MANALTA COAL LTD.

SUNKUNKA RIVER AREA

PR-SUKUNKA RIVER 78(1)A.

Operator - Manalta Coal Ltd.

Coal Licence No.'s:
3530 - 3533 incl.✓
3535 - 3545 incl.✓
3547 - 3549 incl.✓
3551, 3552 ✓
3608 - 3619 incl.✓

Master Explorations Ltd.

all forfieted except 3617

GEOLOGICAL BRANCH ASSESSMENT REPORT

TECHMAN LTD.

JANUARY, 1978

INDEX

REFER TO : CONFIDENTIAL FILE;
PR - SUKUNKA RIVER 78(1)A
FOR CROSS - SECTION A - A'

LIST OF FIGURES

GENERAL

Master Explorations Ltd., a wholly owned subsidiary company of Manalta Coal Ltd., holds 30 Coal Licences, numbered 3530 - 3533, 3535 - 3545 incl., 3547 - 3549 incl., 3551, 3552, 3608 - 3617 incl., in the Sukunka River area of British Columbia. (See Location Maps - Fig. 1&1A). The Sukunka River divides the licenced area into two unequal portions. The north-eastern portion is accessible via a logging road originating at Chetwynd, B.C., and via numerous exploration trails originating from the logging road. Additionally, five seismic lines, trending northeast-southwest transect the property. Access to the southwestern portion is inhibited by the Sukunka River which is not presently bridged near this locality. Evidence of old bridge pilings and an apparent old ford are the originating points for overgrown trails. One seismic line transects this portion of the property.

GEOLOGY

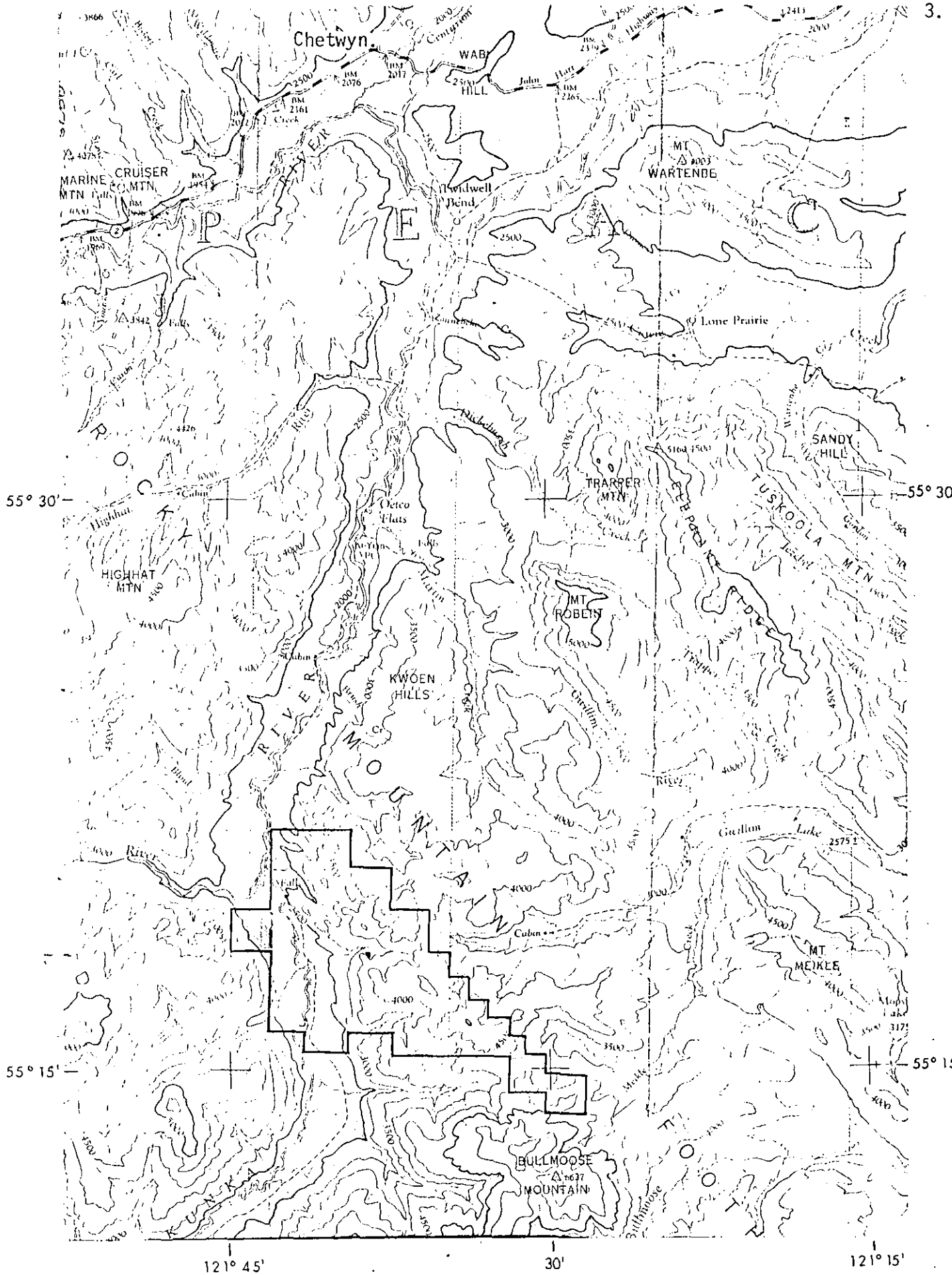
In general the geology of these leases is very complex due to faulting and folding. The area is largely overgrown and exploration is difficult. Surface geology is limited to the few outcrops and the five major seismic lines on the leases.

Coal Formation

McKechnie's theory of formation of the coals of Northeast British Columbia states that the coals were formed in basins on a widespread delta. The coal in each basin would then differ from those in any other basin, thus there is considerable difficulty in correlation from area to area


YUKON
N.W.T.
BRITISH COLUMBIA
ALBERTA
DAWSON CREEK
SUKUNKA COAL PROPERTY
PRINCE RUPERT
PRINCE GEORGE
CALGARY
KAMLOOPS
VANCOUVER
PACIFIC OCEAN
VICTORIA
U.S.A.
SCALE:
100 50 0 100
MILES

FIGURE 1.



COAL LICENCE LOCATION

SUKUNKA RIVER B.C.

SCALE: 1: 250,000

FIGURE 1A.

or even property to property. This is evident by the fact that much of the sandstone in the area is lenticular and the occurence of clay, pebble and concretionary bands in some areas and not in others. Due to extensive orogenic and tectonic activity (i.e. folding and faulting), correlation of even the thickest coal seams is difficult to ensure over great distances without extensive drilling. Many of the seams show several shale and carbshale bands which might suggest a drift origin for the coal, so one would expect variations in the quality of any seam (laid down at the same time) even if a method were found to make such correlation possible. The coal seams vary in thickness from area to area and there are few marker beds or diagnostic features in each formation which extend throughout the area. Stott points out that in the Bullmoose Mountain area the basal member of the Commotion is non-marine whereas in the Hasler Creek area it is entirely marine which further illustrates the difference in deposition in the area. As a result, the interpretations presented herein are correlated to the Cadomin conglomerate to the greatest extent possible. Only those coal members actually cut by cat road, trench, or intersected by drillholes are shown. Where the conglomerate itself did not appear (as is often the case with this formation) the Cadomin formation was identified by its very hard siltstone and sandstone. In actual fact there is a very high potential on these leases for many other seams, even of major thickness.

Stratigraphy

Outcrops within the licenced area are of Lower Cretaceous age and most lie within the Bullhead and Fort St. John Groups. Natural exposures are limited to resistant units of sandstone and conglomerate. A thick succession of alluvial sand obscures bedrock as the Sukunka River is approached, and glacial deposits up to 25 ft. thick mantle most of the remaining area. The numerous seismic lines and exploration trails within the licences often penetrate this mantle to expose the less resistant rock types.

Potentially economic coal seams exist within the Gething Formation and Gates member of the Commotion Formation. The "Upper Gething" Skeeter and Chamberlain seams are currently being exploited by British Petroleum on their licences which adjoin Manalta's to the south-west. For purposes of mapping, Master Explorations Ltd.'s licences contain the following succession:

Commotion Formation - Gates Member
Moosebar Formation
Gething Formation - Upper Gething Sequence
- Lower Gething Sequence
Cadomin Formation
Pre-Cadomin Rocks

The main coal bearing formations are the Gething and Commotion (Gates Member). The Gething formation occurs over the the largest area of the leases,

and the Gates member toward the Western boundary of the leases. The primary marker bed on these leases is the Cadomin conglomerate (and formation) which is composed of pebbles in a sandstone matrix, and the Gething conglomerate at the base of the Moosebar which is composed of black 1/4" diameter chert pebbles in a mudstone matrix. Stratigraphically from the deepest beds to the shallowest, the formation is described below and in Figure II and IIA.

The Cadomin formation varies considerably over the property in that to the northwest the dominant feature is the conglomerate outcrop whereas to the southeast the Cadomin has no conglomerate cap at all. In the gas exploration well (B.P. Sukunka b-19-A) dry hole the Cadomin was encountered at 215' depth and was composed of 115' of very hard sandstone, 15' of siltstone, then 205' of very hard sandstone. Where the Cadomin conglomerate does appear, it is massive, containing well rounded chert, quartz, and quartzite pebbles, cobbles and boulders. Since the Cadomin is detectable on seismic logs, the basic subsurface structure shown in the report "A Discussion of the Stratigraphy and Structure in the Sukunka Area of British Columbia; by Central-Del Rio Oils Limited, Triad Oil Co., and Bow Valley Exploration; July 15, 1970" was used as a guide. Their main sections correspond to the section lines (seismic lines) chosen for the mapping in this report. From this report, and surface geology (supplemented with some drilling), the Cadomin formation was located on the sections.

Immediately overlying the Cadomin is the Gething Formation. The Gething has very few marker beds, other than traceable coal seams and even these thicken and thin at random, over short distances. The Lower Gething

APPROXIMATE LITHOLOGY
SUKUNKA RIVER AREA
MANALTA COAL LEASES

centre: 55°17' & 121°37'

NOTE: FORMATION THICKNESSES VARY CONSIDERABLY OVER THIS PROPERTY. THE ONES PORTRAYED HERE ARE THOUGHT TO BE AVERAGE.

'A' SEAM (COAL)

'B' SEAM (COAL)

COMMOTION
GATES MEMBER
Lk cm(G)

MASSIVE THICK BEDDED, FINE GRAINED, WELL SORTED SANDSTONE WITH SOME INTERBEDDED SHALE, SILTSTONE AND MUDSTONE

'C' SEAM (COAL)

MASSIVE THICK BEDDED, FINE GRAINED, WELL SORTED SANDSTONE WITH SOME INTERBEDDED SHALE AND SILTSTONE

'D' SEAM (COAL)

MOOSEBAR
Lk Mb

MARINE SHALE AND SILTSTONE (SOMETIMES GLAUCONITIC)

DARK GREY TO BLACK SHALES, RUBBLY TO BLOCKY, IRONSTONE CONCRETIONS

GETHING CONGLOMERATE

UPPER
GETHING

BIRD A AND B SEAMS (COAL)

SKEETER SEAM (COAL)

CHAMBERLIN SEAM (COAL)

Lk Gt

- SANDSTONE
- INTERBEDDED SILTSTONE AND MUDSTONE
- MUDSTONE
- GLAUCONITIC SANDSTONE
- MUDSTONE, SILTSTONE
- PEBBLE BAND

LOWER
GETHING

'A' HORIZON

'B' HORIZON (COAL)
MIDDLE SEAM
- SILTSTONE

'C' HORIZON (COAL)
- INTERBEDDED S.S., SILTSTONE, CARB. SHALES

'D' HORIZON (COAL)
- SANDSTONE, SILTSTONES MINOR MUDSTONE GRADING TO SANDSTONE AT BASE
- COALY LENSES COMMON

20° CONGLOMERATIC SANDSTONE
SANDSTONE CONTAINING SILTSTONE AND CARBONACEOUS UNITS.

CADOMIN
Lk cd

CADOMIN
VERY HARD SANDSTONES AND SILTSTONES

Jm

MINNES GROUP

SCALE
1'' - 200'

FIGURE II

7

contains up to 4 seams of potential commercial thickness, the largest and most dominant of which is the Middle Seam. The rock materials of the entire Gething consist of a monotonous sequence of interbedded sandstone and siltstone containing dark grey to carbonaceous mudstone and coaly beds. The lack of diagnostic features in this interval makes the identification of fault repetitions difficult. In general, lower Gething coals contain carbonaceous shale bands and have a fairly high inherent ash. The Upper Gething formation also contains four potentially commercial coal seams, (The Bird A&B, Skeeter and Chamberlain) the most notable of which is the Chamberlain Seam on the adjacent Sukunka - B.P. property.

It is very likely (although with the limited work done to date it is not entirely certain) that the Chamberlain seam and Skeeter seam would also be of commercial thickness on the Master Leases.

The overlying Moosebar Formation was also difficult to identify since it consists mainly of marine shales and siltstones. The greenish siltstones are sometimes glauconitic. There are also occurences of Gething conglomerate on the eastern edge of the property which consists of black, 1/4" diameter chert pebbles in a mudstone matrix.

The Gates Formation is the dominant surface feature along the Northeastern edge of the property. There also appears to be two tight synclines of strippable Gates coal of thicknesses up to 35 feet at section C-C' on the leases. Once again the rock materials are massive thick bedded,

fine grained, well sorted sandstone with interbedded shale and siltstones which are difficult to distinguish from the Gething rocks.

Structure

The structure is typical of the Inner Foothills of the Rocky Mountains with northwesterly trending folds and faults. The folds are asymmetrical and the faults are south-westerly dipping thrusts. Numerous small faults were mapped in outcrop, particularly near the fold axes, but only those thrusts which can be correlated between at least two observation points or which are inferred to necessarily exist as an explanation to outcrop geology are displayed on the accompanying geological map in Appendix IV. It is inferred that the most northeasterly mapped thrust is the local "sole" fault, while the other mapped thrusts are "splays" from this and converge with it at depth. As a general rule, dips are steeper and topography more rugged to the northeast of the sole fault than to the southwest. To date, no economic coal seams have been discovered north-east of the sole fault, but most of the area is mapped as containing the coal-bearing Gates member of the Commotion formation which could contain up to 4 economical coal seams. Since little attention has yet been focused on this area, Manalta still regard its coal potential as high.

As a general rule, dips are steeper and topography more rugged to the northeast of the sole fault than to the southwest. The main fault on the Northwestern edge of the coal area (i.e. along the Sukunka River) is labled by B.P., Triad as the Nuisance Fault. This fault could correspond to the Chamberlain fault on the adjacent Sukunka - B.P.

property. A feature of the thrust faults, which is of considerable significance in the area, is the lack of continuity of the smaller faults in the strata overlying the Gething Formation. The Nuisance Fault and the sole fault are recognized at the surface as they effect the total sequence by virtue of the magnitude of their displacement. The smaller faults, however, terminate at depth. Attached cross-sections A-A' to E-E' in Appendix V show the interpretation of the faulting and folding across the property. The potential coal areas are labled, with some of the coal seams encountered in the various programs shown.

PREVIOUS EXPLORATION

A preliminary reconnaissance survey of the 1971 licence area was conducted by Paul Dyson Consultants and Holdings Ltd. during June of 1971. The results of this survey are contained in "Preliminary Report on Sukunka River Coal Properties of Alberta Coal Ltd.", on file with Manalta Coal Ltd.'s exploration department.

During the period from Sept. 16 to Oct. 31, 1971, Master Explorations Ltd. conducted an exploration program on the property involving surface geological mapping, drilling of 12 holes totalling 2,318 feet, construction of 5 miles of new trail, and backhoe trenching near seven suspected coal outcrops. A "Preliminary Exploration Report" was prepared by company geologist T.N. Yoon and is on file.

1975 EXPLORATION

The purpose of the 1975 exploration program was to further delineate the extent of the 1971 potential reserve estimate and to determine the existence of other potentially economic coal occurrences within the licences. Field headquarters were established at Brascan Resources Ltd.'s Sukunka No. 1 Colliery camp and the co-operation and assistance of Brascans' staff is gratefully acknowledged.

The 1975 exploration program consisted of:

1. Continuous field mapping from Aug. 26 - Nov. 4
2. Drilling 21 holes totalling 3415 ft. with a track mounted rotary drill employing water as a circulating medium
3. Digging 30 trenches totalling 11,260 horizontal feet with a John Deere Model 400 backhoe
4. Constructing approximatley 7 miles of new exploration trails with a Caterpillar D7-E tractor.

COAL SEAM CORRELATION

Down hole geophysical logs including natural gamma, neutron and gamma density were performed on seven of the 1971 drill holes and on one of the 1975 holes. Additionally, down hole resistance logs were performed on two other 1975 drill holes. Correlation of four separate coaly horizons is evident from the radioactive logs, and the electric logs conform to this pattern.

When compared to logs of the complete Gething sequence made available by Brascan Resources Ltd., it is evident that the major coaly horizons encountered do not correspond with the Skeeter and Chamberlain seams as previously reported (1971 Exploration Report). Analyses performed to date show consistently higher ash values, tending to confirm this.

Skeeter and Chamberlain seam equivalents were encountered southwest of the "Master Creek" valley, but have thinned to uneconomic proportions for surface mining. They may, however, thicken under the property as is common with deposition in this area. The mechanical log of a-43-B gas well drilled in the winter of 1974-1975 indicated an 18'-20' coal seam in the Gething formation at 800' of depth which has not yet been cut by surface exploration. Several other coal seams have been cut by trenching and drilling and those which are not shown are illustrated in the well and trench lithological descriptions in appendices I & II.

The main geological map and cross-section A-A' to E-E' show the spacial relationships of the formation and coal seams. The prime area of exploration between sections C-C' and D-D' are labelled along a baseline from 10+00 to 92+00. These sections show in more detail the strippable coal which is thought to be in the Gates and the Gething coal in sections 80+00 and 92+00.

ANALYSES

Analyses performed on two foot sample increments from the complete coal section encountered in drill hole SR-14-75 indicated a 22 vertical foot

mineable portion of coal from depths of 35 ft. to 57 ft. Some higher ash zones were included within the 22 ft. zone, and when corrected for true thickness, the zone was 19.5 foot thick (including partings).

A composite of the 11 two foot samples increments was analysed with the following results:

ok.

Dry Basis:	
Raw ash	27.6%
Volatile	15.5%
Fixed carbon	56.9%

washability?

Sink-Float Analysis: Raw Coal

S.G.	WT%	ASH%	CUM.ASH%
-1.35	44.7	4.2	4.2
1.35-1.45	16.2	13.0	6.5
1.45-1.55	7.4	24.1	8.4
1.55-1.65	4.0	33.1	9.8
1.65-1.80	4.3	45.4	11.8
+1.80	23.4	74.4	26.5

Analysis on Cumulative Floats @ 1.55 S.G. Air Dried Basis

RM%	ASH%	VM%	FC%	FSI	HGI
0.8	8.6	17.3	73.3	4	86

COAL QUALITY EVALUATION

Upper Seam

The most representative sample taken to date is that at depth in the upper seam in drill hole SR-14-75. While this sample was being recovered much uphole dilution was mixed with the sample, which affected the overall coal quality. The gravity distribution looks realistic in the lower specific gravity ranges, but there is quite an excess of +1.80 sink material. Assuming 10% of this is uphole dilution, the washability would be that of Table I following. Because of the shallow depth (35'-57') the FSI is not expected to be high, but it is 4.

The raw coal ash content was calculated to be 20.2% because of uphole dilution which is much like other metallurgical coals being strip mined in Western Canada and which compares well to the trench sample excluding hanging wall and footwall rock. As can be seen from the analyses in Figure III, the ash for the better parts of the seam can be as low as 8% for the upper seam and 4% for the lower seam.

FIGURE III

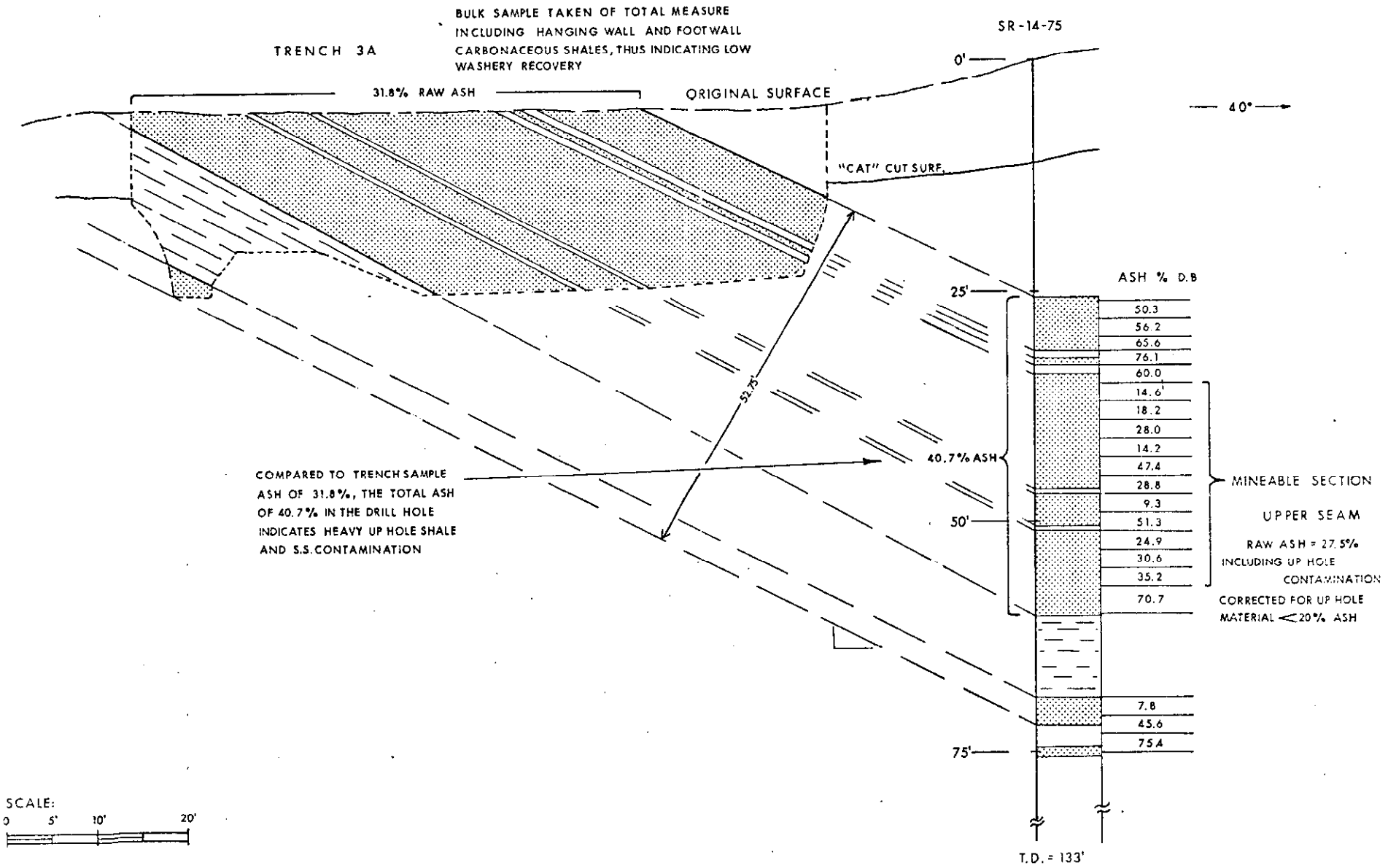

TRENCH 3A
BULK SAMPLE TAKEN OF TOTAL MEASURE INCLUDING HANGING WALL AND FOOTWALL CARBONACEOUS SHALES, THUS INDICATING LOW WASHERY RECOVERY
31.8% RAW ASH
ORIGINAL SURFACE
"CAT" CUT SURF.
SR-14-75
0'
40'
25'
50'
75'
52.5'
ASH % D.B
50.3
56.2
65.6
76.1
60.0
14.6
18.2
28.0
14.2
47.4
28.8
9.3
51.3
24.9
30.6
35.2
70.7
7.8
45.6
75.4
40.7% ASH
COMPARED TO TRENCH SAMPLE ASH OF 31.8%, THE TOTAL ASH OF 40.7% IN THE DRILL HOLE INDICATES HEAVY UP HOLE SHALE AND S.S. CONTAMINATION
MINEABLE SECTION
UPPER SEAM
RAW ASH = 27.5% INCLUDING UP HOLE CONTAMINATION
CORRECTED FOR UP HOLE MATERIAL <20% ASH
T.D. = 133'
SCALE:
0 5' 10' 20'

TABLE I

Washability of SR-14-75

Corrected for Uphole Dilution

Max. S.G.	Wt%	Ash%	Cumulative Wt%	Ash	Corrected +0.1 S.G.
1.35	50.5	4.2	50.5	4.2	
1.45	18.3	13.0	68.8	6.5	30.8
1.55	8.4	24.1	77.2	8.4	14.9
1.65	4.5	33.4	81.7	9.8	9.0
1.80	4.9	45.4	86.6	11.8	
+1.80	13.4	74.4	100.0	20.2	

The upper seam was also trench sampled, but the entire coal and shaley sections were mixed together, so the raw coal ash was 38.7%. In addition, the sample was badly oxidized so it is not representative of the main part of the coal seam. The seam description was as follows:

Highwall - shale
5.0' - coaly shale
5.0' - coal
0.2' - parting
6.0' - coal
2.5' - parting
4.0' - coal
1.0' - parting
6.5' - coal
10.0' - parting

Selective Mine this section

	3.0' - coal
Total	18.7' - coaly shale and parting
	24.5' - coal
Total (if only mid-section is mined)	
	3.7' - parting
	24.5' - coal

Assuming that the seam is selectively mined as shown above it is reasonable to expect a raw coal ash content of 20% or less. There is no way of determining what the washability would be, but it probably will match that shown in Table I, since the elementary ash at various specific gravities is relatively constant.

Lower Seam

The only washability available on the lower seam is from the T-3 trench, shown in Figure IV and this coal was badly diluted as can be seen by the high ash content (40.2%) of the 1/4" x 28M fraction compared to the finer fractions. If one compares the elementary ash versus specific gravity curves shown in Figure V it becomes apparent that the true coal characteristics are shown in drill hole SR-14-75. The trench samples are very similar, but distorted due to oxidation and dilution, thus it may be reasonable to assume that the one washability will apply to the coal in both seams.

This can be confirmed by deeper bulk sampling in the syncline.

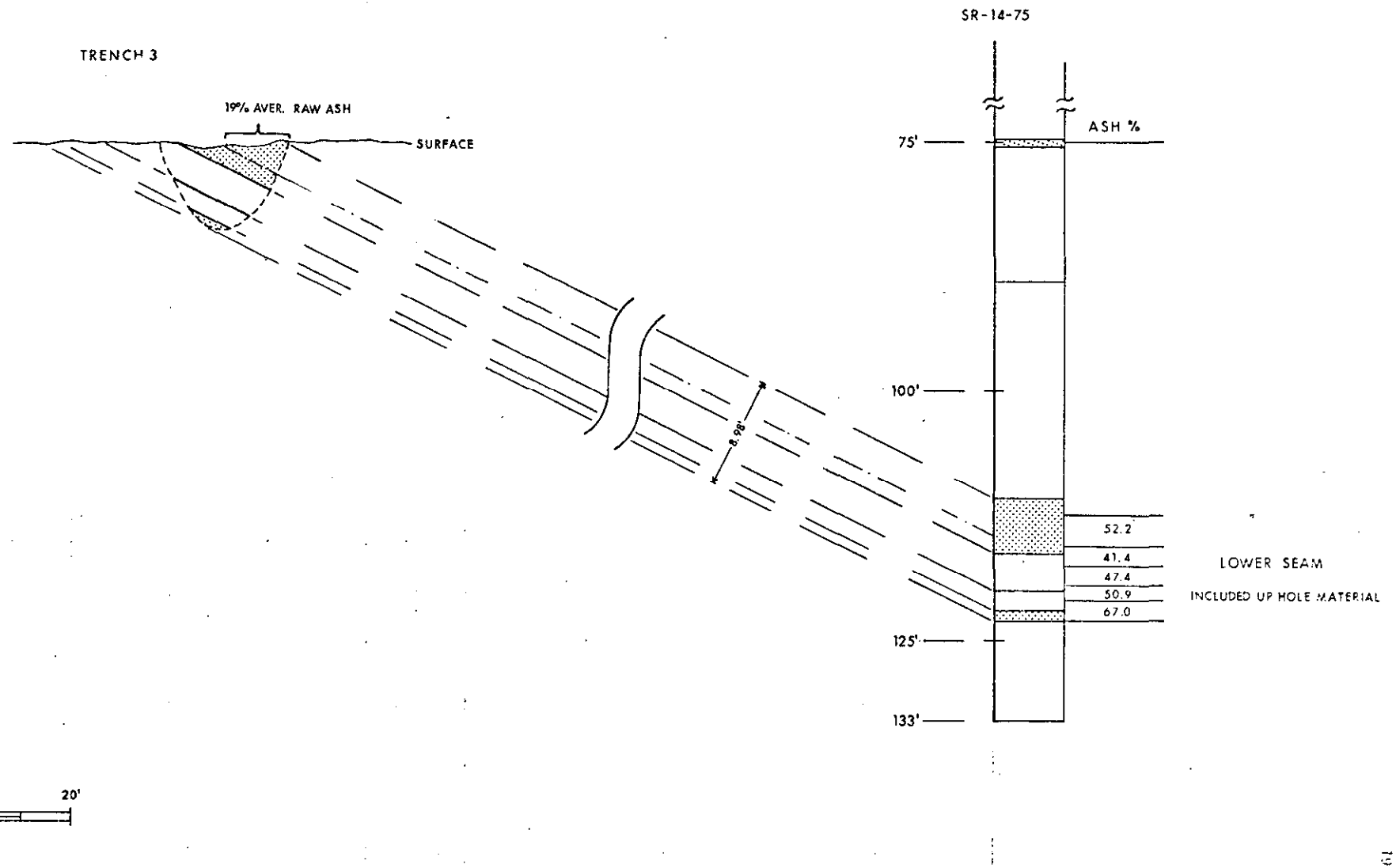
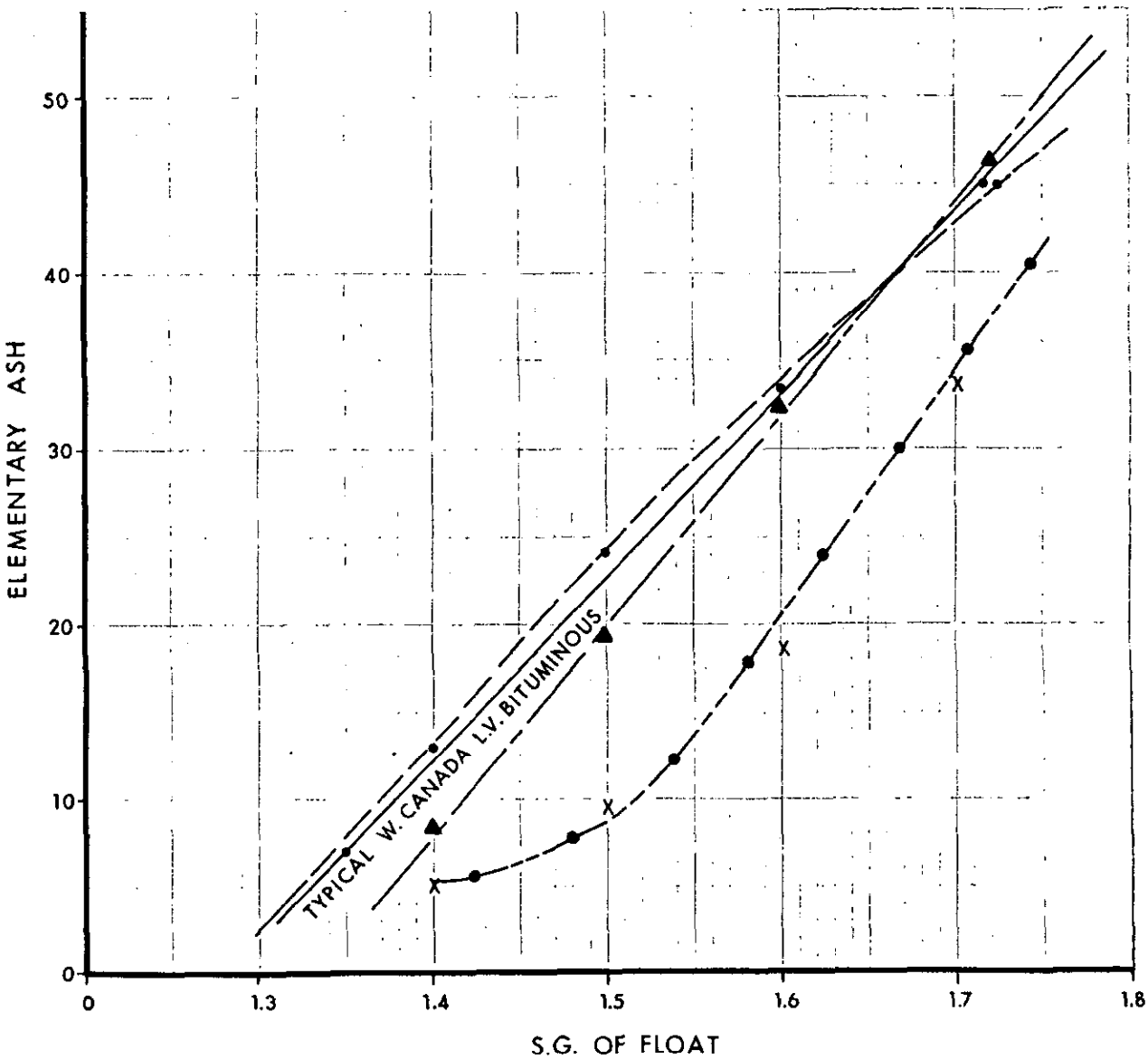

TRENCH 3
19% AVER. RAW ASH
SURFACE
8.98'
SR-14-75
ASH %
75'
100'
125'
133'
52.2
41.4
47.4
50.9
67.0
LOWER SEAM
INCLUDED UP HOLE MATERIAL
SCALE:
0
5'
10'
20'

FIGURE V.

ELEMENTARY ASH AS A FUNCTION OF SPECIFIC GRAVITY

LEGEND:

- SR - 14 - 75 (35'-57') (UPPER SEAM)
- SR - T - 3 - 75 (LOWER SEAM)
- SR - T - 3 2" × 1/4" (UPPER SEAM)
- SR - T - 3 1/4" × 28 M (UPPER SEAM)



Product Evaluation

Based on the washability shown in Table I, the probability error curves in Figure VI were developed. The best possible product would look roughly as follows:

	Feed Ash	Wt%	Product Ash	Recovery
Heavy Media	20.2	70%	8.3%	72%
Compound Water Cyclone	18.0*	15%	9.8%	67%
Froth Floation	16.0*	15%	12.0%	75%
Net	19.2%	100%	9.1%	71.7%

If the amount of near gravity material could be reduced (i.e. selective mining will likely do this) the product would look considerably better.

Also, sulphur which has been tested extensively, is very low in the entire area (less than 0.4%).

RESERVES

Interpretations of 8 radioactive logs show an average coal thickness of 19.5 ft. with average partings. Assuming a selective mining removal

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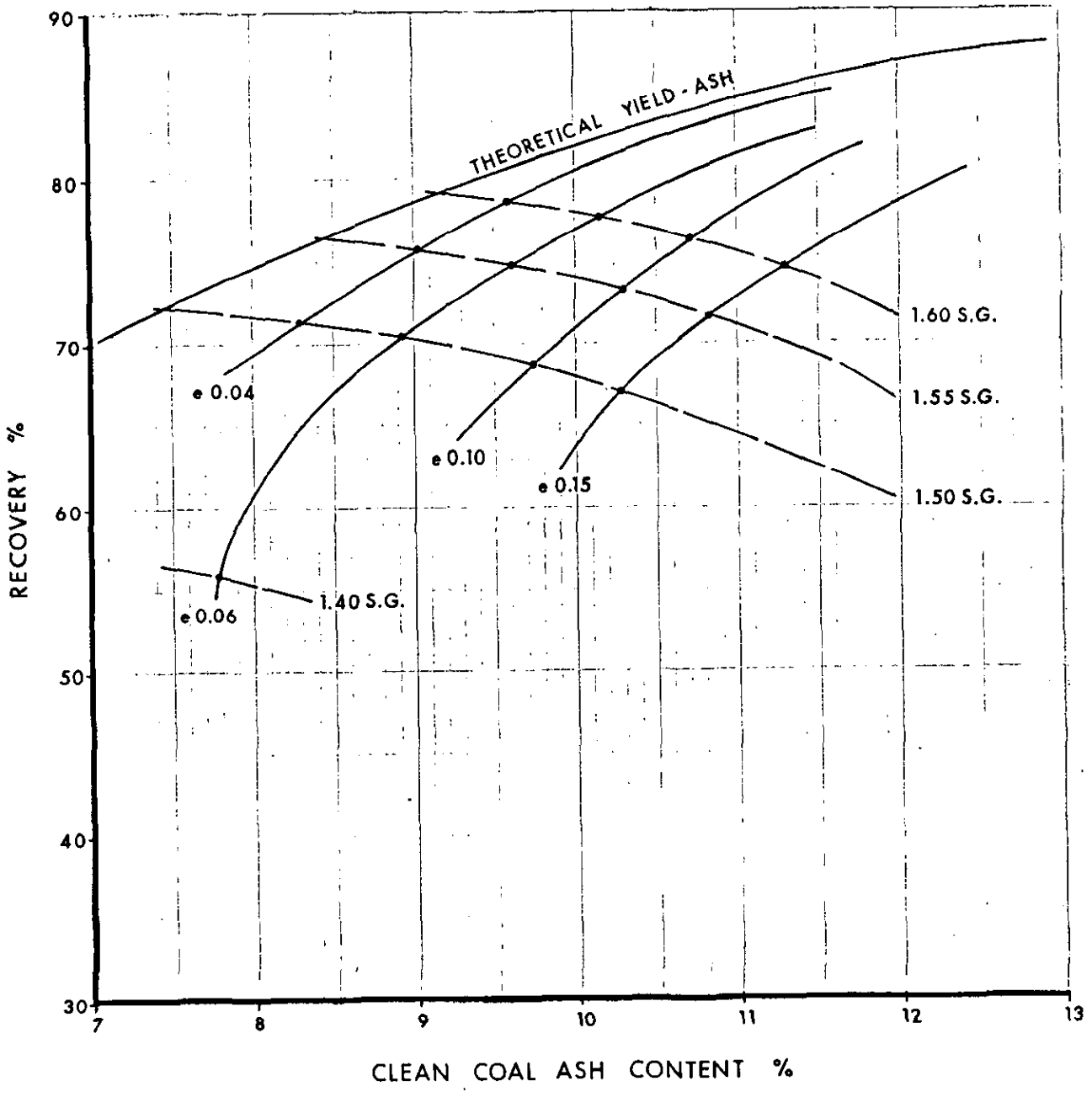
* Estimated from similar data on the property.

FIGURE VI.
CORRECTED YIELD vs. PRODUCT ASH
FOR SR-14-75
(35'-57') UPPER SEAM



RESERVES - Interpretations of 8 radioactive logs show an average coal thickness of 19.5 ft. with average partings [23] of footwall and hanging wall, a gross recoverable raw coal reserve of 9.15 x 10^6T at mining ratio 10:6 was calculated. At mining ratio of 5.25:1, a recoverable reserve of 3.25 x 10^6T was calculated. These reserve figures apply to "Area 1" on the map and are referred to as "measured and indicated". The graph (Figure VII) displays the relationship between recoverable raw coal and mining ratio on the basis of this data. Assuming a selective mining removal

Inferred recoverable reserves of 3.0 x 10^6T at ratio of 5.75:1 can be calculated for "Area 2" on the map (Appendix IV), and an additional inferred recoverable reserve of 1.8 x 10^6T at 5.75:1 can be calculated for the map "Area 3".

The recoverable open pit raw coal reserves at a mining ratio of 5.7:1 are therefore, 8 million tons in Areas 1, 2 and 3. At current Western Canadian strip ratios of 10:1 there would be at least 14 x 10^6 tons of raw coal recoverable.

The "vertical" coals encountered in Trench 24 (see cross-section through Trench 24, Appendix II) and drill hole SR-12-75 (map location b 61 B-93 P5) might provide a further low-ratio reserve, depending on analysis and degree of deformation.

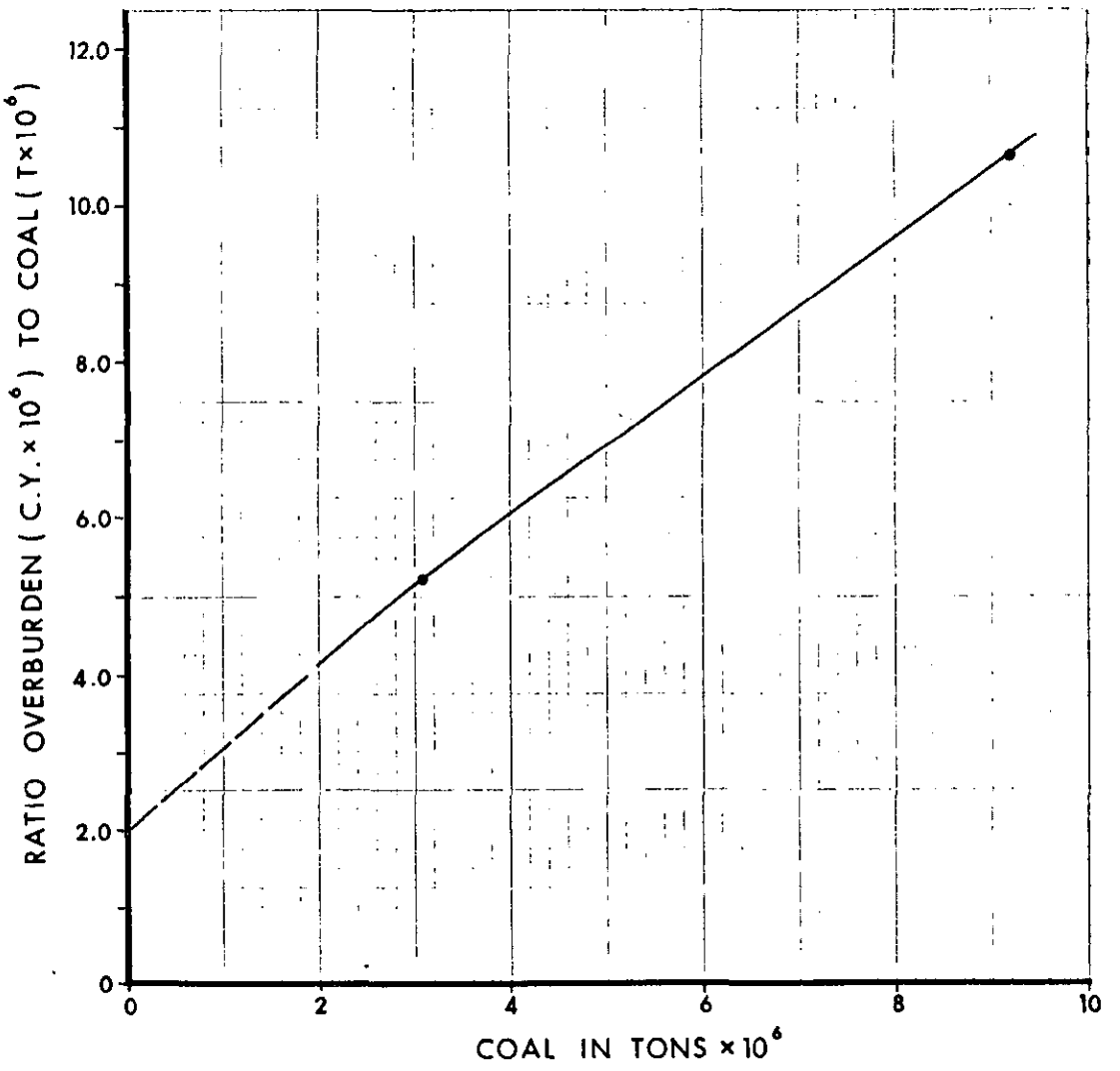
Correlatives of the Skeeter and Chamberlain seams were observed in Trench T-13 (map location d 1 B-93 P5), Trench T-1 (map location d 43 B-93 P5) and Trench T-11 (map location c 18 A-93 P5) but maximum observed seam observed seam thickness was 6' (t-13). No reserve calculations were made for these seams. Should hydraulic mining or conventional underground mining be considered, there is undoubtedly a substantial tonnage of coal on these leases. As an example, if only 10' of coal occurs in the Gething section on the lease, there is 14,000 acres of Gething Formation which would

FIGURE VII.

MINING RATIO vs. RECOVERABLE RAW RESERVE

"MEASURED" AND "INDICATED" COAL

AREA I.



thicknesses are as follows:

GETHING COALS		THICKNESS UP TO
Bird	A&B	8' & 13'
Skeeter		8'
Chamberlain		10'
"A" Horizon		2'
"B" Horizon	(Middle)	20'
"C" Horizon		3.5'
"D" Horizon		10'
GATES COALS		
"A" Seam		5'
"B" Seam		17'
"C" Seam		15'
"D" Seam		5'

SUMMARY OF RESERVES(x 10^6 Tons)

	INDICATED & INFERRED	POTENTIAL
Area (1) Gates (Main Seam)	9.15	?
Area (2) Gething	3.0	?
Area (3) Gething	1.8	?
Remainder of Lease Gething	0.8*	275
Remainder of Lease Gates	?	25
	14.75	300

* The indicated and inferred coal on the remainder of the lease was calculated by multiplying the coal thickness intercepted by an area 100' deep by 3000' long (i.e. 10' of coal intercept would be 90,000 tons of coal in place). Where the drill followed the coal as in SR-12-75 and intersected 418' of coal, only the true thickness was counted which was SR-11-75 (5.3').

The existence of coals in the Minnes Group which is post Gething have not been substantiated to date. Stott has mentioned that no Minnes Group coals have been mapped on surface, however, this does not negate the fact that there could be significant thicknesses of coals in this Group, (i.e. Nikanassin equivalent).

The drillers log as well as communication with B.P.O.G. well site geologists indicate many coal seams from 100' through 1500' in well B.P. Sukunka b 65-B. A gamma-ray neutron log was run through the surface casing (0' - 1100') on this hole and through the log is quite poor, there are indications of coal zones through out the top 1000' and below. Seam thicknesses do not appear to be significant however the presence of coal is indicated.

SUGGESTIONS FOR FUTURE EXPLORATION

The structural cross-sections included as Appendix IV to this report indicate little chance for the existence of more Gething formation coals than already mapped, at least as far south as X-Section B-B', the mapped "Lower Gething coals" between X-Sections A-A' and B-B' should be explored by drilling. Cross-section C-C' indicates several possible Gething coal sequences between the various faults an this section should be investigated with additional deep holes. Also, the area down the hill (west) of SR-13-75 should be further drilled since there could be a sizeable strip potential there if the coal rolls over (as it should). At section 50+00 a further line of drill holes should penetrate the entire syncline and fill-in down the hill to the west. Confirmation of the remaining mapped structure on this cross-section should be obtained by drilling. Cross-section D-D' indicates a potential Gething coal section to the east of trench T-23, and a further potential within the two fault blocks immediately west of SR-3-75. Drilling for structural confirmation is also required. There is also potential Gething coal all along the Nuisance Fault. The continuation of the Gething coal section indicated on cross-sections C-C' and D-D' can also be expected from cross-section E-E' in the fault block immediately east of the dry hole. As interpreted, cross-section E-E' also indicates enough stratigraphic room for the entire Gething sequence to exist within the four fault blocks terminating to the east in grid block 28 A-93 P5 and to the west in grid block 10 A-93 P5. If this sequence can be confirmed within any of the aforementioned fault blocks, then it should be investigated in either strike direction (NW-SE) to the licence boundaries or to its termination. As

mapped on cross-section E-E', the lower Gething coal sequence may be unattractive to open pit recovery because of depth parameters, but the "Chamberlain" seam equivalent is shown near surface and may be of economic thickness.

In excess 10 million tons of in place coal at attractive stripping ratios might be found within these potential Gething formation blocks, depending upon seams thicknesses encountered.

The mapped Gates member of the Commotion formation (including some undivided Commotion formation) is potentially coal bearing to the east depending upon the stratigraphic position of the Gates outcrops within the licences. Two seams, numbered "A" and "B" have been encountered by Brascan Resources Limited through drilling atop Bullmoose Mtn. These are reported to thicken up to 15' each, with variable partings. The seams are expected near the top of the Gates member, but unfamiliarity with stratigraphic markers and that Gates thickness has precluded exact positioning of the Gates coals within these licences. Nichimen at Mr. Spieker have encountered four seams of commercial thickness. The most attractive area for exploration of the Gates within our licences is along the seismic lines used to demark cross-section A-A' and possibly B-B' but their topography is rugged.

APPENDIX I

LITHOLOGICAL LOGS OF DRILL HOLES

DRILL HOLE LOGS

Drill Hole No. SR-71-1

COMPANY: Master Explorations Ltd.

AREA: Sukunka River, B.C.

DRILLER: T. Mullen (McAuley Drilling)

LOCATION: B.C. Land Reference System

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: B.C. Land Reference System 350'S 1300'W NE Cor. 32B

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: B.C. Land Reference System 670'S 620'W NE Cor. 32B

ELEVATION: 3550'

DATE: 21-Sep-71

FROM	TO	DESCRIPTION
0	1'	Silt till
1	34'	Grey siltstone - medium hard to hard
34	39.6'	Brown shale
39.6	44.7'	Coal - clean - at 44.2' thin shale traces
44.7	51.6'	Black & brown shales - coal traces interbedded
51.6	59.3'	Coal - thin shale traces in top 1.0 - thin shale traces below 56.5
59.3	59.9'	Black Shale
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: B.C. Land Reference System 1020'S 0'W NE Cor. 32B

ELEVATION: 3590'

DATE: 22-Sep-71

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'
91.3	95.1'	Coal - thin shale traces to 93'
95.1	101.6'	Black & brown shales
101.6	104'	Coal - few shale stringers
104	104.5'	Black shales
104.5	113'	Coal - few shale stringers
113	113.8'	Brown shale
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
152	153.9'	Coal
153.9	159.5'	Black & brown shales
159.5	174.3'	Grey siltstone
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: B.C. Land Reference System 1020'S 0'W NE Cor. 32B

ELEVATION: 3590'

DATE: 22-Sep-71

FROM	TO	DESCRIPTION
214'	216.8'	Brown shale - coal traces
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: B.C. Land Reference System 1370'S 1270'W NE Cor. 31B

ELEVATION: 3770'

DATE: 25-Sep-71

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
245.5	249.3'	Coal
249.3	256.1'	Brown shale - thin coal traces
256.1	260.2'	Coal - shaley from 257.3' to 258.1'
260.2	261.5'	Brown shale - coal traces
261.5	267'	Coal
267	272.1'	Brown shale
272.1	274.2'	Coal - shale traces
274.2	274.7'	Brown shale
274.7	276.7'	Coal
276.7	277.8'	Brown shale
277.8	283.2'	Coal appears clean
283.2	284'	Brown shale - coal traces
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: B.C. Land Reference System 1370'S 1270'W NE Cor. 31B

ELEVATION: 3770'

DATE: 25-Sep-71

FROM	TO	DESCRIPTION
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: B.C. Land Reference System 850'S 2220'W NE Cor. 40A

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: B.C. Land Reference System 500'S 600'W NE Cor. 40A

ELEVATION: 3770'

DATE: 8-Oct-71

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
121.5	129'	Coal - clean
129	132.3'	Coal - very shaley
132.3	135.5'	Black shale - coal stringers
135.5	137.5'	Coal
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: B.C. Land Reference System 950'S 1320'W NE Cor. 39A

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: B.C. Land Reference System 950'S 1320'W NE Cor. 39A

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: B.C. Land Reference System 1000'S 350'W NE Cor. 31B

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: B.C. Land Reference System 1420'S 2520'W NE Cor. 38A

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: B.C. Land Reference System 1050'S 1870'W NE Cor. 39A

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 stringers
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: B.C. Land Reference System 1100'S 2550'W NE Cor. 17A

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'

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 5, 75 HOLE NO. SR - 1 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods A. Wagg

AREA Sukunka River

LOCATION 1300's 950'W NE Cor 43 - 8 - 93 - P - 5

ELEVATION 3050 HOLE SIZE 4½"

INCLINATION Vertical

(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	5	Shattered Rock and Clay
5	9	Grey Carbonaceous Shale
9	13.5	Dark Grey Sandstone
13.5	16	Grey Shale
16	17.5	Carbonaceous Shale and Coal
17.5	20.8	Grey Shale
20.8	21.5	Carbonaceous Shale and Coal
21.5	29.5	Grey Shale
29.5	30.5	Coal
30.5	34	Grey Shale
34	37	Dark Grey Sandstone
37	40	Carbonaceous Shale and Coal
40	44	Grey Shale
44	49	Carbonaceous Shale and Coal
49	50.5	Coal
50.5	51.3	Carbonaceous Shale and Coal
51.3	52.2	Coal
52.2	55	Grey Shale
55	55.6	Coal
55.6	58	Grey Carbonaceous Shale
58	100	Dark Grey Sandstone
		Total Depth 100'

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 7 & Sept. 8, 1975 HOLE NO. SR - 2 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods, A. Wagg

AREA Sukunka River

LOCATION 1175 S 375 W NE Cor 40 - A - 93 - P - 5

ELEVATION 3600 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION Sept. 7, 1975
0	6	Shattered Rock and Clay
6	28	Clay and Rocks
28	35	Shattered Shales and Sandstone Some clay
35	65	Clay and Rocks
		Sept. 8, 1975
65	84	Clay and Rocks
84	87.5	Light Grey Sandstone (salt and pepper)
87.5	109	Clay and Rocks
109	144	Dark Grey Sandstone
		Total Depth 144'

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 9 - Sept 11, 1975 HOLE NO. SR - 3 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods , A. Wagg

AREA Sukunka River 1975

LOCATION 1500 S 750 W NE Cor 40-A-93-P-5

ELEVATION 3700 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED [xx] yes [ ] no FOOTAGE

FROM	TO	FORMATION
		Sept. 9, 1975
0	12	Clay and Rocks
12	25	Grey Shale
25	27.5	Dark Grey Sandstone
27.5	29	Brown Sandstone
29	35	Hard Grey Sandstone
		Sept. 10, 1975
35	46	Hard Grey Sandstone
46	43	Coal
48	52	Soft Grey Sandstone
52	58	Hard Grey Sandstone
58	60	Brown Sandstone (Lost Circulation)
60	105	Hard Grey Sandstone
		Sept. 11, 1975
105	130	Hard Grey Sandstone
130	205	Dark Grey Siltstone
		Total Depth 205

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 12 - Sept. 15, 1975 HOLE NO. SR - 4 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods, A. Wagg

AREA Sukunka River

LOCATION 950 S 700 W NE Cor 40-A-93-P-5

ELEVATION 3670 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
		Sept. 12, 1975
0	52	Shattered Rock and Clay
52	75	Dark Grey Siltstone
		Sept. 13 lost due to breakdown
75	165	Dark Grey Siltstone
		Sept. 15, 1975
165	205	Dark Grey Siltstone
		Soft Clay (brown) Lenses
		Total Depth 205'

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 15 & 16, 1975 HOLE NO. SR - 5 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods

AREA Sukunka River

LOCATION 1050 S 1800 W NE Cor 39 - A - 93 - P - 5

ELEVATION 3750 HOLE SIZE 4½"

INCLINATION Vertical

(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	7.5	Clay and Rocks
7.5	17	Grey Shale
17	17.4	Coal and carbonaceous Shale
17.4	28.4	Grey Shale
28.4	32	Coal (sample chip)
32	33	Carbonaceous Shale and Coal (sample chip)
33	34.5	Grey and Brown Shale
34.5	37	Coal (sample chip)
37	38	Coal (Shaley and Shale Stringers) (sample chip)
38	39.5	Coal (sample chip)
39.5	42	Grey Shale
		Sept. 16, 1975
42	57	Grey Sandstone
57	60	Grey Shale
60	66	Grey Siltstone
66	83.5	Hard Grey Sandstone
83.5	105	Grey Shale

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 17, 1975 HOLE NO. SR - 6 - 75

COMPANY Manalta Coal Ltd. DRILLER W. Woods

AREA Sukunka River

LOCATION 100 S 2300 W NE Cor 18 - A - 93 - P - 5

ELEVATION 4200 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	6	Organic Material
6	13	Brown Sandstone
13	17.5	Coal (sample chip)
17.5		Hard Dark Grey Sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 26 & 27, 1975 HOLE NO. SR - 7 - 75

COMPANY Manalta Coal Ltd. DRILLER D. Zeigler

AREA Sukunka River

LOCATION 2600 S 350 W NE Cor 29 - A - 93 - P - 5

ELEVATION 4120 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	8	Clay and Rocks
8	9.5	Carbonaceous Shale and Coal
9.5	13.5	Coal (sample chip)
13.5	20	Shale
20	50	Hard Sandstone
		Sept. 27, 1975
50	65	Hard Sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 27 & 28, 1975 HOLE NO. SR - 8 - 75

COMPANY Manalta Coal Ltd. DRILLER Don Zeigler

AREA Sukunka River

LOCATION 2950 S 600 W NE Cor 29 - A - 93 - P - 5

ELEVATION 4060 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	11	Clay and Rocks
11	39	Sandstone
		Sept. 28, 1975
39	108	Sandstone
108	113	Coal (sample chip)
113	125	Hard Sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Sept. 29 & 30, 1975 HOLE NO. SR - 9 - 75

COMPANY Manalta Coal Ltd. DRILLER Don Zeigler

AREA Sukunka River

LOCATION 850 S 300 W NE Cor 28 - A - 93 - P - 5

ELEVATION 4060 HOLE SIZE 4½"

INCLINATION Vertical
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	21	Clay and Rocks
21	56	Shattered Sandstone
56	97.5	Grey Shale
97.5	115	Grey Sandstone
		Sept. 30, 1975
115	131.8	Sandstone
131.8	135	Coal (sample chip)
135	167	Shale
167	170.6	Coal
170.6	193	Sandstone
193	195	Ceal
195	193	Grey Shale
193	225	Grey Sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 1, 1975 HOLE NO. SR-10-75

COMPANY Manalta Coal Ltd. DRILLER Zeigler

AREA Sukunka River, B.C.

LOCATION 600'S., 2500'W., NE 39, A-93 P5

ELEVATION 3690' from map HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	10	Clay and rocks
10	21	Sandstone
21	34	Grey shale
34	36.4	Coal (2.4)
36.4	38	Carb. shale (1.6)
38	39	Coal (1.0)
39	43.8	Carb. shale (4.8)
43.8	45.6	Coal (1.8)
45.6	56.6	Grey shale
56.6	57.8	Coal (1.2)
57.8	63	Grey shale
63	66.5	Coal (3.5)
66.5	114	Shale
114	121	Grey sandstone
		Hole tag 30' east on tree.
		Samples not taken.
		4 3/4"

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 2, 1975 HOLE NO. SR-10A-75

COMPANY Manalta Coal Ltd. DRILLER Zeigler

AREA Sukunka River, B.C.

LOCATION 600'S., 2500'W., NE-39 A-93 P5

ELEVATION 3690' from map HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	9	Clay and rocks
9	31	Sandstone
31	32	Coal sampled (1')
32	35	Shale
35	37	Coal sampled (2')
37	38.6	Black shale
38.6	43.4	Coal sampled (4.8')
43.4	45	Sandstone
		Hole tag on tree 30' east of hole
		Sampled 31-32 32-35 35-37 37-38.5 38.5-43.3

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 2/75 HOLE NO. SR-11-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River B.C.

LOCATION 2500'S., 2250'W., NE-61-B 93 P5

ELEVATION 3295' (map) HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	5	Clay and rocks
5	10.5	Grey shale
10.5	15.8	Coal
15.8	83	Grey shale

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 8, 1975 HOLE NO. SR-12-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 2500'S, 2200'W., NE 61 B - 93P5

ELEVATION 3295' (map) HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	3	Clay and rocks
3	4.5	Carb. shale
4.5	11	Carb. shale and coal
11	16.5	Coal
16.5	21	Coal and carb. shale
21	34	Coal
34	58	Coal and carb. shale
58	142	Coal
142	146	Carb. shale
146	423	Coal and carb. shale
		Sampled 4.5 - 423

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 3/75 HOLE NO. SR-13-75

COMPANY Manalta Coal Ltd. DRILLER WOODS

AREA Sukunka River, B.C.

LOCATION ~~2000~~ 1250'S., 1000'W., NE ~~41~~ 42 B - 93P5

ELEVATION 3745' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	5	Clay and shattered rock
5	8.5	Carb. shale and grey shale
8.5	9	Coal
9	10	Grey shale
10	10.4	Coal and carb. shale
10.4	15	Grey shale
15	22	Grey sandstone
22	30.5	Grey shale
30.5	37	Coal (6.5)
37	49.2	Coal (dirty) (12.2)
49.2	66	Dark grey shale
66	121	Hard grey sandstone
121	123.5	Grey shale
123.5	124.5	Coal
124.5	127.7	Grey shale
127.7	128.5	Coal
128.5	130	Brown shale and carb. shale - coal traces
130	136.5	Coal (dirty)
136.5	140	Soft grey shale
140	149	Grey and brown shale - coal traces
149	184	Grey sandstone
184	192.5	Grey and brown shales
192.5	194.8	Coal and brown carb. shale
194.8	198	Grey siltsone
198	244	Hard sandstone
244	248	Grey shale
248	259	Hard sandstone
259	265	Very hard sandstone
		Sampled 30.5 - 49.9 130 - 136.5 Resistance log shows coal 29.5 - 38, 40 - 48, G.J. Plugged beyond 80'

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 13/75 HOLE NO. SR-14-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 1980'S., 1000'W., NE ~~415~~ 42.5 - 93P5

ELEVATION 3750' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	7	Clay and rocks
7	11	Brown sandstone
11	19	Dark grey shale
19	22	Grey siltstone
22	25.6	Grey and brown shale
25.6	31.5	Coal
31.5	32.4	Coal and brown shale
32.4	33	Coal
33	34	Coal and dark grey shale
34	46.5	Coal
46.5	47	Coal and brown shale
47	50.5	Coal
50.5	51	Soft brown sandstone
51	60.3	Coal
60.3	69	Brown and grey shale
69	72	Coal
72	74.7	Brown shale, coal traces
74.7	75.5	Coal
75.5	89	Brown shale
89	110.8	Hard black siltstone
110.8	116.2	Coal
116.2	120	Coal with brown and carb. shale
120	122	Grey and brown shale
122	123	Coal
123	133	Dark brown shale
		Resistance Log shows coal 25-30, 33-42, 44.5-49, 50.5-55, 58.5-61, 61.5-62, 66.5-73.5, 74.5 - 75.5 and 110-119 - G.J.

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 16, 1975 HOLE NO. SR-15-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 950'W., ~~1825~~ 1150'S., NE Cor. 42B - 93-P-5

ELEVATION 3760' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	12	Clay and rocks
12	18	Grey shale
18	66	Hard sandstone
66	82	Silty dark grey shale
82	84	Coal (2.0)
84	87	Coal with carb. shale (3.0)
87	94	Coal (7.0)
94	100	Coal with carb. shale stgs.
100	101	Light grey shale
101	103	Coal and carb. shale
103	107.5	Brown and grey shales
107.5	110	Grey sandstone
110	115.2	Dark grey shale
115.2	117.5	Coal (2.3')
117.5	151.4	Dark grey shale
151.4	156	Coal (5.6')
156	161	Coal with shale (5.0')
161	162.5	Carb. and brown shale with minor coal
162.5	166.5	Coal and carb. shale
166.5	173	Brown and grey shale

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DRILL LOG

DATE Oct. 18, 1975 HOLE NO. SR-16-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 2450'W., 0'S., NE Blk 41 B - 93 - P5

ELEVATION 3880' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	22	Shattered sandstone
22	51.5	Hard sandstone
51.5	52	Carb. shale and coal
52	53.5	Coal (1.5')
53.5	223	Hard sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 22, 1975 HOLE NO. SR-17-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 2000'W., 2550'S., NE Cor. 51 B 93-P-5

ELEVATION 3725' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	7	Clay and rocks
7	100	Dark grey sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 24, 1975 HOLE NO. SR-18-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 150'W., 200'S., NE Cor. 42 B 93 - P-5

ELEVATION 4000' HOLE SIZE 4 3/4"

INCLINATION 90°

(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	6	Clay and rocks
6	11	Brown and grey shales
11	64	Hard grey sandstone
64	118	Grey and brown sandstone
118	250	Dark grey siltstone

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 27, 1975 HOLE NO. SR-19-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 50'W., 50'S., NE Cor. 42 B 93 - P-5

ELEVATION 3925' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	9	Clay and rocks
9	205	Grey sandstone

A8 - Rev. 12/72

DRILL LOG

DATE Oct. 30, 1975 HOLE NO. SR-20-75

COMPANY Manalta Coal Ltd. DRILLER Woods

AREA Sukunka River, B.C.

LOCATION 2520'W., 350 S., NE Cor. 40 A 93-P-5

ELEVATION 3925' HOLE SIZE 4 3/4"

INCLINATION 90°
(Measured from Horizontal)

MECHANICALLY LOGGED ☐ yes ☒ no FOOTAGE

FROM	TO	FORMATION
0	16	Grey shale
16	61.3	Dark grey sandstone
61.3	66	Carb. and brown shale
66	68.5	Coal (2.0')
68.5	69.2	Grey sandstone (0.7')
69.2	77	Coal (7.8')
77	77.6	Grey sandstone (0.6')
77.6	79.7	Coal (2.1)
79.7	81.5	Coal and carb. shale (1.8')
81.5	90	Brown shale
90	99	Grey siltstone
99	117	Grey sandstone
117	120	Brown and grey shales
120	122.5	Coal and carb. shale (2.5')
122.5	126	Brown shale (minor coal)
126	136	Dark grey siltstone
136	145	Hard sandstone