Table 6.2 contains confidential information or data, as described in Section 2 of the *Coal Act Regulation*, and has been excluded from this report.

Coal Act Regulation: http://www.qp.gov.bc.ca/statreg/reg/C/251_2004.htm

Petro-Canada Inc.

Monkman Coal Project

1985 FIELD EXPLORATION REPORT

Peace River Land District
NTS 93I/15
Lat. 54 45'N to 54 47'N
Long. 120 45'W to 120 48'W
Coal Licences 3235, 3238, 3239 and 3240

Work completed in September, 1985
Report submitted in December, 1985
Report revised and submitted in July, 1987

Original author (1985): T.G.N. Covert, B.Sc.
Report modified (1987) by: L. A. Smith, P. Geol.
& E. J. Allen, P. Eng.

734

File: W7R0401S

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1.0 Summary

The Monkman Coal Project is a joint venture of Petro-Canada Inc., Mobil Oil Corp., McIntyre Mines Ltd. and Sumitomo Corp. Petro-Canada is the operator. Exploration on Duke Mountain Block has delineated surface mineable coal reserves in Duke and Honeymoon Pit areas. This report indicates reserves also occur in Duke Syncline.

Conclusions

The original 1985 exploration program had the objective of delineating the open pit reserves within the northwest nose of Duke Syncline. The program was reduced in scope to mapping and resistivity studies because late summer rains prevented drill access. The resultant map interpretation has confirmed and refined the basic structure of the syncline and provided an adequate interpretation to permit reserve measurement for open pit reserves.

The reserve estimates confirm that a large deposit of low ratio reserves in INFERRED category exists. The reserve estimates by two calculation methods are:

33.5 Mt @ 5.2 bcm/trc (bank cubic metres/tonne raw coal), and 34.6 Mt @ 5.0 bcm/trc.

If the highest ratio reserves (in Section 15,500 N) are excluded, the reserve base is reduced to 23.2 Mt @ 4.4 bcm/trc.

Accordingly, the low ratio open pit reserves with good structural configuration at Monkman now are:

Duke Pit	26.4 Mt
Honeymoon Pit	22.6 Mt
Duke Syncline	23.2 Mt to 34.6 Mt
Total:	72.2 Mt to 83.6 Mt

This is an ample reserve base to support a 2.5 to 3 Mt/year clean coal project utilizing only low ratio coal. All of the deposits are well situated for a common preparation plant location.

An additional program of drilling, bulk sample collection and analysis and engineering feasibility study are necessary to confirm proven reserves at Duke Syncline.

Recommendations

i. The Duke Syncline reserves should be integrated into the Duke Mountain Property mining potential, and

ii. The proposed exploration program should be held in abeyance until markets develop. If a future market appears with potential for sale of Monkman coal, the drill program should be revived.

2.0 Introduction

2.1 Location and Access

The Monkman Coal Property is located in northeastern British Columbia, approximately 630 kilometres northeast of Vancouver (Figure 2-1, page 3).

Situated adjacent to the Heritage Highway, the property can be reached by all-weather gravel road from either Beaverlodge, Alberta and Tupper, British Columbia to the east or from Dawson Creek and Chetwynd via Tumbler Ridge to the north. The Quasar airstrip near Thunder Mountain permits year-round access by light aircraft. This airstrip is 16 kilometres from the property.

2.2 Background

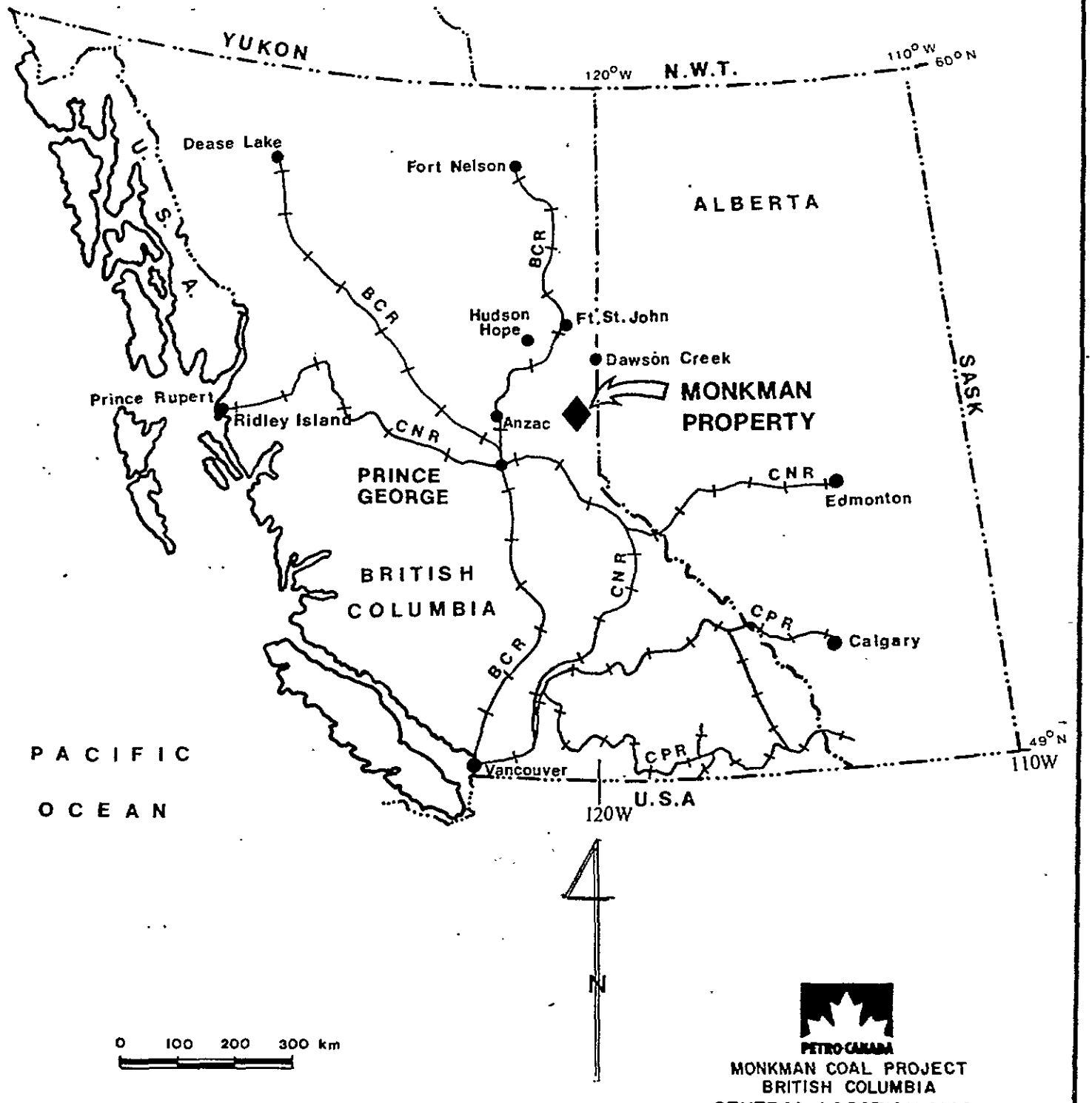
Previous field mapping, trenching and drilling programs have outlined a coal-bearing synclinal structure (Duke Syncline) to the west of the proposed Duke pit coal reserves. Results of these previous studies have shown that the same coal seams which occur in the Duke Pit also occur in Duke Syncline. There are indications that the north end of the structure contains reserves of low ratio coal amenable to open pit mining with short waste hauls and easy access to the coal.

2.3 Physiography

The Monkman property is situated in the Inner Foothills of the Rocky Mountains, in an area of rugged topography (Figure 2-2, page 4). The property is approximately 80 kilometres long, stretching from the southern slopes of Quintette Mountain in the north west to the Narraway River south of Nekik Mountain in the southeast.

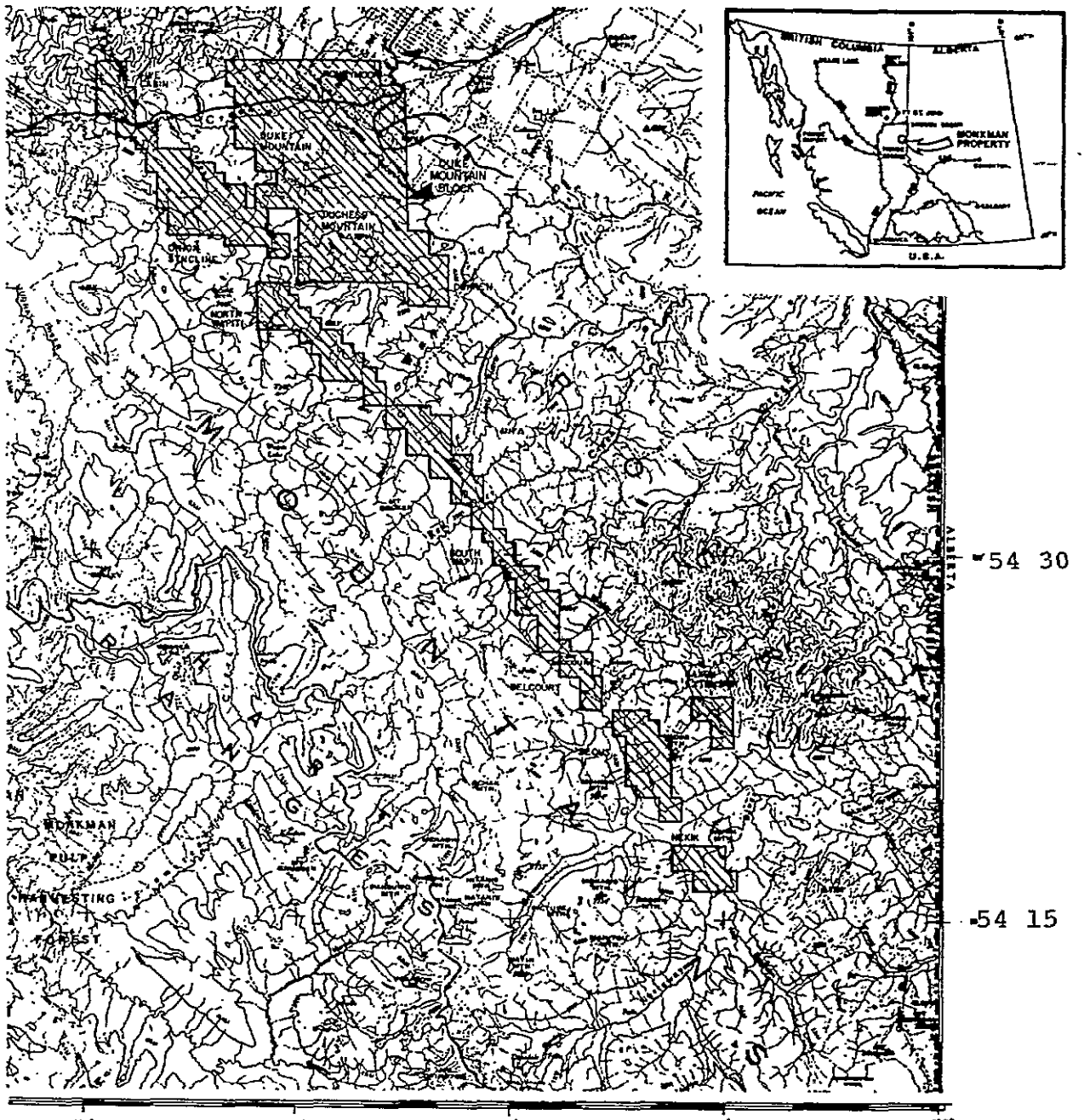
The licences straddle a dissected belt of highlands which rises from a valley floor elevation of 950 metres at Kinuseo Creek to a maximum of 2250 metres on Secus Mountain. These highlands are cut by seven major watersheds which are, from north to south, Kinuseo Creek, Fearless Creek, Dokken Creek, the Wapiti River, Red Deer Creek, Belcourt Creek and Narraway River.

The Duke Mountain Block, which contains Duke Syncline area, is 17 kilometers in length and 10 kilometers wide. This part of the property contains the valleys of the Kinuseo, Fearless and Dokken Creeks and Duke and Duchess Mountains. The southern boundary of this area is the Wapiti River. The highest point in the Duke Syncline area is 1725 metres a.s.l. on section 15,000 N. The valleys and slopes of the highlands are heavily forested with black spruce and jackpine. Treeline is at 1400 metres above sea level.



PETRO-CANADA

MONKMAN COAL PROJECT
BRITISH COLUMBIA
GENERAL LOCATION MAP
FIGURE 2-1



PETRO-CANADA

MONKMAN COAL PROJECT
BRITISH COLUMBIA

Figure 2-2
Regional Physiography

2.4 Coal Licences Explored

The coal licences included in the 1985 exploration program include licences 3235, 3238, 3239 and 3240 as shown on Map 1 and Figure 2-3.

3.0 1985 Exploration Program

3.1 Objectives

The objective of the 1985 field program was to map and define the potential low ratio coal resources in the northwest end of Duke Syncline on licences 3235, 3238, 3239 and 3240 (Figure 2-3, page 6) with geological mapping, ground resistivity surveys and drilling. Bad weather forced cancellation of the drilling program.

3.2 Field Camp and Services

A field camp trailer was set up on the site of the former Petro-Canada exploration camp complex during the first week of September. This trailer was used by field personnel as a base of operations for the duration of the program. The first phase involved the opening up of old access roads to Duke Syncline and preparation of new roads and drill sites. The mapping and resistivity work was undertaken shortly after the road construction was underway.

A list of Petro-Canada personnel involved in the program as well as contractors used in the program are listed in Tables 3-1 and 3-2.

Table 3-1
Monkman Coal Project - Petro-Canada Personnel

J. Steward	General Manager, Engineering and Operations
D. Kerfoot	Manager, Environmental and Social Affairs
T. Covert	Senior Geologist
T. Zehir	Geotechnical Engineer
R. Powers	Safety Supervisor
R. Dunlop	Geologist
W. Hart	Drilling Supervisor

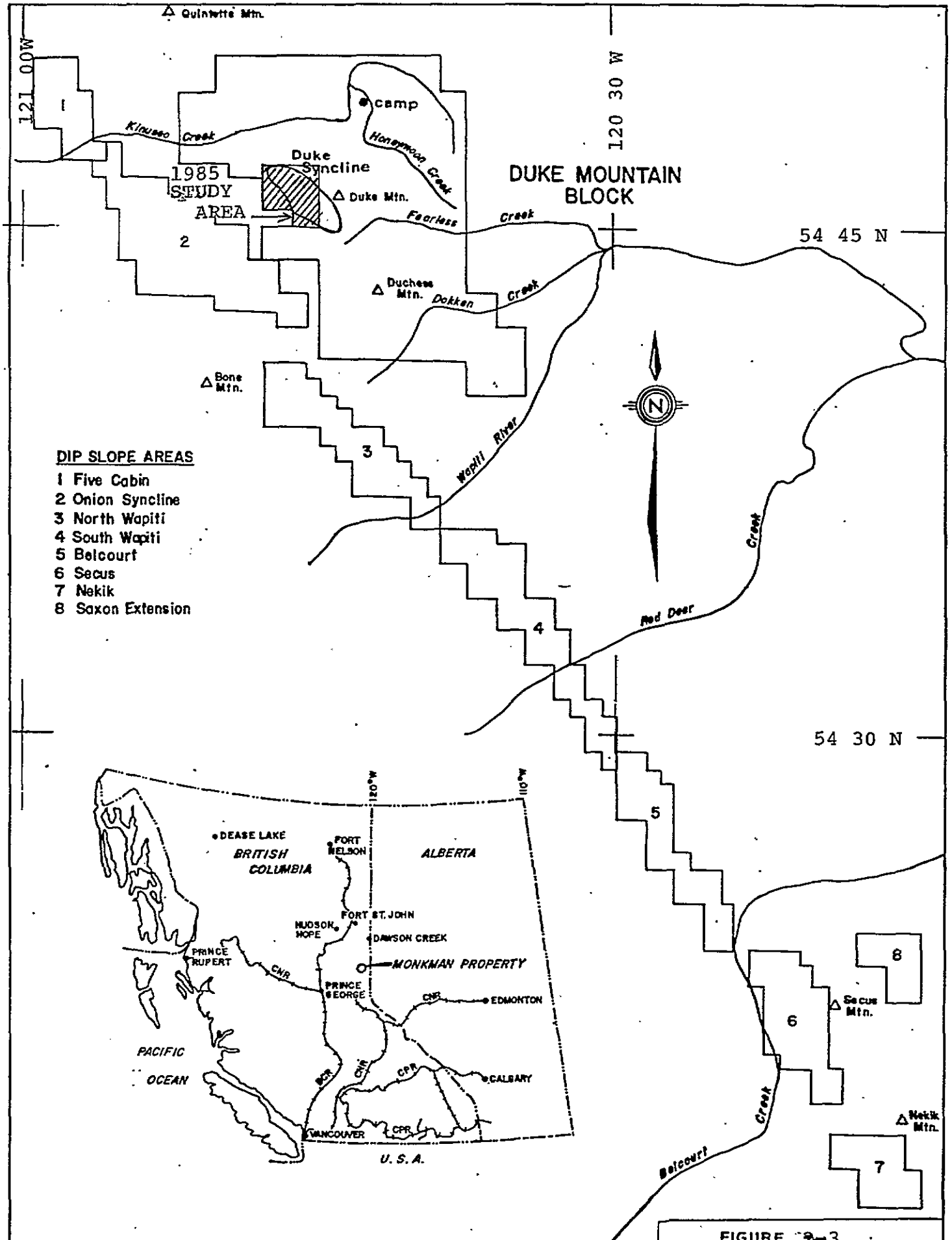


FIGURE 2-3
MONKMAN COAL PROPERTY
1985 STUDY AREA
DUKE SYNCLINE WORK AREA

Table 3-2
Contractors and Services

Atco Pacific	Fort St. John, B.C.
Alberta Government Telephones	Calgary, Alberta
Borek Construction	Dawson Creek, B.C.
Grizzly Exploration	Dawson Creek, B.C.
Nor-Kam Enterprises	Grande Prairie, Alberta
Mountain Mobile Communications	Grande Prairie, Alberta
Hi-Rate Drilling	Stettler, Alberta
Geonics Ltd.	Mississauga, Ontario
Bow City Honda	Calgary, Alberta
L.A. Smith Consulting and Development Ltd.	Calgary, Alberta

3.3 Geological Mapping

Before the actual outcrop mapping program was undertaken, control lines were flagged across the north end of Duke Syncline at 500 metre intervals. The most southerly line started on grid line 15,500 N using surveyed drill hole MDD-76-11 as a point of origin. The lines were surveyed with chain and compass, flagging stations every 50 metres. These stations were used as reference points in the subsequent mapping and resistivity studies.

Two-man field crews were used to conduct the outcrop data collection. The two mapping crews spent a total of 17 man days mapping outcrops in Duke Syncline. All data is plotted on Map 1.

3.4 Resistivity Survey

An EM-16R resistivity survey was carried out over Duke Syncline using the flagged lines for control. The instrument used for this work was a Geonics EM-16R unit, utilizing Seattle, Washington as a primary transmitting station.

The purpose of this work was to further test the application of this type of geophysical method on the location of coal seam subcrops. If proven successful, ground geophysical surveys could save a lot of exploration expense by eliminating the need for extensive subcrop drilling.

VLF transmitting stations are found at several locations around the world. They generate low frequency, high power transmissions that are used in aviation and marine navigation. These transmissions are also used as artificial EM sources. An attachment to the instrument is used to measure the resistivity of the bedrock. The horizontal component of the induced electrical field is measured through

two ground probes spaced 10 m apart. A direct measurement of the apparent ground resistivity is acquired by nulling the audio signal using the quadrature dial and reading the resistivity value obtained. The phase angle difference between the primary magnetic field and the induced electrical field is determined by further nulling the signal using the quadrature dial and reading the value obtained.

Strata displaying a higher resistivity than the surrounding rocks is indicated on resistivity profiles by a high apparent resistivity with an associated decrease in the phase angle. Fresh coal samples are associated with high resistivities, therefore one would expect coal seam subcrops to be readily visible as highs on resistivity profiles.

Thick overburden (>7 m) severely restricts resistivity survey results. Faults can be defined if a conductivity contrast exists on opposite sides of the fault. Coal seams produce highly conductive readings only if they are water bearing. The presence of weathering reduces the apparent resistivities of the coal seams. Often the highly resistive units are sandstone bodies rather than coal seams, other times the coal seams produce anomalies with resistivity highs and corresponding phase angle lows.

The resistivity program was carried out with a two-man crew taking readings every 10 metres along the flagged profile lines. In areas of interest, the spacing interval was reduced to 5 metres.

The resistivity data for Duke Syncline is tabulated in Appendix 2. The anomalous high resistivity readings are plotted on Map 1. This shows that some seams appear to provide resistivity anomalies, whereas other anomalies appear to be sandstone units. This data cannot be proved useful until drilling proves the coal seam subcrop localities. Accordingly, until drilling is completed, the resistivity results can only be used as a guide for mapping.

3.5 Reclamation

The planned drilling program has been postponed indefinitely, therefore reclamation of the disturbed lands was undertaken in early 1986. This work involved slashing, re-contouring and drainage ditches. Full approval was received from Forestry officials. The cost of this work was $29,410.46.

4.0 Program Expenditures

The total cost for the 1985 exploration program amounted to $125,356.79 (inclusive of reclamation costs).

The various cost centers used and the monies spent are outlined on Table 4-1.

Table 4-1

Monkman Coal Project
1985 Exploration Program
Cost Breakdown for AFE 215004

Minor	Component	Cost ($)
001	Company labour	40,320.00
002	Travel and Vehicle	3,969.04
003	Contractor Labour	865.15
010	Consultants and Contractors	30,248.73
090	Safety and Security	47,85
110	Camp and Catering	2,753.07
120	Communications	486.03
221	Drilling - Rotary	3,821.10
255	Fuel, Lubricants and Utility	558.04
260	Printing and Reproduction	200.00
413	Transportation & Freight	78.93
480	Equipment Rentals	2,129.00
	Reclamation	29,410.46
	Final Report Writing	4,000.00
900	Miscellaneous	500.00
990	Corporate Overhead Charges	5,969.37
Total		125,356.79

5.0 Geology

The primary objective of the 1985 exploration program was to map the structure and coal seam development in the northwest nose of Duke Syncline and measure low ratio coal reserves.

5.1 1985 Exploration

The 1985 exploration results demonstrate that the north end of Duke Syncline is structurally simple. The coal seam areal extent is at least as extensive as previously outlined. Map 1 (in pocket at back of report) illustrates the geological compilation and re-interpretation of all data obtained in previous exploration programs augmented by data collected from the 1985 exploration program.

The areal extent of B1 Seam in the nose of Duke Syncline provides the outer limits of the zone of interest for coal mining. This subcrop line now is interpreted to round the nose of the syncline at about 17,550 N. Previously, the subcrop was at about 17,700 N in the nose of the syncline. The reason for this modest change is that the syncline structure is interpreted to be more rounded in the fold axis area.

Observations made during the 1985 field studies have provided a better understanding of Duke Syncline structure. The study has also given a more accurate definition of the Gates Formation - Moosebar Formation contact.

5.2 General Stratigraphy

The Monkman property lies within the tectonically disturbed Foothills Belt of the Rocky Moountains in northeastern British Columbia. The property contains clastic sedmintary rocks and coal measures of the Jura-Cretaceous Minnes Group and the Lower Cretaceous Bullhead and Fort St. John Groups (Table 5-1, page 11 and Figure 5-1, page 12).

THe Minnes Group forms the base of the geological section within the Duke Mountain Block. Overlying the Minnes Group are the Lower Cretaceous Cadomin, Gething, Moosebar, Gates, Hulcross, Boulder Creek and Shaftsbury Formations.

The 1985 mapping program includes areas underlain by strata of the Boulder Creek, Hulcross, Gates and Moosebar Formations..

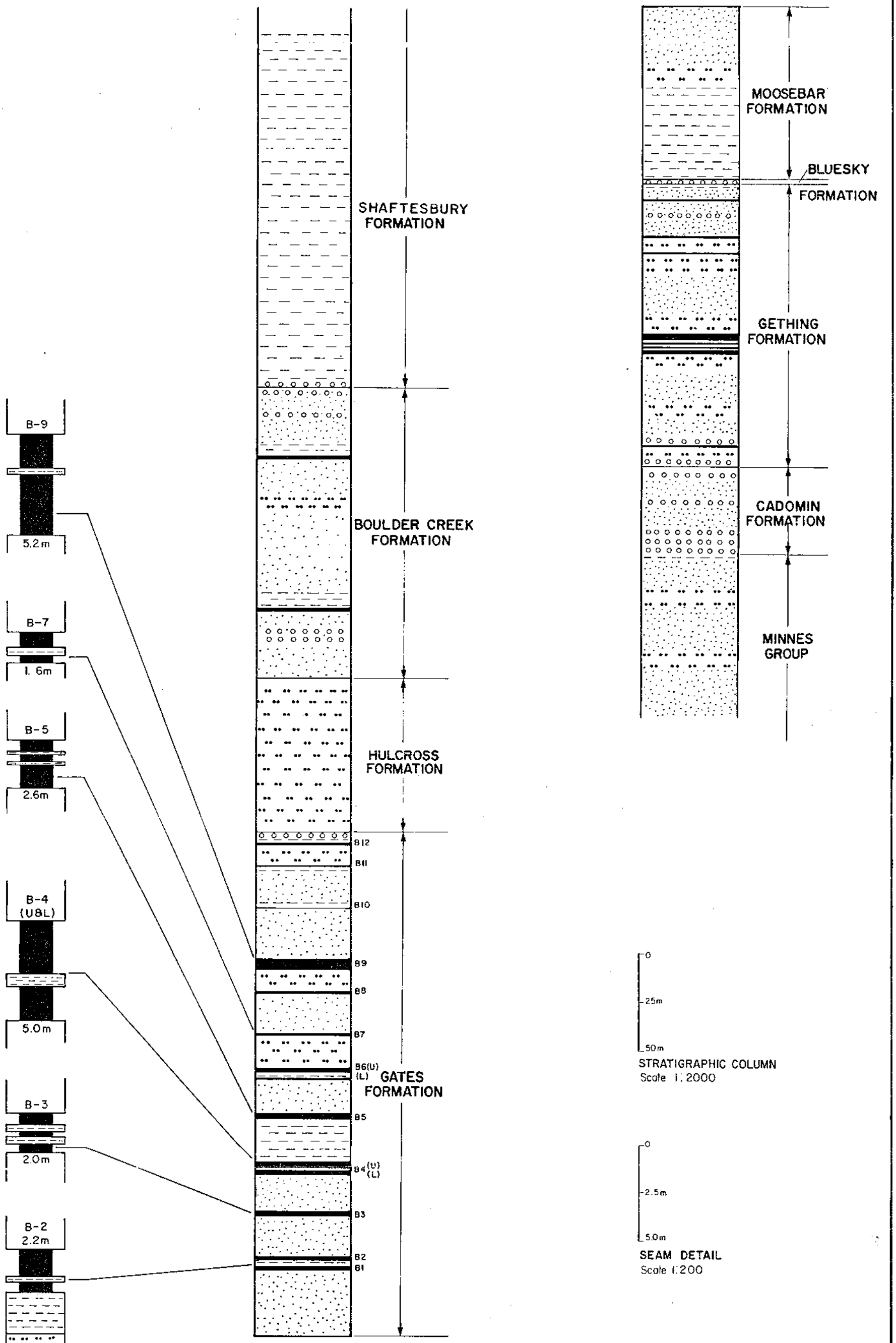
As stated previously, the principal coal-bearing unit on the Monkman property is the Gates Formation. It consists of a cyclic succession of brown weathering sandstone, claystone, siltstone, coal and minor conglomerate. The coal seams are numbered, from oldest to youngest, B1 to B12. Seams B1 to B9 have been identified by drilling and mapping to contain mineable thicknesses of coal in Duke Syncline.

The Gates Formation ranges in thickness from 190 to 360 metres with an overall average of 248 metres on Duke Mountain Block. The basal unit of the Gates Formation is a resistant, medium-grained sandstone referred to as the Torrens Member and is commonly worm-burrowed and cross-bedded. This unit has been used extensively to map the lower boundary of the Gates Formation in the 1985 map area.

TABLE 5-1

TABLE OF FORMATIONS

PERIOD	GROUP	FORMATION OR MEMBER	LITHOLOGY
		Shaftesbury (lower unit) 250 m	Dark grey marine claystone; sideritic concretions, some sandstone grading to silty dark grey marine claystone and siltstone in lower part; minor conglomerate at base.
LOWER	Fort St.	Boulder Creek 125-200 m	Fine to coarse non-marine sandstone; claystone, carbonaceous claystone, and conglomerate, few thin coal seams towards base.
		Hulcross 70-80 m	Dark grey marine siltstone interlayered with fine-grained sandstone and claystone; gradational change to fossiliferous sandstone and claystone in south.
		Gates 190-290 m	Fine to coarse non-marine sandstone; conglomerate, major coal seams, siltstone, and claystone. Torrens Member sandstone at base.
CRETACEOUS	John	Moosebar 80-100 m	Dark grey marine claystone with sideritic concretions in the lower portion; gradational increase in sandstone and siltstone at top.
		Bluesky 1 m	Glauconitic fine-grained sandstone, varying locally to glauconitic pebble conglomerate.
	Bullhead	Gething 100-150 m	Fine to coarse brown sandstone, coal, carbonaceous claystone and conglomerate.
		Cadomin 40-45 m	Massive conglomerate containing chert and quartzite pebbles interbedded with quartzose sandstone.
JURA-CRETACEOUS	Minnes	+ 2000 m	Conglomerate, carbonaceous claystone, thin bedded grey and brown sandstone; contains numerous thin coal seams.



PETRO CANADA
COAL DIVISION

DATE	
REVISED	
AUTHOR	
DRAFTED	
SCALE	as shown

FIG. 5-1

MONKMAN COAL PROJECT

DUKE MOUNTAIN BLOCK

GENERAL STRATIGRAPHIC COLUMN

5.3 Coal Seam Stratigraphy

Gates coal seams B1 to B9 are plotted on Map 1 in the north end of Duke Syncline. Correlation in some areas is somewhat tentative because of seams splitting and because of lack of outcrop and drilling data.

Although seam thicknesses vary, stratigraphic positions of the seams and their relationships to each other should be reasonably constant. Seam thicknesses vary considerably due to both stratigraphic variation and structural thickening. The seam development for this area is tabulated on tables 6.1 and 6.2.

5.5 Structural Geology of Duke Syncline

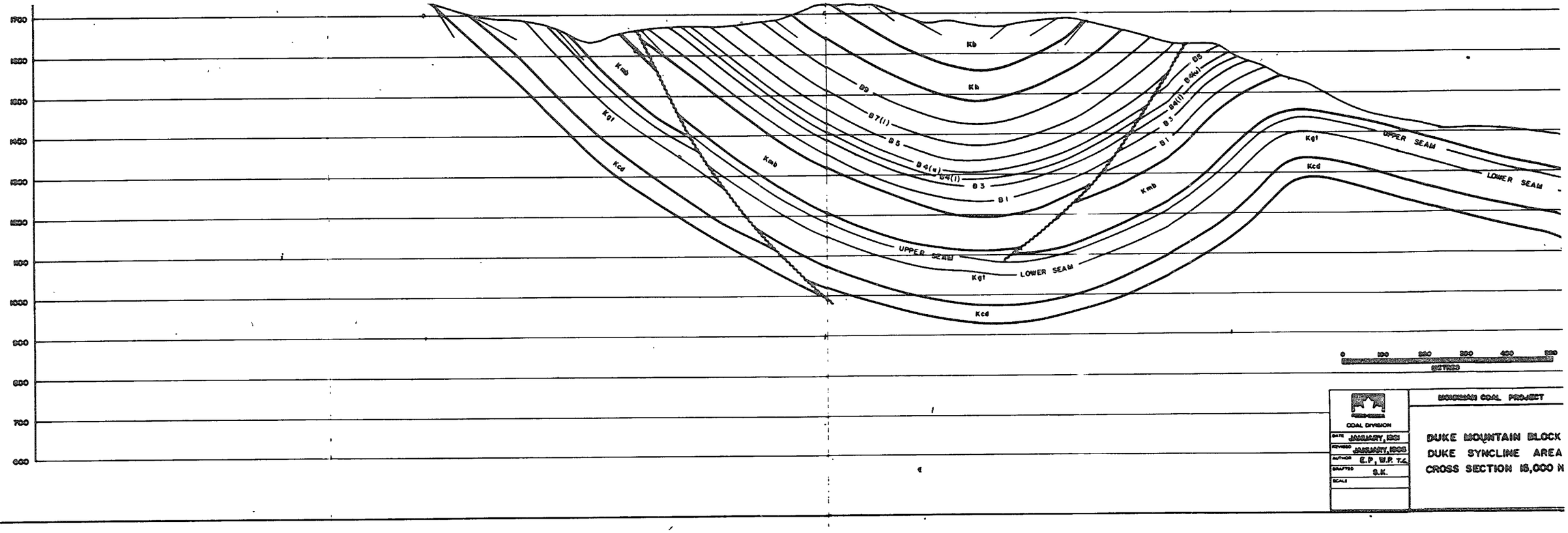
Duke Syncline lies to the west and southwest respectively of Duke and Honeymoon Pits. It is a doubly plunging northwest-southeast trending structure. Thrust faulting on both the east and west limbs of the structure cause minor local disruption of the coal seam stratigraphy. In particular, thrusting of the west limb of Duke Syncline has resulted in thickening of the lower Gates section in the area of 15,500 N. Boulder Creek Formation strata occur as a resistant cap rock sequence in the middle of the structure.

Cross sections 15,500 N to 17,500 N illustrate the generalized structure of the northwest nose of Duke Syncline. The syncline is a slightly assymmetric broad chevron fold which exhibits flexural slip movement as a shortening mechanism. This results in considerable small scale faulting and bedding plane slippage (as exhibited by bedding plane slickensides). Thrust faulting within the Gates Formation results in a thickened section in the west limb of the structure near 15,500 N. Thickened coal in duplex structures can be expected to be a common feature where these thrust faults penetrate the coal seams and, in particular, in the fold axis zone.

6.0 Open Pit Coal Reserves

6.1 Reserve Data

The 1985 program objectives were to collect sufficient information to permit definition of the open pit reserves in the northwest end (nose) of Duke Syncline. This program succeeded in collecting a large amount of outcrop and subsurface resistivity data which resulted in the interpretation on Map 1. The 1976 and 1979 drilling data provide seam thickness data to compliment this information.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B5
B4(u)
B4(l)
B3
B1
B2
B6(u)
UPPER SEAM
LOWER SEAM
0
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COAL DIVISION
DATE JANUARY, 1981
REVISED JANUARY, 1982
AUTHOR E.P., W.P. T.C.
DRAFTED S.K.
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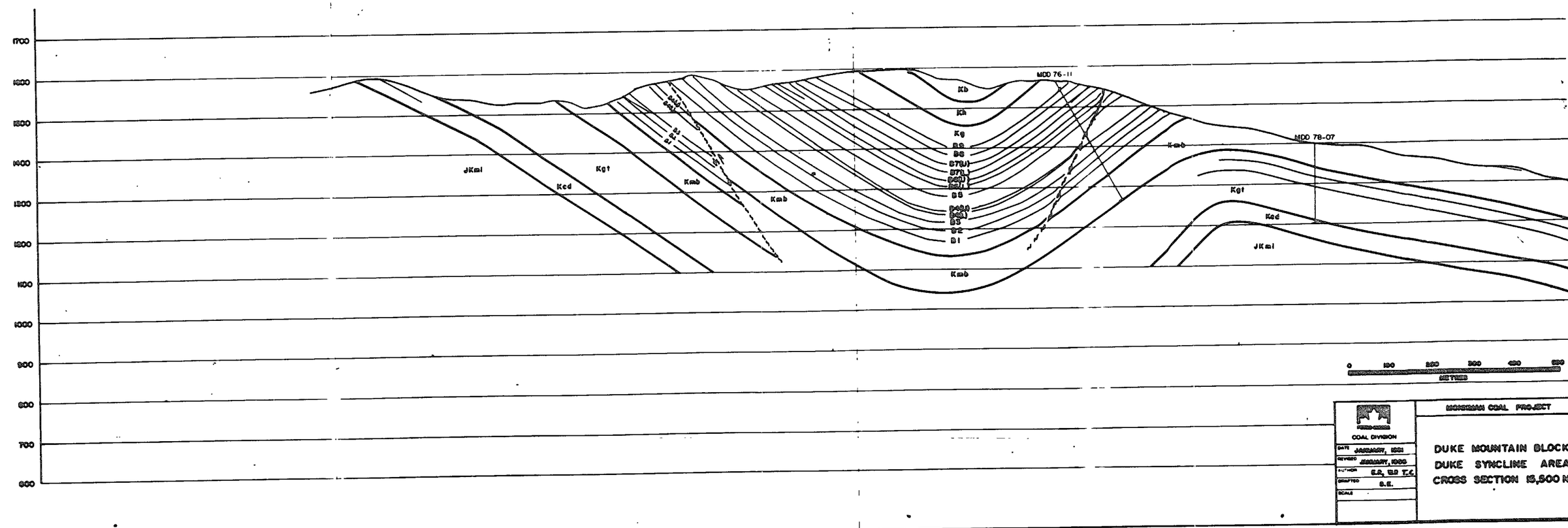
DUKE MOUNTAIN BLOCK
DUKE SYNCLINE AREA
CROSS SECTION 15,000 N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AUTHOR E.P., W.P. T.C.
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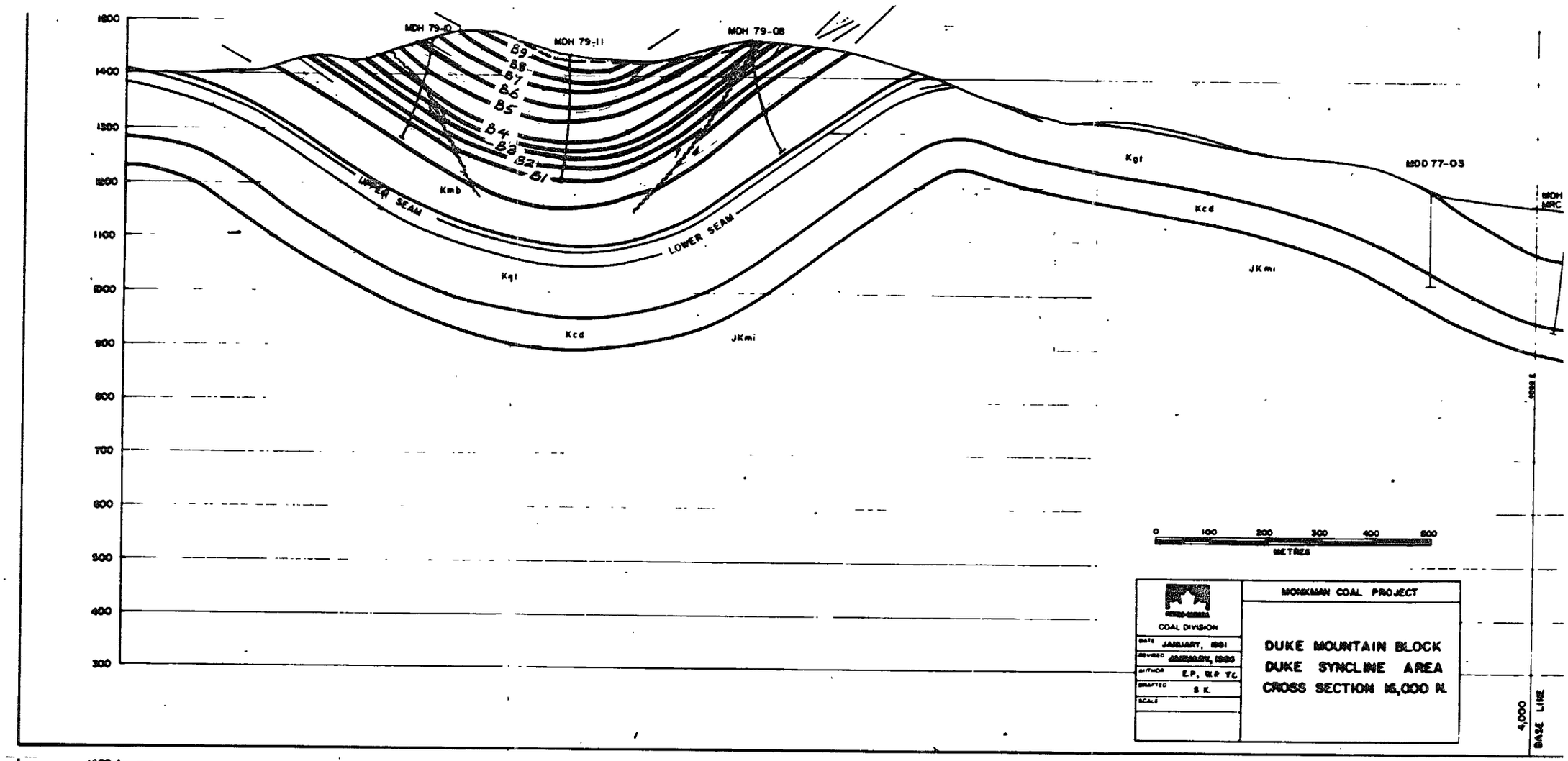
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AUTHOR E.P., W.R. T.C.
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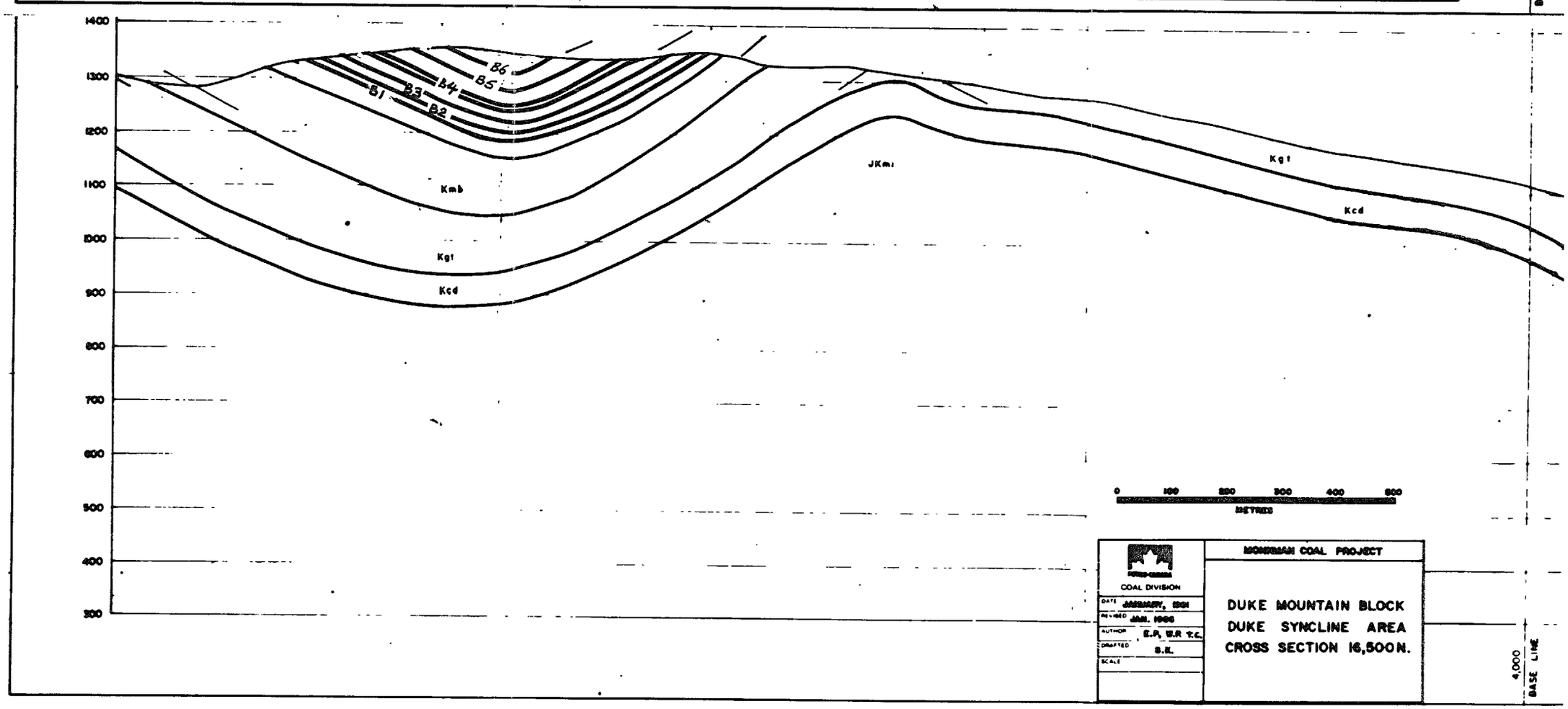
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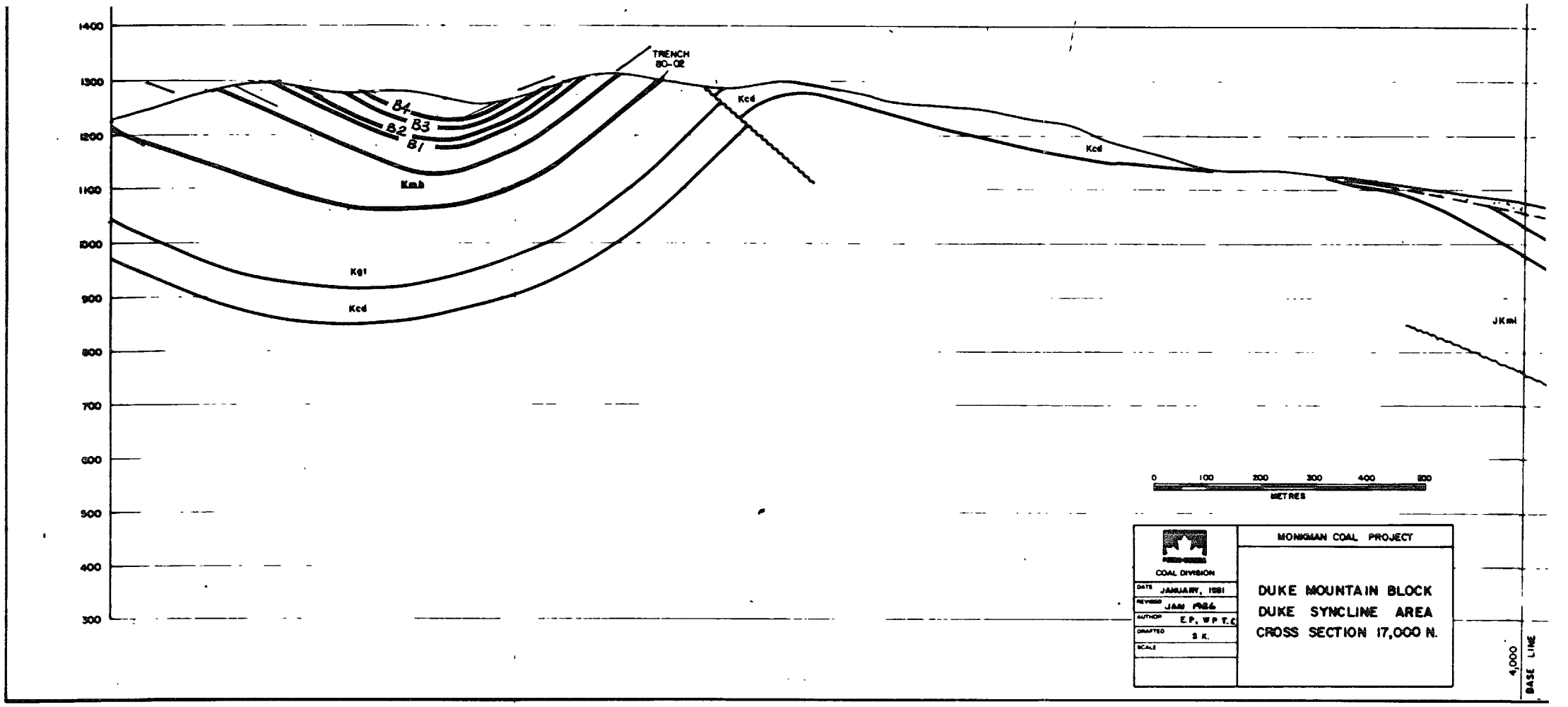
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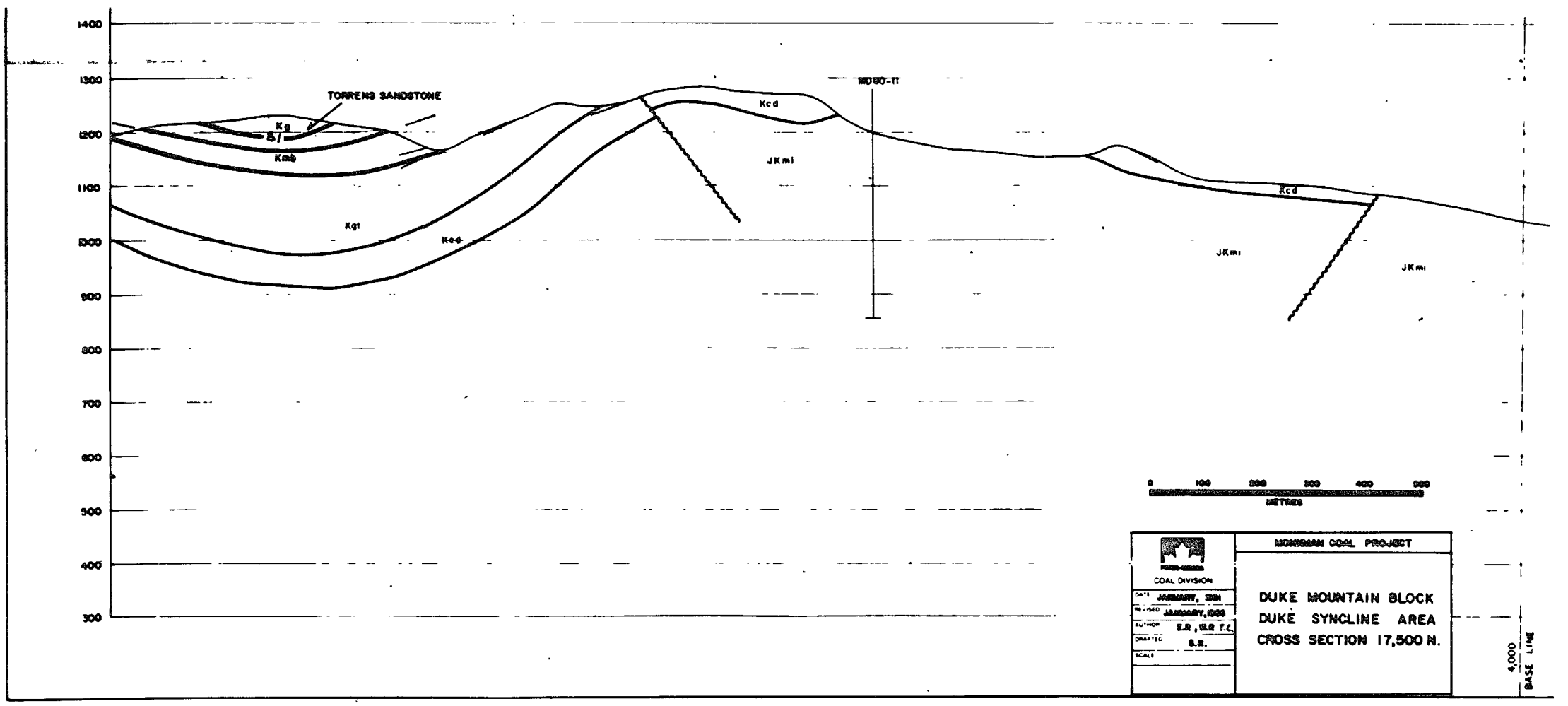
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METRES
COAL DIVISION
DATE JANUARY, 1984
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SCALE
MONKMAN COAL PROJECT
DUKE MOUNTAIN BLOCK
DUKE SYNCLINE AREA
CROSS SECTION 17,500 N.
4,000
BASE LINE

MDD-76-11 provides seam data for Section 15,500 N.

MDH-79-08, MDH-79-10, and MDH-79-11 all provide seam data for Sections 16,000 N, 16,500 N, 17,000 N and 17,000 N.

Table 6-1.

Seam thickness data - Sections 16,000 N to 17,500 N

Seam	MDH-79-08	MDH-79-10	MDH-79-11	Average
B1	3.53	1.59	1.53	2.2
B2	1.91	1.35	1.3	1.5
B3	5.65	4.3	4.5	4.8
B4	5.95	5.94	6.21	6.0
B5	4.0	3.25	3.43	3.6
B6	-	2.2	1.2	1.7
B7	-	-	1.0	1.0
B8	-	-	2.35	2.35
B9	-	-	1.79	1.8

The seam data on Table 6-1 is derived from the drill hole summary sheets reproduced in Appendix 1. The coal quality is not determined because the rotary holes provided no core; the cores from MDD-76-11 have very poor core recovery, thus cannot adequately confirm raw coal quality.

6.2 Reserve Methodologies and Assumptions

For reserve calculation purposes, it is assumed that:

i. the coal seam subcrops occur in a manner similar to Map 1
ii. Seam thicknesses are as discussed in Section 6.1 above
iii. The coal quality is acceptable as plant feed
iv. The coal specific gravity is 1.45
v. The end wall has a 45 slope. Elsewhere B1 Seam base provides the footwall.
vi. A mining loss of 10% is assumed
vii. Unconsolidated surficial cover is negligible, and
viii Oxidation is negligible.

Due to sparcity of data, the wide spacing of the cross sections and the wedge shape of the deposit, two reserve methodologies are used:

1. Reserves by Cross Section
For this calculation, the length of each seam is measured in each cross section and the total area of the pit section is measured by planimeter.

Reserves = length (m) X (thickness X 0.9 (m)) X Section Interval(m) X Density (at 1.45 t/M3)

Overburden = (Section area - coal area) X Section Interval (usually 500 m)

Mining Ratio = Overburden (m3) divided by Coal (tonnes) expressed as bank cubic metres overburden/tonne raw coal

ii. Reserves by plan method (planimetering)
In this calculation method, the area for each coal seam on each side of the syncline axis in measured by planimeter. The seam area is factored by a correction for average dip (30 on the west side, 40 on the east side). Tonnage calculations, for each side of the syncline, and for each seam are:

$$\frac{\text{planimetered area (m2)}}{\cos \text{ of dip}} \text{ X seam thickness (m) X 1.45 t/m3}$$

The total volume of rock overburden plus interburden is as calculated for the cross section methodology.

6.3 Low ratio coal reserves

The low ratio (<6 bcm/trc) coal reserves as calculated by each method are as shown on Table 6-2. On this table, the reserves calculation by the cross section method are at the top of the table. Reserves are measured for each seam on each cross section. The total reserve is 33.5 Mt at a mining ratio of 5.2 bank cubic metres overburden per tonne raw (mined) coal (bcm/trc) with the bulk of reserves derived from B1, B3, B4 and B5 Seams. It can also be determined from the table that by moving the end wall 500 metres to the northwest, the reserves available are 23.2 Mt raw coal at a mining ratio of 4.4 bcm/trc.

The reserve check by planimeter is shown on the lower part of Table 6-2. This method indicates the reserve is 34.6 Mt. The overburden and interburden are not calculated. Using the cross section overburden measurements, the mining ratio will be 5.0 bcm/trc. These alternate reserve methods correlate well for the major seams, but show an inordinate difference for some of the minor seams.

The calculations indicate that the open pit reserves determined for the northwest end of Duke Syncline are likely within the range of:

Maximum: 34 Mt @ 5.2 bcm/trc
Minimum: 23 Mt @ 4.4 bcm/trc

Table 6.2 contains confidential information or data, as described in Section 2 of the *Coal Act Regulation*, and has been excluded from this report.

Coal Act Regulation: http://www.qp.gov.bc.ca/statreg/reg/C/251_2004.htm

It is noted that this estimate is based upon only 4 drill holes. Accordingly, the reserves confidence is Inferred. Greater drill density, closer cross section spacing and coal quality data is required before the reserve confidence can be improved.

Duke Syncline low ratio reserve addition increases the total Duke Mountain Block low ratio open pit reserves to 72 Mt to 82 Mt of raw recoverable coal at less than 5.5 bcm/trc.

6.4 Syncline Mining Potential

The data on table 6.2 (Section 15,500 N indicates the reserves at the highest ratio area (the end wall) are at a ratio of only 6.5 bcm/trc. Given that this includes endwall material and is near the deepest portion of the syncline, indications are that the mining ratio of the entire syncline could be as low as 6 bcm/trc. If this is true, the entire syncline offers a large reserve base at reasonable ratio that could be enhanced with pre-stripping. This is a similar conclusion to that presented by D. Barker in early 1986.

7.0 Proposed Exploration

In order to provide a detailed structural interpretation, adequate coal quality data, and sufficient information to put the reserves into Proven category, the following program is recommended:

i. Drilling: delineation drilling on each 500 metre cross section line with drill holes spaced 100 m apart. this will require the following drilling:

Section 15,500 N - 14 drill holes average 150 m deep
Section 16,000 N - 9 drill holes average 100 m deep
Section 16,500 N - 7 drill holes 75 m deep
Section 17,000 N - 5 drill holes 50 m deep
Section 17,500 N - 2 drill holes 25 m deep

The original 4 holes will reduce the total number to 33 drill holes. The total amount of drilling will be about 3,375 metres. This will cost about $150 per metre of drilling or about $650,000 depending upon the amount of coring completed and including intrepretation.

ii. Bulk sampling: prior to sale of coal, bulk sample analysis from adits must be carried out on B5, B4 and B3 Seams. This will cost about $60,000 to $75,000 per bulk sample for a total of about $180,000 to $225,000. Interpretation will require another $50,000.

iii. Engineering & Feasibility: the final engineering and feasibility will require over 24 man months of engineering time and an equivalent time for drafting. This will cost about $250,000.

The entire program will cost about $1,200,000 to delineate a 33 to 35 Mt low ratio raw coal deposit with about 23 Mt clean saleable coal. The opportunity for success given the present data base is considered to be very good.

Conclusions

The original 1985 exploration program had the objective of delineating the open pit reserves within the northwest nose of Duke Syncline. The program was reduced in scope to mapping and resistivity studies because late summer rains prevented drill access. The resultant map interpretation has confirmed and refined the basic structure of the syncline and provided an adequate interpretation to permit reserve measurement for open pit reserves.

The reserve estimates confirm that a large deposit of low ratio reserves in INFERRED category exists. The reserve estimates by two calculation methods are:

33.5 Mt @ 5.2 bcm/trc (bank cubic metres/tonne raw coal), and
34.6 Mt @ 5.0 bcm/trc.

If the highest ratio reserves (in Section 15,500 N) are excluded, the reserve base is reduced to 23.2 Mt @ 4.4 bcm/trc.

Accordingly, the low ratio open pit reserves with good structural configuration at Monkman now are:

Duke Pit	26.4 Mt
Honeymoon Pit	22.6 Mt
Duke Syncline	23.2 Mt to 34.6 Mt
Total:	72.2 Mt to 83.6 Mt

This is an ample reserve base to support a 2.5 to 3 Mt/year clean coal project utilizing only low ratio coal. All of the deposits are well situated for a common preparation plant location.

An additional program of drilling, bulk sample collection and analysis and engineering feasibility study are necessary to confirm proven reserves at Duke Syncline.

Recommendations

i. The Duke Syncline reserves should be integrated into the Duke Mountain Property mining potential, and

ii. The proposed exploration program should be held in abeyance until markets develop. If a future market appears with potential for sale of Monkman coal, the drill program should be revived.

9.0 Appendices

Appendix 1 Drill Hole Summary Sheets

PETRO-CANADA

DRILL HOLE SUMMARY SHEET

PROJECT	DATE DRILLED	DATE LOGGED (yyyy-mm)	PAGE
	25/08 - 03/09	02/09	1 OF 2

HOLE NUMBER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNESS
MDD 76-11	D.W. COATES	-61	035°	337.4m	NQ	N/A	15500N	3239	N/A	17.3 m

COORDINATES

COLLAR ELEV.	UTM	MINE GRID	NTS
1566.37 m	6071054.26 N 643727.49 E	15477.43N 2562.73E	82-C-93-I-15

GEOPHYSICAL DATA

SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR
1:200	✓				✓	✓				
								10°		

INTERPRETED BY

DATE OF INTERPRETATION

GENERAL COMMENTS

DUKE SYNCLINE.

Incorrectly stated as coal license

3239.

SEAM	ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	BASE	ELEV. BASE	TRUE THICKNESS	COMMENTS
B9		30.50 - 31.80	20°	1.3 ✓									
		32.50 - 33.10	20°	0.6									
B8		47.00 - 47.90	20°	0.9 ✓									
B7u		67.40 - 69.20	20°	1.8 ✓									
B7l		81.05 - 82.50	20°	1.45 ✓									
B6u		102.65 - 104.55	15°	0.9 ✓									
B6l		104.60 - 110.00	15°	0.4									
E5		127.70 - 128.40	15°										
		128.70 - 129.40	15°	2.9 ✓									
		130.00 - 130.60	15°										
B1		175.80 - 177.60	16°	2.8 ✓									
		177.15 - 178.60	16°										HOLE NUMBER

PETRO-CANADA

DRILL HOLE SUMMARY SHEET

PROJECT	DATE DRILLED	DATE LOGGED	PAGE
			2 OF 2

HOLE NUMBER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNES
MDD 76-11										

COORDINATES

COLLAR ELEV.	UTM	MINE GRID	NTS
	N E	N E	

GEOPHYSICAL DATA

SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR

INTERPRETED BY

DATE OF INTERPRETATION

GENERAL COMMENTS

DUKE SYNCLINE

SEAM	ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	Gp/Fm/Mbr BASE	Gp/Fm/Mbr ELEV. BASE	Gp/Fm/Mbr TRUE THICKNESS	COMMENTS
B4		179.70 - 180.60	16°										
		181.40 - 182.00	16°	6.05	✓								
		182.40 - 182.80	16°										
		183.30 - 184.00	16°										
		184.70 - 185.75	16°										
B3		198.10 - 199.40	13°	2.9	✓								
		200.00 - 201.00	13°		21.00								
		201.70 - 202.40	13°				Inc. Ratio		F16				
B2		216.70 - 217.95	13°	1.25	✓								
B1		235.60 - 236.20	18°										
		236.60 - 237.50	18°	3.0	✓								
		238.00 - 238.60	18°		25.25								
													HOLE NUMBER

473-8010

DRILL HOLE COMM... / SHEET

ER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNESS
9-08	ALTA SOUTHERN	-90°	——	214.40	75 mm	29.95° @ 209 m	16000N	3239	63.0	2.13

INATES MDD-79-08.

EV.	UTM			MINE GRID		NTS
06	6071458.561	N.	643401.567 E	16005	N. 2560 E	92-I-15, c-22-C

GENERAL COMMENTS

DIKE SYNCLINE

YSICAL DATA

E	DEN	BRD	LSD	HRD	GAM	NEUT	FDE	FDS	CAL	DIR
D	✓				✓	✓	✓		✓	✓

INTERPRETED BY: E. PANCHYSHYN

DATE OF INTERPRETATION: 1/13/82

ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	Gp/Fm/Mbr BASE	Gp/Fm/Mbr ELEV. BASE	Gp/Fm/Mbr TRUE THICKNESS	COMMENTS
B5(?)	14.05 - 18.05	20°	4.0'					Kg	122.82			B4 (?) IS
B4(?)	19.73 - 25.68	20°	5.95					Kmb				FAULTED
B3	40.42 - 46.07	20°	5.65									
B2	65.54 - 67.45	20°	1.91				36m to Kmb from B1					
B1	83.32 - 86.85	20°	3.53									
												HOLE NUMBER

DRILL HOLE SUMMARY SHEET

PETRO-CANADA

PROJECT	DATE DRILLED	DATE LOGGED	PAGE
	05/04 - 08/04	06/04 - 09/04	OF

HOLE NUMBER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNESS
MDH 79-11	ALTA. SOUTHERN	-90°	—	236.07	75 mm	9.99° @ 232 m.	16000N	3239	47.50	2.74

COORDINATES

DOLLAR ELEV.	UTM				MINE GRID		NTS
1432.52	6071252.791	N	643135.849	E	16018 N	2230 E	93-I-15, a-11-c

GENERAL COMMENTS

DUKE SYNCLINE

GEOPHYSICAL DATA

SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR
1:100	/				/	/	/		/	/

INTERPRETED BY: E. MANCHY

DATE OF INTERPRETATION: 13/1/82

SEAM	ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	Gp/Fm/Mbr BASE	Gp/Fm/Mbr ELEV. BASE	Gp/Fm/Mbr TRUE THICKNESS	COMMENTS
B7(U)		44.41 - 46.20	18°	1.5 1.79					Kg				Gates Fm
B7(L)		59.45 - 61.80	0	2.35									
B6(U)		89.70 - 90.70	0	2.11 1.0									
B6(L)		100.80 - 102.00	0	1.2									
B5		117.65 - 121.08	0	3.43									
B4(U)		152.90 - 156.83	0	3.93									
		158.56 - 159.31	0	0.75									
B4(L)		171.15 - 173.43	0	2.28									
B3		185.20 - 189.70	0	4.5	20.48								THREE BENCHES
B2	35	212.40 - 213.90	0	1.3	8.2								
B1		225.97 - 227.50	0	1.53	22.3								HOLE NUMBER

3-8010

DRILL HOLE SUMMARY SHEET

PETRO-CANADA

PROJECT	DATE DRILLED	DATE LOGGED	PAGE OF
	03/04 - 05/04	9H/04	

HOLE NUMBER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNESS
MDH 79-10	ALTA. SOUTHERN	-90°	—	196.73	N/A	22.94° @ 192.4m	16000 N	3240	112.0	5.0

COORDINATES

COLLAR ELEV.	UTM			MINE GRID		NTS
1463.06	6071077.839	N	642948.626 E	16005 N	1967 E	92-I-15, a-23-C

GEOPHYSICAL DATA

SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR
1:100	✓				✓	✓	✓		✓	✓

INTERPRETED BY: E. PANCHY

DATE OF INTERPRETATION: 13/11/82

GENERAL COMMENTS

DUKE SYNCLINE

SEAM	ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	Gp/Fm/Mbr BASE	Gp/Fm/Mbr ELEV. BASE	Gp/Fm/Mbr TRUE THICKNESS	COMMENTS
									Kgl				Golden Fm.
B6(u)		28.20 - 29.25	18°	1.05									
B6(l)		100.85 - 102.00		1.15									
B5		52.25 - 59.50		3.25									
B4(u)		82.95 - 86.79		3.84									
B4(l)		111.30 - 113.40		2.1									THREE BENCHES
B3		121.50 - 125.80		4.3		—							
B2		145.00 - 146.35		1.35									
B1		162.35 - 163.94		1.59									

HOLE NUMBER

DRILL HOLE SUMMARY SHEET

ETRO-CANADA

PROJECT	DATE DRILLED	DATE LOGGED	PAGE
	05/04 - 08/04	06/09 - 09/04	OF

HOLE NUMBER	DRILLED BY	ANGLE	BEARING	T.D.	CORE SIZE	MAX. DEV.	MAP/SECTION NO.	COAL LICENCE	WATER LEVEL	O.B. THICKNESS
MDH 79-11	ALTA. SOUTHERN	-90°	—	236.07	75 mm	9.99° @ 232m.	16000N	3239	47.50	27.4

COORDINATES

COLLAR ELEV.	UTM			MINE GRID		NTS
1432.52	6071252.791	N	643135.849 E	16018	N 2230 E	93-I-15, a-11-C

GEOPHYSICAL DATA

SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FDE	FDS	CAL	DIR
1:100	/				/	/	/		/	/

INTERPRETED BY: E. MANCHY

DATE OF INTERPRETATION: 13/11/82

GENERAL COMMENTS

DUKE SYNCLINE

SEAM	ELEVATION BASE	INTERVAL	APP DIP	TRUE THICKNESS	COAL/ROCK	REC.	SAMPLE TAG. NO.	COMP. LAB. NO.	Gp/Fm/Mbr NAME	Gp/Fm/Mbr BASE	Gp/Fm/Mbr ELEV. BASE	Gp/Fm/Mbr TRUE THICKNESS	COMMENTS
B7(U)		44.41 - 46.20	18°	1.5 1.79					Kg				Gates Fm
B7(L)		59.75 - 61.80	0	2.35									
B6(U)		89.70 - 90.70	0	2.11 1.0									
B6(L)		100.80 - 102.00	0	1.2									
B5		117.65 - 121.08	0	3.43									
B4(U)		152.90 - 156.83	0	3.93									
		158.56 - 159.31	0	0.75									
B4(L)		171.15 - 173.43	0	2.28									
B3		185.20 - 189.70	0	4.5	20.48								THREE BENCHES
B2	55	212.40 - 213.90	0	1.3	8.2								
B1		225.97 - 227.50	0	1.53	7.33								HOLE NUMBER

3-8010

15, 5

Appendix 2 Resistivity Survey Field Notes

15, 500N

LINE 15+500 N				SEPT. 17, 1985	
NOMINAL STATIONS	DIP	QUAD	RESIS	PHASE	
1950E	+22	+6	180	43	
1940	+27	+8	210	40	
30	+30	+10	300	35	
20	+35	+16	600	36	
10	+30	+10	700	36	
1900E	+27	+11	450	42	= LOWER SIDE OF ROAD
90	+30	+14	550	44	
80	+28	+11	450	43	
70	+28	+8	350	33	
65	+30	+10	350	35	
1850E	+33	+16	750	38	
40	+28	+8	550	45	
30	+24	+5	250	32	
20	+30	+10	280	40	
10	+35	+13	400	40	
1800E	+30	+10	300	38	
90	+30	+10	400	40	
80	+23	+2	250	42	
70	+20	0	250	38	
60	+18	+3	150	45	
1750E	+24	+1	350	40	
40	+25	+2	350	42	
30	+30	+2	300	40	
20	+33	0	200	22	

	LINE 15+ 500N				
	DIP	QUAD	RESIS	PHASE	
.10	+35	+4	200	36	
1700 E	+35	+2	350	35	
90	+45	+10	400	35	
80	+42	+9	900	33	ABOVE CREEK ↑ 10M SHORT OF CR
70	CREEK CANYON				
60					
1650E	+25	-2	500	38	
40	+30	-2	200	38	
30	+28	0	700	45	
20	+26	+2	800	45	
10	+20	-2	1100	45	
1600E	+20	-2	550	47	
90	+15	-4	500	36	
80	+15	-5	700	45	
70	+16	0	250	45	
60	+13	+4	800	45	
1530 E	+15	+6	400	40	
40	+15	+8	250	45	
30	+15	+6	100	20	
20	+15	+5	450	24	
10	+18	+10	350	30	
1500E	+24	+14	400	34	
90	+20	+10	200	30	
1480E	+25	+20	200	40	
70	+27	+22	300	20	
1460E	+18	+8	550	30	
1450E	+20	+8	800	36	
40	+24	+13	450	30	
30	+25	+8	600	35	
20	+30	+12	400	36	
10	+35	+16	650	40	
1400E	+55	+35	100	34	
90	+40	+25	300	40	
80	+40	+25	150	40	
70	+40	+26	150	40	

	LINE 15+ SEPT. 17		500 N	J. GREEN E. MACKENZIE
~~2500E~~				
	DIP	QUAD	RESIS	PHASE
2500E	+12	+14	400	35
10	+12	+12	300	36
20	+4	+14	400	36
30	0	+2	450	40
40	0	0	500	40
2550	-4	-3	450	40
60	-10	-7	600	38
70	-15	-10	1300	38
80	-14	-6	750	38
90	-14	-8	1100	26
2600E	-15	-8	1100	30
10	-19	-9	800	34
20	-18	-4	550	32
30	-22	-9	1600	38
40	-26	-11	600	36
2650	-28	-9	650	36
60	-27	-12	600	38
70	-26	-12	900	34
80	-24	-10	650	40
90	-24	-12	1600	45
2700E	-22	-8	300	47
2710	-14	-8	600	42

LINE 15+500 N

	DIP	QUAD	RESIS	PHASE	
20	-10	-6	200	45	
30	-10	-4	~~3000~~	45	
40	-10	-8	650	42	
27 50E	-9	-8	150	40	
60	-12	-12	30	45	
70	-17	-14	80	47	
80	~~-3~~ -9	-8	400	40	
90	-15	-8	350	40	
2800E	-5	-9	650	45	ON ROAD
10	-8	-12	250	40	
20	-7	-8	500	45	30 M FROM END
30	-6	-11	200	40	
40	-6	-10	450	42	
2850	-3	-8	180	45	
60	-7	-6	180	45	
70	-12	-10	150	40	
80					
90					
2900E					

16+000 N

Sept 15 LINE ~~16+00N~~ AZ 52

	DIP	QUAD	RESIS	PHASE	
2650E	-27	-16	300	45	
60	-27	-8	300	48	
70	-25	-12	220	46	
80	-25	-16	150	46	
90	-23	-14	380	50	
2700E	-32	-28	180	43	
10	-18	-7	400	62	
20	-25	-12	500	50	
30	-25	-8	150	43	
40	-28	-7	150	45	
2750E	-32	-8	100	45	
2650E	-27	-16	300	45	
40	-30	-13	260	45	o/c SS
30	-30	-14	250	41	
20	-32	-17	200	43	
10	-34	-16	450	50	CARB. Shale Possibly Coal
2600E	-35	-18	80	45	Cong. SS
90	-42	-17	250	44	
80	-45	-22	130	45	
70	-37	-11	100	42	Sandy Carb. Shale
60	-25	-10	150	45	
55	-20	-8	100	47	
2550E	-20	-6	100	45	
45	-20	-4	220	43	
40	-18	-6	180	44	
35	-23	-6	110	45	DRILL HOLE
30	-16	-1	300	46	shale
25	-17	-2	300	48	Sandy SS
20	-12	+2	150	45	
10	-14	-1	150	45	
2500E	-9	+1	250	45	
90	-7	+8	200	45	
80	-7	+8	150	45	
70	-3	+10	100	42	
2460E	-13	+6	100	44	

16,000N

LINE 16 N	DIP	S2 QUAD	RESIST	PHASE	D/C
2450 E	-14	+5	100	45	
40	-15	-2	100	45	
30	-18	+1	80	45	
20	-18	+8	180	45	
10	-13	-1	80	45	
2400 E	-16	+1	80	45	
90	-10	+3	80	45	
80	-6	+3	150	48	
70	-2	+5	200	45	
60	-4	-1	200	45	
2350 E	-10	-4	300	43	MAC CREEK
40	-13	-4	200	45	
30	-13	-2	200	48	
20	-15	-8	80	45	
10	-15	-11	150	45	
2300 E	-23	-20	100	45	
90	-30	-19	180	45	
80	-25	-12	150	45	
70	-27	-12	80	45	
60	-32	-21	100	45	
2250 E	-35	-38	300	45	
40	-21	-19	100	45	
30	-27	-25	180	45	
2220 E	-50	-34	100	45	

16,000 N

	DIP	QUAD	RESIST	PHASE	O/C
2210 E	-23	-10	180	45	
2200 E	-25	-14	150	45	
90	-30	-24	150	45	
80	-25	-14	100	45	
70	-24	-14	110	45	
60	-27	-18	150	45	
2150 E	-30	-18	80	47	
40	-30	-22	150	45	
2130 E	-25	-14	400	45	
*					
2135 E	-30	-17	200	45	
2125 E	-30	-20	300	45	
20	-26	-19	120	45	
10	~~-27 -35~~	~~-15 -19~~	120	45	
2100 E	~~-25 -24~~	~~-17 -15~~	~~120~~ 250	45	
90	-26	-17	150	45	
80	-26	-12	180	45	
70	-25	-13	130	45	
60	-25	-18	180	47	
2050 E	-25	-10	180	46	
40	-20	-12	100	45	
30	-18	-10	150	45	
20	-18	-10	200	45	

16,000N

	DIP	QUAD	RESIST	PHASE	O/C
2010E	-15	-11	180	45	
2000E	-15	-8	180	45	
90	-13	-7	180	47	
80	-9	-6	150	45	Shale
70	-8	-8	250	45	
65	-7	-4	150	48	Coaly soil
60	-7	-5	300	45	
55	-7	-4	400	45	
1950E	-5	-8	200	45	
45	-3	-8	200	45	
40	-2	-3	220	45	
30	+3	+2	150	45	
20	+12	0	150	45	
10	+12	-2	150	45	
1900E	+20	+2	130	45	
90	+14	0	100	45	
80	+26	6	500	42	
70	+17	0	400	40	
60	+22	+4	150	45	
1850E	+24	+4	180	42	
40	+30	+12	250	40	
30	+53	+28	100	42	
20	+35	+19	100	45	
10	+65	+33	100	45	
1800E	+30	+15	400	45	

16,000N

LINE 18 N

	DIP	QUAD	RESIST	PHASE	O/C
1790 E	+23	+14	750	45	CREEK BOTTOM
80	+25	+23	150	45	
70	+12	+9	220	45	
60	+6	-3	80	44	CREEK
1750 E	+6	-4	300	45	
1740 E	-4	-15	200	45	
30	-8	-16	450	45	
20	-7	-20	600	45	
10	-16	-20	300	48	
1700 E	-13	-13	200	48	
90	-12	-9	200	50	
80	-10	-4	200	47	CREST OF RIDGE
70	-8	+3	250	50	
60	-10	-2	150	50	
1650 E	-19	-14	80	45	
40	NO SIGNAL -38		80	45	
30	-28	-20	90	45	
20	-16	-8	150	50	
10	-10	-2	150	50	
1600 E	-15	+5	100	48	
1590 E	-15	+3	100	45	
80	-13	+6	100	45	
70	-7	-2	100	45	

16,500N

SEPT 17
LINE 16 +500 N AZ 52°
J. GREEN
E. MACKENZIE

Sta	DIP	QUAD	RESIST	PHASE	O/C etc.
1600 E	+7	+12	150	45	
10	+7	+12	150	47	
20	+8	+9	150	47	
30	+7	+9	100	45	
40	+5	+12	130	45	
1650E	+5	+6	160	45	
60	+7	+12	180	47	
70	+8	+7	150	48	
80	+5	+6	150	45	
90	+5	+6	170	45	
1700 E	+7	+6	80	46	
10	+14	+12	120	45	
20	+18	+13	180	45	
30	+20	+10	150	45	
1740E	+8	+2	250	45	
1735	+7	+4	200	45	
45	+10	0	100	45	
1750E	+2	0	130	45	
60	+4	0	20	45	
70	+12	+2	160	45	
80	+5	-1	150	45	

16,500N

	LINE 16+500N				
	DIP	QUAD	RESIS	PHASE	O/C
1790E	+2	-4	150	45	
1800E	-2	-3	200	45	
05	+1	-3	180	45	
10	-2	-2	150	45	
20	0	-4	150	45	DRILL SITE #2
30	-2	-6	150	45	
40	0	-4	250	45	
1835	0	-8	70	45	
45	0	-3	220	45	
1850E	0	-5	200	45	
55	-4	-8	150	45	
60	+2	-9	180	45	
70	0	-5	300	45	
65	0	-7	200	45	
75	-4	-6	300	50	
80	-2	-5	150	45	
90	0	-5	180	45	
1900	-3	-3	80	45	
10	+2	-2	150	45	
20	-2	-6	100	45	
30	-5	-2	150	45	
40	-6	-5	150	45	

16,500N

	DIP	QUAD	RESIS	PHASE	O/C
1950E	-6	-6	150	45	
60	-6	-3	180	45	
65	-10	-7	450	45	
70	-9	-6	250	45	
75	-8	-8	275	45	
80	-9	-6	150	45	
90	-8	-8	150	45	
2000E	-11	-8	180	45	
10	-12	-8	150	45	
20	-10	-7	250	45	
15	-9	-8	250	45	
25	-13	-8	150	45	
30	-8	-9	200	45	
35	-10	-8	100	45	
40	-15	-10	150	45	
2050E	-15	-10	200	45	
55	-20	-13	300	45	
60	-20	-12	250	45	
65	-17	-6	320	45	
70	-17	-9	150	45	
80	-22	-13	150	40	
90	-24	-11	150	36	
2100	-24	-9	80	45	

	LINE	16+500 N			
	DIP	QUAD	RESIST	PHASE	O/C
2100E	-21	-15	110	45	
20	-25	-12	150	45	
30	-27	-16	170	45	
40	-25	-20	100	45	
2150	-30	-16	150	45	
60	-27	-14	150	45	
70	-37	-20	180	45	DRILL SITE #1
80	-25	-10	250	45	
75	-27	-10	150	45	
85	-28	-12	180	45	
90	-37	-14	180	45	
2200E	-33	-11	180	45	
10	-30	-11	100	45	
20	-25	-8	150	45	AT CREEK
30	-18	-1	100	45	
40	-15	+3	200	45	
45	-14	+3	150	45	
50	-15	+3	140	45	
60	-13	-1	150	45	
70	-18	-2	175	45	
75	-13	-3	150	45	
80	-13	-2	150	45	
90	-13	-5	130	45	
2300	-13	-1	150	45	

16,500 N.

	DIP	QUAD	RESIS	PHASE	c/c etc.
2310 E	-16	-11	150	45	
20	-15	-8	200	45	
15	-14	-6	150	40	
25	-18	-7	150	45	
30	-16	-8	100	45	
40	-14	-5	150	45	
2350	-13	-1	250	45	
45	-13	-4	200	45	
55	-13	-4	300	45	
60	-15	-5	150	45	
70	-13	-4	180	45	
80	-16	-2	130	45	
90	-12	-1	150	45	
2400 E	-13	-5	150	45	
10	-20	-5	250	45	
05	-25	-15	180	45	
15	-18	-10	280	45	
20	-14	-4	350	45	
25	-14	-3	200	45	
30	-13	-7	300	45	
35	-10	-2	250	45	
40	-13	-8	300	45	
45	-18	-11	200	40	
2450 E	-20	-18	200	45	

	LINE 16+500N				
	DIP	QUAD	RESIS	PHASE	O/C etc.
2455E	-20	-15	200	45	
60	-20	-12	150	45	
70	-15	-8	150	45	
80	-14	-6	300	55	
75	-13	-12	150	52	
85	-13	-5	150	45	
90	-13	-11	300	45	
95	-15	-10	250	50	
2500E	-13	-12	400	64	
05	-14	-15	200	50	
10	-14	-14	250	54	
15	-15	-13	250	45	
20	-18	-15	200	47	
25	-18	-17	230	47	
30	-15	-20	150	45	
35	-18	-18	150	45	
40	-17	-16	130	45	
2550	-14	-12	150	45	
60	-16	-13	150	45	
70	-13	-10	110	45	
2580E	-15	-7	80	45	
	//				

LINE	17+00 N.		J. GREEN		
SEPT	15		E. MACKENZIE		
	DIP	QUAD	RESIS	PHASE	o/c
14+00 E	+25	+13	150	45	
10	+35	+10	150	45	
20	+35	+4	150	45	
30	+35	+6	150	45	
40	+40	+10	100	45	
1450	+35	+15	100	45	
60	+25	+4	120	45	
70	+25	+6	100	45	
80	+25	+5	100	45	
90	+15	+2	100	45	
1500	+20	+5	120	45	
10	+13	+5	150	45	
20	+12	+5	150	45	
30	+14	+5	120	45	
40	+12	+6	100	45	
1550	+12	+6	150	45	
60	+15	+8	150	45	
70	+15	+10	150	45	
80	+15	+10	150	45	
90	+15	+11	150	45	
1600	+10	+8	120	45	
10	+5	+12	150	45	
20	+5	+5	100	45	

17,000N

LINE 17N	DIP	QUAD	SEPT. '15 RESIS	PHASE	
1630E	+5	+10	150	45	
40	+3	+5	150	45	
1650	+5	+12	150	45	
60	+3	+11	100	45	
70	0	+10	200	45	
80	0	+4	200	45	DRILL SITE
90	-2	+2	250	45	DRILL SITE
1700E	-5	0	300	45	
10	-9	0	250	45	
20	-10	0	250	45	
30	-10	-6	100	45	
40	-12	-5	250	45	
1750	-12	-4	260	45	= OLD ROAD R/W
60	-12	-5	300	60	
70	-15	-5	350	60	
80	-15	-4	350	60	
90	-15	-4	400	50	
1800E	-12	-3	300	47	
10	-12	-6	250	50	
20	-9	-2	250	45	
30	-9	-3	200	45	
40	-8	-3	200	45	
1850	-8	-2	300	50	
60	-8	0	250	50	

17,000N

LINE 17+000 N

	DIP	QUAD	RESIS	PHASE	
1870 E	-10	-2	80	45	
80	-10	-3	100	35	SEISMIC LINE
90	-9	-4	100	50	
1900 E	-10	-4	150	45	
10	-10	-5	80	45	
20	-10	-6	100	45	
30	-15	-6	150	50	
40	-14	-7	120	47	
1950 E	~~-18~~ -14	-8	150	45	
60	-15	-10	150	45	
70	-12	-9	90	45	
80	-12	-8	80	45	
90	-13	-10	200	45	
2000	-13	-7	100	45	
10	-10	-10	150	45	
20	-10	-10	100	45	
30	-9	-12	150	45	
40	-10	-7	120	45	
2050	-10	-8	200	45	
60	-8	-8	130	45	
70	-10	-13	200	45	
80	-10	-10	180	42	
90	-12	-12	150	45	
2100 E	-15	-16	150	36	

17,000 N

	DIP	QUAD	RESIST	PHASE	
2110E	-10	-20	280	45	
20	-20	-25	220	45	
30	-15	-20	200	45	
40	-5	-20	200	45	CREEK
2150	0	-12	250	45	
60	0	-9	300	45	
70	+7	-3	300	45	
80	+10	-2	250	45	
90	+12	+2	100	45	
2200E	+13	+2	180	45	
10	+15	+3	200	45	
20	+20	+5	250	45	
30	+20	+10	180	45	
40	+18	+12	120	45	
2250	+20	+14	150	50	
60	+17	+15	150	45	
70	+22	+11	180	53	
80	+22	+10	100	45	
90	+22	+10	150	45	
2300	+22	+12	150	45	

17,500N

	P.IP.	QUAD	RESIS	PHASE	
16	-6	-1	350	32	
17	-10	-4	350	32	
18	-10	-4	350	36	
19	-10	-4	250	45	
200M	-10	-4	300	45	
21	-11	-4	300	40	
22	-12	-6	400	35	
23	-11	-6	550	35	
24	-10	-4	500	35	
25	-8	-4	350	38	
26	-6	-2	400	35	
27	-5	-2	450	35	
28	-4	-2	600	32	
29	-4	-2	400	30	
300M	-5	-2	350	30	
31	-5	-3	300	32	
32	-6	-2	250	30	DRILL HOLE
33	-7	-5	250	30	
34	-10	-8	300	28	
35	-15	-5	250	35	
36	-15	-10	250	32	
37	-10	-3	700	34	
38	0	+6	400	32	
39	+2	+3	700	35	

17,500N

	DIP	QUAD	RESIS	PHASE	
400M	0	+3	600	33	
41	+2	+1	400	36	
42	+8	-2	350	38	
43	0	-2	1500	32	
44	+4	-1	400	36	
45	+5	-8	2000	38	
46	0	-10	450	35	
47	+5	-7	110	36	
48	+2	-3	350	38	
49	0	-6	250	38	
500M	0	-3	200	30	
51	0	-3	400	33	
52	+3	-2	250	30	
53	0	-5	300	40	
540M	0	-2	450	35	
~~55~~	~~0~~	~~-10~~	~~250~~	~~22~~	
~~56~~	~~-12~~	~~-20~~			
550M	-2	-6	200	38	
56	-5	-5	150	20	
57	-4	-5	150	29	
58	-5	-5	180	29	
59	-6	-5	200	32	
600m	-7	-7	150	32	

3240

3239

3238

3235

Kcd

Kgt

Kmb

Kg

Kh

Kb

JKmi

LOWER SEAM

UPPER SEAM

B1

B2

B3

B4

B4L

B4U

B5

B6

B7

B7L

B8

B9

MD 80-11

MDH-79-08

MDH-79-10

MDH-79-11

MDH-79-12

MDD-77-03

MDD-78-07

MDD-78-08

MDH-78-09

MRC 82-02

MDH 82-01

Trench 80-12

Trench 9

Trench 10

Trench 13

Trench 14

MARCIA

TORRENS

KINUSEO CREEK

HONEYMOON CK

6,073,000 N

6,072,000 N

6,071,000 N

6,070,000 N

6,069,000 N

14,000 N.

15,500 N.

15,000 N.

14,500 N.

14,000 N.

13,500 N.

47°00'

54°04'

54°46'

54°45'

120°45'

734

LEGEND

Improved road
Secondary road
Track or trail
Cut line
Tree area
River
Steam
Intermittent stream
Swamp
Contours
Horizontal control
Vertical control
Spot elevation
Iron Pin

1300
△ 390
○ V 1372 I
1247.9
◇ IP

CONTOUR INTERVAL 5 METRES
DATE OF PHOTOGRAPHY SEPTEMBER 1975
DATE OF SURVEY APRIL 1977
DATE OF MAPPING MAY 1977

SURVEY NOTE

The Horizontal and Vertical Co-ordinates were established by D W Watson B C L S using conventional and E D M survey equipment. Horizontal and vertical co ordinates and elevations are derived from Trig Stations Quintette E Quintette S W Mamie Hawk Marcia Kinuseo All co ordinates referred to Universal Traverse Mercator Grid Zone 10 Elevations are above Mean Sea Level were established by trig levelling vertical angles being read at both ends of each course simultaneously

GEOLOGIC LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FORMATION	FORT ST. JOHN GROUP
Kb	BOULDER CREEK FORMATION	FORT ST. JOHN GROUP
Kh	HULCROSS FORMATION	FORT ST. JOHN GROUP
Kg	GATES FORMATION	FORT ST. JOHN GROUP
Kmb	MOOSEBAR FORMATION	FORT ST. JOHN GROUP
Kgt	GETHING FORMATION	BULLHEAD GROUP
Kcd	CADOMIN FORMATION	BULLHEAD GROUP

JURASSIC – CRETACEOUS

JKmi	MINNES GROUP (undivided)

AREA OF 20m. + OVERBURDEN

LICENCE BOUNDARY
* COAL SEAM
* GEOLOGIC CONTACT
* THRUST FAULT
SYNCLINE / ANTICLINE (overturned)
STRIKE AND DIP (overturned) 20 15
HOLE LOCATION (diamond, hammer) ● ○
TRENCH LOCATION
ADIT LOCATION

CONGLOMERATE
SANDSTONE
SILTSTONE
CLAYSTONE
COAL

RESISTIVITY ANOMALY, RESISTIVITY(Ω) ● 750

KEY MAP

SCALE 1 250.000

121°00 T S R Q P O N 54°50
25
6 075 000N
24
23
22
M 120°36
21
54 40
3000 E
3000 650
3000 640
6 065 000N
120°45

100 0 100 200 300 METRES

PETRO-CANADA EXPLORATION, INC.

MINING DIVISION

MONKMAN COAL PROJECT

734-P24 Feb2/83 QUIKMAP polylines in 734_P24.DBF

GEOLOGY MAP

DUKE SYNCLINE

Date	MAY 1982
Revised	JUNE 87 LAS.
Author	E. P.
Drafted	S. K.
Scale	1:5,000

MAP 1

P 24

R M HARDY & ASSOCIATES LTD.