PR-SUKUNKA RIVER 71(1)A

PRELIMINARY EXPLORATION OF THE SUKUNKA RIVER COAL PROPERTIES OF HOGAN MINES LTD (N.P.L.)

PAUL DYSON CONSULTANTS + HOLDINGS LTD. SEPT, 1971

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PR-SUKUNKA RIVER 71(1)A

PRELIMINARY EXPLORATION

OF THE

SUKUNKA RIVER COAL PROPERTIES (NOW KNOWN AS MASTER CREEK)

OF

HOGAN MINES LTD. (N.P.L.)

Prepared for:

Hogan Mines Ltd.

By:

PAUL DYSON CONSULTANTS
AND HOLDINGS LIMITED

September 1971

CONTENTS

INTRODUCTION

This report on the initial exploration of the Sukunka River coal properties (14 coal licences, approximately 14 square miles) of Hogan Mines Ltd. was prepared at the request of Mr. D. McLeod of Hogan Mines Ltd. The report is based on a field survey lasting about four days together with several days study of data available from both published and unpublished sources. A summary with comments on the results of two drill holes completed following this field work is also included as an appendix.

The object of the study was to carry out a geological reconnaissance of the properties and to make a preliminary assessment of their potential for development as a viable coal mine. This was done as far as is possible within the time and budget restrictions laid down.

It should be noted that the report has been kept as brief as possible and it does not restate all the detailed published stratigraphic information that is readily available.

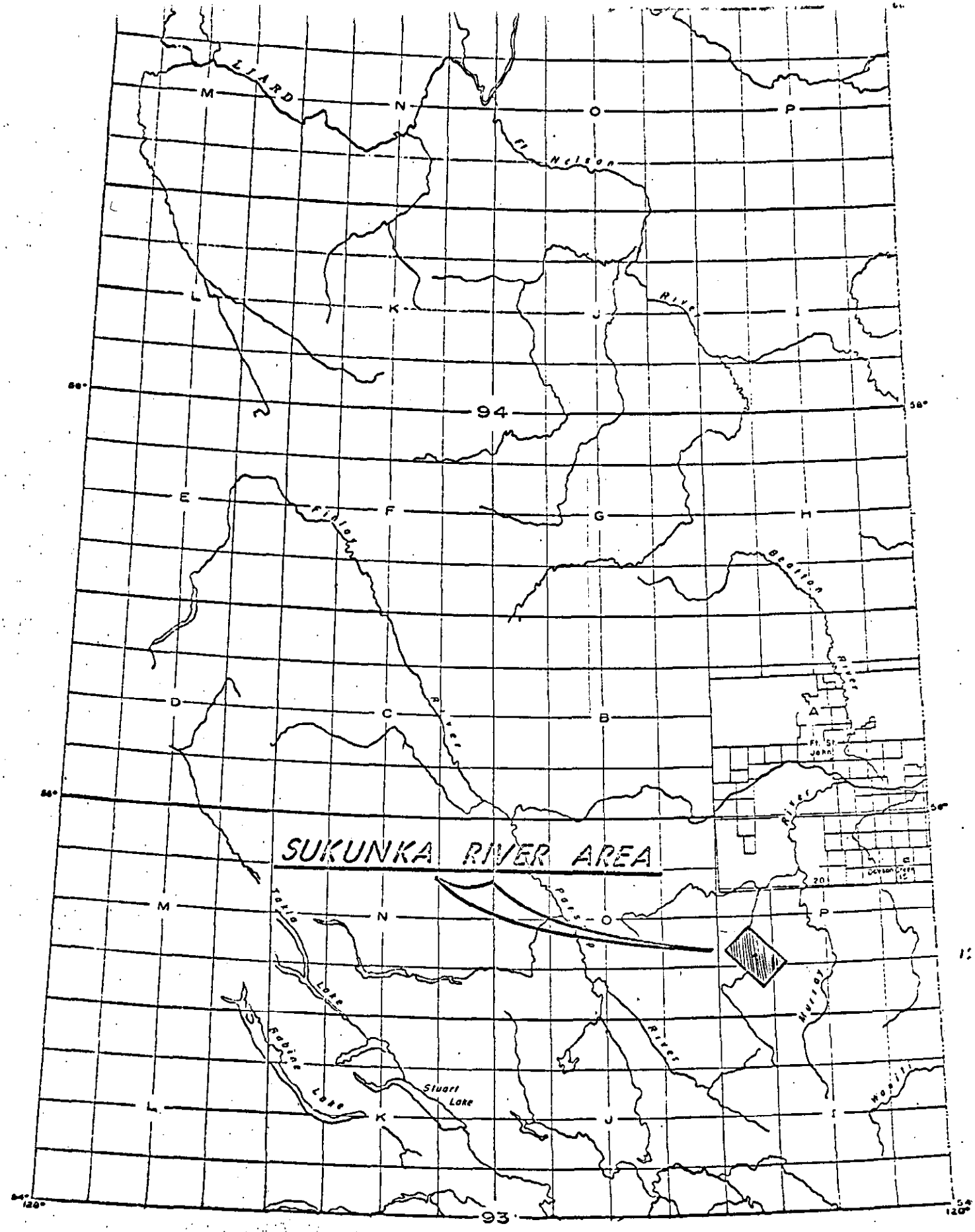
The kind co-operation offered in the field by members of the staff of Brameda Resources Limited is gratefully acknowledged.

LOCATION AND ACCESS

The coal area is situated in the eastern inner foothills of the Rocky Mountains approximately 63 miles southwest of Dawson Creek, British Columbia.

Access to the area is by good gravel road up the Sukunka River valley from Chetwynd, a small town situated on the paved highway some 65 miles west of Dawson Creek. For the first fifteen miles, the gravel road is public highway maintained by the Department of Highways; beyond that it is a logging road maintained by Canadian Forest Products Ltd. The use of this logging road is by permission of the above company and commercial use is subject to a user's fee.

Limited access within the coal properties is available by well site roads and some seismic trails on the east side of the Sukunka River. These latter are rapidly deteriorating and are passable to four wheel drive vehicles only in favourable weather conditions. On the west side of the Sukunka River access is on foot only or by helicopter.



INDEX MAP
N. E. BRITISH COLUMBIA

PR-MCK 71(1)A

0 50 100
1 INCH = 40 MILES

PHYSIOGRAPHY

The topography is characterized by a mixture of rounded hills and sharp ridges. This topography directly reflects the underlying rock formtions in so far as low dips in the bed-rock results in rounded hills, e.g. west of the Sukunka River, and steeply dipped beds give rise to sharp ridges, e.g. most of the area east of the Sukunka River.

Elevations usually do not exceed 5,000 feet with the notable exception of Bullmoose Mountain (6,627 feet A.S.L.) at the southwest end of the project area. The Sukunka River itself flows in a broad flat bottomed valley over one mile wide at an elevation of about 2,200 feet A.S.L.

These relatively low elevations have resulted in a dense undergrowth of willow, devil's club, etc. below the tree cover. This, together with a fair amount of grass, moss, etc. has resulted in an acute scarcity of bed-rock exposure with the notable exceptions of steeply dipped resistive beds forming sharp strike ridges.

GEOLOGY

This section of the report has been kept to a minimum especially from the stratigraphic point of view. Discussion of the stratigraphy is related mainly to the problems of mapping in the area. A somewhat fuller discussion of the structure of the area follows as this is particularly pertinent to the coal mining potential in areas of relatively thin seams.

Stratigraphy.

The rocks exposed at surface within the area of the coal licences held by Hogan Mines Ltd. area all Lower Cretaceous in age. The basic succession is as follows:

Cruiser formation

Goodrich formation

Hasler formation

Commotion formation - (Boulder Creek member
(Hulcross member
(Gates member

Moosebar formation

Gething formation

Cadomin formation

pre-Cadomin rocks

No detailed description of the lithologies of these rocks is given. This information is excellently laid out in several of the selected references in particular by Stott (1963). Brief lithological notes for each formation are shown on the map which accompanies this report.

Several factors are worth noting with regard to the stratigraphy. It is very difficult to map in this area as outcrops are invariably related to thin bands of resistive sandstone and conglomerates. Conglomerates occur in the Boulder Creek and Gates members of the Commotion formation and in the Cadomin formation. They do not appear to be identifiable in the individual outcrop. In fact, Stott (1963) says of the Boulder Creek member conglomerates "these beds bear great resemblance to other conglomerate in the Gething formation and the Gates member and cannot be readily differentiated on the basis of size and composition alone". Some field difficulties were encountered with this very fact, but the map is believed to accurately reflect the main geological features of the area.

Coal seams in the Commotion and Gething formations are poorly exposed. The best coal outcrop is on the west side of the Sukunka River at a spot inaccessible when the river is high. It appears to be a seam six feet or so in thickness and it is probably one of the seams being explored by Brameda. Other coal outcrops are associated with road building to the various well sites scattered throughout the area. No thicknesses could be determined for these poor outcrops.

Structure.

The area lies within the Inner Foothills of the Rocky Mountains and structurally is typical of this belt. In general, a series of folds and faults have developed trending northwest-southeast as a result of crustal shortening at right angles to this

strike direction. Whereas, in southern Alberta the thrust fault is the major form of deformation, it has here taken on a lesser role. Severe folding is a much commoner form of deformation and thrust faults appear to be both fewer and of lesser magnitude. This probably reflects both the lesser crustal shortening in the Sukunka area and the relative increase in shale content of the geological succession.

The coal properties of Hogan Mines Ltd. are crossed by one major thrust fault (Fault III) which basically divides the properties into two distinct areas. The westerly area is underlain by low dipping beds which are relatively unfolded compared to the severely folded area east of the fault.

The easterly area is almost wholly underlain by Gething formation which is highly folded. Access to this area on the ground was by four wheel drive and low level reconnaissance by helicopter. Numerous very sharp folds with limbs dipping for the most part in excess of 60^{o} were noted. Minor thrust faulting is probably associated with these folds but has not been mapped. No significant areas of low dip were recognized.

West of Fault III, the Gething and pre-Gething formations appear to be less disturbed. Several fold axes cross the licences but, in general, the dips are much less severe. It should be borne in mind that the structure is certainly no simpler than shown on the map and is probably much more complex.

COAL DISTRIBUTION AND QUALITY

Coals are known to occur in at least four geological horizons in the area of the Hogan Mines Ltd. properties. These horizons are, from youngest to oldest:

a. the Boulder Creek member of the Commotion formation,

b. the Gates member of the Commotion formation,

c. the Gething formation,

d. rocks of the pre-Cadomin formations.

These different geological horizons have all been described as containing coal but the significance varies widely. To date, only the coals of the Gething formation and the Gates member of the Commotion formation are considered to be prospective for mining. All four coal horizons are discussed below both from "quantity" and "quality" points of view.

a. Boulder Creek member.

Coals have been reported from the Boulder Creek member by both Stott (1961, 1968) and Hughes (1964, 1967). They are not, however, believed to be of economic interest and the thickest seam known is only twenty-two inches in thickness.

The presence of seams of greater thicknesses cannot be wholly ruled out, but their occurrence is believed to be highly unlikely. The coals of the Boulder Creek member are not considered to be of economic interest.

b. The Gates Member of the Commotion formation.

This horizon contains the coals which are the northwesterly continuation of the coals found in the Luscar formation and mined

in Alberta by both Cardinal River Coals Ltd. and McIntyre Porcupine Mines Ltd. These coal seams of the Luscar formation thicken northwesterly from the Smoky River area in Alberta and reach probable maximum thicknesses of almost forty feet in the Belcourt area of British Columbia before starting to thin again. At the Peace River, some 125 miles to the north of the Belcourt area, the Gates member has become wholly marine and coals are no longer present within it. The Sukunka area of Hogan Mines Ltd. lies within this area where the thinning of the coal seams is taking place. With regard to this, Stott (1961) says "...the coal is more likely to be found in mineable quantities south of Bullmoose Mountain..." This conclusion of Stott would appear to be borne out by all presently available data. Brameda Resources Ltd. are presently operating a major exploration program on Bullmoose Mountain (4 miles southeast of the Hogan Mines properties) and drilling of the Gates member has indicated thin seams of low grade coal. Although on the Wolverine River (15 miles to the south) seams thicker than 8 feet exist in the Gates member, no seams thicker than 6 feet have been drilled on Bullmoose Mountain by Brameda. Furthermore, these seams do not compare with those of the Gething formation as they are "very poor in quality being very high in ash" (personal comment from Brameda). It is likely that the Gates member coals are no better on the Hogan Mines property than on the Brameda and, in fact, they are probably thinner. In summary, it can be said that Gates member coals in the area being considered are probably poor in quality and less than 6 feet thick. No field observations were made that would appear to conflict with this opinion.

c. The Gething Formation.

The Gething formation contains the main prospective coal seams in the Sukunka River area. Most information on the seams is available as a result of the exploration program presently underway by Brameda Resources immediately adjacent to the Hogan Mines properties.

Prior to this program which commenced in 1969, the general presence of Gething formation coals in this area had only been inferred by various workers as Gething formation coals had been mined on Hasler Creek (20 miles northwest) and noted during exploration in the Alberta foothills (100 miles southeast). Brameda have drilled in excess of 50,000 feet of NQ diamond drill hole and two main coal seams are recognized in the Gething formation. These seams occur at approximately 160 feet and 200 feet below the top of the Gething formation.

The upper seams, present over most of the Brameda exploration area, has been termed the Skeeter seam by Brameda and lower has been called the Chamberlain seam. The Skeeter seam varies from 6 - 9 feet in thickness and the Chamberlain seams varies from 7 - 10 feet in thickness.

Drilling on the Brameda property usually ceases some 50 - 100 feet below the Chamberlain seam but a few drill holes have penetrated further. Several seams lower in the Gething formation have been recognized but these are all less than 5 feet in thickness. They are not considered to be of economic interest at present.

The quality of both the Skeeter and Chamberlain seams is excellent for a metallurgical coal. A typical analysis of the raw coal of the Chamberlain seam is believed to be approximately as follows:

Fixed Carbon	69.5%
Volatile Matter	23.0%
Inherent Moisture	0.5%
Ash	6.5%
Sulphur	0.5%
F.S.I.	6 - 8

The Skeeter seam is essentially similar but shows more variability in quality from place to place.

These two seams must therefore be considered major objectives of any exploration program in the area.

d. Rocks of the pre-Cadomin formations.

The pre-Cadomin formation rocks of the area are very poorly known due to a lack of outcrops and the absence of any regional studies. The western properties of Hogan Mines Ltd. are underlain by these rocks. They are not believed to contain economic coal seams. However, it should be noted that coals up to 5 feet may possibly be present. It is expected that Brameda will test their properties underlain by these rocks.

To summarize the occurrence and quality of coals in the area, it can be said that the Gates member and Gething formation probably contain the only possible viable coal seams of adequate quality for metallurgical market. Coals of the pre-Cadomin rocks are an unknown factor.

MINING POTENTIAL

The problems of locating a coal deposit in Western Canada suitable for the production of coking coal are well known. Three broad criteria can be applied when assessing the viability of a property. These are:

a. a suitable mining method,

b. sufficient recoverable reserves, and,

c. an adequate transportation system.

These factors are reviewed in turn with respect to the Sukunka coal properties of Hogan Mines Ltd.

Mining Methods.

The possibility of mining coals in the Sukunka River area by some form of open pit mining is not believed to be good. This conclusion is reached as seams in general would be expected to be in the 6 - 8 foot range in thickness. Such thicknesses do not permit the removal of large amounts of overburden at what are viable overburden to coal ratios. The probable oxidation of the coal at low cover (less than 50 feet) also compounds this ratio problem. This being the case, the Sukunka area must primarily be considered to be an underground mining prospect.

For the development of a successful economically viable underground mine, certain basic geological factors are preferred. The main preference is the existence of an area of simple structure, preferably with low dip, containing seams of a thickness suited to extraction by modern mechanized equipment. In general, dips above 20^{o} are reported to effect a rapid decrease in the efficiency of modern underground machinery and increases in seam thickness to more than

8 feet may also cause problems. Another limiting factor is total cover especially in the Rocky Mountains which are an area with built-in tectonic stresses. Conversations with experienced Rocky Mountain coal mining engineers would suggest that a total cover of 2000 feet to 2500 feet is a reasonable maximum.

Applying these factors to the coal properties of Hogan Mines Ltd., it is readily apparent that the prospects for major coal production are limited. The properties can be considered as three areas.

Area A.

All licences to the west of Fault III (5) are underlain by pre-Gething rocks which may not contain viable seams. However, this area is structurally favourable and approximately 5½ square miles of coal rights might be amenable to underground mining methods.

Area B.

To the east of Fault III dips are more severe and details of the geology unknown due to poor exposure. The more northeasterly licences (5) are underlain by Gething, Moosebar and Commotion formations at varying dips (flat to 60° or more). It is possible that a limited area of these licences may be underlain by coal seams that can be mined.

Area C.

The four licences that lie along the floor of the Sukunka River valley are an unknown factor owing to the very poor rock exposure.

Recoverable Reserves.

It is premature to estimate probable recoverable coal reserves prior to any drilling or detailed mapping. However, certain assumptions can be made bearing in mind that the likely mineable seams lie close to the top of the Gething formation.

For Area A no probable coal reserves can be assigned at this time as viable seams are not known in the pre-Gething rocks.

Area B covers 5 square miles of which approximately half (2½ square miles) may realistically be considered prospective. For a 7 foot seam total "in place" reserves would be approximately 17.5 million long tons. Using a 75 % mining recovery factor and an 80% washing recovery factor (both these figures are optimistic), the total marketable coal could be as high as 10.5 million tons.

Area C is not at present assigned any reserves but in fact, it may contain some recoverable reserves.

Transportation

Transportation would be by railroad connection to the Pacific Great Eastern railroad at Chetwynd. This connection does not at present exist and the probable marketable tonnages of coal on the Hogan Mines properties certainly would not warrant the construction of the line. However, the coal reserves of Brameda Resources adjacent to the Hogan Mines properties will probably be developed in the near future. The railway will then be constructed at no cost to Hogan Mines Ltd. Consequently, the mineable reserves of Hogan Mines Ltd. have merit as an additional reserve for any other mine in the area.

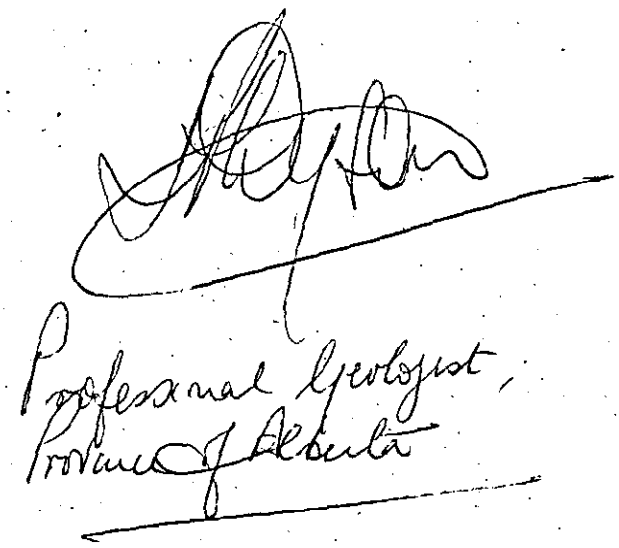
CONCLUSIONS

The total likely maximum reserves of coal recoverable by underground methods on the properties of Hogan Mines Ltd. are approximately 13.0 million tons. If an 80% yield of clean coal from a washing plant is further assumed, then the total marketable coal is approximately 10 million long tons. It is very questionable whether such a reserve would indeed support a mine even if it is assumed that a rail line is within 2 miles of the property.

The properties have only limited potential and do not merit major exploration expenditures at this time.

RECOMMENDATIONS

In order to prove up the existence of coal seams of economic interested within the area of the licences, a limited drilling program should be undertaken. Drill holes should be located to commence in the lower portion of the Moosebar formation. In this way a minimum footage will eanble samples from seams equivalent to those on the adjoining Brameda property will probably be recovered. It is further recommended that these drill holes be completed using diamond drilling equipment so as to obrain continuous core of the prospective stratigraphic section. It is believed that this drilling will yield more information for less money than a trenching program.
A further advantage of drilling is that no difficulty should be experienced in obtaining permission to carry out the program.



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APPENDIX

DRILLING PROGRAM - August 1971.

Some brief comments on the shallow holes drilled as a result of the recommendations are as follows:

Drill Hole No. 1 (see map)

This hole was located at a position believed to be underlain by the lower part of the Moosebar formation. Outcrop was not very good in the area, but it was believed that sufficient information had been obtained for the locating of the hole. The hole was drilled at an angle of -50° at right angles to the strike of the rocks. In this way maximum stratigraphic penetration would be obtained for a maximum drilled footage. Locating the drill close to known outcrop, almost 100 feet of overburden was penetrated prior to the drill entering bedrock. The section penetrated consisted of sandstones, siltstones, shales and conglomerates with only minor coal seams. The thickest seam is believed to be approximately 4 feet thick (187¼ - 191¼), but only about 30% of the interval believed to be coal was recovered.

The Moosebar formation was not recognized in the hole and, consequently, the section penetrated must be either middle Gething formation or Gates member of the Commotion formation. Distinguishing with certainty between these two alternatives is almost impposible on the basis of 325 feet of core. However, comparing this core with that recovered by Brameda Resources, it is believed that the interval penetrated is a part of the Gates member of the Commotion formation. This being the case, it was decided to complete the hole at a total depth of 428 feet.

Drill Hole No. 2 (see map)

This hole was located in an attempt to recover samples from the probable extension of the coal seams being explored by Brameda Resources. It was believed that it would commence approximately at the Moosebar - Gething contact. The probability of this location being correct was further enhanced by the information from the adjoining abandoned wellsite. In actual fact, no Moosebar was drilled and it appears probable that the drill hole penetrates only a part of the middle of the Gething formation. The absence of conglomerates, bentonite and glauconitic sandstones all preclude the presence of either Gates member or basal Moosebar formation. The presence of abundant fracturing and some brecciation indicate the possibility of the borehle being located in a fault zone.

While the two holes completed on the property have failed to locate the northwesterly extension of the coal seams being explored by Brameda, they in no way rule out the presence of these seams on the properties of Hogan Mines Ltd. A seam at least 6 feet thick is known to exist on the west bank of the Sukunka River on the coal licences of Alberta Coal just north of the Hogan Mines properties. This seam undoubtedly continues across the properties of Hogan Mines Ltd. and a very detailed mapping program in conjunction with further shallow drilling would be required to delineate it. It appears that Alberta Coal Ltd. are about to commence a fairly extensive exploration program on their coal licences. This program will be watched with interest in an attempt to gather more data regarding the potential of the properties of Hogan Mines Ltd. The main conclusion that can be drawn from the

drilling program is that the geology is certainly more complex than shown on the map (the geology shown on the map has not been modified following the drilling program).

HOGAN MINES LIMITED — SUKUNKA COAL PROPERTIES

CORE DESCRIPTIONS

Borehole No. 1 (-50° N 45° E)
Total Depth - 428 feet

0 - 98	*Overburden - unconsolidated sands and silts.
98 - 130½	Mudstone gradational to very fine sandstone, medium to dark grey, well defined bedding and sedimentary structures (ripple marks, etc.)
130½ - 131½	Sandstone, medium to coarse grained, medium to light green, numerous calcite veins (¼") running vertically.
131½ - 151	Mudstone, etc. as 98 - 130½.
151 - 152	Sandstone, medium grained, medium grey, abundant carbonaceous material in upper 6 inches. One pebble (1 inch) subangular.
152 - 153½	Sandstone, medium grained, medium to dark grey, distinct cross-bedding and banding.
153½ - 164	Shale, dark grey and blocky.
164 - 178	Sandstone, medium to coarse grained, light to medium grey, largely structureless. (177 3/4 - 178 conglomeratic breccia?).
178 - 180½	Shale as 153½ - 164.
180½ - 181	Conglomerate, very variable (¼" - 1" pebbles).
181 - 183	Sandstone as 164 - 178.
183 - 184	Conglomerate, pebbles up to 2 inches plus, but mostly around 1 inch. Fairly well rounded and cemented.
184 - 187¼	Shale as 153.5 - 164.
187¼ - 191¼	COAL SEAM - recovered only 1¼' of clean bright coal.
191¼ - 196	Shale, dark grey, carbonaceous grading to coaly in places.
196 - 197	Sandstone, medium to fine grained, medium grey, banded, abundant ripple marks.

197 - 202½	Shale as 191¼ - 196. Not quite as carbonaceous.
202½ - 203	Sandstone as 196 - 197.
203 - 204½	Shale as 197 - 202½.
204½ - 234½	Sandstone, medium grained, medium to light grey, well developed thin bedding, slumps, flakes, etc. in bedding. Thin (6") bands of shaley sandstone, dark to medium grey.
234½ - 249½	Shale, dark grey, carbonaceous, blocky. (Tendency to break up in core box). No visible structure. Few plant remains.
249½ - 257	Sandstone, gradational from medium to fine grained at top to conglomeratic at base, medium to dark grey, carbonaceous material, abundant fracturing.
257 - 272	Conglomerate, pebbles up to 1", with occasional thin (2" - 3") bands of coarse sandstone, medium light grey.
272 - 300	Mudstone/shales, medium to dark grey, silty in part. Band at 288 - 289 is extremely carbonaceous. Silt bands containing carbonaceous material.
300 - 308	Sandstone, medium to very coarse grained, medium to light grey.
308 - 311	Sandstone, very coarse grained, medium to light grey, occasional 1" pebble of shales/mudstone.
311 - 326	Mudstone, medium to dark grey.
326 - 330	Sandstone, very fine grained, medium to dark grey.
330 - 373	Mudstone and sandstone, very fine grained, medium to dark grey. Abundant slump and other sedimentary structures, occasional 1" - 2" coal beds. Thin (3" - 6") medium grained, light grey sandstone beds.
373 - 376½	Sandstone, medium to coarse grained, medium to light grey, thin (1/4" - 1/8") coal seams.
376½ - 377	COAL SEAM
377 - 411	Sandstone, medium grained, medium grey, abundant small scale cross bedding. Occasional mudstone band (1' - 2') with thin (¼") bands of sandstone.
411 - 428	Sandstone, medium to coarse grained, light grey.

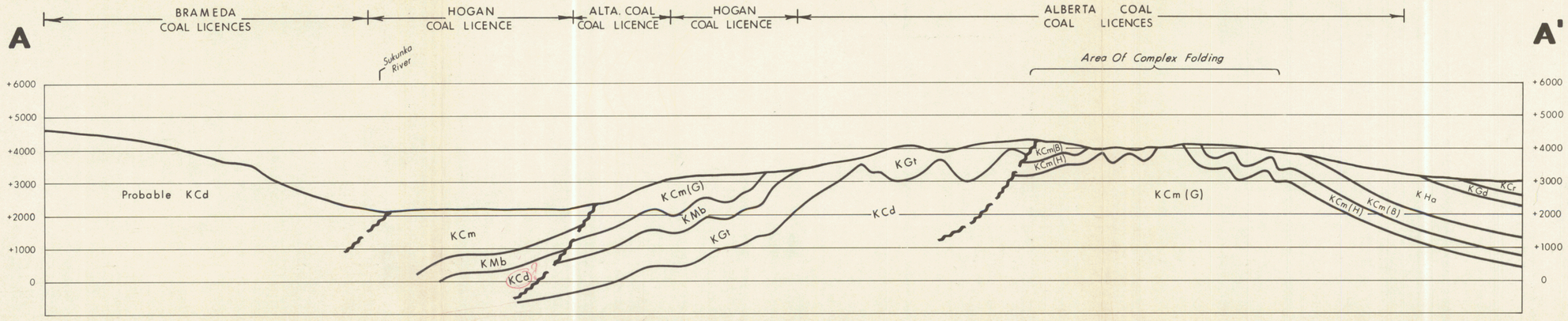
* This hole is apparently situated in an old river channel as bedrock is visible close to the surface location.

HOGAN MINES LIMITED - SUKUNKA COAL PROPERTIES

CORE DESCRIPTION

Borehole No. 2 (-60° N 40° E)
Total Depth - 327 feet

0 - 6	Overburden.
6 - 12	Sandstone, medium grained, medium to light grey, strongly banded.
12 - 66	Shale, medium to dark grey. Occasional thin sandstone bands. Bedding appears to be up to 30° from borehole direction.
66 - 90	Sandstone, medium grained, medium to light grey, abundant fractures filled with calcite, shaley in part.
90 - 170	Shale, predominantly dark grey to black. Occasional (3) thin (2") bands of sandstone as 66 - 90. Thin seams of bright, clean coal at 106 - 107, 117 - 118, 132 - 133, 156½ - 158.
170 - 180	Sandstone, medium grained, medium to light grey, well defined bedding, abundant cross beds, mud flakes, etc. Few coaly partings and some brecciation.
180 - 195½	Sandstone, grades from medium to very fine grained, medium to dark grey.
195½ - 237½	Sandstone, medium to coarse grained, medium to light grey, highly fractured (brecciation?) coaly partings and veins. Interval 218½ - 221 is predominantly silty shale.
237½ - 275	Shale, dark grey, blocky, carbonaceous, abundant coaly partings.
275 - 279	COAL SEAM. All coal is bright and apparently clean (10% or less ash).
279 - 291	Shale as 237½ - 275.
291 - 312	Silstone, medium grey, occasional brecciation, plant remains in thin shaley partings.
312 - 327	Sandstone, medium to coarse grained, light grey, abundant coaly streaks, calcite veins, and pysite.



Horizontal and Vertical Scale : 1 Inch = 2000 Feet

121°45'W
55°25'N
55°25'N
121°40'W
121°50'W
BRAMEDA
55°20'N
121°35'W
55°20'N
121°30'W
Thin Coal Seams
BRAMEDA - TECK
Possible KCm(H) & KCm(B)
Contorted KCm(B)
Highly Contorted
NO OUTCROP
Possible KCd. In Valley Bottom
MAIN EXPLORATION AREA (Brameda Resources)
BRAMEDA
55°15'N
121°45'W
121°25'W
55°15'N
121°40'W
121°35'W
121°30'W
55°10'N
55°10'N
I
II
III
A
A'

LOWER CRETACEOUS	FORT ST. JOHN GROUP	KCr — CRUISER FORMATION — Marine Shale.
		KGd — GOODRICH FORMATION — Fine Grained Sandstone.
		KHa — HASLER FORMATION — Dark Marine Shale.
	COMMOTION FORMATION	KCm(B) — BOULDER CREEK MEMBER — Conglomerate, Coarse Sandstone, Minor Coal.
		KCm(H) — HULCROSS MEMBER — Dark Marine Shale.
		KCm(G) — GATES MEMBER — Carbonaceous Sandstone, Shale Minor Coal. Conglomerate.
		KMb — MOOSEBAR FORMATION — Dark Marine Shale.
	BULLHEAD GROUP	KGt — GETHING FORMATION — Conglomerate, Carbonaceous Sandstones, Shale & Coal.
		KCd — CADOMIN FORMATION (incl. all older rocks) — Massive Conglomerate, Sandstones, Shales & Minor Coal.

- Formation Boundary
- Anticline
- Syncline
- Thrust Fault
- Strike & Dip (Measured)
- Strike & Dip (Observed)
- Horizontal
- Coal Occurrence
- Oil / Gas Test Well
  1. Triad B.P. Sukunka 6-10-A
  2. Triad B.P. Sukunka a-43-B
  3. Triad B.P. Sukunka c-56-B
  4. C.P.O.G. et al Sukunka d-57-B

H — HOGAN MINES LTD. (N.P.L.)

A — ALBERTA COAL LTD.

672

PR-McK.71(2)A

HOGAN MINES LTD. (N.P.L.)

SUKUNKA RIVER AREA

PRELIMINARY GEOLOGICAL MAP

JUNE 1971

1 : 50,000

0 1 2 3

SCALE — MILES

Paul Dyson Consultants

PR-SUKUNKA RIVER 71(3)6

BOREHOLE DATA

OPEN FILE

— 1971 —

672

PR-SUKUNKA RIVER 71(3)B.

Appendix

Drill Logs

(SR-71-1 - SR-71-12)

DRILL HOLE LOGS

Drill Hole No. SR-71-1

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 2400'

DATE: 16-Sep-71

FROM	TO	DESCRIPTION
0	2'	Gravel - cobbles
2	9.5'	Grey till - wet below 5.5'
9.5	14'	Black shale - coal traces to 11'
14	24'	Grey siltstone
24	45'	Grey & black shales
45	51'	Grey siltstone
51	80'	Grey shale - silty
80	107'	Black & grey shales - siltstone bands - few thin coaly traces
107	134.5'	Grey siltstone - medium hard to hard at 113'
134.5	135.3'	Coal - very shaley
135.3	186'	Grey siltstone - hard some coarse
186	187'	Brown shale - coal traces
187	196'	Grey siltstone - hard
196	198.5'	Brown shale - silty
198.5	249.5'	Grey siltstone - medium hard - much water at 244'
249.5	251'	Brown shale
		Total Depth = 251'

DRILL HOLE LOGS

Drill Hole No. SR-71-2

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3440'

DATE: 20-Sep-71

FROM	TO	DESCRIPTION
0	9'	Grey till - siltstone chips - cobbles
9	11'	Grey siltstone - hard
11	17'	Soft brown siltstone
17	21.8'	Coal - trace of shale at 19.5' - dull between 20' and 21'
21.8	28'	Grey and black shales - some silty - coal traces - approx. 0.3' coal at 27'
28	28.8'	Coal - very shaley
28.8	40'	Grey & black shales
40	52.2'	Grey siltstone - medium hard
52.2	53.8'	Brown & black shales - some carb.
53.8	65.8'	Coal - shale traces between 57' and 58' - shale traces between 60' and 61'
65.8	70.8'	Black & grey shales - coal traces
70.8	71.5'	Coal
71.5	72.5'	Black shale
72.5	76'	Grey siltstone
76	81.5'	Grey & brown shales
81.5	90'	Hard grey siltstone - coarse
		Total Depth = 90'

DRILL HOLE LOGS

Drill Hole No. SR-71-3

COMPANY: Master Explorations Ltd.

AREA: Sukunka River

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3550'

DATE: 21-Sep-71

COAL 17.6

FROM	TO	DESCRIPTION
0	1'	Silt till
1	34'	Grey siltstone - medium hard to hard
34	39.6'	Brown shale
5.1 39.6	44.7'	Coal - clean - at 44.2' thin shale traces
44.7	51.6'	Black & brown shales - coal traces interbedded
7.7 51.6	59.3'	Coal - thin shale traces in top 1.0 - thin shale traces below 56.5
59.3	59.9'	Black Shale
4.8 59.9	64.7'	Coal - trace of shale at 62.3'
64.7	80'	Black and brown shales - few coal traces - few silty bands
80	86'	Grey siltstone - coarse - much water at 81'
		Total Depth = 86'

DRILL HOLE LOGS

Drill Hole No. SR-71-4

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3590'

DATE: 22-Sep-71

Coal 36.2'

	FROM	TO	DESCRIPTION
	0	2'	Silt till - siltstone cobbles
	2	24'	Grey siltstone - med. hard to hard
	24	46'	Grey shale
	46	87'	Grey siltstone - med. hard to hard - few shale bands
	87	91.3'	Black & brown shale - 0.2 coal at 89.7'
3.8	91.3	95.1'	Coal - thin shale traces to 93'
	95.1	101.6'	Black & brown shales
2.4	101.6	104'	Coal - few shale stringers
	104	104.5'	Black shales
8.5	104.5	113'	Coal - few shale stringers
	113	113.8'	Brown shale
3.0	113.8	116.8'	Coal - very shaley
	116.8	123'	Brown shale - few coal traces
	123	125'	Grey siltstone - med. hard
	125	127'	Brown shale
	127	129'	Grey siltstone
	129	141.8'	Brown & grey shale - some silty
	141.8	143.5'	Grey siltstone - med. hard
	143.5	152'	Brown shale - few coal bands
1.9	152	153.9'	Coal
	153.9	159.5'	Black & brown shales
	159.5	174.3'	Grey siltstone
2.9	174.3	177.2'	Coal
	177.2	189'	Black & brown shales - few silty bands
	189	214'	Grey siltstone - med. hard to hard - Water at 190'

DRILL HOLE LOGS

Drill Hole No. SR-71-4

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3590'

DATE: 22-Sep-71

FROM	TO	DESCRIPTION
214'	216.8'	Brown shale - coal traces
13.7 216.8	230.5'	Coal - shale traces - no samples - too much water
230.5	237'	Grey siltstone - coarse - hard
		Total Depth = 237'

DRILL HOLE LOGS

Drill Hole No. SR-71-5

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3770'

DATE: 25-Sep-71

COAL 30.6

	FROM	TO	DESCRIPTION
	0	1.5'	Brown silt till
	1.5	30'	Brown & grey siltstone - top 8.0' weathered
	30	60'	Grey & brown shales
	60	184'	Grey siltstone - med.hard - shaley bands
	184	204'	Grey & brown shales - silty bands
	204	240'	Grey siltstone - very hard
	240	245.5'	Grey & brown shales
3.8	245.5	249.3'	Coal
	249.3	256.1'	Brown shale - thin coal traces
4.1	256.1	260.2'	Coal - shaley from 257.3' to 258.1'
	260.2	261.5'	Brown shale - coal traces
5.5	261.5	267'	Coal
	267	272.1'	Brown shale
2.1	272.1	274.2'	Coal - shale traces
	274.2	274.7'	Brown shale
2.0	274.7	276.7'	Coal
	276.7	277.8'	Brown shale
5.4	277.8	283.2'	Coal appears clean
	283.2	284'	Brown shale - coal traces
2.0	284	286'	Coal - clean
	286	296'	Brown shale - coal traces - coal bands between 290' and 293'
	296	324.8'	Grey siltstone - med. hard to hard - shale bands
	324.8	325.8'	Coal - very shaley
	325.8	341'	Brown shale - few coaly bands - some carb. shale
	341	369'	Grey siltstone - med. hard to hard
	369	374.5'	Brown shale

DRILL HOLE LOGS

Drill Hole No. SR-71-5

COMPANY: Master Explorations Ltd.

AREA: Sukunka River

DRILLER: T. Mullen

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3770'

DATE: 25-Sep-71

FROM	TO	DESCRIPTION
5.7 374.5	380.2'	Coal - shale traces
380.2	394'	Brown shale - silty bands
394	401'	Grey siltstone - med. hard
		Total Depth = 401'

DRILL HOLE LOGS

Drill Hole No. SR-71-6

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3760'

DATE: 1-Oct-71

FROM	TO	DESCRIPTION
0	4.5'	Silt till - rocks
4.5	14'	Grey siltstone - very hard - coarse
14	18'	Grey sandstone - fine grain - hard
18	60.5'	Grey siltstone - very hard
60.5	62.5'	Grey shale
62.5	88'	Grey siltstone - very hard
		Total Depth = 88'

DRILL HOLE LOGS

Drill Hole No. SR-71-7

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: L. Desjarlais (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3770'

DATE: 8-Oct-71

Coal 20.5 +

	FROM	TO	DESCRIPTION
	0	7'	Brown silt till - rocks
	7	9'	Grey siltstone - boulders
	9	12.5'	Till gravel bands
	12.5	18'	Grey siltstone
	18	52'	Grey siltstone - med. hard to hard
	52	56.5'	Black shale - hard
	56.5	57.5'	Grey siltstone
	57.5	76.5'	Black shale - few coaly traces
	76.5	80'	Grey siltstone
	80	95'	Grey siltstone - bands of black shale
	95	103'	Grey siltstone - very hard
	103	119'	Black shale - hard to med. hard
	119	121.5'	Shale - very coaly
7.5	121.5	129'	Coal - clean
	129	132.3'	Coal - very shaley
	132.3	135.5'	Black shale - coal stringers
2.0	135.5	137.5'	Coal
11.0	137.5	148.5'	Coal - shale traces
	148.5	151'	Coal - very shaley
	151	160'	Black shale - coal traces
	160	167'	Black shale - hard
	167	170'	Grey siltstone - med hard
	170	177'	Grey siltstone - coal traces
	177	194'	Grey siltstone - med hard
	194	197'	Black shale - soft coal traces
	197	200'	Black shale
			Total Depth = 200'

DRILL HOLE LOGS

Drill Hole No. SR-71-8

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: L. Desjarlais (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3740'

DATE: 11-Oct-71

FROM	TO	DESCRIPTION
0	2.5'	Till
2.5	5.5'	Grey sandstone - mod.hard
5.5	8.5'	Shaley coal
8.5	11'	Coal - shale traces
11	12.5'	Grey sandstone - soft
12.5	13.3'	Coal - shaley
13.3	14'	Grey sandstone - mod.hard
14	15.5'	Black shale - coal traces soft
15.5	19'	Black shale - coal traces
19	42.5'	Grey sandstone - mod. hard
42.5	58'	Grey siltstone - very hard
58	60.5'	Black shale - coal traces
60.5	67'	Grey siltstone - mod. hard
67	70.5'	Black shale - coal traces
70.5	74.5'	Black shale
74.5	82.5'	Coal - shale bands throughout
82.5	87'	Black shale - coal seams throughout
87	90'	Black shale - mod hard
90	101'	Grey siltstone - hard
101	108'	Brown sandstone - hard,brittle
108	116'	Grey siltstone - very hard
116	117'	Sandstone - very hard
117	120'	Grey sandstone - very hard
120	125'	Grey siltstone - very hard
125	130.5'	Black siltstone - very hard
130.5	136'	Black shale - coal traces (soft)
136	140'	Carb. shale
140	145'	Black shale

DRILL HOLE LOGS

Drill Hole No. SR-71-8

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: L. Desjarlais (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3740'

DATE: 11-Oct-71

FROM	TO	DESCRIPTION
145	160'	Black shale - coal traces
160	170'	Black shale
170	175'	Grey sandstone
		Total Depth = 175'

DRILL HOLE LOGS

Drill Hole No. SR-71-9

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: L. Desjarlais (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3800'

DATE: 14-Oct-71

FROM	TO	DESCRIPTION
0	3.5'	Till - hard
3.5	13'	Grey sandstone
13	29'	Brown sandstone
29	35'	Coal
35	36'	Black shale - coal traces
36	47'	Coal - shale bands
47	52'	Brown shale (soft) - coal stringers
52	58'	Brown shale (soft)
58	64.5'	Grey sandstone - hard
64.5	87'	Brown shale - mod. hard
87	95'	Black shale - coal stringers
95	106'	Black shale
106	108'	Black shale - coal stringers
108	110'	Grey siltstone
110	124'	Brown shale
124	128'	Coal - shale bands throughout
128	132'	Black shale - coal stringer throughout
132	140'	Grey sandstone - mod. hard
140	175.5'	Black shale - mod. hard
175.5	180'	Black shale - coal traces
185	200'	Black shale - coal stringers
200	215'	Black shale - very hard
215	220'	Grey siltstone - hard
		Total Depth = 220'

DRILL HOLE LOGS

Drill Hole No. SR-71-10

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: Desjarlais (McAuley Drilling)

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3810'

DATE: 16-Oct-71

FROM	TO	DESCRIPTION
0	12'	Grey siltstone - very hard
12	23'	Grey siltstone - very hard
23	30'	Grey siltstone - very hard
30	41'	Grey siltstone - very hard
41	48'	Brown shale - mod. hard
48	50'	Grey sandstone - hard
50	65'	Grey sandstone - hard
65	71'	Grey sandstone
71	74'	Black shale - coal traces
74	87'	Grey siltstone - very hard
87	92'	Grey sandstone - very hard
92	97'	Grey siltstone - hard
97	118'	Quartz - very hard
118	127'	Quartz - very hard
		Total Depth = 127'

DRILL HOLE LOGS

Drill Hole No. SR-71-11

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 3750'

DATE: 23-Oct-71

FROM	TO	DESCRIPTION
0	9'	Till
9	10'	Shaley coal
10	12.5'	Brown clay
12.5	16'	Coal
16	30'	Grey sandstone
30	33'	Black shale - coal traces
33	35'	Coal - shale stringers
35	52'	Grey sandstone - mod. hard
52	57.5'	Grey & brown shales
57.5	58.2'	Coal - shaley
58.2	75.3'	Brown & grey shales - few silty bands
75.3	81'	Grey siltstone
81	91.8'	Brown & black shales - few coal traces
91.8	161.5'	Grey siltstone - mod. hard to hard - some coarse bands - Water at 113'
161.5	164.8'	Black & brown shales - some coal and carb. shale str
164.8	166.2'	Coal - shale traces
166.2	166.7'	Grey siltstone
166.7	172.9'	Coal - shaley from 169' to 170'
172.9	191'	Brown & black shales - silty bands
191	215.8'	Grey siltstone - mod. hard - some coarse
215.8	218'	Brown shale - coal traces
218	229.5'	Grey siltstone
229.5	236'	Brown & black shales
236	240.7'	Grey siltstone
240.7	251'	Coal - shaley from 246' to 247'
251	252'	Black & brown shales
252	258'	Grey siltstone
		Total Depth = 258'

DRILL HOLE LOGS

Drill Hole No. SR-71-12

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen

LOCATION: S, W, NE Cor. Sec. , Twp. , R. , W M

ELEVATION: 4380'

DATE: 30-Oct-71

FROM	TO	DESCRIPTION
0	3.6'	Brown till - rocks - fill
3.6	4'	Carb. shale - coaly
4	29'	Grey sandstone - hard
		Total Depth = 29'