	JCD's Spec.
Total Moisture	8.0%	8.0%	Max. 10%
Residual Moisture	1.0%	1.0%	
Ash	6.5%	14.0%	Max. 20%
V.M.	29.0%	26.0%	
Fuel Ratio		2.3	Max. 2.5%
Calorific Value (Cal/gr)	7800	7100	Min. 6200
Total Sulphur	0.3%	0.3%	Max. 1.0%
Free Swelling Index	4 - 8		
Maximum Fluidity (DDPM)	40-300		
Total Dilatation	30-100		
Ash Fusion Temp.			
S.T.		1350°C	Min. 1200°C
F.T.		+1450°C	Min. 1300°C
Nitrogen		1.28%	Max. 1.8%
Na_2O in Ash		0.91%	0.1% - 3.0%
Basic/Acid in Ash		0.27	Max. 0.5%
HGI		64	Min. 45
Cl in Coal		0.03%	Max. 0.05%

7.1.2 Coal Quality Specifications - Gething Seam No. 5

The Gething No. 5 Seam is a low volatile bituminous coal. The volatiles range from 20 to 27% on a dry mineral matter free (dmmf) basis. The average FSI obtained is 4.75 at a 5% ash level. The coal quality presented in Table 7.1.2 is based on an average of four drill core samples drilled north of the Brazion Creek Property.

7.2 Summary of the 1982 Data

Coal quality analyses and washability tests performed by Birtley Coal and Minerals Testing show that excellent metallurgical and thermal coal products were obtained from an adit (ADT-82-1) bulk sampling program of the Gething Seam No. 1 located north of the Brazion Creek Area.

Three unoxidized bulk samples were taken at the adit and tested for various product specifications. Results for the three samples, B2, B3A and B3B, are listed on Table 7.2.1. For further information refer to the 1982 Goodrich Geological Report.

7.2.1 Summary of Metallurgical Coal Products

The metallurgical coal products from the entire seam sample (B2) Table 7.2.1, were washed and tested separately at 9.5% and 6.5% ash levels. The volatile matter on a dry mineral matter free basis (dmmf) for both the 9.5% and 6.5% ash product is about 26%, the free swelling index is 2 to 2.5, and the clean coal recoveries are 78% and 66% respectively.

TABLE 7.1.2

PRELIMINARY SPECIFICATIONS OF COAL QUALITY

SEAM NO. 5

(air-dried basis)

		JCD's Specifications
Total Moisture	8.0 %	Maximum 10%
Residual Moisture	1.2 %	
Ash	14.0 %	Maximum 20%
Volatile Matter	21.0 %	
Fuel Ratio	3.0	Maximum 2.5
Calorific Value (Cal/g)	7100	Minimum 6200
Total Sulphur	0.49 %	Maximum 1.0%
Ash Fusion Temperature		
S.T.	1270	Minimum 1200°C
F.T.	1350	Minimum 1300°C
Na_2O in Ash	1.0 %	0.1 - 3%
Base/Acid in Ash	0.44 %	
H.G.I.		Minimum 45
Chlorine in Coal	0.049%	Maximum 0.05%

Table 7.2.1

COAL QUALITY SUMMARY
B2 SAMPLE (ENTIRE SEAM MINED)
(air-dried basis)

Product Specification	Thermal Coal 14% Ash Sub Sample 1	Met Coal 9.5% Ash Sub Sample 2	Met Coal 6.5% Ash Sub Sample 3a
Sample I.D. Number	3434	3375	3376
Air dried moisture	5.9 %	5.5 %	7.4 %
PROXIMATE ANALYSIS			
Residual Moisture	1.8 %	0.8 %	0.8 %
Ash	12.3 %	9.3 %	6.3 %
Volatile matter	23.7 %	24.4 %	24.9 %
Fixed Carbon	62.2 %	65.5 %	68.0 %
Sulphur	0.32%	0.34 %	0.32 %
Free Swelling Index	2	2	2.5
Fuel Ratio	2.62	-	2.73
Calorifix Value (cal/gm)	7245	7589	7867
PHYSICAL PROPERTIES			
Hardgrove Index	62	65	61
Specific Gravity	1.36	1.37	1.33
ASH ANALYSIS			
P in Ash	0.08%	0.08%	0.027%
CL in coal	0.02%		
N in coal	0.95%	0.92 %	1.02 %
DILATATION	Not tested		
Soft Temprature		404°C	407°C
Maximum Temperature		-	-
Contr. Temperature		20%@ 500°C	19%@ 491°C
Maximum Dilatation		-	-
G Factor		-	-
FLUIDITY	Not tested		
Start Temperature		1 ddpm @ 440°C	1 ddpm @ 448°C
Maximum Temperature		2 ddpm @ 460°C	2 ddpm @ 460°C
Final Temperature		0 ddpm @ 491°C	0 ddpm @ 488°C
Range		42	40
CLEAN COAL YIELD	86.7 %	78.3 %	66.7 %

Table 7.2.1 (cont'd...)

COAL QUALITY SUMMARY
B3 SAMPLE (SELECTIVELY MINED)
(air-dried basis)

Product Specification	B3A Met Coal 6.5% Ash	B3B Thermal Coal 145 Ash includes rejects from Sample B3A
Sample ID Number	3454	3474
Air Dried Moisture	4.8%	6.0 %
PROXIMATE ANALYSIS		
Residual Moisture	0.9 %	0.6 %
Ash	6.3 %	12.7 %
Volatile Matter	29.1 %	23.3 %
Vm (dmmf)	30.9 %	25.92%
Fixed Carbon	63.7 %	63.4 %
Sulphur	0.32%	0.30%
Free Swelling Index	7	1
Fuel Ratio		2.72
CALORIFIC VALUE(cal/gm)	7954	7286
Physical Properties		
Hardgrove Index	69	60
Specific Gravity		1.40
ASH ANALYSIS		
P in ash		0.09%
Cl in coal		0.04%
N in coal		
Dilatation		
Soft Temperature	383°C	Not Tested
Maximum Temperature	461°C	
Contr. Temperature	22%@ 431°C	
Maximum Dilatation	32 %	
G Factor	1.017	
FLUIDITY		Not Tested
Start Temperature	1 ddpm @ 427°C	
Maximum Temperature	333 ddpm @ 462°C	
Final Temperature	0 ddpm @ 495°C	
Range	68	
CLEAN COAL YIELD	21.7 %	100 %

Table 7.2.1 (cont'd...)
COAL QUALITY SUMMARY
BI SAMPLE (ENTIRE SEAM, OXIDIZED)
(air-dried basis)

Sample ID Number	3617
PROXIMATE ANALYSIS	
Residual Moisture	3.8 %
Ash	13.4 %
Volatile Matter	28.0 %
Fixed Carbon	54.8 %
Sulphur	0.24%
CALORIFIC VALUE(cal/gm)	5882
Fuel Ratio	1.96
Hardgrove Index	98
Specific Gravity	1.49
Clean Coal Yield	44.6 %

Although below average results were obtained from the clean metallurgical coal products from the entire seam, excellent coking characteristics were identified in the selectively mined metallurgical coal portion of Seam No. 1.

The separately mined 6.5% ash metallurgical coal product tested as a high volatile (30.9% dmmf) coking coal with an FSI of 7, dilatation of 32%, and maximum fluidity of 333 ddpm.

The coal products contain approximately .32% total sulphur and less than .03% phosphorus.

7.2.2 Summary of Thermal Coal Products

A high calorific thermal coal of greater than 7100 Cal/gm is attainable from the No. 1 Seam regardless of the mining method.

Phosphorus and chlorine content in the thermal products are less than .09% and .04%, respectively. Nitrogen content in the coal is less than 0.95%.

The Hardgrove Index ranges, for all products, between 60 to 69.

The average ash fusion temperatures are shown in Table 7.2.2.

Table 7.2.2
AVERAGE ASH FUSION TEMPERATURE (C°)
OF THERMAL COAL PRODUCT FROM TOTAL SEAM

Atmosphere	Initial Deform. Temp.	Softening Temp.	Hemispherical Temp.	Final Temp.
Oxidizing	1332.2	1423.9	1446.1	1460.0
Reducing	1237.8	1340.6	1390.6	1482.3

Mining the entire seam produced a run of mine coal with an ash level of 20.6%. At a clean coal ash level of 12.3% (well below the product specification) the total yield is 86.7%. In comparison, the selectively mined thermal portion of the No. 1 Seam has a run of mine ash level of 12.7%. The tonnage of product coal produced is dependent on the thickness of the thermal portion of the seam*.

Exclusion of the tuffaceous claystone zone that separates the thermal portion of the seam from the metallurgical portion is considered instrumental in the lower ash level of the separately mined seam product.

Furthermore, a higher than average fuel ratio of 2.7 (versus the predicted value of 2.3 indicated by the drill core) and lower volatile contents are attributed to the below average thickness of metallurgical coal encountered at the bulk sampling point.

---

* The thermal to metallurgical coal thickness ratio at the adit sampling location is 4.45/1.15 metres. This ratio varies within the mine area.

7.3 Coal Petrography

Petrographic results obtained from D. Pearson & Associates on six adit channel samples indicates that an average mean reflectance for the upper and lower portion of the No. 1 Seam is 1.12 and 1.00 respectively, while the average total reactives for the upper and lower portion of the No. 1 Seam are 45.8% and 73.3% respectively (Table 7.3.1).

TABLE 7.3.1
Summary of Petrographic Results
from ADT-82-1 Channel Samples
(off Property)

		Reflectance RO Max.	Reactives %	Inerts %
Station CS-00	Upper Portion (ID 02117)	1.13	49.3	50.7
	Lower Portion (ID 02118)	0.98	80.4	19.6
Station CS-11	Upper Portion (ID 04646)	1.10	42.9	57.1
	Lower Portion (ID 04647)	1.01	69.8	30.2
Station CS-28	Upper Portion (ID 04531)	1.12	45.1	54.9
	Lower Portion (ID 04536)	1.02	69.6	30.4
Averages:	Upper Portion	1.12	45.77	54.23
	Lower Portion	1.00	73.27	26.73

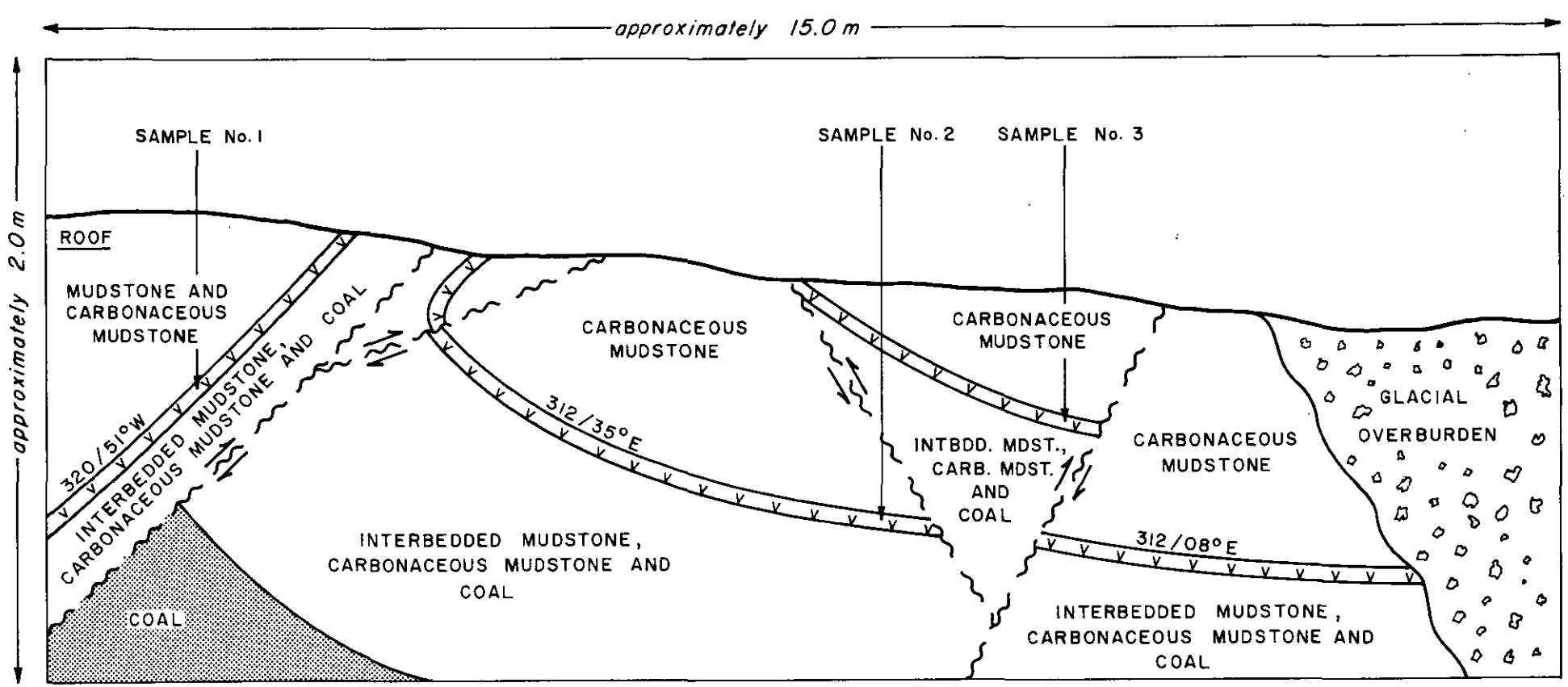
8.0 TONSTEIN CORRELATION

During the 1984 exploration program four representative samples of tuffaceous material were collected from 2 coal seams exposed during trenching (Figure 8.0.1). These samples were analyzed for the following:

- Silicate Analyses: determination of the major oxides; (%), SiO^2, Al^2O^3, Fe^2O^3, MgCa, K, PO^2, MnO, P^2O^5, Na^2O, K^2O, TiO^2, BaO.
- Sulphur
- Loss of Ignition
- Partial Oxides; (ppm) Ba, Sr, Rb, Zr.

The results were entered into a data base available to GCRI through the B.C. Department of Mines. A series of statistical programs were applied to the data which resulted in a best fit correlation indicating that the No. 1 Seam had been intersected.

The results of the analyses are included in Table 8.1.



VIEW LOOKING NORTHWARD

LEGEND

~ ~ ~ FAULT

v v v v v TUFFACEOUS BAND

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

Gulf

SCHEMATIC DIAGRAM OF TUFFACEOUS BANDS AND SAMPLE LOCATIONS IN TRENCH GDR-BC-TRC-84002

PREPARED BY: B. CARPENTER, R. INKSTER	SCALE N/A
APPROVED BY: C. WILLIAMS DATE: OCT., 1984	FIGURE 8.0.1

Table 8.1

SUMMARY OF TONSTEIN ANALYSES

Oxides	Gulf Laboratory				Terramin Laboratory			
	No. 1 Trench 1	No. 1 Trench 2	No. 2 Trench 2	No. 2 Trench 2	No. 1 Trench 1	No. 1 Trench 2	No. 2 Trench 2	No. 2 Trench 2
SiO_2 (wt. %)	4.01	46.54	46.78	48.52	4.06	49.6	50.7	48.8
Al_2O_3 (%)	0.95	31.00	29.62	27.72	.945	29.9	28.7	28.0
Fe_2O_3 (%)	27.89	5.56	5.77	6.29	27.5	6.88	6.06	7.21
CaO (%)	1.78	0.07	0.05	0.07	2.01	0.49	.055	.060
MgO (%)	0.39	0.12	0.13	0.13	.386	.154	.148	.154
Na_2O (%)	0.11	0.23	0.13	0.22	.008	.065	.045	.035
K_2 (%)	<0.03	0.39	0.48	0.37	.057	.393	.343	.358
TiO_2 (%)	0.01	1.26	0.84	0.69	.033	.834	.684	.651
MnO (%)	0.21	0.02	0.02	0.02	.212	.022	.030	.021
P_2O_5 (%)	0.10	0.39	0.38	0.28	.080	.305	.303	.0250
BaO (%)	0.04	0.19	0.25	0.11				
S (%)	0.07	0.02	0.02	0.01				
L.O.I. (%)	62.82	13.86	14.57	14.89	65.5	13.4	13.6	14.6
Partial Oxides								
Ba (ppm)	--	--	--	--	360	1420	1560	1520
Sr (ppm)	29	52	65	39	36	47	50	60
Rb (ppm)	25	--	--	--	10	15	13	13
Zr (ppm)	12	259	231	225	20	170	190	210

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Appendix 1

1984 COAL QUALITY DATA

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

PROJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID [26651]

NOTE: Do not mark shaded regio

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID [3] GDR-TRC-BC-84001 01

LAB NAME [LORING]

DATE RECEIVED [09] DY / [08] MO / [84] YR

SAMPLE WEIGHT (KG) [2.29] *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ]

SPLIT SAMPLE ID [ ]

DATA TYPE (REAL, BORO, AVER, CALC) [REAL]

DATE ANALYSED [15] DY / [08] MO / [84] YR

ANALYSIS BASIS TYPE (AD, DB, AR, EM) [AD]

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) [ASTM]

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	[28.38]	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	[14.67]	0. <= VALUE <= 60.0
ASH %	[8.94]	0. <= VALUE <= 80.0
FIXED CARBON %	[49.32]	0. <= VALUE <= 99.99
VOLATILE MATTER %	[27.07]	0. <= VALUE <= 50.0
TOTAL SULPHUR %	[.20]	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	[21.59]	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 2000
[illegible]	[ ]	1.0 <= VALUE <= 2.6
FSI	[0.0]	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

PROJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID [26651]

NOTE: Do not mark shaded regions.

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID [4] GDR-TRC-82-8400 1-2

LAB NAME [LORING]

DATE RECEIVED [09] DY / [08] MO / [84] YR

SAMPLE WEIGHT (KG) [3.07] *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) [REAL]

SPLIT SAMPLE ID [ ] DATE ANALYSED [15] DY / [08] MO / [84] YR

ANALYSIS BASIS TYPE (AD, DB, AR, EM) [AD]

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) [ASTM]

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	[24.18]	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	[14.57]	0. <= VALUE <= 60.0
ASH %	[9.67]	0. <= VALUE <= 80.0
FIXED CARBON %	[49.45]	0. <= VALUE <= 99.99
VOLATILE MATTER %	[26.31]	0. <= VALUE <= 50.0
TOTAL SULPHUR %	[.16]	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	[21.96]	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 20000
SPG	[ ]	1.0 <= VALUE <= 2.6
[illegible]	[0.0]	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

PROJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded regions

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 5 GDR-TRC-BC-84001 2-3.07

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 2.21 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	29.10	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	1.4.19	0. <= VALUE <= 60.0
ASH %	6.58	0. <= VALUE <= 80.0
FIXED CARBON %	51.05	0. <= VALUE <= 99.99
VOLATILE MATTER %	28.18	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.10	0. <= VALUE <= 15.0
PHOSPHOROUS	.	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	22.25	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	.	0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SPG	.	1.0 <= VALUE <= 2.6
	0.0	0. <= VALUE <= 9.0
HGI	.	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	.	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

PROJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded regions

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 6 GDR-TRC-BC-84001 3.07-4.0

LAB NAME LORING

DATE RECEIVED 09 / 08 / 84 (DY / MO / YR)

SAMPLE WEIGHT (KG) 2.77 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 05 / 08 / 84 (DY / MO / YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	26.83	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	14.51	0. <= VALUE <= 60.0
ASH %	9.95	0. <= VALUE <= 80.0
FIXED CARBON %	48.08	0. <= VALUE <= 99.99
VOLATILE MATTER %	27.46	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.08	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	21.23	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SRG		1.0 <= VALUE <= 2.6
FSI	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

PROJ [ ] BLK [ ] DS. [ ]

LAB SAMPLE ID 26651

NOTE: Do not mark shaded regions.

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 7 GDR-TRC-BC-84001 4.0-5.0

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 2.09 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID

SAMPLE PRODUCT ID

SPLIT SAMPLE ID

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	31.21	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	14.20	0. <= VALUE <= 60.0
ASH %	13.54	0. <= VALUE <= 80.0
FIXED CARBON %	45.43	0. <= VALUE <= 99.99
VOLATILE MATTER %	26.73	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.08	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	19.77	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SPG		1.0 <= VALUE <= 2.6
[redacted]	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

[redacted] BLK DS

LAB SAMPLE ID 26651

NOTE: Do not mark shaded regions.

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 8 GDR - TRC - BC - 8400 1 5.0 - 5.48

LAB NAME LORING

DATE RECEIVED 09 / 08 / 84 (DY / MO / YR)

SAMPLE WEIGHT (KG) 2.93 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS ☐

HEAD ANALYSIS ☑

SAMPLE ID

[redacted] PLE PRODUCT ID

SPLIT SAMPLE ID

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 / 08 / 84 (DY / MO / YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	.	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	29.17	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	13.00	0. <= VALUE <= 60.0
ASH %	13.59	0. <= VALUE <= 80.0
FIXED CARBON %	45.80	0. <= VALUE <= 99.99
VOLATILE MATTER %	27.61	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.10	0. <= VALUE <= 15.0
PHOSPHOROUS	.	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	20.31	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	.	0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SPG	.	1.0 <= VALUE <= 2.6
[redacted]	0.0	0. <= VALUE <= 9.0
HGI	.	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	.	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

J [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651

NOTE: Do not mark shaded regions.

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 9 GDR-TRC-BC-84003 0-1

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.76 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ]

SPLIT SAMPLE ID [ ]

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	29.15	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	14.49	0. <= VALUE <= 60.0
ASH %	7.63	0. <= VALUE <= 80.0
FIXED CARBON %	50.32	0. <= VALUE <= 99.99
VOLATILE MATTER %	27.56	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.14	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	21.03	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 20000
SPG	[ ]	1.0 <= VALUE <= 2.6
[redacted]	0.0	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651

NOTE: Do not mark shaded region

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 10 GDR-TRC-BE-84003 1-2

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.21 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	28.46	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	13.35	0. <= VALUE <= 60.0
ASH %	9.65	0. <= VALUE <= 80.0
FIXED CARBON %	49.83	0. <= VALUE <= 99.99
VOLATILE MATTER %	27.17	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.09	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	20.99	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SRG		1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded region

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 1.1 GDR-TRC-BC-84003 2-3.44

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.93 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID

SAMPLE PRODUCT ID

SPLIT SAMPLE ID

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	28.00	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	13.52	0. <= VALUE <= 60.0
ASH %	18.44	0. <= VALUE <= 80.0
FIXED CARBON %	41.14	0. <= VALUE <= 99.99
VOLATILE MATTER %	26.90	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.12	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	17.54	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SPG		1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

PROJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded regions

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 12 GDR-TRC-BK-84003 3.44-3.84

LAB NAME LORING

DATE RECEIVED 09 / 08 / 84 (DY / MO / YR)

SAMPLE WEIGHT (KG) 0.93 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID

SAMPLE PRODUCT ID

SPLIT SAMPLE ID

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 / 08 / 84 (DY / MO / YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	24.43	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	10.48	0. <= VALUE <= 60.0
ASH %	29.30	0. <= VALUE <= 80.0
FIXED CARBON %	36.62	0. <= VALUE <= 99.99
VOLATILE MATTER %	23.60	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.11	0. <= VALUE <= 15.0
PHOSPHOROUS	.	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	15.60	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	.	0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SRG	.	1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI	.	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	.	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 266,51 NOTE: Do not mark shaded region

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 13 GDR-TRC-BL-84004 0-1

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.76 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	28.75	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	14.04	0. <= VALUE <= 60.0
ASH %	9.88	0. <= VALUE <= 80.0
FIXED CARBON %	49.10	0. <= VALUE <= 99.99
VOLATILE MATTER %	26.98	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.27	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	20.69	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
SRG		1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

P–380 (11-81)

COAL COMPOSITION OR HEAD ANALYSIS

J [ ] BLK [ ] DS [ ]

LAB SAMPLE ID [26651]

NOTE: Do not mark shaded regions.

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID [14] GDR-TRC-BC-84004 1-2

LAB NAME [LORING]

DATE RECEIVED [09] DY / [08] MO / [84] YR

SAMPLE WEIGHT (KG) [1.73] *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) [REAL]

SPLIT SAMPLE ID [ ] DATE ANALYSED [15] DY / [08] MO / [84] YR

ANALYSIS BASIS TYPE (AD, DB, AR, EM) [AD]

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) [ASTM]

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	[28.27]	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	[13.54]	0. <= VALUE <= 60.0
ASH %	[7.21]	0. <= VALUE <= 80.0
FIXED CARBON %	[52.05]	0. <= VALUE <= 99.99
VOLATILE MATTER %	[27.20]	0. <= VALUE <= 50.0
TOTAL SULPHUR %	[.37]	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	[22.15]	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 20000
SPG	[ ]	1.0 <= VALUE <= 2.6
[redacted]	[0.0]	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651

NOTE: Do not mark shaded regions

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 15 GDR – TRC – BC – 84004 2-3

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 2.14 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

MPLE PRODUCT ID [ ]

SPLIT SAMPLE ID [ ]

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	24.85	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	13.07	0. <= VALUE <= 60.0
ASH %	29.19	0. <= VALUE <= 80.0
FIXED CARBON %	36.61	0. <= VALUE <= 99.99
VOLATILE MATTER %	21.13	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.26	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	15.79	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 20000
[illegible]	[ ]	1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded region

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 16 GDR-TRC-BL-84004 3-4

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.64 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	28.95	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	13.44	0. <= VALUE <= 60.0
ASH %	18.12	0. <= VALUE <= 80.0
FIXED CARBON %	43.13	0. <= VALUE <= 99.99
VOLATILE MATTER %	25.31	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.28	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	18.41	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
[illegible]G		1.0 <= VALUE <= 2.6
[illegible]SI	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

OJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651 NOTE: Do not mark shaded region

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 17 GDR - TRC - BC - 84004 4 - 5.03

LAB NAME LORING

DATE RECEIVED 09 / 08 / 84 (DY / MO / YR)

SAMPLE WEIGHT (KG) 1.19 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ] DATA TYPE (REAL, BORO, AVER, CALC) REAL

SPLIT SAMPLE ID [ ] DATE ANALYSED 15 / 08 / 84 (DY / MO / YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]	[ ]	0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	23.97	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	7.99	0. <= VALUE <= 60.0
ASH %	31.35	0. <= VALUE <= 80.0
FIXED CARBON %	38.29	0. <= VALUE <= 99.99
VOLATILE MATTER %	22.37	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.34	0. <= VALUE <= 15.0
PHOSPHOROUS	[ ]	0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	17.06	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)	[ ]	0. <= VALUE <= 34.0
CHLORINE (PPM)	[ ]	0. <= VALUE <= 20000
SRG	[ ]	1.0 <= VALUE <= 2.6
[illegible]	0.0	0. <= VALUE <= 9.0
HGI	[ ]	30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)	[ ]	0. <= VALUE <= 200

GULF CANADA RESOURCES INC. – COAL DIVISION

COAL COMPOSITION OR HEAD ANALYSIS

P–380 (11-81)

DJ [ ] BLK [ ] DS [ ]

LAB SAMPLE ID 26651

NOTE: Do not mark shaded regions

THIS PART APPLIES WITH HEAD ANALYSIS ONLY.

SAMPLE

SAMPLE ID 18 GDR-TRC-BC-84005 COMPLETE

LAB NAME LORING

DATE RECEIVED 09 (DY) / 08 (MO) / 84 (YR)

SAMPLE WEIGHT (KG) 1.08 *

* THIS IS THE WEIGHT OF THE SAMPLE RECEIVED FROM THE FIELD.

CHECK ONE OF:

COAL COMPOSITION ANALYSIS [ ]

HEAD ANALYSIS [✓]

SAMPLE ID [ ]

SAMPLE PRODUCT ID [ ]

SPLIT SAMPLE ID [ ]

DATA TYPE (REAL, BORO, AVER, CALC) REAL

DATE ANALYSED 15 (DY) / 08 (MO) / 84 (YR)

ANALYSIS BASIS TYPE (AD, DB, AR, EM) AD

NAME OF STANDARD (ASTM, JIS, DIN, BS, AS, GOST, ISO) ASTM

		NORMAL RANGE
SURFACE MOISTURE % [AD, AR]		0. <= VALUE <= 15.0
TOTAL MOISTURE % [AR]	29.62	0. <= VALUE <= 80.0
INHERENT MOISTURE [AD, EM]	12.28	0. <= VALUE <= 60.0
ASH %	19.20	0. <= VALUE <= 80.0
FIXED CARBON %	43.24	0. <= VALUE <= 99.99
VOLATILE MATTER %	25.28	0. <= VALUE <= 50.0
TOTAL SULPHUR %	.30	0. <= VALUE <= 15.0
PHOSPHOROUS		0. <= VALUE <= 5.0
GROSS CALORIFIC VALUE (MJ/KG)	18.63	0. <= VALUE <= 34.0
NET CALORIFIC VALUE (MJ/KG)		0. <= VALUE <= 34.0
CHLORINE (PPM)		0. <= VALUE <= 20000
G		1.0 <= VALUE <= 2.6
FSI	0.0	0. <= VALUE <= 9.0
HGI		30. <= VALUE <= 150.0
TOP SIZE (mm) (head analysis only)		0. <= VALUE <= 200

Appendix 2

BRAZION CREEK BLOCK
RESOURCE CALCULATIONS

Table No. 1

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1500 S

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	7.35							
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49							
6	0.78/0.78							
7	0.53/0.74							
	0.64/0.79							
8	0.72/0.84							
9	1.05/1.13							
10	0.86/0.98							
11	0.69/0.79							
12	1.03/1.03							
13	1.87/1.87					38 800	108 800	
14	1.08/1.27					73 000	139 000	
15	4.15/4.35					261 000	1 703 000	
16	2.36/2.78					305 800	1 275 200	
							3 226 000	3 226 000

Table No. 2

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1000 S

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	7.35							
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					145 700	762 700	
6	0.78/0.78							
7	0.53/0.74							
	0.64/0.79							
8	0.72/0.84							
9	1.05/1.13					586 500	994 100	
10	0.86/0.98							
11	0.69/0.79							
12	1.03/1.03					754 000	1 164 900	
13	1.87/1.87					883 800	2 279 100	
14	1.08/1.27					850 800	1 620 800	
15	4.15/4.35					750 000	4 893 800	
16	2.36/2.78					750 000	3 127 500	
							15 042 900	15 042 900

Table No. 3

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 500 S

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	7.35							
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					341 500	1 787 800	
6	0.78/0.78							
7	0.53/0.74							
	0.64/0.79							
8	0.72/0.84							
9	1.05/1.13					730 000	1 237 400	
10	0.86/0.98							
11	0.69/0.79							
12	1.03/1.03					861 300	1 330 700	
13	1.87/1.87					867 000	2 431 900	
14	1.08/1.27					837 400	1 595 300	
15	4.15/4.35					820 000	5 350 500	
16	2.36/2.78					805 300	3 358 100	
							17 091 700	17 091 700

Table No. 4

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 000

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	7.35							
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					328 100	1 717 600	
6	0.78/0.78							
7	0.53/0.74							
	0.64/0.79							
8	0.72/0.84							
9	1.05/1.13	132 500	224 600	62 500	105 900	132 500	224 600	
10	0.86/0.98							
11	0.69/0.79							
12	1.03/1.03					525 000	811 100	
13	1.87/1.87					543 800	1 525 400	
14	1.08/1.27					562 500	1 071 600	
15	4.15/4.35					562 500	3 670 300	
16	2.36/2.78	35 000	146 000	96 300	401 600	397 500	1 657 600	
			370 600		507 500		10 678 200	11 556 300

Table No. 5

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 250 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total Tonnes
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	
1	7.35	20 000	220 500	16 300	179 700			
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					212 500	1 112 400	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43			160 000	271 200	152 500	258 500	
10	0.40/0.40							
11	1.11/1.47							
12	1.03/1.03			76 300	117 900	257 500	397 800	
13	1.87/1.87			81 300	228 000	261 300	732 900	
14	1.08/1.27			83 800	159 600	268 800	512 000	
15	4.15/4.35			59 400	387 600	309 400	2 018 800	
16	1.09/1.17			95 000	396 200	262 500	1 094 600	
			220 500		1 900 100		6 319 900	8 440 500

Table No. 6

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 500 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	Tonnes
1	7.35			56 300	620 700			
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					237 500	1 243 300	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43	92 500	198 400	42 500	91 200	175 000	375 400	
10	0.40/0.40							
11	1.11/1.47	100 000	220 500	43 800	96 600	172 500	380 400	
12	1.03/1.03	110 000	170 000	43 800	67 700	175 000	270 400	
13	1.87/1.87	112 500	315 600	40 000	112 200	182 500	511 900	
14	1.08/1.27	125 000	238 000	45 000	85 700	182 500	347 700	
15	4.15/4.35	75 000	489 400	45 000	293 600	227 500	1 484 400	
16	1.09/1.17	70 000	122 900	56 300	98 800	205 000	359 800	
			1 754 800		1 466 500		4 973 300	8 194 600

Table No. 7

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 750 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total Tonnes
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	
1	7.35	97 500	1 074 900					
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49			55 000	287 900	186 300	975 300	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43			63 800	136 900	238 800	512 200	
10	0.40/0.40							
11	1.11/1.47			70 000	154 400	245 000	540 200	
12	1.03/1.03			75 000	115 900	290 000	448 000	
13	1.87/1.87			75 000	210 400	330 000	925 700	
14	1.08/1.27			81 300	154 900	388 800	740 700	
15	4.15/4.35			60 000	391 500	367 500	2 397 900	
16	1.09/1.17			57 500	100 900	359 500	630 900	
			1 074 900		1 552 800		7 170 900	9 798 600

Table No. 8

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1000 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total Tonnes
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	
1	7.89			40 000	473 400	167 500	1 982 400	
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49	55 000	287 900	37 500	196 300	305 000	1 596 700	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43					317 500	681 000	
10	0.40/0.40							
11	1.11/1.47					305 000	672 500	
12	1.03/1.03					397 500	614 100	
13	1.87/1.87					395 000	1 108 000	
14	1.08/1.27					342 000	651 500	
15	4.15/4.35					257 500	1 680 200	
16	1.09/1.17					195 000	342 200	
			287 900		669 700		9 328 600	10 286 200

Table No. 9

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1250 N

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	9.71			171 900	2 503 700	171 900	2 503 700	
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49			122 500	641 300	303 800	1 590 400	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43					62 500	134 100	
10	0.40/0.40							
11	1.11/1.47					22 500	49 600	
12	1.03/1.03							
13	1.87/1.87							
14	1.08/1.27							
15	4.15/4.35							
16	1.09/1.17							
					3 145 000		4 277 800	7 422 800

Table No. 10

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1500 N

Seam	Seam Thickness	Measured Area m^2	Measured Tonnes	Indicated Area m^2	Indicated Tonnes	Inferred Area m^2	Inferred Tonnes	Total Tonnes
1	10.00	357 500	5 362 500					
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					331 300	1 734 400	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43							
10	0.40/0.40							
11	1.11/1.47							
12	1.03/1.03							
13	1.87/1.87							
14	1.08/1.27							
15	4.15/4.35							
16	1.09/1.17							
			5 362 500				1 734 400	7 096 900

Table No. 11

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 1750 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total Tonnes
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	
1	9.23	137 500	1 903 700					
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					125 000	654 400	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43							
10	0.40/0.40							
11	1.11/1.47							
12	1.03/1.03							
13	1.87/1.87							
14	1.08/1.27							
15	4.15/4.35							
16	1.09/1.17							
			1 903 700				654 400	2 558 100

Table No. 12

BRAZION CREEK BLOCK RESOURCE CALCULATIONS

Section 2000 N

Seam	Seam Thickness	Measured		Indicated		Inferred		Total Tonnes
		Area m^2	Tonnes	Area m^2	Tonnes	Area m^2	Tonnes	
1	10.92			15 000	245 700	15 000	245 700	
2	0.79/0.80							
3	0.87/0.87							
4	0.67/0.67							
5	3.31/3.49					18 800	98 400	
6	0.78/0.78							
7	0.77/0.77							
8	0.74/0.74							
9	1.43/1.43							
10	0.40/0.40							
11	1.11/1.47							
12	1.03/1.03							
13	1.87/1.87							
14	1.08/1.27							
15	4.15/4.35							
16	1.09/1.17							
					245 700		344 100	589 800

Appendix 3

1984 Trench Logs

Trench Logs

GDR-TRC-BC-84001

GDR-TRC-BC-84002

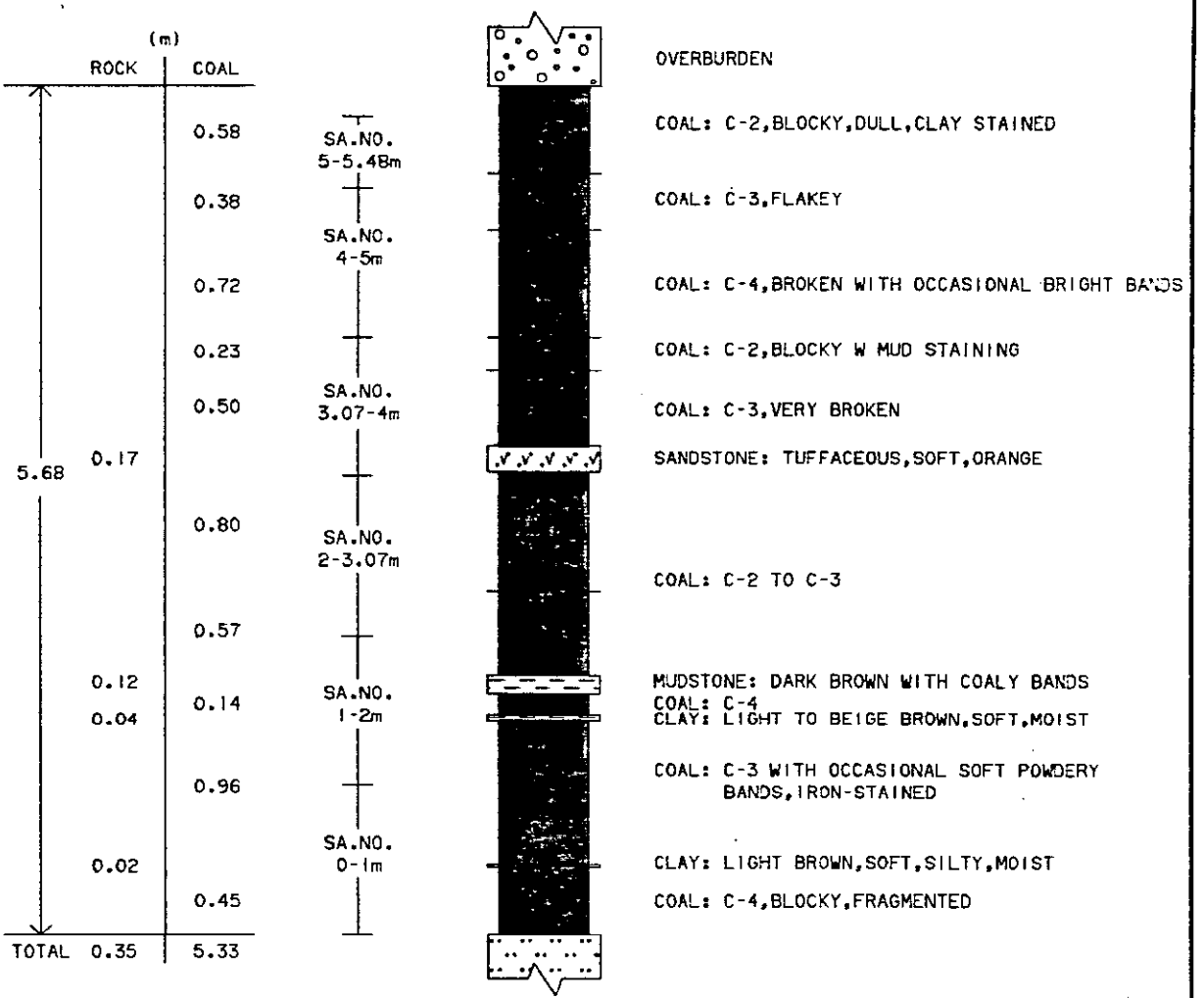
GDR-TRC-BC-84003

GDR-TRC-BC-84004

GDR-TRC-BC-84005

GDR-TRC-BC-84006

GDR-CRT-81-G01



ATTITUDE OF ROOF	:	NOT OBTAINED
ATTITUDE OF FLOOR	:	324/29°W
UTM COORDINATES	:	51445mE/38300mN
ELEVATION	:	1095m
MAP CARD NUMBER	:	N/A
TRENCH DEPTH	:	1.70m
TRENCH WIDTH	:	0.75m
TRENCH LENGTH	:	16.0m
TRENCH BEARING	:	227°
TRENCH SLOPE	:	90°
TRENCH BLOCK	:	B.C.

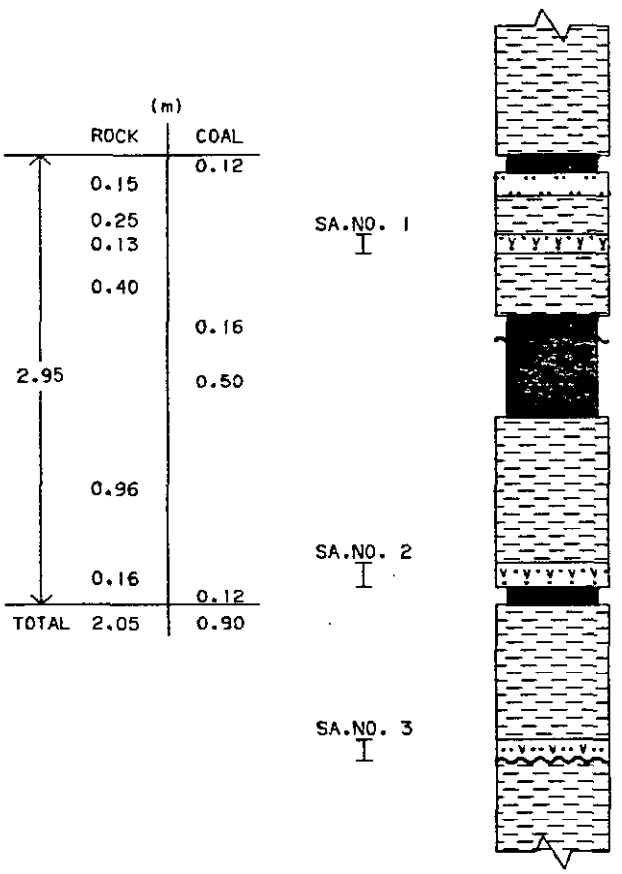
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY

TRENCH LOG
GDR-TRC-BC-84001

DRAWN BY: R. INKSTER	SCALE: 1:50
LOGGED BY: B. CARPENTER	DATE: 26/07/84
APPROVED BY: C.W.	

QSD:[205,4184091500].LOG; 26/07/84



MUDSTONE: DARK GREY, VERY RUBBLY WITH FEW CARBONACEOUS LAMINATIONS

COAL: SOFT, SHALEY
SILTSTONE: DARK GREY, MICACEOUS
MUDSTONE: CARBONACEOUS, DARK GREY TO BLACK WITH ABUNDENT PLANT FRAGMENTS
SANDSTONE: TUFFACEOUS, ORANGE-BROWN

MUDSTONE: DARK GREY, SHEARED WITH COALY LENSES

COAL: HIGHLY SHEARED
FAULT: WEST DIPPING

COAL: C-2, HIGHLY SHEARED

MUDSTONE: DARK BROWN WITH INTERBEDDED COALY BANDS

SANDSTONE: TUFFACEOUS (AS AT 0.13)
COAL: C-1, BLOCKY, HARD

MUDSTONE: CARBONACEOUS WITH PLANT FRAGMENTS AND COALY ROOTLETS

SILTSTONE: TUFFACEOUS (AS ABOVE AT 0.13)
FAULT: DIPPING 10° TO THE WEST

MUDSTONE: DARK BROWN, CARBONACEOUS

NOTES: THIS TRENCH WAS LOGGED AT THE CREST OF AN ANTICLINE AND IS STRUCTURALLY DISTURBED THEREFORE BELIEVE IT TO BE MUCH THICKER.

ATTITUDE OF ROOF	:	316/51°W
ATTITUDE OF FLOOR	:	312/8°E
UTM COORDINATES	:	5108OmE/38497mN
ELEVATION	:	1080m
MAP CARD NUMBER	:	N/A
TRENCH DEPTH	:	2.0m
TRENCH WIDTH	:	1.0m
TRENCH LENGTH	:	15.0m
TRENCH BEARING	:	228°
TRENCH SLOPE	:	90°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY

TRENCH LOG
GDR-TRC-BC-84002

DRAWN BY: R. INKSTER	SCALE: 1:50
LOGGED BY: B. CARPENTER	DATE: 26/07/84
APPROVED BY: C.W.	

QSO:[205,4]B4D915002.LOG; 26/07/84

(m) ROCK	COAL		
			SA.NO. 0-1m
	0.54		
	0.88		SA.NO. 1-2m
0.05			
3.49	0.47		
	1.02		SA.NO. 2-3.44m
0.13			
	0.40		SA.NO. 3.44-3.84m
TOTAL 0.18	3.31		

MUDSTONE: DARK GREY, SOFT RUBBLY

MUDSTONE: DARK GREY WITH COALY LAMINATIONS

COAL: C-4, SOFT, FLAKEY

COAL: C-3, SHEARED

SANDSTONE: BUFF, SOFT WITH COALY STRINGERS

COAL: C-4, SOFT, FLAKEY

COAL: C-3, SOFT, EASILY BROKEN

MUDSTONE: DARK GREY, ABUNDENT PLANT FRAGMENTS

COAL: C-4, SOFT, FLAKEY

MUSTONE: DARK BROWN TO GREY WITH PLANT FRAGMENTS

ATTITUDE OF ROOF	:	308/80W
ATTITUDE OF FLOOR	:	308/80W
UTM COORDINATES	:	51285mE/39000mN
ELEVATION	:	1030m
MAP CARD NUMBER	:	N/A
TRENCH DEPTH	:	1.5m
TRENCH WIDTH	:	1.2m
TRENCH LENGTH	:	4.5m
TRENCH BEARING	:	047°
TRENCH SLOPE	:	90°
TRENCH BLOCK	:	B.C.

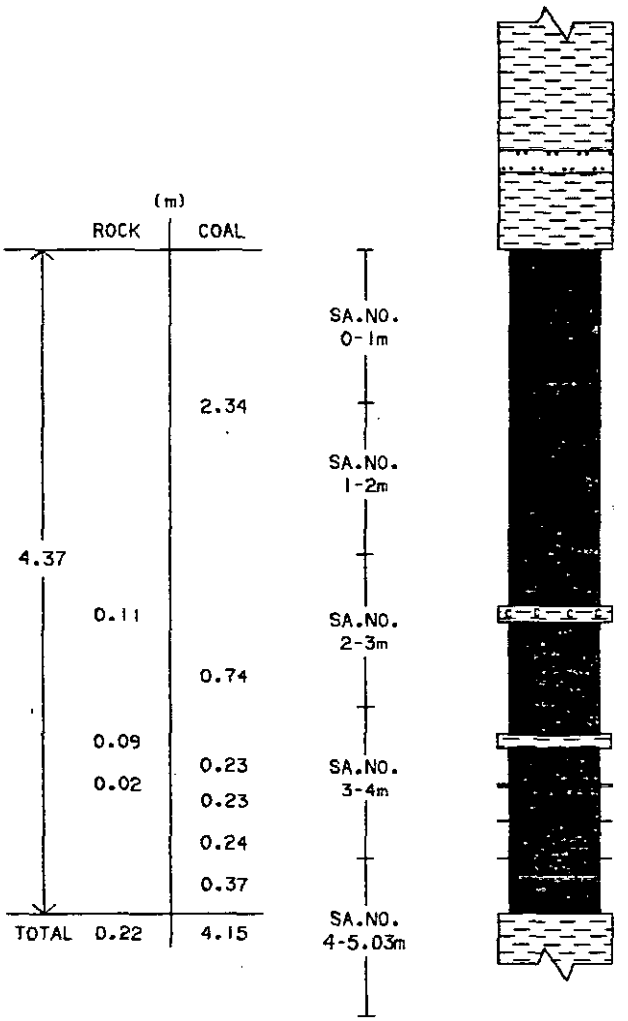
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY

TRENCH LOG
GDR-TRC-BC-84003

DRAWN BY: R. INKSTER	SCALE: 1:50
LOGGED BY: B. CARPENTER	DATE: 26/07/84
APPROVED BY: C.W.	

QSD:[205.4]8409150O3.LOG; 26/07/84



ATTITUDE OF ROOF	:	311/52W
ATTITUDE OF FLOOR	:	311/52W
UTM COORDINATES	:	51780mE/38935mN
ELEVATION	:	1057m
MAP CARD NUMBER	:	N/A
TRENCH DEPTH	:	1.1m
TRENCH WIDTH	:	1.0m
TRENCH LENGTH	:	7.5m
TRENCH BEARING	:	069°
TRENCH SLOPE	:	90°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY

TRENCH LOG
GDR-TRC-BC-84004

DRAWN BY:	R. INKSTER	SCALE:	1:50
LOGGED BY:	B. CARPENTER	DATE:	27/07/84
APPROVED BY:	C.W.		

QSO:[205,41840915004.LOG; 27/07/84

(m)

	ROCK	COAL
		0.84
1.17		
	0.03 0.05	0.06 0.19
TOTAL	0.08	1.09

SAMPLE

SILTSTONE: DARK BROWN WITH ABUNDENT COALY PLANT FRAGMENTS, MICACEOUS

COAL: C-4, SOFT

MUDSTONE: LIGHT GREY, RUBBLY
COAL: C-4
MUDSTONE: CARBONACEOUS
COAL: C-4
MUDSTONE: CARBONACEOUS

SILTSTONE: DARK BROWN WITH ABUNDENT COALY PLANT FRAGMENTS

ATTITUDE OF ROOF	:	306/53W
ATTITUDE OF FLOOR	:	306/53W
UTM COORDINATES	:	51782mE/3896 1mN
ELEVATION	:	1053m
MAP CARD NUMBER	:	N/A
TRENCH DEPTH	:	1.1m
TRENCH WIDTH	:	1.0m
TRENCH LENGTH	:	3.5m
TRENCH BEARING	:	056°
TRENCH SLOPE	:	90°
TRENCH BLOCK	:	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

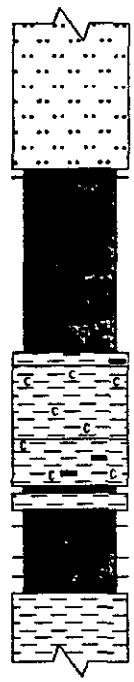
GOODRICH COAL PROPERTY

TRENCH LOG
GDR-TRC-BC-84005

DRAWN BY: R. INKSTER	SCALE: 1:50
LOGGED BY: B. CARPENTER	DATE: 27/07/84
APPROVED BY: C.W.	

QSC:[205,4]840915005.LOG; 27/07/84

	(m) ROCK	COAL
		0.05
		0.01
		1.14
2.78	0.09	
	0.48	
	0.30	
	0.11	0.05
		0.11
		0.20
		0.13
		0.11
TOTAL	0.98	1.80



SILTSTONE: DARK GREY, SOFT AND RUBBLY WITH OCCASIONAL HARD BANDS. IRON STAINING GRADES UPWARD

COAL: C-2
COAL: C-1

COAL: C-4, POWDERY

MUDSTONE: DARK GREY WITH COALY LAMINATIONS
MUDSTONE: DARK BROWN TO GREY, WITH OCCASIONAL CARBONACEOUS STRINGERS AND PLANT FRAGMENTS

MUDSTONE: DARK BROWN TO BLACK, CARBONACEOUS

COAL: C-2 WITH COALY(C-1) LAMINATIONS
MUDSTONE: COALY
COAL: C-2
COAL: C-4 POWDERY
COAL: C-2
COAL: WITH DARK BROWN INTERBEDDED MUD

MUDSTONE: DARK BROWN

ATTITUDE OF ROOF	319/63W
ATTITUDE OF FLOOR	319/63W
UTM COORDINATES	49890mE/38963mN
ELEVATION	1055m
MAP CARD NUMBER	N/A
TRENCH DEPTH	0.5m
TRENCH WIDTH	0.5m
TRENCH LENGTH	4.0m
TRENCH BEARING	229°
TRENCH SLOPE	0°
TRENCH BLOCK	B.C.

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY

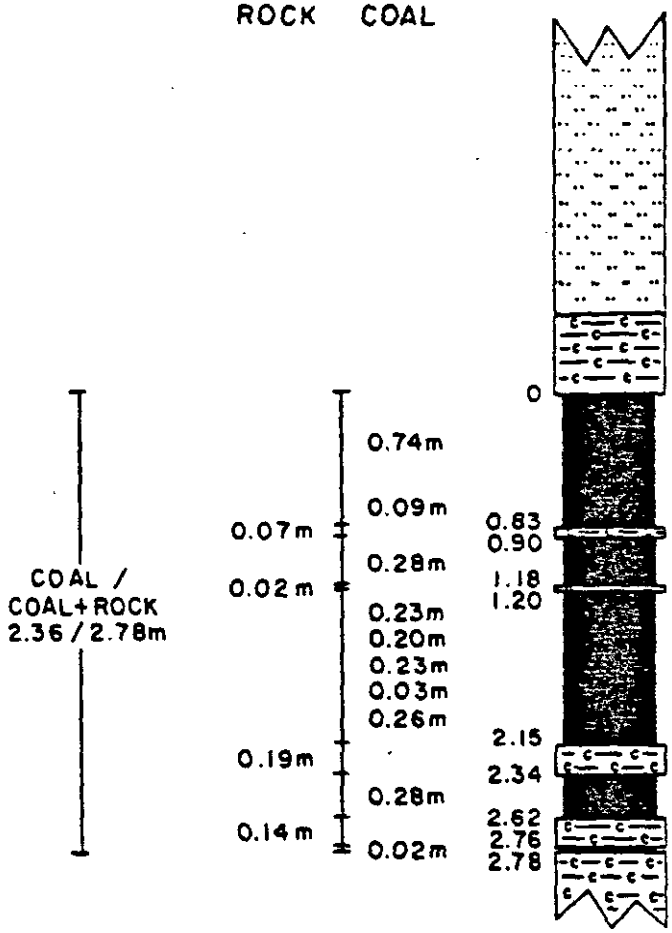
TRENCH LOG
GDR-TRC-BC-84006

DRAWN BY: R. INKSTER	SCALE: 1:50
LOGGED BY: B. CARPENTER	DATE: 22/07/84
APPROVED BY: C.W.	

QSO:[205,4]840915006.LOG; 22/07/84

TRUE THICKNESS
ROCK COAL

ROOF: 332°/32°SW



SANDSTONE:	very fine grain, light grey-brown weathering irregularly bedded 1–20 cm thinner bands, takes on rubbly appearance, argillaceous
CLAYSTONE:	and carbonaceous claystone, weathers orange to orange grey, soft, wet and rubbly,
COAL:	badly weathered, soft and wet, light brown claystone laminations on secondary cleats, dull
COAL:	banded, slightly harder than above, some bright bands
MUDSTONE:	carbonaceous, banded, light brown weathering
COAL:	dull, *minor bright bands, traces of claystone* on secondary cleats
SILTSTONE:	slightly carbonaceous, weathers light brown
COAL:	dull with discontinuous bright bands, traces *of claystone, weathered on cleavage plane*
COAL:	dull and bright banded, occasionaly hard (stoney) predominantly cleats perpendicular to bedding plane
COAL:	*soft, dull, minor iron staining, weathered* soft and wet
COAL:	dull banded, hard, iron staining
COAL:	dull, minor bright bands, weathered soft *and wet*
MUDSTONE:	carbonaceous, weathers orange
COAL:	dull, bright, weathered, soft and wet, minor iron staining
MUDSTONE:	*carbonaceous, weatheres grey*
COAL:	dull banded, soft
MUDSTONE:	carbonaceous

FLOOR: 328°/30°SW

FORMATION :GETHING
UTM COORDINATES :138 420 N, 552 180 E
MAP CARD NUMBER :1R42 - II(1:5000)
AIR PHOTO NUMBER :
TRENCH DEPTH :
TRENCH WIDTH :1.0m
TRENCH LENGTH :2.9m
TRENCH BEARING :043
TRENCH SLOPE :60°

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROJECT
TRENCH LOG
CRT - 81-G01

DRAWN BY: M. ANDERSON SCALE 1:50
LOGGED BY: V. TAPLEY DATE OCT./81
APPROVED BY: H. ZSCHACH

Appendix 4

BRAZION CREEK

DATA BASE

Appendix 4
Drill Hole Intersections

Hole Number	Apparent Thickness From - TO	True Thickness Coal/Coal + Rock
DDH 80-19	182.05 - 196.52	2.06/5.42
	196.52 - 214.19	5.16/6.24
	220.40 - 242.98	2.94/4.38
	244.93 - 253.35	5.63/5.95
	256.70 - 269.78	9.21/9.55
	275.93 - 277.08	0.81/0.81
	278.59 - 280.75	1.53/1.53
	284.70 - 286.40	1.20/1.20
DDH 80-22	35.60 - 39.33	0.78/0.78
	169.51 - 170.99	0.53/0.74
	174.25 - 175.57	0.64/0.79
	303.99 - 305.49	0.72/0.84
	318.17 - 320.10	1.05/1.13
	348.22 - 349.89	0.86/0.98
	358.05 - 359.61	0.69/0.79
DDH 80-26	54.02 - 55.29	0.79/0.80
	125.07 - 126.13	0.87/0.87
	152.66 - 153.49	0.67/0.67
DDH 80-27	178.70 - 182.22	1.09/1.09
*DDH 80-28	239.29 - 240.89	1.04/1.51
	248.20 - 256.34	5.29/7.40
	258.16 - 266.52	5.15/5.48
	268.27 - 273.29	2.24/2.52
	276.39 - 286.46	6.57/7.38
DDH 80 -29	82.97 - 87.78	1.65/1.65
	93.13 - 96.00	1.63/1.63
DDH 80 - 43	138.31 - 139.54	0.74/0.74
	257.98 - 259.91	1.03/1.03
	274.19 - 277.33	1.87/1.87
	307.94 - 310.29	1.08/1.27
*DDH 81-20	215.91 - 220.19	3.53/3.67
	221.72 - 225.12	1.97/2.91
*DDH 81-21	151.34 - 155.86	1.82/3.46
	170.39 - 174.16	2.05/2.91
	176.27 - 177.17	0.64/0.64

*Drill hole intersections projected from drill holes located immediately outside of the Brazion Creek Block Licence boundary.

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

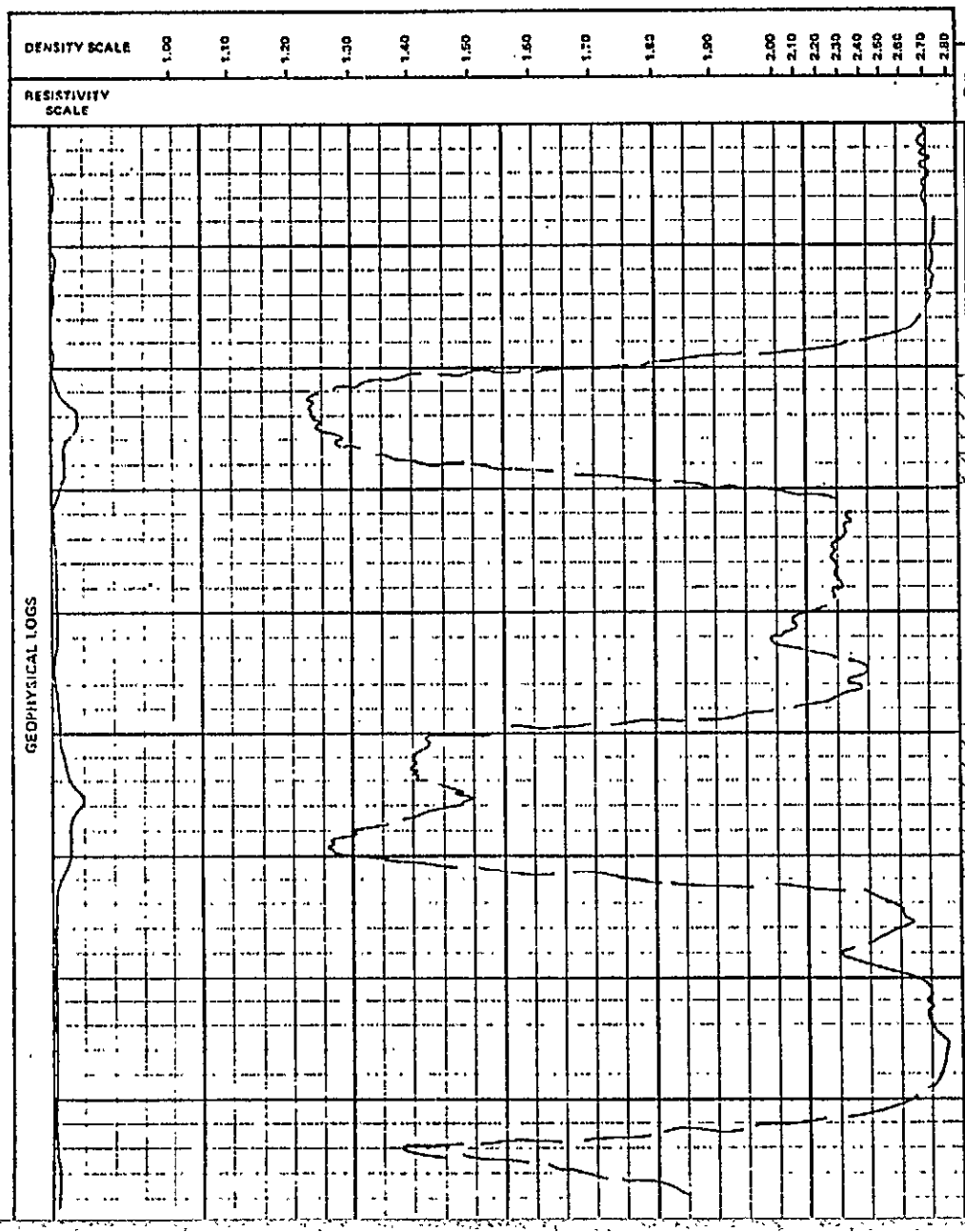
P-267 (12.4

APPARENT THICKNES

DENSITY ——— RESISTIVITY ———

DRILL NO. GDR-DDH-80-19 SEAM _____ SEAM INTERVAL 182.05 - 188.69 m

SCALE 1:40



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU	FSI
	182.05			.73 (0.10)		00347		1.18	10.91	23.43	64.50	.49	13,069	2.0
	182.88		1.78 (0.54)			00348		1.31	81.14	8.22	9.33	.08	2,061	0
	184.95			1.12 (0.11)		00349		1.11	24.44	22.25	52.20	.36	11,188	4.5
	186.18		2.03 (0.14)			00350		1.09	87.98	8.99	1.94	.08	388	0
	188.35		(1.10) 0.23			00351		0.87	75.12	14.55	9.46	.08	2,008	0

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

APPARENT THICKN

DENSITY ——— RESISTIVITY ———

DRILL NO. GDR - DDH - 80 - 19 SEAM _____ SEAM INTERVAL 188.69 - 196.52 m

SCALE 1:40

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	
	189.68			0.40 (0.54)		00352		1.24	20.91	27.60	50.25	.29	11,630
	190.62		0.25 (0.28)			00353		1.37	60.57	15.04	23.02	.15	5,441
	191.18			0.20		00354		1.20	25.36	28.38	47.06	.25	11,144
	191.35		0.07			00355		1.15	56.12	14.00	28.67	.14	6,214
	191.42			0.20 (0.24)		00356		1.06	21.01	24.93	53.00	.27	11,859
	191.86		0.77			00357		0.89	70.16	17.07	11.88	.09	3,419
	192.63			0.14 (0.22)		00358		0.90	24.70	29.16	45.24	.30	11,439
	192.99		0.36 (0.36)			00359		0.91	70.27	16.95	11.87	.10	2,885
	193.72			(0.58) 0.10		00360		1.10	20.45	29.64	48.81	.31	11,917
	194.40		0.28			00361		0.86	43.90	29.68	25.56	.17	6,277
	194.68			(0.28) 0.15		00362		1.09	40.02	23.01	35.88	.21	8,622
	195.25			0.98 (0.29)		00363		1.12	67.94	13.00	17.94	.11	4,155
	196.52												

COAL SEAM DATA SHEET

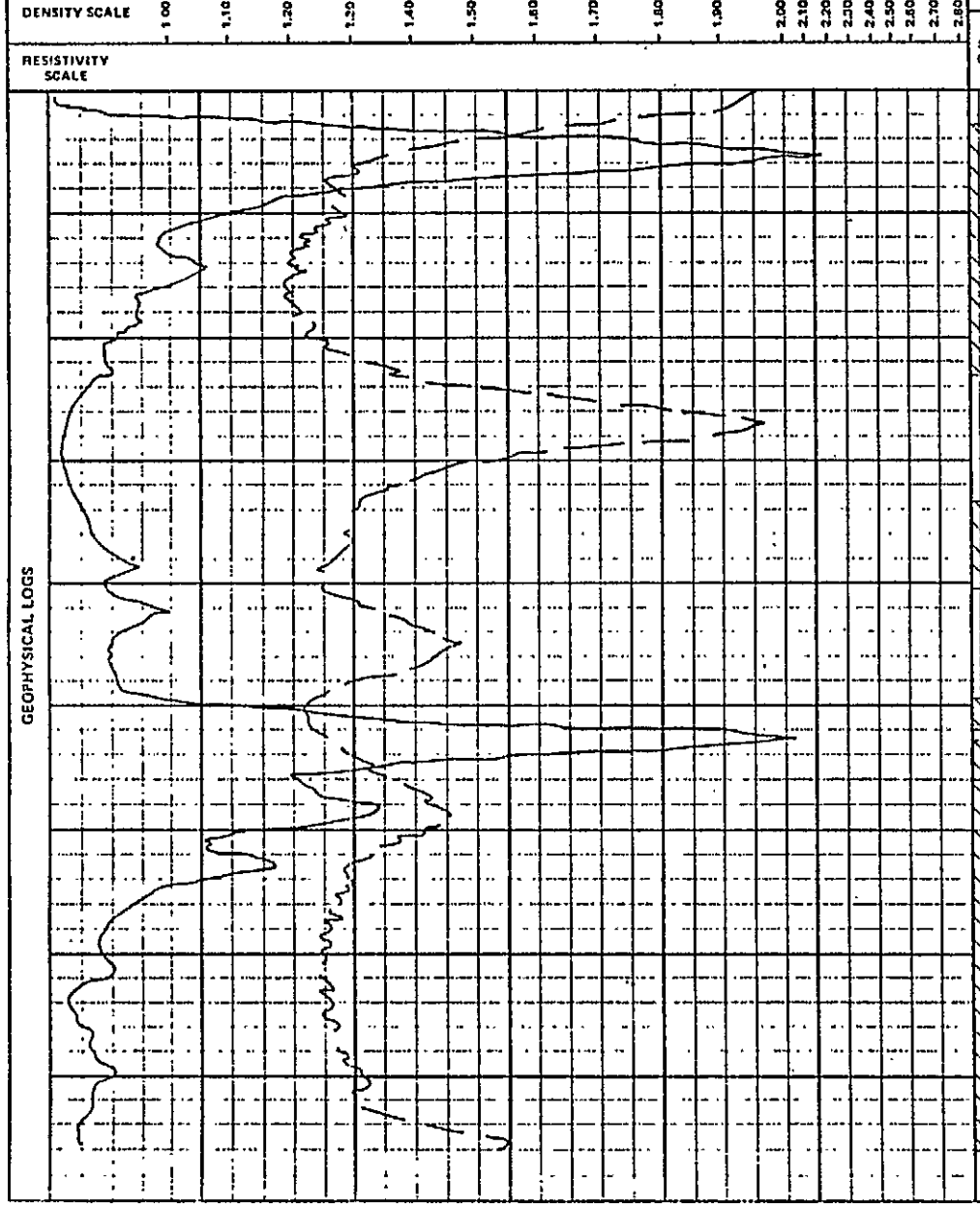
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH-G-80-19 SEAM _____ SEAM INTERVAL 196.52 – 204.89 m

SCALE 1:40

APPARENT THICKNESS



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU
				1.99 (0.09)		00364		0.67	7.82	34.33	57.18	.23	13,890
	198.80		0.51			00365		0.77	63.01	16.54	19.68	.07	4,211
	199.11			0.73 (0.56)		00366		0.80	5.96	30.19	63.05	.19	14,014
	200.40		0.19 (0.45)			00367		0.71	19.11	35.54	44.64	.14	10,597
	201.02												
				3.73 (0.14)		00368		0.80	8.77	25.93	64.50	.19	13,646
	204.89												

COAL SEAM DATA SHEET

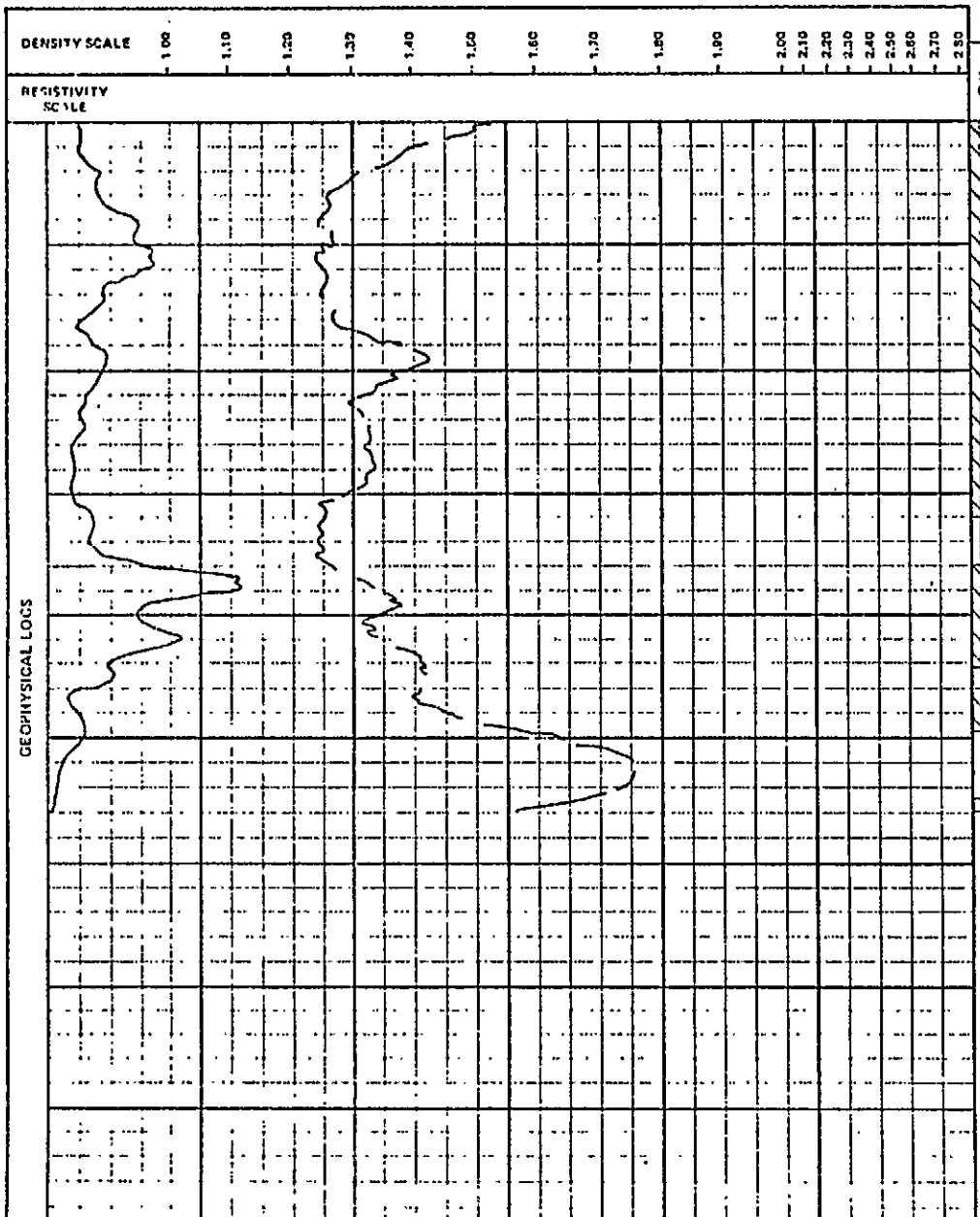
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH-G-80-19 SEAM _____ SEAM INTERVAL 204.89 - 210.50m

SCALE 1:40

APPARENT THICK



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU
	204.89					00369		0.76	10.06	26.35	62.83	.38	13,491
				4.41 (0.49)									
	209.79		0.54			00370		0.95	56.42	16.61	26.02	.19	5,677
	210.33												

COAL SEAM DATA SHEET

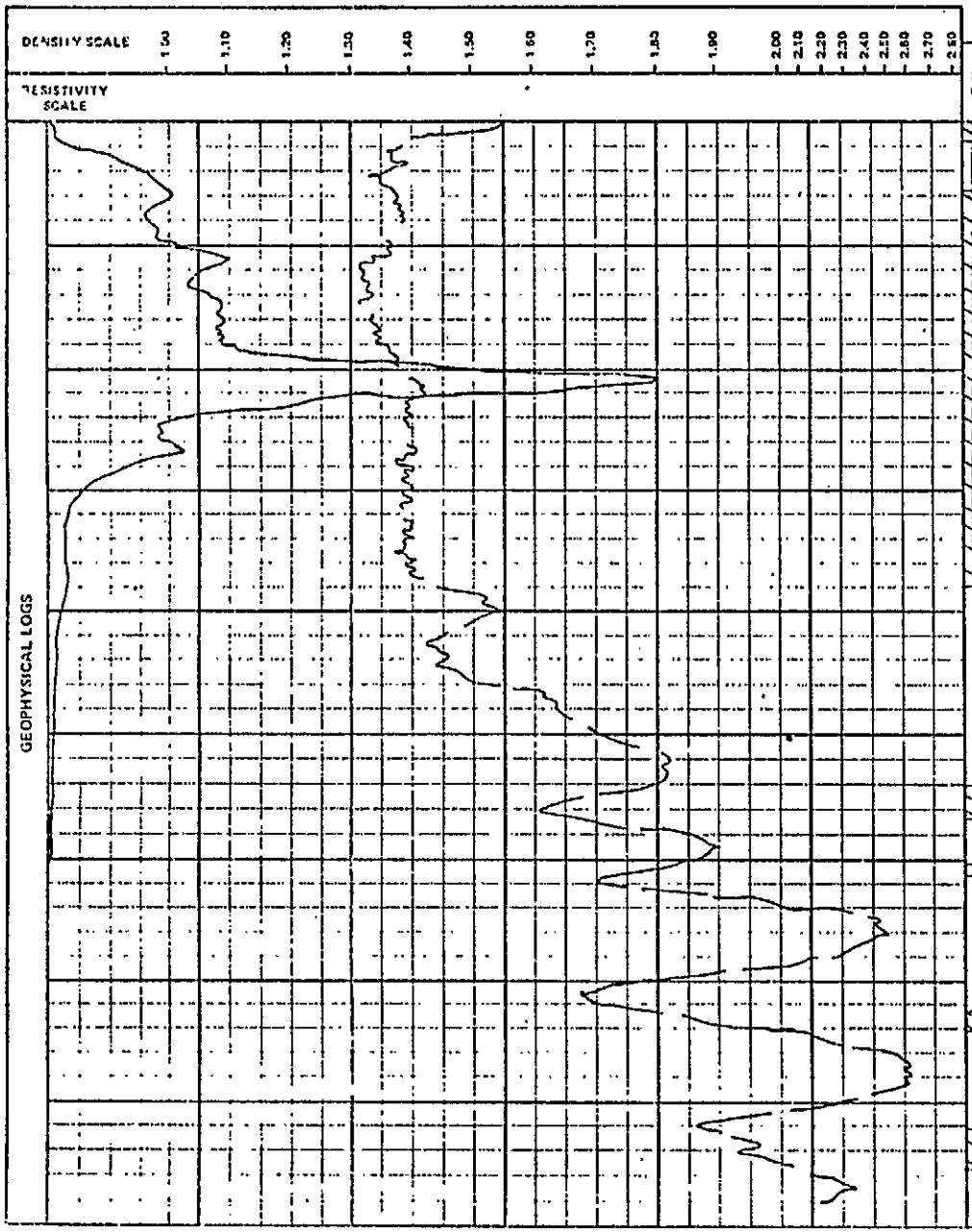
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

APPARENT THICKNE

DRILL NO. GDR - ODH-80-19 SEAM _____ SEAM INTERVAL 210.50 - 219.21 m

SCALE 1:40



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	
				3.43 (0.43)		00371		0.94	17.97	21.30	59.79	.27	12,559
	214.19		1.34 (0.25)			00372		1.09	61.11	13.98	23.82	.17	5,339
	215.78			0.25		00373		1.04	34.14	22.75	42.07	.28	9,696
	216.03		0.40			00374		1.05	65.66	13.60	19.69	.20	4,775
	216.43		0.07										
	216.61		0.11			00375		0.95	23.93	26.01	49.11	.31	11,360
			0.47 (0.15)			00376		0.90	86.05	7.19	5.86	.19	1,355
	217.23			0.14 (0.47)		00377		0.95	43.22	21.03	34.80	.28	8,112
	217.84		0.39 (0.23)			00378		1.06	72.09	11.94	14.91	.16	3,369
	218.46			0.31 (0.16)		00379		1.55	57.98	16.00	24.47	.19	5,550
	218.93												
	219.21		0.28			00380		1.46	76.45	10.42	11.67	.11	2,891

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH -80-19 SEAM _____ SEAM INTERVAL 219.21 - 228.10 m

SCALE 1:40

APPARENT THICKNESS

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	T
			(0.59) 0.60											
						00381		1.69	82.99	8.10	7.22	.06	1,637	0
	220.40			0.70		00382		1.21	31.18	19.70	47.91	.23	9,928	1
	221.10													
			0.38			00383		0.82	46.94	41.54	10.70	.06	4,097	0
	221.48													
				1.78 (1.34)		00384		1.37	6.87	27.07	64.69	.30	14,821	5
	224.60													
			0.60			00385		0.65	49.57	40.93	8.85	.06	3,407	0
	225.20													
				1.73 (0.65)		00386		1.40	7.00	27.43	64.17	.30	13,922	7
	227.58													
			0.52			00387		1.49	61.49	13.67	23.35	.16	5,183	1
	228.10													

COAL SEAM DATA SHEET

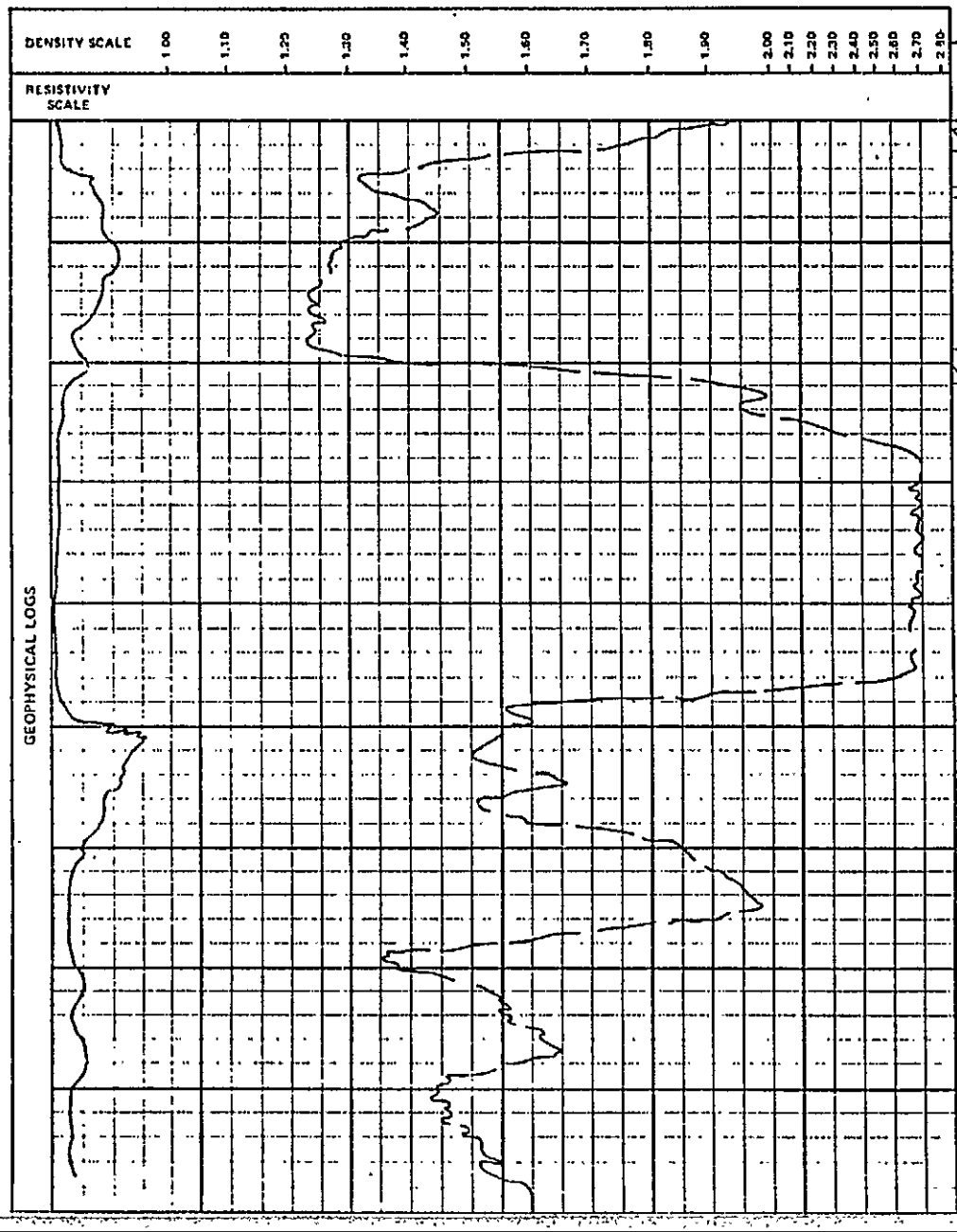
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

APPARENT THICKNES

DRILL NO. GDR-DDH-80-19 SEAM SEAM INTERVAL 228.10-236.80

SCALE 1:40



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU
	228.10			0.24 (0.31)		00388		1.17	16.69	24.85	57.29	.37	12,544
	228.65		0.04										
	228.94		0.25			00389		1.12	39.78	20.60	38.50	.29	9,109
				(0.96)									
				0.30		00390		1.23	18.44	26.37	53.96	.41	12,279
	230.20												
			2.36 (0.19)			00391		0.63	95.75	2.89	.75	.02	133
	232.75			0.84 (0.40)		00392		1.13	24.93	21.08	52.86	.35	11,210
			0.12										
	234.11												
			1.29 (1.90)			00393		1.42	60.66	14.02	23.90	.18	5,291
	236.80												

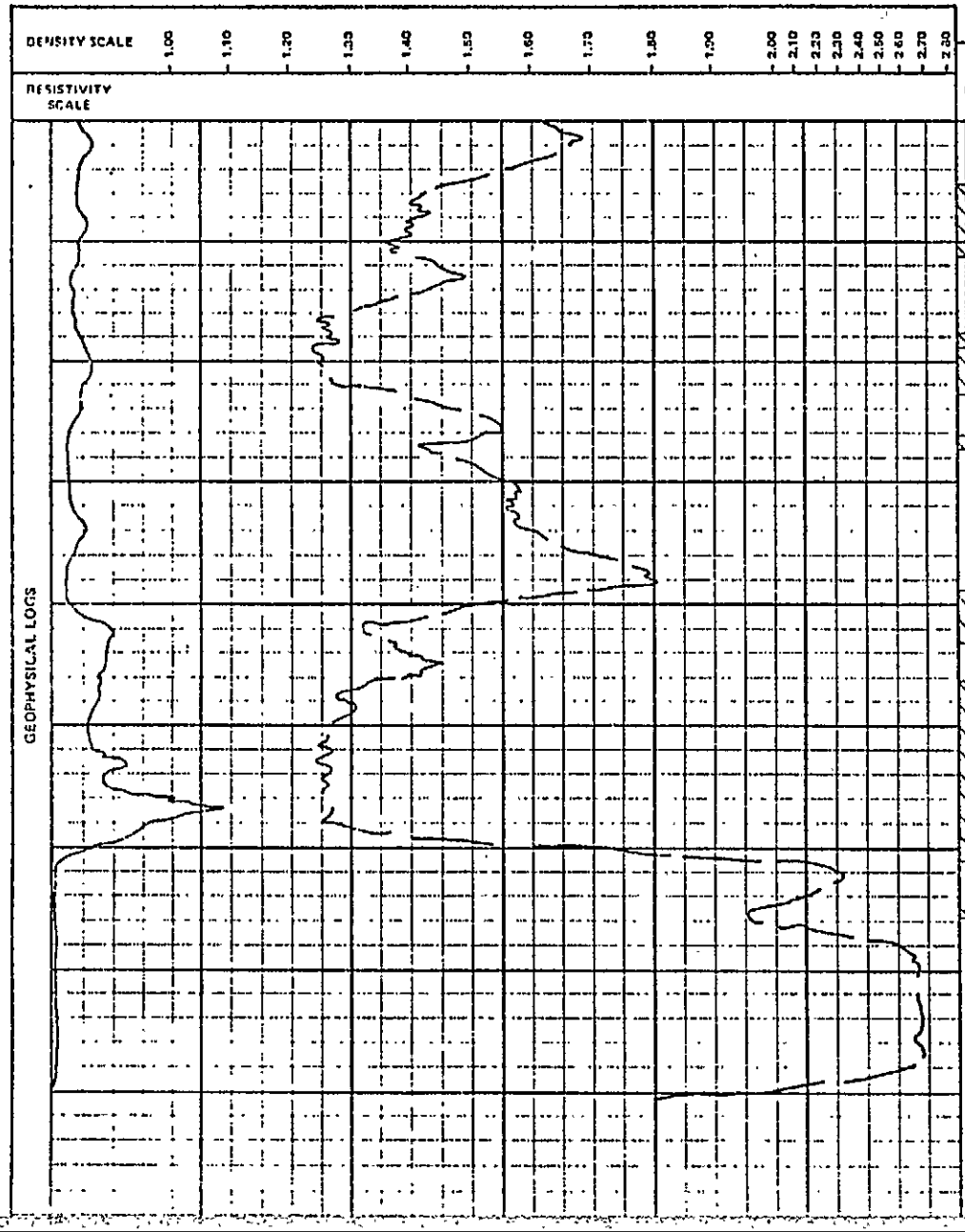
COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH-80-19 SEAM SEAM INTERVAL APPARENT THICKNESS 236.80 - 244.93 m

SCALE 1:40



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSES MOIST	ASH	VM	FC	S	BTU	FI
	237.30													
				0.60		00394		1.16	34.86	22.94	41.04	.29	9,561	5.5
	237.90													
			0.68			00395		1.13	38.30	15.97	24.60	.24	5,790	1.0
	238.58													
				0.50		00396		1.19	36.41	22.05	40.35	.25	9,273	6.5
	239.08		(0.17)											
	239.48		0.25			00397		1.18	52.08	16.70	30.04	.16	6,821	2.0
				0.51										
				(1.14)		00398		1.07	36.84	22.45	39.64	.28	9,325	5.0
	241.13													
			0.33			00399		1.17	50.07	16.90	31.86	.22	7,116	1.0
	241.46													
				1.76		00400		1.01	10.70	26.23	62.06	.45	13,497	4.0
	242.92													
				1.74										
			0.06	(0.21)		00401		0.83	90.55	6.11	2.51	.04	676	0
	244.93													

COAL SEAM DATA SHEET

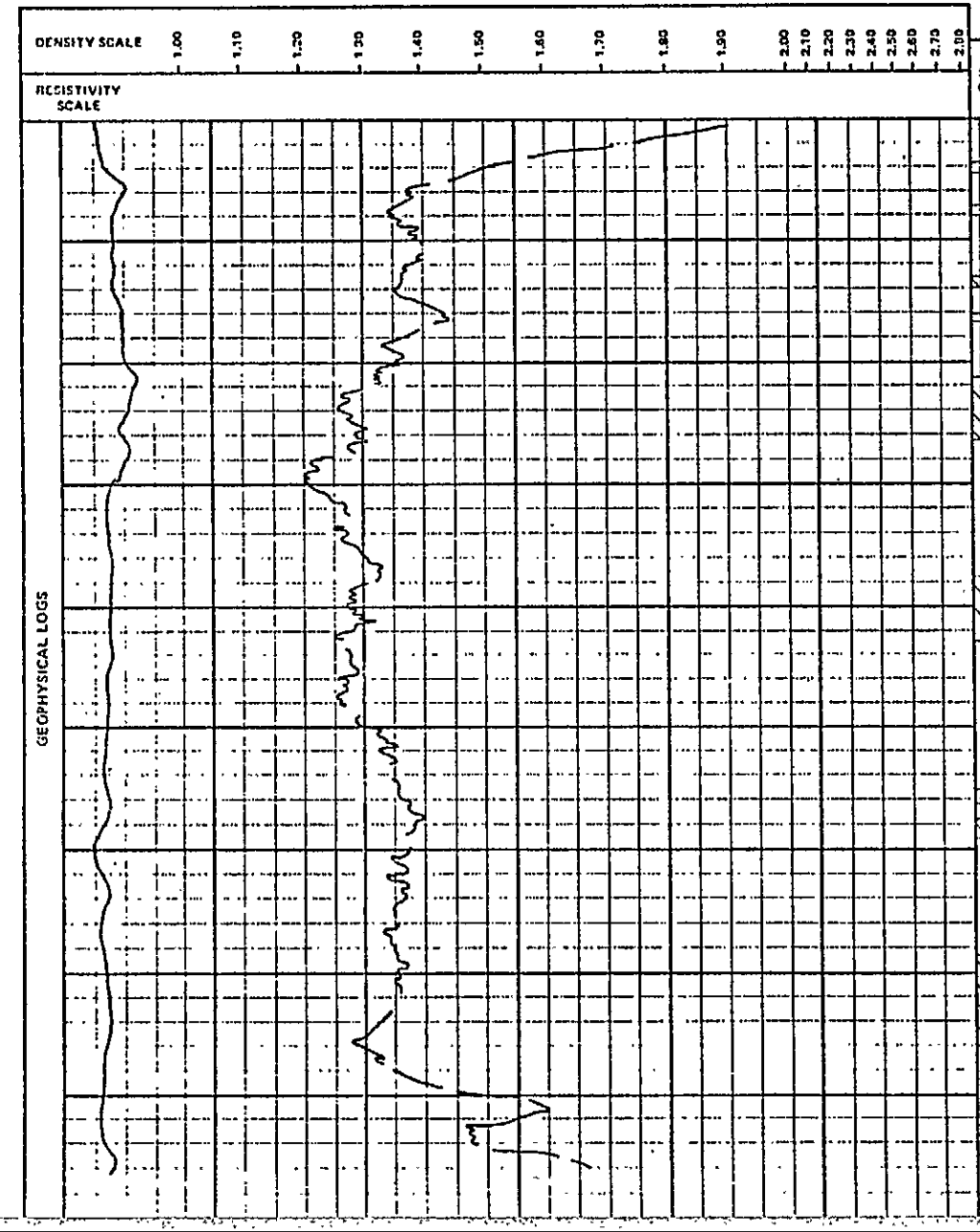
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH-80-19 SEAM _____ SEAM INTERVAL 244.93 - 253.33 m

SCALE 1:40

APPARENT THICKNES



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU
	244.93			1.37 (4.19)		00402		1.11	15.90	25.60	57.39	.22	12,665
	250.49		0.14										
	250.63			1.15 (1.57)		00404		1.11	13.84	25.89	59.16	.20	12,648
	253.33												

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

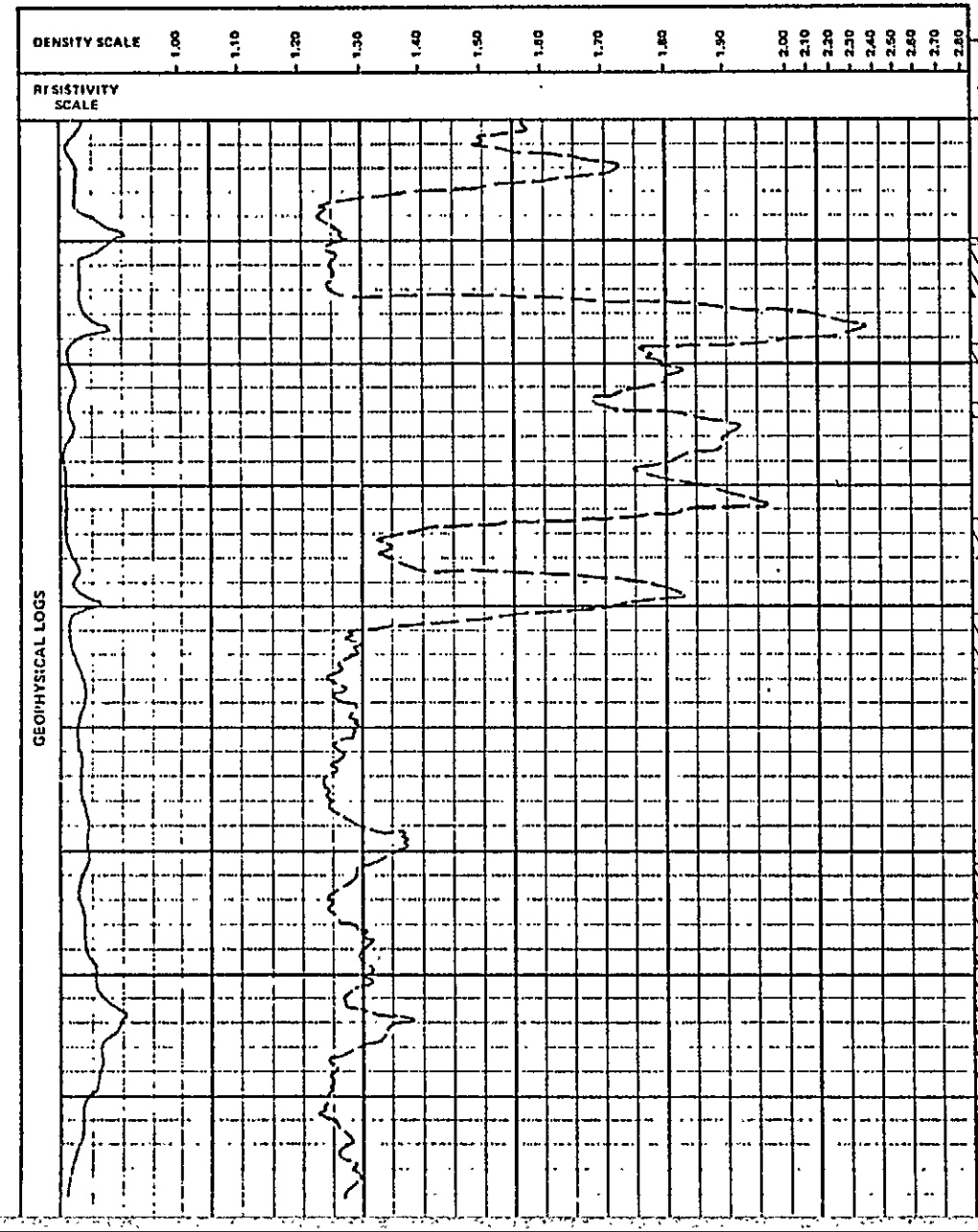
P-267 (12)

DENSITY ——— RESISTIVITY ———

APPARENT THICKNES

DRILL NO. GDR- DDH-80-19 SEAM _____ SEAM INTERVAL 253.45 - 262.45 m

SCALE 1:40



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU	
			(0.47)											
	254.00		0.18											
				(0.40)										
				0.50		00406		0.86	10.94	33.32	54.88	0.38	13,486	8
	254.90													
			0.35			00407		0.68	75.28	19.57	4.47	0.06	836	0
	255.25													
	255.40			0.15		00408		1.03	27.32	26.91	44.74	0.33	10,691	8
				0.10										
			0.65			00409		1.29	69.16	13.88	15.63	0.13	4,606	
			(0.55)											
	256.70													
				0.34		00410		0.67	18.92	32.01	48.20	0.20	12,355	7
	257.18			(0.14)										
			0.14			00411		0.93	68.01	14.98	16.06	0.35	3,280	0
	257.50		0.18											
				2.43										
				(2.53)										
						00412		1.12	6.18	33.06	59.64	0.19	14,134	2
	262.46													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ---- RESISTIVITY ——

DRILL NO. GDR - DDH - 80 - 19 SEAM _____ SEAM INTERVAL 262.46 - 271.01 m

SCALE 1 : 40

APPARENT THICKNESS

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	m REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU
	262.46			2.05 (2.42)									
						00412		1.12	6.18	33.06	59.64	.19	14,154
	266.91		0.15			00413		0.89	31.62	26.90	40.39	.15	9,303
	267.06			(1.71) 1.01									
						00414		1.10	16.45	25.84	56.61	.23	12,533
	269.78		(2.15) 4.00			00415		1.34	83.19	8.12	7.35	.09	1,577

COAL SEAM DATA SHEET

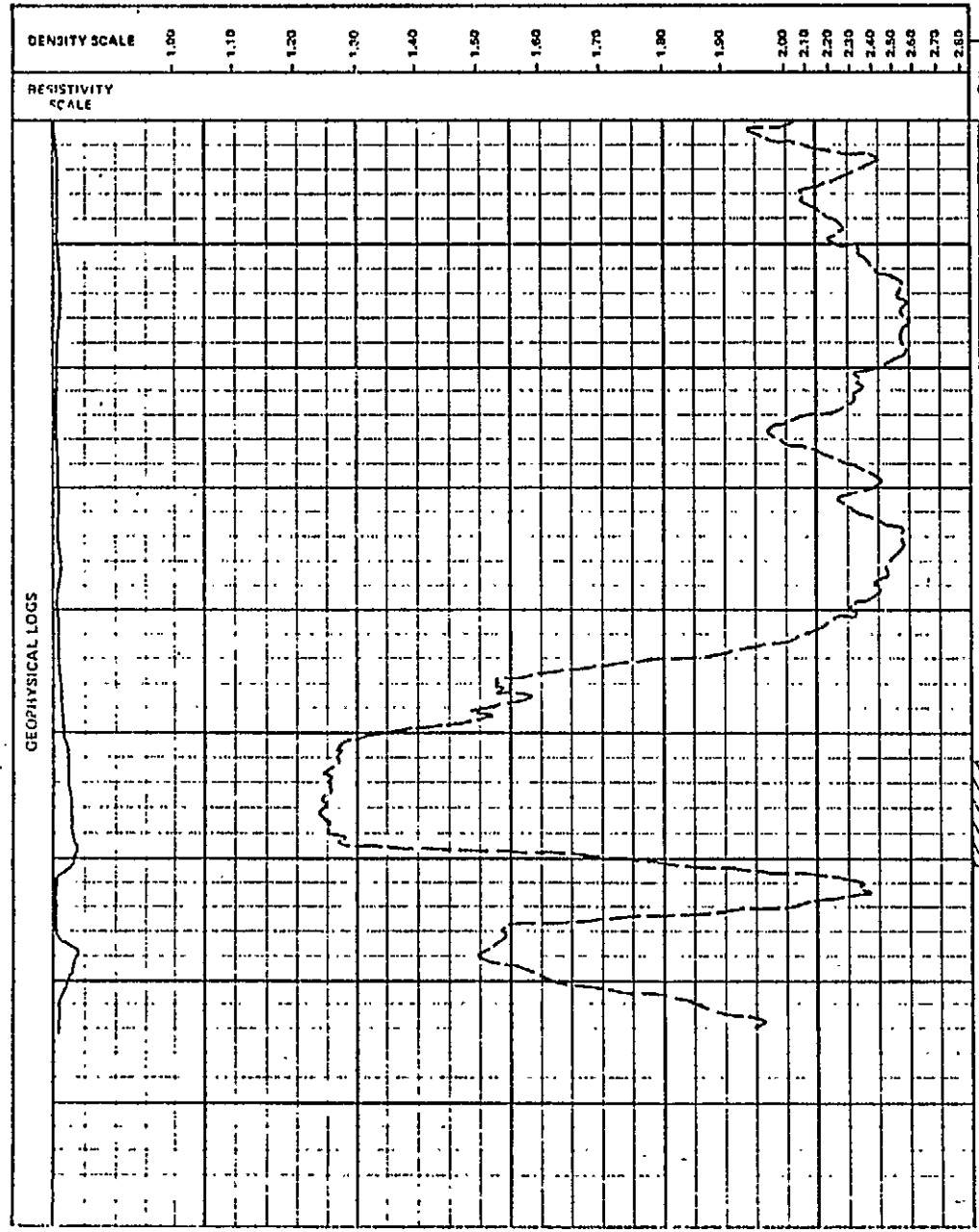
GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. DDH-80-19 SEAM _____ SEAM INTERVAL 271.01 - 278.36 m

SCALE 1:40

APPARENT THICKNESS



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU	C
	275.93			(0.30)		00416		1.37	15.13	21.87	61.63	.32	12,610	
				0.85										
	277.08		0.57 (0.94)											
						00417		1.59	77.87	8.88	11.66	.16	2,432	

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ▬▬▬ RESISTIVITY ▬▬▬

DRILL NO. GDR-DDH-80-19 SEAM _____ SEAM INTERVAL 279.35 - 288.04 m

SCALE 1:40

APPARENT THICKNESS

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	BT.	
	278.59			0.13										
				(2.03)		00418		1.19	26.36	22.20	50.25	0.40	10,703	2
	280.75		1.54 (1.06)											
						00419		0.71	94.59	3.97	0.73	0.03	218	0
	283.35		0.70 (0.65)			00420		1.00	88.49	6.39	4.12	0.06	958	0
	284.70			0.28 (1.42)		00421		1.13	29.44	20.52	48.91	0.41	10,504	1.
	286.40		2.15			00422		0.84	95.41	3.73	0.02	0.02	66	0
	288.04													

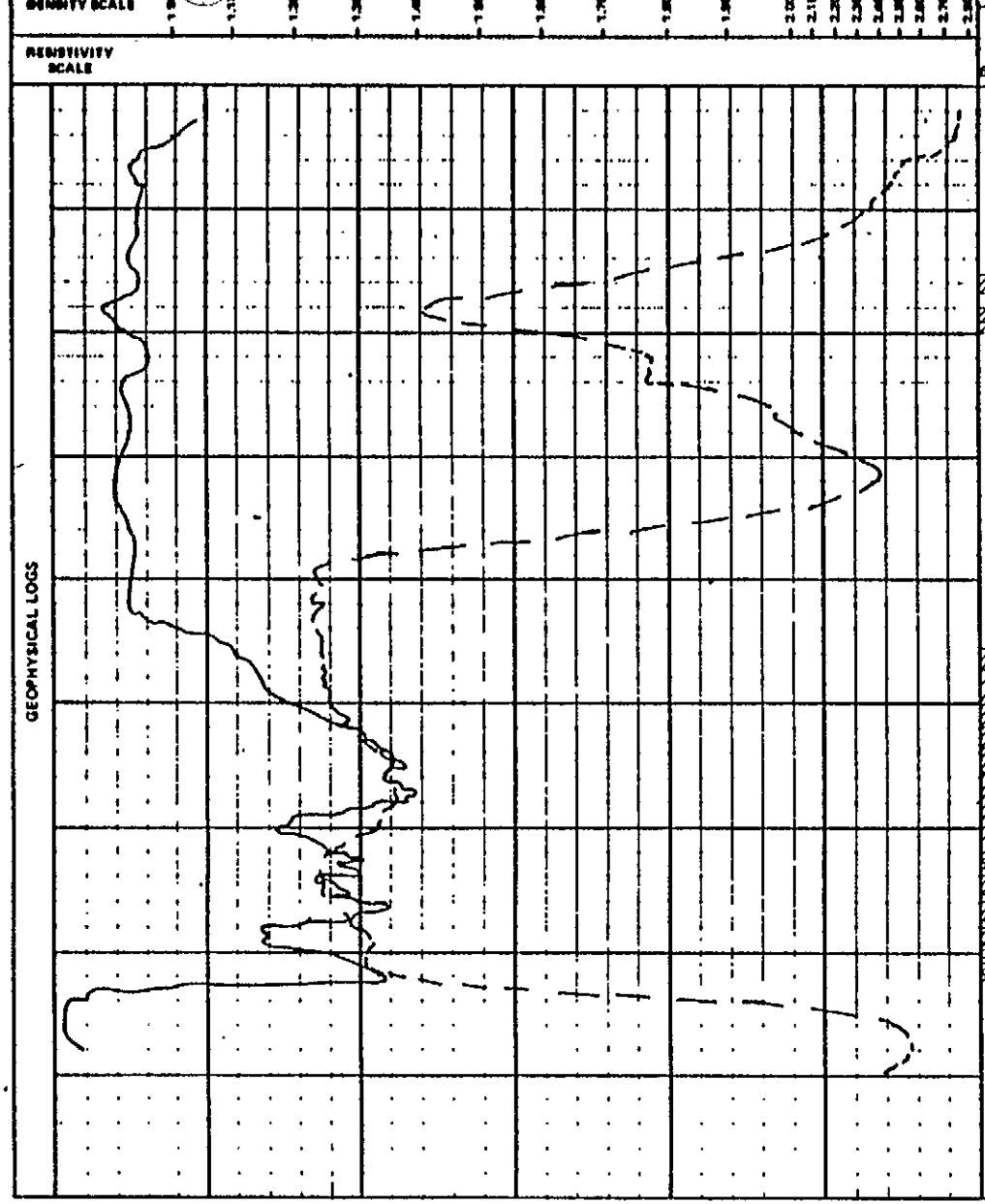
DENSITY

RESISTIVITY

ILL NO. GDR - DDH - 80 - 22 SEAM

ALE 1:40

SEAM INTERVAL = 39.33 m



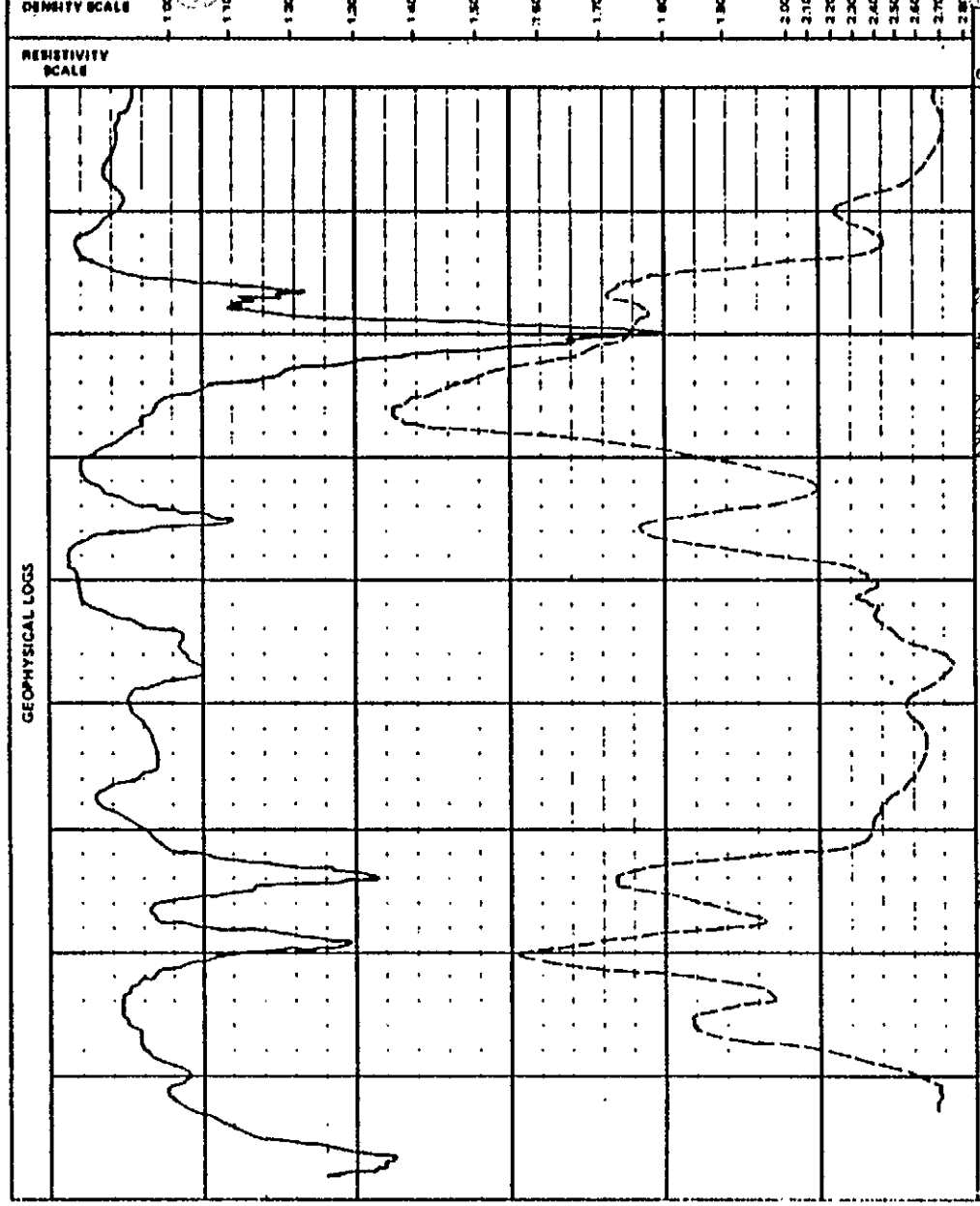
SEAM COMP. 65432	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
	33.42			(0.11) 0.16										
	33.89			(0.12) 0.20	65	00424		0.60	30.04	22.57	46.79	1.26	10,437 (24 28)	8 0
			1.61		100	00425		0 98	79.51	9.66	9.83	0.55	2,304 (5 36)	0 0
	35.60			(0 97)										
	36.57			2 24	61	00426		0 73	5.15	27.57	66.55	1.28	14,460 (33 63)	8 0
				(0.07)	95	00427		0.71	5.72	27.66	65.91	0.89	14,395 (33 48)	8 0
	39.33			0.45										

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 22 SEAM

SCALE 1:40

SEAM INTERVAL 170.74 to 170.99 m
170.99 - 170.99 m
175.25 - 175.57 m

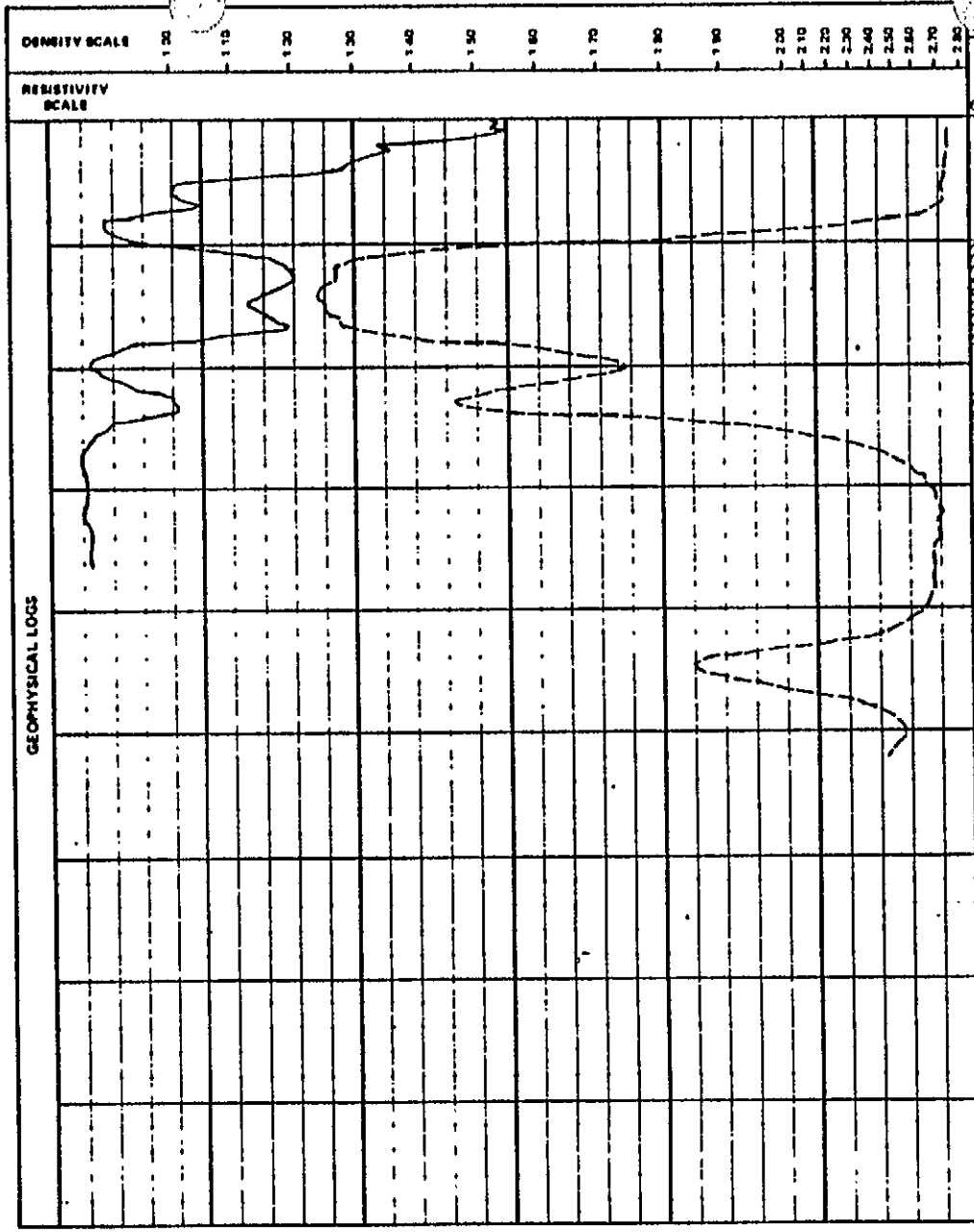


SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
	169.61			(0.12) 0.13										
			(0.20) 0.05 0.06	0.04 0.04 (0.36)	53	00430		0.49	57.10	12.52	29.89	0.25	6,067 (14.11)	1.0
			0.06 0.04	0.17 0.05 0.14										
	170.99		0.36	(0.31)										
			0.69											
			1.35											
			0.65											
	174.25			(0.13) 0.26	58	00431		0.43	41.55	15.95	42.07	0.37	8,674 (20.18)	1.0
	174.82		0.05	(0.11) (0.21) 0.21	50	00432		0.61	83.92	15.64	30.33	0.39	6,671 (15.87)	1.5
	175.24		0.20		100	00433		0.70	81.34	8.99	8.97	0.20	1,998 (4.65)	0.0
	175.44 175.57			0.13	100	00434		0.54	37.84	17.97	43.65	0.48	9,246 (21.51)	3.0

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 22 SEAM

SCALE 1:40 SEAM INTERVAL 0.270.84 9 - 305.49 m

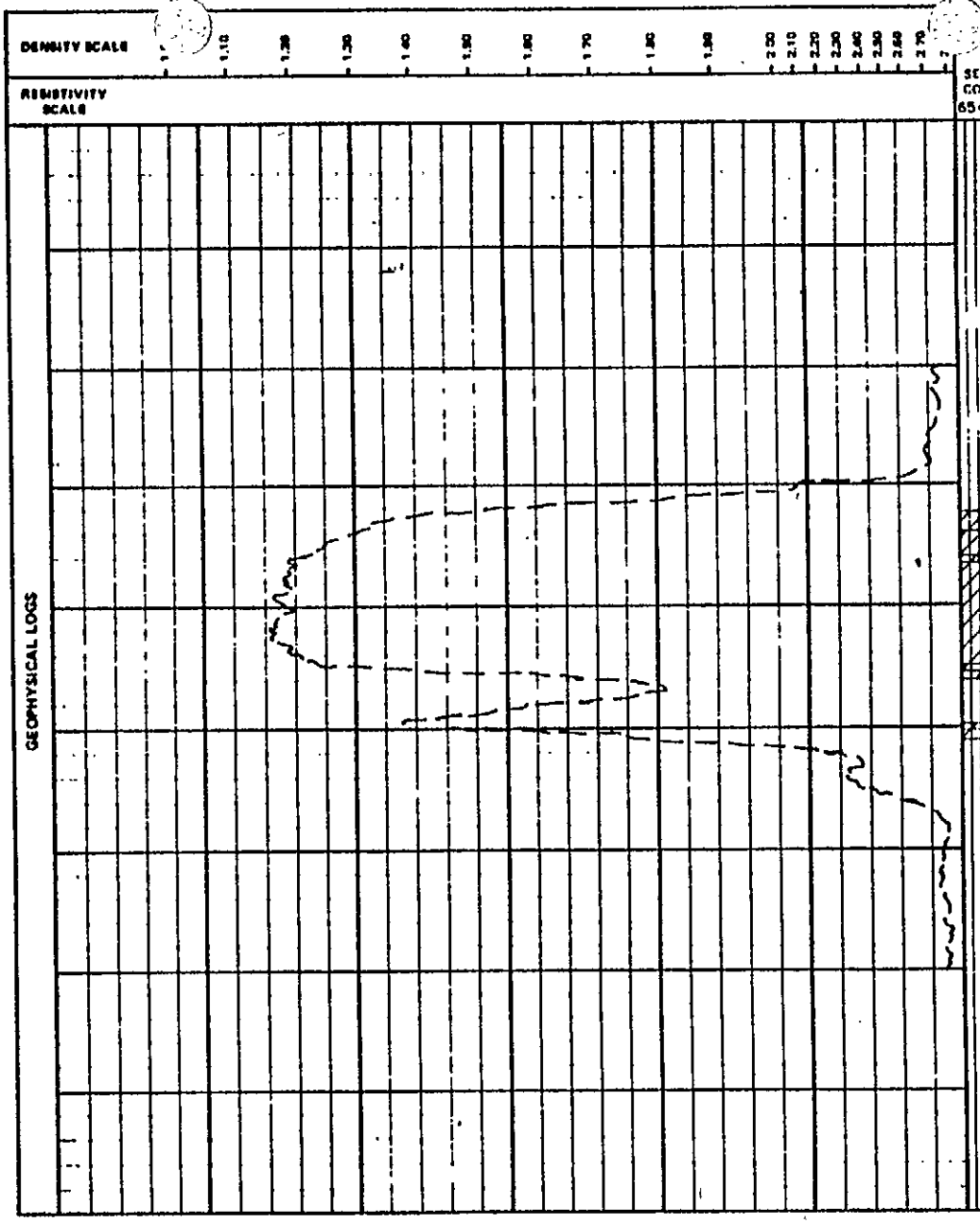


SEAM COMP 65432	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
	303.99			0.92	100	00441		0.75	6.64	25.47	67.14	0.99	14,569 (33.89)	8.5
	304.91		0.09 (0.04) 0.08											
	305.49			(0.20) 0.17	59	00442		0.69	49.96	15.62	33.53	0.58	7,235 (16.83)	2.0

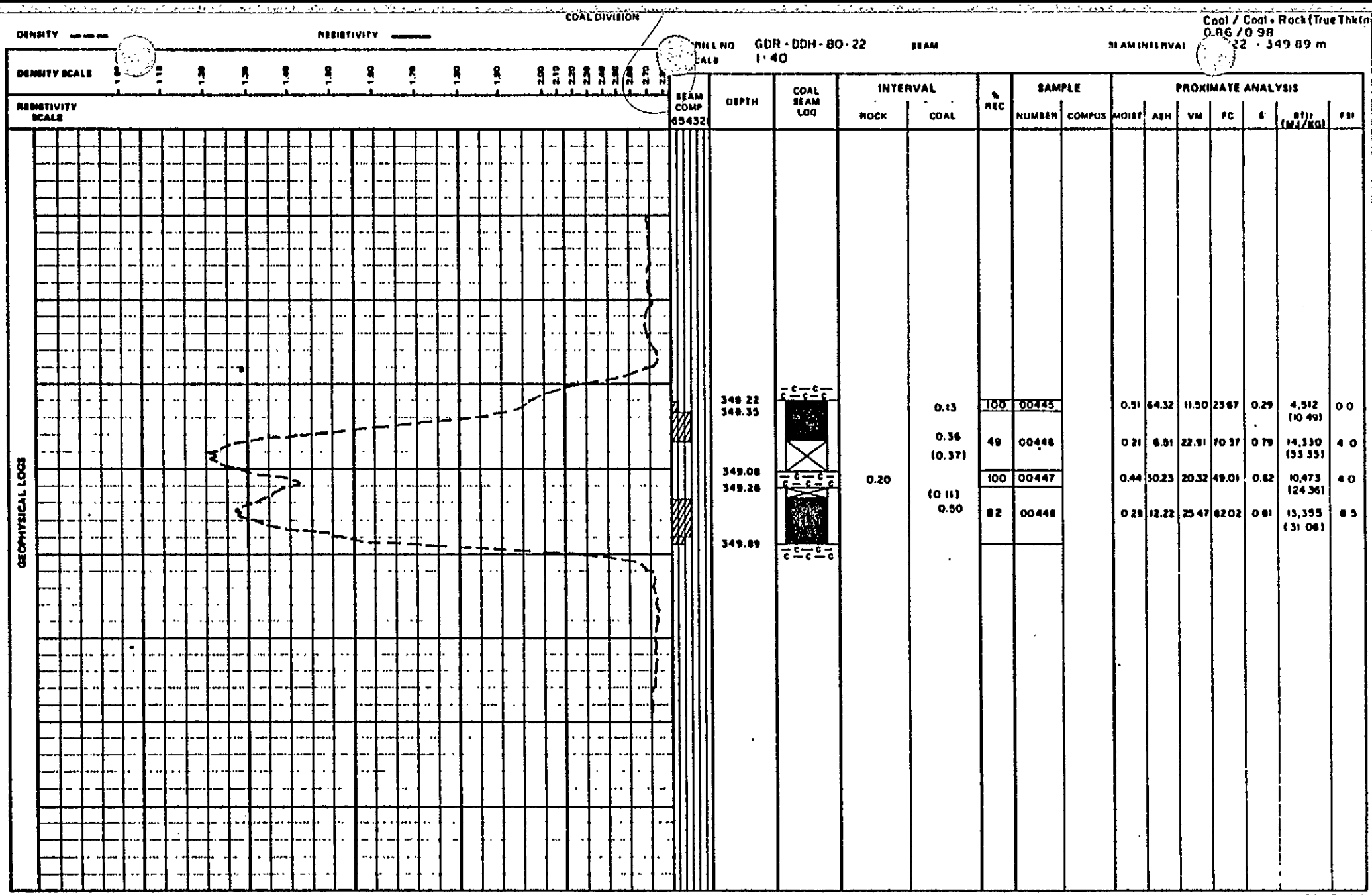
DENSITY —— RESISTIVITY ——

DRILL NO. GDR - DDH - 80 - 22 SEAM SEAM INTERVAL 318.17 - 320.10 m

SCALE 1:40



SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
	318.17			(0.05)										
				1.40	97	00443		0.65	10.15	22.54	66.66	0.92	13,724 (31.92)	5.5
	319.62		(0.03) 0.11											
				(0.22) 0.12	48	00444		0.70	50.47	16.25	32.58	0.76	7,087 (16.48)	3.0
	320.10													


DENSITY
RESISTIVITY
COAL DIVISION
DRILL NO GDR - DDH - 80 - 22
SCALE 1' 40
BEAM
SEAM INTERVAL
Coal / Coal + Rock (True Thk (m
0.86 / 0.98
22 - 349.89 m
DENSITY SCALE
RESISTIVITY SCALE
GEOPHYSICAL LOGS
SEAM COMP 654321
DEPTH
COAL SEAM LOG
INTERVAL
ROCK
COAL
% REC
SAMPLE
NUMBER
COMPOS
PROXIMATE ANALYSIS
MOIST
ASH
VM
FC
S
BTU (MJ/KG)
FSI
348.22
348.35
0.13
100
00445
0.51
64.32
11.50
23.67
0.29
4,512 (10.49)
0.0
0.36 (0.37)
49
00446
0.21
6.81
22.91
70.37
0.79
14,330 (33.35)
4.0
349.08
349.28
0.20
100
00447
0.44
30.23
20.32
49.01
0.62
10,473 (24.36)
4.0
(0.11) 0.50
82
00448
0.29
12.22
25.47
62.02
0.81
13,355 (31.08)
8.5
349.89

COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 22 SEAM

SCALE 1:40

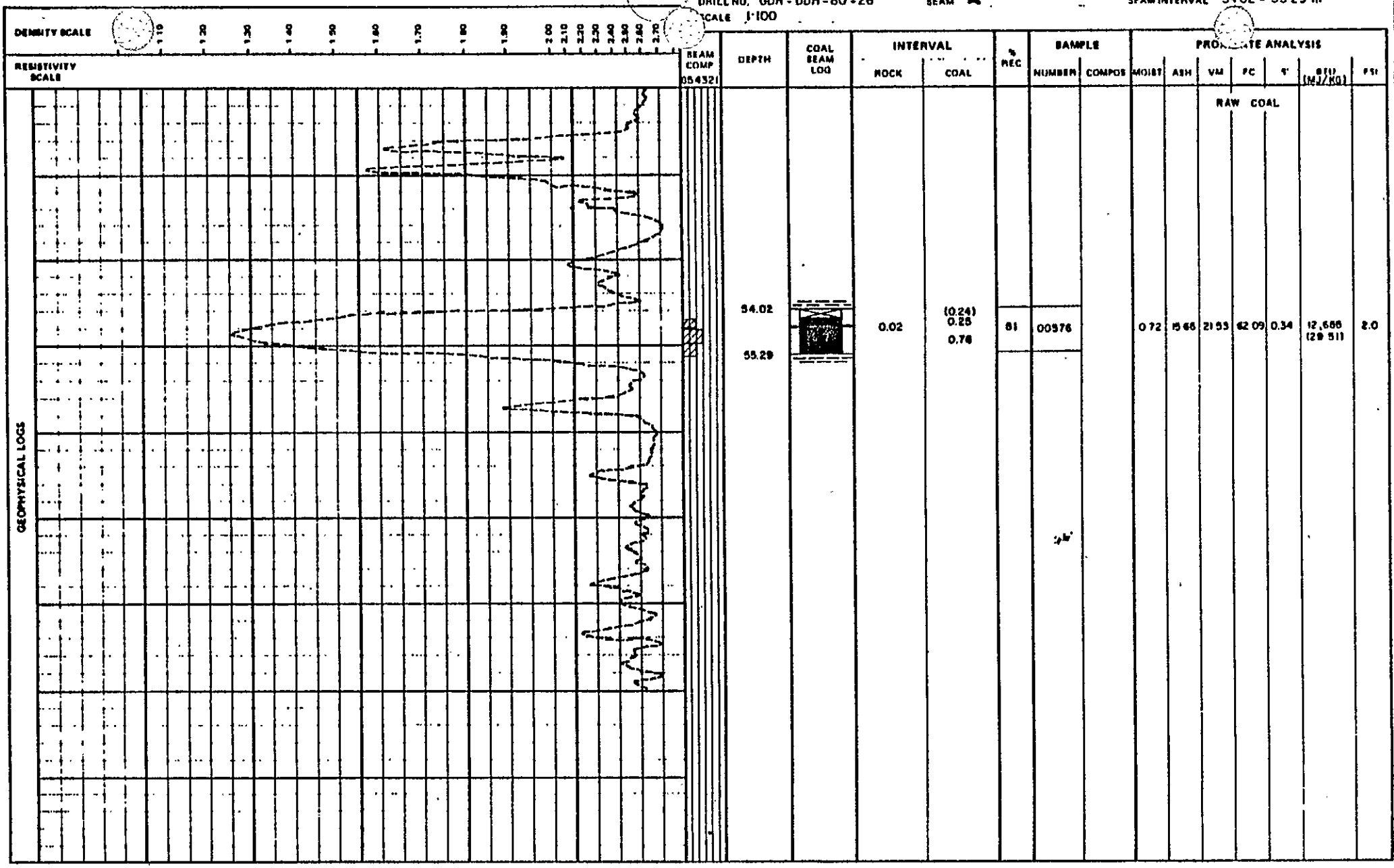
SEAM INTERVAL 069/079 105 - 359 61m

DENSITY SCALE 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.8

RESISTIVITY SCALE

GEOPHYSICAL LOGS

SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
	358.06			(0.32)										
				0.47	39	00449		0.42	17.47	18.13	63.98	0.60	12,455 (28.97)	1 0
				(0.42)										
	358.26		(0.11)		45	00450		0.85	7734	9.13	12.68	0.18	9,099 (6.77)	0
	358.46		0.09	(0.06)	60	00451		0.58	37.19	18.14	44.09	0.60	8,514 (19.80)	4.5
	359.61			0.09										

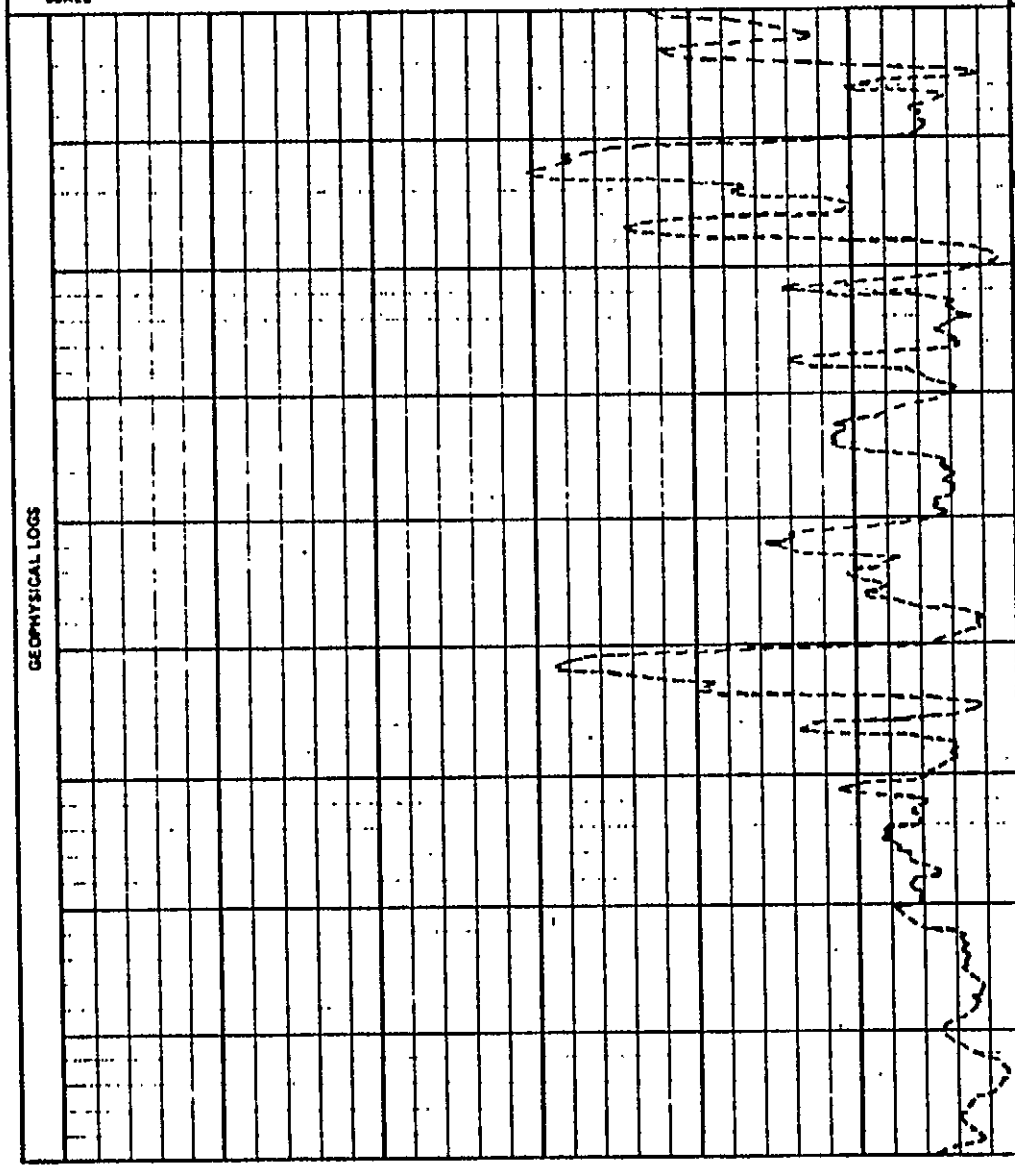

DENSITY
RESISTIVITY
DRILL NO. GDR - DDH - 80 - 26
SCALE 1:100
SEAM 2
SEAM INTERVAL 5402 - 5529 m
0.797080
DENSITY SCALE
1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70
RESISTIVITY SCALE
GEOPHYSICAL LOGS
SEAM COMP
654321
DEPTH
COAL SEAM LOG
INTERVAL
ROCK
COAL
% REC
SAMPLE
NUMBER
COMPOS
PROXIMATE ANALYSIS
MOIST
ASH
VM
FC
S
BTU (MJ/KG)
FSI
RAW COAL
54.02
55.29
0.02
(0.24)
0.25
0.76
81
00976
0 72
15 66
21 53
62 09
0.34
12,686
(29 51)
2.0

COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 26 SEAM 4 SEAM INTERVAL 0.67/0.67 152.66 - 153.49 m.

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 (MJ/KG)	FSI
65432								RAW COAL						
	152.66			(0.49)	41	00578		0.86	35.32	15.99	48.13	0.25	9,677 (22.51)	1.0
	153.49			0.94										

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

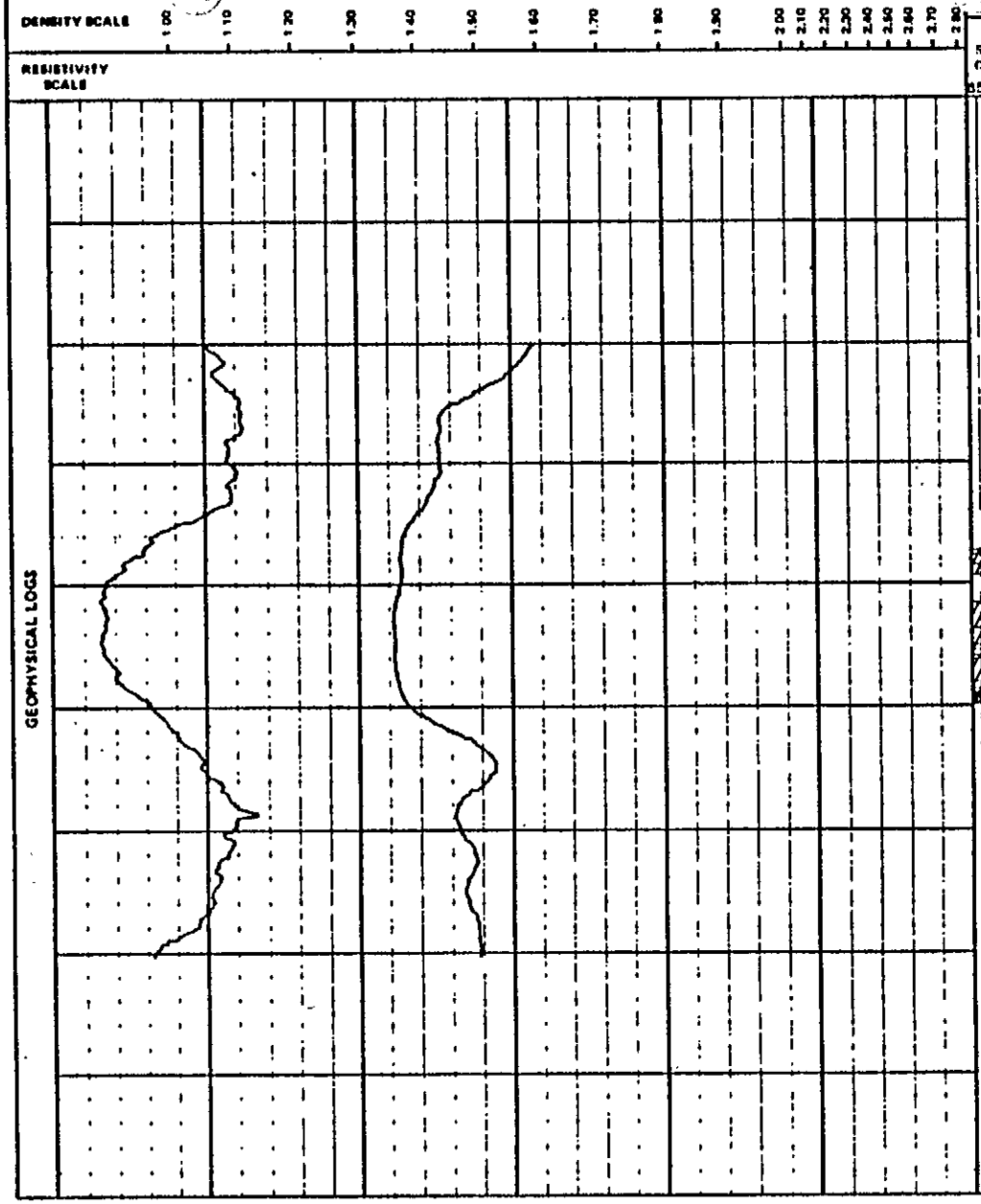
DENSITY ——— RESISTIVITY ———

DRILL NO. GDR - DDH - 80 - 27 SEAM 4

SCALE 1:100

Coal/Coal + Rock (True Thk(m))
0.98/0.98

SEAM INTERVAL [illegible] - 182.50 m



SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
								RAW COAL						
	178.70			(0.65)										
				0.48										
				(0.56)										
				0.97	62	00584		0.58	5.43	27.05	66.94	0.81	14,522 (33.78)	5.5
				(0.13)										
				0.75										
	182.22													
	182.50		0.03	0.07	100	00585		0.62	30.46	23.11	45.81	0.68	10,399 (24.19)	5.0

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

Coal / Coal + Rock (True Thk (m))
1.04 / 1.51
SEAM INTERVAL 239.29 - 240.89 m

DENSITY ——— RESISTIVITY ———

DRILL NO. GDR-DDH-80-28 SEAM 1
SCALE 1:40

DENSITY SCALE 3.10 2.90 2.70 2.50 2.30 2.10 1.90 1.70 1.50 1.30 1.10 .90 .70 .50
RESISTIVITY SCALE

GEOPHYSICAL LOGS

SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
								RAW COAL						
	239.29		0.17	0.21 (0.12)	78	00514		0.90	45.87	19.92	33.31	2.33	7,768 (18.07)	5.5
	239.79		0.20		100	00515		0.87	68.40	13.61	17.12	0.35	4,123 (9.59)	1.0
	239.99			0.13	100	00516		0.88	12.17	27.53	59.42	0.70	(5.15)	9.0
	240.12		0.13		100	00517		0.93	71.17	13.19	14.71	0.23	(3.42)	0.0
	240.25			0.64	100	00518		0.90	6.18	29.20	63.72	0.75	14,140 (32.89)	9.0
	240.89													

COAL SEAM DATA SHEET

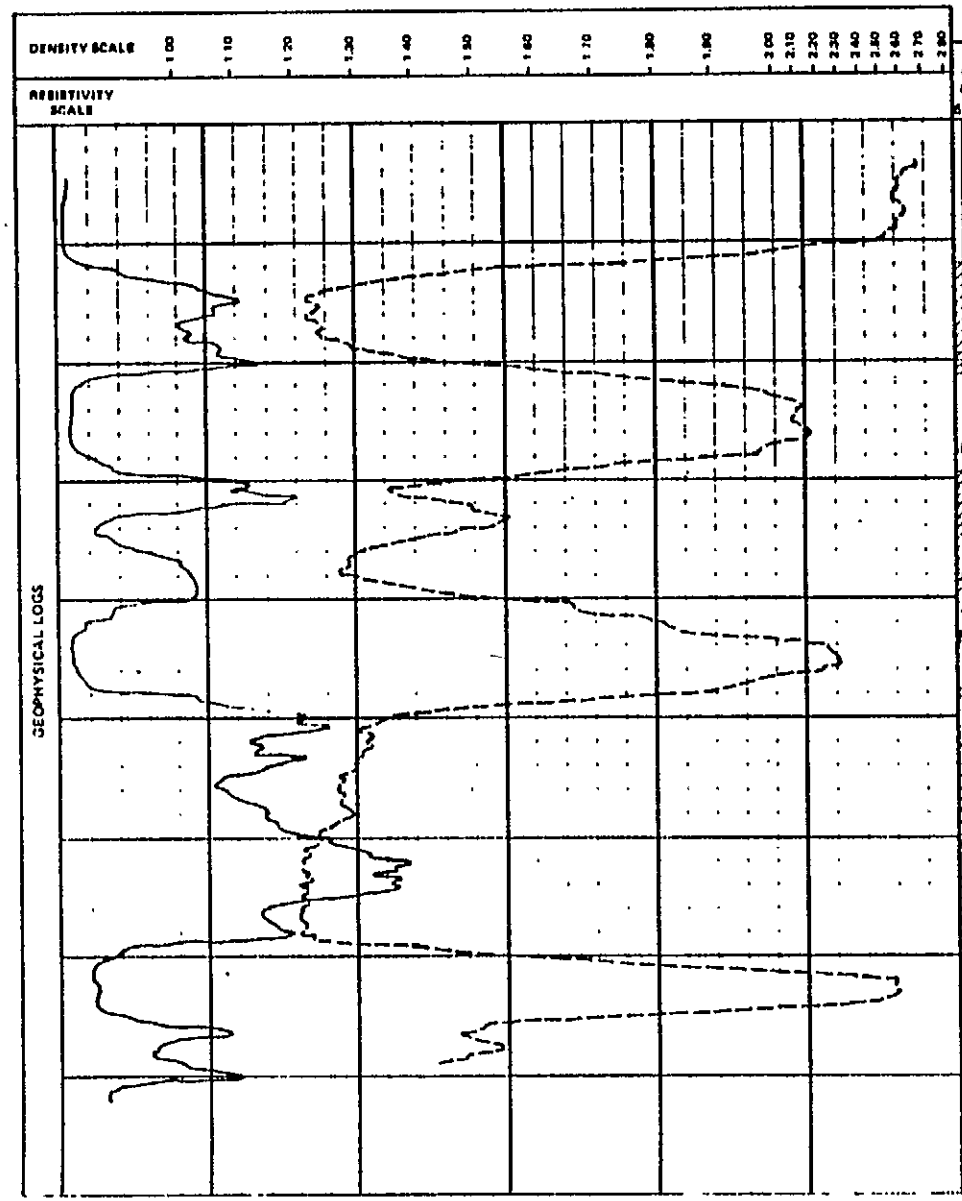
GULF CANADA RESOURCES INC
COAL DIVISION

Coal / Cool & Rock (True Thk (m))
5 29 / 7 40

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 28 SEAM 1 SEAM INTERVAL 248 20 - 256.34 m

SCALE 1 40



SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	P2O5
								RAW COAL						
	248 20													
				0 93	100	00519		0 84	9 80	23 69	65 87	0 35	13,540 (31 49)	1 9
	249 13													
			0 70		100	00520		0 99	7 165	10 98	18 40	0 09	2,925 (6 80)	0 0
				0 08										
	249 89			(0 05)										
				0 28	85	00521		0 84	13 87	22 98	62 53	0 28	12,770 (29 70)	1 8
	250 22				100	00522		0 82	3725	17 03	45 10	0 18	9,118 (21 21)	1 0
	250 35													
				0 79	100	00523		0 85	14 37	23 50	61 30	0 28	12,753 (29 66)	1 8
	251 14													
			0 61	0 10	100	00524		0 90	68 74	18 82	15 74	0 12	3,085 (7 13)	0 0
	251 85			(0 25)										
				0 61										
				(0 16)	87	00525		0 98	8 94	27 63	62 47	0 27	13,828 (32 16)	6 0
				0 97										
	256 04													

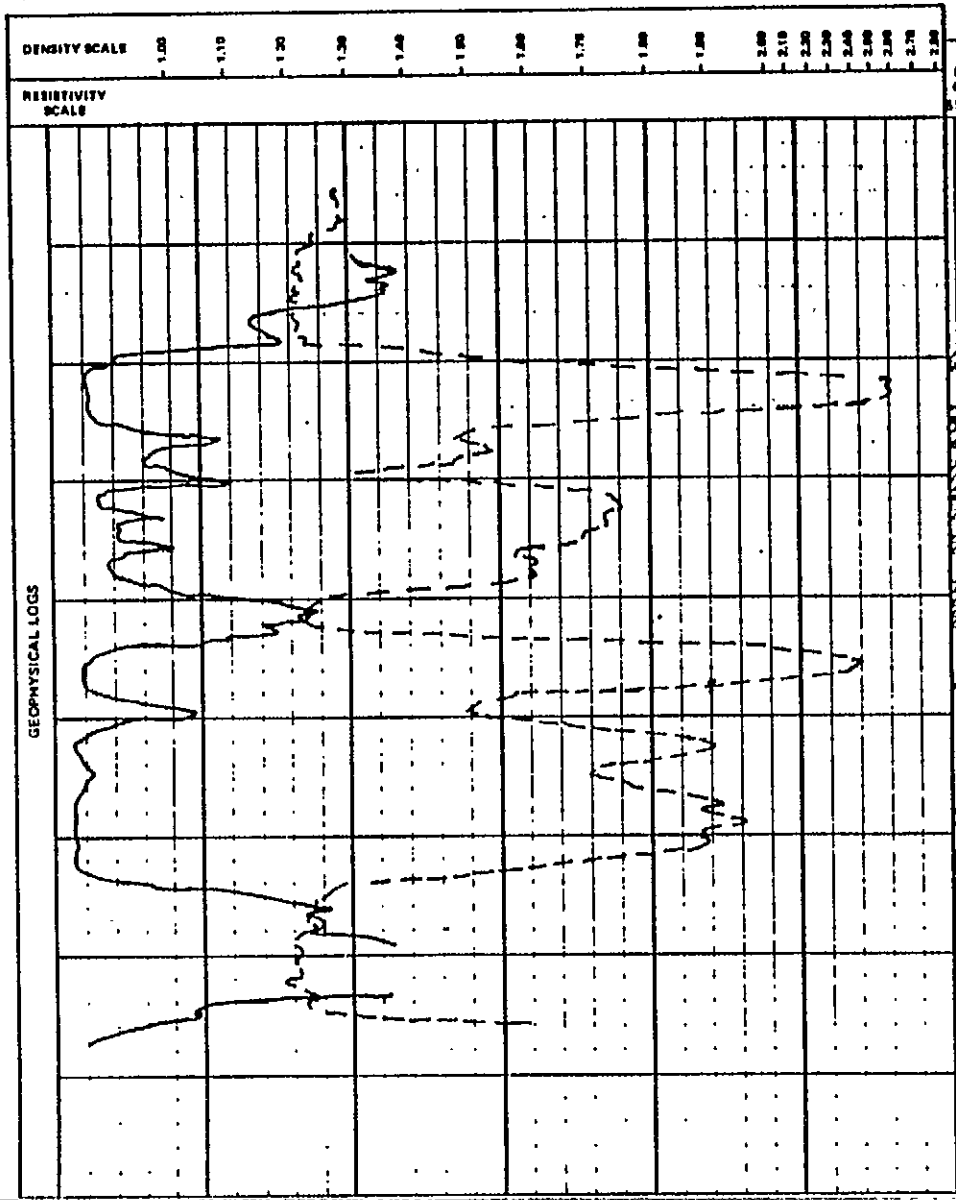
COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO GDR-DDH-80-28 SEAM 1 SEAM INTERVAL 248.20 - 256.34m

SCALE 1:40



SEAM COMP. 54321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU/lb (MJ/kg)	FSI
											RAW COAL			
	254.04		0.41	0.05	100	00526		0.70	61.29	22.96	15.15	0.09	5,816 (9.10)	0.0
	254.50		0.17	0.45	100	00527		0.88	22.74	23.66	52.52	0.25	11,833 (27.08)	8.0
	255.12		0.42	0.29 (0.05)	93	00528		0.58	53.81	21.64	23.97	0.16	6,198 (14.42)	4.0
	255.86			0.38 (0.08)	83	00529		0.85	9.77	33.75	56.65	0.35	13,831 (32.17)	8.5
	256.34			0.09 (0.43)										
			1.30		78	00530		0.92	87.63	15.54	15.11	0.12	3,893 (9.05)	0.5
	258.18													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC
COAL DIVISION

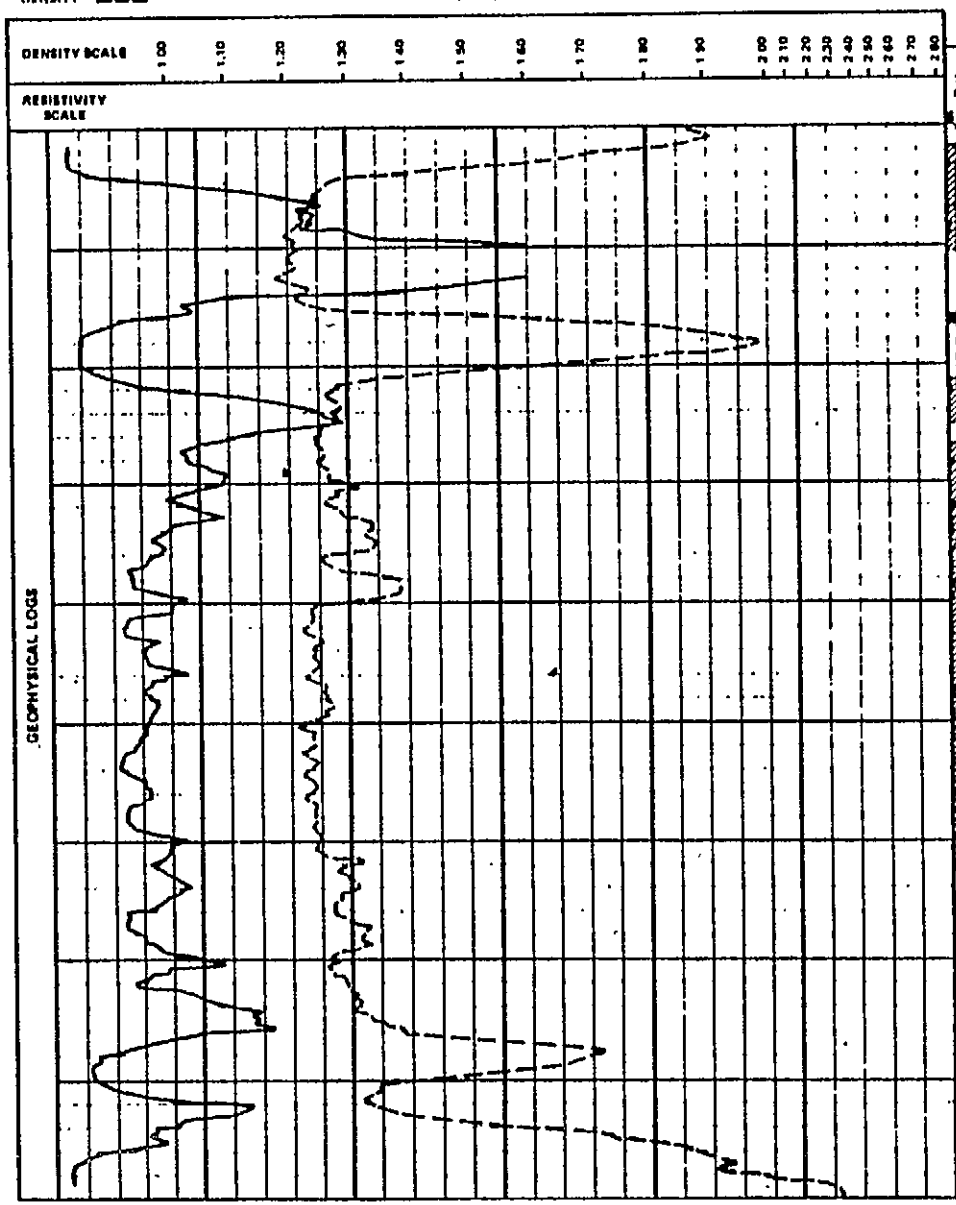
Coal/Coal + Rock (True Thk (m))
515/548

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 28 SEAM I

SCALE 1 : 40

SEAM INTERVAL 258 16 - 266 52m



SEAM COMP	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
								RAW COAL						
	258 16			0 89	85	00851		0 92	12 81	28 20	58 07	0 25	13,281 (30 84)	4 5
				(0 03)										
	258 68			0 06										
	258 99		0 33	(0 13)	100	00852		0 68	67 92	15 46	15 94	0 06	3,158 (7 35)	0 0
				0 36										
				(0 17)										
				1 30	86	00853		0 78	7 87	25 49	66 06	0 21	13,800 (32 10)	1 5
	261 97													
				2 24										
					89	00854		1 12	6 48	28 65	67 80	0 25	14,518 (33 30)	3 0
				(0 23)										
				1 08										
	266 72			(0 20)										
	266 92													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC
COAL DIVISION

Coal / Coal + Rock (True Thickness)
2.24/2.52

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 28 SEAM 1
SCALE 1 : 40

SEAM INTERVAL 268.27 - 273.29

DENSITY SCALE 2.8 2.6 2.4 2.2 2.0 1.8 1.6 1.4 1.2 1.0 0.8 0.6 0.4 0.2 0.0

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 (MJ/KG)	PSI
								RAW COAL						
	268.27		(0.09)											
			1.66		95	00835		1.11	7.41	41.18	49.97	0.10	9,460 (7.35)	0.0
	268.27			(0.38)										
				0.25	39	00836		0.93	12.18	23.64	63.25	0.27	12,902 (10.01)	1.8
	268.90		0.26		72	00837		0.48	3.80	38.20	57.33	0.13	10,340 (7.03)	0.8
	269.26		(0.10)	(0.15)										
				0.52										
				(0.09)										
				0.26										
				(0.72)	53			1.16	5.58	29.25	64.01	0.31	14,279 (13.21)	7.0
			0.02	0.26		00838								
				0.65										
				(0.65)										
	272.48													
	272.68													
	273.29													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC
COAL DIVISION

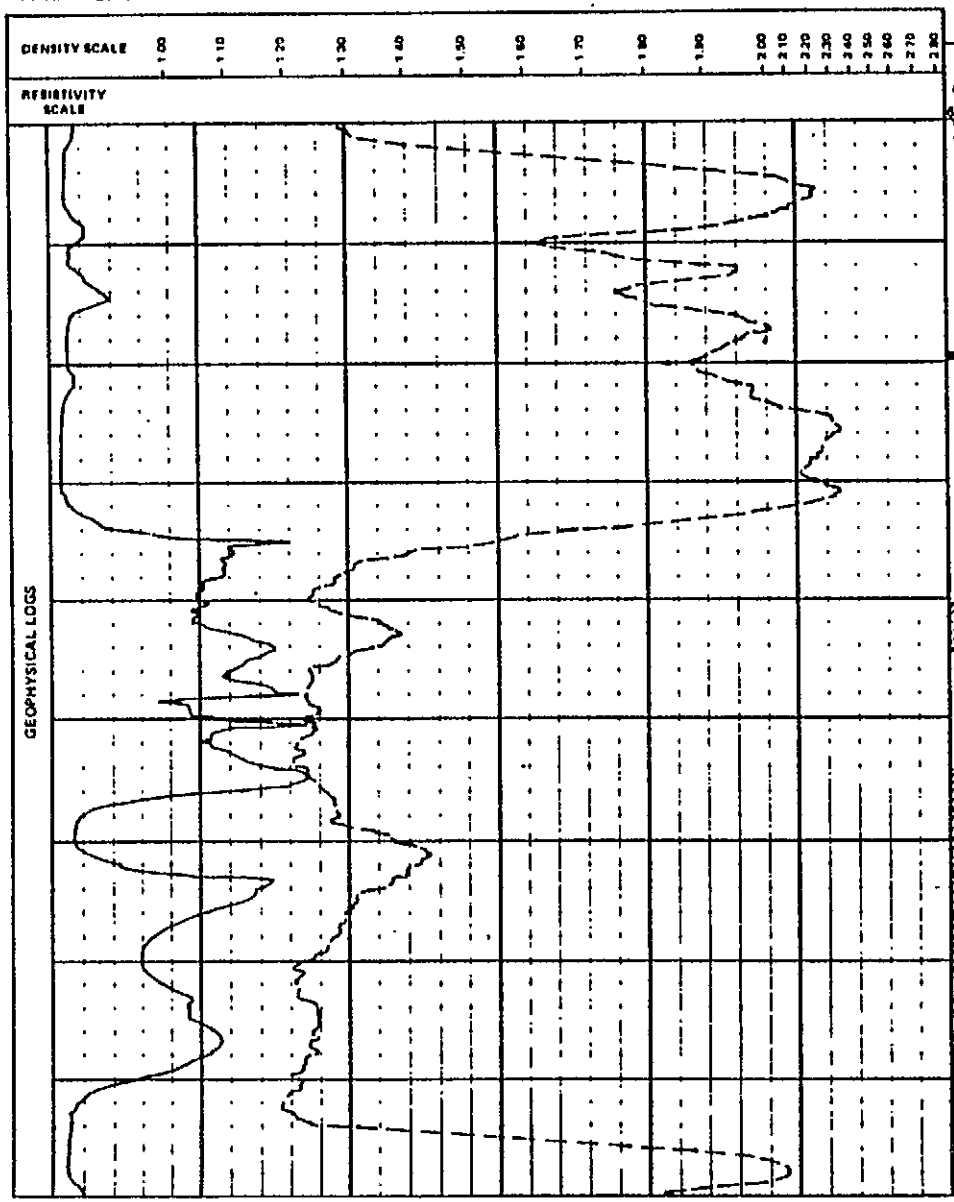
Coal/Coal + Rock (True Thkns)
6.57 / 7.38

DENSITY —— RESISTIVITY ——

DRILL NO GDR - DDH - 80 - 28 SEAM I

SCALE 1 : 40

BEAM INTERVAL 276.39 - 286.46m



BEAM COMP 66432	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	REC %	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (adb)	FSI
								RAW COAL						
	27329		0.66											
				(017)										
			0.25											
				(016)	88	26								
			0.40					1.37	7.749	10.42	10.72	0.08	2,646 (5.97)	0.0
				0.03										
						00539								
			1.11											
	27839													
				(064)										
				0.24	50	27 00540		1.25	17.34	25.34	56.07	0.26	11,727 (27.28)	1.5
	27930		0.05											
				0.16										
				(097)	48	28 00541		1.17	6.38	27.68	64.79	0.30	14,148 (32.91)	6.0
				0.65										
	28001		0.08		100	29 00542		1.07	22.78	28.00	48.15	0.26	11,247 (26.16)	8.0
	28022			0.06										
				0.39										
			0.02											
				0.70	60	30 00543		1.21	13.08	25.13	60.58	0.28	13,036 (30.32)	4.0
				(118)										
	28184													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC
COAL DIVISION

Coal/Coal + Rock (True THk(m))
6 57 / 7 38

DENSITY ——— RESISTIVITY - - - -

DRILL NO GDR – DD11 – 80 – 28 SEAM 1 SEAM INTERVAL 276 39 – 286 46 m

SCALE 1:40

DENSITY SCALE 2 1.9 1.8 1.7 1.6 1.5 1.4 1.3 1.2 1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0

RESISTIVITY SCALE

GEOPHYSICAL LOGS

SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
								RAW COAL						
	281 51		0 58		100	00544		1 25	7 7 70	10 50	10 75	0 08	2,854 (6 63)	0 0
	282 09			0 42										
				(0 18)	70	00545		1 16	12 53	24 31	62 00	0 27	13,056 (30 37)	1 5
	282 69			0 11	100	00546		0 52	19 26	34 09	46 13	0 20	10,310 (23 98)	4 5
	282 80			0 29										
				(0 87)	38	00547		0 78	5 99	27 03	66 20	0 29	14,208 (33 05)	4 5
			0 02	0 11										
	284 21			0 12										
	284 49		0 28		100	00548		0 66	66 42	15 06	18 86	0 16	4,699 (10 93)	1 0
	284 75			0 26	100	00549		0 75	9 87	28 40	61 28	0 31	14,044 (32 7)	7 5
	284 85		(0 10)	(0 10)										
				0 40	80	00550		0 58	9 00	30 32	60 12	0 21	13,382 (31 13)	8 0
	285 35													
				1 11	100	00551		0 79	5 38	28 81	65 04	0 32	14,822 (33 51)	7 0
	286 46													

COAL SEAM DATA SHEET

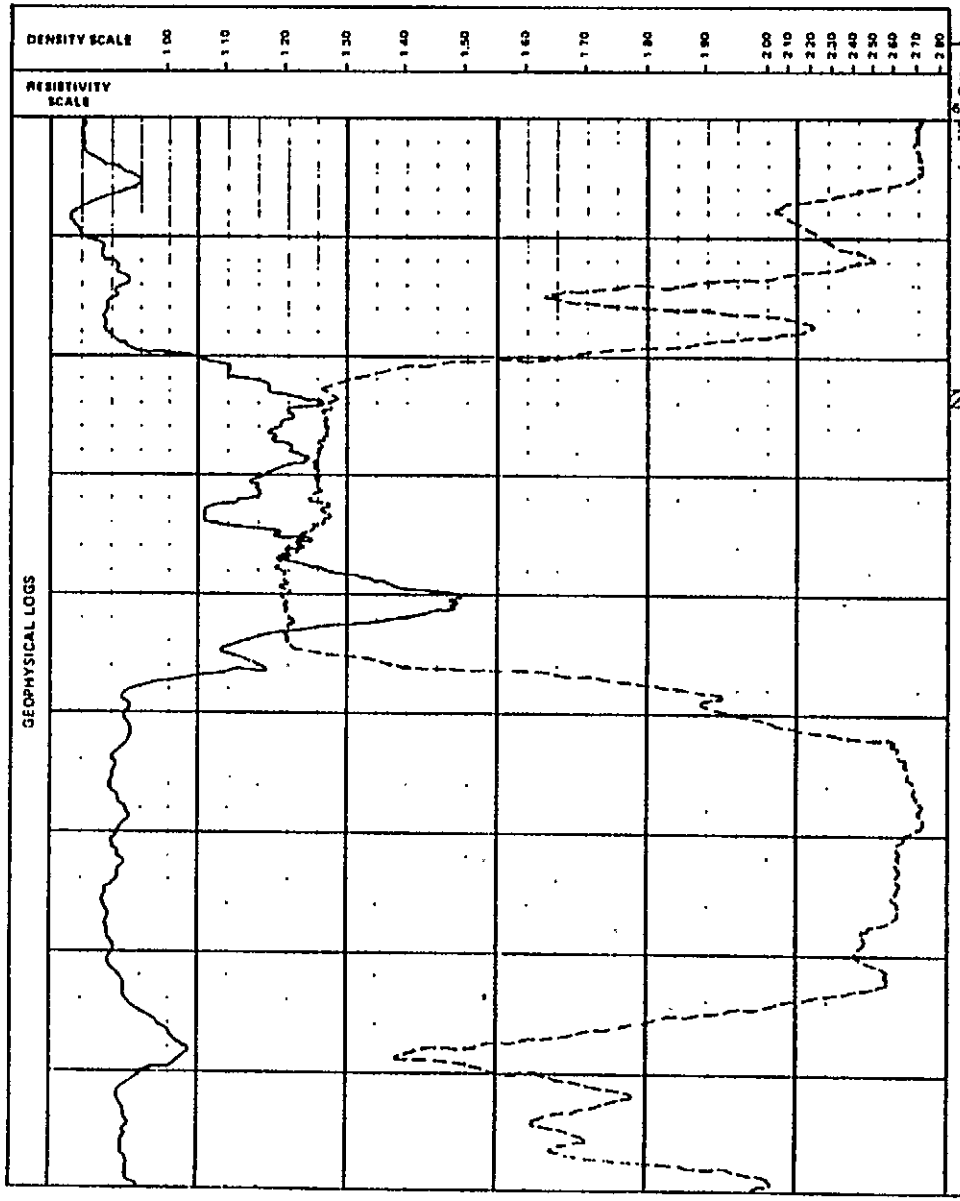
GULF CANADA RESOURCES INC
COAL DIVISION

DENSITY ---- RESISTIVITY ——

DRILL NO GDR-DDH-80-29 SEAM 1
SCALE 1:40

SEAM INTERVAL 82.97 - 85.78 m

Coal/Coal+Rock(True Thk(m))
1.65/1.65



SEAM COMP 65432	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	REC.	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/KG)	FSI
								RAW COAL						
	82.97			(0.38)										
				0.15										
					05	00505		0.42	15.39	32.58	51.61	0.37	12,755 (29.66)	9.0
				(2.28)										
	85.78													
			1.25		100	00506		0.37	9.21	8.36	1.09	0.15	441 (1.03)	0.0
	87.03		(0.04)											
			0.90		96	00507		0.29	83.82	13.19	2.70	0.08	394 (0.92)	0.0
	87.97													

COAL SEAM DATA SHEET

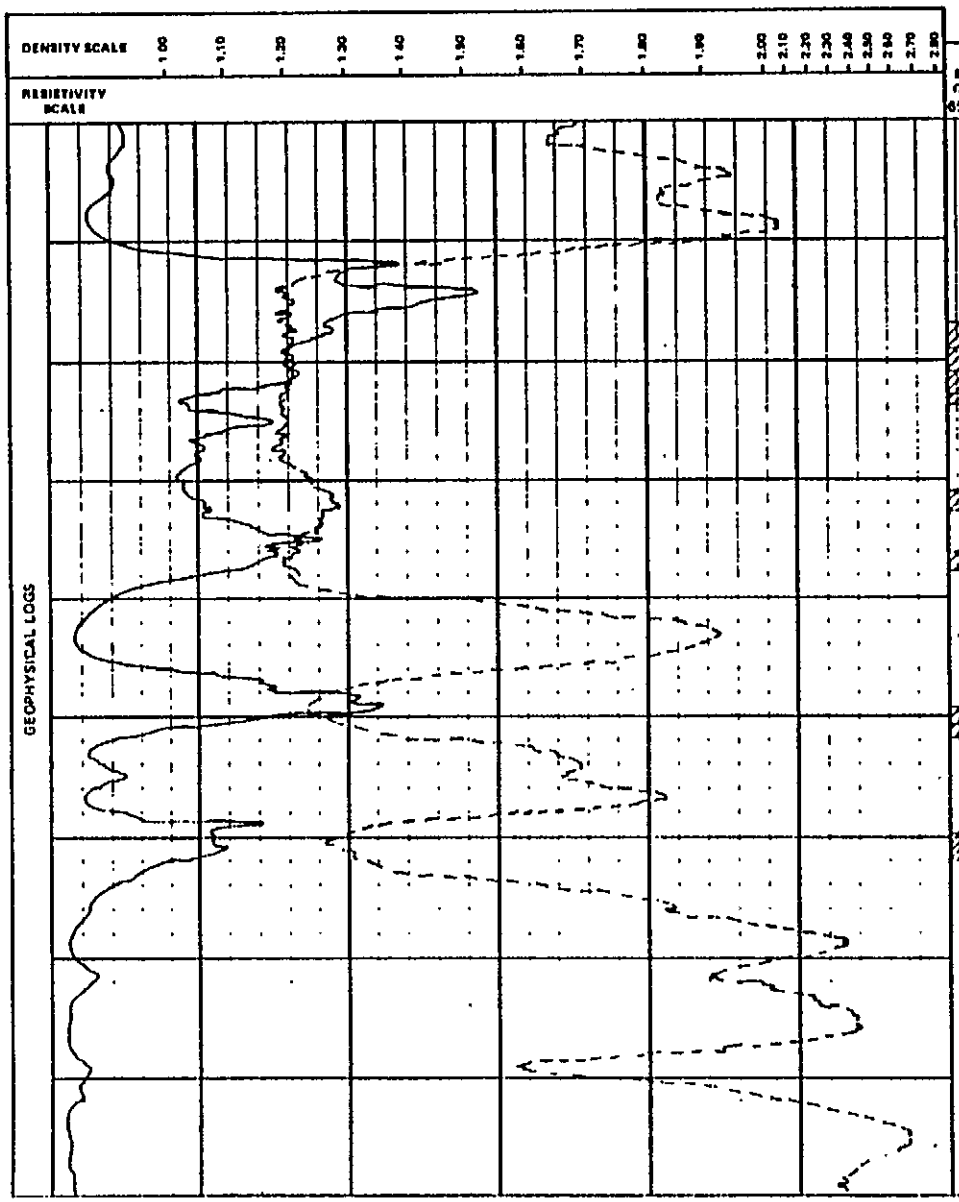
GULF CANADA RESOURCES INC
COAL DIVISION

Coal/Coal + Rock (True Thickness)
1.63/1.63

DENSITY ——— RESISTIVITY ———

DRILL NO GDR - DDH - 80 - 29 SEAM 1 SEAM INTERVAL 93.13 - 96.00 m

SCALE 1: 40



SEAM COMP 654321	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU (MJ/Kg)	FSI
								RAW COAL						
	93.13			(0.58)										
				0.67										
				(0.17)	38	00509		0.65	8.04	35.44	55.87	0.25	14,148 (32.94)	9.0
				0.18										
				(0.36)										
				0.15										
				(0.21)										
	96.00		0.29											
			(0.43)		40	00510		0.60	74.87	13.10	11.73	0.09	2,598 (6.04)	0.0
	96.72			0.23										
				(0.24)	49	00511		0.61	5.40	24.63	69.36	0.25	14,377 (33.46)	1.5
			0.36											
			(0.32)		53	00512		0.78	68.31	12.99	20.92	0.10	4,627 (10.76)	0.5
				0.26										
				(0.36)	40	00513		0.81	12.11	29.90	57.18	0.29	13,372 (31.10)	6.5
	96.90													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

Coal/Coal + Rock (Plus Thin Rock) (m)
0.74/0.74

DENSITY ——— RESISTIVITY ———

DRILL NO GDR-DDH-80-43 SEAM

SCALE 1:40

SEAM INTERVAL 138.31 - 139.54 m

DENSITY SCALE 1.80 1.85 1.90 1.95 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50 2.55 2.60 2.65 2.70 2.75 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	PSI
	138.31			(1.23)		NO SAMPLE								
	139.54													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO. GDR-DDH-80-43 SEAM SEAM INTERVAL 155.61-157.94 m

SCALE 1:40

DENSITY SCALE 1.10 1.15 1.20 1.25 1.30 1.35 1.40 1.45 1.50 1.55 2.00 2.05 2.10 2.15 2.20 2.25 2.30 2.35 2.40 2.45 2.50

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	FSI
	155.61		(1.31)	(1.22)		NO SAMPLE								
	157.94													

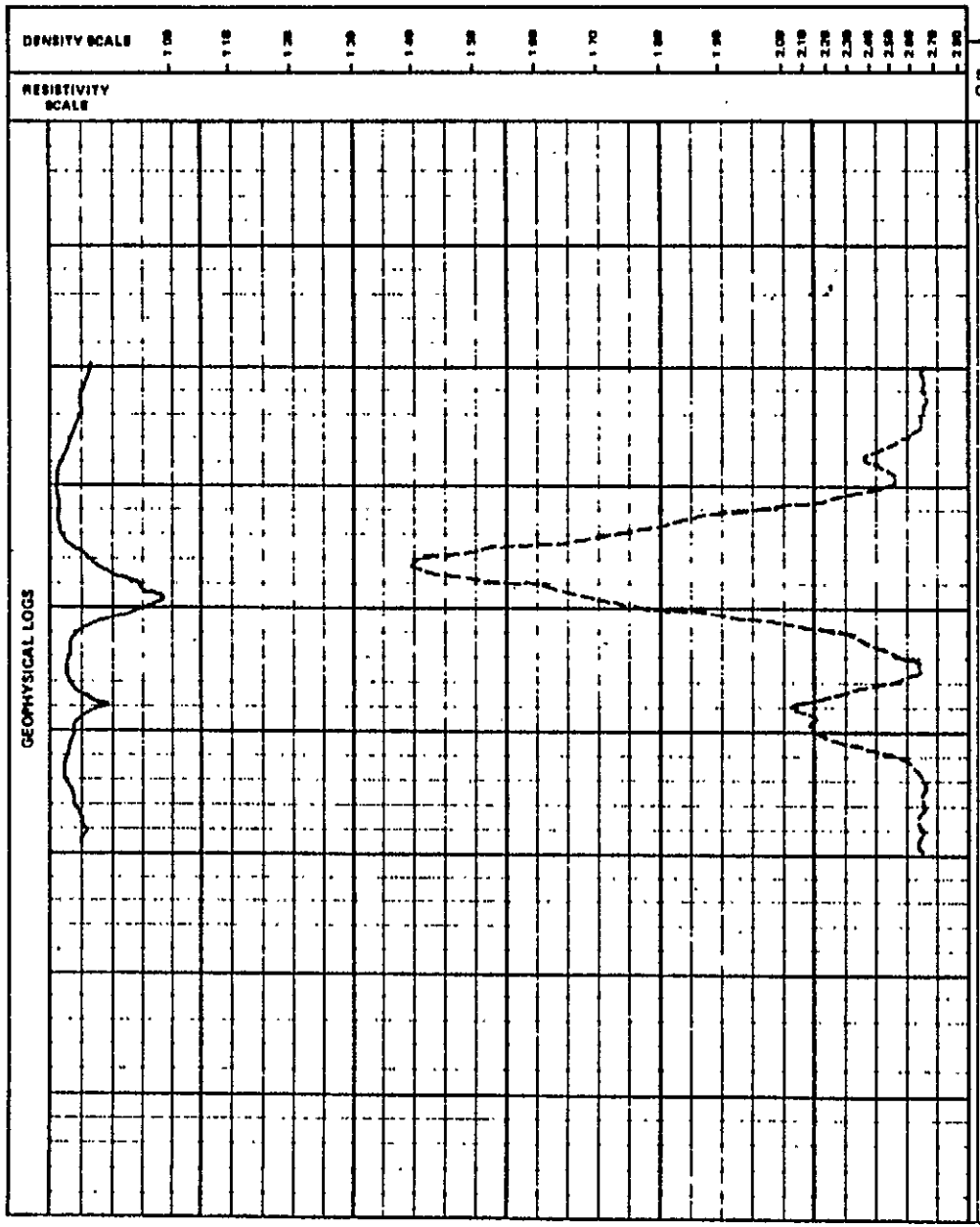
COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

DENSITY ——— RESISTIVITY ———

DRILL NO GDR-DDH-80-43 SEAM SEAM INTERVAL 198.26 - 200.10 m.

SCALE 1:40



SEAM COMP	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC	SAMPLE NUMBER	SAMPLE COMPOS	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU	PSI
	198.26			(1.84)		NO SAMPLE.								
	200.10													

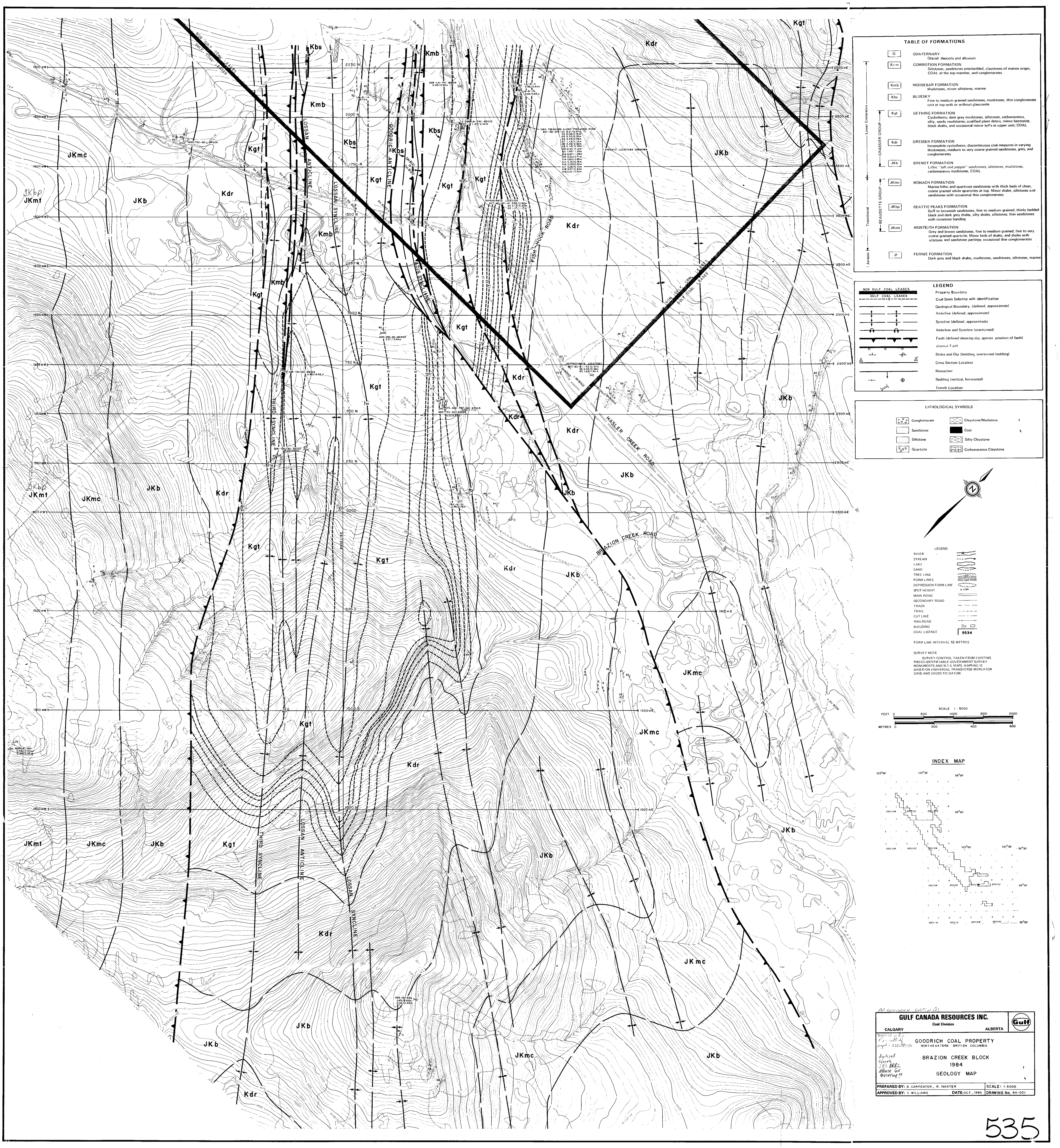
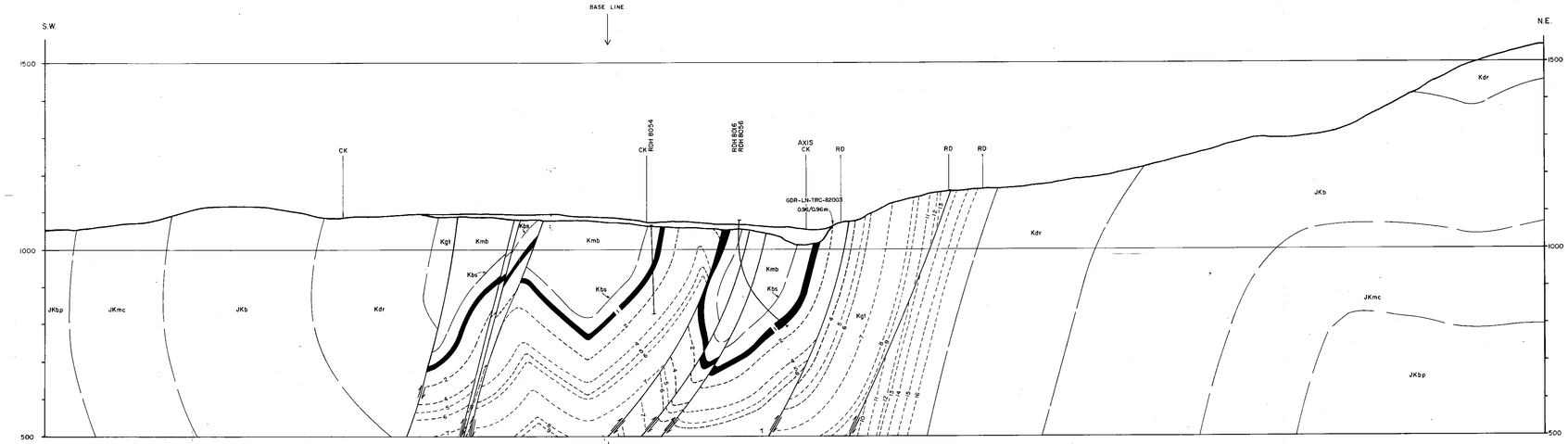


TABLE OF FORMATIONS
Q QUATERNARY
Glacial deposits and alluvium
Kcm COMMOTION FORMATION
Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
Kmb MOOSEBAR FORMATION
Mudstones, minor siltstones, marine
Kbs BLUESKY
Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
Kgt GETHING FORMATION
Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
Kdr DRESSER FORMATION
Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
JKb BRENOT FORMATION
Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
JKmc MONACH FORMATION
Marine lithic and quartzose sandstones with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
JKbp BEATTIE PEAKS FORMATION
Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
JKmt MONTEITH FORMATION
Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings; occasional thin conglomerates
Jf FERNIE FORMATION
Dark grey and black shales, mudstones, sandstones, siltstones, marine
Lower Cretaceous
Transitional
Jurassic
CRASSIER GROUP
BEAUDETTE GROUP
LEGEND
NON GULF COAL LEASES
GULF COAL LEASES
Property Boundary
Coal Seam Subcrop with identification
Geological Boundary, (defined, approximate)
Anticline (defined, approximate)
Syncline (defined, approximate)
Anticline and Syncline (overturned)
Fault (defined showing dip, approx. position of fault)
Normal Fault
Strike and Dip (bedding, overturned bedding)
Cross Section Location
Monocline
Bedding (vertical, horizontal)
Trench Location
LITHOLOGICAL SYMBOLS
Conglomerate
Claystone/Mudstone
Sandstone
Coal
Siltstone
Silty Claystone
Quartzite
Carbonaceous Claystone
LEGEND
RIVER
STREAM
LAKE
SAND
TREE LINE
FORM LINES
DEPRESSION FORM LINE
SPOT HEIGHT
MAIN ROAD
SECONDARY ROAD
TRACK
TRAIL
CUT LINE
RAILROAD
BUILDING
COAL LICENCE
5534
FORM LINE INTERVAL 10 METRES
SURVEY NOTE
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.
SCALE 1 : 5000
FEET 0 500 1000 1500 2000
METRES 0 200 400 600
INDEX MAP
123°00'
122°30'
56°00'
55°45'
122°00'
121°30'
55°30'
55°15'
55°00'
LOSSAN ANTICLINE
LOSSAN SYNCLINE
GOODRICH ANTICLINE
ARIS SYNCLINE
THIRD SYNCLINE
FISH HOOK ROAD
HASLER CREEK ROAD
BRAZION CREEK ROAD
BASELINE
1980 TRENCHES ALONG "FISH HOOK ROAD"
SPECIFIC LOCATIONS UNKNOWN
APPROXIMATE LOCATION
PR-GOODRICH 84(1*)A(2)
GULF CANADA RESOURCES INC.
Coal Division
CALGARY
ALBERTA
Gulf
GOODRICH COAL PROPERTY
NORTHEASTERN BRITISH COLUMBIA
BRAZION CREEK BLOCK
1984
GEOLOGY MAP
PREPARED BY: B. CARPENTER, R. INKSTER
SCALE: 1:5000
APPROVED BY: C. WILLIAMS
DATE: OCT., 1984
DRAWING No. 84-001
535

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	8.58	
		40
2	0.79/0.80	
		47
3	0.87/0.87	
		8
4	0.67/0.67	
		19
5	3.31/3.49	
		18
6	0.78/0.78	
		53
7	0.77/0.77	
		48
8	0.74/0.74	
		9
9	1.43/1.43	
		15
10	0.40/0.40	
		6
11	1.11/1.47	
		23
12	1.03/1.03	
		7
13	1.87/1.87	
		16
14	1.08/1.27	
		25
15	4.15/4.35	
		23
16	1.09/1.17	
		49



LEGEND

- Q — **QUATERNARY** — *Glacial deposits & alluvium*
- Kcm — **COMMOTION FORMATION** — *Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates*
- Kmb — **MOOSEBAR FORMATION** — *Mudstones, minor siltstones, marine*
- Kbs — **BLUESKY** — *Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite*
- Kgt — **GETHING FORMATION** — *Cyclothems ; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones ; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit ; COAL*
- Kdr — **DRESSER FORMATION** — *Incomplete cyclothems ; discontinuous coal measures in varying thicknesses ; medium to very coarse grained sandstones, grits, and conglomerates*
- JKb — **BRENOT FORMATION** — *Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL*
- JKmc — **MONACH FORMATION** — *Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.*
- JKbp — **BEATTIE PEAKS FORMATION** — *Buff to brownish sandstones, fine to medium grained ; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding*
- JKmf — **MONTEITH FORMATION** — *Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.*
- Jf — **FERNIE FORMATION** — *Dark grey and black shales, mudstones, sandstones, siltstones, marine*

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS — BEAUDETTE GROUP — CRASSIER GROUP

BASELINE LOCATION
COAL SEAM No.1
2 — COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ: 1:5000
VERT.: 1:5000

535

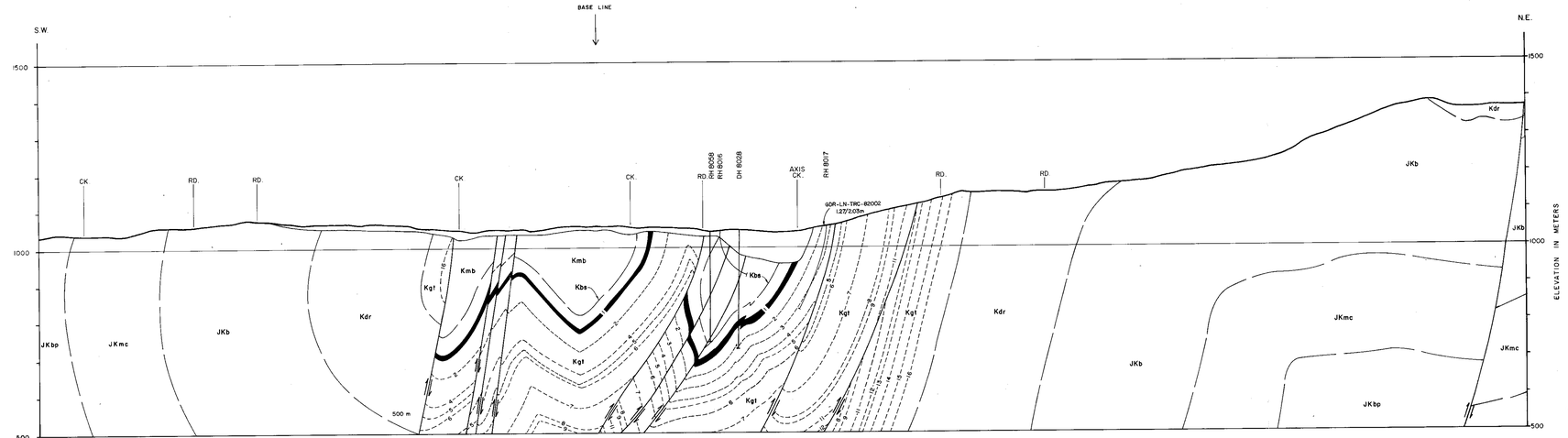
BC GEOLOGICAL SURVEY FILE

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 2250

PREPARED BY: D. CARPENTER, R. INASTER — SCALE: 1:5,000
APPROVED BY: C. WILLIAMS — DATE: OCT., 1984 — DRAWING No. 84-015

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	10.92	40
2	0.79/0.80	40
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	53
7	0.77/0.77	48
8	0.74/0.74	9
9	1.43/1.43	15
10	0.40/0.40	6
11	1.11/1.47	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	1.09/1.17	49



LEGEND

- **Q** — *QUATERNARY* — Glacial deposits & alluvium
- **Kcm** — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- **Kmb** — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- **Kbs** — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- **Kgt** — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- **Kdr** — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- **JKb** — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- **JKmc** — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of chert, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- **JKbp** — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- **JKmt** — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained, fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- **Jf** — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS — BEAUDETTE GROUP + CRASSIER GROUP

BASELINE LOCATION
2 — COAL SEAM No.1
COAL SEAM

NOTE-Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ: 1:5000
VERT: 1:5000

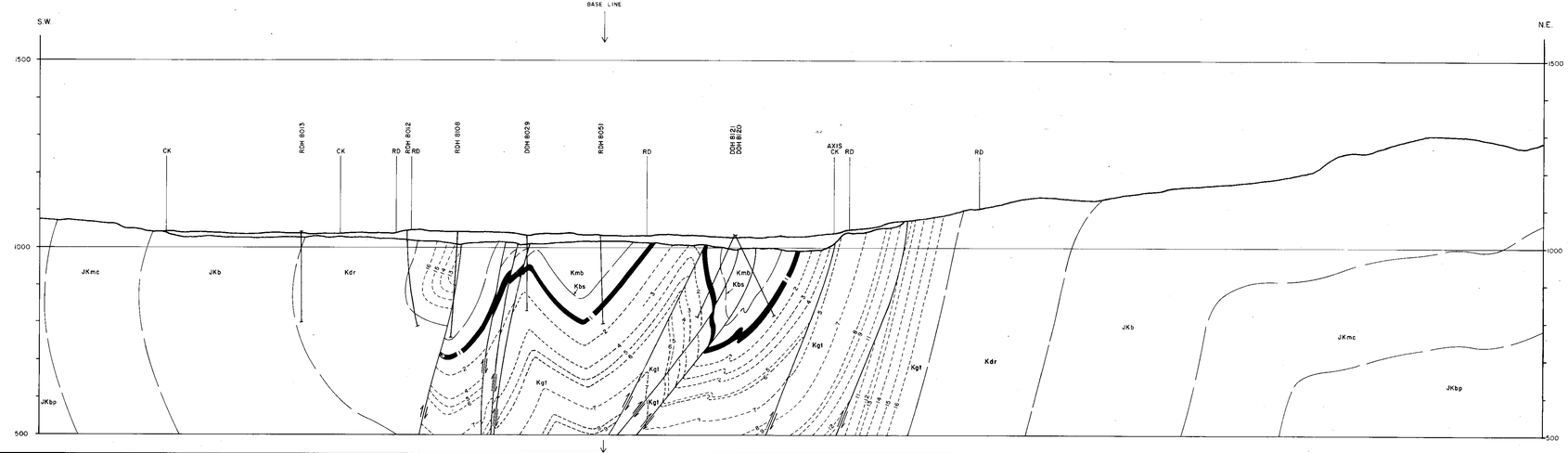
535
80 Geological Sections # 2

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 2000

PREPARED BY: B. CARPENTER, R. MEYER — SCALE: 1:5,000
APPROVED BY: C. WILLIAMS — DATE: OCT., 1984 — DRAWING No. 84-016

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	9.23	40
2	0.79/0.80	40
3	0.87/0.87	47
4	0.67/0.67	8
5	3.31/3.49	19
6	0.78/0.78	18
7	0.77/0.77	53
8	0.74/0.74	48
9	1.43/1.43	9
10	0.40/0.40	15
11	1.11/1.47	6
12	1.03/1.03	23
13	1.87/1.87	7
14	1.08/1.27	16
15	4.15/4.35	25
16	1.09/1.17	23
		49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmf — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS
BEAUDETTE GROUP + CRASSIER GROUP

BASELINE LOCATION
COAL SEAM No.1
2 COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ. 1:5000
VERT. 1:5000

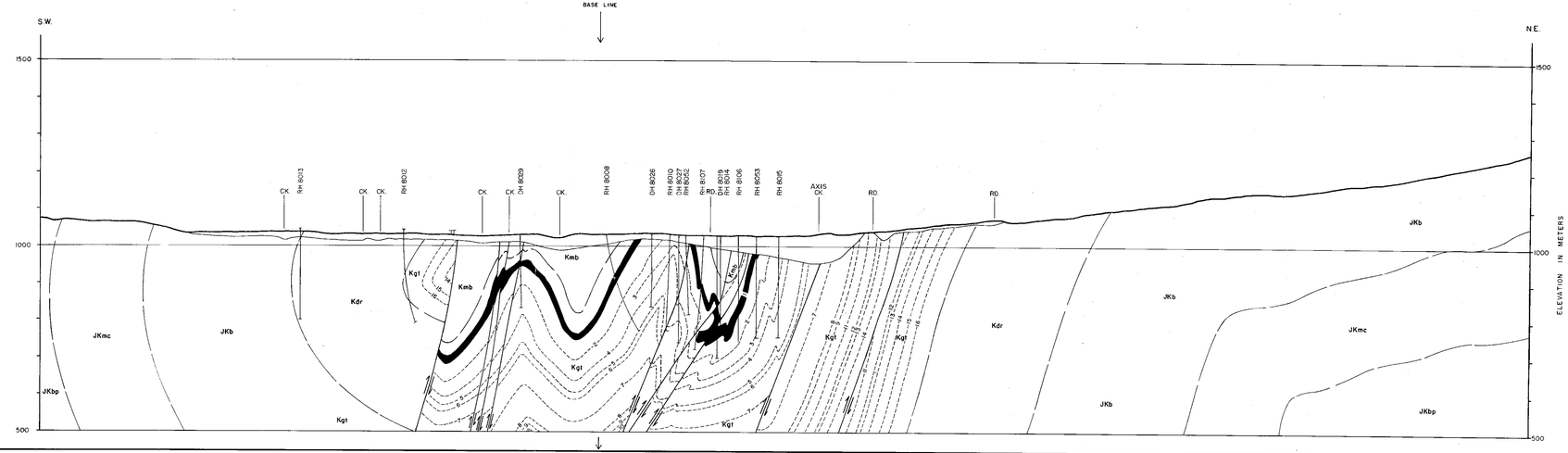
535

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 1750

PREPARED BY: B. CARPENTER, R. INGSTER — SCALE: 1:5,000
APPROVED BY: C. WILLIAMS — DATE: OCT./1984 DRAWING No. 84-013

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	10.00	40
2	0.79/0.80	40
3	0.87/0.87	47
4	0.67/0.67	8
5	3.31/3.49	19
6	0.78/0.78	18
7	0.77/0.77	53
8	0.74/0.74	48
9	1.43/1.43	9
10	0.40/0.40	15
11	1.11/1.47	6
12	1.03/1.03	23
13	1.87/1.87	7
14	1.08/1.27	16
15	4.15/4.35	25
16	1.09/1.17	23
		49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems, dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmt — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS — CRASSIER GROUP — BEAUDETTE GROUP

BASELINE LOCATION

COAL SEAM No. 1
COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000

METRES 0 200 400 METRES

HORIZ.: 1:5000
VERT.: 1:5000

535

(Geological Section) #2

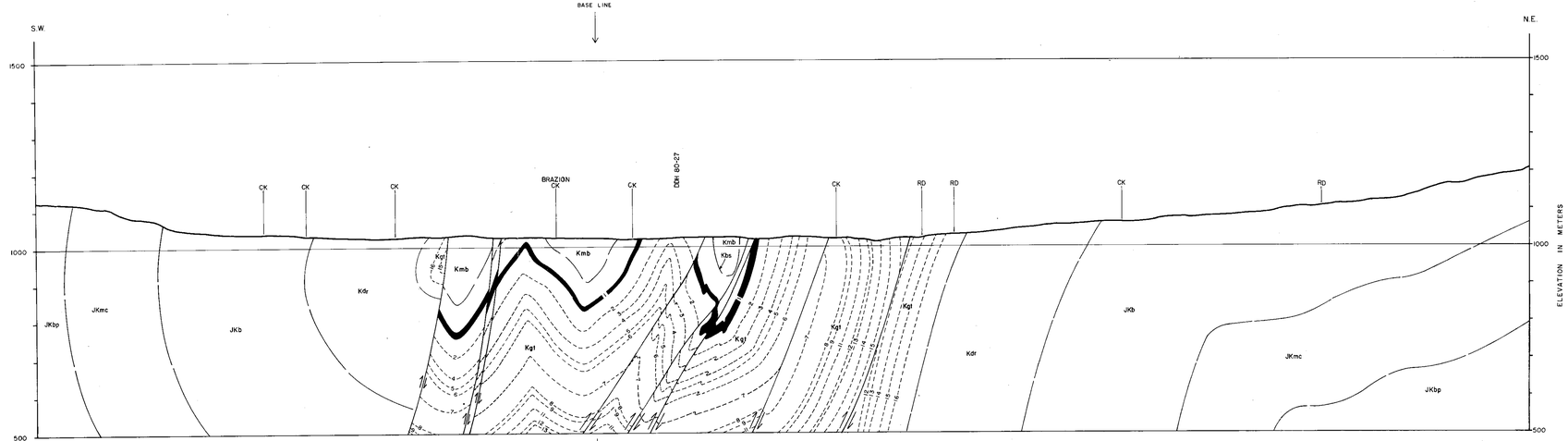
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GODRICH COAL PROPERTY
Northeastern British Columbia
1984

BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 1500

PREPARED BY: B. CARPENTER, R. INGATES — SCALE: 1:5,000
APPROVED BY: C. WILLIAMS — DATE: OCT. 1984 — DRAWING No. 84-012

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	9.71	40
2	0.79/0.80	47
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	53
7	0.77/0.77	48
8	0.74/0.74	9
9	1.43/1.43	15
10	0.40/0.40	6
11	1.11/1.47	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	1.09/1.17	49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmt — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

LOWER CRETACEOUS — TRANSITIONAL — CRASSIER GROUP — BEAUDETTE GROUP — JURASSIC

BASELINE LOCATION
COAL SEAM No.1
2 COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ.: 1:5000
VERT.: 1:5000

535

Projection 441/13 #2

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 1250

PREPARED BY: D. CARPENTER - R. INKSTER — SCALE: 1:5,000
APPROVED BY: C. WILLIAMS — DATE: OCT. 1984 — DRAWING No. 84-010

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	7.89	
		40
2	0.79/0.80	
		47
3	0.87/0.87	
		8
4	0.67/0.67	
		19
5	3.31/3.49	
		18
6	0.78/0.78	
		53
7	0.77/0.77	
		48
8	0.74/0.74	
		9
9	1.43/1.43	
		15
10	0.40/0.40	
		6
11	1.11/1.47	
		23
12	1.03/1.03	
		7
13	1.87/1.87	
		16
14	1.08/1.27	
		25
15	4.15/4.35	
		23
16	1.09/1.17	
		49

LEGEND

Q	*QUATERNARY* Glacial deposits & alluvium
Kcm	*COMMOTION FORMATION* Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
Kmb	*MOOSEBAR FORMATION* Mudstones, minor siltstones, marine
Kbs	*BLUESKY* Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
Kgt	*GETHING FORMATION* Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
Kdr	*DRESSER FORMATION* Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
JKb	*BRENOT FORMATION* Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
JKmc	*MONACH FORMATION* Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
JKbp	*BEATTIE PEAKS FORMATION* Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
JKmt	*MONTEITH FORMATION* Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
Jf	*FERNIE FORMATION* Dark grey and black shales, mudstones, sandstones, siltstones, marine

LOWER CRETACEOUS — CRASSIER GROUP

TRANSITIONAL — BEAUDETTE GROUP

JURASSIC

↓ BASELINE LOCATION

COAL SEAM No. 1

--- 2 --- COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000

METRES 0 — 200 — 400 METRES

HORIZ. 1:5000
VERT 1:5000

535

PR-GOODRICH 84(1)A #2

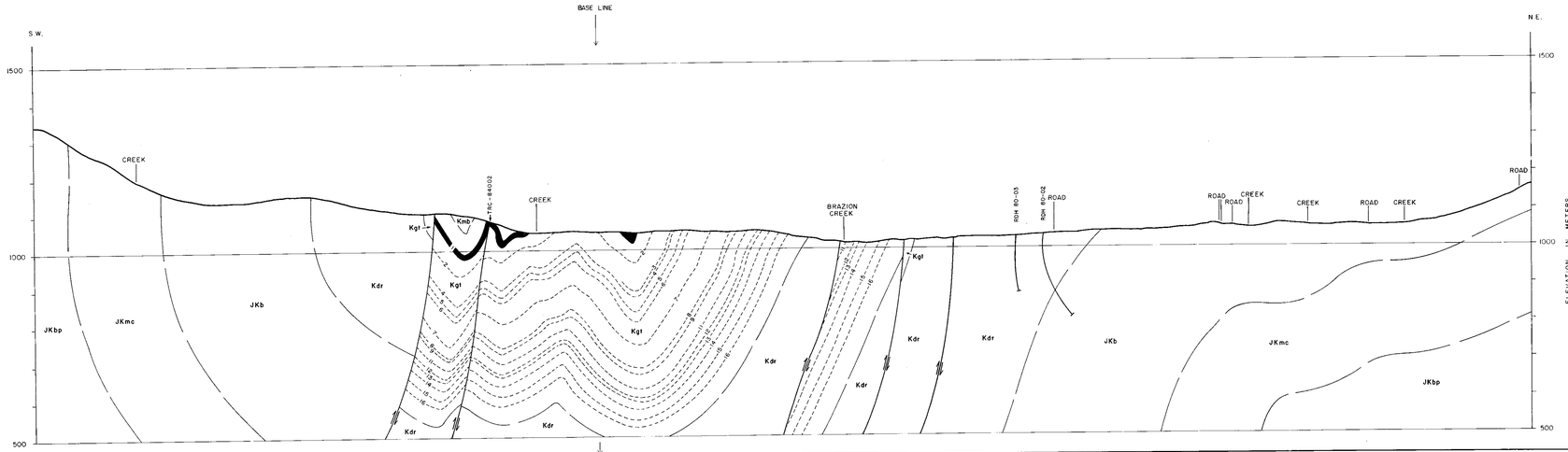
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984

BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 1000

PREPARED BY: B. CARPENTER, R. INKSTER		SCALE 1:5000
APPROVED BY: C. WILLIAMS	DATE: OCT., 1984	DRAWING No. 84-010

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	7.35	40
2	0.79/0.80	47
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	53
7	0.77/0.77	48
8	0.74/0.74	9
9	1.43/1.43	15
10	0.40/0.40	6
11	1.11/1.47	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	1.09/1.17	49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit, COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic salt and pepper sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine limic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained, thinly bedded black and dark grey shales, silty shales, siltstones, thin sandstones with ironstone banding
- JKmt — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

I. JURASSIC — TRANSITIONAL — LOWER CRETACEOUS — BEAUFICETTE GROUP — CRASSIER GROUP

BASELINE LOCATION
COAL SEAM No.1
COAL SEAM

NOTE Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ 1:5000
VERT 1:5000

535

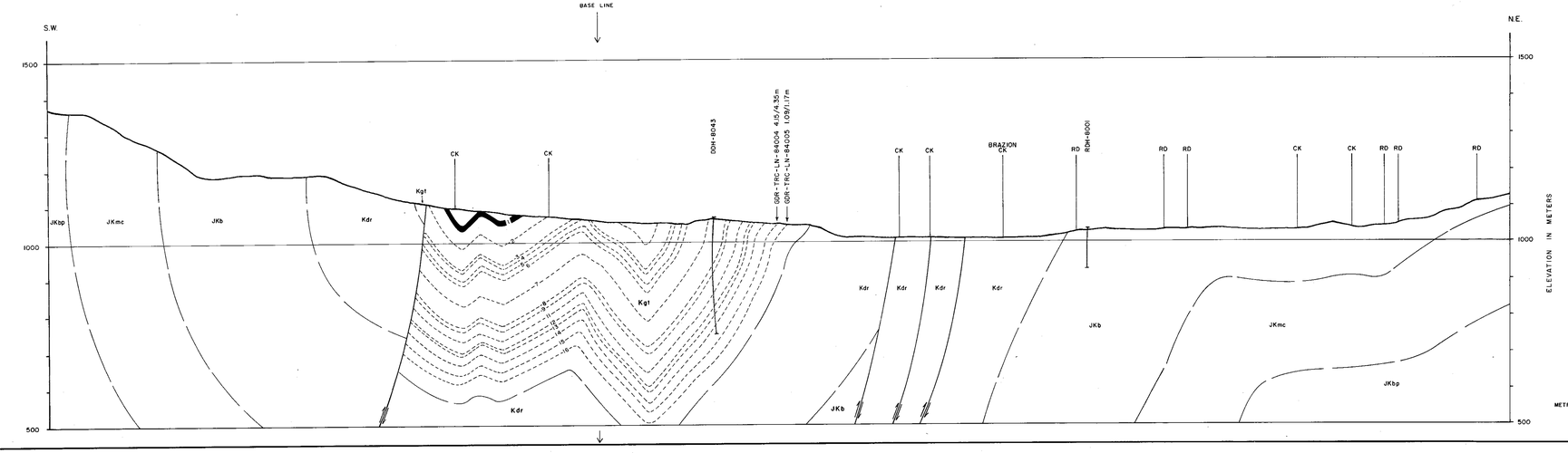
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984

BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 750

PREPARED BY: B. CARPENTER, K. INASTER — SCALE 1:5000
APPROVED BY: C. WILLIAMS — DATE OCT. 1984 — DRAWING No. BA-1-008

SUMMARY OF Kgl COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	7.35	40
2	0.79/0.80	47
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	53
7	0.77/0.77	48
8	0.74/0.74	9
9	1.43/1.43	15
10	0.40/0.40	6
11	1.11/1.47	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	1.09/1.17	49



LEGEND

	Q	*QUATERNARY* — Glacial deposits & alluvium
	Kcm	*COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
	Kmb	*MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
	Kbs	*BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
LOWER CRETACEOUS	Kgl	*GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
CRASSIER GROUP	Kdr	*DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
	JKb	*BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
BEAUDETTE GROUP	JKmc	*MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
	JKbp	*BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
TRANSITIONAL	JKmt	*MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
JURASSIC	Jf	*FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

↓ BASELINE LOCATION

COAL SEAM No. 1

--- 2 --- COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000

METRES 0 200 400 METRES

HORIZ: 1:5000
VERT.: 1:5000

535

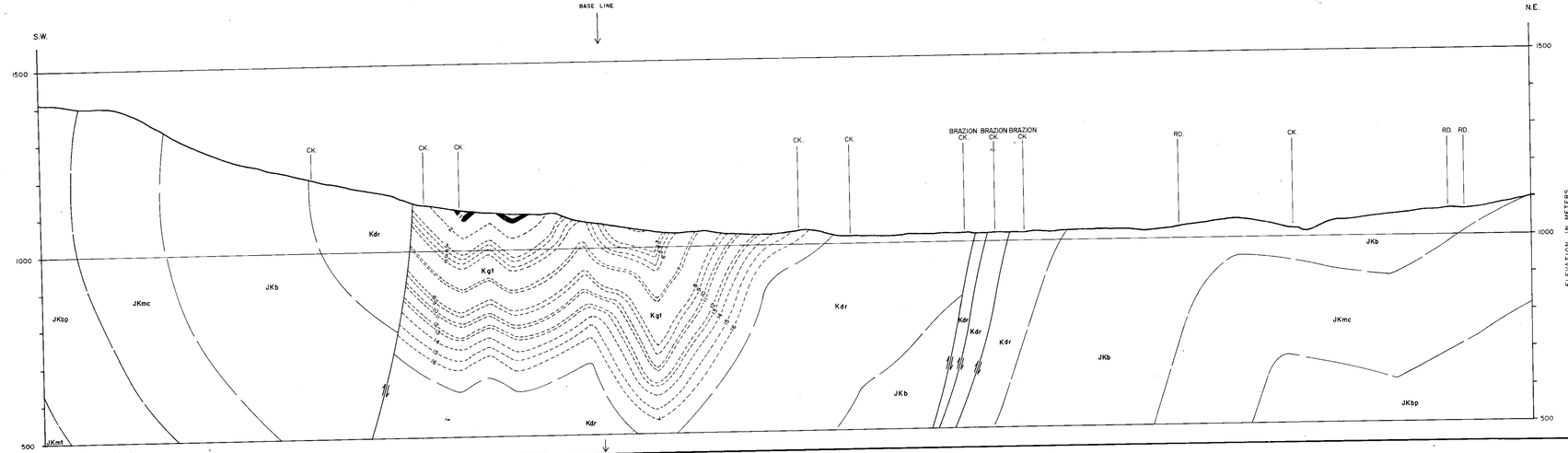
P&P Goodrich 81/MAR 82

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 0500

PREPARED BY: R. CARPENTER, R. INNSTER	SCALE: 1:5,000
APPROVED BY: C. WILLIAMS	DATE: OCT./84 DRAWING No. 84-005

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	7.35	40
2	0.79/0.80	40
3	0.87/0.87	47
4	0.67/0.67	8
5	3.31/3.49	19
6	0.78/0.78	18
7	0.53/0.74	50
	0.64/0.79	3
8	0.72/0.84	48
9	1.05/1.13	9
10	0.86/0.98	15
11	0.69/0.79	6
12	1.03/1.03	23
13	1.87/1.87	7
14	1.08/1.27	16
15	4.15/4.35	25
16	2.36/2.78	23
		49



LEGEND

- Q — QUATERNARY — Glacial deposits & alluvium
- Kcm — COMMOTION FORMATION — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member; and conglomerates
- Kmb — MOOSEBAR FORMATION — Mudstones, minor siltstones, marine
- Kbs — BLUESKY — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — GETHING FORMATION — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — DRESSER FORMATION — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — BRENOT FORMATION — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — MONACH FORMATION — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- JKbp — BEATTIE PEAKS FORMATION — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmt — MONTEITH FORMATION — Grey and brown sandstones, fine to medium grained, fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occotional thin conglomerates.
- Jf — FERNIE FORMATION — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS — BEAMERETTE GROUP — CRASSIER GROUP

BASELINE LOCATION
COAL SEAM No. 1
2 COAL SEAM

NOTE Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ. 1:5000
VERT. 1:5000

535

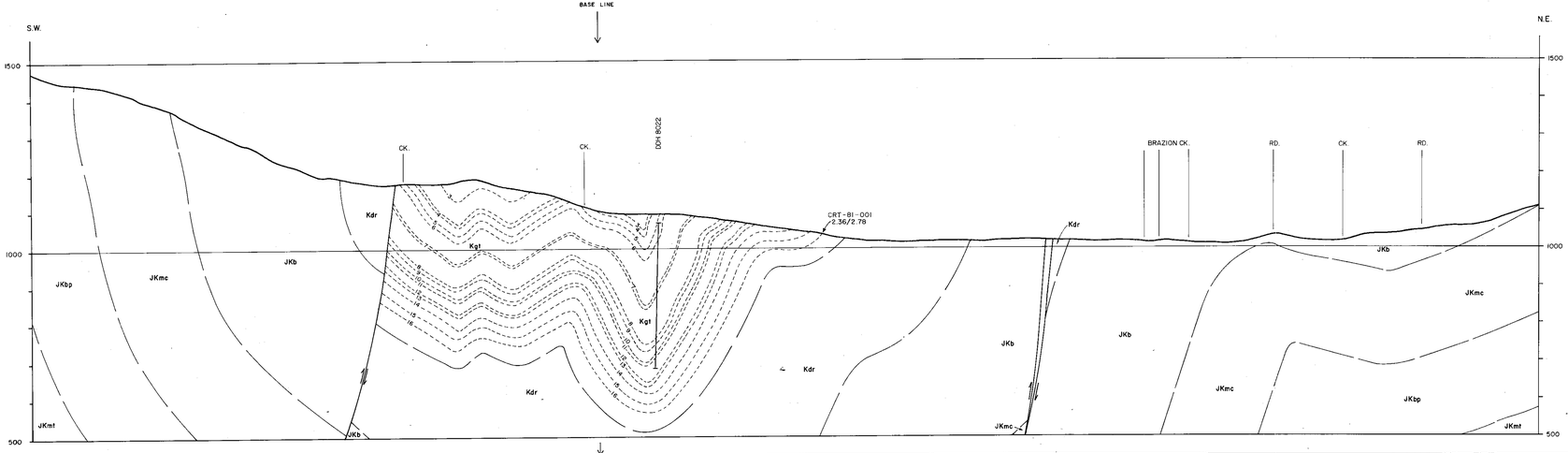
PR-GEOGRAPH 84/10A "2

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
N 0250

PREPARED BY: R. CARPENTER, A. INKSTER — SCALE 1:5,000
APPROVED BY: E. WILLIAMS — DATE OCT. 1984 DRAWING No. 84-007

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	7.35	40
2	0.79/0.80	47
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	50
7	0.53/0.74	3
	0.64/0.79	48
8	0.72/0.84	9
9	1.05/1.13	15
10	0.86/0.98	6
11	0.69/0.79	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	2.36/2.78	49



LEGEND

- **Q** — *QUATERNARY*: Glacial deposits & alluvium
- **Kcm** — *COMMOTION FORMATION*: Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- **Kmb** — *MOOSEBAR FORMATION*: Mudstones, minor siltstones, marine
- **Kbs** — *BLUESKY*: Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- **Kgt** — *GETHING FORMATION*: Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- **Kdr** — *DRESSER FORMATION*: Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- **JKb** — *BRENOT FORMATION*: Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- **JKmc** — *MONACH FORMATION*: Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates.
- **JKbp** — *BEATTIE PEAKS FORMATION*: Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- **JKmt** — *MONTEITH FORMATION*: Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- **Jf** — *FERNIE FORMATION*: Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — BEAUDETTE GROUP — CRASSIER GROUP — LOWER CRETACEOUS

BASELINE LOCATION
COAL SEAM No. 1
2 COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ.: 1:5000
VERT.: 1:5000

535

P82-GOODRICH 541/94 "2

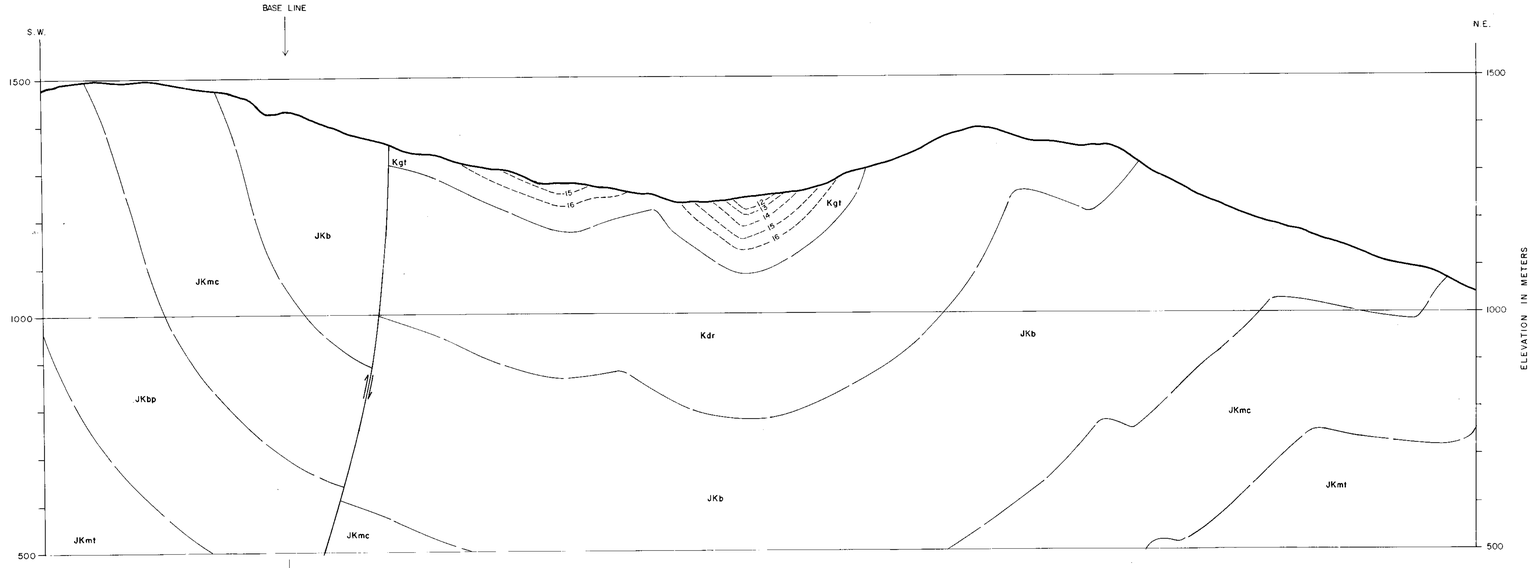
GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984

BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
0000

PREPARED BY: B. CARPENTER, R. IMESTER — SCALE 1:5,000
APPROVED BY: C. WILLIAMS — DATE OCT. 1984 — DRAWING No. 84-006

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	7.35	40
2	0.79/0.80	40
3	0.87/0.87	47
4	0.67/0.67	8
5	3.31/3.49	19
6	0.78/0.78	18
7	0.53/0.74	50
	0.64/0.79	3
8	0.72/0.84	48
9	1.05/1.13	9
10	0.86/0.98	15
11	0.69/0.79	6
12	1.03/1.03	23
13	1.87/1.87	7
14	1.08/1.27	16
15	4.15/4.35	25
16	2.36/2.78	23
		49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- JKmt — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

LOWER CRETACEOUS — CRASSIER GROUP — BEAUDETTE GROUP — TRANSITIONAL — JURASSIC

RASELINE LOCATION

COAL SEAM No.1

2 COAL SEAM

NOTE-Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000

METRES 0 200 400 METRES

HORIZ. 1:5000
VERT. 1:5000

RR-GOODRICH 74(1)A "L"

535

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
S 1500

PREPARED BY: B. CARPENTER, R. INKSTER	SCALE 1:5000
APPROVED BY: C. WILLIAMS DATE OCT. 1984	DRAWING No. 84-003

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
		40
1	7.35	40
2	0.79/0.80	47
3	0.87/0.87	8
4	0.67/0.67	19
5	3.31/3.49	18
6	0.78/0.78	50
7	0.53/0.74	3
	0.64/0.79	48
8	0.72/0.84	9
9	1.05/1.13	15
10	0.86/0.98	6
11	0.69/0.79	23
12	1.03/1.03	7
13	1.87/1.87	16
14	1.08/1.27	25
15	4.15/4.35	23
16	2.36/2.78	49

LEGEND

LOWER CRETACEOUS
TRANSITIONAL
JURASSIC
CRASSIER GROUP
BEAUDETTE GROUP

- **Q** — *QUATERNARY*
  Glacial deposits & alluvium
- **Kcm** — *COMMOTION FORMATION*
  Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- **Kmb** — *MOOSEBAR FORMATION*
  Mudstones, minor siltstones, marine
- **Kbs** — *BLUESKY*
  Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- **Kgt** — *GETHING FORMATION*
  Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
- **Kdr** — *DRESSER FORMATION*
  Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- **JKb** — *BRENOT FORMATION*
  Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- **JKmc** — *MONACH FORMATION*
  Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
- **JKbp** — *BEATTIE PEAKS FORMATION*
  Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
- **JKmt** — *MONTEITH FORMATION*
  Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- **Jf** — *FERNIE FORMATION*
  Dark grey and black shales, mudstones, sandstones, siltstones, marine

↓ BASELINE LOCATION
▬▬▬ COAL SEAM No. 1
– – – 2 – – – COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000

METRES 0 — 200 — 400 METRES

HORIZ.: 1:5000
VERT.: 1:5000

535

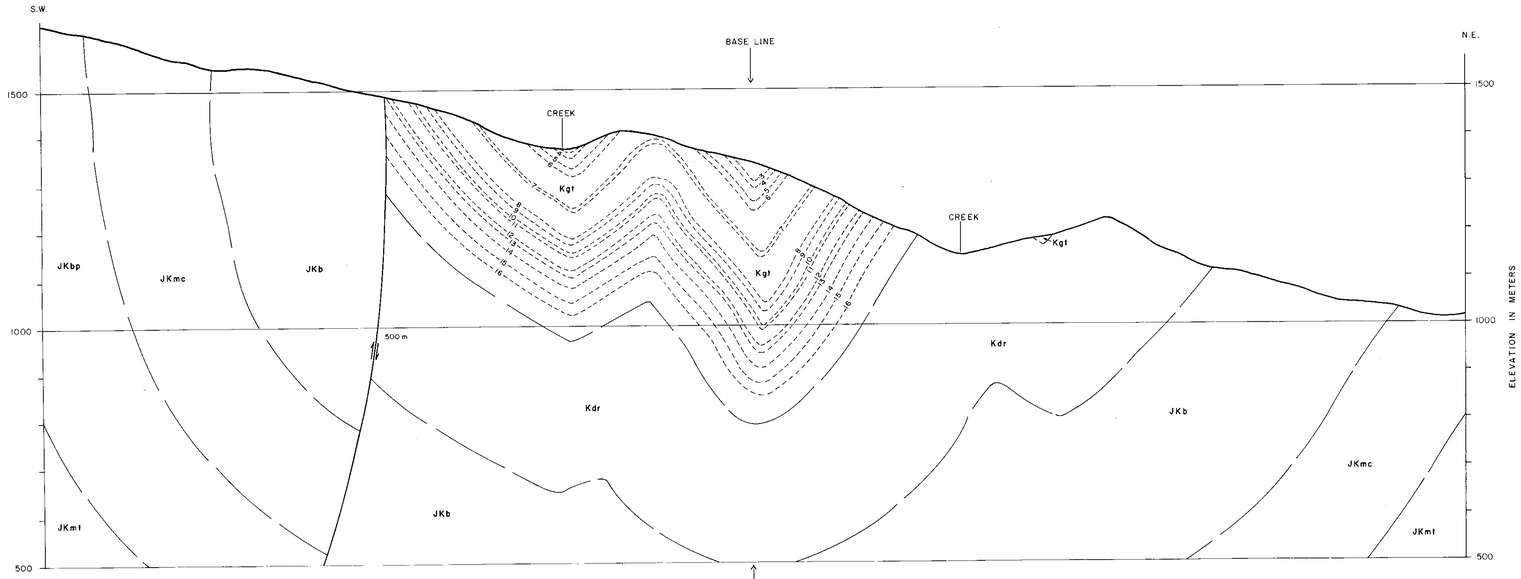
PR-GOODRICH 84(1)A #2

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
S 500

PREPARED BY: B.CARPENTER, R. INKSTER	SCALE 1:5000
APPROVED BY: C.WILLIAMS DATE: OCT., 1984	DRAWING No. 84-005

SUMMARY OF Kgt COAL OCCURRENCES		
SEAM NO.	COAL/COAL + ROCK (m)	APPROXIMATE INTERBURDEN THK. (m)
1	7.35	40
2	0.79/0.80	40
3	0.87/0.87	47
4	0.67/0.67	8
5	3.31/3.49	19
6	0.78/0.78	18
7	0.53/0.74	50
	0.64/0.79	3
8	0.72/0.84	48
9	1.05/1.13	9
10	0.86/0.98	15
11	0.69/0.79	6
12	1.03/1.03	23
13	1.87/1.87	7
14	1.08/1.27	16
15	4.15/4.35	25
16	2.36/2.78	49



LEGEND

- Q — *QUATERNARY* — Glacial deposits & alluvium
- Kcm — *COMMOTION FORMATION* — Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
- Kmb — *MOOSEBAR FORMATION* — Mudstones, minor siltstones, marine
- Kbs — *BLUESKY* — Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
- Kgt — *GETHING FORMATION* — Cyclothems; dark grey mudstones, siltstone, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales; and occasional minor tuffs in upper unit; COAL
- Kdr — *DRESSER FORMATION* — Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
- JKb — *BRENOT FORMATION* — Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
- JKmc — *MONACH FORMATION* — Marine lithic and quartzose sandstones, with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
- JKbp — *BEATTIE PEAKS FORMATION* — Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones, thin sandstones with ironstone banding
- JKmt — *MONTEITH FORMATION* — Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings, occasional thin conglomerates.
- Jf — *FERNIE FORMATION* — Dark grey and black shales, mudstones, sandstones, siltstones, marine

JURASSIC — TRANSITIONAL — LOWER CRETACEOUS
CRASSIER GROUP
BEALDETTE GROUP

BASELINE LOCATION
COAL SEAM No.1
2 COAL SEAM

NOTE: Section number indicates distance in metres along baseline from south to north to include all 1980 and 1981 drill holes.

SCALE 1:5000
METRES 0 200 400 METRES
HORIZ. 1:5000
VERT. 1:5000

535
PR-GOODRICH-SHEET #1

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

GOODRICH COAL PROPERTY
Northeastern British Columbia
1984
BRAZION CREEK MINE AREA
GEOLOGICAL CROSS SECTION
S 1000

PREPARED BY: B. CARPENTER, R. INKSTER — SCALE 1:5000
APPROVED BY: C. WILLIAMS — DATE OCT. 1984 — DRAWING No. 84-004

TABLE OF FORMATIONS

	Q	QUATERNARY Glacial deposits and alluvium
Lower Cretaceous – Transitional – Jurassic	Kcm	COMMOTION FORMATION Siltstones, sandstones interbedded, claystones of marine origin, COAL at the top member, and conglomerates
	Kmb	MOOSEBAR FORMATION Mudstones, minor siltstones, marine
	Kbs	BLUESKY Fine to medium grained sandstones, mudstones, thin conglomerate unit at top with or without glauconite
CRASSIER GROUP	Kgt	GETHING FORMATION Cyclothems; dark grey mudstones, siltstones, carbonaceous, silty, sandy mudstones; coalified plant debris, minor bentonite, black shales, and occasional minor tuffs in upper unit; COAL
CRASSIER GROUP	Kdr	DRESSER FORMATION Incomplete cyclothems; discontinuous coal measures in varying thicknesses; medium to very coarse grained sandstones, grits, and conglomerates
CRASSIER GROUP	JKb	BRENOT FORMATION Lithic "salt and pepper" sandstones, siltstones, mudstones, carbonaceous mudstones, COAL
BEAUDETTE GROUP	JKmc	MONACH FORMATION Marine lithic and quartzose sandstones with thick beds of clean, coarse grained white quartzites at top. Minor shales, siltstones and sandstones with occasional thin conglomerates
BEAUDETTE GROUP	JKbp	BEATTIE PEAKS FORMATION Buff to brownish sandstones, fine to medium grained; thinly bedded black and dark grey shales, silty shales, siltstones; thin sandstones with ironstone banding
BEAUDETTE GROUP	JKmt	MONTEITH FORMATION Grey and brown sandstones, fine to medium grained; fine to very coarse grained quartzite. Minor beds of shales, and shales with siltstone and sandstone partings; occasional thin conglomerates
	Jf	FERNIE FORMATION Dark grey and black shales, mudstones, sandstones, siltstones, marine

LEGEND

- NON GULF COAL LEASES / GULF COAL LEASES — Property Boundary
- Coal Seam Subcrop
- Geological Boundary, (defined, approximate)
- Anticline (defined, approximate)
- Syncline (defined, approximate)
- Anticline and Syncline (overturned)
- Fault (defined showing dip, approx. position of fault)
- Normal Fault
- Strike and Dip (bedding, overturned bedding)
- A — A' Cross Section Location
- Monocline
- Bedding (vertical, horizontal)
- Trench Location

LITHOLOGICAL SYMBOLS

- Conglomerate
- Sandstone
- Siltstone
- Quartzite
- Claystone/Mudstone
- Coal
- Silty Claystone
- Carbonaceous Claystone

LEGEND

- RIVER
- STREAM
- LAKE
- SAND
- TREE LINE
- FORM LINES
- DEPRESSION FORM LINE
- SPOT HEIGHT ×1134
- MAIN ROAD
- SECONDARY ROAD
- TRACK
- TRAIL
- CUT LINE
- RAILROAD
- BUILDING
- COAL LICENCE 5534

FORM LINE INTERVAL 10 METRES

SURVEY NOTE

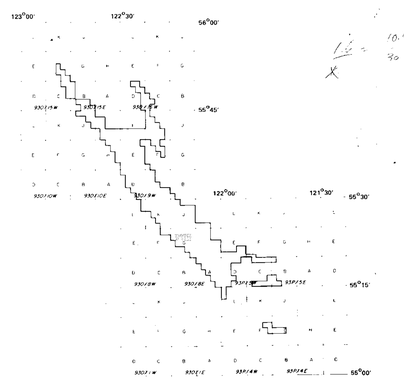
SURVEY CONTROL TAKEN FROM EXISTING PHOTO IDENTIFIABLE GOVERNMENT SURVEY MONUMENTS AND N.T.S. MAPS. MAPPING IS BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID AND GEODETIC DATUM.

SCALE 1 : 5000

FEET 0 500 1000 1500 2000

METRES 0 200 400 600

INDEX MAP



PR. GOODRICH 54N/9 "2

GULF CANADA RESOURCES INC.
Coal Division
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GOODRICH COAL PROPERTY
NORTHEASTERN BRITISH COLUMBIA

BRAZION CREEK BLOCK
1984
DATA SOURCE MAP

PREPARED BY: B. CARPENTER, R. INKSTER	SCALE: 1:5000
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