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THE INVESTMENT POTENTIAL OF THE GROUNDHOG COALFIELD, BRITISH COLUMBIA, FROM A GEOLOGICAL STANDPOINT

PREPARED FOR: ALBERTA ENERGY COMPANY LTD.,
CALGARY, ALBERTA.

BY: ROBERTSON RESEARCH (NORTH AMERICA) LIMITED,
CALGARY, ALBERTA.

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ROBERTSON RESEARCH

LIST OF CONTENTS

APPENDICES

Structure

7 - At least moderate structural deformation.

7 - Could be structural thickening

8 - Further field work is necessary to make definitive statements about the structure.

Continuity

9. - Structural interpretation too optimistic but no definite statement can be made.

Resources

* 10 - The one major uncommitted coal field in British Columbia or possibly western Canada.

11 - not in agreement with Mountford's 60 MMT potential figure.

11. Suggests looking at thickened seam potential structural.

Quality

17 - Core samples are a realistic guide (they are consistent)

16 - 42 intersections of coal?

16 - High middlings in washing recovery less than 50%

REPORT.

ASKS AS MANY QUESTIONS AS IT ANSWERS. / IS ANY EXPLORATION WARRANTED?

1. Conclusions and Recommendations

Based on the evaluation presented above and bearing in mind the contingencies existing in the data available, the following conclusions are drawn.

1. The Groundhog Coalfield contains a sequence of coal-bearing sediments, albeit ill-defined at this time, which appear to contain significant tonnages of coal.

2. Data available lead to the conclusion that the area has undergone intense structural deformation and a high degree of probability exists that the coal-bearing sediments have been deformed, in spite of the inferences drawn by some workers in the area. Structures both within the enclosing sediments and in the coal seams are the prime basis for this conslusion, and the conclusion is drawn that the current structural interpretation is in error.

3. Seam continuity has not been established, although it would appear that seams with thicknesses of 5 feet to 6 feet, and possibly thicker, are present.

4. It is not possible to realistically estimate the resource base due to insufficient structural and seam continuity information. Similarly overburden ratios, even based on assumptions,have to be regarded as meaningless.

5. The clean coal quality is reasonably well established and a product, after washing, of the following specifications, on a dry basis, is predicted:

Ash	11%
V.M.	5.5%
F.C.	83.5%
C.V.	12,900 BTU/lb.

The calorific value would be reduced to 12,000 BTU/lb. at 7% moisture.

6. The ash content of the coal feed to a washing plant is not well defined, but could range up to 50% and average 25%. The seams are considered to contain rock bands and partings, in many cases sheared, and also contain quartz veins especially on the clean faces. Fine grinding may be necessary to achieve adequate liberation of the quartz. Quality

7. The high ash content and the presence of a high percentage of middlings, from a washing standpoint, result in a predicted washing yield of between 30% and 40%. Quality

8. An expenditure of in excess of $2 million would be necessary to define the stratigraphy and structure, but could not be expected to more than infer the presence of economic coal thicknesses in the coal measures. The exploration programme proposed by Tompson (1977) is regarded as inappropriate in format and technique and overly optimistic in objectives, given the doubts expressed in the foregoing sections of this evaluation. Exploration

If investment is made in the Groundhog Coalfield the following considerations must be taken into account:

(9) the property is a high risk venture; Yes. it is exploration.

(10) considerable expenditure will be necessary to upgrade the degree of confidence in the geological conclusions;

(11) although significant tonnages of coal may exist, the structural complexity present could be expected to result in difficult mining conditions, even by surface mining methods; Exploration required to determine

GULF MINING STRUCTURALLY THICKENED COAL

(12) the nature of the coal suggests a difficult cleaning operation and anticipated low yields; is the sampling representative?

(13) a specific exploration philosophy would have to be developed if full value is to be obtained from the necessary expenditure.

as more information is developed, the exploration philosophy becomes more specific.

2. DATA SOURCES

This appraisal of the Groundhog Coalfield in British Columbia, is based principally on a report by one of the shareholders in the preperty, Willard D. Tompson. That report very completely documents the results of exploration carried out in the coal-field to 1970, the last year of any significant activity. Discussions was had with Mr. Tompson regarding the report and its conclusions. Although the report is a result of field investigations and literature research by Tompson, it bears observing that, with the exception of the geological map, the documentation is essentially factual and is not conjectural; nor does it draw unwarranted or unsupported conclusions.

Supplementary to the above report is an evaluation prepared in July 1978 by another shareholder in the property, Mr. B. Mountford; this report was also reviewed.

Two Geological Survey of Canada (G.S.C.) reports were referred to, Buckham and Latour (1950) and Eisbacher (1974), and personnal communication was made with Mr. Bernie Latour of the G.S.C.

The writer's conclusions regarding washability testing of the coal core were verified by Donovan F. Symonds and Associates of Park City, Utah; the report by that company is included as Appendix I to this review.

Personal contact was made with Mr. Edwin D. Holdup, Consulting Engineer of Toronto regarding the brief comments included herein on burnability of the coal from this coalfield.

The area was not visited by the author of this report.

3. GEOLOGY

3.1 STRATIGRAPHY

Tompson (1977) identified four "lithosomes", or rock units, one of which is reported by many investigators to be coal bearing. The geological map presented with Tompson's report illustrates the extent of the four rock units throughout the coal licences covering this part of the Groundhog Coalfield. It is understood that the map is reconnaissance in nature due to the limited amount of field work completed to date and, in places, the dense vegetation obscuring much of the potential outcrop. X

Apart from the fourfold division of the outcropping lithologies no detailed correlations within the rock units have been achieved to date. The presence of coal seams within the Coal Bearing Lithosome has been established in many localities, and particularly in outcrops along the Skeena River. Small scale mining activity in the early decades of the century, as documented by the various published reports on the coal-field, gives confidence in the conclusions that coal in potentially large tonnages could exist in the area, provided that structural, quality and certain economic parameters can be quantified.

From the purely stratigraphic sense, the area warrants further prospecting to establish if an economic stratigraphic sequence can be defined. This conclusion is qualified however by the subsequent sections of this evaluation. X

3.2 STRUCTURE

The geological map and cross-sections accompanying the report by Tompson (1977) illustrate a series of faults and folds occurring throughout the geological sequence in this area. While realising that the interpretation is preliminary in nature there are however certain aspects of the structure which are difficult to reconcile. As a basis for discussion, it is recognised that the area has undergone intense deformation as evidenced by the structures reported; for example, horizontal fold axes, overturned bedding, steep and variable bedding planes, thrust and reverse faults, etc.

The first aspect requiring reconciliation is that the geological map shows that the majority of the faulting is virtually confined to the non-coal bearing rock units, while the Coal Bearing Lithosome appears to be gently folded with local areas of steeply dipping sediments. The lithologies comprising the folded and faulted McEvoy Ridge Lithosome are similar to those comprising the stratigraphically higher Coal Bearing Lithosome; that is, predominantly mudstone with lesser amounts of sandstone and carbonaceous units. Without having examined the rock types, either in the field or in bore core, it can none-the-less be expected that the two lithosomes will react in a similar manner to the stress regime, or regimes, which operated during the period, or periods, of deformation of the region.

Latour, in personal communication, reports observing overturned sequences in outcrops in the Skeena River adjacent to Jackson's Flats, that is, in the coal measure sequence. Tompson (1977) has recorded both overturned bedding and dips in excess of 30^{O} in outcrops along the length of the Skeena River Valley, although the latter are in close association with outcrops exhibiting lower angles of dip. In personal communication, Tompson expressed the opinion that the general structure in the coal measures was one of the gentle dips, the field evidence of steep dips representing local deformation only.

Detailed logging of the coal seams intersected in the diamond drill holes indicates that a resonable proportion of the seams have undergone structural deformation at least of moderate intensity.

While field evidence is insufficient to more accurately define the structure of the region, it is none-the-less suggested that the Coal Bearing Lithosome could be as intensely deformed as the McEvoy Ridge Lithosome. If this supposition is correct the structures present in association with the coal seams will have a significant effect both on the lateral continuity of the coal seams and on their mineability.

Alternatively, intense structural deformation can result in "structurally thickened" zones of coal which could be considered favourable exploration targets.

The second aspect which cannot be reconciled is the form which the faulting is reported to have adopted, as illustrated on the cross-sections. The variability in the competance of coarser clastic sediments, in comparison to the underlying mudstone sequences, will affect the attitude of the fault traces. However, the variability in attitude of some of the faults appears to be anti-pathetic to the principal structural element, the Groundhog Thrust Fault. While, it is not possible to be more categoric regarding this aspect and further, while it may be a matter of interpretation, this apparent mechanistic inconsistency requires resolving.

With respect to the two concerns noted above, since insufficient data are available at this time, further field work is essential before any definitive statements can be made. It is axiomatic that the basic stratigraphy of the area be well established as a pre-requisite to elucidating the structure. Photo-interpretation would be a necessary adjunct to the field work and it is possible that the results of such a study may elucidate the concerns referred to.

4. Economic Geology

4.1 COAL SEAM CONTINUITY

Prior to considering the continuity of the coal seams, it is essential that the stratigraphy and structure of the target areas be understood. In that the exploration has not progressed to such a stage, as discussed in Section 3 of this report, the comments made hereafter must be viewed in that light.

It has been inferred that up to six potentially economic seams exist in at least each of the following three localities: Beirnes Creek, Telfer Creek and Discovery Creek, all tributaries of the Skeena River. This inference is based on the interpretation that the structure in the coal measures is relatively constant, dipping gently to the east with minor fold patterns.

Since the structural data is, at best, indefinite at this time, it is believed that the interpretation is too optimistic. A more realistic rationale would be to suggest coal seams exist in the area under examination but no definite statements can be made with respect to their number, continuity or their economic potential.

Tompson has, quite correctly, stated that seam continuity has not been established yet.

It is known that overturned bedding and regions of very steeply dipping sediments occur along the Skeena River, in conjunction with intense regional structural deformation. Consequently the presence of fault repetitions and structural thickening of the coal seams could be anticipated.

If however, the inference that very little structural disturbance has occurred within this part of the coal measures, it is still not possible to establish either the number of seams present or their continuity due, again, to the current insufficiency of data.

While it is regretable that the drill holes were not geophysically logged, since it is possible that the particular signature most coal seams possess may have provided a preliminary basis for correlation, it is understood budget limitations precluded such an operation.

4.2 COAL RESOURCES

Field work carried out on this coalfield over many years has indicated that significant quantities of coal could be present, and leads to the conclusion that it is possibly the one major uncommitted deposits of coal in British Columbia, if not in Western Canada. As such it should be considered a good exploration prospect, subject to any identifiable qualifications. To date no resource base has been established for the coalfield due to the lack of definitive data.

Recent drilling and outcrop sampling has established the presence of seams up to eight feet thick, though with the majority in the five to six feet range. These thicknesses, are marginal for an underground operation, especially if roof problems occur due to structural deformation, but would be amenable to open pit mining, if acceptable an overburden ratio can be achieved. The predicted present of multiple seams in a vertical succession suggests that multiseam open cut operations possibly could be viable, if the structural configuration is favourable. Again, however, it is not possible to make any predictions given the current state of exploration.

Tompson (1977), page 85, has correctly not estimated coal reserves since "It is not possible to correlate coal seams due to insufficient information ...". In the same light, we are unable to agree with statements made by Mountford (1978) as to the present "... sufficient reserves of near surface ..." or "... the potential for approximately 60,000,000 tones of surface strippable coal".

As an alternative to multi-seam open pit mining, the identification of structurally thickneed zones of coal should be considered as a probability. This type of occurrence has been economically mined in the past and could constitute viable exploration targets in the Groundhog Coalfield. Exploration

Appendix III is a comparison of data relating to the total thickness of coal in 200 feet of stratigraphic section, as tabulated by Mountford (1978). There are data available (Ball, 1970) which result in a reduction in the total coal in any one intersection. An arithmetic average of intersections regarded as valid is 8.8 feet as opposed to 13.6 feet in Mountford's table. Attempting to calculate a "target resource base", even assuming certain parameters, is not considered realistic. It is possible to *suggest* that between 25 and 35 million tones of coal may exist in the 2500 acres west of the Skeena River, assuming a total coal thickness from 6 feet to 8 feet. But since the structure and seam continuity are unknown, any overburden ratio assumed is meaningless.

4.3 COAL QUALITY

The considerable amount of quality data accrued over the past 60 years provides a reasonably accurate definition of the clean coal quality, in spite of the variability of sampling. What is not evident, however, is the raw or as-mined coal quality, one of the necessary parameters for establishing the economic viability of the project.

An analysis of the data presented by Tompson (1977) produced an estimation of the clean coal quality but raised a concern regarding the washing yield which might be achieved. A second opinion was sought on the latter aspect from a coal preparation engineering viewpoint. Symonds and Associates reviewed the data and their conclusions are included as Appendix I to this report.

The coal occurring in the Groundhog Coalfield ranges in rank from low volatile bituminous to anthracite with the majority being semi-anthracite. The high rank of the coal can be due to one of two principal reasons:

i) increased depth of burial and thus an extended coalification process; or
ii) higher than normal temperatures due to thermal metamorphism.

Buckham and Latour (1950) suggest that structural deformation could be another cause. This is not considered likely by this writer since extreme deformation in the coalfields of north east British Columbia has not produced any change in rank of those coals.

The presence of significant quantities of quartz veining in the coal seams has been observed by all workers in the field. This is a particularly anomolous feature in coal seams and, as such, raises two issues. These are:

(a) the presence of quartz contributing to a higher ash content of the raw coal; and
(b) whether the origin of the quartz is from heated waters.

The former issue is simply an added deleterious constituent which must be removed by a cleaning process (at a cost!) but the latter issue may suggest the presence of igneous rocks at depth not yet uncovered by erosion.

It is suggested the the increase in rank of the coal to semi-anthracite and the widespread occurrence of quartz veining are due to the same source of heating, in association with increased pressure resulting from structural deformation. While there is no evidence of igneous rock in the coalfield, or indeed within the region, the possibility of their occurrence should not be ignored.

The mean *clean coal quality* based on analytical data from seams exceeding four feet in thickness, is estimated to be as follows:

	Dry Basis
Ash	11.0%
Volatile Matter	5.5%
Fixed Carbon	83.5%
Calorific Value	12,900 Btu/lb.
F.S.I.	0

Note that the calorific value is reduced by approximately 120 to 130 BTU/lb. for every percent of moisture added. A washed coal could be expected to contain around 6% to 8% moisture when shipped.

With respect to the burnability of this coal, while carefully controlled burn tests would establish definite parameters necessary to evaluate the suitability of the coal from this coalfield for thermal power generation, some general comments can be made. Advice was sought from Mr. E. D. Holdup, a consulting power station engineer who provided the following comment.

Due to the low volatile matter content of this type of coal, a long retention time in the furnace is necessary to achieve complete combustion of the carbon. Where coals of this type are being used, South Wales, Spain, Korea and at the Milner Station, Alberta, a "downshot" fired furnace is employed, in which the pulverised fuel is injected from the top and to one side of the furnace. In this manner the retention time is almost doubled, in comparison to the front or corner fired furnace where low volatile fuels result in unstable firing. It is understood that Milner Station is burning 10% volatile matter middlings coal and up to 65% ash, although designed for 30% ash.

Although the clean coal quality parameters are reasonably well defined, the *raw or "run-of-mine' coal quality* is not well defined. The ash values are particularly variable, for the total seam, ranging up to in excess of 50% and commonly exceeding 30%. The various sampling methods employed lead to inconsistencies in results and renders comparision difficult. Comments relating to sampling are included at the end of this section of the report in Appendix II.

The mean of 71 raw coal ash determinations tabulated by Tompson (1977), Table 4, is 24.5%, the range being between 7.50% and 57.20%. The mean ash content for the total seam in 10 borehole intersections drilled in 1970 is 40.49% and the range of ash content is from 29.2% to 54.5%.

Although many of the descriptions of the coal seams suggest that they are clean and contain no rock partings, apart from bands of coal 0.5 foot or greater, raw coal analyses indicate otherwise.

Two sets of detailed seam logs have been located. One set, by C. W. Ball of Canex Placer, describes the seams intersected in the diamond drill holes, and the second set, by B. A. Latour of the Geological Survey of Canada, are unpublished seam descriptions and analyses resulting from 1949 field activities in the area.

Both these sets of data indicate that rock partings up to 1.5 inches occur in a number of the seams and that the quartz content of most seams is reasonably high. The quartz occurs on cleat faces and microfractures within the coal. Latour (pers. comm.) reports that the quartz rarely breaks free from the coal when the seams are sampled, which suggests that a high degree of comminution will be necessary to liberate the quartz from the seam.

A sample of coal collected by Mr. T.R. Kennedy of Alberta Energy Company Ltd., examined by the author of this report, contained quartz and sheared coal, intermixed with clean bright coal. C. W. Ball's (1970) descriptions of the coal seams record various percentages of pulverised coal, which is interpreted as being coal, possibly containing unrecognised rock, which has been sheared during structural deformation.

This may be a further contributor to the high ash content of the raw coal.

The degree of shearing varies between 2% and 100% of the coal seam and averages 22% in (42) intersections; the total number of intersections is 50.

As noted by Symonds (1978) the *clean coal yields* achieved on washing the various sampled intervals are not encouraging. Tables I and II in Appendix I summarise the clean coal quality data and yields achieved by bench scale washing for seams thicker than four feet.

Although yields up to 85% are obtained from outcrop samples, the arithmetic mean is less than 50% in both outcrop and borehole samples. The borehole data produced a mean of 36.5% and the outcrop data a mean of 47.6%, both below what is regarded as a minimum value for western Canadian operations. An average of the yields tabulated by Mountford (1978) is 50.2%, the values ranging between 28% and 99%.

Symonds (1978) has commented on the high proportion of middlings material in these coal seams, thus making them difficult to wash. This is illustrated by the graphs accompanying the washability data. This parameter is not important when considering the overall economic viability of the project. In essence, the principal judgement then is whether the diamond drill core and the resultant analytical data, on the outcrop samples, are representative of the coal seams occurring in this coalfield.

Although the opinion has been expressed by Tompson (pers. comm.) that the outcrop samples are more representative of the coal seams in this coalfield the author of this report is not entirely of that opinion. The drill hole analytical results are internally consistent, even though limited in number. The outcrop samples represent both full seam intervals and selected sections, and while providing accurate data on the coal which may be regarded as a product, are not regarded as representative of the R.O.M. quality. Further the only washing yield data available are from the drill cores.

Accordingly it is our opinion that the drill core analytical results should be accepted as a realistic guide to the various parameters they document, and should be used in conjunction with the outcrop sample data.

G. R. Wallis, P. Geol.

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APPENDIX I

A PRELIMINARY ASSESSMENT OF THE COAL QUALITY DATA - GROUNDHOG COALFIELD, B.C.

INTRODUCTION

This assessment is based on the coal quality data presented in the report entitled "Geology of the Groundhog Coalfield, Upper Skeena River Area, British Columbia" by Willard D. Tompson, March 25, 1977, and comprises both borehole and outcrop samples. Greater reliance should be placed on the borehole results (assuming satisfactory recoveries were achieved) since the surface samples are often oxidized and contamined by extraneous material.

A summary of the borehole results is shown in Table 1 and a summary of the outcrop sample results is shown in Table 2.

Note: This assessment is based on coal seams whose thickness is greater than 4 ft. It is felt that this is a reasonable preliminary economic cut-off level.

SEAM THICKNESS

Maximum seam thickness appears to be about 8-ft. with the majority of the seams in the 5-6 ft. range.

CLEAN COAL YIELD

The clean coal yield results are the most discouraging part of this coal quality analysis. None of the borehole results showed a yield value in excess of 60%, which, under normal current Western Canadian coal mining practices could be considered to be the minimum level. Higher yield values were encountered in certain outcrop samples but the overall arithmetic mean level (see Table 2) was still less than 50%.

CLEAN COAL QUALITY

The clean coal quality was somewhat variable with ash contents ranging from 4 - 14% and sulphur levels ranging from 0.3 - 1.23%.

The elevated ash contents are attributable, in part, to the higher s.g. of separation (1.65s.g.) required to give improved clean coal

A mean clean coal proximate analysis is estimated to be as follows:

	dry basis
% ash	11.0
% volatile matter	5.5
% fixed carbon	83.5
Calorific value	12,900 BTU/lb.
FSI	0

Note: Calorific value with 7% total moisture = 12,000 BTU/lb.

WASHABILITY CHARACTERISTICS

The washability characteristics of the coal are somewhat erratic and this is probably attributable to the small size of sample sent to the laboratory. The coals, however, do contain high proportions of middlings material which would make them difficult to wash. In addition, the high cut points (+ 1.65 s.g.) that would be required to produce satisfactory yield levels would probably require that a less efficient, jig washing system be utilized. It is anticipated then, that the yield levels achieved in practice would be about 5% less than the theoretical values shown in table 1 and 2.

SUMMARY

Definite conclusions with regard to coal quality are difficult to draw due to the preliminary nature of the exploration program. However, the coals appear to vary in rank from anthracite to low volatile bituminous with the majority of the coals in the semi-anthracite range. The coals do contain high proportions of middlings material and dirt bands, with the result that the yield values are low. It is our opinion that this project cannot be viable unless the mean, actual, clean coal levels are in excess of 60%. Any further exploration work should therefore be directed to delineating coal seams which appear to have higher yield values.

Park City, Utah
Dec. 28, 1978.

Donovan F. Symonds & Associates.

TABLE I

SUMMARY OF CLEAN COAL QUALITY FOR

+4' SEAMS FROM BOREHOLE DATA

DDH	SEAM FOOTAGE	SEAM THICKNESS	FLOATS S.G.	YIELD %	ASH %	S %
1	347.5-355.0	7.5	1.75	58.1	11.0	0.46
2	194.6-200.8	6.2	1.75	58.3	9.4	0.43
3	53.5-60.0	6.5	1.65	17.6	13.2	1.04
3	71.2-76.0	4.8	1.65	41.9	13.3	0.83
3	347.0-351.5	4.5	1.65	34.2	14.4	1.23
3	383.3-387.8	4.5	1.65	25.7	10.9	0.79
4	259.7-263.8	4.1	1.65	49.3	9.5	0.59
5	362.0-366.0	4.0	1.65	9.5	4.5	0.38
5	429.5-435.5	6.0	1.65	16.6	7.7	0.74
5	527.0-533.6	6.6	1.65	27.0	8.6	0.51
6	278.5-282.6	5.1	1.65	41.6	13.0	0.75
6	355.6-360.9	5.3	1.65	59.1	10.3	0.85
MEAN VALUES:		5.0	1.65	36.5	10.5	0.7

dry basis results.

TABLE II

SUMMARY OF CLEAN COAL QUALITY FOR +4' SEAMS

FROM OUTCROP SAMPLES

FIELD DESCRIPTION	SAMPLE WIDTH FT.	S.G.	YIELD %	ASH %	S %
L. 988 Trail Creek	5.2	1.58	16.1	5.9	0.40
C.L. 822, about 5300', Dave Cr.	4.1	1.58	83.9	5.2	0.50
Discovery Cr. elev. 4470 ft.	5.5	1.58	84.9	5.3	0.32
Beirnes Cr. - Currier Pass	4.0	1.58	39.1	8.3	0.58
N. side Beirnes Cr.	6.5	1.58	48.5	8.3	0.67
E. side Jackson Cr. elev. 2990'	8.3	1.58	4.2	6.3	0.46
Ridge east side Anthracite Cr.	5.2	1.58	34.9	9.6	0.52
Lower part Scott seam	5.9	1.58	34.9	9.6	0.52
MEAN VALUES:	5.6	1.58	47.6	7.3	0.48

dry basis results.

APPENDIX II

COMMENTS ON SAMPLING METHODS

Although not directly pertinent to the results of this review, it is believed that some comment should be made with respect to the sampling methods employed, and the data resulting therefrom. Variable and non-standard sampling procedures result in inconsistent and sometimes misleading results.

For example, grab samples and selective sampling of coal outcrops can be particularly misleading. Similarly, the exclusion of rock bands from a coal seam when sampled, either in outcrop or from bore core, produces results which are both meaningless and in contradiction to standard practice.

As an example, the 99% yield at 1.75 S.G. and an ash content of 4.91% for the Discovery Creek Seam Outcrop sample tabulated by Mountford (1978) is from a sample "Selected by hand, ...", but had an ash content of 5.85% before washing. Reference to the analytical results from the drill core for the Upper Discovery Creek and Lower Discovery Creek Seams reveals raw ash values up to 54% and yields at 1.75 S.G. of between 24% and 58%, which is contradiction to the tabulated result of 99% yield quoted above. It is doubted if the tabulated value (Mountford, 1978) can be regarded as "... more indicative of actual mining practice" when the composite of either seam is considered.

A final cricital aspect of sampling requiring comment is the practice of splitting the coal core for analysis. The tests performed on the two halves of the core can be carried out on the total sample more accurately due to the larger volume of core; in practice the full core of a coal seam is regarded as a minimum for testing purposes.

APPENDIX III

COMMENTS ON TABULATION IN REPORT

BY MOUNTFORD (1978)

Included in the report by B. Mountford entitled "The Groundhog Coalfield", July 1978, is a tabulation entitled "Groundhog Coalfield - Seam Thickness and Quality" which contains a number of discrepancies which should be clarified.

Those section of the table requiring modification are reproduced below. They refer specifically to inferences drawn regarding the presence of coal seams in a section 200 feet thick, which in fact, are beds of carbonaceous shale containing coal lenses. The result of this re-analysis is that the total coal thickness in any one 200 feet thick interval is significantly reduced, affecting both total reserves and the associated overburden ratio.

The source of the "new" data is the detailed logging of the coal seams carried out by Mr. C. W. Ball of Canex Aerial Exploration Ltd., dated September 24, 1970 to October 27, 1970.

COMPARATIVE DATA

DATA FROM MOUNTFORD (1978)			C. W. BALL LOGGING
Location	Seam	Thickness (feet)	
DD 2	Disc.*	6.2	Coal
	2	2.9	90% shale, 10% coal.
	3	4.5	Shale, carbaceous black with bands of coal up to 1".
	4	3.5	3.2'; 70% shale, 30% coal.
DD 2	5	2.6	75% coal, 25% shale, alternating bands.
	6	3.0	Est. 15% to 20% coal and about 80% shale, carbonaceous.
DD 3	3	4.5	Coal
	4	4.5	Contains 1.71 coal, balance shale, carbonaceous with bands of coal to ¼".
	5	3.6	3.3' coal dipping 80°; thus less 1 foot coal.
DD 5	3	4.0	Coal slickensided
	4	6.0	Carbonaceous shale containing 3 coal lenses totalling 2.5'; dip 70°.
	5	6.6	Coal; dip 40°.
DD 6	1	7.7	3 seams (3.4', 1.8', 2.5') between 206.1 and 217.8 in DD 5, not DD 6.
	2	5.1	4.4' carbonaceous shale and coal; raw ash 39%.
	3	5.3	4.7' coal; raw ash 29%

* Discovery Creek