PR- Burnt River 81(1)A

BURNT RIVER COAL PROPERTY
1981 EXPLORATION REPORT
(Coal Licences 4524-4529, 3061-3088 inclusive)
SUKUNKA RIVER AREA, B. C.
93 P/5W

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FOR
TECK CORPORATION

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

SUMMARY

The Burnt River property consists of thirty-four licences covering 8,970 hectares; approximately 85 square kilometers. The area has been extensively explored by Teck Corporation since 1971.

This report contains details of the 1981 geological program and incorporates the interpretations and conclusions from previous programs.

The property lies in the eastern foothills of the Rocky Mountains and consists of a series of tightly folded and faulted formations of Lower Cretaceous age. The important coal measures at Burnt River occur in a section of Lower Gething rocks approximately 240 meters thick. The three main seams under study are: Lower seam, Upper seam and Seam 60; several important marker seams also occur in this section. These coals are semi-anthracite in rank and have low ash, low sulphur, low volatiles and high calorific values.

The property has several areas of potential coal reserves and further geological programs are necessary to test this potential. The Brule deposit (main reserve area) requires additional geological work to clarify a number of less well-defined elements of the structural setting as well as confirm the existence of additional reserves in the fringe areas of the deposit.

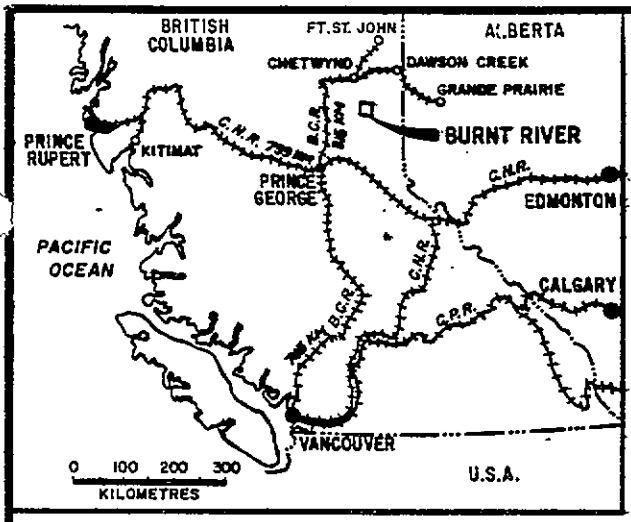
INTRODUCTION

The 1981 exploration program on the Burnt River property was a continuation of a major project started in 1978. The drilling program focused on fill-in drilling in the main reserve area as determined by previous drilling, and testing northerly extensions of this area. The field program began June 1 and the camp was demobilized September 29. The 1981 field work consisted of rotary drilling, diamond drilling, geological mapping and geotechnical and environmental studies.

The month of June was spent upgrading the access road constructed the previous winter. A detailed mapping and trenching program was initiated.

A fifteen-man trailer and tent camp was re-established at the site of the 1980 camp in the last week of June. The drilling program and drill-road construction were fully underway by July 1. The project was supervised by the writer. Other Teck Exploration staff included a camp manager, expeditor, two Winkie drillers, cook, camp attendant and geological assistant. Bertram Drilling Ltd. supplied a three-man crew to operate a Mayhew 1000 rotary drill. Cat work and slash disposal was contracted to W. & J. Schilling Ltd.

The program was co-ordinated with the B. C. Department of Mines and the local B. C. Forest Service office. A report on reclamation operations for 1981 has been submitted.



FORT ST. JOHN

B.C.R.

B.C.R.

CHETWYND

DAWSON CREEK

JOHN HART HIGHWAY

B.C. RAILWAY

BURNT RIVER

ROCKY

SUKUNKA

BULLMOOSE

MT. SPIEKER

QUINTETTE

ANZAC

PROPOSED RAILWAY

MOUNTAINS

SAXON

PRINCE GEORGE

FIG. 2

TECK CORPORATION

BURNT RIVER PROJECT

LOCATION MAP

SCALE KILOMETRES 0 10 20 30 40 50

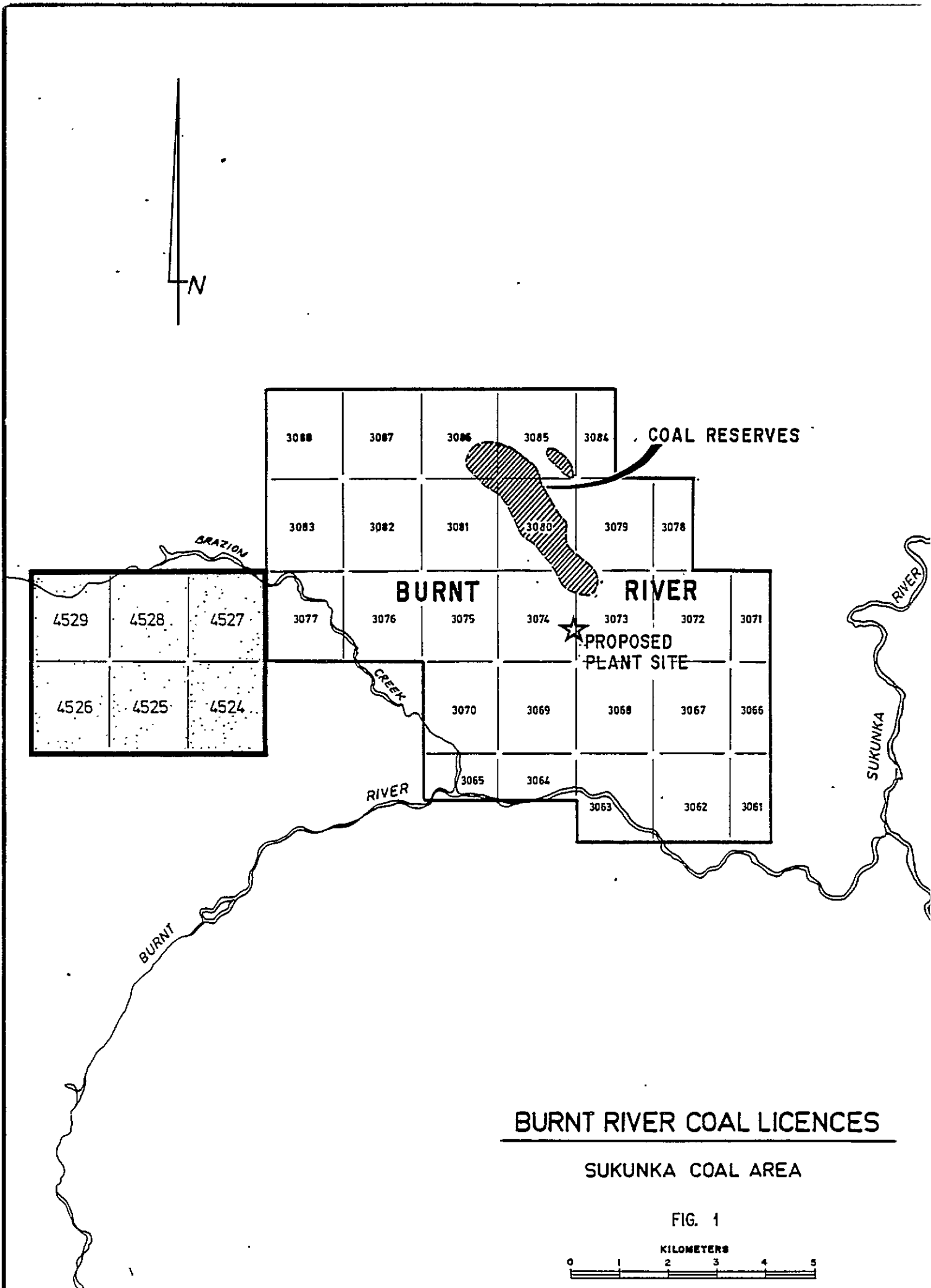
This report is intended as a compilation of all geological data to date and will be the basis for updating the mining feasibility study which was based on 1980 data.

PROPERTY, LOCATION, ACCESS

The thirty-four coal licences are held by Teck Corporation (Figure 1). The field program was carried out by Teck Explorations Limited of Vancouver, B. C. The property is located 38 kilometers south-southwest of Chetwynd, B. C. (62 kilometers by road) in the Liard Mining Division (Figure 2). The licences cover approximately 22,000 acres (8,888 hectares).

Access to the base camp has changed since the 1980 program. During the period December, 1980 to March 1981, Canfor Forest Products constructed a "winter" logging road. This new road connected the B.P. Oil and Gas access road with the existing Teck Explorations access road (Figure 3). Canfor constructed 4.8 kilometers of winter haul road which was subsequently upgraded by Teck in June 1981 to provide "all season" access.

During the 1981 project, new on-property roads were constructed (7.35 kilometers) for drill site access. Due to the very dry summer season all drill sites were accessible by 4 x 4 trucks. A bombardier tractor was used to move the Winkie drill along existing seismic trails and roads.



BURNT RIVER COAL LICENCES

SUKUNKA COAL AREA

FIG. 1

PREVIOUS WORK

Work carried out prior to 1980 has been documented in the 1980 geological report. The extensive work program of 1980 was, for the most part, a continuation of the systematic drilling program started in September, 1978. This program was intended to test the extent of the three seams discovered in 1977-78 (Lower Seam, Upper Seam, Seam 60)

Diamond drilling in 1980 continued until late in the season and was stopped short of fully tracing the seams to the northeast and northwest. Bulk sampling of the Upper seam, Lower seam and Seam 60 was completed in 1980 to supply coal for washability and quality testing.

ROTARY AND DIAMOND DRILLING

1. Rotary Drilling

The rotary drilling contract was carried out by Bertram Drilling of Carbon, Alberta. The track mounted equipment used included a Mayhew 1000 drill, Schram compressor and a water-supply unit, all mounted on Nodwells. The drilling commenced on June 29 and was completed September 26 (90 days). The three-man crew worked a twelve-hour shift, seven days a week. Due to the extreme forest fire hazard the shift was cut to eight hours per day from August 13-24. Fifty-nine rotary holes were drilled using a five inch down-hole hammer for a total of 4,500 meters (14,760 feet). Average hole depth was 77.5 meters (254'). The average rate of penetration was 40.0 meters per day (164'). Drilling was hampered in some areas by deep overburden.

2. Diamond Drilling

Teck Explorations supplied a portable Winkie drill for the project. Twelve holes were drilled for a total of 303.20 meters (average 25.2 meters/hole). The function of the drill was three-fold:

(1) to test known coal seams near surface;

(2) to test coal exposures discovered in 1981;

(3) to provide core samples for proximate analysis of coal sections.

The Winkie drill was moved by truck, bombardier tractor or manually as circumstances warranted. The Winkie drill was found to be a valuable exploration tool and will continue to be used. Drilling started June 23 and terminated August 5.

A summary of diamond drill data is given in Table 2.

Core recovery of coal sections in diamond drilling was poorer than in previous programs (52%) and may be due in part to inferior drill parts supplied to the project and to the condition of the coal seams where intersected. Overall recovery from the Winkie drilling was 78.0% from AIX core.

CORE LOGGING AND SAMPLING

All drill cores were examined in detail and stratigraphic logs were prepared at a scale of 1:100. As before, the coal sections were sampled in "plies" and detailed notes were drafted on the detail coal quality geophysical logs. Coal sections were shipped to Birtley Engineering in Calgary for proximate analysis. Average coal recovery was 52% but varied from 20% to 85%.

TABLE II

WINKIE DRILL HOLE SUMMARY - BURNT RIVER - 1981

Hole No.	Drill Dates	Total Depth (meters)	OVB. (meters)	Seam 60 at: (meters)	Upper Seam at: (meters)	Lower Seam at: (meters)	Geophysical Logs Run:					Casing	Remarks
							Gamma Ray	Density	Neutron	F.E.	Dip Meter	In / Out	
BW-58	1980	47.8	7.90	-	-	-	Yes	Yes	-	-	-	27'/27'	Marker "C" 15.16 - 16.04
BW-19	1978	14.0	2.74	-	-	-	Yes	Yes	-	-	-	-	Big Seam (Lower Seam) 3.40 - 5.60
BW-59	Jun 23-25	17.60	1.0	-	-	-	Yes	Yes	-	-	-	3'/3'	Coal 3.62 - 4.24 (.62M)
BW-60	Jun 29-30	15.8	0.30	5.74	-	-	Yes	Yes	-	-	-	5'/5'	
BW-61	July 1	9.30	1.5	-	-	4.12	Yes	Yes	-	-	-	5'/5'	Seam 11 ≡ Lower Seam
BW-62	July 2-6	38.9	0.6	-	2.18	28.08	Yes	Yes	-	-	-	6'/6'	Outcrop 101 ≡ Upper Seam
BW-63	July 8-9	17.5	0.5	-	5.08	9.92	Yes	Yes	-	-	-	6'/6'	
BW-64	Jul 15-22	58.20	2.1	-	18.06	49.42	Yes	Yes	-	-	-	15'/15'	Faulted Section 2 - 30 meters
BW-65	July 23	13.1	1.80	7.64	-	-	Yes	Yes	-	-	-	11'/11'	
BW-66	Jul 24-26	17.5	0	-	-	-	Yes	Yes	-	-	-	3'/3'	No Coal Collared Below Lower Seam
BW-67	Jul 27-28	16.7	3.26	-	-	3.26	Yes	Yes	-	-	-	11'/0'	Casing broke off Big Seam (Lower Seam)
BW-68	Jul 28-29	23.5	0	-	-	5.04	Yes	Yes	-	-	-	9'/9'	Big Seam (Lower Seam)
BW-69	Aug 1-2	10.0	0.6	-	-	-	Yes	Yes	-	-	-	14'/14'	Minor Coal
BW-70	Aug 3-5	15.5	1.5	-	-	-	No	No	-	-	-	9'/9'	No Coal Bedding 70° dips
TOTAL 1981	12 holes	303.20											

ROTARY DRILL HOLE SUMMARY - BURNT RIVER - 1981

Hole No.	Drill Dates	Total Depth (meters)	OVB. (meters)	Seam 60 at: (meters)	Upper Seam at: (meters)	Lower Seam at: (meters)	Geophysical Logs Run:					Casing	Remarks
							Gamma Ray	Density	Neutron	F.E.	Dip Meter	In / Out	
BR-63	Jun 29-30	76.0	3.0	34.80	-	-	Yes	Yes	----Not Available----			15'/15'	
BR-64	July 1	36.0	14.0	----------No Coal--------			Yes	Yes	-	-	-	46'/46'	
BR-65	July 1-3	165.0	6.0	48.66	124.16	132.60	Yes	Yes	Yes	Yes	Yes	20'/20'	Sonic Log
BR-66	July 3-4	134.0	1.0	33.88	103.52	115.28	Yes	Yes	Yes	Yes	Yes	5'/0'	Piezometer Installed
BR-67	July 5	81.0	4.5	-	67.08	72.92	Yes	Yes	Yes	Yes	Yes	20'/20'	
BR-68	July 6-7	185.0	4.2	-	12.14	16.98	Yes	Yes	Yes	Yes	Yes	15'/0'	Drilled to Cadomin Fm.
BR-69	July 7-8	75.0	4.6	-	51.40	62.56	Yes	Yes	Yes	Yes	Yes	15'/0'	Piezometer Installed
BR-70	Jul 14-15	65.5	11.4	45.18	-	-	Yes	Yes	Yes	Yes	Yes	36'/0'	Piezometer Installed Flowing 10 g.p.m.
BR-71	July 13	40.5	27.5	-	24.95	30.82	Yes	Yes	Yes	Yes	Yes	0'/0'	
BR-72	Jul 15-16	115.5	3.0	10.18	90.44	104.16	Yes	Yes	Yes	Yes	Yes	9'/9'	Piezometer Installed - Caliper on dip meter down
BR-73	Jul 17-18	91.0	18.5	-	-	33.23	Yes	Yes	Yes	Yes	Yes	60'/0'	Caliper on dip meter down Piezometer Installed
BR-74	July 19	57.0	2.0	-	23.52	41.46	Yes	Yes	Yes	Yes	Yes	9'/0'	
BR-75	July 19	48.0	4.4	-	-	16.80	Yes	Yes	Yes	Yes	Yes	14'/14'	Marker "AA" @ 40.0 M
BR-76	July 20	34.0	6.0	-	6.54	21.56	Yes	Yes	Yes	Yes	-	20'/20'	
BR-77	Jul 20-21	27.0	2.0	-	18.60	-	Yes	Yes	-	-	-	20'/20'	Hole Caved - Scoria Logged in rods Single Function Tools

ROTARY DRILL HOLE SUMMARY - BURNT RIVER - 1981

Hole No.	Drill Dates	Total Depth (meters)	OVB. (meters)	Seam 60 at: (meters)	Upper Seam at: (meters)	Lower Seam at: (meters)	Geophysical Logs Run:					Casing	Remarks
							Gamma Ray	Density	Neutron	F.E.	Dip Meter	In / Out	
BR-78	Jul 21-22	40.0	3.0	-	-	-	Yes	Yes	-	-	Yes	10'/10'	Marker "AA" @ 17.06
BR-79	Jul 22-23	131.0	5.5	109.02?			Yes	Yes	Yes	Yes	Yes	21'/21'	Coal: 6.20-7.30, 31.4-33.4 109.02-112.46
BR-80	Jul 23-24	50.0	1.0	-	16.54	26.24	Yes	Yes	Yes	Yes	Yes	3'/3'	
BR-81	July 24	79.0	1.2	-	56.04	63.26	Yes	Yes	Yes	Yes	Not working	5'/5'	
BR-82	Jul 25 Sept 2	85.0	2.5	60.20?			Yes	Yes	Yes	Yes	"	10'/10'	Coal: 60.20-63.54
BR-83	Jul 25-26	53.0	6.0	-	12.38 32.32	42.92	Yes	Yes	Yes	Yes	"	17'/17'	Upper Seam fault repeated
BR-84	Aug 3-6	89.0	20.80	-	24.32	45.25	Yes	Yes	-	-	Yes	70'/70'	First hole collapsed - "skid" Logged in three stages
BR-85	July 29	21.0	2.0	-	-	7.88	Yes	Yes	Yes	Yes	Not working	7'/0'	
BR-86	July 31	57.0	15.0	-	27.58	46.58	Yes	Yes	-	-	"	50'/50'	Re-drill of BW-51 Piezometer Installed
BR-87	Aug 2-3	50.0	19.40	21.30	-	-	Yes	Yes	Yes	Yes	-	60'/60'	Piezometer Installed Flowing until BR-115 drilled
BR-88	Aug 6-8	81.0	15.40	-	53.0	71.48	Yes	Yes	Yes	Yes	Yes	56'/56'	
BR-89	Aug 8-10	49.5	32.3	-	-	34.08	Yes	Yes	-	-	-	0'/0'	
BR-90	Aug 10-11	82.0	5.4	-	51.46	69.04	Yes	Yes	Yes	Yes	Yes	26'/26'	Re-drill of BW-55
BR-91B	Aug 12-13	77.0	11.60	53.50	-	-	Yes	Yes	Yes	Yes	Yes	33'/0'	Flowing hole
BR-92	Aug 13-15	138.2	2.0	30.24	109.36	127.87	Yes	Yes	Yes	Yes	Yes	10'/10'	
BR-93	Aug 15-17	107.0	0.0	-	66.40	88.28	Yes	Yes	Yes	Yes	Yes	0'/0'	
BR-94	Aug 17	49.0	1.0	-	3.0	26.90	Yes	Yes	Yes	Yes	Yes	6.5'/0'	

ROTARY DRILL HOLE SUMMARY - BURNT RIVER - 1981

Hole No.	Drill Dates	Total Depth (meters)	OVB. (meters)	Seam 60 at: (meters)	Upper Seam at: (meters)	Lower Seam at: (meters)	Geophysical Logs Run:					Casing	Remarks
							Gamma Ray	Density	Neutron	F.E.	Dip Meter	In / Out	
BR-95	Aug 18-19	144.0	2.5	-	106.0	135.80	Yes	Yes	Yes	Yes	Yes	6.5'/0'	Marker 'D' @ 37.06 (2.38M)
BR-96	Aug 20	51.0	0.0	-	13.40	40.56	Yes	Yes	Yes	Yes	Yes	6.5'/0'	
BR-97	Aug 20-21	26.0	2.0	14.48	-	-	Yes	Yes	Yes	Yes	Yes	6.5'/0'	
BR-98	Aug 21-22 Sept 10	109.0	1.0	-	77.30	97.02	Yes	Yes	Yes	Yes	Yes	10'/0'	
BR-99C	Aug 23-29	151.5	19.0	29.20	147.58	-	Yes	Yes	Yes	Yes	-	36'/36'	flowing 5-10 g.p.m. hole collapsed and drilling stopped @ 151.5 meters Seam 60 = 13.70 meters
BR-100	Aug 29	31.0	3.0	-	7.53	19.70	Yes	Yes	Yes	Yes	Yes	10'/0'	
BR-101	Aug 29-30 Sept 8-9	186.0	3.2	62.83	141.18	153.28	Yes	Yes	Yes	Yes	Yes	10'/0'	
BR-102	Aug 30-31	28.8	1.6	-	-	-	Yes	Yes	-	-	-	35'/35'	Re-drill of BR-77 Lost circulation @ 15 meters No coal
BR-102A	Sept 2	7.0	1.0	-	-	-	-	-	-	-	-	0'/0'	Re-drill of BR-102 Hole will not stay open for casing
BR-103	Aug 31	66.0	3.0	-	10.42	19.60	Yes	Yes	Yes	Yes	-	10'/0'	
BR-104	Sept 3-4	105.0	1.0	-	79.98	89.16	Yes	Yes	Yes	Yes	Yes	3'/0'	Posible fault between "c" and upper seam
BR-105	Sept 3	57.0	0.50	5.28	-	-	Yes	Yes	Yes	Yes	Yes	0'/0'	BR-105 trench sampled
BR-106	Sept 5	35.0	1.40	-	-	-	Yes	Yes	Yes	Yes	Yes	5'/0'	Casing fell below G.L. Minor coal (.7m) @ 3.70 meters
BR-107	Sept 5-6	70.0	2.20	55.4	-	-	Yes	Yes	Yes	Yes	Yes	10'/0'	Coal 55.40 - 58.48

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Hole No.	Drill Dates	Total Depth (meters)	OVB. (meters)	Seam 60 at: (meters)	Upper Seam at: (meters)	Lower Seam at: (meters)	Geophysical Logs Run:					Casing	Remarks
							Gamma Ray	Density	Neutron	F.E.	Dip Meter	In / Out	
BR-108	Sept 6	38.0	3.80	-	16.12	22.58	Yes	Yes	Yes	Yes	-	15'/0'	Hole caved - no dip meter
BR-109	Sept 7-8	93.0	3.40	-	70.78	79.50	Yes	Yes	Yes	Yes	-	10'/0'	
BR-110	Sept 8	17.0	0.0	-	-	-	Yes	Yes	-	-	-	0'/0'	Minor coal @ 8.0 meters
BR-111	Sep 10-11	93.0	1.0	12.72	-	-	Yes	Yes	Yes	Yes	Yes	6'/0'	Flowing 10-15 g.p.m. Marker "D" 53.72-55.51
BR-112	Sept 12	91.0	1.0	-	50.10	70.52	Yes	Yes	Yes	Yes	Yes	5'/0'	
BR-113	Sep 13-14	57.0	8.5	-	-	17.76	Yes	Yes	Yes	Yes	Yes	28'/28'	Water level 3.0 meters
BR-114	Sep 15-16	67.0	24.0	-	30.86	52.64	Yes	Yes	Yes	Yes	Yes	20'/20'	Water level @ 20.0 meters
BR-115	Sept 17	79.0	34.0	-	-	-	Yes	Yes	-	-	-	20'/20'	Flowing 20 g.p.m. @ 34 meters Install standpipe to 71 meters Marker "C" @ 55.50 meters Hole collapsed @ 63 meters
BR-116	Sep 18-20	98.0	36.0	-	66.72	88.88	Yes	Yes	-	-	-	40'/40'	Logged thru rods with single function tools Marker "C" @ 38.30 meters
BR-117	Sep 21-22	51.0	24.0	-	-	31.80	Yes	Yes	-	-	-	20'/20'	Logged thru rods with single function tools
BR-118	Sep 23-24	67.0	43.0	-	-	-	Yes	Yes	-	-	-	20'/0'	" (and) flowing 20 g.p.m. Marker "c" @ 58.60 meters
BR-119	Sep 24-25	58.0	27.0	-	31.44	48.27	Yes	Yes	-	-	Yes	0'/0'	
BR-120	Sep 25-26	104.0	39.0	-	-	-	Yes	Yes	-	-	-	20'/0'	No coal - faulted section Coal marker @ 75 meters
BR-3	1977	243.0	3.0	-	-	5.48	Yes	Yes	Yes	Yes	Yes	10'/0'	Seismic Seam = Lower Seam

1981 total rotary = 4,500M (14,765')

Although the drill cuttings from the rotary drilling were not passed through a collection device, an attempt was made at retrieving coal sections during drilling of selected holes. The object was to collect enough sample in areas distant from previous core drilling to give a check on coal quality. The analyses are appended with this report. It is noted that most of the samples were badly contaminated with rock cuttings resulting in high apparent ash contents. This high ash content affected the percentage of volatile matter reported. It is concluded that the coal quality in these areas is consistent with that reported for the main reserve area from earlier programs.

GEOPHYSICAL LOGGING

Geophysical logging of boreholes were contracted to B.P.B. Intruments of Calgary, Alberta. The truck-mounted logging unit was able to reach all drill locations requiring logging. The basic suite of logs included gamma-ray, neutron, sidewall density, focused electric and caliper. A verticality-dip meter tool was run in anticipation of the need for this data in resolving any structural complications arising from the rotary drilling program. The information was recorded on cassette tapes for possible future analysis. The field engineer gave spot hole deviations (verticality) using a simple computer program adaptable to a programmable hand calculator. A demonstration run was made in one hole to allow analysis by Teck personnel for future use of this relatively new tool. The effectiveness of the tool has not been completely evaluated.

All geophysical data for each method were recorded graphically on site as well as on cassette tape for future reference. An attempt was made to log all boreholes "open-hole" with casing set to bedrock. Several holes were logged through the rods when caving conditions occurred using the single function tools (density and gamma-ray), as the multi-sonde would not fit through the rods. The un-calibrated data are satisfactory for determining coal depth and thickness, but not quality.

Winkie drill holes were logged using the single-function tools. The single function caliper tool was not available this year. The detail (1:20) bed-resolution density (BRD) log was used as a guide in dividing the coal seams cored into sample plies.

The detail BRD and LSD density logs run on the rotary holes will be used to determine coal quality of those seams drilled in 1981. The logs were prepared at 1:100 and 1:200 scales. Copies of all goephysical logs are appended with this report under separate cover.

GEOLOGY

1. INTRODUCTION

The Burnt River property is located within the Inner Foothills Belt of the Rocky Mountains. This belt comprises a sequence of tightly folded and faulted sediments of Lower Cretaceous age. The geological environment has been described more fully in previous reports (McClymont and Wright - 1980 Exploration Report)

The Lower Cretaceous sediments in the Burnt River area lie along a prominent northwesterly structural trend. They are tightly folded and, for the most part, heavily faulted.

Two regional faults of considerable importance cut across the property. The Mt. Chamberlain fault cuts across the southwestern boundary of the property and could have considerable displacement. It may be steeply dipping and could be a transcurrent (strike-slip) fault, unlike the southwesterly dipping thrust faults which predominate the area.

The other important fault is the Bullmoose thrust fault which trends northwesterly, east of the Blind Creek Syncline. It is a major regional structure believed to consist of a number of thrust faults and possibly some normal faults. This fault complex has considerable displacement as all units to the east are of younger age (Gates to Boulder Creek Formation).

Between these two faults the property is transected by several southwest dipping thrust faults that are believed to be low to moderate overthrusts ($10\text{-}40^{o}$). The dip of the fault planes may tend to flatten with depth. This "stacking effect gives rise to a repetition of Lower Gething, Cadomin and Bernot formations across the property.

Folding on the property tends to be fairly tight and asymmetrical in nature. There is speculation that coal seams have undergone ductile deformation along fold axis. For the most part folding preceded

faulting in this region. Fold axes trend northwest in sympathy with the regional structure. These axes tend to plunge north or south rather than be horizontal.

The region was extensively glaciated and, coupled with erosion, may have affected outcrop attitudes; however this is not believed to be a significant factor, but rather one that must be considered during detailed field mapping.

Geological mapping at a scale of 1:10,000 was carried out during June 1981 by the writer and his assistants. This was a continuation of the program which has been carried out intermittently since 1976. The mapping was supplemented by air-photo interpretation based on all available data. There are a large number of changes in the distribution of the rock types and location of faults. However there are no significant changes in the stratigraphic section or in the fault pattern.

Additional mapping will be required to completely cover the property at a standard commensurate with the 1:10,000 scale. This will permit a more reliable evaluation of the additional coal possibilities.

2. STRUCTURE

The structure of the main reserve area (Brule deposit) is dominated by several west dipping thrust faults and folds trending northwest. The western extent of the deposit is limited by the Camp Ridge fault which is considered to be a thrust zone or series of thrust faults

similar in nature to the Bullmoose fault complex.

The coal measures of this deposit are contained within a gently undulating zone that trends northwest by southeast and dips roughly 10^{o}-20^{o} to the southwest. The coal seams subcrop to the east and north under glacial till with erratic variation in thickness.

The northern half of the deposit is bisected into two thrust plates by the Willow Creek fault. Displacement along the fault appears to increase in a northerly direction (20 meters at BR-37 and 25 meters at BW-48). Beginning as a low angle thrust fault dipping west the fault works itself up the west limb and towards the crest of an anticline that developed as part of a series of tight folds at the northern end of the deposit. In the area of BR-37 the fault dips at about 30^{o}-40^{o} southwest. As the fault is traced northward the displacement increases and the fault steepens to near-vertical in the area of BR-54

The Lower Ridge fault is an off-set of the Camp Ridge fault zone. The fault dictates, in part, the western limit of the Brule deposit.

The Warga fault was interpreted previously during an air-photo geological interpretation. During the 1981 program this fault was first observed in BR-83. The Upper seam is repeated in this drill hole with a vertical displacement of 20 meters. The fault dips southwest at about 35^{o}. Drill sections 100N and 80N show steep dips at their eastern edges which are presumed to be related to

the Warga fault. Section 60N shows the coal measures are faulted off before reaching BR-120 and the section between BR-73 and BR-36 is faulted. Both of these structural features are assumed to be related to the southwest extension of the Warga fault. There is no information regarding the fault position south of section 20N. More drilling is required to establish the attitude and bearing of this fault, as well as the amount of displacement along the fault.

The 1981 Rotary drilling program has added a great deal of structural knowledge to the north and northeastern area of the main reserve area. The drilling in this area was designed to verify the previous structural interpretation and to define the coal reserves more accurately. The lack of marker beds makes correlation and displacement along faults difficult. The program indicated that folding is very complex in the northeastern part of the area (eg. Sections 120 + 60N and 140 + 60N).

Correlation of rock units in the area of BR-79 and BR-82 is difficult. The lack of outcrop and rapid facies changes as well as faulting make correlation between sections difficult. More drilling is required to clarify the apparent structural complexity in this area.

In the northeastern area the major seams occur on the east limb of a tight anticline, east of the Dillon syncline (BR-80, BR-81, 99024, 99025). The extent of these seams is limited by a west dipping thrust fault.

In the northwestern area the drilling of BR-111 showed that the coal seams begin to flatten to the west. This confirms our interpretation that the axis of a syncline oocurs along the creek west of BR-111.

The fill-in drilling in the southern portion of the deposit verified the previous structural interpretation (see Sections 0 + 00 to 100 south). In the area of Sections 20N to 100N the eastern portion shows erratic dips and faults which were not intersected previously. This portion of the property has been covered by a thick mantle of glacial debris. During the drilling of this area it was not possible to case our boreholes to bedrock and many of the holes were "flowing". Due to these difficulties several holes did not reach the Lower Seam. Logging tools had to be run through the rods in these holes and hence were uncalibrated.

In the southwestern portion of the main reserve area new coal exposures were explored along the seismic line as well as along the Canfor Road. These seams occur west of the Lower Ridge fault that runs northwest from BW-63 to BR-49, BR-30, BR-60. These two seams appear to be equivalent to the Upper and Lower seams. Seam 60 can also be traced across this fault.

The 1977 drill hole BR-3 which intersected a thick coal seam designated as the "Seismic Seam", was geophysically logged this year.

On the basis of the log it appears that this seam is equivalent to the Lower seam. This helps to correlate the eastern portion of the property and its relationship to the overall geologic setting. There is a possibility of a substantial tonnage of mineable coal in the syncline to the west if a well developed Upper seam and Seam 60 are present.

3. STRATIGRAPHY

Table I lists the idealized section underlying the Burnt River property. The thicknesses noted do not directly relate to the area presently under study. The Moosebar Formation has not been positively located on the property and therefore it has been impossible to calculate the true thickness of the Gething Formation.

The lack of outcrop has made it difficult to establish a complete stratigraphic picture. Air photo interpretation gave the first reliable information and was used as a guide for mapping the Gething in 1978. Mapping and subsequent drilling did not aid correlation as much as was hoped due to a lack of marker beds and rapid facies changes during sedimentation. From core study, it is estimated that the sediments were laid down in a "moderate" energy environment.

The Gething formation is believed to be 400 meters in thickness based on structural interpretations, and at least 240 meters of section have been observed in drill core. The top of the Gething

RIOD	GROUP		SYMBOL	FORMATION OR MEMBER	THICKNESS (metres)	LITHOLOGY
LOWER CRETACEOUS	FORT ST. JOHN GROUP	COMMOTION FORMATION	Bc	Boulder Cr. Member	73 - 170*	G.S.C. Bulletin - 1 Fine grained, well sorted sandstone, massive conglomerate, non-marine sandstone and mudsto
			Hul	Hulcross Member	0 - 137*	G.S.C. Bulletin -15 Dark grey marine shale with sideritic concretions.
			Ga	Gates Member	67 - 274*	G.S.C. Bulletin - 1 Fine grained, marine and non-marine sandstone conglomerate, coal, shale and mudstone.
			MbR	Moose Bar Formation	304 - 426*	G.S.C. Bulletin -15 Dark grey marine shale with sideritic concretions, glauconitic sandstone and pebbles at base.
	BULLHEAD GROUP		Ge	Gething Formation	0 - 549*	G.S.C. Bulletin -15 Fine to coarse grained, brown, calcareous, carbonaceous sandstone; coal, carbonaceous shale, and conglomerate.
			Cd	Cadomin Formation (erosional unconformity)	13 - 183*	G.S.C. Bulletin -15 Massive conglomerate containing chert and quartz pebbles.
	MINNES GROUP		Mi	Minnes Group	0 - 1828*	G.S.C. Bulletin -21 Massive, quartzose sandstone, alternating units of fine grained sandstone and mudstone, minor carbonaceous sediments.

TABLE I

*Estimated Figures Compiled From:

B.C. Dept. of Mines Bulletin No. 52
.....by, J.E. Hughes, 1967
G.S.C. Bulletin No. 152
.....by, D.F. Stott, 1968
G.S.C. Bulletin No. 219
.....by, D.F. Stott, 1973

formation has not been observed in drill core or in outcrop. Facies changes make it difficult to correlate the rock units with those on surrounding properties (Pan Ocean and Sukunka). The Gething drilled to date is a thick succession of laminated to interbedded siltstones, sandstones, mudstones and coal seams. The coal bearing section is widespread and underlies nearly 70% of the Burnt River property. Several thick coal seams have been located; however, correlation is difficult.

Sediments that make up the Gething are generally fine to medium grained, carbonaceous, cross-bedded and convoluted. Mud swirls and slump structures are common, as well as iron concretions ($FeCO_3$) and minor pyrite. It is speculated that source areas alternated from north to south.

The mudstones and siltstones were soft to moderately hard and dark grey to black in color. Massive units are an exception, with bedding being laminated to medium. The mudstones desiccated very quickly after being drilled and showed a rubbly texture.

The sandstones are highly variable in composition and structure. Analysis of the environment of deposition has not been carried out.

The gamma-ray logs showed the presence of bentonitic mudstones, one just below Marker "C" Seam and one mid-way between Markers "C" and "D".

We have been unable to subdivide the Gething formation into smaller units except for the coal seams, and these have not been correlated satisfactorily across the major Camp Ridge thrust fault. We do not recognize any marker beds or units within the sequence lying southwest of the Bullmoose thrust except for the Cadomin conglomerate. The Gething formation is readily divisible into three units on the basis of gross lithology at Sukunka and Mt. Suprenant. This was not possible at Burnt River since the marine tongue, which constitutes the middle member has not been located.

West of the Camp Ridge fault an attempt was made in 1978 to subdivide the Lower Gething into stratigraphic units. Using drill core logs and air photos, the Gething was subdivided into an upper unit consisting mainly of massive sandstone and a lower unit of mudstone, coal, siltstone and sandstone. As a practical application it met with only limited success as the upper sandstone unit was exposed intermittently and did not prove to be a mappable unit. On several occasions the upper sandstone unit was mistaken for the sandstone unit which overlies the Lower (Big) seam.

The thickness of Gething in this area is difficult to predict due to facies changes, heavy faulting and the lack of any drill hole sections to the Cadomin formation.

In the lower unit the thickness of partings between coal seams varied considerably over short distances as did the thickness of the units above and below the seams. Coal seams in this area exhibit extreme thickening and thinning over relatively short distances down dip as well as along strike.

Most of the rock units on the Burnt River property are recessive in nature. The only mappable units of any degree are the massive sandstones and conglomerates. The ratio of rock matrix to pebbles varies greatly within the Cadomin conglomerate thus making it somewhat difficult to distinguish the Cadomin from the pebble sandstone of the Lower Gething. However, this is mainly due to the limited extent of outcrop on the property.

The strata overlying Seam 60 in the main reserve area is predominately sandstone, and may correlate to the upper sandstone units west of the Camp Ridge fault. In the main reserve area this overlying sandstone varies from coarse grained sand to a pebble sand. However, pebble sandstone units exist between Seam 60 and the Lower seam as well as between the Lower seam and the Cadomin. Future mapping programs will concentrate on attempting to correlate massive sandy units from one area to another in order to fully determine the potential area for further coal exploration.

Table II shows the average for seam thicknesses and thickness variations of rock units between the seams. The interval between Seam 60 and the Lower seam is most commonly 70-85 meters over an area of 2-3 kilometers along strike.

The greatest change in stratigraphic thickness occurs along the western margin of the deposit from BR-68 (120S) to BR-55 (140 + 60N). The distance from the Lower seam to the Upper seam gradually increases from 1 meter to 20 meters. This is due to the development of a clean sandstone unit between the two seams.

Along this same north-south line the distance from the Upper seam to Marker 'C' stays relatively constant with some thinning at BR-27 and thickening at BR-55.

Using the same north-south line once again the distance from Marker'C' to Seam 60 gradually increases from 35 meters at BR-65 to 48 meters at BR-55. Of interesting note is, as we move north from BR-72 there is a decrease in the stratigrpahic thickness from Marker 'C' to Marker 'D' by approximately 10 meters (See BR-55). The explanation for the increased interval from Marker 'C' to Seam 60 to the north is due to the development of a clean sandstone between Marker 'D' and Seam 60. From BR-65 to BR-72 the interval has increased by 10 meters and Marker 'D' has developed into a very clean coal approximately 1.2 meters thick. Frcm BR-72 to BR-55 the

interval increases another 10 meters so that Marker 'D' to Seam 60 is now some 22 meters. Marker 'D' is now in the order of 2 meters thick and very clean coal. The quality of Seam 60 also increases along this trend although it does thin dramatically.

In summary, it is the development of sandstone units that causes the variations in stratigraphic thicknesses between certain areas of the deposit.

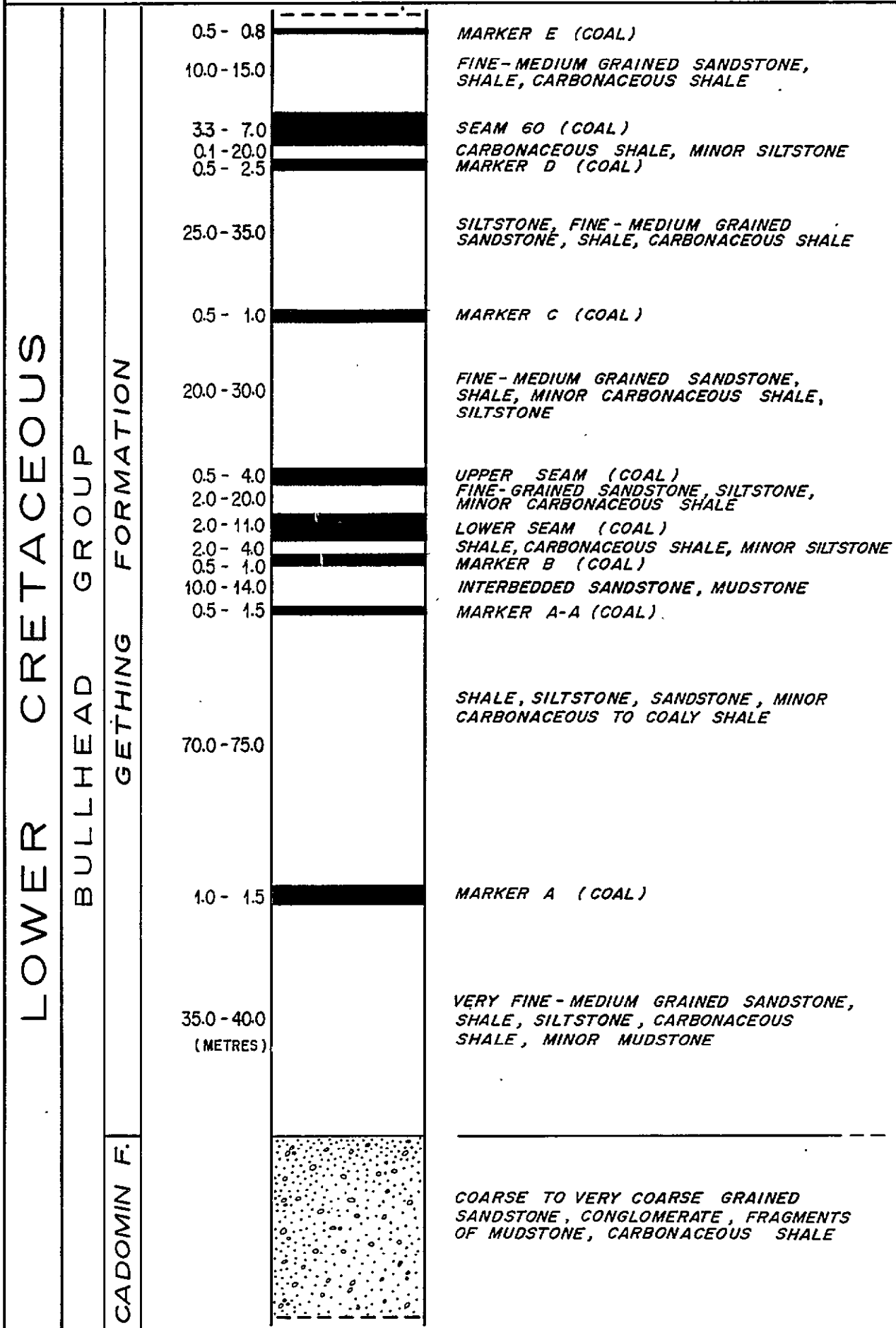
4. COAL SEAMS

Several new coal exposures were uncovered during road construction and geological mapping. A good percentage of these coal seams and coaly horizons are exposed along the new Canfor logging road. These seams occur in both the Minnes group, just below the Cadomin formation, and in the lower Gething formation. New coal exposures were uncovered by hand trenching during mapping of the north and northwest limits of the property. (Many of these could not be fully exposed due to overburden). A new exposure of the "Big Seam" was located 550 meters west of BW-24. This extends our known surface trace to this seam, which was the focus of the early phase of the 1978 program. Within the main reserve area several exposures of Lower seam, Upper seam and Seam 60 were trenched and drilled. Additions to our list of Marker seams include Marker 'AA' and Marker 'E' seams (see Table III). All seams less than one meter thick are considered geological markers. Some of the marker seams are more consistent than others, while several pinch out entirely.

IDEALIZED STRATIGRAPHIC SECTION

LOWER GETHING - COAL SEAMS

TABLE III



The more important marker seams continue to be the B, C, and D seams due to their consistency and possible mineability.

West of the Camp Ridge fault the major seam was previously referred to as the "Big seam". With the aid of drill core logs and geophysical logs a correlation has been made between this seam and the Lower seam. The stratigraphic distance from the two seams to the Cadomin conglomerate correlates as well. It appears that the Upper seam occurs in this area but is much thinner and higher in ash content. Marker seams C & D may also occur (see BR-2). Seam 60 may also occur on this plate (see BW-18).

Marker 'E' and 'F': Very few drill holes have been collared high enough above Seam 60 to explore the overlying sediments in the "main reserve" area. A representative drill hole is BR-32 which was collared 55 meters above Seam 60 and intersected two marker seams in this interval. Marker 'E' is located 10-15 meters above Seam 60 and averages .50-.80 meters. Marker 'F' is found approximately 20 meters above 'E' and is .50 meters thick. (See BR-32 and BR-58).

Marker 'D': South of Section 0 + 00 Marker 'D' occurs just below Seam 60 and is about .60 to .90 meters thick. It is associated with a high gamma response and generally has a high ash content. However, north of section line 0 + 00 the stratigraphic thickness between Seam 60 and Marker 'C' increases greatly and Marker 'D' is found mid-way between (10-20m below Seam 60). It becomes much cleaner and thicker to the north of section 20S (1.0-2.0 meters).

East of the north-south line 60 + 00 East Marker 'D' is again close to Seam 60 and is of reduced thickness.

In several drill holes in the northwestern section of the Brule deposit a thin, clean coal marker (.30-.60 meters) occurs between Marker 'C' and Marker 'D'. This marker is associated with a moderate gamma response directly below it and a very high gamma response directly above it which may indicate a tonstein (volcanic ash).

Marker 'C': This marker seam has been well documented in previous reports (McClymont and Wright, 1980). A small coal marker does occur in three drill holes between the Upper Seam and Marker 'C'. It is unnamed and occurs 10-20 meters above the Upper seam. It shows a consistent thickness of 0.40 meters for all three intersections.

In general, the thickness of Marker 'C' is maintained throughout the Brule deposit (.70-1.0 meter), although thinning occurs in the northerly limits of the area. The seam is characterized by a high gamma response in the mudstone units just below the seam (reference: BR-16, BR-27 and BR-29). It is a low ash seam and may be amenable to open-pit mining.

Mid-Marker: This is a thin coal marker located between the Upper and Lower seams. The mid-marker averages approximately .50 meters and is limited in extent to the area between 0 + 00 and 80 south. Moving from south to north the marker migrates from Upper seam to the

Lower seam. This may indicate a change in source area for the sediments found in this area.

Marker 'B': This marker seam usually occurs .30 to 1.8 meters below the Lower seam. In some cases it is incorporated into the bottom of the Lower seam and does not register on the geophysical log. It averages .45 to .60 meters in thickness and usually contains a high percentage of ash in the form of carbonaceous shale.

Marker 'A': Marker 'A' was intersected previously only in DDH BR-1 and has never been located in outcrop. In 1981, rotary drill hole BR-68 was drilled to the Cadomin formation. In this hole the marker was 43 meters above the Cadomin formation. This is roughly the same stratigraphic position as the seam found in BR-1; the BR-1 log shows a thickness of 1.52 meters. This seam may correlate with the "Discovery Seam" on the West Brazion property. It is now believed that the coal in BR-79, BR-82 and BR-107 correlates to Marker 'A'.

Marker 'AA': This newly discovered coal horizon is poorly documented but appears to be limited to the northern limits of the main reserve area. It is a high-ash coal seam 1.0-1.2 meters thick, and occurs approximately 10-12 meters stratigraphically below Marker 'B'. The true extent of this marker is unknown as most drill holes were stopped once Marker 'B' had been intersected.

Seam 60: During the 1981 program the reserves of Seam 60 were extended to the north, east and south of those defined in 1980.

In the southwest corner of the main reserve block Seam 60 was intersected in BR-63 and BW-60, which extends the known surface trace 400 meters south to section 60 + 00S. These drill intersections occur a short distance west of the northwest-trending thrust fault, thus placing Seam 60 on another thrust plate west of the main reserve area. Seam 60 is 4.1 meters thick in this plate, which is less than the average of 6.70 meters for the main reserve area.

Seam 60 thins north of section 120 + 60N. North of BR-56 the seam was traced to 160 + 60N and has thinned from 3.17 meters to 2.70 meters. In the area of BR-111 the seam has thinned to 3.70 meters. In the Owl Creek syncline Seam 60 was drilled from 80N to 140 + 60N. In this area Seam 60 thins north of 120 + 60N to less than 4 meters (BR-105).

In the area of BR-99 Seam 60 is unusually thick (apparent thickness 13.70 meters). This is believed to be due in part to steep dips and structural thickening of the coal related to movement associated with these steep dips.

Upper Seam: The Upper seam averages 3.2 meters in thickness and usually is split by a 30-60 centimeter shale parting in the northern area of the deposit. North of BR-53 the seam begins to thin out

and north of section 140 + 60N the seam has pinched out completely. In the northeastern part of the area drilled in 1981 the Upper seam is somewhat thicker and has lost its characteristic rock parting.

Lower Seam: The Lower seam is the most consistent coal seam with respect to extent and quality. However, it varies considerably in thickness. In the southern half of the main reserve area the seam averages 3.2 meters, compared with 6.2 meters in the north half The northeastern area, drilled in 1981, shows the considerable extent of this seam and it averages about 5.5 meters in thickness east of section 120 + 00 East. The seam shows no rock partings and is easily identifiable due to the close proximity to Marker 'B'. In the very southern end of the deposit the seam is thin with a mineable rock parting.

COAL QUALITY

Drilling of the main reserve area (Brule deposit) in 1981 was designed to provide information regarding the structure and reserves of the coal measures. A conventional rotary drill program was used which did not provide for coal sample collection. Drill spacing was in the order of 100-200 meters so it was felt that previous diamond drilling has provided sufficient definition of coal quality in this area.

Several Winkie core holes were drilled near the northern limits of the present reserve area to acquire further information on coal quality. Samples of drill cuttings from rotary holes in the northeastern area were also collected with the intention of gaining coal quality data for the reserves added by the 1981 program. For the most part these samples were badly contaminated with rock cuttings which gave erroneous values for ash content. The increased ash content has affected the proximate analysis values for fixed carbon, volatile matter and heat values. However, the data is still useful as ash content can be adjusted based on previous core data and by use of calibrated goephysical density logs. Therefore reasonable assumptions can be made regarding in-situ values for fixed carbon, heat value and volatile matter.

All analyses from 1981 core drilling and rotary drilling are appended with this report.

With the use of lab analyses of drill core for proximate values and specific gravity it is possible to correlate values, such as ash content, to the calibrated bulk density geophysical logs that were run "open hole" and acquire information on ash content and heat value for every coal seam intersected.

Core samples of Winkie core were handled as in previous programs. The core for each seam was sampled in individual plies based on seam lithology. Detail geophysical logs, core recovery and physical appearance dictated sampling procedures. These individual plies for each seam will be composited at a later date. Further analysis will include proximate and ultimate analysis, H.G.I, calorific value and equilibrium moisture.

Although most of the rotary drill hole samples were contaminated it is worth noting drill hole analyses for BR-113. The ash content is near the average (< 10%) so this intersection serves as a check for coal quality in the "new" reserve area.

	Seam	Ash	V.M.	F.C.	S	Cal/gm
Average	Lower	6.9%	13.2	79.0	.40	7910
BR-113	Lower	7.3%	12.7	79.5	.46	7911

It is estimated, using the 1981 drill data, that the quality of the reserves tested in 1981 is consistent with the quality of the coal tested previously. (See coal quality summary, Table IV).

Lower Seam

The Lower Seam trends from a thin seam with a mineable parting in the southern end of the deposit to a thick low ash seam towards the north.

In the southern end, ash content ranges from 8 to 15% due to the inclusion of minor rock partings in the coal seam. The opposite extreme occurs at the north end where the thickness of the seam has more than tripled ash levels less than 3.0%. Average analysis for the Lower seam was 6.9%

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
	2222	A	137 597.2	72 602.3	1245.2	Target between BR-2 & BW-30
	67443	A	138 367.5	74 735.6	1149.7	Target near BW-44
	Coal Outcrop	B	140 100.0	73 615.0	1302.0	Position estimated by McClymont

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
	99023	B	139 999.0	73 982.5	1234.0	
	99024	B	140 133.7	74 178.7	1223.4	
	99025	B	140 380.2	74 006.0	1270.0	
	99054	B	139 913.1	73 222.6	1292.1	
	99201	B	137 919.1	74 789.9	1112.5	Second readings as "99001"
	99202	B	137 307.3	74 038.6	1108.0	
	99203	B	138 162.3	74 563.5	1173.3	
	99204	B	137 079.8	73 392.8	1130.6	
	99206	B	136 433.1	73 328.06	1183.6	
	99210	B	139 836.8	72 675.8	1329.2	Elevations ± (No stereo vision)
	99211	B	139 914.9	72 600.4	1322.4	
	99212	B	139 905.1	72 439.6	1332.0	Elevations ± (No stereo vision)
	99213	B	139 637.0	72 349.2	1308.4	Elevations ± (No stereo vision)
	99214	B	139 395.8	72 156.4	1286.7	
	99217	B	138 881.5	71 151.5	1288.3	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
	99002	B	138 005.6	74 823.6	1110.3	
	99003	B	138 119.2	74 849.8	1111.4	
	99004	B	138 166.5	74 844.5	1115.58	
	99005	B	138 231.2	74 957.5	1126.5	Elevations ± (No stereo vision)
	99007	B	139 510.3	75 763.0	1061.9	
	99009	B	139 809.9	74 063.9	1223.3	
	99010	B	139 827.4	74 072.2	1223.4	
	99012	B	139 870.6	74 177.4	1216.5	
	99014	B	139 878.7	73 145.7	1298.7	
	99015	B	140 070.4	73 083.9	1352.1	
	99016	B	140 196.0	73 294.9	1334.0	
	99017	B	140 585.3	73 474.8	1321.7	
	99018	B	140 376.5	73 706.0	1303.3	
	99019	B	140 380.39	73 709.33	1303.2	
	99020	B	140 137.7	73 757.0	1266.7	
	99021	B	139 995.4	73 766.9	1250.8	
	99022	B	140 020.2	73 780.8	1255.2	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BR 108	22108	B	140 269.9	73 028.8	1338.5	
BR 109	22109	B	140 218.7	72 939.7	1342.4	
BR 110	22110	B	140 170.1	72 854.0	1340.2	
BR 111	22111	B	139 718.2	72 023.7	1236.1	
BR 112	22112	B	139 597.3	73 637.1	1358.9	
BR 113	22113	B	139 766.6	73 404.5	1257.4	
BR 114	22114	B	139 229.2	73 341.9	1264.0	Unsure of position
BR 115	22115	B	139 503.6	73 407.5	1253.9	
BR 116	22116	B	139 286.9	73 458.3	1254.1	
BR 117		B	139 113.0	73 527.0	1227.0	Position estimated by McClymont
BR 118	22118	B	139 341.8	73 538.5	1245.3	
BR 119	22119	B	139 151.6	73 604.9	1219.6	
BR 120	22120	B	139 394.3	73 616.4	1236.5	
GT 1	44001	B	138 841.8	74 255.2	1167.9	
GT 2	44002	B	138 315.8	75 134.5	1120.0	
GT 3	44003	B	138 919.8	74 514.3	1132.4	
GT 6	44006	B	139 117.7	74 627.7	1124.1	
GT 5		B	139 126.0	74 405.0	1143.5	Position estimated by McClymont
GT 7	44007	B	138 941.4	74 803.0	1097.4	Elevation ± (No stereo vision)
GT 8	44008	B	138 525.5	74 413.0	1156.0	Position estimated by McClymont
GT 9		B	138 611.0	74 606.0	1136.0	Position estimated by McClymont
GT 10	44010	B	138 668.3	74 829.4	1123.8	
EXTRA UNIDENTIFIED TARGETS						
	99001	B	137 919.1	74 789.9	1112.5	Second reading as "99201"

	TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
	BR 90	22090	B	139 530.3	73 015.5	1294.5	
	BR 91B	22091	B	139 663.7	73 186.1	1272.9	
	BR 92	22092	B	139 863.9	72 703.0	1331.8	
	BR 93	22093	B	139 559.7	72 567.2	1353.1	
	BR 95	22095	B	139 780.8	72 153.3	1292.2	Elevations ± (No stereo vision)
	BR 94	22094	B	139 856.1	72 341.7	1331.3	
	BR 96	22096	B	139 988.6	72 142.5	1299.3	
	BR 97	22097	B	139 638.7	72 313.7	1304.1	
	BR 98	22098	B	139 946.9	72 532.9	1320.0	Elevations ± (No stereo vision)
	BR 99C	22099	B	139 707.0	73 258.2	1267.0	
	BR 100	22100	B	139 989.1	73 346.3	1284.2	
*	BR 101	22101	B	139 860.6	73 122.1	1298.7	
*	BR 102	22102	B	140 158.4	73 694.9	1280.8	
	BR 102 A	22102	B	140 241.1	73 639.2	1292.5	
	BR 103	22103	B	140 166.4	73 272.9	1334.5	
	BR 104	22104	B	140 094.3	73 129.8	1345.7	
	BR 105	22105	B	140 066.8	73 075.5	1353.6	
	BR 106	22106	B	140 591.7	73 482.0	1320.8	
	BR 107	22107	B	140 364.0	73 213.5	1346.2	

TARGET	CODE	YEAR	NORTHING	EAST	ELEVATIONS	REMARKS
BR 72	22072	B	138 598.9	73 380.5	1237. 8	
BR 73	22073	B	138 960.1	73 624.2	1221. 7	
BR 74	22074	B	139 750.3	74 277.6	1196. 5	
BR 75	22075	B	139 970.0	73 973.2	1224. 8	
BR 76	22076	B	140 103.5	73 818.8	1252. 6	
BR 77	22077	B	140 154.4	73 700.7	1280. 5	
BR 78	22078	B	140 209.0	73 805.7	1279. 8	
BR 79	22079	B	140 302.1	73 564.5	1303. 9	
BR 80	22080	B	140 386.3	73 716.1	1303. 4	
BR 81	22081	B	140 405.4	73 747.1	1299. 3	
BR 82	22082	B	140 235.3	73 437.9	1317. 1	
BR 83	22083	B	139 958.9	73 301.2	1282. 7	
BR 84	22084	B	139 156.7	73 190.3	1279. 4	
BR 85	22085	B	138 226.5	74 945.5	1127.0	
BR 86	22086	B	139 332.4	73 170.8	1277.2	
BR 87	22087	B	139 456.0	73 318.4	1262.7	
BR 88	22088	B	139 404.1	73 225.4	1270. 1	
BR 89	22089	B	139 539.3	73 498.6	1249.6	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BR 55	22055	C	139 649.6	72 361.0	1311.9	
BR 56	1056 22056	C	139 463.1	72 465.5	1333.3	
BR 57	1057 22057	C	139 816.6	72 733.6	1332.8	
BR 58	1058 22058	C	139 756.1	72 877.0	1323.8	
BR 59	22059	C	139 816.0	72 251.7	1310.8	
BR 60	1060 22060	C	138 365.0	73 506.7	1256.1	
BR 61	1061 22061	C	139 257.6	74 129.6	1175.6	
BR 62	1062 99011	C	139 848.3	74 132.1	1221.0	
BR 63	22063	B	137 457.17	74 327.7	1110.1	
BR 64	22064	B	138 457.05	74 401.02	1162.9	Elevation ± (No stereo vision)
BR 65	22065	B	138 383.0	73 882.3	1230.6	
BR 66	22066	B	138 235.5	74 007.6	1216.7	
BR 67	22067	B	137 842.03	74 150.09	1163.2	Elevation ± (No stereo vision)
BR 68	22068	B	137 809.5	74 566.4	1145.5	
BR 69	22069	B	138 188.0	74 372.7	1184.3	
BR 70	22070	B	138 421.0	73 566.0	1244.0	Position estimated by McClymont
BR 71	22071	B	138 426.0	74 364.0	1171.0	Position estimated by McClymont

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BR 36	1036 22036	C	139 007.7	73 721.2	1209.7	
BR 37	1037	A	138 895.8	73 256.0	1252.0	
BR 38	1038 22038	C	139 056.4	73 405.8	1241.5	
BR 39	22039	B	139 069.68	73 104.35	1283.6	
BR 40	22040	B	139 192.50	73 299.33	1267.5	
BR 41	22041	B	139 240.42	72 991.08	1296.3	
BR 42	22042	B	139 193.93	72 862.30	1308.3	
BR 43	22043	B	139 265.83	73 424.82	1257.2	
BR 45	1045	A	138 859.8	73 128.5	1260.9	
BR 46	1046 22046	C	138 711.0	73 246.5	1253.1	
BR 47	1047	A	138 711.2	73 246.6	1252.8	Only 1 target visible
BR 48	1048 22048	C	139 071.3	73 805.2	1199.9	
BR 49	1049 22049	C	137 787.8	74 079.9	1171.5	
BR 50	1050	A	139 139.4	72 780.8	1318.7	
BR 52	1052 22052	C	139 701.1	72 797.6	1334.9	
BR 53	1053	A	139 620.2	72 716.8	1349.0	
BR 54	22054	B	139 755.0	72 528.2	1334.1	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BR 21	1021 22021	 C	138 806.0	73 790.7	1205.7	
BR 22	1022 22022	 C	138 719.6	73 647.6	1215.0	
BR 23	1023 22023	 C	138 623.6	73 463.8	1227.6	
BR 24	1024 22024	 C	138 528.2	73 313.4	1246.2	
BR 26	1026 22026	 C	138 382.7	74 290.6	1174.4	
BR 27	1027 22027	 C	138 267.7	74 118.3	1198.3	
BR 28	1028		138 105.8	74 244.7	1189.0	
BR 29	1029 22029	 C	138 156.6	73 946.5	1225.6	
BR 30	1030	A	137 921.2	73 918.6	1202.1	
BR 31	1031	A	138 557.3	73 809.1	1206.6	
BR 32	1032 22032	 C	138 319.4	73 779.9	1250.6	
BR 33	22033	B	138 452.7	73 636.1	1229.0	
BR 34	1034	A	138 780.3	73 387.2	1240.4	
BR 35	1035	A	138 897.0	73 550.4	1227.9	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BR 5	1005 22005	 C	138 104.7	72 295.6	1336.6	
BR 6	1006	A	138 464.3	71 765.7	1293.9	
BR 7	1007	A	137 031.9	72 847.7	1186.3	
BR 8	1008	A	135 596.9	74 429.0	1235.4	
BR 9	1009	A	136 232.7	73 510.7	1213.3	
BR 10	1010	A	136 431.1	73 331.3	1185.2	
BR 11	1011 99208	 C	137 280.1	72 768.3	1219.0	
BR 12	1012 22012	 C	137 763.9	72 817.7	1250.5	
BR 13	1013	A	137 894.1	72 660.2	1270.1	
BR 14	1014 22014	 C	137 837.0	72 576.4	1261.8	
BR 15	1015 22015	 C	139 907.5	74 636.7	1174.6	
BR 16	1016	A	137 985.0	73 999.7	1201.7	
BR 17	1017 22017	 C	138 445.4	73 982.6	1211.6	
	1111	A	137 782.8	74 555.1	1144.9	Portal (upper seam) Position estimated by McClymont
	3333	A	138 459.5	74 752.4	1144.1	Portal (lower seam) Position estimated by McClymont
BR 18	1018 22018	 C	137 977.9	74 439.3	1165.8	
BR 19	22019	B	137 858.1	74 254.8	1158.4	
BR 20	1020	A	137 790.6	74 532.0	1145.6	Position estimated by McClymont

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BW 53	9953	A	137 815.9	74 525.7	1145.0	
BW 54	9954	A	139 914.0	73 199.8	1295.8	
BW 55	9955	A	139 535.2	73 014.7	1294.2	Position estimated by McClymont
BW 56	9956	A	139 280.4	73 081.6	1287.4	Position estimated by McClymont
BW 57	9957	A	138 401.5	74 696.5	1149.9	Position estimated by McClymont
BW 58	33058	B	139 953.1	73 239.9	1296.7	
BW 59	33059	B	137 398.0	74 165.0	1100.2	Position estimated by McClymont
BW 60	33060	B	137 459.1	74 350.5	1105.1	
BW 61	33061	B	137 302.9	74 034.9	1107.9	
BW 62	33062	B	137 524.3	73 832.01	1155.2	
BW 63	33063	B	137 579.0	74 399.8	1107.0	Position estimated by McClymont
BW 65	33065	B	139 918.8	72 607.8	1323.4	
BW 64	33064	B	139 790.0	72 598.0	1332.0	Position estimated by McClymont
BW 66	33066	B	139 947.7	74 178.3	1219.8	
BW 67	33067	B	138 941.0	70 621.07	1201.6	
BW 68	33068	B	138 945.8	70 671.7	1215.1	
BW 69	33069	B	139 003.04	70 703.0	1200.9	
BW 70	33070	B	138 598.0	70 181.0	1152.0	Position estimated by McClymont
BR 2	1002	A	137 487.1	72 499.5	1247.9	
BR 3	1003	C	139 601.4	75 650.3	1088.2	
BR 4	1004 2222	C	137 597.3	72 602.1	1245.0	

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BW 19	9919	A	138 252.8	72 240.3	1339.8	Position estimated by McClymont
BW 20	9920	A	138 515.2	72 072.6	1322.8	Position estimated by McClymont
BW 21	9921	A	138 416.0	72 098.8	1319.0	Position estimated by McClymont
BW 22	99215 & 9922	C	138 874.1	71 229.5	1296.0	Elevation estimated
BW 23	99218 & 9923	C	138 804.5	71 157.1	1294.0	Elevation estimated
BW 24	99216 & 9924	C	138 843.5	71 186.7	1294.0	Elevation estimated
BW 25	9925	A	6 138 887.7	571 235.4	1295.0	Elevation estimated
BW 26	9926		138 052.8	74 141.4	1200.7	
BW 28		B	138 528.4	74 162.4	1171.6	
BW 29	9929	A	138 057.2	74 630.1	1156.0	Surveyed Position estimated by McClymont
BW 30	9930	A	137 738.3	72 678.7	1238.4	Position estimated by McClymont
BW 32	9932	A	139 409.1	75 677.1	1038.2	
BW 33	9933	A	139 292.1	75 911.5	1093.0	Position estimated by McClymont
BW 34	9934	A	6 139 528.6	575 579.4	1065.4	
BW 41	33041	B	138 236.39	74 184.1	1194.1	
BW 44	9944	A	138 396.4	74 744.5	1146.7	Position estimated by McClymont
BW 46		B	138 464.0	74 442.0	1158.0	Position estimated by McClymont
BW 47	9947	A	137 973.0	74 103.0	1192.5	Position estimated by McClymont
BW 48	9948	A	139 490.6	72 913.2	1315.6	
BW 49	9949	A	139 993.8	572 931.5	1308.4	Position estimated by McClymont
BW 50	9950		139 593.4	73 096.1	1282.7	
	33050	C				
BW 51	9951	A	139 336.3	73 169.3	1277.0	
BW 52		B	138 565.0	74 321.9	1153.1	Position estimated by McClymont

~~November 27, 1981~~
Burnett Resource Surv Ltd.
Received Feb 8/82

AERIAL TRIANGULATION VALUES

FOR DRILL HOLE TARGETS

TARGET	CODE	YEAR	NORTHING	EASTING	ELEVATIONS	REMARKS
BW 4	9904 33004	C	6 137 704.2	572 766.0	1244.5	
BW 5	9905	A	136 820.3	573 099.9	1158.9	No target visible estimated position re-read
BW 6	9906 99205	C	136 905.3	73 235.5	1147.9	
BW 7	9907	A	136 607.0	72 883.9	1157.1	
BW 8	9908	A	136 661.1	72 949.7	1160.8	Position estimated by McClymont
BW 9	9909	A	136 312.5	73 320.1	1214.9	
BW 10	9910	A	136 328.0	73 281.2	1208.9	
BW 11	9911	A	138 610.4	71 761.8	1336.8	Elevation ± (No stereo vision)
BW 12	9912 33012	C	137 887.0	72 815.9	1263.2	
BW 13	9913	A	138 390.5	71 996.7	1305.7	
BW 14	9914	A	138 371.4	72 370.7	1361.3	Position estimated by McClymont
BW 15	9915	A	137 394.9	73 034.4	1191.3	
BW 16	9916	A	138 341.9	72 383.8	1361.8	Position estimated by McClymont
BW 17	9917	A	138 382.3	72 193.5	1330.2	Position estimated by McClymont
BW 18	9918	A	137 703.6	72 228.3	1301.0	

Note: A = 1980
B = 1981
C = 1980 & 1981 Mean Value

1861

Licence No.	Drill Hole No.
3085 (Continued)	BR-80
	BR-106
	BR-107
	BR-108
	BR-109
	BR-110
	BR-105
	BR-104
	BR-103
	BR-82
	BW-66
3081	BR-97
	BR-112
	BR-93
3082	BW-68
	BW-69
	BW-70
3086	BR-92
	BR-98
	BR-94
	BR-95
	BR-111
	BR-96
	BW-65
	BW-64

1981

BURNT RIVER--1981 DRILLING

Licence No.	Drill Hole No.
3074	BW-59
	BW-60
	BW-61
	BW-62
	BW-63
	BR-63
	BR-67
3073	BR-68
3079	BR-85
3080	BR-69
	BR-66
	BR-65
	BR-73
	BR-70
	BR-119
	BR-118
	BR-120
	BR-89
	BR-115
	BR-87
	BR-88
	BR-86
	BR-90
	BR-91B
	BR-84
	BR-114
	BR-116
	BR-117
3085	BR-99L
	BR-113
	BR-101
	BR-83
	BR-100
	BR-77
	BR-102
	BR-79
	BR-78
	BR-76
	BR-75
	BR-74
	BR-81

CLIENT: TECK CORPORATION

PROJECT: BURNT RIVER SAMPLES

RAW COAL ANALYSIS, air dried basis

LAB NO.	SAMPLE I.D.	ADM%	MOIST%	ASH%	VOL%	FC%	S%	C.V: Cal/gm	F.S.I.
310	BW-64 18.06-19.04m	7.3	0.6	39.1	11.4	48.9	0.62	5037	0
311	BW-64-1 49.44- 54.82	6.8	0.5	17.6	12.9	69.0	0.61	7043	0
312	BW- 64-2 54.82- 55.72	5.8	0.9	47.8	11.0	40.3	0.26	4216	0
313	BW- 64-3 56.66- 57.72	3.8	0.8	2.9	14.2	82.1	0.35	8323	0
314	Weathered Coal SEAM 85	35.1	5.1	10.0	26.5	58.4	0.48	5906	0
315	Weathered Out-Crop SEAM 86	19.5	3.0	16.7	22.8	57.5	0.74	5858	0
316	Weathered Out-Crop SEAM 87	21.0	5.4	7.3	23.7	63.6	0.54	6472	0
317	BR-98 LOWER SEAM	14.8	0.3	45.5	13.3	40.9	0.26	4274	0
318	BR-101 UPPER SEAM	18.0	0.3	33.7	11.2	54.8	0.36	5520	0
319	BR-101 LOWER SEAM	11.1	0.4	66.7	9.4	23.5	0.17	-	0
320	BR-104 ? UPPER	14.9	0.5	37.6	10.8	51.1	0.32	5267	0
321	BR-104 UPPER SEAM COMP.	15.1	0.4	36.0	10.9	52.7	0.31	5348	0
322	BR-104 LOWER SEAM	11.9	0.4	34.0	11.2	54.4	0.24	5423	0
323	BR-104 # 1	16.0	0.4	35.6	11.4	52.6	0.25	5317	0
324	BR-104 # 2 LOWER	14.5	0.3	35.1	11.5	53.1	0.25	5399	0
325	BR-105 TRENCH D-1	15.0	5.1	42.5	20.4	32.0	0.21	3326	0
326	BR-105 TRENCH D-2	15.0	3.8	53.9	16.4	25.9	0.19	-	0
327	BR-106 MARKER SEAM	3.2	0.5	29.3	14.6	55.6	0.46	5897	1/2
328	BR-107	15.3	0.3	30.9	10.6	58.2	0.34	5884	0
329	BR-108 LOWER SEAM	13.1	0.4	26.7	12.5	60.4	0.27	6154	0
330	BR-109 UPPER SEAM	14.3	0.6	59.9	8.4	31.1	0.23	-	0
331	BR-109 LOWER SEAM	16.1	0.5	39.3	10.5	49.7	0.28	5037	0
332	BR-112 LOWER SEAM	23.3	0.5	9.3	13.9	76.3	0.32	7796	0
333	BR-113 LOWER SEAM	8.7	0.5	7.3	12.7	79.5	0.46	7911	0

Birtley Coal
& Minerals Testing

A DIVISION OF GREAT WEST STEEL INDUSTRIES LTD

CLIENT : TECK CORPORATION LTD.

PROJECT: BURNT RIVER CORE SAMPLES Received Aug. 14/81

RAW COAL ANALYSIS, air dried basis

LAB NO.	SAMPLE I.D.	ADM%	MOIST %	ASH%	VOL%	F.C.%	S%	C.V. Cal/gm	F.S.I.
8946	BW- 60 5.74 - 6.76	1.8	0.8	35.0	13.1	51.1	0.31	5328	1/2
8947	BW- 60 6.76 - 10.24	nil	0.7	21.4	19.2	58.7	0.42	6573	1 1/2
8948	BW- 60 10.24-12.80	0.3	0.7	8.9	17.6	72.8	0.45	7842	2 1/2
8949	BW - 61 4.21 - 6.96	0.8	1.4	12.6	18.3	67.7	0.52	7233	1/2
8950	BW -62-1 2.18 - 3.58	3.2	1.1	15.7	18.9	64.3	0.53	7004	1
8951	BW62-2 28.08 - 28.86	1.6	0.8	21.3	15.2	62.7	0.58	6754	1
8952	BW 62-3 29.9 - 31.3	1.3	0.8	12.3	16.3	70.6	0.43	7606	1 1/2
8953	BW -63 U Seam 5.08 - 6.08	0.7	0.9	13.4	13.0	72.7	0.43	7396	N.A.
8954	BW-63 U. SEAM 6.08 - 9.0	1.2	0.8	3.5	14.1	81.6	0.44	8330	N.A.
8955	BW-63 L. SEAM 9.92 - 10.88	3.8	0.9	7.9	14.5	76.7	0.65	7931	N.A.
8956	BW - 63 13.24 - 14.08	2.7	0.9	24.9	12.6	61.6	0.48	6411	N.A.
8957	BW-65 8.26 - 10.92	2.2	0.8	8.5	16.9	73.8	0.47	7856	1
8958	BW 67-1 3.26- 3.58	2.5	0.9	9.9	16.3	72.9	0.43	7464	N.A.
8959	BW 67-2 4.18 - 6.66	1.6	0.8	2.4	15.5	81.3	0.38	8406	N.A.
8960	BW 68-1 5.61-6.84	1.9	1.1	7.6	15.1	76.2	0.47	7950	N.A.
8961	BW-68-2 ~~23.4 - 3.29 (?)~~ 7.15 - 8.54	2.0	0.9	4.2	16.8	78.1	0.36	8210	N.A.
8962	BW-68-3 15.7-16.2	0.7	1.1	27.4	13.8	57.7	0.62	6090	N.A.

Birtley Coal & Minerals Testing

A DIVISION OF GREAT WESTERN STEEL INDUSTRIES LTD

APPENDIX

COAL QUALITY TEST RESULTS

COAL QUALITY

RANGES AND AVERAGES

Seam		Thickness (m)	RM (%)	Ash (%)	VM (%)	FC (%)	S (%)	Cal/gm
UPPER	Range	1.34-4.25	0.4-1.4	3.3-27.8	12.2-15.4	63.7-83.0	.22-.53	6178-8283
	Average	2.82	0.8	8.1	13.2	77.9	.41	7800
LOWER	Range	1.47-11.54	0.5-1.2	2.8-14.6	12.1-14.1	72.5-82.9	.30-.65	7244-8294
	Average	4.15	0.9	6.9	13.2	79.0	.40	7910
60	Range	2.42-8.78	0.5-1.0	6.1-14.7	15.2-17.3	69.1-77.0	.26-.48	7021-7795
	Average	5.87	0.8	11.2	16.1	71.9	.32	7550

TABLE IV

ash, 13.2% volatile matter, 79.0% fixed carbon, 0.9% inherent moisture, 0.40% sulphur, 7910 cal/gm and thickness of 4.15 meters.

Upper Seam

The Upper seam is thick and clean in the south with trends to thinning and partings toward the north. Ash levels of 4 to 5% exist in the south on 3 meter intercepts whereas in the north, ash levels of 8 to 12% are more common on thinner seam thicknesses. Average analysis for drill core for the Upper Seam includes thickness 2.82 m, ash 8.1%, inherent moisture 0.8%, volatile matter 13.2%, fixed carbon 77.9%, sulphur 0.41%, calorific value 7800 cal/gm.

Seam 60

The majority of Seam 60 reserves are in the southwest where the seam is consistent with respect to thickness and quality. In the northern end, the seam thins and appears to be cleaner. Seam 60 possesses two major high ash zones (25 to 40% ash) as well as minor rock partings. In the north, the lower major ash parting increases in thickness to the point of breaking the seam apart. Seam 60 normally runs 10 to 12% ash and 16% volatile matter over a thickness of 6 meters. Average analysis for the whole Seam 60 includes: 5.87 meters thick, 0.8% inherent moisture, 11.2% ash, 16.1 volatile matter, 71.9% fixed carbon, 0.32 sulphur and 7550 cal/gm.

Marker Seams

The marker seams of importance include Marker B and Marker C. Marker B frequently acts as the Lower Seam contact and although in excess of 30% ash (for its true thickness) would normally be taken due to the low ash content of the Lower Seam. Marker C also has mining potential due to the thickness of the seam (.75 to 1.0 m). The coal ranges from 13% to 28% ash depending on the number of minor partings. The seam was only tested on occasion, and fits into the potential geologic reserve.

Drill holes BW-61 and BW 62 were drilled between the Camp Ridge and Lower Ridge faults. The Upper and Lower seams were cored and samples were sent for analysis. The results are interesting in that for both seams the volatile matter is higher than normal. Volatiles for the two seams in the "main reserve area" are 12-14%, compared to 15-18% for BW-61 and BW-62.

In summary, the Burnt River coal is of semi-anthracite mark, with low volatiles (12-17%), low sulphur and high heat value.

Respectfully submitted,

Bruce I. McClymont

B. I. McClymont, P.Geol.