PR-Windfall 81(C)A

GULF CANADA RESOURCES INC.
WINDFALL COAL PROJECT

GEOLOGICAL REPORT

DECEMBER, 1981

MAP AND LICENCE NUMBERS

NTS Map 93 P/4W and 93 P/4E

Licence Numbers 5635 - 5669 inclusive ✓ only 5666 is in good standing

5770 - 5777 inclusive ✓ forfeited

6590 - 6604 inclusive ✓ in good standing

Approximate center of Windfall property:

Latitude N 55° 10'; to Longitude 121° 45'.

Authors H. Zschach

A. Bienia

* Drillhole logs and some trenches are on dropped licences ∴ duplicate logs are filed in PR-Windfall 81(3)A OPEN FILE

GULF CANADA RESOURCES INC.
WINDFALL COAL PROJECT
Geological Report, December 1981

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1.0 SUMMARY

Gulf Canada Resources' wholly owned Windfall coal property is situated in the Inner Foothills of the Rocky Mountains, approximately 70 road kilometres south of Chetwynd, British Columbia (see Figure 3.1.2).

The property consists of 60 crown coal licences covering 17,756 hectares. The block is located to cover the coal-bearing lower Cretaceous Minnes Group and Bullhead Group strata.

In the summer of 1981, Gulf Canada Resources Inc. conducted a field exploration program consisting of geological mapping and rotary drilling of some ~~940~~ 1297.3 metres. The mapping project undertaken on a 1:25,000 map scale, established the regional stratigraphic and structural trend of the Minnes and Bullhead strata. The property essentially consists of a sequence of folded sediments, mostly of the Brenot Formation, trending in a northwesterly direction.

Additional coal exposures were located in the Brenot Formation, both in outcrop and in drill holes. All coal seams identified were found to be thin, attaining thicknesses less than 1.5 metres. Geological field coverage is generally restricted on the Windfall block due to extensive vegetation cover inhibiting good outcrop exposure.

LICENCES WORK DONE ON:

ROTARY DRILL HOLES (7)
RDH-WF-8101 — 5649
RDH-WF 8102 — 5652
RDH-WF 8103 — 5635
RDH — WF 8105 — 5652
RDH-WF 8106 — 5635
RDH-WF 8107 — 5636
RDH-WF 8104 — 5649

TRENCHES
SKA-81-B01 -5636
SKA-81-B02, B03, B04, B05, B06, B07 (OFF PROPERTY GRID)
SKR-81-B01, B02, B03, B04, (5656)
RCK-81-B01, B02, B03, B04, B05, B06, B07, (6602)
WFC-81-B01 — 5641

2.0 RECOMMENDATIONS

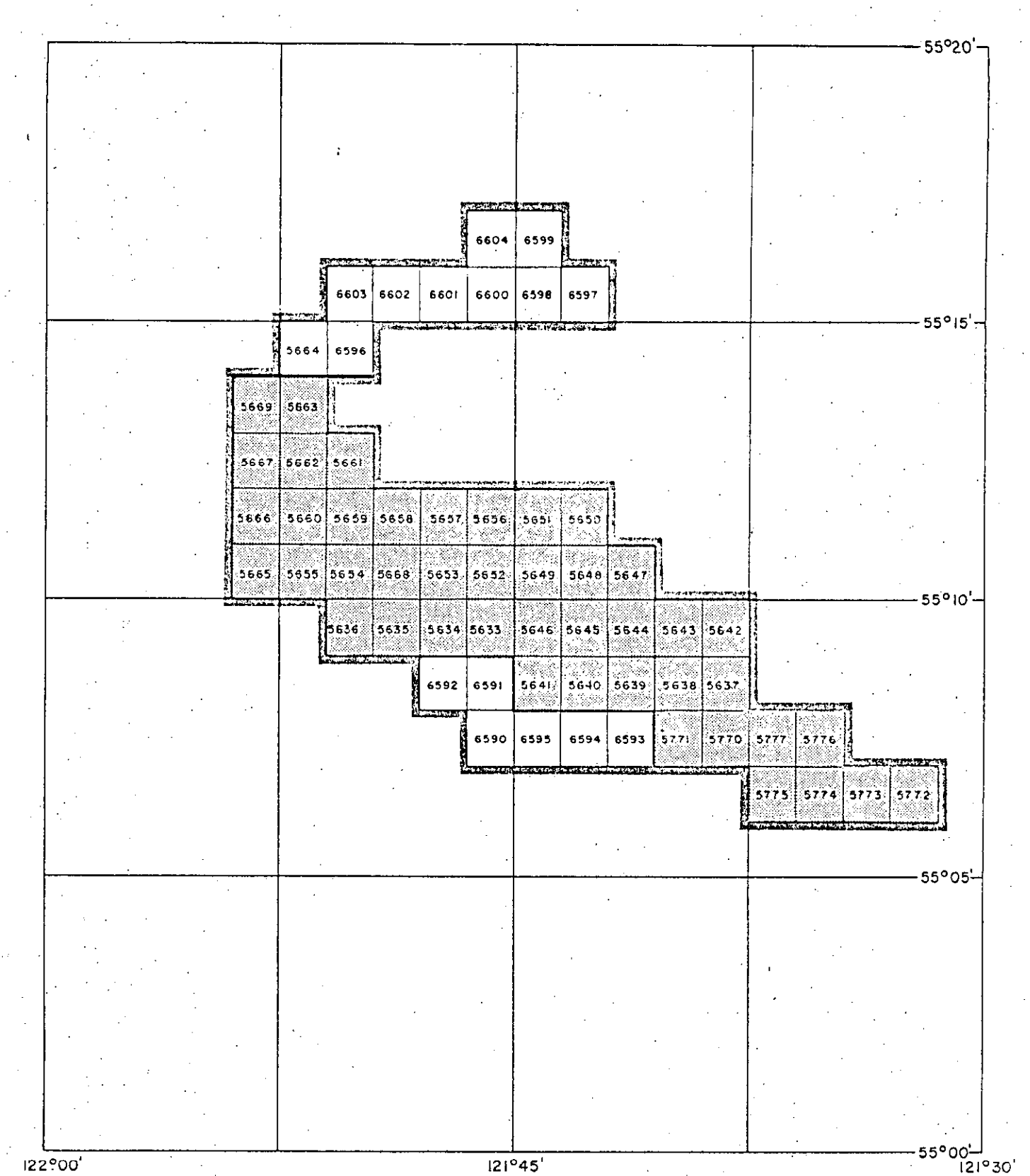
A. Based on the 1979-1981 geological mapping programs, where very few and thin Brenot coal seams have been found within the Windfall block, it is recommended that GCRI relinquish the following 44 licences:

5669, 5663, 5667, 5662, 5661, 5666, 5660, 5659, 5658, 5657, 5656, 5651, 5650, 5665, 5655, 5654, 5668, 5653, 5652, 5649, 5648, 5647, 5636, 5635, 5634, 5633, 5646, 5645, 5644, 5643, 5642, 5641, 5640, 5639, 5638, 5637, 5771, 5770, 5777, 5775, 5774, 5773, 5772.

Figure 2.0.1 shows the distribution of licences recommended for surrender.

B. On the retained licences (6592, 6591, 6590, 6595, 6594, 6593), and in particular the northern section (5664, 6596, 6603, 6602, 6601, 6600, 6598, 6597, 6604, 6599), further geological field mapping is recommended to explore the coal-bearing potential of the Gething Formation.

A short drilling program may be warranted if coal outcrop exposure is poor and favourable structures are delineated.



LICENCES TO BE SURRENDERED
DECEMBER 20, 1981

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

COAL LICENCES

Figure 2.0.1

PREPARED BY	SCALE
APPROVED BY	DATE: DEC. 81 DRAWING No

3.0 INTRODUCTION

3.1 Property Location and Access

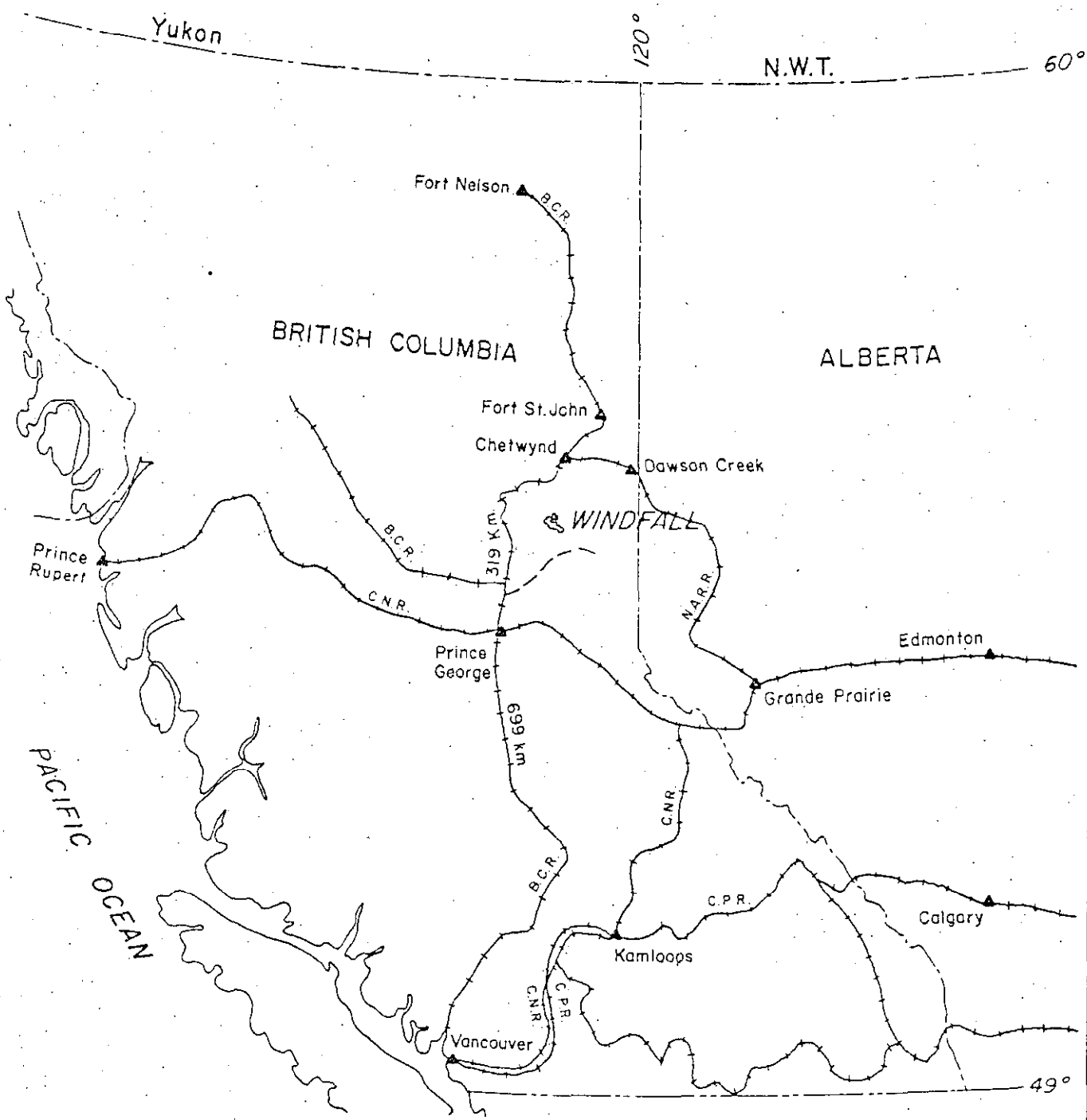
The Windfall property is situated in the Inner Foothills region of northeastern British Columbia (see Figure 3.1.1). The property consists of 60 Crown coal licences covering 17,756 hectares. Figure 3.1.2 illustrates the relative position of the Windfall block to the existing northeast coal block. The property contains coal-bearing upper Minnes and Bullhead strata.

The Windfall property is accessible only via the Sukunka Road which crosses the property from mile 39 (63 km) to mile 47.5 (75 km). Extensive upgrading of the Sukunka Road is in progress, due to the scheduled mine openings at Quintette and Bullmoose. The Sukunka River dissects the property and constitutes the major river valley. The areas' main tributary is Windfall Creek.

In general, the block is heavily wooded and only a small portion, the higher peaks, are above treeline. The Sukunka River Valley has an average elevation of 750 metres, rising to approximately 1750 metres in the southeast and 1450 metres in the northwest of the property.

3.2 History of Land Tenure

A reconnaissance exploration program was undertaken by G.C.R.I. during the summer of 1979. Published maps up until that point, indicated eroded sections of Minnes Group strata at



LEGEND

Railroad

Anzac Railroad

0 40 80 120 160 200 KMS (APPROXIMATE)

GULF CANADA RESOURCES INC.

Coal Division

CALGARY ALBERTA

Gulf

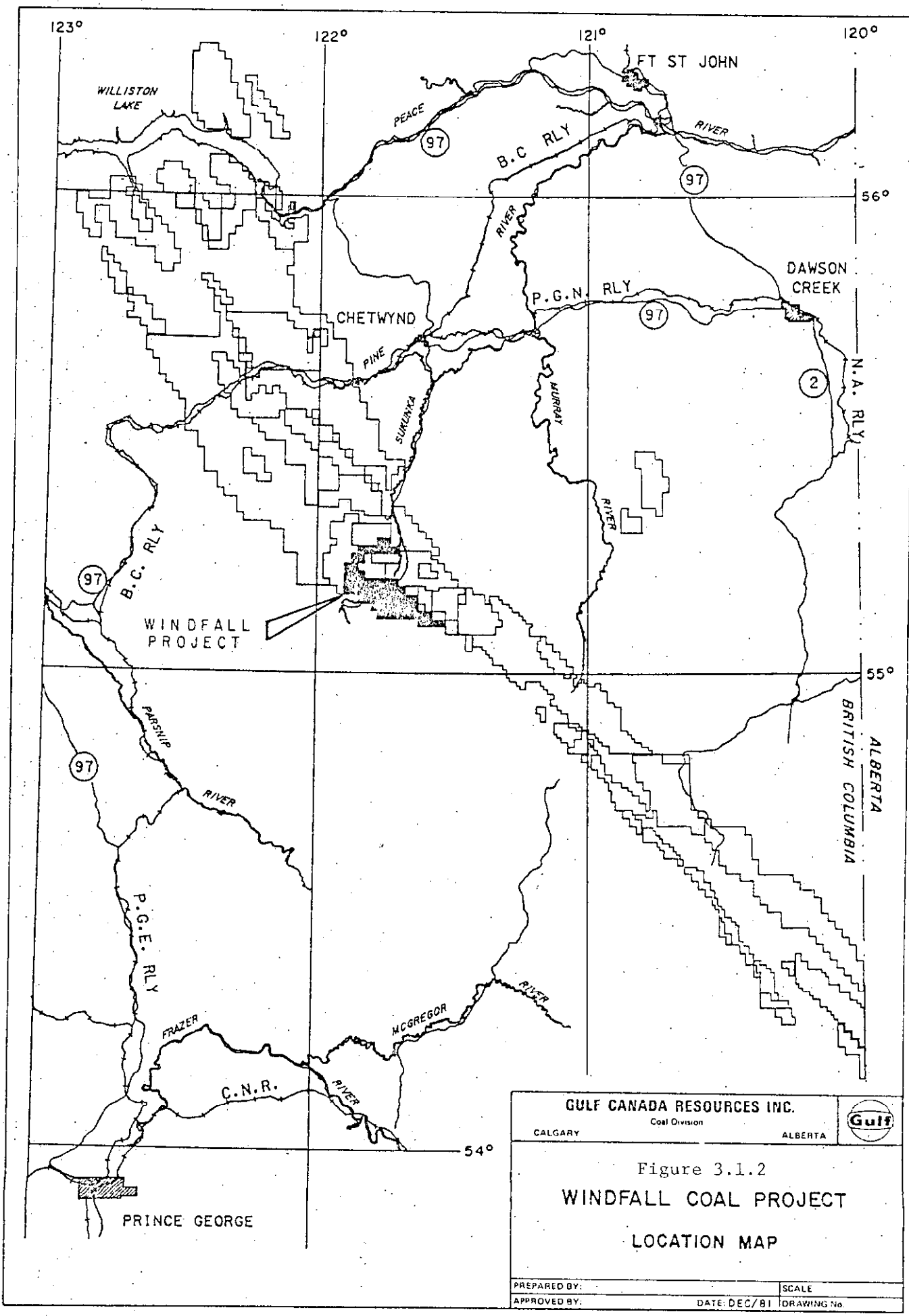
1981

WINDFALL COAL PROPERTY

LOCATION MAP

Figure 3.1.1

PREPARED BY	SCALE
APPROVED BY H. D. Z	DATE NOV 81 DRAWING No.



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Figure 3.1.2

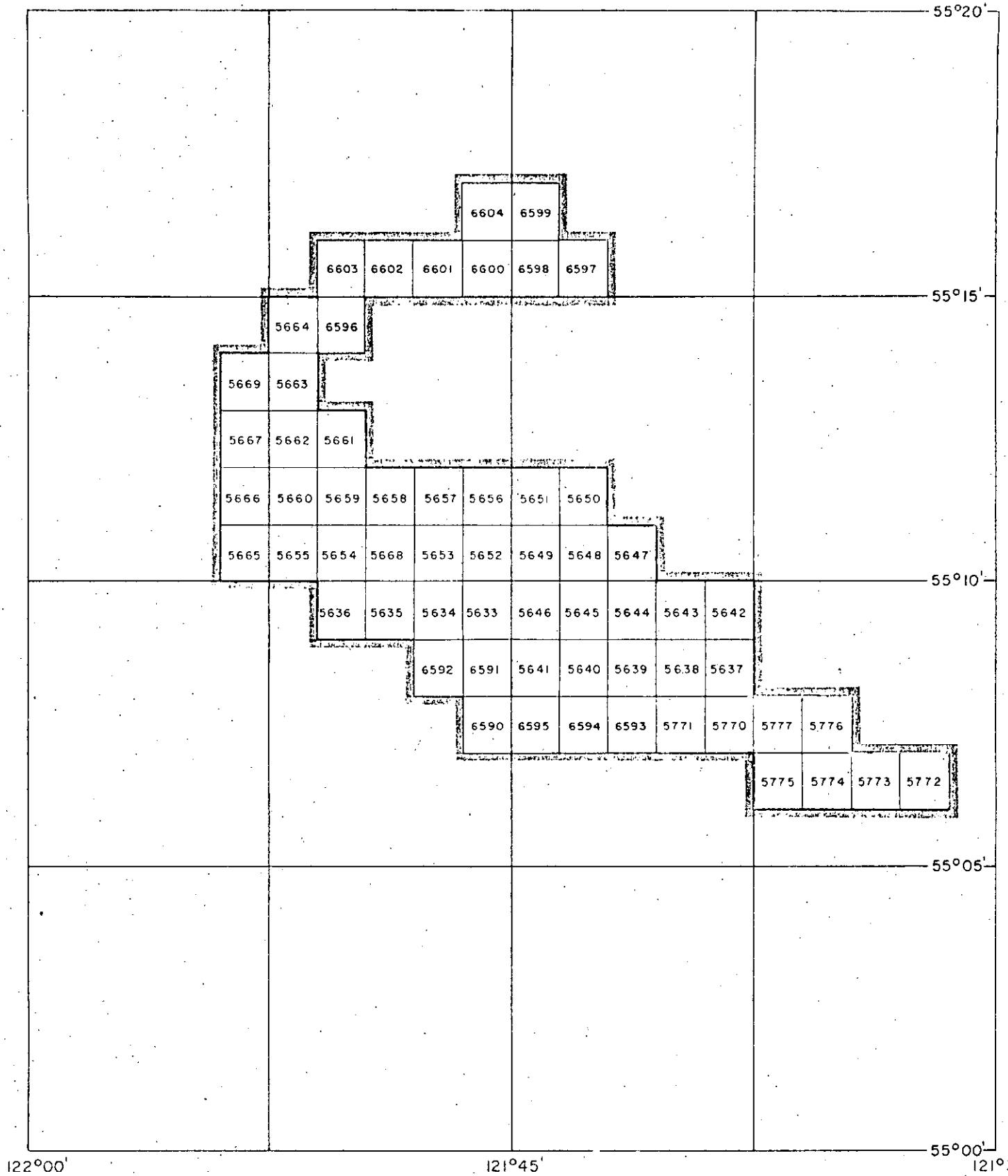
WINDFALL COAL PROJECT

LOCATION MAP

PREPARED BY:	SCALE
APPROVED BY: DATE: DEC/81	DRAWING No.

surface for the area between Moberly River and Burnt River. Regional exploration and reconnaissance mapping confirmed that a large part of the area is underlain by younger Dresser and Gething formations, as well as the Minnes.

Norwest Resource Consultants Ltd. was commissioned to undertake the exploration in 1979. Based on the data collected in 1979, G.C.R.I. acquired 45 coal licences for a total of 13,324 hectares. After the 1980 exploration season, G.C.R.I. acquired 15 more licences in September in the Windfall Block, covering 4432 hectares. The entire Windfall Block now holds 60 licences and 17,756 hectares. Figure 3.2.1 illustrates the Windfall licence distribution listed in Table 3.2.1.



GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

COAL LICENCES

Figure 3.2.1

PREPARED BY:	SCALE
APPROVED BY: DATE: DEC. 81	DRAWING No.

TABLE 3.2.1

Licence and Acreage Summary of the Windfall Property

Licence No.	Date of Acquisition	No. of Licences	Hectares
5633 - 5669	Dec. 20, 1979	37	10,952
5770 - 5777	Jan. 25, 1980	8	2,372
6590 - 6609	Sept. 29, 1980	15	4,432
TOTAL		60	17,756

4.0 1981 EXPLORATION PROGRAM

4.1 Objectives

Based on the 1980 Geological Report recommendations, a second year field mapping and rotary drilling program was planned and executed with the following objectives:

1. to run reconnaissance and detail mapping traverses on a 1:25,000 scale in previous unmapped areas on the Windfall block;

2. to locate coal seam exposures and delineate areas favourable to the formation of thickened coal;

3. to trench and log all coal showings identified in the 1980 and 1981 field mapping seasons;

4. to conduct a small rotary drilling and geophysical logging program for assessment of the subsurface coal potential;

5. to describe the lithologies of drill chip samples;

6. to summarize the 1980 and 1981 field data in a geological report.

4.2 Field Camp and Logisitics

Exploration of the Windfall property commenced on June 2, 1980. All field personnel were housed in motels in Chetwynd, B.C. A four-man geological party, assigned to the Windfall block, carried out the mapping program during a 6-week period.

Accessibility to and from the Windfall area was provided by Bell 206 helicopter chartered from Northern Mountain Helicopters of Prince George, B.C. Field investigation on the property along the Sukunka road was done using a four-wheel drive vehicle leased from West Wheels Leasing Ltd. in Calgary.

Communications were provided by B.C. Telephone. A battery-operated repeater, owned by GCRI and located on Mt. LeHudette, allowed for adequate communication between field parties and base in Chetwynd. Small portable field radios were provided by West Can Electronics, Calgary, Alberta.

Table 4.2.1 provides a list of personnel, contractors, and service companies employed on the Windfall project.

TABLE 4.2.1

Personnel Employed

Gulf Personnel

G. D. Childs, P. Geol.	Manager, Coal Exploration
A. E. Bienia, P. Geol.	Project Supervisor
H. D. Zschach, P. Geol.	Project Geologist
A. Petzold	Geologist
E. K. Bogoslowski	Geological Assistant
S. McKenzie	Geological Assistant
R. McIntosh	Geological Assistant
C. Fitzgerald	Geological Assistant
W. Heck	Field Bookkeeper
M. Sparks	Senior Technologist
L. Leonard	Typist
S. Hansen	Trencher
M. Johnson	Trencher
M. Cassidy	Trencher
G. Love	Trencher

Consultants

Norwest Resources Consultants Ltd.:

G. Jordan, P. Geol.	Consultant
I. Delas, P. Geol.	Consultant

Sampietro Expediting Services:

T. Sampietro	Expeditor

List of Contractors and Services

Accommodation

Stagecoach Inn	Chetwynd, B.C.

Aircraft

Northern Mountain Helicopters	Prince George, B.C.

Equipment and Fuel

Texaco	Chetwynd, B.C.
Gulf	" "
Esso	" "
Petro-Canada (Chetwynd-Pacific)	" "
P. Demuellermeester	" "

Communications

A.G.T.	Calgary, Alta.
B.C. Telephones	Vancouver, B.C.
West Can Electronics	Calgary, Alta.

Truck Rentals

West Wheels Leasing Ltd.	Calgary, Alta.

Surveying

Donald E. Watson, Land Surveyor	Delta, B.C.

Drilling

Alberta Southern Exploration Drilling Ltd.	Calgary, Alberta

4.3 Surveying and Photogrammetry

The 1981 Exploration program continued to use the 1980 - 1:25,000 scale topography base map of the Windfall area which was provided by R.M. Hardy & Associates. The topographic contour lines are given in feet. In addition to the available air-photos at a 1:60,000 and 1:15,000 scale, 3 flight lines at 1:30,000 have been prepared for the 1982 program.

All drill locations and elevations of the Windfall project were surveyed by Watson Surveys from Delta, B.C. The drill hole locations are plotted on the 1:25,000 scale geology and trench location maps found in the back pocket of the text. A listing of the drill location coordinates is given in Table 4.3.1.

4.4 Geological Mapping

Mapping and subsequent interpretation were carried out by Gulf's staff with assistance from Norwest Resource Consultants Ltd.

Mapping was done on a reconnaissance scale and by plane table surveys. All field observations were plotted on 1:25,000 scale base maps or 1:15,000 scale aerial photographs.

TABLE 4.3.1

WINDFALL PROJECT

DRILLING SUMMARY

Drill Hole	UTM Coordinates	Ground Elevation	Overburden	Total Depth Drilled
WF-RDH-81-01	N 6115 430.29 E 580 054.21	718.10 m	16.4 m	262.7 m
WF-RDH-81-02	N 6114 897.40 E 579 178.77	729.33 m	128.0 m	128.0 m
WF-RDH-81-03	N 6113 335.86 E 576 103.26	727.50 m	61.0 m	61.0 m
WF-RDH-81-04	N 6115 551.03 E 580 199.66	716.10 m	13.9 m	321.4 m
WF-RDH-81-05	N 6114 801.88 E 578 820.93	727.90 m	137.1 m	137.1 m
WF-RDH-81-06	N 6113 066.35 E 575 469.83	730.20 m	30.5 m	30.5 m
WF-RDH-81-07	N 6112 140.45 E 574 521.24	756.10 m	5.5 m	356.6 m

Note: Drill hole diameter is approximately 15.88 cm.

4.5 Trenching

A hand-trenching program was undertaken by a 4-man crew under the supervision of a geologist who measured and logged the exposed coal seam. A total of 19 trenches were dug during a one-week period.

The coal was described by visually estimating the relative percentage of bright (vitrain) to dull (durain) bands in a given interval, and assigned to one of the following categories:

Lithotype Seam Composition

C1 = 80 - 100% Vitrain

C2 = 60 - 80% Bright Banded

C3 = 40 - 60% Dull-Bright Banded

C4 = 20 - 40% Dull Banded

C5 = 0 - 20% Dull Coal

C6 = 0 - 10% Bone Coal

4.6 Rotary Drilling

Alberta Southern Exploration Drilling commenced the Windfall rotary drilling project on July 23, 1981 and completed the last borehole on Aug. 6, 1981.

A DHD 360 Ingersoll-Rand downhole hammer and TH60 Cyclone air water combination rig was employed on a 24 hour, 7 day basis.

Seven rotary drill holes were attempted but only 3 holes were completed for a total of 940.7 metres. Downhole drilling problems in excessively thick overburden (as much as 140 m) forced abandonment in three locations, while a fourth hole was only spudded, but never drilled on discovery of its wrong site location. All drill sites were prepared off to one side on the Sukunka Road. The rotary drill locations are shown on the Windfall geology and trench location maps, and a drilling summary is given in Table 4.3.1.

Drill cuttings were collected by Gulf personnel at 10 foot intervals in rotary holes RDH 81-04 and RDH 81-07. The drill cuttings were collected in plastic bags; later washed, dried and stored in plastic vials in preparation for lithology description by a geologist. The chip sample lithology descriptions are presented in Appendix A.

4.7 Geophysical Logging

The three successfully completed rotary drill holes were geophysically logged with the following tools: 1) directional; 2) gamma-ray neutron; 3) focused beam electric (20 cm spacing); 4) sidewall densilog; and 5) caliper. A paper print log on 1:100 scale is provided in Appendix B.

4.8 Cost Analysis

Total exploration expenditures on the 1981 Windfall Project were $161,147.02. Table 4.8.1 provides an approximate cost breakdown, and Table 4.8.2 lists the application of work credits applied for on the retained licences.

TABLE 4.8.1

COST BREAKDOWN

1.	Wages/Salaries		$13,407.62
2.	Consultant Fees		1,140.00
3.	Food and Accommodation		11,880.00
4.	Travel		1,980.00
5.	Helicopter Support	(Reconnaissance Flying)	7,695.00
		(Drilling)	7,695.00
6.	Drilling		80,270.93
7.	Geophysical Logging		8,847.99
8.	Reclamation		5,514.00
9.	Report Preparation		500.00
		Sub-Total	$146,497.29
10.	Overhead @ 10%		14,649.73
		TOTAL	$161,147.02

TABLE 4.8.2

APPLICATION OF WORK CREDITS

1) Amount of expenditure claimed = $161,142.02.

2) At approximately 296 hectares per licence, the costs were distributed as follows:

A. Up to 3 years work credit is applied to 9 licences (total 2664 hectares):

6604, 6599, 6603, 6602, 6601, 6600, 6598, 6597, 6596

1 year @ $ 7.50 per hectare =	$ 19,980.00
2 year @ 12.50 per hectare =	$ 33,300.00
3 year @ 25.00 per hectare =	$ 66,600.00
Sub-Total	$119,880.00

B. 2nd years work credit is applied for to 1 licence (296 hectares):

5664

2 year @ $12.50 per hectare =	$ 3,700.00

C. Up to 2 years work credit is applied for to 6 licences (total 1776 hectares):

6592, 6591, 6590, 6595, 6594, 6593

1 year @ $ 7.50 per hectare =	$ 13,320.00
2 year @ 12.50 per hectare =	$ 22,200.00
Sub-Total	$ 35,520.00

TOTAL WORK CREDIT APPLIED FOR	$159,100.00

TABLE 4.8.2

APPLICATION OF WORK CREDITS

Windfall 1981 work expenditures totalled 161,147.02 to be allocated to 15 licences dated September 29, 1980 and 1 licence dated December 20, 1979.

LICENCE	1st Year 9-29-80-81 at $7.50	2nd Year 9-29-81-82 at $12.50	3rd Year 9-29-82-83 at $12.50	SUBTOTAL
6590	$2220.00	$3700.00	$3700.00	$9620.00
6591	2220.00	3700.00	3700.00	9620.00
6592	2220.00	3700.00	3700.00	9620.00
6593	2220.00	3700.00	3700.00	9620.00
6594	2220.00	3700.00	3700.00	9620.00
6595	2220.00	3700.00	3700.00	9620.00
6596	2220.00	3700.00	3700.00	9620.00
6597	2212.50	3687.50	3687.50	9687.50
6598	2212.50	3687.50	3687.50	9587.50
6599	2212.50	3687.50	3687.50	9587.50
6600	2212.50	3687.50	3687.50	9587.50
6601	2212.50	3687.50	3687.50	9587.50
6602	2212.50	3687.50	3687.50	9587.50
6603	2212.50	3687.50	3687.50	9587.50
6604	2212.50	3687.50	3687.60	9587.50

	2nd Year 12-20-80-81 at $12.50	3rd Year 12-20-81-82 at $12.50	4th Year 12-20-82-83 at $25.00	
5664	$ 3700.00	$ 3700.00	$ 7400.00	$ 14800.00
SUBTOTAL	$36940.00	$59100.00	$62800.00	
			TOTAL	$158840.00

5.0 GEOLOGY OF THE WINDFALL BLOCK

The Windfall Block is approximately centered at kilometre 70 on the Sukunka River road and covers an area of Minnes Group and Bullhead Group strata on both sides of the Sukunka River.

Geological mapping, via reconnaissance and plane-table survey, has been carried out to date on the Windfall block. Some significant differences between the geology of the block, and the Goodrich and Lossan blocks have been observed.

5.1 Stratigraphy

The stratigraphic subdivision used on the Windfall report is illustrated in Table 5.1.0.

5.1.1 The Minnes Group

Field investigations from previous summers have indicated that the Minnes Group on the Windfall block has a significantly different stratigraphy to the same group on the Goodrich block to the northwest.

To date, none of the quartzite beds, which define either the top of the Monach and Monteith formations, have been identified on the Windfall Property.

TABLE 5.1.0

STRATIGRAPHIC COLUMN

AGE	GROUP	FORMATION
LOWER CRETACEOUS	FORT ST. JOHN	COMMOTION
		MOOSEBAR
	BULLHEAD	GETHING
		CADOMIN
JURASSIC OR LOWER CRETACEOUS	MINNES	UPPER BRENOT
		MIDDLE BRENOT
		LOWER BRENOT
		MONACH
		BEATTIE PEAKS
		MONTIETH
JURASSIC	FERNIE	FERNIE

The absence of the Brenot/Monach contact suggests that, in fact, the base of the Minnes Group is nowhere exposed within the Windfall block. Therefore, the thickness of the Brenot is unknown, as it cannot be measured at the surface due to a lack of complete exposure. Records of gas well geophysical logs drilled in the vicinity, however, do indicate a thickness of up to 2500 metres of Minnes Group sediments.

Near the Sukunka River, the Minnes Group consists of mudstones, medium to coarse-grained lithic sandstones and siltstones, as well as carbonaceous mudstone and coal seams, making the unit essentially non-marine.

Geological mapping, in the programs 1979-81, has identified three mappable units in the Brenot formation of the Minnes Group.

The oldest Brenot sequence consists predominantly of carbonaceous mudstones, with frequent beds of siltstones, and occasional sandstone horizons. Coal measures are also found within this unit. Although a lower contact to this formation has not been mapped, the unit thickness is thought to be approximately 1200-1300 m. Overlying the mudstone and coal-bearing sequence is a section which consists mainly of medium-grained sandstones, and some carbonaceous mudstones. The unit thickness for this member, from data to date, is approximately 800-1000 m.

The youngest beds of the Brenot formation consist mainly of coarse-grained sandstones and grits, which tend to form small cliffs whenever exposed. Generally, scree deposits at the base of these cliffs make it difficult to trace, by mapping, those coal seams that were either found in trenches or intersected in the 1981 drill holes. The unit thickness for this member is thought to be 350-400 m, according to data from exploration activities.

The top of the Minnes Group is defined by the Brenot/Cadomin contact found in the northern portion of the Windfall block.

5.1.2 Cadomin Formation

The Cadomin Formation is a well-developed conglomerate containing clasts, usually about 3 cm in diameter, over a stratigraphic interval of about 20 metres. This formation has only recently been discovered to exist on the Windfall block. It is exposed along Rock Creek in the north, and near West Bullmoose Creek in the south. The formation marks the top of the Brenot formation and Minnes Group, and represents the oldest formation of the Bullhead Group. The Cadomin is overlain by the Gething formation. The unit thickness for the Cadomin is thought to be 250-300 m.

5.1.3 Gething Formation

In the Windfall Block, the Gething formation is the youngest formation present; however, approximately 200 m of incomplete section have been mapped to date. (Approximately 400 m of Gething has been intersected in the Goodrich-Lossan area.) The Gething sediments consist of predominantly fine to medium-grained sandstones with a monotonous appearance. The sandstones are quart-lithic and often contain an abundance of plant casts. Carbonaceous mudstones and siltstones also constitute a significant portion of this formation. While numerous coal seams have been identified in the Gething, on the Goodrich block; none have, however, been located on the Windfall block to date.

5.2 Coal Occurrences

To date, coal occurrences have been identified only in the Minnes Group strata.

5.2.1 Minnes Group

Minnes Group coal occurrences were located in three areas of the Brenot formation, and were trenched and logged in detail in 1981. The trench logs are presented in Appendix C, and the trench location map can be found in the back pocket.

In the southwest area, along the Sukunka River, there are seven trenches (SKA 81-B01 to B07) in the upper Brenot near the Cadomin-Brenot contact. The net coal thicknesses range from .04 m to 0.60 m; generally the average is less than 0.50 m.

The second area exposing coal measures exists further downstream along the Sukunka River, northeast of Windfall Creek. These seams (Trenches SKA 81-B01 to B04) are located in the lower Brenot and the net coal thicknesses range from 0.18 m to 1.45 m.

The third area of exposed coal measures is situated in the north of the property along Rocky Creek. These seams (Trenches RCK 81-B01 to B07) are located in the upper Brenot and the net coal thicknesses range from 0.28 m to 0.76 m.

A solitary Brenot seam was trenched (WFC 81-B01) upstream along Windfall Creek and its coal to coal + rock ratio is 0.63/0.91 m.

The coal intersections in the three rotary drill holes are listed in table 5.2.1.1 and illustrated in the coal seam data sheets found in Appendix D. Approximate true coal thicknesses given in the same table are based on surface data found in the vicinity of the drill locations. A complete suite of geophysical logs for the rotary holes can be found in Appendix B.

TABLE 5.2.1.1

ROTARY DRILL HOLE COAL INTERSECTIONS

Drill Hole	Interval	Apparent Thickness	Approximate True Thickness (based on surface geology)
RDH-81-01	81.70 - 82.50 m	0.80 m	0.27 m
	84.67 - 85.24 m	0.57 m	0.19 m
	85.93 - 86.81 m	0.88 m	0.30 m
	118.88 -122.74 m	3.86 m	1.32 m
RDH-81-04	48.29 - 50.17 m	1.92 m	0.66 m
	53.03 - 55.15 m	2.12 m	0.73 m
	60.39 - 61.69 m	1.30 m	0.44 m
RDH-81-07	2.38 - 3.84 m	1.46 m	0.61 m
	28.36 - 28.93 m	0.57 m	0.24 m
	46.24 - 49.77 m	3.53 m	1.49 m
	58.75 - 59.23 m	0.48 m	0.20 m

5.3 Geologic Structure

The Windfall block consists of a faulted, moderately folded synclinorium.

The structures trend in a northwesterly direction with no apparent plunge. The geology is illustrated on the accompanying geological map, and cross-sections X-X', Y-Y', and Z-Z' found in Appendix E.

Because the depth of folding is unknown and erosion of the upper Minnes section was found to be extensive in the broad Sukunka River valley, structural trends were not continued through cross-section Y-Y'.

Exposure is limited to mostly Bullhead strata for most of the Windfall block, primarily due to shallow secondary folding within the Minnes Group. Some Cadomin and Gething sediments are exposed, however, on the eastern edge of the property in the Rocky Creek and Mount Chamberlain areas.

Three types of faults are thought to exist on the Windfall property.

The Merrick fault is interpreted as a normal, or down-faulted block exposing a preserved section of younger strata (Gething) along the limbs of the anticline in the southwest

(see cross-section Z-Z'). The eastern limb of the anticline is eventually cut-off, due to the oblique trending Merrick fault leaving only a relative shallower dipping west limb (see cross-section X-X').

The Windfall fault is considered to be rotational, whereby downfaulted movement in the north has preserved the Cadomin-Gething section, and upthrusted movement to the south has exposed the older Minnes Group. A small fault splay off the Windfall fault in the north may have partially acted as a pivot in the scissor-like type of displacement.

A major thrust fault exists outside the west edge of the Windfall block which places Triassic sediments adjacent to Lower Cretaceous strata. Two thrusts within the Minnes Group are interpreted in the southeast portion of the property. Displacement along the fault is considered to be in the order of 200 to 300 metres, as no difference in strata on either side of the thrusts were observed in the field.

6.0 CONCLUSION

A regional mapping program of 1:25,000 scale, and rotary drilling program, comprised the major exploration objectives of the 1981 Windfall project.

An abundance of upper Minnes strata has been mapped with the recent addition, in 1981, of some minor Bullhead not before known to exist on the Windfall Block.

The geological mapping identified mostly folded sediments of the Brenot formation. The structure is trending northwesterly, and folds are generally small-scale and frequently closely spaced. The stratigraphy is disrupted by only a few widely separated, west-dipping faults; sub-parallel to the regional trend.

Exposure of outcrop is limited by the extensive vegetation cover and to date, only few significant coal measures have been identified on well-eroded creek banks.

In future exploration programs, one particular area merits further attention. The area is located on the north licences in the Rocky Creek area, west of the Sukunka River, where strata from the upper Brenot, Cadomin, and lower Gething formations are exposed. The contacts have been mapped, however extensive mapping within the Gething in search of continuous coal measures has not taken place and merits further exploration.

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APPENDIX A

DRILL CUTTING LITHOLOGY DESCRIPTION

WF-RDH-81-04
WF-RDH-81-07

ROTARY DRILL CHIP SAMPLES

WF-RDH-81-07

Logged by: A. Petzold

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
9.1	18.3	9.1	siltstone, medium grey, calcareous carby pieces, weathered pieces
18.3	70.1	51.8	chip samples not taken in this interval
70.1	79.2	9.1	sandstone, dark grey, calcareous
79.2	106.7	27.4	siltstone, medium grey, micaceous, calcareous
106.7	109.7	3.1	sandstone, medium grey, micaceous
105.7	112.8	3.1	mudstone, dark grey, pyrite, carbonaceous
112.8	115.8	3.1	sandstone, very fine grained, micaceous, light grey
115.8	121.9	6.1	mudstone, dark grey, minor coal
121.9	140.2	18.3	siltstone, medium grey, calcareous micaceous
140.2	143.3	3.1	mudstone, dark grey, minor coal
143.3	146.3	3.1	coal, polished, bright pieces
146.3	155.5	9.1	siltstone, dark grey, micaceous, minor sandstone pieces

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
155.5	158.5	3.1	sandstone/mudstone, light-dark grey, very calcareous
158.5	169.6	6.1	siltstone, medium grey, pyritic, calcareous, minor coal
164.6	170.7	6.1	sandstone, very fine grained, light-medium grey, minor coal
170.7	173.7	3.1	mudstone, dark grey
173.7	176.8	3.1	siltstone, dark grey, calcareous
176.8	182.9	6.1	mudstone, medium grey, very calcareous
182.9	189.0	6.1	siltstone, medium grey, very calcareous
189.0	192.0	3.1	mudstone, dark grey, calcareous
192.0	195.1	3.1	sandstone, very fine grained, calcareous, light-grey
195.1	219.5	24.4	siltstone, medium grey, micaceous, calcareous
215.5	222.5	3.1	mudstone, medium grey, calcareous
222.5	246.9	24.4	siltstone, medium dark grey, micaceous, calcareous
246.9	249.9	3.1	mudstone, dark grey, slicken sides, calcareous
249.9	256.0	6.1	sandstone/siltstone, medium grey, calcareous

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
256.0	259.1	3.1	mudstone, dark grey, pyritic, very small pieces, calcareous
259.1	262.1	3.1	siltstone, medium grey, calcareous
262.1	265.2	3.1	mudstone, dark grey, minor coal pieces
265.2	277.4	12.2	siltstone, dark grey, micaceous calcareous
277.9	280.4	3.1	mudstone/coal, dark grey shiny bright pieces, pyritic
280.4	292.6	12.2	siltstone, medium grey, polished surfaces, slicken sides, calcareous, micaceous
292.6	295.7	3.1	mudstone, dark grey, carbonaceous
295.2	301.7	6.1	siltstone, dark grey, calcareous
301.7	304.8	3.1	mudstone/coal, dark grey bright pieces
304.8	317.0	12.2	siltstone, light-dark grey, slickensides, polished, carbonaceous
317.0	323.1	6.1	mudstone, dark grey, carbonaceous polished pieces
323.1	326.1	3.1	siltstone, dark grey, calcareous

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
326.1	329.2	3.1	mudstone, dark grey, minor coal pieces, calcite veining
329.2	397.5	18.3	siltstone, medium-dark grey, polished pieces, calcareous, micaceous, carbonaceous

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
103.6	106.7	3.1	mudstone, dark grey, carbonaceous, polished pieces
106.7	112.8	6.1	sandstone, very fine grained medium grey, calcareous
112.8	121.0	9.1	siltstone, light-medium grey calcareous, micaceous
121.9	131.1	9.1	sandstone, very fined grained light grey, micaceous
131.1	134.1	3.1	siltstone, dark grey, some carbonaceous pieces, micaceous
134.1	137.2	3.1	mudstone, medium grey
137.2	140.2	3.1	sandstone/coal, fine grained bright coal, small pieces
140.2	146.3	6.1	siltstone, medium grey calcareous
146.3	149.4	3.1	sandstone, very fine grained, light grey, very calcareous
149.4	161.5	12.2	siltstone, medium grey, very calcareous
161.5	167.6	6.1	sandstone/siltstone, dark grey, calcarous
167.6	173.7	6.1	sandstone, fine grained, light grey, calcareous
173.7	182.9	9.1	siltstone, medium grey, micaceous, calcareous
182.9	185.9	3.1	coal, mostly bright pieces polished.

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
185.9	192.0	6.1	siltstone, medium grey, calcareous
192.0	210.3	18.3	sandstone, very fine grained, light grey, very calcareous, some curby pieces
210.3	213.4	3.1	sandstone/siltstone, medium grey, silty
213.4	216.4	3.1	mudstone, dark grey, small carbonaceous pieces
216.4	240.8	24.4	siltstone, medium-dark grey micaceous, calcareous
240.8	296.9	6.1	mudstone, medium-dark grey very calcareous, some polished pieces
246.9	253.0	6.1	siltstone, medium grey, calcareous
253.0	256.0	3.1	sandstone, very fine grained, medium grey, calcareous
256.0	262.1	6.1	siltstone, medium grey, calcareous
262.1	265.2	3.1	sandstone, very fine grained, medium grey, calcareous
265.2	268.2	3.1	mudstone, dark grey, very calcareous
268.2	274.3	6.1	siltstone, dark grey, pyritic, calcareous
274.3	283.5	9.1	sandstone, very fine grained, medium grey, calcite veining

FROM (m)	TO (m)	INTERVAL THICKNESS	LITHOLOGY
283.5	292.6	9.1	siltstone, dark grey, micaceous, calcareous, some coaly pieces.
292.6	295.7	3.1	sandstone, fine grained, light grey, some silty pieces
295.7	298.7	3.1	siltstone, light grey, micaceous
298.7	304.8	6.1	mudstone, dark grey, carbonaceous
304.8	317.0	12.2	siltstone, medium grey, very calcareous, polished pieces
317.0	320.0	3.1	mudstone, dark grey, calcareous
320.0	323.1	3.1	siltstone, light grey, some weathered pieces; rust brown micaceous, calcareous

APPENDIX B

(under separate cover)

GEOPHYSICAL LOGS

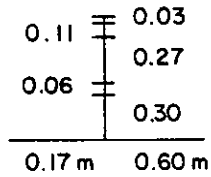
APPENDIX C

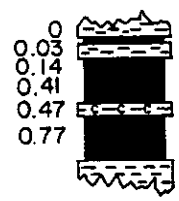
TRENCH LOGS

TRUE THICKNESS

ROCK COAL

T
COAL/
COAL + ROCK
0.60/0.77m
⊥





ROOF = 302° / 61° SW

MUDSTONE
COAL: powdery
SHALE: carbonaceous
COAL: 30% vitrain
SHALE: carbonaceous
COAL: 30% vitrain
MUDSTONE: friable

FLOOR = 302° / 61° SW

FORMATION : BRENOT
UTM COORDINATES : 112 050 N, 574 600 E
MAP CARD NUMBER
AIR PHOTO NUMBER : B.C. 7194-28
TRENCH DEPTH : 0.30m
TRENCH WIDTH : 0.50 m
TRENCH LENGTH : 0.82 m
TRENCH BEARING : 214°
TRENCH SLOPE : 0°

CL 5636

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Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

TRENCH LOG

SKA - 81 - B01

DRAWN BY: A. BAILLIE	SCALE 1:50
LOGGED BY: S. MCKENZIE	DATE OCT./81
APPROVED BY: H. ZSCHACH	

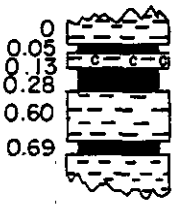
TRUE THICKNESS

ROCK COAL

COAL /
COAL + ROCK
0.29/0.69m

0.08 | 0.05 | 0.09 | 0.06 | 0.32 | 0.09

0.40m 0.29m



ROOF : 304/57° SW

WET MUDSTONE
COAL : Shiney sheared
MUDSTONE : Wet carbonaceous
COAL : Wet, crumbled
COAL : Dull
MUDSTONE

COAL : Dull , wet
MUDSTONE

FLOOR : 304°/57°SW

FORMATION : BRENOT
UTM COORDINATES : 111 800 N, 574 110 E
MAP CARD NUMBER
AIR PHOTO NUMBER : B.C. 7194 - 128
TRENCH DEPTH : 0.65 m
TRENCH WIDTH : 0.61 m
TRENCH LENGTH : 1.00 m
TRENCH BEARING : 214°
TRENCH SLOPE : 0°

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TRENCH LOG

SKA - 81 - B02

DRAWN BY: A. BAILLIE	SCALE 1 : 50
LOGGED BY: S. MCKENZIE	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS
ROCK COAL

COAL/
COAL + ROCK
0.04 / 0.04

0.04
0 0.04m

0
0.04

ROOF : 310° / 70° W

MUDSTONE
COAL: wet, shiney, sheared
MUDSTONE : carbonaceous

FLOOR : 310° / 70° W

FORMATION : BRENOT
UTM COORDINATES : 111 795 N, 574 105 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7194 - 128
TRENCH DEPTH : 0.13 m
TRENCH WIDTH : 0.21 m
TRENCH LENGTH : 0.75 m
TRENCH BEARING : 220°
TRENCH SLOPE : 0°

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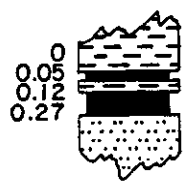
WINDFALL COAL PROJECT
TRENCH LOG
SKA - 81 - B03

DRAWN BY: A. BAILLIE	SCALE 1 : 50
LOGGED BY: S. MCKENZIE	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

COAL /
COAL + ROCK
0.20 / 0.27

TRUE THICKNESS
ROCK COAL

0.07 = 0.05
0.15
0.07 m 0.20 m



ROOF: 308° / 75° SW

MUDSTONE
COAL: wet, shiney, sheared
MUDSTONE
COAL: shiney, 80% vitrain
SILTSTONE

FLOOR: 308 / 75° SW

FORMATION : BRENOT
UTM COORDINATES : 111 770 N, 574 000 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7194 - 128
TRENCH DEPTH : 0.34 m
TRENCH WIDTH : 0.31 m
TRENCH LENGTH : 0.45 m
TRENCH BEARING : 218°
TRENCH SLOPE : 0°

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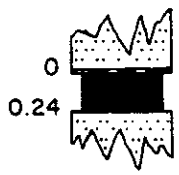
WINDFALL COAL PROJECT
TRENCH LOG
SKA - 81 - B04

DRAWN BY: A. BAILLIE	SCALE 1 : 50
LOGGED BY: S. MCKENZIE	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS

COAL / COAL + ROCK	ROCK	COAL
0.24 / 0.24	0.0	0.24
	0.0m	0.24m



ROOF: 318° / 80° SW

GREY SILTSTONE
MUDSTONE: very carbonaceous
COAL: dull, blocky
GREY SILTSTONE

FLOOR: 318° / 80° SW

FORMATION : BRENOT
UTM COORDINATES : 111 760 N, 573 990 E
MAP CARD NUMBER
AIR PHOTO NUMBER : B.C. 7194 - 128
TRENCH DEPTH : 0.29 m
TRENCH WIDTH : 0.31 m
TRENCH LENGTH : 0.47 m
TRENCH BEARING : 228°
TRENCH SLOPE : 0°

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TRENCH LOG

SKA - 81 - B05

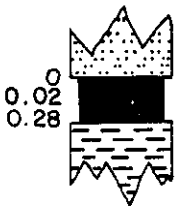
DRAWN BY: A. HENCZEL	SCALE 1 : 50
LOGGED BY: S. MC KENZIE	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

COAL / COAL + ROCK

0.28 / 0.28

TRUE THICKNESS

ROCK	COAL
0.0	0.02
	0.26
0.0m	0.28m



ROOF: 310° / 76° SW

GREY, SILTY SILTSTONE
COAL: bone
COAL: bright, banded
MUDSTONE: Fissile

FLOOR: 310° / 76° SW

FORMATION : BRENOT
UTM COORDINATES : 111 750 N, 573 980 E
MAP CARD NUMBER
AIR PHOTO NUMBER : B.C. 7194 - 128
TRENCH DEPTH : 0.20m
TRENCH WIDTH : 0.25 m
TRENCH LENGTH : 0.39m
TRENCH BEARING : 220°
TRENCH SLOPE : 0°

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TRENCH LOG

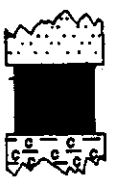
SKA-81-B06

DRAWN BY: C. BARNES	SCALE 1 : 50
LOGGED BY: S. MCKENZIE	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

TOTAL THICKNESS

COAL / COAL + ROCK	ROCK	COAL
.47/.47	0.09	0.38

0 — 0.47 m



ROOF 299° / 64° SW

SILTSTONE : grey

COAL: bright, banded, blocky

COAL: powdery

CLAYSTONE : carbonaceous, friable, getting cleaner downwards

FLOOR: 299° / 64° SW

FORMATION : BRENOT
UTM COORDINATES : 111 795 N 573 905 E
MAP CARD NUMBER
AIR PHOTO NUMBER : BC 7194 - 128
TRENCH DEPTH :
TRENCH WIDTH :
TRENCH LENGTH :
TRENCH BEARING : 209°
TRENCH SLOPE :

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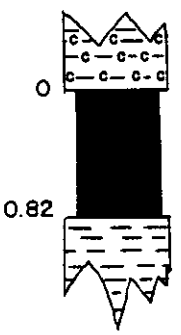
TRENCH LOG

SKA - 81 - 807

DRAWN BY: A. BAILLIE	SCALE 1:50
LOGGED BY: S. MCKENZIE	DATE OCT. 1981
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS

	ROCK	COAL
COAL / COAL + ROCK	0.0	0.82
0.82 / 10.82	0.0 m	0.82 m



ROOF: 335° / 75° SW

SHALE: Carbonaceous shale, coaly inclusions, dark, blocky, fresh, weathers brown - black.

COAL: Dull, solid, C - 4

MUDSTONE: Brown/Black when fresh, coaly inclusions.

FLOOR: 333° / 75° SW

FORMATION : BRENOT
UTM COORDINATES : 116 520 N, 579 470 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7194 - 087
TRENCH DEPTH : 0.30 m
TRENCH WIDTH : 0.50 m
TRENCH LENGTH : 0.82 m
TRENCH BEARING : 260°
TRENCH SLOPE : 0°

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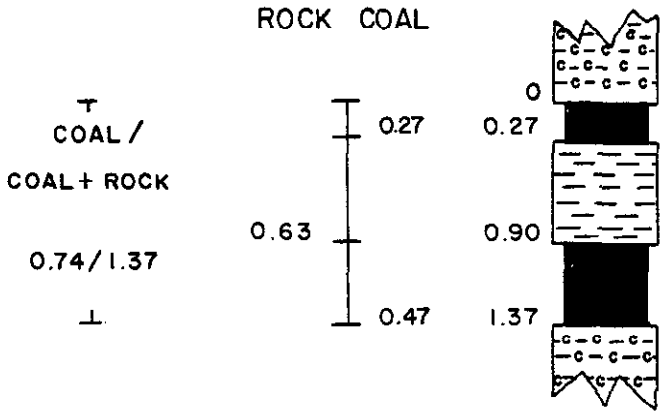
TRENCH LOG

SKR - 81 - B01

DRAWN BY: C. BARNES	SCALE 1: 50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS
ROCK COAL



ROOF: 333° / 74° S

SHALE: Carbonaceous, thinly bedded (0.25-0.50cm)

COAL: C-2, bright, 60% vitrain

CLAYSTONE: Carbonaceous, coaly inclusions, weathers chalky white-grey, iron staining, grey when fresh

COAL: C-2, bright, 60% vitrain, sheared, powdery

MUDSTONE: Coaly inclusions, fresh earthy black, blocky cleavage, carbonaceous

FLOOR: 337° / 74° SW

FORMATION : BRENOT
UTM COORDINATES : 116 520 N, 579 470 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7194-087
TRENCH DEPTH : 0.65 m
TRENCH WIDTH : 0.61 m
TRENCH LENGTH : 1.51 m
TRENCH BEARING : 254°
TRENCH SLOPE : 0°

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TRENCH LOG

SKR-81-B02

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT. /81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS

	ROCK	COAL	
			0
COAL /	0.08	0.08	
	0.22	0.30	
COAL + ROCK			
	0.65	0.95	
1.45/1.45			
	0.50	1.45	

ROOF: 330°/70° SW

MUDSTONE: Black when fresh, carbonaceous, coaly inclusions.
COAL: Dull, brown, solid.
COAL: Bright, banded, crumbly, 60 - 80% vitrain, C-2

COAL: Dull, bright, banded, C - 3.

COAL: Crumbly, C - 2.

MUDSTONE: Carbonaceous, dark, blocky when fresh, weathers orangy-brown, iron staining, contains plant fossils.

FLOOR: 335°/65° SW

FORMATION : BRENOT
UTM COORDINATES : 116 520 N, 579 420 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7194-087
TRENCH DEPTH : 0.57m
TRENCH WIDTH : 0.45m
TRENCH LENGTH : 1.58m
TRENCH BEARING : 260°
TRENCH SLOPE : 0°

CL 5666

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Gulf

WINDFALL COAL PROJECT

TRENCH LOG

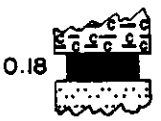
SKR-81-B03

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS

COAL / COAL + ROCK
.18/.18

ROCK COAL
0.18



ROOF : 335° / 70° SW

CARBONACEOUS SHALE : fissle, fresh black, weathers brown
COAL : c2, bright - banded, powdery
SILTSTONE : carbonaceous, iron stained, fresh black, weathers medium grey

FLOOR : 335° / 75° SW

FORMATION : BRENOT
UTM COORDINATES : 116 520N 579 420E
MAP CARD NUMBER :
AIR PHOTO NUMBER : BC 7194 - 087
TRENCH DEPTH : 0.25
TRENCH WIDTH : 0.20
TRENCH LENGTH : 0.35
TRENCH BEARING : 260°
TRENCH SLOPE : 0°

CL 5656

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

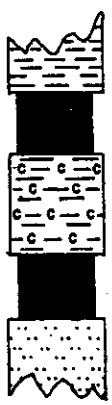
WINDFALL COAL PROJECT
TRENCH LOG
SKR-81-B04

DRAWN BY: A. BAILLIE	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. MCINTOSH	DATE OCT. 1981
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS
ROCK COAL

COAL
COAL + ROCK
0.76 / 1.46

0.37
0.70
0.39



ROOF : 310° / 35° NE

CLAYSTONE: Light-grey, chalky, light-brown weathering.

COAL: C-3,

CLAYSTONE: Dark grey hemattic stain carbonaceous-slick'n slides, coalified root casts, blocky cleavage

COAL: C-3, bright beds, finely spaced 1/2 cm solid.

SANDSTONE: Fine grain, light brown, light grey lamented coaly root casts, weathers light brown.

FLOOR: 310°/ 35° NE

FORMATION : BRENOT
UTM COORDINATES : 124 230 N, 575 450 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7193 - 183
TRENCH DEPTH : 0.5 m
TRENCH WIDTH : 1.50m
TRENCH LENGTH : 2.81 m
TRENCH BEARING : 220°
TRENCH SLOPE : 39°

CL 6602

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Coal Division
CALGARY ALBERTA

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WINDFALL COAL PROJECT
TRENCH LOG

RCK-81-B01

DRAWN BY: C. BARNES	SCALE 1: 50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT. /81
APPROVED BY: H. ZSCHACH	

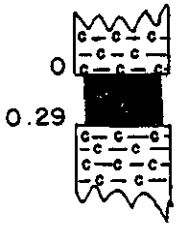
TRUE THICKNESS

ROCK COAL

COAL / COAL+ ROCK

0.29/0.29

0.29



ROOF: 306° / 35° NE

CLAYSTONE: Light grey, weathered light brown, limonitic stain fissile, carbonaceous layers.

COAL: Solid slick'n slides, some iron stains, hard bands of bright coal 0.5 cm thick.

CLAYSTONE: Dark black, very carbonaceous, thin coaly lamenations, weathered reddish brown due to iron stains.

FLOOR: 306° / 35° NE

FORMATION : BRENOT
UTM COORDINATES : 124 230 N, 575 450 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7193 - 183
TRENCH DEPTH : 0.56 m
TRENCH WIDTH : 1.5 m
TRENCH LENGTH : 0.3 m
TRENCH BEARING : 191°
TRENCH SLOPE : 0°

CL 6602

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

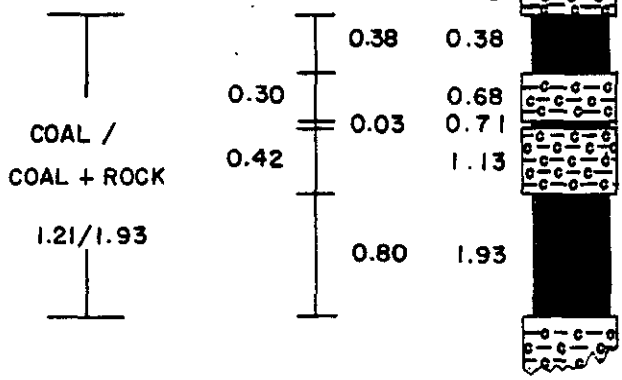
Gulf

WINDFALL COAL PROJECT

TRENCH LOG

RCK- 81 - B02

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI	DATE OCT. / 81
APPROVED BY: H. ZSCHACH	



ROOF: 299° / 45° NE

COALY INCLUSIONS: light grey, brown weathered, medium grey fresh

COAL: c2 bright banded

CLAYSTONE: carbonaceous, orange iron stained

COAL: parting

CLAYSTONE: carbonaceous, orange iron stained

COAL: sheared c2

CARBONACEOUS CLAYSTONE: coaly inclusions, coalified plant fragments

FLOOR: 299° / 45° NE

FORMATION : BRENOT
UTM COORDINATES : 124 310 N 575 530E
MAP CARD NUMBER :
AIR PHOTO NUMBER : BC-7193-183
TRENCH DEPTH : 0.56 m
TRENCH WIDTH : 1.5 m
TRENCH LENGTH : 2.0 m
TRENCH BEARING : 200
TRENCH SLOPE : 0

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GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

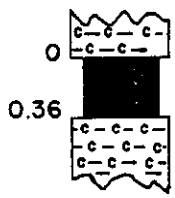
TRENCH LOG

-81-

RCK-B03

DRAWN BY: A. BAILLIE	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. MCINTOSH	DATE OCT. 1981
APPROVED BY: R. MCINTOSH	

COAL / ROCK	TRUE THICKNESS ROCK	TRUE THICKNESS COAL
0.36/0.36		0.36



ROOF: 297°/46° NE

CLAYSTONE: Carbonaceous, iron stained, 2cm band weathered brown-grey.

COAL: C-1, very bright banded, sheared fissile

CLAYSTONE: Carbonaceous, iron stained, 2cm band weathered brown-grey.

FLOOR: 297°/46° NE

FORMATION : BRENOT
UTM COORDINATES : 124 310 N, 575 530 E
MAP CARD NUMBER :
AIR PHOTO NUMBER : B.C. 7193 - 183
TRENCH DEPTH : 0.5 m
TRENCH WIDTH : 0.7 m
TRENCH LENGTH : 0.78m
TRENCH BEARING : 200°
TRENCH SLOPE : 0°

CL 16602

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

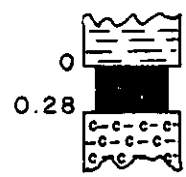
TRENCH LOG

RCK - 81 - B04

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT. /81
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS

COAL / COAL+ROCK	ROCK	COAL
0.28 / 0.28		0.28



ROOF: 333 ° / 31 ° SW

CLAYSTONE: Light brown, weathered, thinly bedded iron stained, soft clay below.

COAL: C-2, powdery, bright bands sheared.

CLAYSTONE: Carbonaceous, black brown, weathered grey, fresh, minor coaly inclusions, plant fragments.

FLOOR: 333° / 31°SW

FORMATION	: BRENOT
UTM COORDINATES	: 124 310 N, 575 530 E
MAP CARD NUMBER	:
AIR PHOTO NUMBER	: B.C. 7193 - 183
TRENCH DEPTH	: 0.4 m
TRENCH WIDTH	: 0.7 m
TRENCH LENGTH	: 1.1 m
TRENCH BEARING	: 243°
TRENCH SLOPE	: 0°

CL 6602

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

TRENCH LOG

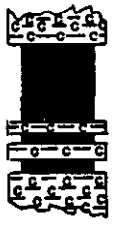
RCK - 81 - B 05

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. McINTOSH	DATE OCT./ 81
APPROVED BY: H. ZSCHACH	

COAL /
COAL + ROCK
0.64 / 0.84

TRUE THICKNESS

ROCK	COAL	
	0.15	0
	0.34	0.49
0.08	0.05	0.57
0.12	0.10	0.74
		0.84



ROOF: 315° / 17° NW

CLAYSTONE: chalky, grey weathering, thinly bedded, carbonaceous, iron staining

COAL: dull, bright bands c3
COAL: c2
MUDSTONE: carbonaceous
COAL: c2
CLAYSTONE: carbonaceous
COAL: c1
CLAYSTONE: carbonaceous

FLOOR: 315° / 17° NW

FORMATION : BRENOT
UTM COORDINATES : 124 500N 575 770E
MAP CARD NUMBER :
AIR PHOTO NUMBER : BC-7193-183
TRENCH DEPTH : 0.79 m
TRENCH WIDTH : 0.60m
TRENCH LENGTH : 1.79 m
TRENCH BEARING : 223°
TRENCH SLOPE : 0°

CL 66/02

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

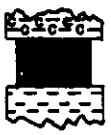
TRENCH LOG

RCK-81-806

DRAWN BY: A. BAILLIE	SCALE 1:50
LOGGED BY: E. BOGOSLOWSKI, R. MCINTOSH	DATE OCT. 1981
APPROVED BY: R. MCINTOSH	

TRUE THICKNESS

COAL / COAL+ROCK	ROCK COAL		
0.30/0.30	0.30	0.30	



ROOF : 295° / 41°NW

CARBONACEOUS CLAYSTONE : thinly bedded with 4 cm of iron stained clay.

COAL : dull, banded, powdery, c4

FLOOR : 295° / 41° NW

FORMATION : BRENOT
UTM COORDINATES : 176 050N 524 820E
MAP CARD NUMBER :
AIR PHOTO NUMBER : BC-7193-183
TRENCH DEPTH : 0.30m
TRENCH WIDTH : 0.20m
TRENCH LENGTH : 0.30m
TRENCH BEARING : 230°
TRENCH SLOPE :

CL 66602

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

WINDFALL COAL PROJECT

TRENCH LOG

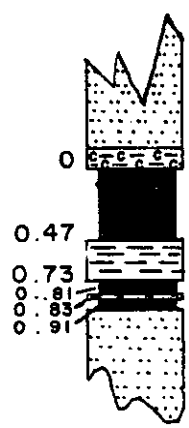
RCK-81-807

DRAWN BY: A. BAILLIE	SCALE 1 : 50
LOGGED BY: E. BOGOSLOWSKI, R. MCINTOSH	DATE OCT. 1981
APPROVED BY: H. ZSCHACH	

TRUE THICKNESS
ROCK COAL

COAL /
COAL ROCK
0.63 / 0.91

0.47
0.26 — 0.08
0.02 — 0.08



ROOF: 287° / 67° N

SILTSTONE

MUDSTONE: Carbonaceous.

COAL: Powdery, minor shearing

MUDSTONE

COAL: Powdery, minor shearing
SHALE: Carbonaceous
COAL: Powdery, minor shearing

SILTSTONE

FLOOR: 287° / 67° N

FORMATION	: BRENOT
UTM COORDINATES	: 111 200 N, 580 775 E
MAP CARD NUMBER	: WINDFALL PROPERTY (1:25000)
AIR PHOTO NUMBER	: B.C. 7194 - 128
TRENCH DEPTH	: 0.75 m
TRENCH WIDTH	: 0.70 m
TRENCH LENGTH	: 1.0 m
TRENCH BEARING	: 197°
TRENCH SLOPE	: 0°

CL 5641

GULF CANADA RESOURCES INC.
Coal Division
CALGARY ALBERTA

Gulf

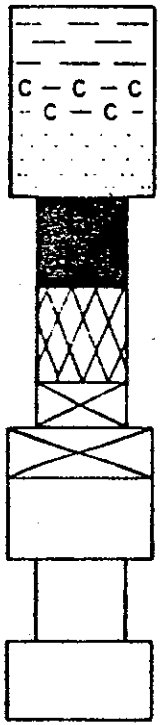
WINDFALL COAL PROJECT
TRENCH LOG
WFC-81-B01

DRAWN BY: C. BARNES	SCALE 1:50
LOGGED BY: S. MCKENZIE	DATE OCT. 1981
APPROVED BY: H. ZSCHACH	

APPENDIX D

COAL SEAM DATA SHEETS

LEGEND


C — C — C
C — C —
claystone
carbonaceous claystone
sandstone
siltstone
coal
boney, stoney coal. Coal & bands (Coal & rock)
CORED HOLE
GEOPHYSICALLY LOGGED
LITHOLOGY DESCRIBED
MISSING CORE
UNCORED HOLE
GEOPHYSICAL LOGS ONLY

COAL SEAM DATA SHEET

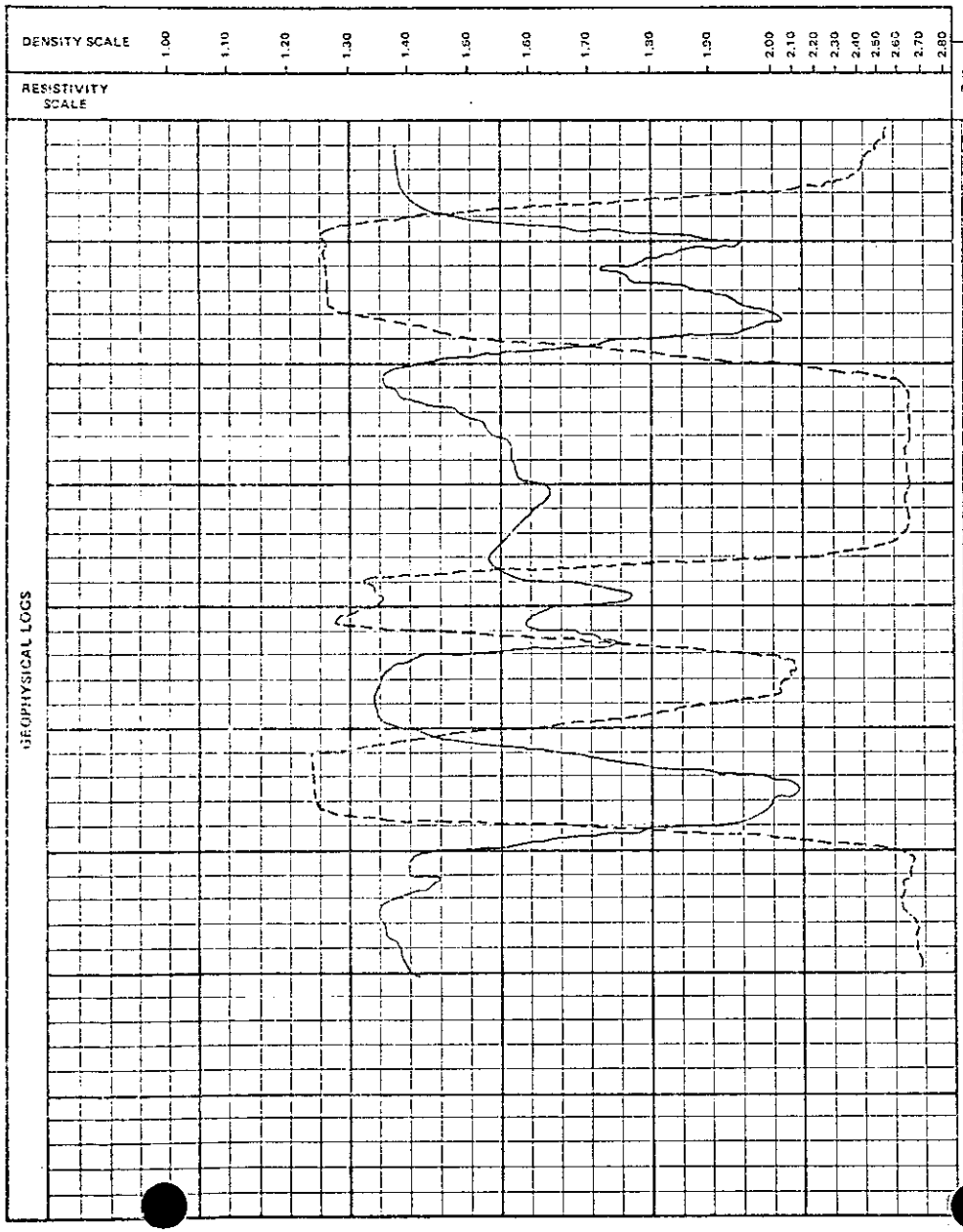
GULF CANADA RESOURCES INC.
COAL DIVISION

P-267 (12 80)

DENSITY ——— RESISTIVITY ———

DRILL NO. WDF_RDH_81-01 SEAM _____ SEAM INTERVAL 81.70m - 86.81m

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
	81.70			1.20 m										
	82.90		1.77 m											
	84.67			0.57 m										
	85.24		0.59m											
	85.93			0.88										
	86.81													

COAL SEAM DATA SHEET

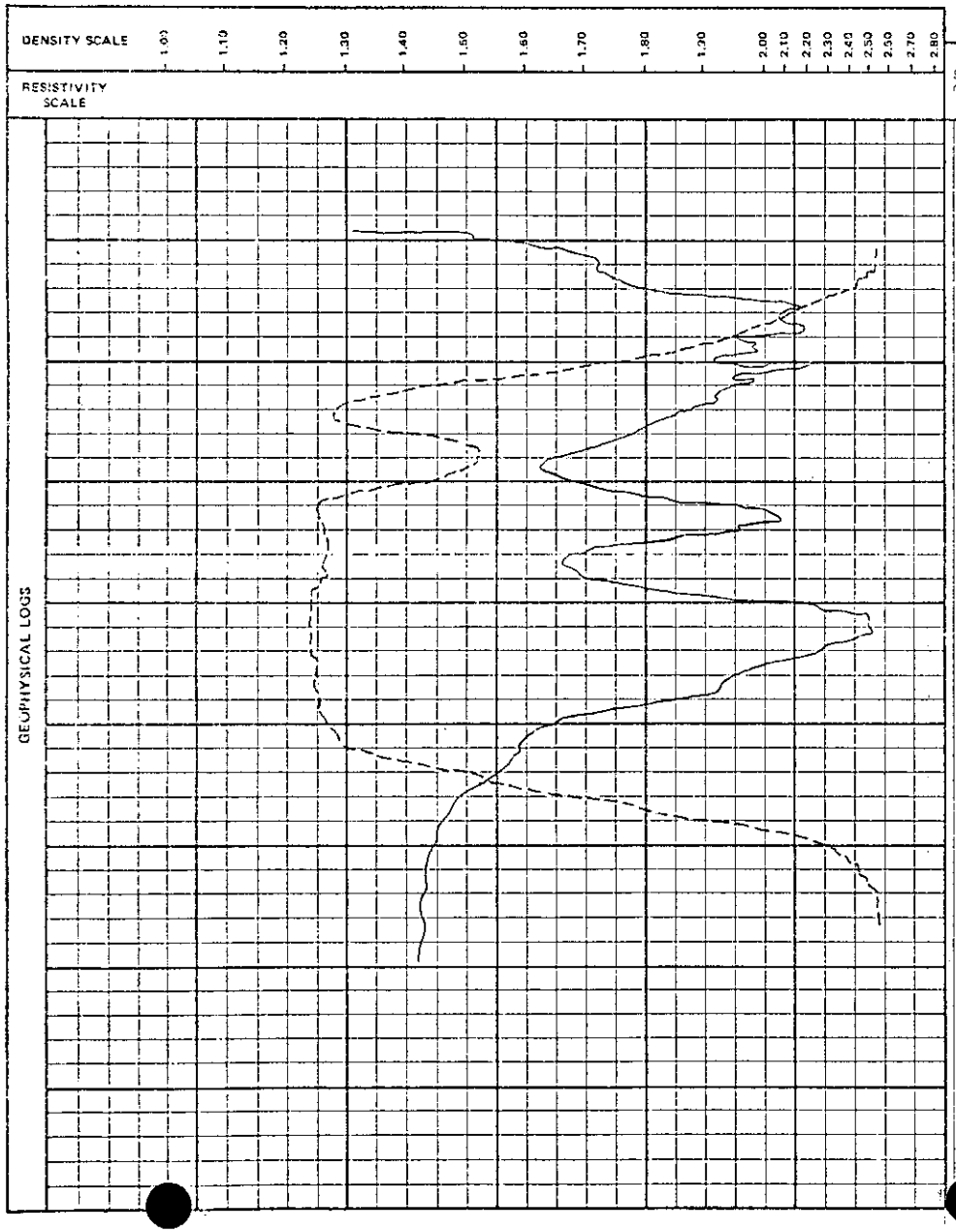
GULF CANADA RESOURCES INC.
COAL DIVISION

P-257 (12-80)

DENSITY ——— RESISTIVITY ———

DRILL NO. WDF_RDH_81_01 SEAM _____ SEAM INTERVAL 118.88m - 122.74m

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
	118.88			3.86m										
	122.74													

COAL SEAM DATA SHEET

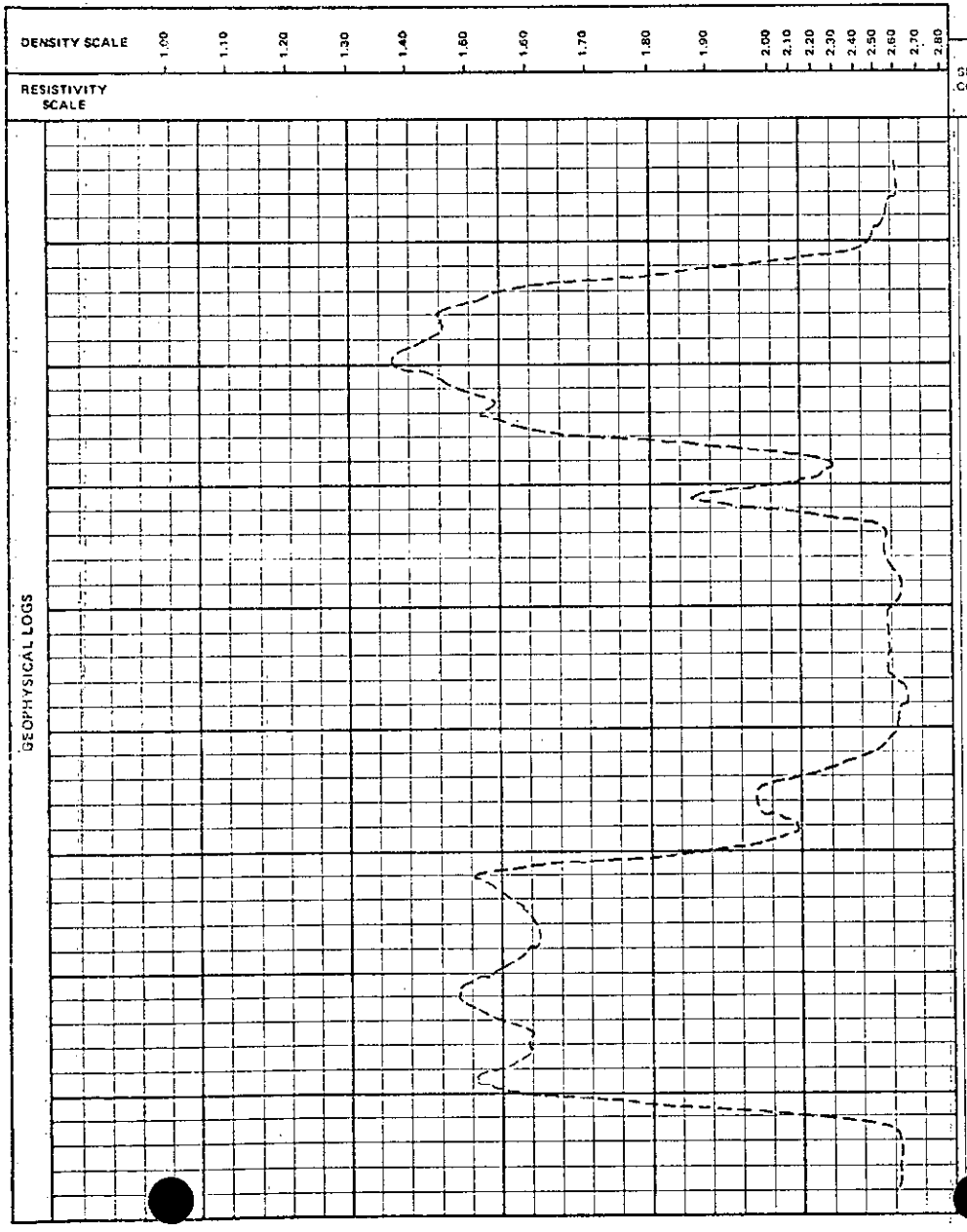
GULF CANADA RESOURCES INC.
COAL DIVISION

P-267 (12-80)

DENSITY ——— RESISTIVITY ———

DRILL NO. WDF RDH 81 04 SEAM _____ SEAM INTERVAL 48.29 - 55.15m

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
	48.29			1.88m										
	50.17		2.86m											
	53.03			2.12m										
	55.15													

COAL SEAM DATA SHEET

GULF CANADA RESOURCES INC.
COAL DIVISION

P-267 (12-83)

DENSITY ——— RESISTIVITY ———

DRILL NO. WDF RDH 81 04 SEAM _____ SEAM INTERVAL 60.33 - 61.69m

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		% REC.	SAMPLE		PROXIMATE ANALYSIS						
			ROCK	COAL		NUMBER	COMPOS.	MOIST	ASH	VM	FC	S	BTU	FSI
	60.39			1.30m										
	61.69													

COAL SEAM DATA SHEET

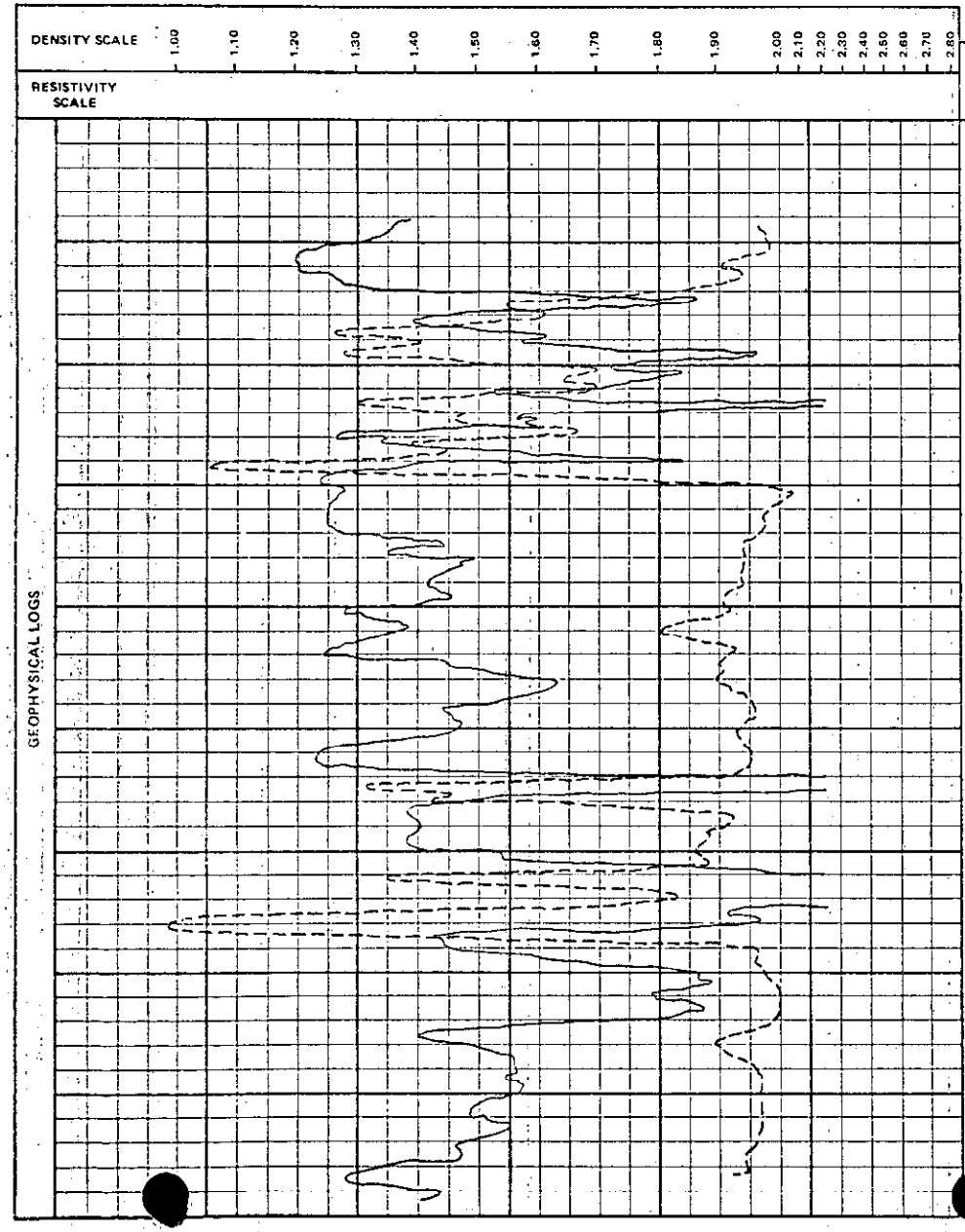
GULF CANADA RESOURCES INC.
COAL DIVISION

F-267 (12-80)

DENSITY ——— RESISTIVITY ———

DRILL NO. WDF-RDH-81-07 SEAM _____ SEAM INTERVAL 46.24m-49.77m
58.75m-59.25m

SCALE 1:100



SEAM COMP.	DEPTH	COAL SEAM LOG	INTERVAL ROCK	INTERVAL COAL	% REC.	SAMPLE NUMBER	SAMPLE COMPOS.	PROXIMATE ANALYSIS MOIST	ASH	VM	FC	S	BTU	FSI
	46.24													
				3.53										
	49.77													
			8.98											
	58.75													
	59.25			0.50										