PR- BURNT RIVER 77 (1) A.

REPORT ON THE 1977 EXPLORATION PROGRAM ON THE BURNT RIVER PROPERTY (COAL LIC. 3061-3088 Inclusive) SUKUNKA RIVER AREA, B. C. (93 P/5W)

BY
R. S. VERZOSA, P.Eng.
FOR
TECK CORPORATION LIMITED
AND
BRAMEDA RESOURCES LIMITED

November, 1977

TECK CORPORATION

SAMPLE #: BR4-1 (40.09-41.87) C.E.S. No.: 60

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	15.32	15.52
Volatile Matter %	13.04	13.21
Residual Moisture %	1.30	--
Fixed Carbon %	70.34	71.27
TOTAL SULPHUR %	0.32	0.32
F.S.I. 1/2		
CALORIFIC VALUE (BTU/lb.)	13,120	13,290

CYCLONE ENGINEERING SALES LTD.
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TECK CORPORATION

SAMPLE #: BR4-3 (44.82-49.08) C.E.S. No.: 62

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	1.65	1.67
Volatile Matter %	16.28	16.49
Residual Moisture %	1.26	--
Fixed Carbon %	80.81	81.84
TOTAL SULPHUR %	0.30	0.30
F.S.I.	1/2	
CALORIFIC VALUE (BTU/lb.)	14,690	14,880

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TECK CORPORATION

SAMPLE #: BR4-4 (13.18-14.18) C.E.S. No.: 63

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	23.01	23.19
Volatile Matter %	15.47	15.59
Residual Moisture %	0.79	--
Fixed Carbon %	60.73	61.22
TOTAL SULPHUR %	0.54	0.54
F.S.I.	2 1/2	
CALORIFIC VALUE (BTU/lb.)	11,590	11,680

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INTRODUCTION

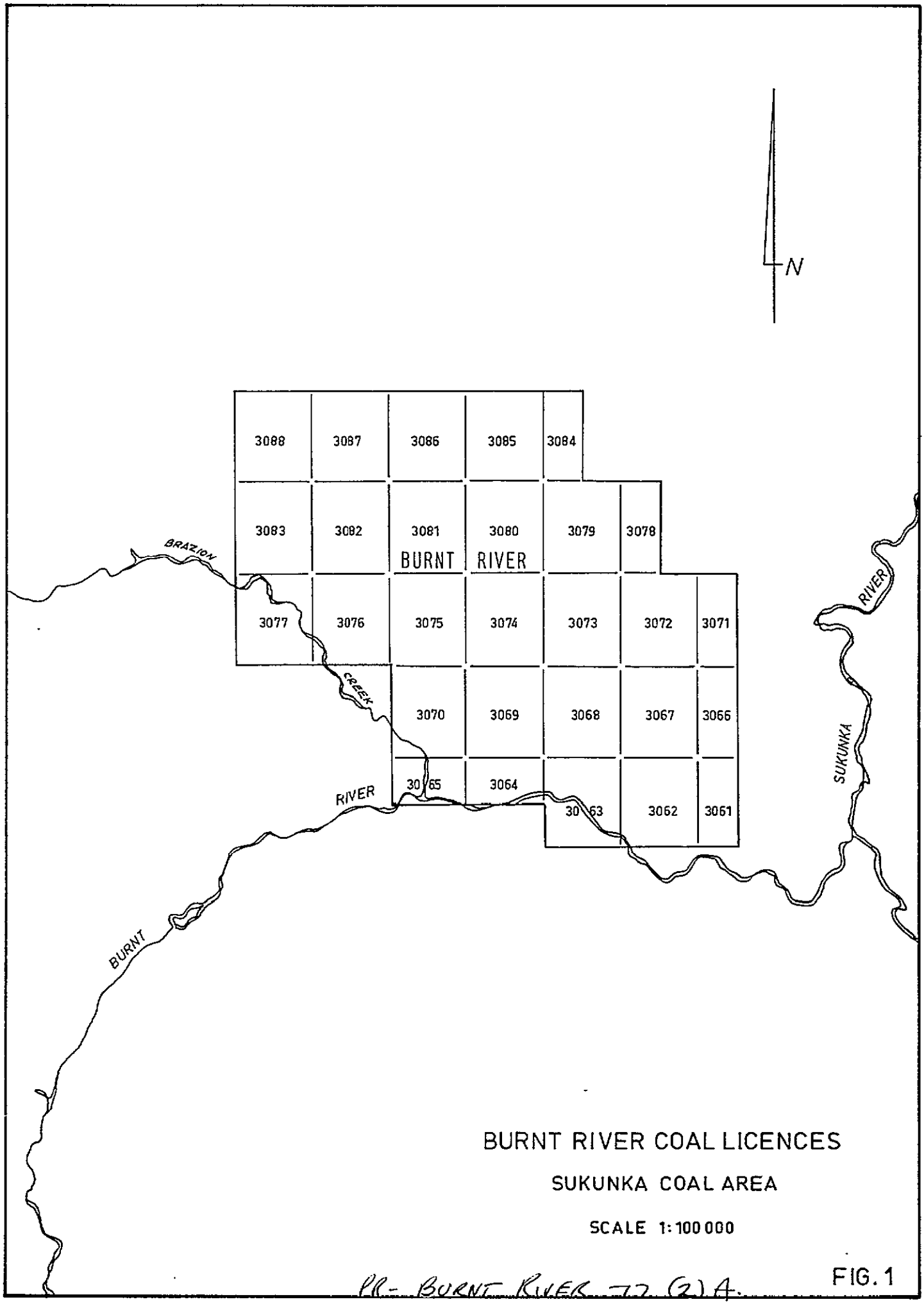
This report deals mainly with the results of the 1977 exploration program carried out by Teck Corporation Limited on the Burnt River property of Brameda Resources Limited. The program which consisted of geologic mapping and diamond drilling was designed firstly, to test the quality of the coals in the Gething Formation and secondly, to acquire further information on the stratigraphy and structure of the area.

Geologic mapping started before drilling and covered the period between the 9th of July and the 19th of August. A tent camp was established on the property to accommodate a crew of three.

The diamond drilling phase of the program was fully supported by a helicopter. It started on the 15th of August and was completed on the 12th of September, 1977.

The discussions on structural geology and stratigraphy in this report are repetitions of those made by the writer in 1975 although they are expanded in light of new data from this year's program.

The attached geological map is a compilation of data from the 1975 mapping and this year's mapping. The small scale map titled Regional Geology is included with the rest of illustrations and merely serves to satisfy government requirements on assessment reports.



BURNT RIVER COAL LICENCES

SUKUNKA COAL AREA

SCALE 1:100 000

PR- BURNT RIVER 77.(2)A.

FIG. 1

PROPERTY, LOCATION, ACCESS

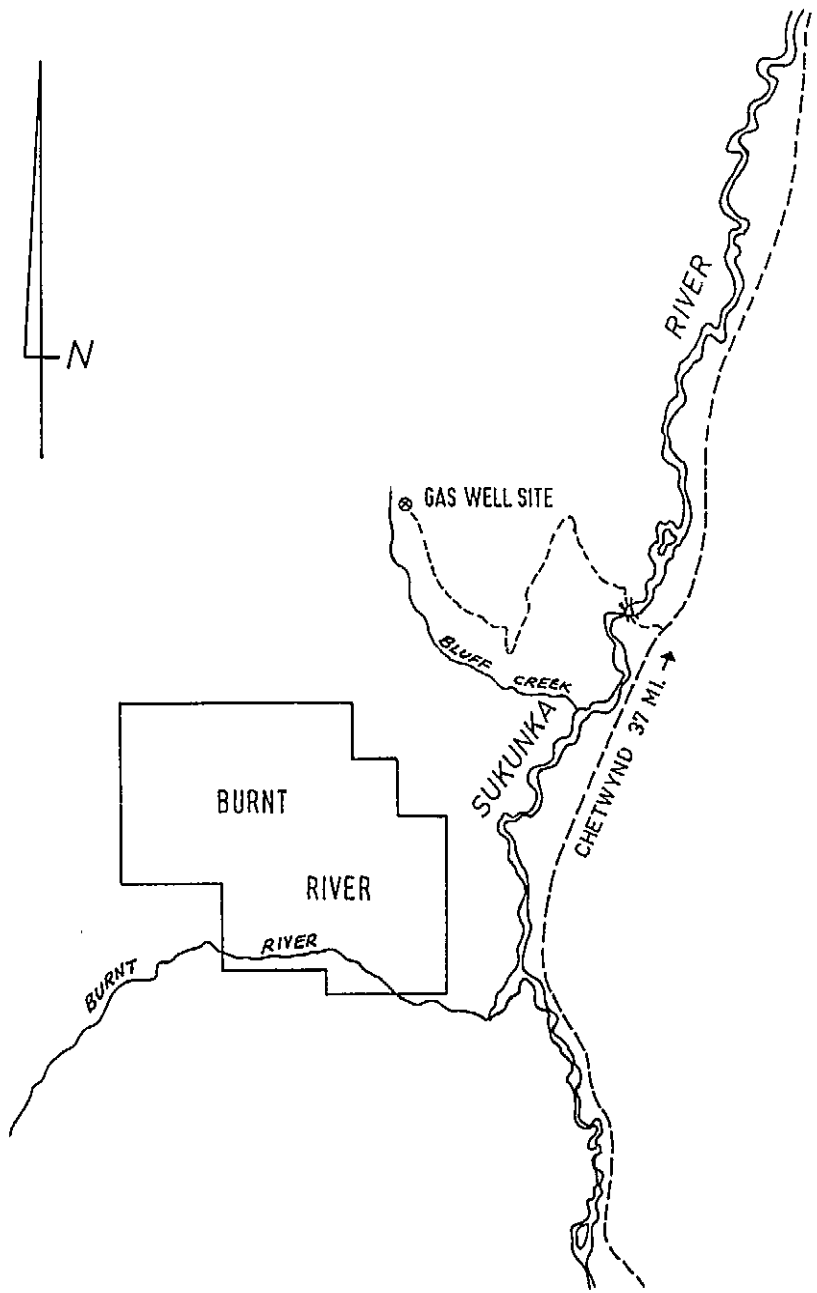
The Burnt River property comprising 28 coal licences is wholly owned by Brameda Resources Ltd. (Figure 1).

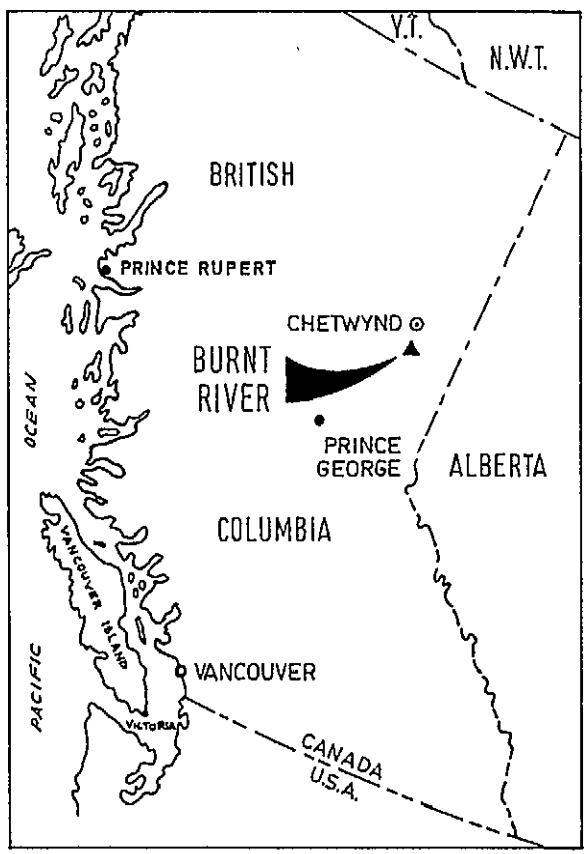
The property is located 38 kilometres south-southeast of the town of Chetwynd, B. C. in the Liard Mining Division (Figure 2).

Access into the property at the present time can only be on foot or by helicopter. However, future road access can be made expeditiously by connecting with a gas rig road built by Pacific Petroleum Ltd. during the year. This road crosses the Sukunka River at Mile 23 over a newly constructed Bailey bridge and winds up westward on the north side of Bluff Creek for approximately 10 kilometres. A point on the new road comes to within 5 kilometres of the Burnt River property.

PREVIOUS WORK

A reconnaissance survey was carried out on the Burnt River property by Hopkins and Gluskoter in 1971. It was upon the results of their work that the stratigraphy of the area was first established. During the month of June, 1975 the writer carried out a semi-detailed mapping of the property. The results of this work while benefitting from more detailed information and more ground coverage essentially confirmed the geological interpretations of Hopkins and Gluskoter





PROPERTY LOCATION MAP

PR- BURNT RIVER 77(2)A. FIG. 2

SUMMARY AND CONCLUSIONS

Exploration work carried out on the Burnt River property to date consists of reconnaissance surface mapping in 1971, semi-detailed geologic mapping in 1975, and geological mapping and diamond drilling in 1977. All this work verifies the existence of Lower Cretaceous coals, the most important of which occurs in the Gething Formation. The Chamberlain seam of the Sukunka property has not been recognized at the Burnt River area although its presence could be masked by facies changes.

Thick Gething seams were encountered in three diamond drill holes. The coals in these seams are very low in ash with an average content of less than 4 per cent and high in calorific value with an average greater than 14,000 BTU/lb. However, their low free swelling indexes disallow their being classed as metallurgical coal.

A rough estimate of possible coal reserves solely from the thick coal seams encountered in drill holes amounts to some 288 million metric tons of coal in place. It is possible that a large portion of this reserve could be under thin cover along the flanks and crests of folds.

The 1977 program does not alter our basic understanding of the complex nature of the geology of the area. Because of this, less expensive exploration methods will have to be devised or else future work programs will cost more than their normal share of funds spent per ton of coal developed.

DIAMOND DRILLING

A diamond drilling contract of no minimum footage was awarded to Connors Drilling Limited of Vancouver. The equipment consisted of a skid-mounted Boyles 25A surface rig that was equipped to drill to a maximum of 275 metres using NQ rods.

Movement of equipment between drill sites was carried out using a Jet Ranger 206B helicopter. This aircraft, normally rated a maximum sling load of 1200 pounds proved quite efficient. However, because of altitude and topography at the property maximum sling loads were limited to 800 pounds. Even at this derated capacity normal moves did not exceed 7 hours. The establishment of two twelve-hour shifts reduced helicopter time to a minimum as the drill crew had to be ferried everyday from Chetwynd.

A helicopter-assisted drilling program can be efficient and effective. However, its cost of operation is sensitive to weather conditions, crew efficiency and equipment downtime. None of these factors exceeded tolerable limits during the Burnt River drilling program.

In regard to effectivness, a complicating factor may arise in the choice of a drill site where a compromise is usually made between geologic requirements and topography combined with safety.

Four NQ diamond drill holes were completed as follows:

HOLE	TOTAL DEPTH (metres)
BR-1	165.55
BR-2	95.12
BR-3	244.51
BR-4	78.35

Figure 3 shows the locations of drill holes. The stratigraphic logs of each hole are shown in Figures 4 to 7 inclusive.

GEOLOGY

General Comments

A study of the geology of the Burnt River area suffers a great deal from the scarcity of outcrops mainly due to extensive overburden. This problem particularly exists near the central portion of the property where Gething coals are expected to occur. Apart from scarce outcrops there exists the other problem of the apparent lack of consistent and recognizable marker beds. The only units that may be useful for correlation are the conglomeratic beds of the Cadomin. Yet these beds in places seemingly wedge out as they pass into sandstones and even mudstones as well as they are believed to occupy different stratigraphic levels as they partly intertongue with the overlying Gething Formation. It is for this reason that in the geologic map (Figure 8) that accompanies this report the Cadomin Formation is in most places represented only as a horizon where its ridge-forming features disappear in areas chiefly underlain by recessive beds.

The Gething Formation in the Burnt River area in contrast to its equivalent in the Sukunka property includes a greater amount of silty and muddy fractions and there is a discernible lack of clean sandstone units. As such, it must constitute a facies change closer to marine conditions than its counterpart to the south.

Geologic Setting

The Burnt River property lies between the well known Sukunka/Bullmoose coal properties on the southeast and the Pan Ocean coal property on the northwest. All three are within a prominent northwesterly structural trend within which occur Lower Cretaceous and possibly late Jurassic successions. At the Burnt River property the Cadomin conglomerate appears to be present and rests on units that belong to the Minnes Group. This same relationship reportedly occurs on the adjoining Pan Ocean property on the north.

In contrast to the Sukunka area the rocks at the Burnt River property are tightly folded. A number of faults are also known to occur although their relationship with the folds is still not clear.

The Moosebar Formation which has been consistently relied upon as a stratigraphic marker horizon in the northeast foothills has never been recognized on the property. However, its presence is not ruled out since it does not take much to conceal 100 metres of section particularly over steeply dipping beds.

Stratigraphy

The only marker beds that could be useful for correlation at the Burnt River property are the pebbly to conglomeratic sandstone units that are easy to recognize in outcrops. Since these units form cliffs and ridges they usually stand out as traceable marker beds on aerial photographs. The conglomeratic beds are within close stratigraphic intervals of each other the aggregate of which comprise a distinct mappable unit. The unit appears correlative with the well-established Cadomin Formation of the foothills region.

At the Burnt River area there is very little lithologic distinction between the successions that overlie the Cadomin and those that underlie it. Thus in areas where the Cadomin is not exposed or is difficult of projection the assignmnet of units to any one formation or group becomes doubtful.

Minnes Group

Under this Group are assigned the successions that outcrop along parts of Brazion Creek on the southwestern edge of the property and also along parts of Blind Creek and some of its northerly tributaries. The succession comprises an almost nondescript, monotonous and repetitive sequence of alternating fine to medium to coarse grained, thin to medium to thick bedded generally muddy sandstones, siltstones and mudstones.

BURNT RIVER			HUGHES (1964)			STOTT (1967 & 1968)		
Group	Formation	Thickness (metres)	Group	Formation	Thickness (metres)	Group	Formation	Thickness (metres)
BULLHEAD	Gething	>400	CRASSIER	Gething	156-548	BULLHEAD	Gething	22-304
	Cadomin	± 75		Dresser	204-365		Cadomin	13-183
MINNES	Minnes	>100		Brenot	93-228	MINNES	Unit 3?	to 188

CORRELATION CHART OF THE BURNT RIVER AREA WITH SURROUNDING GEOLOGY

The siltstones and mudstones are usually carbonaceous and they sometimes enclose coal seams ranging in thickness anywhere from a few centimetres to one metre. The sandstones are generally well-bedded and flaggy mainly due to intercalations of silty and shaly layers. Occasionally, ferruginous layers and reddish beds occur.

In DDH BR-3 approximately 20 metres of interbedded carbonaceous siltstone and mudstone belonging to the Minnes Group was penetrated. The Minnes successions at the Burnt River property fits very well descriptions of rock units in the Pine Pass area which Hughes (1964) called the Brenot Formation. Similar unnamed units elsewhere in the foothills are placed by Stott (1967) above the Monach Formation.

At least some 100 metres of mudstone, siltstone and sandstone belonging to the Minnes group are exposed along Brazion Creek.

Cadomin Formation

Conglomeratic sandstones and conglomerate lenses in sandstone occur almost anywhere on the property. In the Brazion Creek area they form ridges and cliffs along the limbs of folds serving as marker beds in structural definition and interpretation.

The conglomerates consist of phenoclasts of well-rounded quartz and chert ranging in size from granules to cobbles reaching 4 cm in diameter.

Generally the conglomerates have very coarse quartz sandstone matrix although in some cases no matrix is present in lenses consisting solely of equal-sized pebbles of quartz and chert. Some angular fragments of chert and/or argillites occur in bands in the conglomeratic beds penetrated in DDH BR-1 and BR-3.

The conglomeratic beds of the Cadomin Formation on the Burnt River property are generally carbonaceous and include interbeds of carbonaceous to coaly siltstone and mudstone. This feature makes them different from the Cadomin observed in the Bullmoose area which is totally barren of any carbonaceous material. At the northeastern segment of the main seismic line that traverses the property a seven-foot coal seam (location 4) is enclosed in carbonaceous mudstone that is interbedded in conglomeratic sandstone.

Approximately 75 metres of the Cadomin Formation was intersected in DDH BR-3 of which nearly one third consisted of siltstone and mudstone.

Gething Formation

A thick succession of interbedded carbonaceous mudstone, siltstone, sandstone and coal comprise the Gething Formation on the Burnt River property. The Formation is widely distributed, occupying nearly four-fifths of the area. All the units comprising the Formation are characteristically carbonaceous and they invariably show fair amounts of coal wisps and partings. The sandstone units are finer-grained and they not only are generally silty and shaly but they also include closely-spaced intercalations of siltstone and mudstone. Some interbedded Moosebar-type mudstone not exceeding 15 metres in thickness may lend themselves as marker beds. This easily recognized unit is present a few metres below seam outcrop No. 10 on the main seismic line. It also occurs some 20 metres above seam outcrop No. 12.

None of the clean, coarse-grained, cliff-forming sandstone units that consistently and characteristically mark the upper part of the Gething Formation in the Sukunka property has yet been observed on the Burnt River property. Nonetheless, their stratigraphic equivalents are believed to be present although more likely either in the form of siltstone or mudstone.

Several coal seams, some of appreciable thicknesses occur in the Gething. Their mere presence in the section serves as a correlating feature in identifying their enclosing strata as equivalents of the Gething Formation of the Sukunka property.

No place on the property is known to expose a complete section of the Gething. However, based on structural interpretations its maximum thickness could exceed 400 metres. Its top has not been observed.

Structure

Folds

The main structural feature of the Burnt River property is the northwesterly folds whose limbs and axes at times form the prominent elongated topographic highs in the area. Where resistant beds occur the folds are easy to recognize and interpret from aerial photographs. In cross-section (Figure 9) the folds appear to be slightly assymetrical with their axial planes steeply dipping southwest. The intensity of folding appears to be more pronounced in the Brazion Creek area and in the northeast and eastern portion of the property. A less disturbed zone defined by a broader syncline extends northwesterly through the southwestern half of the property. It is on this syncline where the thickest section of the Gething is believed to occur. The dominant strike of beds is 45 degrees northwest with dips ranging from horizontal to vertical.

Faults

At least three faults of appreciable displacements are known to occur on the property. The northernmost fault that forms the contact between Minnes strata and the Gething Formation manifests itself in outcrops along the seismic line in the form of extensive shearing, slickensides and steep dips. Although the two other faults were not directly observed at any one locality their presence where shown appears

necessary to explain the differences in elevation of the conglomerate marker beds.

Because of the seemingly complex structure of the area it is quite possible that several other unobserved faults are present.

COAL SEAMS

Several coal outcrops of varying thickness and appearance occur in the different formations on the property. The coal seams of the Minnes Group while appearing to be of good quality are mostly thin (less than 20 cm) and not one is known to reach 1 metre in thickness. Most of the coal seams found on the property occur in the Gething. They constitute the most important ones not only because of the appreciable thicknesses some of them attain but also because they seem to occur frequently in the section. Coal also occurs in the Cadomin although their presence does not at the moment appear important.

All surface coal occurrences found to date are plotted on the geologic map and are numbered for reference purpose. Their individual descriptions are tabulated as follows:

Seam No.	Thickness (metres)	Floor	Roof	Rock Band	Enclosing Formation
1	>6.09	shale	not seen	.20 m near middle	Gething
2	>2.44	sandstone	sandstone	none	Gething
3	3.05	shale	mudstone	none	Gething
4	2.13	conglom-erate	siltstone	none	Cadomin
5	0.91	siltstone	siltstone	none	Gething
6	>2.13	not seen	mudstone	none	Gething
7	>1.5	not seen	not seen	none	Gething
8(BR-3)	4.88	mudstone	siltstone	none	Gething
9a(BR-1)	3.5	mudstone	mudstone	none	Gething
9b(BR-1)	2.59	mudstone	mudstone	none	Gething
10	3.65	sandstone	shale	.91 m in upper half	Gething
11	Same as in Seam No. 10.				
12	>1.8	not seen	not seen	none	Gething
13	>3	sandstone	not seen	none	Gething
14(BR-4)	9.52	mudstone	mudstone	.33 m. near top	Gething
15	0.91	siltstone	mudstone	none	Minnes
16	0.25	sandstone	sandstone	none	Minnes
17	.45	shale	siltstone	none	Gething
18	1.52	sandstone	sandstone	.30 m. near top	Gething
19	1.2	siltstone	siltstone	.25 m. near top	Gething

It is possible that some of the seams are equivalent to each other. However, seam correlation using present data would be very tenuous if not impossible.

An attempt to correlate surface coal occurrences was made by submitting samples for reflectance tests. The test is based on studies by Hacquebard and Donaldson (1974) whereby they concluded that the reflectance values of the vitrinite in coal increases with depth of burial. The method is claimed immune to the effects of oxidation on the samples. The results of the reflectance tests are shown in table 1 together with other data used in its interpretation.

TABLE 1

Coal Seam	Max. Ave. Reflectance	Vol. Matter (Prox. Analysis)	Kotters Curve VM	Kotters Curve Ro
13	1.3658		23	
12	1.5428		19	
14	1.670		17	
8(seismic)	1.3364	16.34 ave. ←	→	1.7
9	1.7392	15.82 ave. ←	→	1.74
10 & 11	1.0612 & 1.118 respectively		32 & 29	
7	1.6406		17	
5	1.134		28	
6	1.353		23	
4	1.495		20	

Conglomerate Horizon

The above table was constructed by arranging the coal seams in chronological order as best as could be interpreted from the stratigraphy of the area and using the Cadomin conglomerate as the datum. The lowest seam in the column is the oldest and consequently the deepest of burial. Two of the seams were core-drilled and proximate analyses of their volatile matter are shown. The volatile matter of the other seams based on reflectance values were calculated using Kotter's curve and the maximum reflectance of the seams that were submitted for proximate analyses based on their volatile matter content were calculated using the same method.

The sample from seam No. 9 is considered the least oxidized of all since it was collected as cuttings around the collar of a recently drilled seismic shot point hole. The good quality of the sample in contrast to the rest is dramatically shown by the concurrence of reflectance values with the proximate analysis of the sample as shown in Table 2. This leads to the conclusion that with the exception of the sample from seam No. 9 all the rest suffered from varying degrees of oxidation and their reflectance values are, therefore, doubtful.

If a certain degree of reliability can be placed on the reflectance tests, the values would indicate that seams No. 10, 11 and 5 are higher in the section and the conglomerate beds to which they are close to must be of different units much younger than the Cadomin. While this possibility is not totally discounted there is presently no field evidence to support such case.

Coal Quality

The coal seams No. 8, 9 and 14, mainly because of their appreciable thickness, appear to be the most important on the property. Based on their volatile matter content they appear to be within close stratigraphic interval of each other. All three seams were intersected in diamond drill holes completed during the year. The drill cores from each of the seams are generally hard and in appearance are mainly bright. Very few minor rock bands are present.

The results of proximate analyses of coal intersected in drill holes are appended with this report. A summary of proximate analyses of the important seams are as follows:

Seam No.	DDH No.	Thickness (metres)	Ash	VM	RM	FC	S	Btu/lb.	FSI
8	BR-3	2.39	2.48	17.35	2.80	77.37	0.50	15,230	NA
(Seismic)		2.75	1.95	15.33	1.80	80.92	0.32	15,080	½
9(a)	BR-1	3.50	5.41	17.31	1.06	76.12	0.50	14,740	½
(b)		2.59	4.72	14.34	1.11	79.83	0.40	14,730	½
14	BR-4	1.78	15.32	13.04	1.30	70.34	0.32	13,120	½
		2.95	2.92	15.00	1.56	80.52	0.24	14,780	½
		4.26	1.65	16.28	1.26	80.81	0.30	14,690	½

Coal seam 9(a) is discrete from 9(b). The total thickness of seams 8 and 14 is the sum of the individual sampling thicknesses. The above analyses classify the coals by ASTM standards as low volatile bituminous. They are low in ash and high in calorific value. However, their inability to form a coke button in the crucible makes them unsuitable by themselves as metallurgical coal.

A one-metre thick seam intersected in DDH BR-2 had an FSI value of 9. It is low in ash and by ASTM standards falls under the medium volatile bituminous class. Proximate analyses of other coal seams intersected in drill holes are found in the appendix.

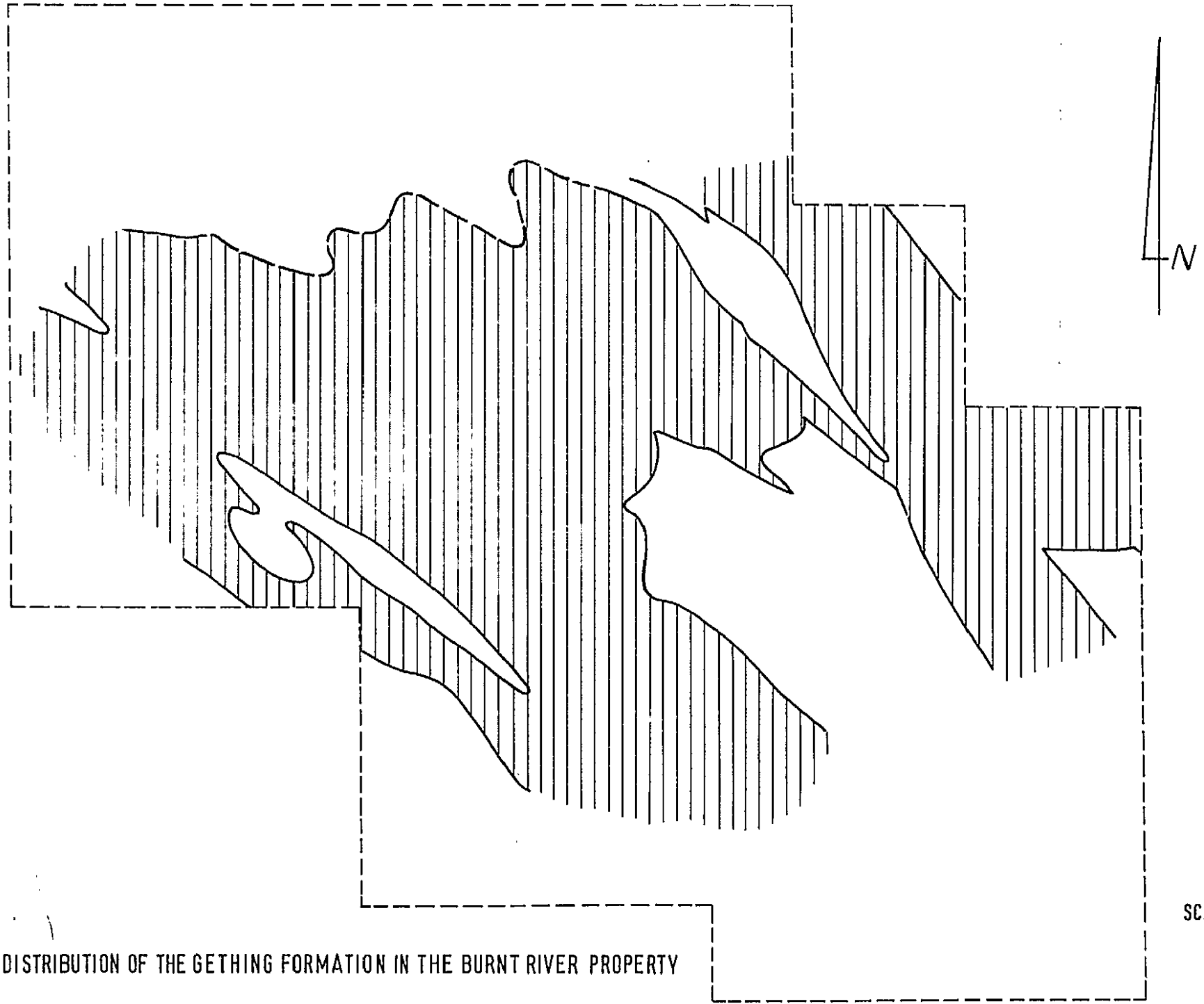
COAL RESERVE POTENTIAL

Two factors enhance the coal reserve potential of the Burnt River property. First, is the known occurrence of thick coal seams in the Gething and second, is the widespread areal distribution of the enclosing Gething Formation (Figure 10).

While it is obvious that the present exploration stage of the property does not permit the computation of reserves it seems reasonable that at least an estimation can be made based on limited data.

For a preliminary estimate, only the thick coal seams encountered in the diamond drill holes are considered, i.e. seams No. 8 (seismic) 9(a) and (b) and 14 whose aggregate thickness amounts to 20.22 metres.

Simply stated, the gross coal reserve potential of the property is represented by the aggregate thickness of 20.22 metres of coal that would be contained in the total area on the property that is underlain by the Gething Formation.



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DISTRIBUTION OF THE GETHING FORMATION IN THE BURNT RIVER PROPERTY

FIG. 10

Obviously this oversimplification neglects the effects of erosion. To allow for this and to be on the conservative side only one-half of the total area underlain by the Gething is considered. The procedure of calculation is as follows:

Estimated area underlain by Gething - 21,600,000 sq. metres

Aggregate thickness of coal seams - 20.22 metres

Average S.G. of coal seams, assume - 1.32

Therefore: $\frac{21,600,000}{2} \times 20.22 \times 1.32 = 288,256,320$ M.T.

The estimated reserve would be classed as possible and in-place.

RECOMMENDATIONS

Seam tracing by prospecting and hand-trenching, geologic mapping and diamond drilling is recommended. Geologic mapping does not have to take precedence in any future program since it only serves to delimit the prospective Gething Formation which is already known to cover a large area. Seam tracing appears to be of paramount importance. But whether or not it should guide diamond drilling or vice versa is debatable. The arguments in favour of diamond drilling to guide seam tracing are (1) the structural complexity of the area, (2) the lack of established, readily recognizeable marker beds, and (3) the concealment of large areas by extensive overburden.

Respectfully submitted,

R. S. Verzosa

R. S. Verzosa, P.Eng.

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TECK CORPORATION

SAMPLE #: BRT-1 (9.67-13.17) C.E.S. No.: 53

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	5.41	5.47
Volatile Matter %	17.31	17.51
Residual Moisture %	1.16	--
Fixed Carbon %	76.12	77.02
TOTAL SULPHUR %	0.50	0.51
F.S.I. 1/2		
CALORIFIC VALUE (BTU/lb.)	14,740	14,910

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TECK CORPORATION

SAMPLE #: BR1-2 (16.14-18.73) C.E.S. No.: 54

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	4.72	4.77
Volatile Matter %	14.34	14.50
Residual Moisture %	1.11	--
Fixed Carbon %	79.83	80.73
TOTAL SULPHUR %	0.40	0.40
F.S.I.	1/2	
CALORIFIC VALUE (BTU/lb.)	14,730	14,890

CYCLONE ENGINEERING SALES LTD.
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TECK CORPORATION

SAMPLE #: BR1-3 (88.72-90.24) C.E.S. No.: 55

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	13.67	13.80
Volatile Matter %	12.77	12.89
Residual Moisture %	0.94	—
Fixed Carbon %	72.62	73.31
TOTAL SULPHUR %	0.41	0.41
F.S.I. 1/2		
CALORIFIC VALUE (BTU/lb.)	13,350	13,480

CYCLONE ENGINEERING SALES LTD.
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TECK CORPORATION

SAMPLE #: BR2-1 (80.79-82.0) C.E.S. No.: 56

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	35.16	35.45
Volatile Matter %	16.08	16.21
Residual Moisture %	0.82	--
Fixed Carbon %	47.94	48.34
TOTAL SULPHUR %	0.51	0.51
F.S.I.	2	
CALORIFIC VALUE (BTU/lb.)	9,710	9,790

CYCLONE ENGINEERING SALES LTD.
EDMONTON, ALBERTA, CANADA.

TECK CORPORATION

SAMPLE #: BR2-2 (23.20-24.39) C.E.S. No.: 57

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	8.32	8.39
Volatile Matter %	21.86	22.05
Residual Moisture %	0.88	
Fixed Carbon %	68.94	69.56
TOTAL SULPHUR %	0.72	0.73
F.S.I. 9		
CALORIFIC VALUE (BTU/lb.)	13,670	13,790

CYCLONE ENGINEERING SALES LTD.
EDMONTON, ALBERTA, CANADA.

TECK CORPORATION

SAMPLE #: BR3-1 (6.14-8.53) C.E.S. No.: 58

PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	2.48	2.55
Volatile Matter %	17.35	17.85
Residual Moisture %	2.80	--
Fixed Carbon %	77.37	79.60
TOTAL SULPHUR %	0.50	0.51
F.S.I.	N.A.	
CALORIFIC VALUE (BTU/lb.)	15,230	15,670

CYCLONE ENGINEERING SALES LTD.
EDMONTON, ALBERTA, CANADA.

TECK CORPORATION

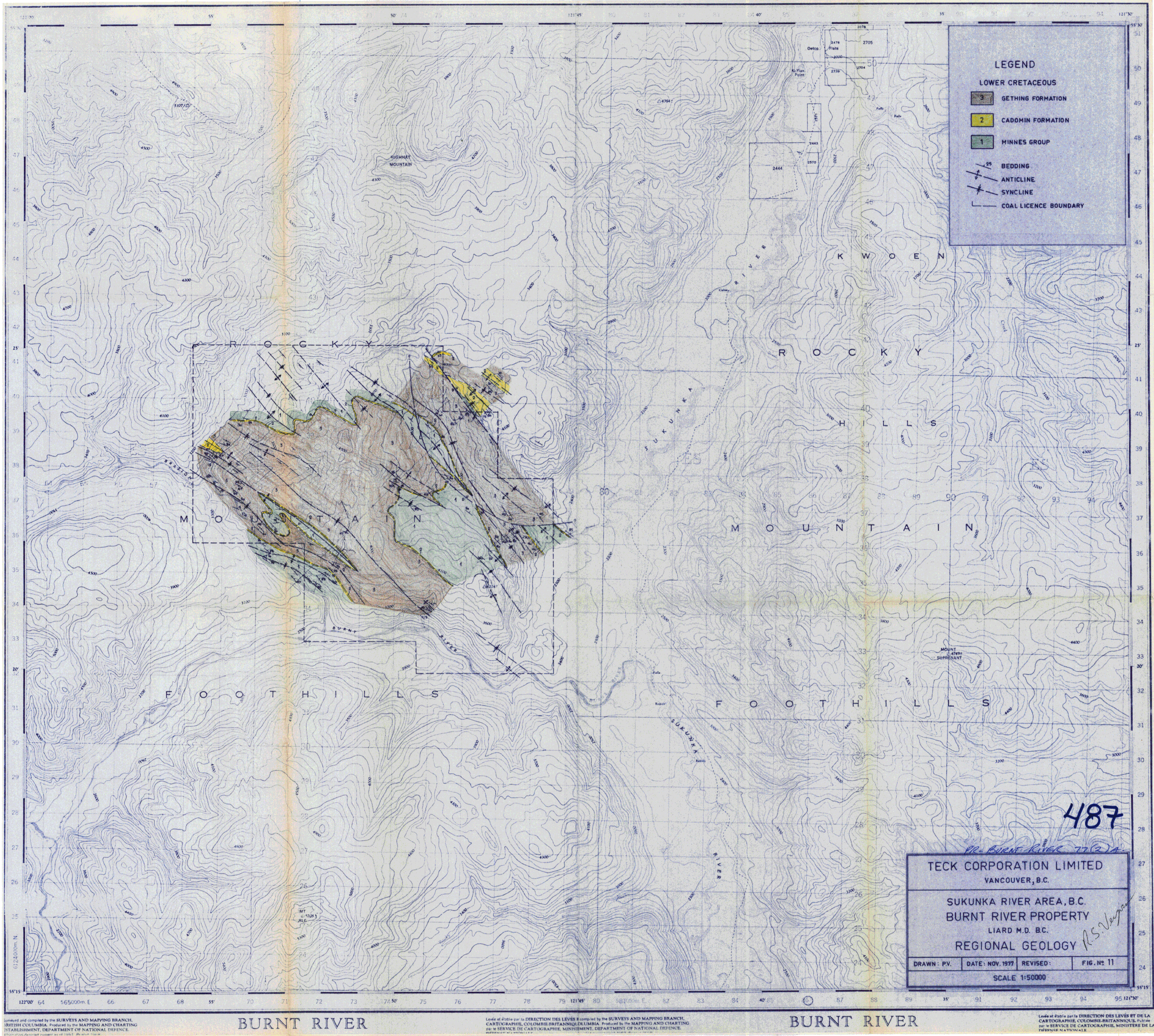
SAMPLE #: BR3-2 (8.53-11.28) C.E.S. No.: 59

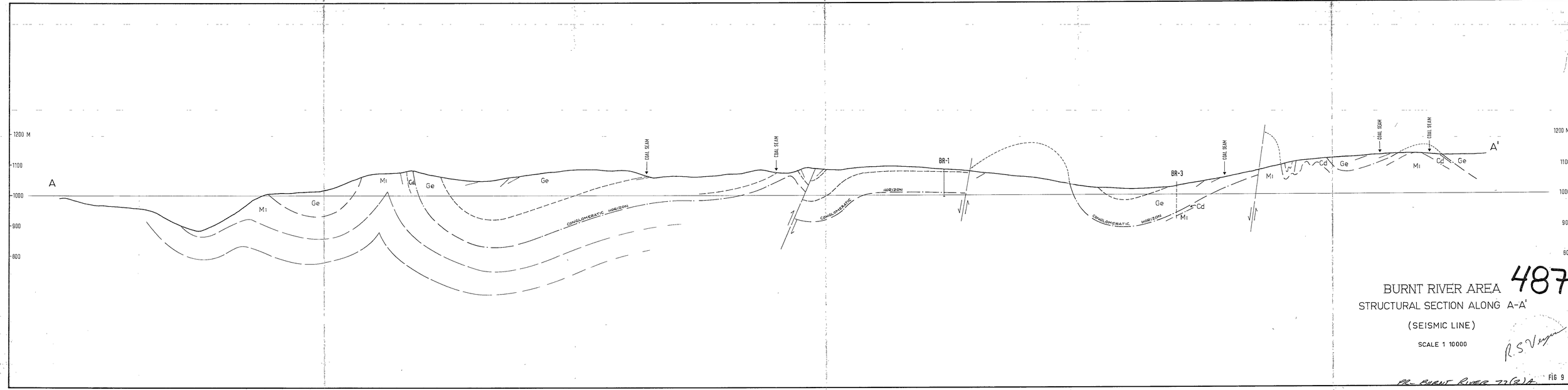
PROXIMATE ANALYSES:

	Air Dry Basis	Dry Basis
Ash %	1.95	1.99
Volatile Matter %	15.33	15.61
Residual Moisture %	1.80	--
Fixed Carbon %	80.92	82.40
TOTAL SULPHUR %	0.32	0.33
F.S.I. 1/2		
CALORIFIC VALUE (BTU/lb.)	15,080	15,360

CYCLONE ENGINEERING SALES LTD.
EDMONTON, ALBERTA, CANADA.


N
BURNT
LEGEND
LOWER CRETACEOUS
BULLHEAD GROUP
Ge GETHING FORMATION
Cd CADOMIN FORMATION
UNCONFIRMITY
MINNES GROUP
Mi MINNES UNDIVIDED
BR-3 DRILL HOLE
12 COAL SEAM OUTCROP
BEDDING (HORIZONTAL, INCLINED, VERTICAL, OVERTURNED)
ANTICLINE, SHOWING DIRECTION OF PLUNGE
SYNCLINE, " " " "
U D FAULT
FORMATION BOUNDARIES
APPROXIMATE POSITION OF CADOMIN HORIZON
SEISMIC LINES AND TRAILS
487
PR-BURNT RIVER 77(2)A.
BRAMEDA RESOURCES LTD.
VANCOUVER, B.C.
PRELIMINARY GEOLOGY
OF THE BURNT RIVER PROPERTY
SUKUNKA RIVER AREA
LIARD M.D., B.C.
SCALE 1:10000
FIG. 8


LEGEND
LOWER CRETACEOUS
3 GETHING FORMATION
2 CADOMIN FORMATION
1 MINNES GROUP
25 BEDDING
ANTICLINE
SYNCLINE
COAL LICENCE BOUNDARY
ROCKY MOUNTAIN FOOTHILLS
KWOEN
ROCKY HILLS MOUNTAIN FOOTHILLS
HIGHHAT MOUNTAIN
SUKUNKA RIVER
BURNT RIVER
MOUNT SUPREMANT
487
PR-BURNT RIVER 77(3)A
TECK CORPORATION LIMITED
VANCOUVER, B.C.
SUKUNKA RIVER AREA, B.C.
BURNT RIVER PROPERTY
LIARD M.D. B.C.
REGIONAL GEOLOGY
R.S. Verzosa
DRAWN: P.V.
DATE: NOV. 1977
REVISED:
FIG. № 11
SCALE 1:50000
BURNT RIVER
BURNT RIVER



BURNT RIVER AREA 487

STRUCTURAL SECTION ALONG A-A'

(SEISMIC LINE)

SCALE 1 10000

R.S.V

FIG 9

PR-BURNT RIVER 72(2)A.

BR-3

BR-1

BR-4

BR-2

BURNT RIVER

CREEK

MINK CREEK

IRRIGATION

ELLIOT CREEK

N

487

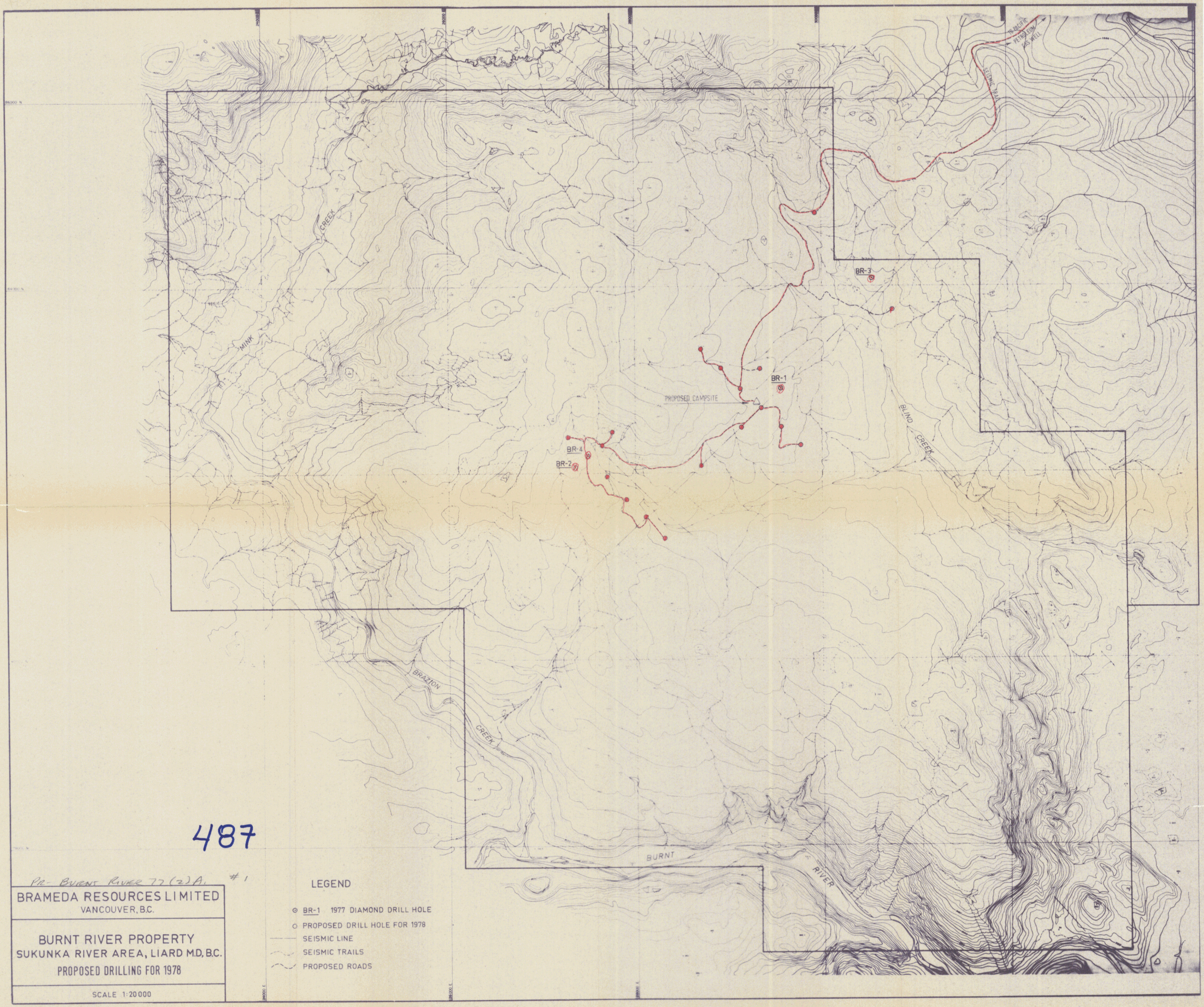
Re BURNT RIVER 77 (24) A

BRAMEDA RESOURCES LTD.
VANCOUVER, B.C.

DRILL HOLE LOCATIONS
BURNT RIVER PROPERTY
1977 PROGRAM
LIARD M.D. B.C.

SCALE 1:10000

FIG. 3



487

Pr- Burnt River 77 (2) A. #1

BRAMEDA RESOURCES LIMITED
VANCOUVER, B.C.

BURNT RIVER PROPERTY
SUKUNKA RIVER AREA, LIARD M.D, B.C.
PROPOSED DRILLING FOR 1978

SCALE 1:20000

LEGEND

- ⊙ BR-1 1977 DIAMOND DRILL HOLE
- ○ PROPOSED DRILL HOLE FOR 1978
- SEISMIC LINE
- SEISMIC TRAILS
- PROPOSED ROADS

HAZARDOUS TERRAIN

BURNT RIVER COAL PROPERTY

TECK MINING GROUP LIMITED

The Burnt River Coal Licences are situated west of the Sukunka River in the Rocky Mountain Foothills physiographic region. The terrain consists of deeply dissected plateaus with a local relief of 750 meters. Fine-grained clastic Cretaceous sediments are exposed in near vertical cliffs near the summits. Several valleys including the Mink and Bluff Creek have been widened by glaciation but tributary valleys are narrow with steep sides. Brazion Creek and the Burnt River drain the lease area eastward into the Sukunka River.

HABITAT CLASSIFICATION

DESCRIPTION OF AREA

This property is situated in a transition zone between boreal and subalpine forest types. The lower elevations (below 1000 meters) are dominated by lodgepole pine, trembling aspen and white birch which have colonized in the wake of fire. Aspen, of importance to wildlife, is more abundant on south-facing slopes. White spruce may be invading some of the older stands. Black cottonwood is common along the streams.

Engelmann Spruce (possibly including some hybrids with white spruce) and subalpine fir are dominant above the boreal zone. The coniferous forest is dotted with patches of aspen, willows and open areas (burns and meadows).

This type of forest complex, comprised of many edges between only succession and climax vegetation is highly productive for wildlife, in particular, ungulates especially deer and moose.

WILDLIFE HABITATS REPRESENTED IN THE AREA

1. Fish

Arctic grayling, rainbow trout, dolly varden char, whitefish, and walleye are important food and sport fish found in the Peace River drainage. These species will occur in the main streams, Sukunka River, Burnt River and Brazion Creek. Arctic grayling are extremely susceptible to pollution by siltation of the water.

2. Waterfowl

The basic needs of waterfowl includes permanent marshes, or deep open water areas with well developed marsh edges. The four ponds in the north-east section of the area are deep and have poorly developed marsh edges. The small pond to the south provides the best potential waterfowl habitat in the area.

3. Moose, Mule Deer and Whitetail Deer

New plant growth in disturbed areas provides the highest quantity and quality of ungulate browse. The areas are shown on the map as being hazardous for wildlife if they are also sensitive to mechanical disturbance. A mixture of deciduous vegetation with conifers is especially valuable as winter habitat providing browse and shelter from wind and snow.

Abundant moose can be expected on this property.

Mule deer and whitetail deer occur locally. Their distribution is uncertain on this property.

Moose and deer will be most abundant in the area in winter. They may leave the study area completely in the summer for higher aspen and subalpine forests (above approximately 1500 meters elevation).

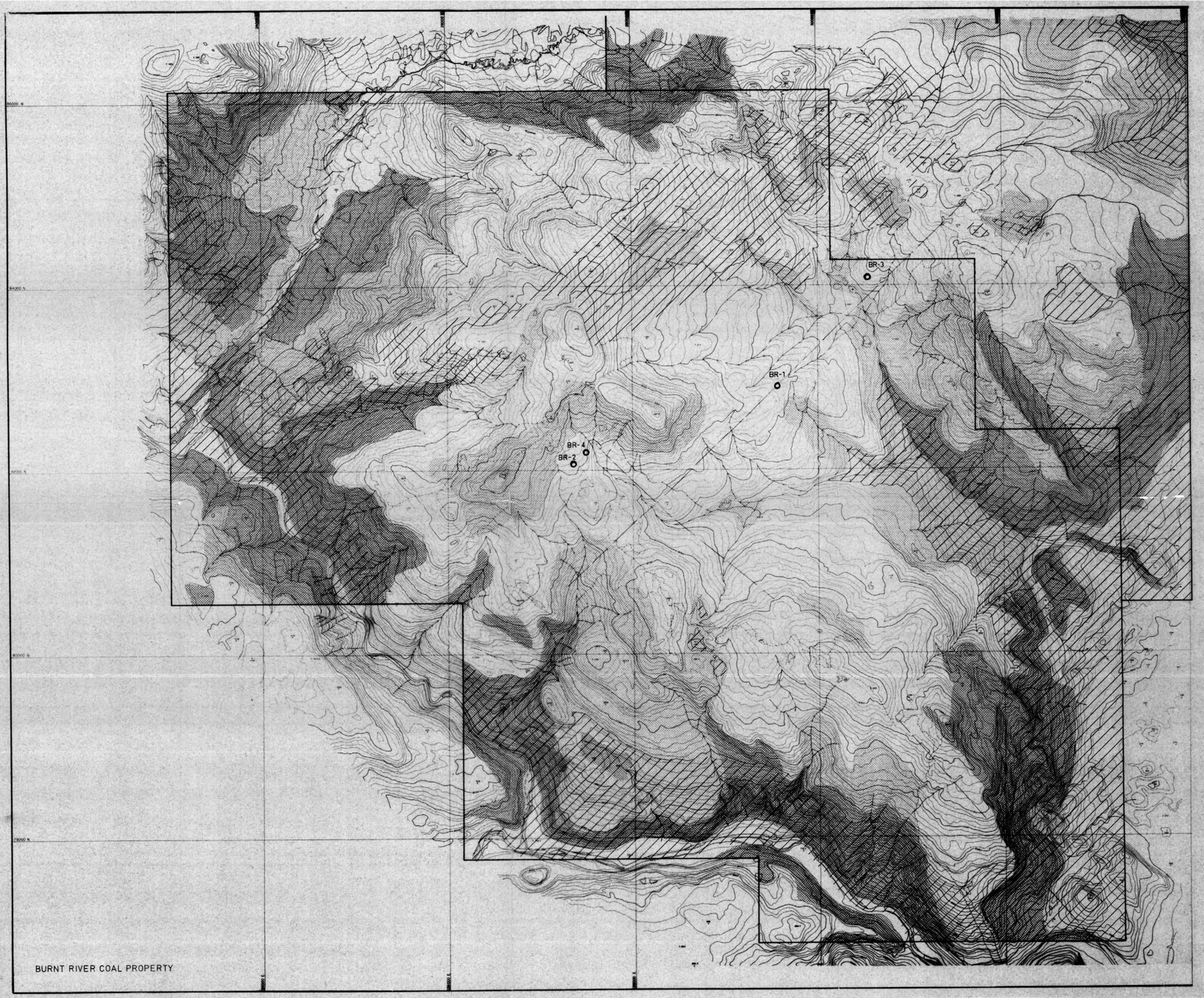
CONCLUSIONS

1. The greatest potential hazard to wildlife populations is the possible improvement of access to the property for hunters and recreationists. Access to this prime wildlife habitat should be restricted.

2. Avoid erosion and siltation at stream crossings.

3. Prime wildlife habitat is widespread on the Burnt River property. The important zones, where wildlife activity is expected to be highest, are shown as diagonal lines on the map. These areas include larger streams and ponds that can be significant migration routes and concentration areas for wildlife.

4. The physical operations involved in exploratory mining should have little detrimental effect on wildlife if animals are not shot or willfully disturbed and mechanical disturbance of soil is minimized.



GEOLOGICAL HAZARDS

Glacial sediments attributed to two or more major glaciations are present. Pitted glaciofluvial deposits in the Sukunka River Valley belong to the youngest glacial advance (12,000 years ago). In places they are overlain by silty lacustrine sediments. Glacial sediments which mantle the gentle parts of slopes and tops of plateaus were deposited by ancient glaciations (greater than 150,000 years). As a result, glacial tills (which consists of more than 90 percent of ground-up local Cretaceous sediments) have deeply leached and weathered soil profiles.

Fine-grained calcium carbonate, derived from glacial grinding and crushing of carbonates, acts as a binding agent in the glacial sediments. The surface soils of ancient glacial sediments are leached up to 2 meters in depth of calcium carbonate. Upon removal or disturbance of existing vegetation the surface soils are rendered more susceptible to surface erosion on slopes above 30 percent. In the unleached profile, glacial sediments stabilize rapidly upon removal of vegetation.

Fluvial deposits in this area, if disturbed, tend to stabilize rapidly.

Colluvial deposits are the most widespread. They occur on all slopes and are generally less than 2 meters in thickness. If colluvium is removed on steep slopes for road construction, the underlying fine-grained bedrock materials will be susceptible to rapid erosion.

The Burnt River Coal Licences mainly are underlain by thin surficial deposits generally not more than 2 - 5 meters in thickness. Several slopes have seepage areas and potential slumps. The area has been subdivided on a tripartite basis with respect to environmental damage upon mechanical disturbance of the ground. The units are based on a knowledge of the action of surficial materials on slopes.

Not Hazardous

Areas characterized by well-drained soils, gentle to moderate relief, shallow weathering and leaching profiles, (less than .5 meters), medium to coarse-textured materials, includes river flats, plateau tops, fluvial areas, gentle slopes on valley sides.

Moderately Hazardous

Areas characterized by moderately drained soils, moderate slopes, very small seepage areas, deeply weathered and leached profiles (1 - 2 meters), fine-textured materials, glacial tills on moderate slopes, thick colluvial materials (greater than 3 meters).

Very Hazardous

Areas characterized by moderate to poorly-drained soils, moderate to steep slopes, deeply weathered and leached profiles, large seepage areas, potential areas for slumping and sliding, large local relief in short distances, thin fine-textured materials on local bedrock, glacial tills on steep slopes.

All areas can be crossed provided care in geological design is exercised, with minimum of environmental damage and/or cost.

PR-BURNT RIVER 77(2)A. #2

LEGEND

HAZARDOUS TERRAIN AND HABITAT AREAS

- Not Hazardous
- Hazardous for Wildlife Habitat
- Moderately Hazardous Terrain with Respect to Mechanical Disturbance
- Very Hazardous Terrain with Respect to Mechanical Disturbance
- Extremely Hazardous for Wildlife Habitat and Mechanical Disturbance

CONTOURS IN METERS

SCALE 1:20,000

Prepared by

INTERNATIONAL ENVIRONMENTAL CONSULTANTS

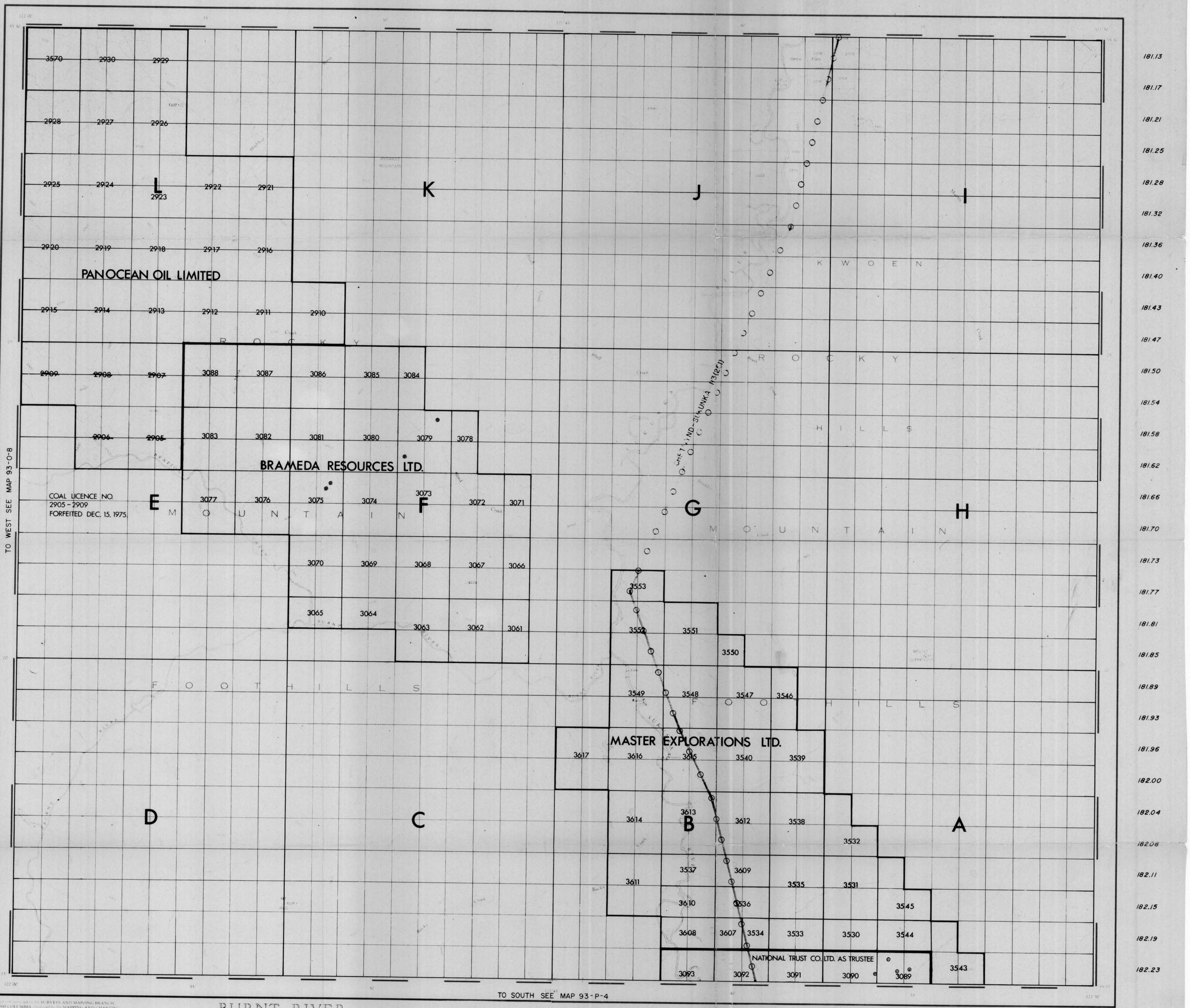
-and-

BAYROCK AND REIMCHEN SURFICIAL GEOLOGY LIMITED

MARCH 1977

487

COAL 93-P-5



Surveyed and compiled by the SURVEYS AND MAPPING BRANCH, BRITISH COLUMBIA. Produced by the MAPPING AND CHARTING ESTABLISHMENT, DEPARTMENT OF NATIONAL DEFENCE.

BURNT RIVER

PEACE RIVER DISTRICT

BRITISH COLUMBIA

SCALE 1:50,000 ÉCHELLE

LEGEND

Drill hole	DDH ● RDH
Proposed drill hole	○
Shaft	
Adit	
Trench or open cut	HAND CAT
Open pit or stripped area	
Seam tracing	— — —
Access road	
Exploration road	
Proposed exploration road	- - - -

COAL TITLES REFERENCE MAP 93-P-5

DEPARTMENT OF MINES AND PETROLEUM RESOURCES, VICTORIA, B.C.

FOR INFORMATION AND MAP COPIES APPLY TO THE OFFICE OF THE CHIEF GOLD COMMISSIONER, VICTORIA, B.C.

PR- BURNT RIVER 77(2)A.

487

⊙ 1976 DRILLING
• 1977 "

TECK CORPORATION LIMITED

STRATIGRAPHIC LOG
OF
DDH. BR-1

VERTICAL SCALE 1 : 200

487

PR- BURNT RIVER 77(3)A.

PROJECT Burnt River — LOCATION Sukunka

HOLE Nº 1 — CORE SIZE NQ — DATUM Top of casing

CO-ORDINATES 83000 N 29660 E — DATE STARTED 15 Aug 1977

COLLAR ELEVATION 1161 METRES — DATE FINISHED 21 Aug 1977

HOLE ANGLE 90° — TOTAL DEPTH 165.55 M — LOGGED BY R S Verzosa

SERIES	FORMATION	MEMBER	DISTANCE FROM DATUM	COLUMNAR SECTION	LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS	GETHING		0		CASING, OVERBURDEN - .5 M
			5		SANDSTONE, FINE-MEDIUM GRAINED, THIN BEDDED, GRADING DOWNWARDS TO BROWN MUDSTONE WITH SOME INTERBEDDED SANDSTONE, MUD SEAM AT 9 METERS, SOME WORM BURROWS
			9.67		
			10		COAL, HARD AND BRIGHT ALTHOUGH BROKEN AND SHEARED, RECOVERY ± 70% 5 CM SHALE BAND AT 12.04 M (SAMPLE BR 1-1, 9.67-13.17)
			13.17		
			15		MUDSTONE, DARK GREY, CARBONACEOUS, SILTY, SHALY
			16.14		
			16.46		COAL, HARD AND SEMI-BRIGHT (SAMPLE BR 1-2, 16.14-18.79)
			18.79		
			20		MUDSTONE GRADING DOWNWARDS TO THIN BEDDED SILTSTONE AND VERY FINE SANDSTONE
					MOSTLY SHALY COAL WITH 16 CM HARD BRIGHT COAL AT BASE
			25		MOSTLY FINE TO MEDIUM SANDSTONE WITH INTERBEDDED SILSTONE, X-BEDDED SWIRLED, MUD CRACKS, WORM BURROWS, SOME CARBONACEOUS LAYERS
			30		MUDSTONE, DARK-BROWN, CARBONACEOUS, SILTY-SHALY, INTERBEDDED THIN SILTSTONE AND SANDSTONE >85° TO CORE
			35		SANDSTONE-SILTSTONE, MUD CRACKS, SWIRLED, WORM BURROWS
					MAINLY MUDSTONE VERY DARK GREY, CRUMBLY, SHALY, VERY CARBONACEOUS, SOME BONE, ABUNDANT COAL AND COALY PARTINGS
			40		SILTSTONE AND CARBONACEOUS SHALE INTERBEDDED
			45		MAINLY MUDSTONE DARK GREY TO BLACK, VERY CARBONACEOUS, COAL PARTINGS AND BANDS OF UP TO 30 CM
			50		SANDSTONE, FINE-MEDIUM, CARBONACEOUS, INTERBEDDED WITH CARBONACEOUS, SHALY SILTY MUDSTONE, SOME DIPS < 60° TO CORE
			55		MUDSTONE, VERY CARBONACEOUS, PARTINGS AND BANDS OF UP TO 30 CM OF SHALY COAL
			60		SANDSTONE, FINE-MEDIUM-COARSE WITH MINOR SHALE INTERBEDS GRADING DOWNWARDS TO MAINLY SILTY-SHALY CARBONACEOUS MUDSTONE, COAL PARTINGS AND BANDS OF UP TO 5 CM AT BASE
			65		
			70		
			75		MAINLY SANDSTONE, FINE-MEDIUM INTERBEDDED WITH SILTSTONE-MUDSTONE, GRADING DOWNWARDS TO MAINLY CARBONACEOUS MUDSTONE
			80		SANDSTONE, FINE-MEDIUM GRAINED, GRADING DOWNWARDS TO SILTSTONE AND CARBONACEOUS MUDSTONE,
			85		MAINLY MUDSTONE, VERY CARBONACEOUS, DARK GREY TO BLACK, SILTY TO SHALY, FREQUENT COAL PARTINGS
			88.72		
			90		COAL, HARD AND SEMI-BRIGHT, RECOVERY ± 86% (SAMPLE BR 1-3, 88.72-90.24)
			90.24		SANDSTONE, VERY FINE TO SILTY, THINLY BEDDED, GRADING DOWNWARDS TO VERY CARBONACEOUS MUDSTONE, 5 CM BRIGHT COAL AT BASE
			95		MAINLY SANDSTONE, FINE-MEDIUM-COARSE, SPECKLES AND PARTINGS OF CARBONACEOUS MATERIAL, CARBONACEOUS TO COALY PARTINGS, CALCITE-FILLED FRACTURES AND BEDDINGS, ± 80° TO CORE
			100		
			105		MAINLY MUDSTONE, VERY DARK GREY, CARBONACEOUS, COAL PARTINGS AND BANDS OF UP TO 6 CM, SILTY AND SANDY DOWNWARDS
			110		SANDSTONE, FINE-MEDIUM GRAINED, THINLY BEDDED, > 85° TO CORE, SOME CARBONACEOUS MUDSTONE LAYERS
			115		
			120		MAINLY MUDSTONE WITH MINOR INTERBEDS OF FINE SANDSTONE AND SILTSTONE, SOME CARBONACEOUS AND COALY PARTINGS IN MUDSTONE.
			125		
			130		
			135		MAINLY SANDSTONE, VERY FINE-MEDIUM-COARSE WITH FREQUENT INTERBEDS OF THIN CARBONACEOUS TO COALY MUDSTONE, BEDDING > 80° TO CORE
			140		
			145		
			150		VERY FINE SHALY SANDSTONE GRADING DOWNWARDS TO MAINLY SILTY MUDSTONE
					MAINLY MUDSTONE, VERY SILTY
	CADOMIN		155		
			160		SANDSTONE-CONGLOMERATE, COARSE TO VERY COARSE, CARBONACEOUS PARTINGS, CONGLOMERATE LENSES OF UP TO 30 CM WITH CHERT AND QUARTZ PEBBLECLASTS OF UP TO 35 MM, CHERT AND QUARTZ, BEDDING ± 70° TO CORE, SCATTERED ANGULAR FRAGMENTS (35 MM) OF MUDSTONE
			165		165.55 END OF HOLE

(2)

TECK CORPORATION LIMITED

STRATIGRAPHIC LOG
OF
DDH. BR-2

487

VERTICAL SCALE 1 200

RR- BURNT RIVER 77(3)A.

PROJECT Burnt River — LOCATION Sukunka

HOLE Nº 2 — CORE SIZE NQ — DATUM Top of Casing

CO-ORDINATES 82040 N 27440 E — DATE STARTED 24 Aug 1977

COLLAR ELEVATION 1257 METRES — DATE FINISHED 29 Aug 1977

HOLE ANGLE 90° — TOTAL DEPTH 95 12 M — LOGGED BY R.S. Verzosa

SERIES	FORMATION	MEMBER	DISTANCE FROM DATUM	COLUMNAR SECTION	LITHOLOGIC DESCRIPTION
			0		CASING
			5		
			10		MAINLY SANDSTONE, MEDIUM-COARSE, SILTY AND SHALY PHASES, HIGHLY FRACTURED AND CALCITE-FILLED, BEDDING FROM >85° TO <40° TO CORE
			15		
			20		MUDSTONE, DARK GREY, VERY CARBONACEOUS, COALY TO COAL PARTINGS
			23 20		COAL, HARD, BRIGHT-SEMI BRIGHT, FRACTURED, RECOVERY 0 6 M (SAMPLE BR 2-2 23 20-24 39)
			24 39		MUDSTONE, VERY CARBONACEOUS, COAL PARTINGS.
			25		SANDSTONE, COARSE TO VERY COARSE, CARBONACEOUS, COAL PARTINGS, ± 55° TO CORE
			30		
			35		MAINLY SILTSTONE, INTERBEDDED FINE SANDSTONE, ALSO COARSE CARBONACEOUS SANDSTONE 65° TO CORE
LOWER CRETACEOUS	GETHING		40		MAINLY MUDSTONE, CARBONACEOUS, INTERBEDDED, SILTSTONE-SANDSTONE WITH CALCITE-FILLED FRACTURES COAL PARTINGS AND BANDS
			45		
			50		MAINLY SANDSTONE, FINE-MEDIUM, THIN-BEDDED, IN PARTS SHALY AND SILTY 50°-60° TO CORE
			55		COAL SEAM, INCLUDES VERY CARBONACEOUS SANDSTONE AND MUDSTONE
			60		
			65		SILTSTONE-SANDSTONE INTERBEDDED, IN PARTS SHALY, BEDDING 50° TO CORE SOME CARBONACEOUS AND COALY MUDSTONE LAYERS
			70		
			75		MAINLY MUDSTONE, CARBONACEOUS, SILTY AND SANDY PHASES, ± 70° TO CORE 15 CM COAL AT 73 17 M
			80		
			80 79		
			82		COAL MOSTLY DULL, HARD, 10% SANDY AND SHALY BANDS (SAMPLE BR 2-1 80 79-82)
			85		MUDSTONE, VERY CARBONACEOUS, VERY SILTY TO SANDY, COAL PARTINGS AND BANDS OF UP TO 25 CM
			90		SANDSTONE, FINE-MEDIUM GRAINED, CARBONACEOUS AND COALY PARTINGS
					MUDSTONE, BLACK, VERY CARBONACEOUS WITH FREQUENT COAL PARTINGS
			95		95 12 END OF HOLE
			100		
			105		

(4)

TECK CORPORATION LIMITED

STRATIGRAPHIC LOG
OF
DDH. BR-4

487

VERTICAL SCALE 1 · 200

PR- BURNT RIVER 77(8)A.

PROJECT Burnt River — LOCATION Sukunka

HOLE Nº 4 — CORE SIZE NQ — DATUM Top of casing

CO-ORDINATES 82160 N 27500 E — DATE STARTED 8 sept 1977

COLLAR ELEVATION 1255 METRES — DATE FINISHED 11 sept 1977

HOLE ANGLE 90° — TOTAL DEPTH 78 35 M — LOGGED BY R S Verzosa

SERIES	FORMATION	MEMBER	DISTANCE FROM DATUM	COLUMNAR SECTION	LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS	GETHING		0		CASING
					SANDSTONE, FINE GRAINED WITH INTERBEDDED SILTSTONE
			5		SILTSTONE WITH MINOR SANDY PHASES
			10		MUDSTONE
			13 18		COAL SEAM, MOSTLY DULL AND SEMI-BRIGHT, INCLUDES 47 CM OF VERY CARBONACEOUS MUDSTONE (SAMPLE BR 4-4, 13 18-14,80)
			14 80		
			15		MAINLY SILTSTONE WITH MINOR SANDY PHASES
			20		COAL SEAM, 36 CM THICK, LOWER 2/3 VERY SHALY
					SILTSTONE, THIN BEDDED, THIN SANDSTONE, 87° TO CORE
					SANDSTONE, MEDIUM GRAINED, CARBONACEOUS, COALY WISPS
			25		
			30		MAINLY MUDSTONE, SILTY AND SHALY, IN PARTS CARBONACEOUS, 90° TO CORE
			35		
			39 56		
			40		COAL, GENERALLY HARD, SEMI BRIGHT WITH SOME BRIGHT BANDS CARBONACEOUS MUDSTONE AT 39 76 – 40 09 AND 41 77 TO 41 87 (8 75 M RECOVERED) (SAMPLE BR 4-1, 40 09-41 87, SAMPLE BR 4-2, 41 87-44 82 BR 4-3, 44 82-49.80)
			45		
			49 08		
			50	NO CORE	PROBABLY MUDSTONE
				HIGH CORE LOSS	RECOVERY 0 75, MOSTLY MUD SEAM (FAULT GOUGE) AND SHEARED CARBONACEOUS MUDSTONE
					MUDSTONE, CARBONACEOUS
			55		SANDSTONE-SILTSTONE, INTERBEDDED, 85°–90° TO CORE
					MUDSTONE, CARBONACEOUS, COALY PARTINGS AT BASE
					SILTSTONE
			60		MUDSTONE, SILTY AND SHALY, IN PARTS CARBONACEOUS WITH COAL PARTINGS.
			65		SANDSTONE, IN PARTS CARBONACEOUS, CALCITE VEINLETS
			70		MAINLY SANDSTONE AND SILTSTONE INTERBEDDED WITH MINOR MUDSTONE LAYERS
			75		
			78 35		END OF HOLE
			80		
			85		