OPEN FILE

PETRO-CANADA
COAL DIVISION

MONKMAN COAL PROJECT
1983

NTS 93I/15B

THE STRUCTURAL GEOLOGY OF DUKE PIT

Lat. 54°45'N – 54°48'N
Long. 120°42'W – 120°46'30"W
Peace River Land District

COAL LICENCES:	3225	3239	3946
	3226	3242	3947
	3227		3949

PREPARED BY: L.A. SMITH
CONSULTING AND DEVELOPMENT LTD.

1983-12-31

THE STRUCTURAL GEOLOGY OF DUKE PIT

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1.0 SUMMARY

The Project: This report presents the findings of a detailed 1:2000 scale structural study of Duke Pit, Monkman Coal Project. The results confirm the folded thrust concept suggested by the authors in a 1982 study.

Scope: The scope was defined as a compilation of all relevant geological data within the study area onto 1:2000 base and to provide a detailed interpretation, the interpretation to include twelve cross-sections and a structure contour map on the base of B1 Seam.

Methodology: The methodology utilized the compiled computer data base for the area, augmented and corrected where necessary, and used the interactive graphics capability of the TRIPOD computer package to determine the direction and plunge needed to project the drillhole and outcrop data onto the lines of section. The TRIPOD software also carried out the raw data plotting onto the geology maps and the cross-sections.

After determination of the data projections and completion of the raw data plots, the cross-sections and maps were interpreted. The structural contour map is the result of a compilation of data points from drillhole information, cross-section information and a down-plunge grid of data points.

Stratigraphy: The Gates Formation of Lower Cretaceous Age contains the coal measures of economic interest in this area, and the bulk of the stratigraphic and structural data is derived from the Gates Formation.

Folding: The dominant fold in the study area is the Quintette Syncline, a southerly plunging structure that has coal subcropping in the hinge zone from 15800N to 17200N. To the south the coal outcrops on the west flank along the northeast slope of Duke Mountain. To the east the coal subcrops in a southeast trend that extends outside the study area. Structural thickening of coal seams does occur near the hinge zone where the structures are very flat. Flexural slip movement is the mechanism of fold deformation.

Faulting: Two major and several minor thrust faults lie in the study area. The lowermost Quintette Thrust separates Duke Pit from the Honeymoon Pits and limits Duke Pit on the east flank. The overlying Duke Thrust has a modest 100 m throw and provides repeat sections of the coal measures in the northeast portion of Duke Pit. The two thrust faults generally parallel one another. They trend southeast of the study area at about Section 15000N.

Reserve Potential in Duke Pit: Due to the nature of the thrust faulting that effectively repeats coal seams in certain areas, and because of the structural thickening of coal seams (see MDD 78-12 and MH 8060B), the reserve potential within Duke Pit will undoubtedly be greater than has been measured in the past.

1.0 SUMMARY (cont'd)

Duke Pit Potential Reserve Additions: This study indicates that Duke Pit may be expanded in two directions (see Map 8). These potential reserve additions are:

The East Flank - this area extends eastward from the old (1981) pit highwall and will effectively move the highwall eastward (see Map 8). Although an in-place possible reserve of 20 megatonnes is estimated for the East Flank, additional exploration is required to delineate the reserve area, size and potential.

Duke Pit South Extension - this reserve area at the south end of Duke Pit extends from 13800N in a southerly direction off the study area. It is believed that this area may be mined all the way to Fearless Creek (Section 11000N) and add at least 15 megatonnes in-place coal reserves.

Overburden: Thick amounts of till (up to +90 m) cover the coal measures in the northern part of Duke Pit. This till is so thick that the volumes of unconsolidated material will provide a serious constraint on mining in this area. Localized zones of up to 25 metre thick till occurs elsewhere in the map area. The till thickness is represented on Maps 5a, 5b and 5c.

Additional Exploration: Additional data collection is necessary to define Duke Thrust, Quintette Thrust and the small thrust west of Duke Pit on Section 16600N. Possibly thickened coal zones in the axis of Quintette Syncline require drilling and may occur on both the Duke and Quintette Thrust Sheets. Additional mesocopic scale structures (both thrust faults and folds) will be identified as more data is collected in Duke Pit. The East Flank requires major amounts of data collection to confirm and delineate the structure. Overburden studies are required in the reserve areas on the north map sheet and the northern part of the central map sheet. Localized areas of till elsewhere in the pit require greater definition.

2.0 INTRODUCTION

This report provides a written account of a structural geology study of the Duke Pit, Monkman Coal Project as requested by Mr. Tom Covert on 21 September, 1983 and approved by Mr. John Steward on 29 September, 1983. The study was limited to the structural interpretation and a structure contour map of B1 Seam. The work is authorized by a consulting contract dated 30 September, 1983.

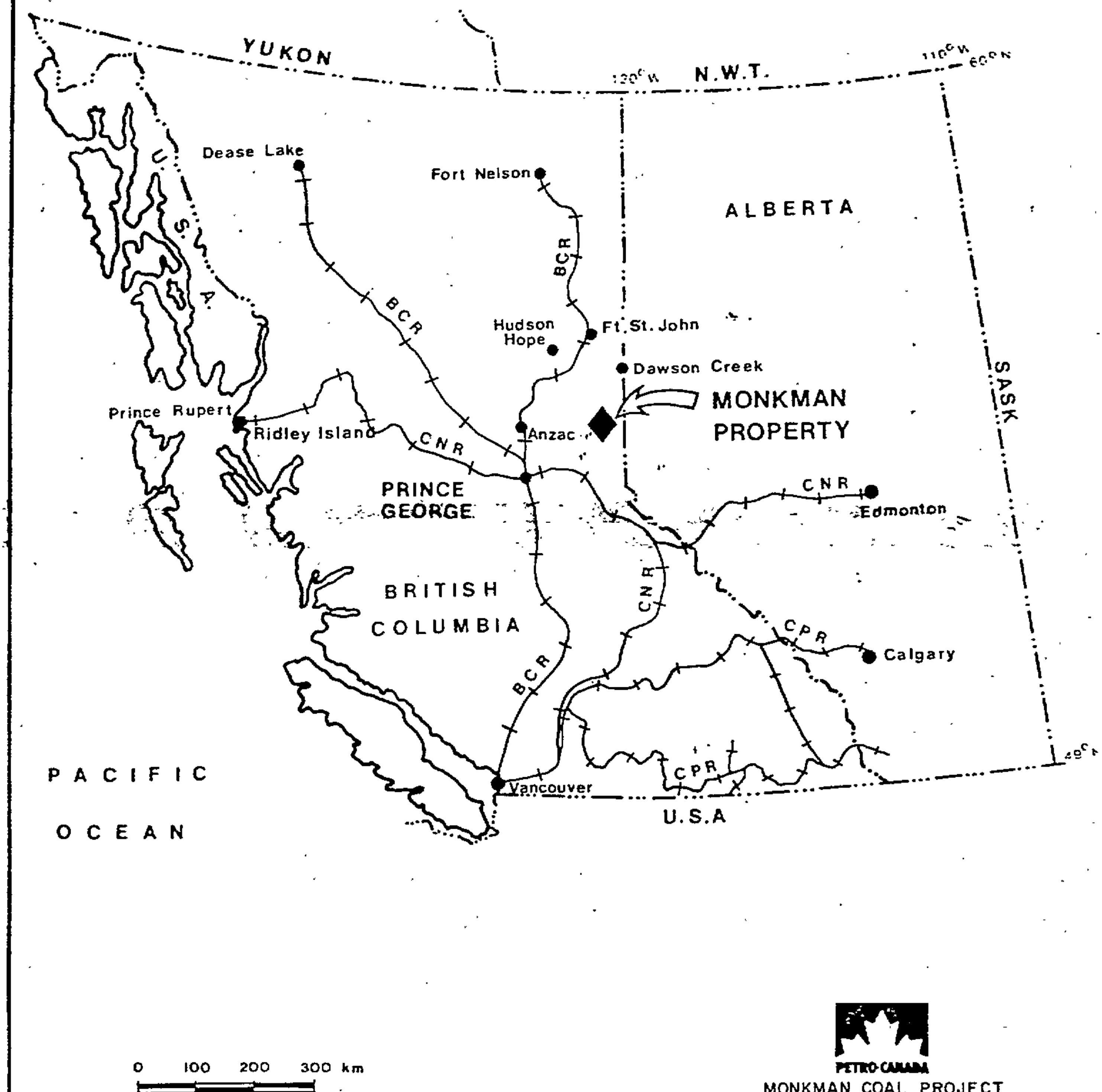
The Monkman Coal Project lies in northeast B. C. at 54° 47' N - 120° 45' W and about 40 km immediately south of Tumbler Ridge, B. C. Duke Pit is located in the north central portion of the main Duke Block coal leases. The open pit reserves lie on the northeast side of Duke Mountain and extend northward into Honeymoon Creek Valley.

The deposit was discovered in 1977 when drillhole MDD 77-2B penetrated the major coal zones (B1 to B9) in the central portion of the dip slope. The area was assumed to be a relatively simple dip slope until drillhole MDD 78-02 indicated zones of structurally thickened coal and fault repeated coal measures. Additional structural complications were indicated by very steep (70° dip) strata in MDD 78-12.

A study by the authors in 1982 indicated that faulting in the north end of the reserve area consists of west-dipping thrusts that were subsequently folded. This interpretation pointed out serious conflicts with the existing mine plan with regard to pit design and configuration, coal seam thickening, location of dumps and, ultimately, the coal reserves available for mining.

This study is intended to resolve as much as is practical the structural configuration on 1:2000 scale. This will provide a higher level of understanding of the geology in the pit area. The geology is presented in sufficient detail to allow the mine planners to carry out reasonably detailed design work.

The TRIPOD computer package is used in this study to enhance data handling, maximize utilization of outcrop data, and to determine the limits of data projection. The use of this software has greatly enhanced the quality and detail of the structural interpretation.



PETRO-CANADA

MONKMAN COAL PROJECT
BRITISH COLUMBIA
GENERAL LOCATION MAP
MAP 1

3.0 SCOPE AND OBJECTIVE

Data Base

The data base for the structural interpretation consists of several sets of data:

i) outcrop information - listed in Appendix 1,
ii) drillhole stratigraphic information - listed in Appendix 2,
iii) drillhole deviation data - listed in Appendix 2,
iv) dipmeter data for 1982 drillholes,
v) 1:2000 scale topographic maps, and
vi) air photos.

The Coordinate System

Two grid systems are currently used on the Monkman Coal Project: the UTM and Mine Grid Systems. Mine Grid North is oriented 40° west of true north and roughly parallels the trend of the structural geology. The origin of the system is located at UTM 51721.4592E and 57557.7076N.

The outcrop data compiled during the 1:5000 scale study completed in 1981 were recorded in UTM coordinates. The Petro-Canada engineering staff supplied grid conversion equations to this study. A computer program was designed and used to convert coordinates and outcrop dip directions to the Mine Grid System.

All orientations and location coordinates used in this study are in the Mine Grid System.

Project Area

The study area is defined by the following coordinates on the mine grid (see Map 2):

3700E - 17500N
6000E - 17500N
3700E - 13000N
6000E - 13000N

Drillhole and outcrop data from an expanded area has been used to provide the additional structural data required for this study. The rough outline of the expanded area is as follows:

3200E - 12500N
6500E - 12500N
3200E - 18000N
6500E - 18000N

Stratigraphy

Rocks that range from the Jurassic Minnes Group to the Ku Shaftsbury Formation subcrop and outcrop in the study area. The study is, however, primarily concerned with Gates Formation strata. Coal seam stratigraphy has been reviewed in detail and each drillhole in the study area has been correlated. During compilation of the structural geology, this correlation has been reviewed extensively because detailed knowledge of the coal seam stratigraphy is necessary to determine the structural geology. The correlation chart (Fig. 5) represents the coal seam stratigraphy used in this study.

Structural Geology

The object of this study is to delineate the structural geology of the defined project area on 1:2000 scale. As defined in the proposal dated 1983.09, 1:2000 scale cross-sections are drawn on 400 m intervals on the following section lines:

~~13000N~~	15400N
13400N	~~15800N~~
~~13800N~~	16200N
~~14200N~~	~~16600N~~
14600N	~~17000N~~
~~15000N~~	~~17400N~~
~~15200N~~	

All but four have been lost. A set of more recent 1:5000 sections, covering 13,000N - 17,500N is substituted jjj 3/7/86

Each section line extends from 3700E to 6000E.

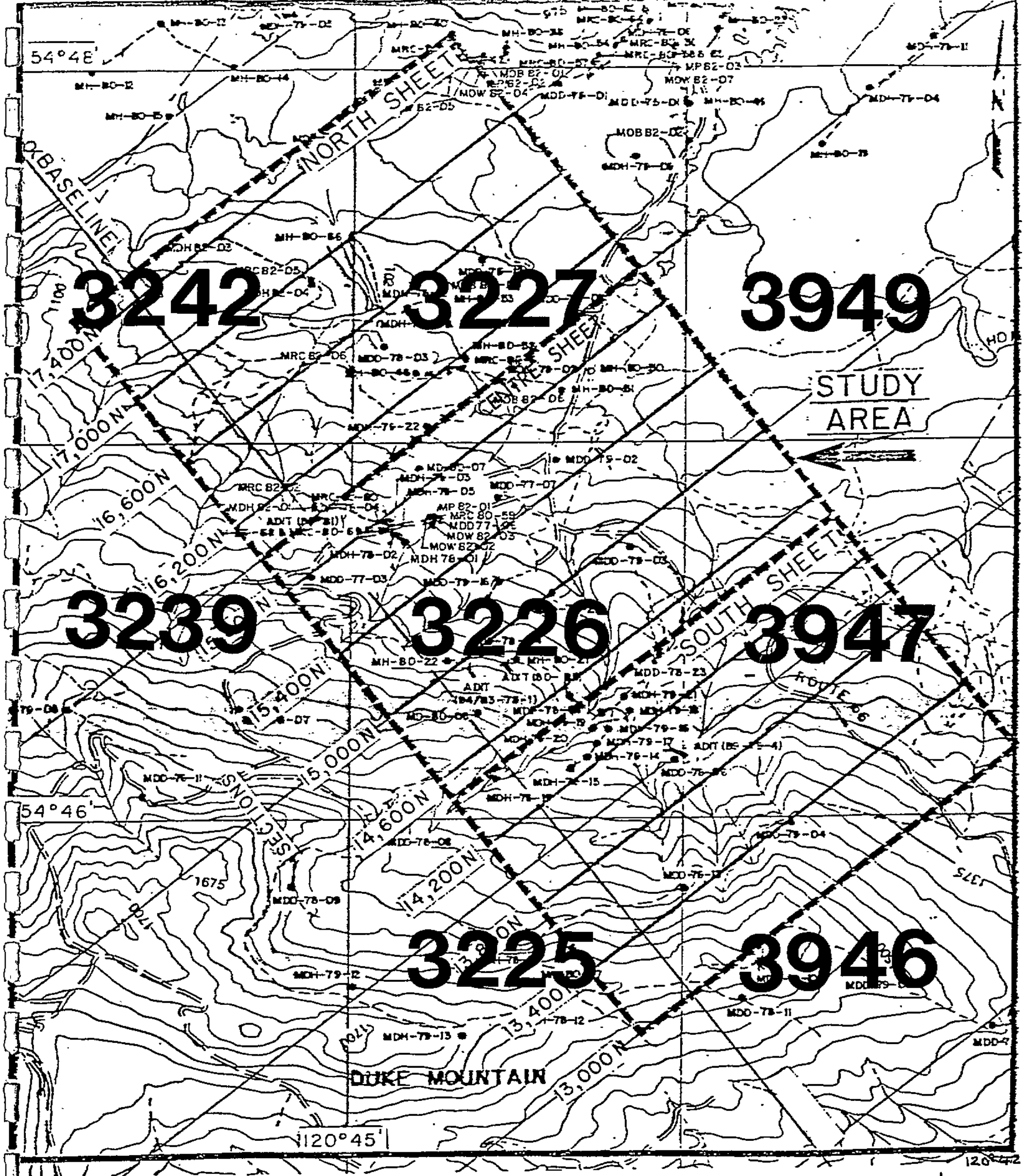
The geology map portrays the subcrop geology on three maps, the south, centre and north sheets (see Map 6a, b, c). In order to facilitate proper definition of the subcrop geology, an overburden isopach map was required (Map 5a, b, c).

Structure Contours

The original proposal requested structure contour maps with 15 m contours drawn at the base of B9, B7, B5, B4, B3 and B1 Seams. The scope was reduced by Petro-Canada Coal Division to include a single structure contour map on the base of B1 Seam using 15 m contours. This is represented on Map 7~~a~~, b, ~~c~~.

Required Exploration

Areas with insufficient data have been examined in as much detail as is practical in this study. In certain areas the structural geology has not been



NTS : 93 I/15B

7

NEW STUDY AREA

SCALE: 1:25000

MAP 2

Required Exploration (cont'd)

resolved adequately and additional data is required to fully understand the geology. These problem areas are identified and discussed and data collection methods are proposed.

4.0 THE TRIPOD COMPUTER PACKAGE

The TRIPOD computer package was designed to assist geologists working with structurally deformed sedimentary rocks. It is used to store, edit, retrieve, process and graphically reproduce structural and stratigraphic geological data accurately and swiftly while leaving the interpretation to the geologist.

Raw data used by the package consists of both outcrop and drillhole information. Cross-sections, geological maps, structure contour maps, isopach maps, isoburden maps and orientation diagrams are generally produced after data processing and geological interpetation is complete.

The TRIPOD package allows the geologist to utilize more data, handle plunging structures more effectively and eliminate graphical errors. In addition, the numerical techniques employed to evaluate a structure are purely objective and the results are reproducible by other geologists.

5.0 METHODOLOGY

5.1 General

Graphical procedures normally used to evaluate orientation data have numerical bases. These numerical techniques, although more accurate than graphical methods, are tedious and time consuming.

Since the advent of computers, these calculations can be performed in an efficient, cost-effective manner. Advances in computer graphics allow the results of the numerical procedures to be displayed in a visual fashion.

The TRIPOD computer package utilizes the numerical methods and computer graphics to describe and display the geology of complex structural features.

5.2 Data Collection

Well collected, reliable raw data is of the utmost importance for undertaking any geological study. Both outcrop and drillhole data must be collected in a consistent fashion. This is particularly important for outcrop data because the TRIPOD package employs statistical techniques that require consistent high quality data.

Outcrop Data

Well collected outcrop data can be used to determine the surface traces and dips of map units and the trend and plunge of structural features. Ideally, outcrop information should be collected with consideration given to the use to which it will be put. For example, outcrop data collected during 1:10,000 or 1:5000 reconnaissance mapping will be useful but certainly will not be accurate enough for detailed geological studies on a 1:2000 or 1:1000 scale. While the data may be good quality for its intended purpose, it is not accurate enough for use in a detailed evaluation.

Two data forms are used to record outcrop information. At each outcrop the outcrop number, location and stratigraphic horizon are coded on Form A (Fig. 1) along with a code to indicate whether the strata is right way up or overturned. Orientation data describing folds, faults, joint sets, slickenside striae and planar strata is entered into Form B (Fig 1). In this study, only orientations referring to planar bedded strata were collected. Normally four to ten bedding orientations are collected at each outcrop in order to utilize the statistical capabilities of TRIPOD to the fullest extent. In many map areas, as is the case for this study, only one bedding orientation was collected at each outcrop.

Drillhole Data

Drillhole data is collected and entered into Forms C and D (Fig. 2). Form C contains the collar coordinates, the original orientation of the drillhole, the total depth, overburden thickness and deviation measurements recorded as depth, trend of the hole and the angle between the hole and vertical (90° - plunge). Form D contains a drillhole intersection entered as the stratigraphic horizon and a depth.

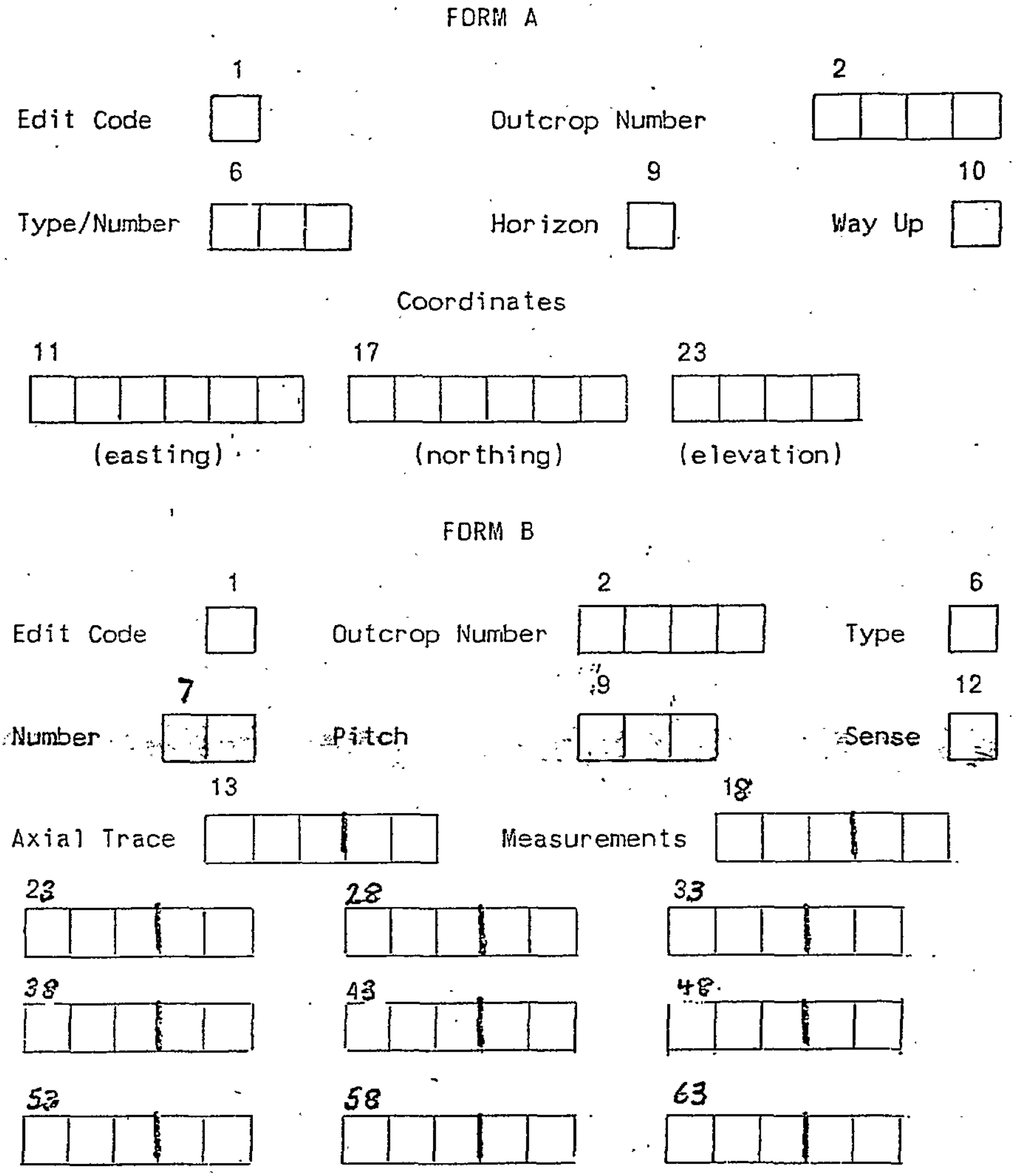


Fig. 1. Format of Forms A and B.

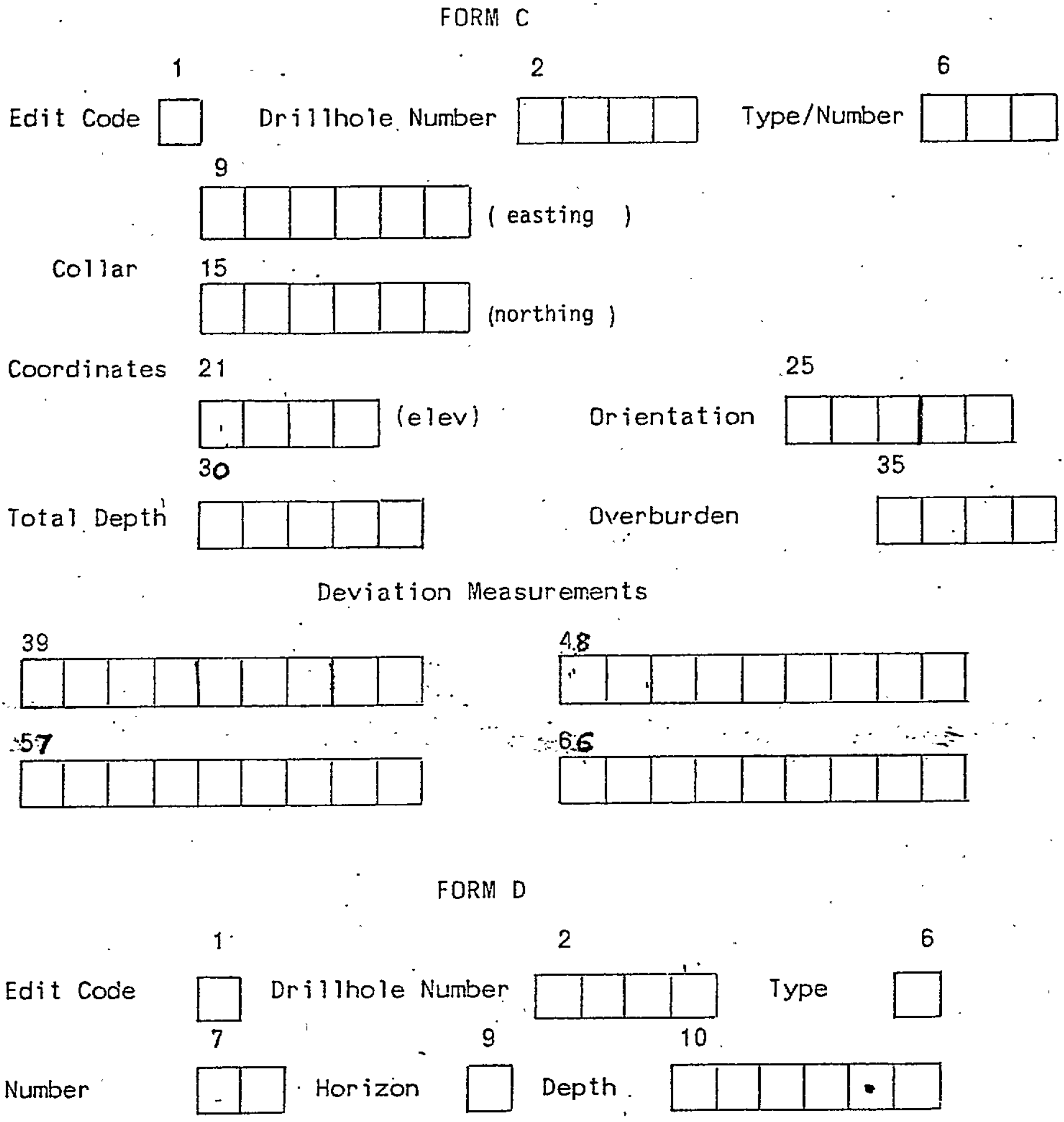


Fig. 2. Format of Forms B and C. Note that up to 150 sets of deviation measurements may be recorded on Form C.

Raw Data File

All of the raw data on Forms A through D are entered into one data file. The data types are entered sequentially with Type A data entered first followed by B through D, respectively. This file (Appendix 3) is generally listed, checked for errors and corrected.

5.3 Data Processing

Master Files

The initial phase of data processing involves reading the raw data file with the TRIPOD package, performing some preliminary calculations and storing the information in four master data files written in binary code. These data are now in a format ready for data processing and suitable for use in a structural intepretation. Mean bedding orientations have been calculated for each outcrop and a path of each deviated drillhole has been determined.

The data contained in the master files can be easily retrieved and displayed (Appendix 4).

Error Checking and Editing

Data entered into the computer data files needs to be carefully scrutinized for errors. Numerical errors or errors in stratigraphic codes can be located by carefully examining each line of the raw data file. When the raw data is read into the TRIPOD package, errors in data spacing, outcrop or drillhole numbers, the sequence of drillhole intersections or in drillhole deviation sequences will be identified by the computer and an error message will be generated.

The first column in each line of the raw data file is used as an editing space. The number 1 is entered into this space of an erroneous line and the corrected line is added to the raw data file. When these two lines are read into the TRIPOD package, the erroneous data is eliminated from the master file and is replaced by the corrected information. This procedure eliminates the necessity of re-reading the complete data file each time an error is located.

Data Retrieval

Once the data has been checked and edited, the preliminary processing complete and the data stored in the master data files, data processing and geological interpretation can begin. Both outcrop and drillhole information can be retrieved based upon a number of parameters:

1) geographical area outlined by the apices of a polygon;
2) drillhole or outcrop numbers;
3) stratigraphic horizon encountered at an outcrop or drillhole intersection;
4) type of structural data (i.e. bedding, joints, etc.).

Outcrop and Drillhole Maps

Geological information retrieved from the master files can be displayed on geological maps of any size or scale. Outcrops, drillholes, joint sets, small scale folds, etc. can be represented.

5.4 Cylindricity and Structural Domains

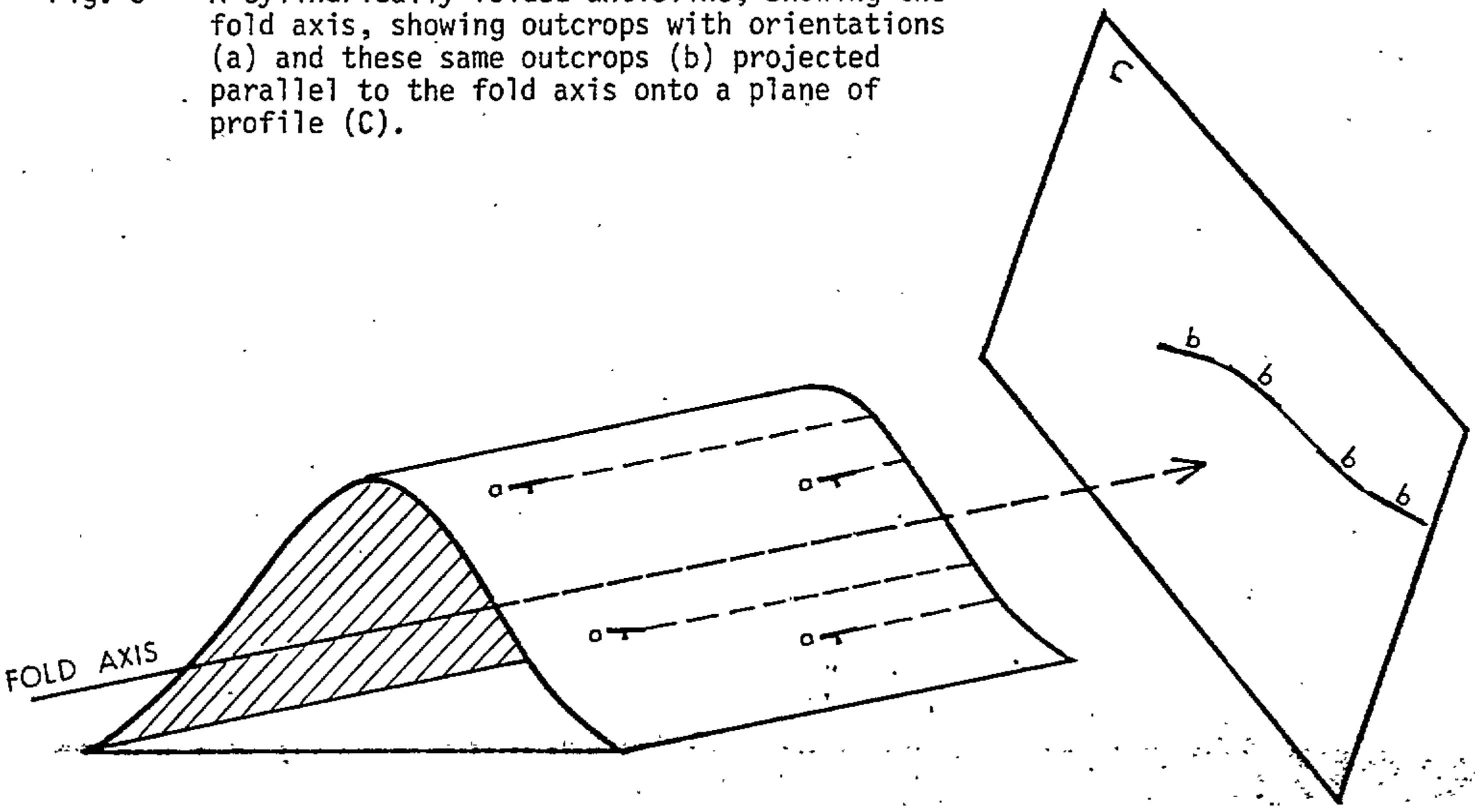
A structure is defined as being cylindrical if a line of fixed orientation (the fold axis) can be used to trace out the bedding surfaces simply by changing the position of the line (Fig. 3). It holds that if a structure displays this property, then all of the data collected on the stratigraphic surfaces may be projected parallel to the fold axis onto a vertical cross-section or an inclined plane or profile. This ideal situation seldom exists in nature so techniques have been developed to test the "goodness of fit" of real data to the cylindrical ideal.

Structural Domains

Outcrop data within the Duke Pit Study limits and within a 500 m perimeter of the area was plotted on a 1:5000 scale outcrop map. These data were examined qualitatively to assess the potential limits of cylindrical domains.

Outcrop information in Duke Pit is severely restricted due to extensive overburden, and generally speaking, outcrop data is only available along the southwest limb of the structure. This limits the use of the cylindrical fold model and planar segments of the structure were examined rather than cylindrical segments. The statistical tests used for defining cylindricity do not apply to this study and accordingly will not be discussed further (See Appendix 6).

Fig. 3 A cylindrically folded anticline, showing the fold axis, showing outcrops with orientations (a) and these same outcrops (b) projected parallel to the fold axis onto a plane of profile (C).



Slice Plots

When cylindrical domains with associated fold axes cannot be proven based upon the outcrop data, the initial stage of geological interpretation is done on "slice plots". Data within narrow strips, centred on the section lines, can be projected onto each line of section. The trend and plunge of the projection axis is based upon the regional structural grain. The projection axis orientation is refined by use of interactive graphics.

This procedure is effective when a large number of drillholes are available. If data is sparse and if these data are projected for a long distance, either a) insufficient data on each section prevents one from arriving at a reasonable interpretation, or b) excessive projection distances make a hodge-podge of the data displayed on each line of section.

Slice Plots (cont'd)

Two sets of slice plots were prepared for the Duke Pit Study. Data from 400 m and 600 m wide slices was projected onto each line of section. These plots provided some initial indications of the geology of the study area. However, the structural geology in some parts of Duke Pit is very complex and all of the data in one slice could not be projected along a single projection axis.

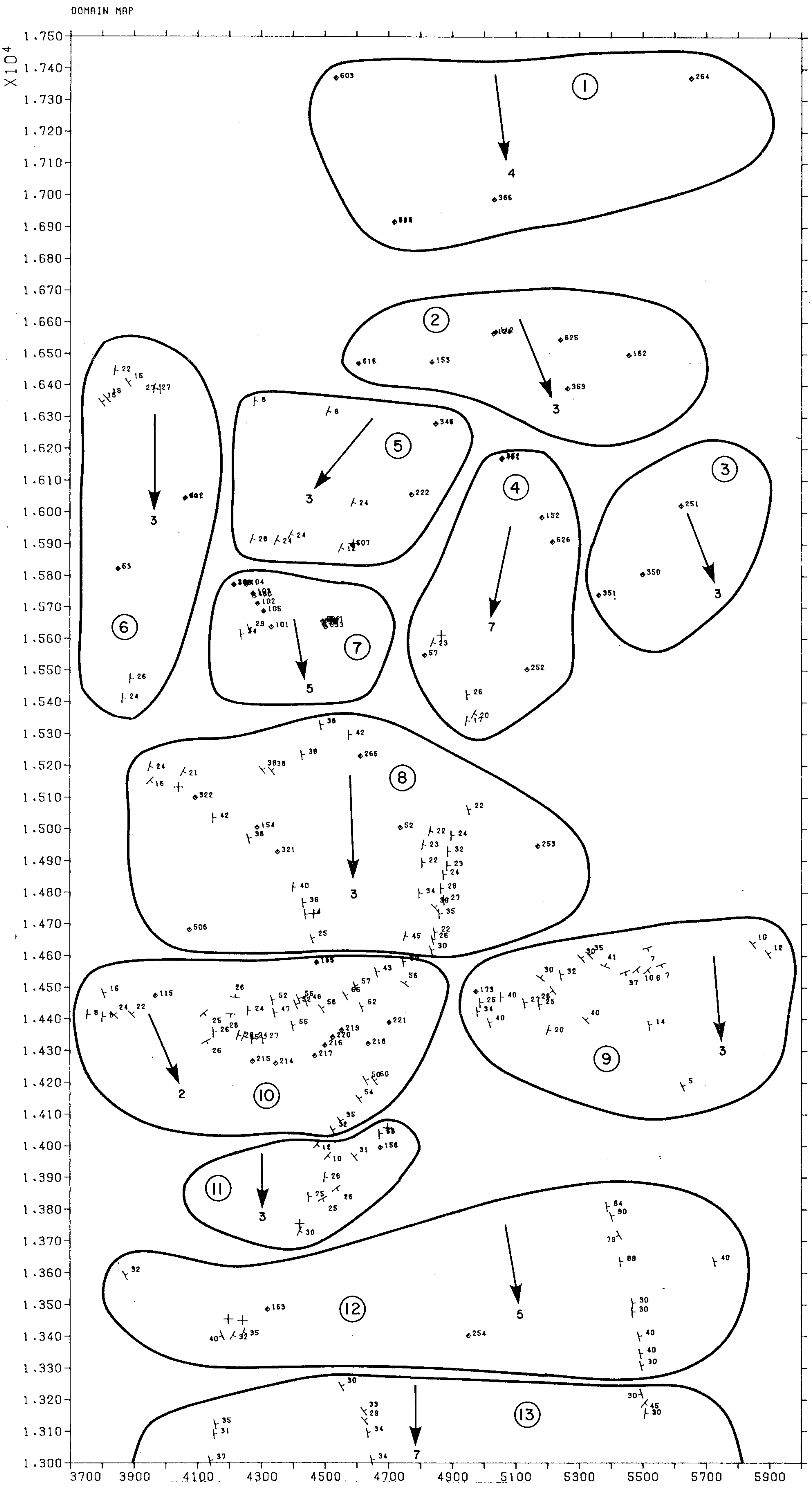
Use of Interactive Graphics

Interactive graphics can be used extensively when cylindrical domains cannot be defined statistically. Surface bedding orientations are examined and general trends of the structural grain are established. Data from specific areas are retrieved and plotted onto a profile. The size of the data set can be changed, the projection axis adjusted and the display updated immediately. This procedure is repeated until the geologist achieves a visual "best fit" of the data while using a projection axis that is compatible with the structural geology of the area.

Data from specific areas in Duke Pit was plotted onto profiles using the TRIPOD package and interactive graphics. Each data set was reviewed using several different projection axes and the data sets were enlarged or reduced until a data set size and a projection axis were combined to produce the most reasonable geological picture for a given area. This procedure was repeated for the entire Duke Pit Area. Thirteen structural domains (Map 3) were finally established. Down-plunge profiles of each structural domain were prepared and these plots were used during preparation of the structure contour grid on the base of B1 Seam.

Composite Plots

Once the structural domains had been established, twelve composite cross-sections at 400 m spacing were prepared. Data from structural domains which straddled the cross-sections were projected parallel to their respective projection axes onto the cross-sections. The geology of Duke Pit was interpreted and drawn onto these cross-sections.



LEGEND

⑩ DOMAIN NUMBER

PROJECTION AXIS

→ 3 - TREND & PLUNGE

PETRO-CANADA RESOURCES

DUKE PIT STRUCTURAL DOMAIN MAP

SCALE 1:10,000

Interpretation

Structural domains defined in Duke Pit are shown on Map 3. The geology was interpreted on both the domain profiles and the twelve composite cross-sections. The subcrop geology from each of the cross-sections was plotted onto the geology maps and the three subcrop geology maps (Maps 6a, b, c) were prepared in this fashion.

Structure Contour Maps

Structure contour maps can be generated from two data sources by using the TRIPOD package. Drillhole intersections and outcrops for a specific horizon can be retrieved and the elevations posted on a map. These values can then be machine or manually contoured.

The second method involves utilizing the down-plunge profiles prepared for each domain. The trace of the horizon of interest is drawn and digitized on each profile. This trace is then projected parallel to the projection axis to create a grid of data points representing the surface of interest. This grid of data points is then combined with the outcrops and drillhole intersections. If necessary, the grid values are adjusted to be compatible with the outcrop and drillhole values. The grid values and the intersected values can then be machine or manually contoured. The TRIPOD package also generates a dip direction and dip at each grid value, therefore it is advantageous to use a contouring package with an algorithm that utilizes orientation data as well as coordinate values.

Surface topography can also be incorporated into the grid of elevations. Overburden isopachs, seam isopachs, interburden and structure contour maps can be generated for any number of surfaces.

6.0 OVERBURDEN

The outcrop data locations and the drillhole information were combined to provide a depth of overburden data base. The interpreted data is represented in two methods, in planar view on Maps 5a, b and c and in section on each cross-section at 400 m spacing.

6.0 OVERBURDEN (cont'd)

On the south map sheet, a localized zone of till from 5 to 25 metres thick has covered a reserve area centred on 14200N, between 4500E and 5500E. A zone of till up to 15 m thick extends from this area in a northern direction onto the centre map sheet. The rest of the south sheet has nominal amounts of till according to the very sparse data base.

The centre sheet contains two areas with thick till. An area around 4500E between 14500N to 15200N contains up to 27 m of till. This irregular shaped area is defined by only two drillholes and urgently requires greater resolution. In all likelihood, it has been interpreted in a liberal method.

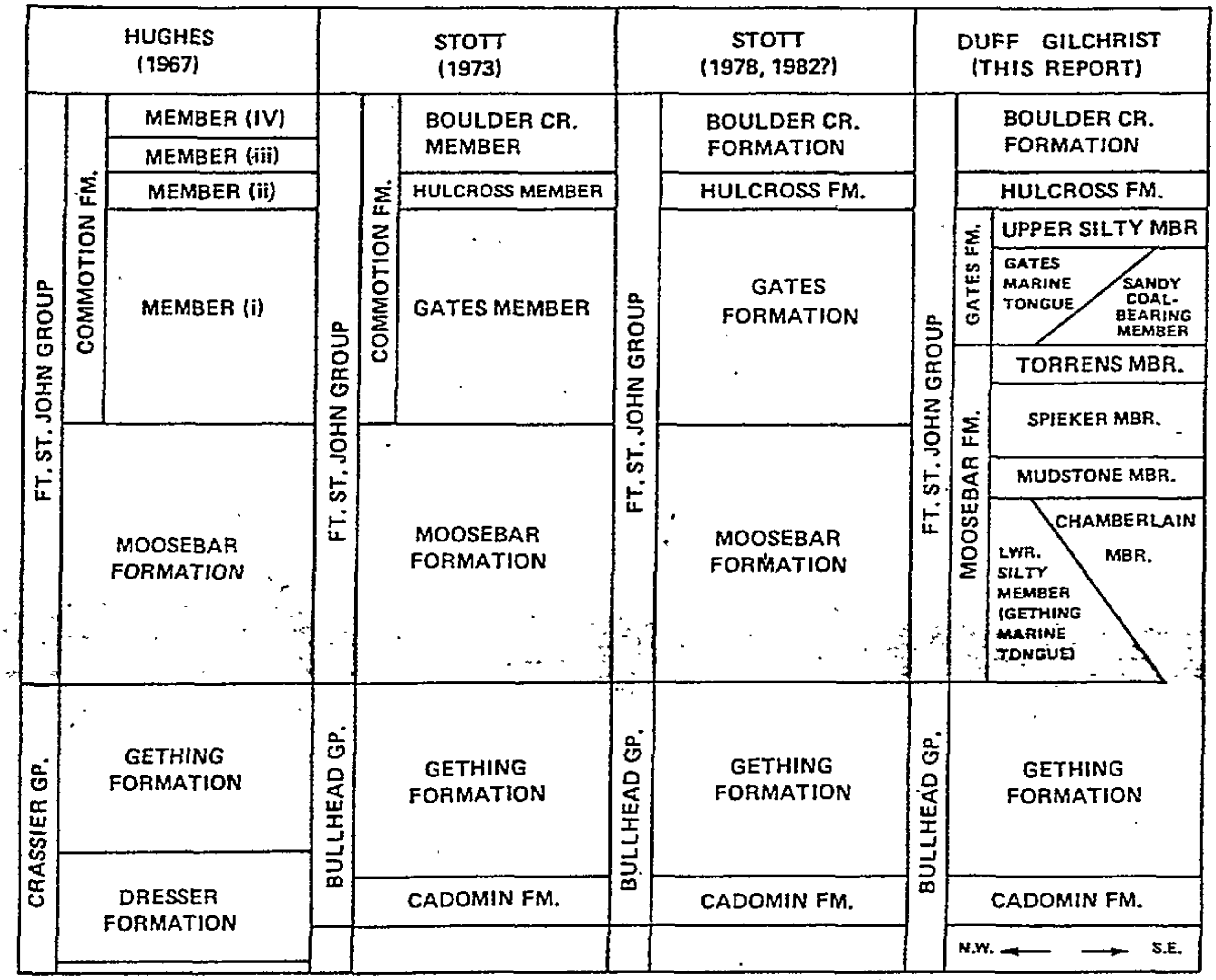
The main area with deep till lies in the northeast corner of the centre sheet and in a large area trending through the centre and eastern portion of north sheet. On the centre sheet the till attains a maximum thickness of 45 m along the northern boundary. Further to the northwest, on the north sheet, the area of deep till covers nearly two-thirds of the map sheet. This till attains a maximum thickness of 100 metres in a north trending linear zone immediately east of 5000E. The thick till will have a major bearing on pit design and coal extraction for the entire northern and eastern part of Duke Pit.

7.0 THE STRATIGRAPHY OF DUKE PIT AREA

7.1 Stratigraphic Nomenclature

During early exploration in the 1970's, the exploration staff used Stott's 1973 nomenclature. The stratigraphy used for this study, however, uses terminology adopted by Duff and Gilchrist (1981) for the southeast section of the Peace River Coalfield (Fig. 4). Extensive exploration throughout the coalfield in recent years has resulted in abandoning the Commotion Formation and elevation of the Gates, Hulcross and Boulder Creek to formational status. In addition, a marine sand and silt unit at the base of the Gates has been moved into the Moosebar Formation. The Torrens Member of the Moosebar Formation is an easily recognizeable unit within the Moosebar Formation and is shown on the maps and cross-sections.

STRATIGRAPHIC NOMENCLATURE



from Duff and Gilchrist, 1981

Fig. 4

7.2 The Minnes Group (Ju)

Although the Minnes Group (Nikinassin Formation equivalent) of Upper Jurassic Age does not outcrop within the map area, it underlies the coal measures everywhere within the project area. The Minnes Group is a thick (+1000 m) unit of generally recessive continental sediments that is mainly comprised of siltstone and sandstone but does contain conglomerate, shale, claystone and thin coal seams.

7.3 The Bullhead Group

The Bullhead Group of Lower Cretaceous Age was deposited following a major hiatus that occurred near the end of the Jurassic Period. The Group contains two formations, the Cadomin Formation and the overlying Gething Formation. Both units outcrop in the study area.

Cadomin Formation

The Cadomin Conglomerate is one of the excellent marker horizons in the Inner Foothills of the Rocky Mountains between Luscar and the Pine Pass. It commonly consists of conglomerate pebbles and cobbles, sandstone matrix and silica cement. A major diagnostic feature in the Monkman area is the inclusion of extremely hard pebbles of green, grey and pink chert. The unit is harder than conglomerates in either the Gates or Gething and exhibits a flat gamma curve. Regionally, the Cadomin Formation varies from 35 m to 150 m. It is assumed to be 50 m thick in the Duke Pit Area.

Gething Formation

In the Monkman Area, the Gething Formation consists of three units. A marine tongue representing the central unit is absent. The lower unit is comprised of mainly thin sands, silts and thin coal seams. The upper unit contains thick clean sandstones and conglomerates and thick continuous coal seams. All of the significant coal seams (A2 and A3) in the Duke Mountain Area lie within the upper unit. The Upper Gething contains, in general, cleaner sandstone units than does the Gates Formation. The clean sandstone at the top of the Gething is correlated to be the Bluesky Formation equivalent (Panchy, 1982).

Gething Formation (cont'd)

The Gething Formation varies from 100 metres thick at Dokken Ridge to 155 metres in the Honeymoon Area and averages about 125 m thick (Panchy, 1982). Within the Duke Pit Area, Table 6.1 below indicates the Gething varies from 115 m to 150 m and averages about 130 m thick. The average thickness of 130 m is used on the cross-sections unless a local drill interval is available.

TABLE 7.1

GETHING FORMATION THICKNESS

Drillhole	True Thickness (m)
MDD-7803	127.8
MDD-7807	126.5
MDD-7808	122.9
MDD-7703	150.1
MDH-8201	115.3
MDH-8204	144.7
	131.0 (average)

7.4 The Fort St. John Group

The Fort St. John Group represents the major Lower Cretaceous depositional sequence. It contains two marine transgressive phases and two phases of predominantly continental clastic deposition. The major coal deposition in this portion of northeast B. C. occurs in the lower thick continental sequence that is sandwiched between two thick intervals of fine-grained marine sediments.

The Moosebar Formation (includes Torrens Member)

The Moosebar Formation was deposited during the southward transgression of the Moosebar Sea. In the Monkman Area, the Moosebar Formation consists of three units, a lower silty member that contains a diagnostic and persistent ash horizon (coded 'P' on the computer data files), a middle sandy member that grades upwards into a coarser-grained sequence and the upper Torrens Member. The Torrens Member is a clean sandstone deposited in a beach-bar environment. For the purposes of this report, the Torrens Member is shown as a separate zone of the Moosebar because it provides a resistant and easily recognizeable marker horizon.

The Moosebar Formation (includes Torrens Member) (cont'd)

Duff and Gilchrist (1981) note the lower member is 15 m thick and the middle 120 metres thick at Babock Mountain to the north. On Saxon Ridge, the lower unit is absent and the middle is only 70 metres thick. On the Duke Mountain Block of the Monkman Property, the combined lower and middle units (excluding the Torrens Member) average about 115 m thick. This is confirmed by the 119 metre thickness in MDH-7922 and the 110 metre thickness in MDD-7804. In this report, a thickness of 110 to 115 metres is commonly used.

The Torrens Member varies from 14 metres thick to over 30 metres. Numerous intersections of the Torrens Member provide adequate control, however where data is lacking a thickness of 20 m to 25 m is used.

Gates Formation

The Gates Formation is the thickest unit in the Lower Cretaceous and also the best understood because it contains the primary economic coal measures in this area. The data base for the Gates Formation on this property and adjoining properties (Quintette, Belcourt and Saxon) is very extensive.

According to Duff et al (1981), the Gates Formation consists of two members in the Monkman area. The lower Sandy Coal Bearing Member varies from 150 m to 170 m thick (thickening southwards). Local changes of 20 to 30 metres in thickness are common. Drillhole data at Duke Mountain suggest an average thickness of 190 m for this unit.

The Sandy Coal Bearing Member consists predominantly of mudstones and siltstones with numerous sandstone zones and thin claystone and shale units. Coal Seams B1 to B9 all occur within this unit. They are described in detail in Section 8. The correlation chart (Fig. 5) indicates the strata included in the Sandy Coal Bearing Member.

Conformably overlying the Sandy Coal Bearing Member is the Upper Silty Member. It is commonly about 50 m thick. The upper contact is gradational into the Hulcross (Stott, 1968) but shown to be unconformable by Carmichael (1983). The Upper Silty Member is comprised of fine-grained

Gates Formation (cont'd)

siltstone. Three coal seams (B10, B11 and B12) usually occur within this unit. B10 Seam and B12 Seam are persistent within the Pit Area, however B11 Seam does shale out occasionally.

The Gates Formation is shown by drillhole data to average 240 metres thick within Duke Pit (see Table 6.2 below). Where local drillhole definition is absent, a thickness of 240 metres is used.

TABLE 7.2
GATES FORMATION UNIT THICKNESS

Drillhole	Thickness (m)
MDD-7822	251
MDD-7902	249
MDD-7905	241
MDD-7906	234
MDD-7914	233
	240 (average)

The Hulcross Formation

The Hulcross Formation represents a major marine incursion from the north and, accordingly, thins to the southeast. The lower contact is a fining upward sequence that may or may not be conformable with the underlying Gates Formation. The lower unit is a fining upward sequence that is characterized by thinly laminated siltstone that is dark in color and contains numerous very thin light colored fine-grained sand bands. This thinly laminated texture is a diagnostic feature that makes the Hulcross readily distinguishable from the Moosebar Formation. The Hullcross averages about 85 metres in thickness as evidenced by Table 6.3 below.

TABLE 7.3
HULCROSS FORMATION THICKNESS

Drillhole	Unit Thickness (m)
MDD-7822	83.3
MDH-7912	84.6
MDD-7903	80.1
MDD-7906	86.3
MDH-7904	80.5
	83.0 (average)

The Boulder Creek Formation (K_l)

The Boulder Creek Formation is a remarkably consistant, clean conglomerate and sandstone unit containing rare fine-grained clastics and thin coal zones. None of the coal zones are recognized to have commercial importance. Because of the high coarse-grained silica content the unit is very resistant and commonly forms resistant ridges and provides a craggy capping to mountain tops such as Babcock Mountain and Duke Syncline area of Duke Mountain.

Duff et al (1981) notes the unit is from 107 m to 122 m in thickness with the thicker interval to the north. Plachner et al (1981) estimates the thickness to be 150 m. Where required, a general thickness of 150 m is used for the Boulder Creek Formation.

Shaftsbury Formation (Ku)

The youngest strata in the project area is the Upper Cretaceous Shaftsbury Formation. This unit is predominantly shale that contains Belemnites. To the northwest, the unit partially grades into the Hasler Formation. No thickness is ascribed to this unit.

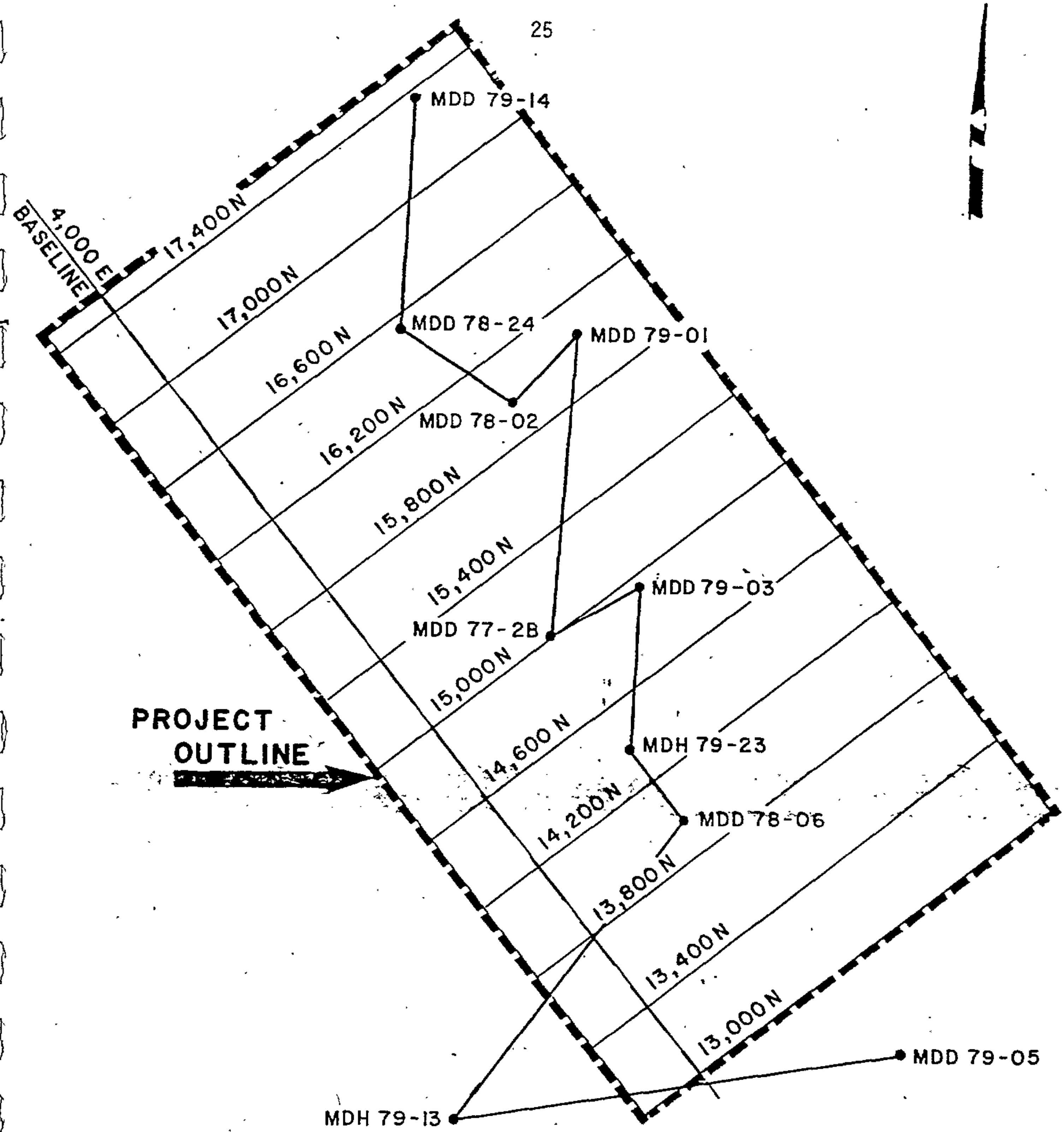
8.0 COAL SEAM DEVELOPMENT (see Fig. 5 and Map 4)

8.1 B1 Seam

B1 Seam usually lies less than 5 metres above the Torrens Sandstone and the base of the Gates Formation. The coal seam is continuous throughout the property and is a single clean coal zone at the south and north ends of Duke Pit. In the central part of the pit, up to two shale partings often occur. B1 Seam exhibits a thickening trend from southeast to northwest. South and west of Duke Pit, B1 Seam is less than 1 metre thick, and it thickens progressively north to Section 16000N where the thickness often exceeds 5 metres at the east side of the pit.

8.2 B2 Seam

B2 Seam is a thin reasonably continuous coal seam. It lies 15 m to 30 m above B1 Seam and contains a rock parting only in the area around



PETRO-CANADA RESOURCES

PETRO-CANADA

DUKE PIT

DRILL HOLES USED IN CORRELATION CHART

DRAWN BY: Sb	CHECKED: L.A.S.	DATE: 83/12
COMPILED BY: L.A.S.	CLIENT APPL	DWG NO: MAP 4
	SCALE: 1:25,000	FILE NO.

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8.2 B2 Seam (cont'd)

Section 14000N. The seam is absent in the western portion of the northwest end of the pit. B2 Seam will not contribute a significant amount of coal reserves in any part of the pit due to its thin development.

8.3 B3 Seam

B3 Seam is a very persistent and major seam that will be mined in all areas of the pit. It lies from 15 m to 25 m above B2 Seam. Although it contains partings in all areas, it is unlikely that any of the rock partings can be wasted due to thin development. The seam varies from less than 4 metres thick to in excess of 12 metres with the thickest development occurring in areas where the coal seam appears structurally thickened. A thin coal zone sporadically occurs below the base of the main seam and will not be included in the pit reserves in any part of Duke Pit.

8.4 B4 Seam

B4 Seam is the thickest coal seam developed within Duke Pit. Within the pit area it varies from about 7 m to 15 m in thickness. There are three distinct parts to the coal seam. The lower zone is always the cleanest. This zone is separated from the central portion by a rock parting that starts at 15000N and thickens to about 2 m thick by Section 13000N. The central portion contains predominantly coal with a few thin partings. This zone does not achieve the low ash quality of the lower zone in any portion of the pit. It will represent pit reserves in all areas except the outcrop area (west portion) of Sections 14000N and 13000N. Here it shales to the west and is absent to the west of Duke Pit (see MDH 79-13 on Fig. 5). The upper coal zone is developed in Sections 17000N and 16000N and progressively shales to the south. At Section 15000N, the upper zone is represnted by a slightly carbonaceous shale. It is absent further south. Detailed coal quality studies are required to establish where this upper zone will contribute coal.

A major period of siltstone deposition occurs above B4 Seam. The unit is 20 to 50 metres thick and is barren of coaly material.

8.5 B5 Seam

B5 Seam was deposited over a thick (20 m to 50 m) succession of fine-grained sediments. Although B5 Seam will, in all probability, provide plant feed in all areas of Duke Pit, two areas may provide coal with very high ash content. These areas are at both extreme ends of the pit, Section 13000N where the material is very shaly, and 17000N where, to the east of the pit, B5 Seam is extremely thin. Generally B5 Seam is 2 to 4 metres thick and commonly contains splits and partings.

8.6 B6 Seam

B6 Seam is a coal zone that is continuous throughout Duke Pit. It lies about 20 m above B5 Seam and is, in all localities, either two separate coal zones with a 1 m to 3 m parting, or else a single coal zone with the other undeveloped. It is unlikely that B6 Seam will contribute coal reserves to the mine.

8.7 B7 Seam

B7 Seam occurs in the western part of Duke Pit and overlies B6 Seam by 2 m to 15 m but usually about 8 m. B7 Seam is less than 3 m thick but is of mineable thickness in all areas except the east central portion of Duke Pit.

8.8 B8 Seam

B8 Seam represents a continuous but thin and dirty coal zone. At the north end of the pit, it immediately overlies B7 Seam. At the south end of Duke Pit, it is separated from B7 Seam by about 30 m of rock. B8 Seam will not likely contribute coal to run of mine coal reserves.

8.9 B9 Seam

B9 Seam varies from 1.5 m to 4 m thick in the Duke Pit Area. It is likely that it will contribute reserves. It is generally quite clean with only rare partings and splits. At the very south end of the pit it attains a maximum thickness of greater than 4 m. To the west of Section 13000N, it is split into two zones that together represent in excess of 5 m of coal.

8.10 Upper Seams (B10, B11 & B12)

In the upper 50 m to 80 m of Gates Strata (and equivalent to the Upper Silty Member of Duff et al, 1981), three coal seams occur. The lowest, B10, is thin and persistent throughout. The middle seam, B11, is thin and split in some localities.. It is absent in some locations around 16000N and is split into two coal seams at Section 15000N and 15400N. B12 Seam is always present and always thin, generally less than 1 m. It is unlikely that these 3 seams will represent mineable coal reserves except in isolated localities.

8.11 Structurally Thickened Coal

In those areas of the pit where the structures are very tight and complex, structural thickening of the coal seams is indicated. In particular, the hinge zone of Quintette Syncline between Sections 16200N and 17000N appears to contain structurally thickened coal seams. Additional drilling will undoubtedly identify local areas with structurally thickened coal seams.

9.0 STRUCTURAL GEOLOGY OF DUKE PIT

9.1 Introduction

The structural geology of the coal-bearing strata in Duke Pit is a complex association of folding and thrust faulting. The earliest phase of structural deformation appears to be thrust faulting. This was followed by folding and continued development of the thrusts.

The study area is bounded to the east by the Quintette Thrust. Strata in this thrust sheet ranges from Minnes Formation to Hulcross Formation rocks. The Duke Thrust Fault, which is a splay from Quintette Thrust, overlies the Quintette Thrust Sheet. Minnes to Shaftsbury Strata lie within the Duke Thrust Sheet.

Folding during and after thrusting altered the geometry of the rocks within the two thrust sheets. From east to west the major folds are Quintette Syncline, Duke Anticline and Duke Syncline. Duke Anticline and Duke Syncline lie to the west of the study area. The steep orientation of

9.1 Introduction (cont'd)

Quintette and Duke Thrusts at the subcrop are due to the later phase of folding. The surfaces of both thrust faults have been folded below the strata of Duke Pit. Thrusting continued during this period of folding, as evidenced by the variation in the geometry of the folded strata in each of the thrust sheets.

The mechanism of folding is flexural slip movement. It has resulted in structural thickening of the coal seams with associated shortening in the more competent units by small thrusts and folds.

9.2 Quintette Thrust Sheet

Drillhole MDD 78-12 suggests that the Quintette Thrust Fault is a major structure separating the Duke and Honeymoon areas. Moosebar strata overlies badly fractured and sheared Boulder Creek rocks. The stratigraphic throw on the fault is estimated to be in the order of 400 to 500 m, however, there is very little information to confirm this. The Quintette Thrust overlies the entire Duke Pit and Duke Mountain Area. The fault developed early in the structural history of the area and was folded during later structural deformation. It has probably originated as a splay from a deeper seated sole thrust, that may be located in the underlying Fernie Formation.

Near the subcrop in the north end of the study area, the thrust dips to the west at about 60°. It steepens to approximately 65° near Section 16600N and then shallows to 40°to 50° in a southerly direction. This thrust gradually cuts up section in a southerly direction. At the north end of the study area, Moosebar Strata to B3 Seam subcrops in the Quintette Thrust Sheet whereas further to the south, B4 to B9 Seams subcrop. The surface trace of the thrust extends off the map sheet in a southeasterly direction near Section 15400N. It continues in this direction for an unknown distance.

9.3 Duke Thrust Sheet

The Duke Thrust Fault has probably developed as a splay from Quintette Thrust. The stratigraphic throw is estimated to be approximately 100 m.

9.3 Duke Thrust Sheet (cont'd)

In the north end of the study area, the fault dips to the west at about 60°. It steepens to about 65° near section 16600N and then becomes slightly shallower to about 55° to the south. This thrust is folded below Duke Pit and may reverse its orientation to east dipping further to the west.

Coal seams located in the footwall strata of Duke Thrust may be structurally thickened near the plane of the thrust. Along Section 17000N the footwall strata are folded into a tight syncline and Duke Thrust terminates the western limb of the syncline close to the hinge zone. Both B3 and B4 Seams appear to be structurally thickened (MH-8066).

Duke Thrust cuts up section to the southeast. Strata sub-cropping against the surface trace of the thrust range from Moosebar Strata in the north to Hullcross Strata near Section 15000N. South of Section 14600N, the thrust extends off the map sheet to the southeast.

Drillholes MDD 78-02, MH 80-51 and MH 80-66 intersect and define the thrust fault. Additional information is available in the footwall of the thrust from drillholes MDD 79-01, MH 80-50 and MH 80-53. This limited data base is inadequate to define the structure in anything but an approximate manner.

9.4 Quintette Syncline

Most of the Duke Pit Study Area lies in Quintette Syncline. The western limb of the structure forms a dip slope along the eastern slope of Duke Mountain and the eastern limb is truncated by Duke Thrust Fault. The geometry and structural geology of the syncline changes dramatically from north to south. In the north end, it is a tight fold closely associated with thrusting, and in the south it is an open less complex structure.

The fold axes (projection axes) and structural domains, shown on Map 3, are only approximations. They have been determined by interactive graphics and honor the data base, but they have no statistical basis. Consequently, additional data collection and geological interpretation will alter these values, and as a result refine the structural interpretation to a greater degree.

9.4 Quintette Syncline (cont'd)

Generally, the syncline trends at approximately 175° and plunges south at 5°. This trend and plunge is fairly constant south of Section 15400N except for Sections 14600N and 14200N west of 4900E. Here the structure is complicated by a small thrust (drillhole MDH 79-21) which repeats Seams B6 and B7 in the subsurface. Seams B8 and B9 are probably repeated near the surface (Map 5b). The fault is interpreted to flatten into an underlying coal seam (B5). It may repeat additional strata lower down in the stratigraphic succession.

The mechanism of structural deformation appears to be flexural slip movement. This is confirmed by the large number of small scale faults and bedding plane slickenside striae noted in the core descriptions. Small thrusts can be expected to be common in the limbs and hinge zone of the syncline. Mesoscopic scale structural features and areas of coal zone thickening have not been represented on the cross-sections because the limited data base prevents adequate definition of these structures.

North of Section 15400N the structural geology of Quintette Syncline becomes more complex. The central portion of the structure continues to plunge to the south but the trend has changed to about 190°, whereas the western limb of the structure becomes much steeper and trends at 220°. Near Section 16200N the syncline fold axis trends about 160° and plunges at about 3°. Here the fold becomes very tight. Between Sections 16200N and 16600N the fold axis trends at 160° but the plunge flattens to 0°. Further north, the syncline axis trends at 170° and plunges 4° to the south.

An easterly dipping thrust fault with about 70 m of stratigraphic throw is present in the Moosebar Formation in drillhole MDD 78-03. The origin of the fault is uncertain. It may have developed as a shortening mechanism in the Moosebar Formation due to the tight folding or it may be a more significant thrust related to deeper structural features. Almost certainly the abrupt change in the orientation of the syncline and the steepening of the limbs of the syncline are related to underlying structural changes. These changes may be related to a change in the geometry or the nature of the underlying thrust faults.

9.4 Quintette Syncline (cont'd)

The hinge zone of Quintette Syncline has not been drilled. Coal seams may be structurally thickened in the hinge zone, particularly where the structure changes trend and in the north, where it is very tight (Map 5c). B3 Seam is structurally thickened in drillhole MDD 78-02 (Section 16200N). B4 Seam is very thick in this hole but it appears to be stratigraphic rather than structural thickening.

9.5 Structure Contour Maps, Base of B1 Seam

Structure contour maps were prepared on the base of B1 Seam for both the Quintette and Duke Thrust Sheets. Elevations of B1 Seam in the Duke Thrust Sheet range from a minimum of 585 m in the centre of Quintette Syncline to 1560 m on the southern end of the eastern limb of the syncline. The base of B1 Seam has been encountered by twenty drillholes in the Duke Thrust Sheet. The data points are poorly distributed on the map sheets with four in the south, twelve in the centre and four in the north, respectively. Many of the data points are closely grouped, especially on the centre sheet. Considering the limited data base, the structure contours on the base of B1 Seam can be defined in only an approximate manner. Elevations of B1 Seam in Quintette Thrust Sheet range from 915 to 600 m.

Two data points are located on the centre map sheet and one on the north sheet. The structure contour maps on the base of B1 Seam in the Quintette Thrust Sheet are, accordingly, only an approximation.

The structure contour maps confirm the structural trends discussed in the Sections 9.2 to 9.4. In the Quintette Thrust Sheet, the structure contour maps indicate a reversal of the plunge of Quintette Syncline between Sections 16600N and 16200N. Here the syncline axis trends at 330° and plunges 14°. With the exception of this area, Quintette Syncline plunges in a southerly direction in both Duke and Quintette Thrust Sheets.

10.0 EXPLORATION REQUIREMENTS

10.1 Exploration Concepts

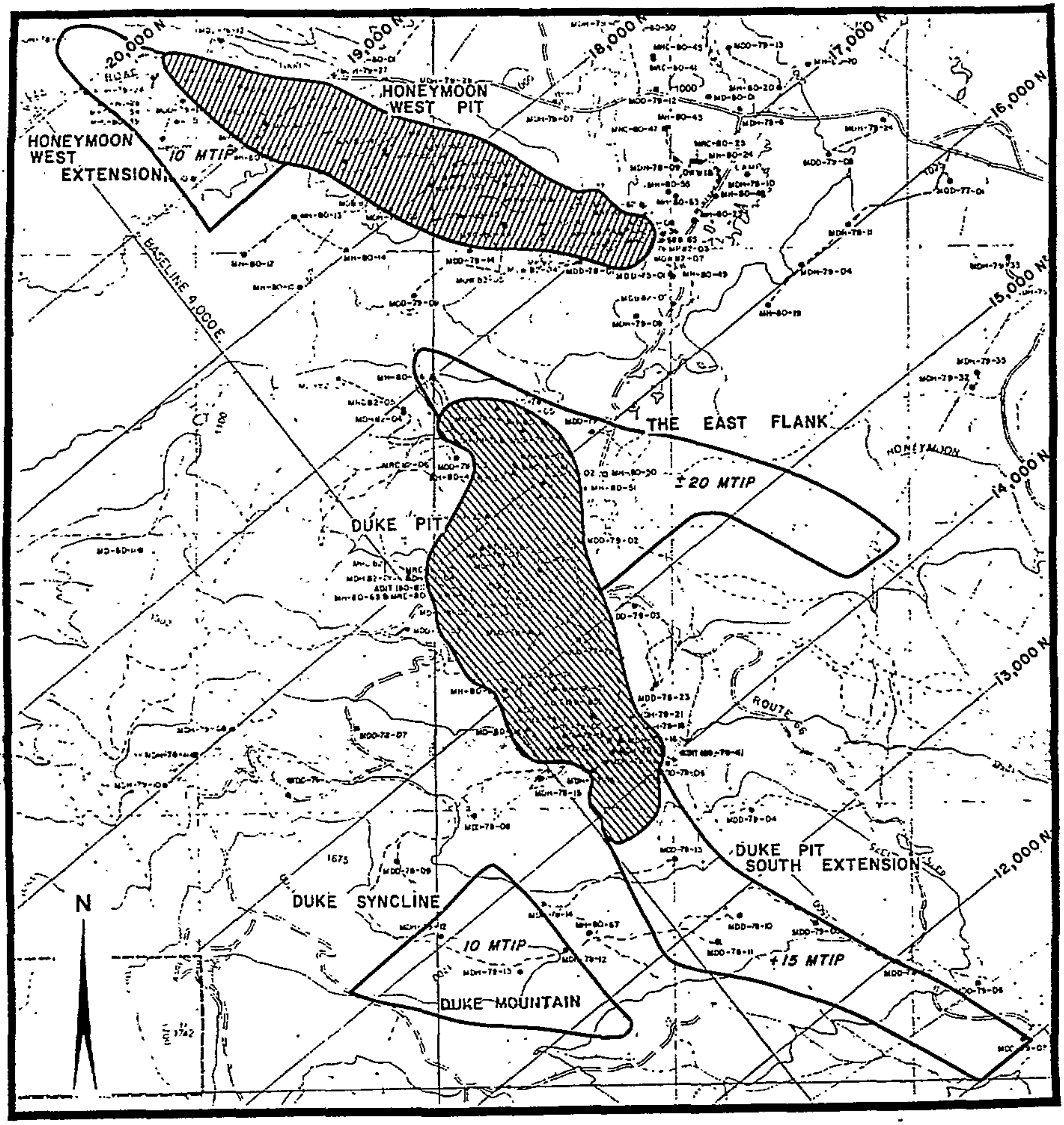
The role of exploration in a pit is to provide a geological interpretation in sufficient detail and at a level of confidence suitable for the required engineering studies. At present, the data base for Duke Pit is sufficient to provide an interpretation on 1:2000 scale, but lacks the level of confidence required for detailed mine planning. Prior to detailed mine planning, additional data collection and interpretation is necessary to resolve certain problems identified by this and other studies. In addition, exploration is required to confirm possible reserve extensions in at least two areas.

10.2 Geological Mapping

All of the outcrop data has been collected on 1:5000 scale without careful identification of stratigraphic horizons, collection of multiple orientations and proper plotting of the outcrop locations. This data must now be re-collected because the requirements call for detailed geology for mine planning purposes. Attention must be paid to detailed geology and additional traverses are required to collect data in many areas not already mapped. It is estimated that 20 to 30 days with a two-man crew (geologist and assistant) will be sufficient to collect all the outcrop data that is available.

10.3 Reserve Extensions (see Map 8)

Indicated reserve extensions in two areas, Duke Pit South Extension and The East Flank on Sections 14000N to Section 17000N, require evaluation for probable reserve additions. These areas are significant because they could provide up to a 35 megatonne in-place reserve expansion within Duke Pit. The 3000 m zone from Section 12000N to 11000N has an adequate data base for a preliminary evaluation of the Duke Pit South Extension. The East Flank portion of Duke Pit will require additional drilling information to prove and delineate the reserve area. The drill program should be designed to progressively test the structures both in an easterly direction (along section) and in a southeasterly direction (along structural trend) in order to fully delineate the potential reserve area.



Legend

Recognized Reserve Area

Potential Reserve Addition

Note:
RESOURCES LISTED AS MTIP
(MEGATONNES IN PLACE)

SCALE: 0 1 2 km

PETRO-CANADA RESOURCES
DUKE PIT
POTENTIAL
RESERVE ADDITIONS

10.3 Reserve Extensions (see Map 8) (cont'd)

Two smaller, but potentially significant open pit reserve areas that require evaluation are the Gates coal measures at the south end of Duke Syncline and the Gates and Gething coal measures at the north end of Quintette Syncline (Honeymoon West Extension). The Duke Syncline prospect has potential for a mining situation similar to 4 Pit at Tent Mountain. The backwall area progressively reaches higher ratios and the cutoff can be chosen at an economically attractive position. An estimate of up to 10 megatonnes in-place coal resource awaits evaluation. The Honeymoon West Extension is of interest because the very steep structure at the nose of Honeymoon Syncline will likely contain structurally thickened coal zones within the hinge zone. Possible coal resources in the order of 5 to 10 megatonnes in-place may occur and add significantly to the Honeymoon West reserve.

10.4 Drilling Requirements

Duke Pit South Sheet

In order to provide a suitable reserve definition, additional rotary drilling with spot coring is recommended as follows:

TABLE 10.1

SOUTH SHEET DRILLING REQUIREMENTS

Section	No. of Drillholes
13000N	3
13500N	2
14000N	1
14500N	1
Total:	7

The above drilling will provide sufficient detail to place all open pit coal reserves into the probable category, and a large portion will be proven. Additional definition would not be required until pre-development drilling commences.

10.4 Drilling Requirements (cont'd)

Duke Pit Centre Sheet

There are several problems that require resolution in the centre sheet. Of paramount importance is resolution of the East Flank geology. Along the West Flank (Duke Pit as presently defined), additional work must be performed to define the fault structures. The amount of drilling required for proper definition of the East Flank will depend upon the size, complexity and reserve potential of that very interesting resource area.

Duke Pit North Sheet

Drilling requirements in the north sheet are necessary to solve two related problems - definition of the complicated structures and to outline the mineable reserve areas. This program will have to be well planned and coordinated with engineering input to ensure that the areas with mineable reserves are properly defined. All three fault structures require definition throughout the reserve area, the fold hinge and limbs require definition, and the coal-bearing strata must be drilled to the north beyond the pit endwall. In addition, the overburden thickness must be defined in greater detail. The drill program should be used in conjunction with a surface geophysical program.

10.5 Surface Geophysics

Surface geophysical techniques can be used to provide information concerning subcrop geology, bedrock topography and till thickness and composition. Seismic, resistivity and EM surveys may be employed. A combination of several techniques is often necessary in areas with rapid variations in overburden thickness and the extremely thick zones of till encountered in some areas. These techniques should be reviewed by Petro-Canada mining staff as a possible method of rapidly and inexpensively mapping the till thickness in the northern part of Duke Pit.

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A P P E N D I X   I

STRATIGRAPHIC CODE

DUKE MOUNTAIN STRATIGRAPHIC CODE

Shaftsbury Formation	S
Boulder Creek Formation	B
Hullcross Formation	H
Tonstein Bed	Q
Gates Formation	G

SEAMS

Base 12 Seam	Z
Base 11 Seam	Y
Base 10 Seam	X
Base 9 Seam	9
Base 8 Seam	8
Base 7 Seam	7
Base 6 Seam	6
Base 5 Seam	5
Base 4 Seam	4
Base 3 Seam	3
Base 2 Seam	2
Base 1 Seam	1
Unidentified	U
Torrens Member	T
Moosebar Formation	M
k-ash bed	P
Gething Formation	E
Base of Gething Coal Seam	O
Cadomin Formation	C
Minnes Group	N
Fault	F

APPENDIX II

DRILLHOLE NUMBERING CODE

DRILLHOLE NUMBERING CODE

Computer File Drillhole No.	Petro-Canada Drillhole No.
1	MQD 75-01
11	MDD 76-11
52	MDD 77-02B
53	MDD 77-03
57	MDD 77-07
58	MDD 77-08
101	MDH 78-01
102	MDH 78-02
103	MDH 78-03
104	-04
105	-05
112	-12
114	-14
115	-15
121	-21
151	MDD 78-01
152	-02
153	-03
154	-04
155	MDD 78-05
156	-06
157	-07
158	-08
159	MDD 78-09
160	-10
161	-11
162	-12
163	MDD 78-13
172	-22
173	-23
174	-24
204	MDH 79-04
205	-05
208	-08
209	-09
210	MDH 79-10
211	-11
212	-12
213	-13

Computer File Drillhole No.		Petro-Canada Drillhole No.
214		MDH 79-14
215		-15
216		-16
217		-17
218	O.B.	MDH 79-18
219		-19
220		-20
221		-21
222		MDH 79-22
226		-26
232		-32
235		-35
251		MDD 79-01
252		-02
253		-03
254		-04
255		-05
256		MDD 79-06
259	O.B.	-09
264		-14
266		-16
307		MH 80-07
308	O.B.	-08
310	O.B.	-10
312	O.B.	-12
313	O.B.	-13
314	O.B.	-14
315	O.B.	-15
317	O.B.	-17
319		MH 80-19
321		-21
322		-22
334	O.B.	MH 80-34
338		-38
339		-39
340		-40
346		MH 80-46
349		-49
350		-50
351		-51

Computer File Drillhole No.		Petro-Canada Drillhole No.
352		MH 80-52
353		-53
357		-57
366		MH 80-66
367		-67
368		-68
442		MRC 80-42
444		-44
459		-59
460		-60
461		-61
469		-69
506		MD 80-06
507		-07
511		-11
601		MDH 82-01
603		-03
604		-04
612		MRC 82-02
615		-05
616		-06
621	O.B.	MOB 82-01
622	O.B.	-02
625	O.B.	-05
626	O.B.	-06
632		MOW 82-02
633		-03
634		-04
635		-05
641		MP 82-01
642		-02

APPENDIX III

DUKE PIT RAW DATA

OUTCROP AND DRILLHOLE DATA

>	30	G1	5883	17787	945
>	450	G1	5896	17746	950
>	31	G1	6169	17589	943
>	451	G1	6170	17550	942
>	34	H1	2992	13605	1658
>	452	H1	3014	13552	1663
>	453	H1	3052	13493	1640
>	46	H1	4622	13163	1540
>	454	H1	4624	13134	1554
>	47	H1	4633	13096	1568
>	455	B1	4646	13009	1571
>	50	41	4155	13122	1600
>	456	41	4151	13092	1599
>	53	H1	4769	12554	1520
>	457	H1	4823	12475	1526
>	54	H1	4766	12440	1509
>	458	H1	4819	12404	1516
>	55	H1	4857	12383	1518
>	459	H1	4834	12364	1510
>	460	H1	4847	12305	1495
>	57	E1	3798	12590	1466
>	461	E1	3818	12561	1460
>	462	E1	3818	12546	1459
>	463	E1	3839	12497	1457
>	59	E1	3610	12603	1445
>	464	E1	3604	12580	1442
>	62	E1	3577	12489	1431
>	465	E1	3613	12469	1426
>	466	E1	3618	12433	1419
>	189	C1	4046	17850	1075
>	467	C1	4049	17817	1075
>	194	C1	3294	17659	1138
>	468	C1	3357	17642	1146
>	469	C1	3409	17650	1147
>	195	N1	3275	17727	1093
>	470	N1	3249	17686	1115
>	196	C1	3265	17564	1152
>	471	C1	3349	17531	1122
>	198	C1	3198	17450	1186
>	472	C1	3195	17428	1202
>	473	C1	3206	17417	1202
>	474	C1	3221	17396	1202
>	199	C1	3140	17393	1227
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> 3219 3     71.6
> 3219 4     78.3
> 3219 5     79.4
> 3219 64    82.9
> 3229 1     14.5
> 3229 21    17.8
> 3409 1     20.1
> 3409 29    22.6
> 3409 3     25.9
> 3409 4     26.3
> 3409 5     29.9
> 3409 68    30.3
> 3409 7     46.4
> 3409 87    48.7
> 3409 9     64.1
> 340910     64.6
> 340911     73.5
> 3409126    74.0
> 340913    106.8
> 3409145   111.0
```

```
> 340915   116.0
> 3409164  123.2
> 340917   144.2
> 3409183  148.2
> 6349 1    26.8
> 6349 2X   27.7
> 6349 3    50.0
> 6349 49   52.8
> 6349 5    56.0
> 6349 68   60.8
> 6349 7    82.2
> 6349 87   82.9
> 6349 9   100.2
> 634910   101.3
> 634911   108.3
> 6349126  109.3
> 634913   135.8
> 6349145  140.4
> 634915   154.7
> 6349164  162.0
> 634917   181.3
> 6349183  185.4
> 634919   221.4
> 6349201  225.3
> 6359 1    24.2
> 6359 2X   25.2
> 6359 3    47.0
> 6359 49   49.7
> 6359 5    53.4
> 6359 6    54.0
> 6359 7    56.2
> 6359 88   56.6
> 6359 9    77.2
> 6359107   80.0
> 635911   104.8
> 635912   105.2
> 635913   106.8
> 6359146  107.3
> 635915   135.5
> 6359165  140.0
> 635917   151.3
> 6359184  158.8
> 635919   178.7
> 6359203  182.8
> 635921   217.4
> 635922   220.9
> 6429 1    24.0
> 6429 2X   24.8
> 6429 3    47.4
> 6429 49   50.2
> 6429 5    53.8
> 6429 6    54.4
> 6429 7    57.0
> 6429 88   58.4
> 6429 9    80.6
> 6429107   81.2
> 642911    98.8
> 642912    99.8
> 642913   107.8
> 6429146  108.2
> 642915   136.4
> 6429165  141.0
> 642917   154.8
> 6429184  162.4
> 642919   182.2
> 6429203  186.2
> 642921   222.0
> 6429221  225.4
> 3579 1    57.5
> 3579 23   61.5
> 3689 1F   15.0
> 3689 2    20.5
> 3689 31   23.6
> 3679 1P   75.7
> 3679 2E  112.0
> 3679 3   123.5
> 3679 40  123.9
> 3679 5   126.7
> 3679 6   127.4
> 3679 7   134.3
```

```
> 3679 80  134.7
> 3679 9   135.6
> 3679100  136.3
> 4429 1    29.9
> 4429 27   32.4
> 4429 3    48.2
> 4429 4    49.4
> 4429 5    55.8
> 4429 66   56.3
> 4429 7    69.8
> 4429 85   75.8
> 4429 9   107.3
> 4429104  113.5
> 442911   132.6
> 4429123  136.6
> 442913   171.5
> 4429141  175.1
> 4449 1    20.4
> 4449 29   22.9
> 4449 3    26.2
> 4449 48   31.0
> 4449 5    47.2
> 4449 67   49.7
> 4449 7    65.2
> 4449 8    65.7
> 4449 9    74.2
> 4449106   74.7
> 444911   107.6
> 4449125  111.9
> 444913   117.3
> 4449144  124.3
> 444915   145.1
> 4449163  149.0
> 444917   183.6
> 4449181  186.7
> 4699 1    10.5
> 4699 2    12.0
> 4699 3    15.5
> 4699 42   16.1
> 4699 5    19.0
> 4699 6    19.7
> 4699 7    21.4
> 4699 81   24.8
> 4699 9T   26.8
> 1149 1P   12.5
> 1149 2E   52.0
> 1149 3    63.7
> 1149 40   64.4
> 1149 5    91.8
> 1149 60   93.9
> 1149 7   158.8
> 1149 80  160.3
> 1149 9   170.2
> 1149100  171.0
#T=1.366 DR=0   $2.42,    $6.67T
#
```

DRILLHOLE DEVIATION DATA

- Hole #
- Easting
- Northing
- Elevation
- Hole Trend
- Hole Plunge
- Hole T.D. -ve for deviated hole
- overburden
- deviation readings →: depth, trend, 90-plunge, etc.

1028 538 3851 15822 1216 16988 -190 5 15169 3 30170 3 3
8166 3 39166 3 46169 3 61173 3 66171 3 69173 3 70173
3 76175 3 91182 3 107186 4 122188 4 124189 4 137194 4 145
196 5 146193 4 152196 5 155195 5 156196 5 168194 5 183198 5
186199 5

1029 578 4814 15549107419290 -209 4 69213 0 70225 1 7
2216 1 73217 1 86226 1 90232 1 91230 1 107237 1 122236
1 131244 1 137240 1 142250 1 152253 2 159257 2 168259 2 173
263 2 176263 2 183255 2 187258 2 191257 2 198261 2 204264 3

1030 528 4738 15005113929888 -336 22 30298 2 40297 2 4
1298 2 46298 2 57297 2 61296 2 76295 2 78295 2 91290
2 95288 2 96296 2 107289 2 111287 2 112286 2 122283 2 124
284 2 125285 2 127284 2 128283 2 137282 2 144277 2 146276 2
152268 2 168259 2 183252 1 192252 2 198248 2 203248 2 2092
47 2 213247 2 214247 2 229246 2 230245 2 231243 2 244245 2
250244 2 253245 2 259246 2 274247 2 290245 2 305246 3 32024
8 3

1031 1528 5183 15985102110489 -357 32 50104 1 100 74 1 15
0 94 1 200 24 0 250359 1 300324 2 349299 3

1032 1538 4837 164751022 090 -332 21 10 84 0 50 84 1 10
0219 1 150214 4 175359 6 200354 7 230357 7 240349 7 250349
7 275344 7 300342 7 329339 7

1033 1548 4289 15005123928488 -401 3 50284 2 100264 2 15
0254 2 200244 2 250244 3 300239 3 350214 4 398214 4

1034 1558 4475 145791246 1490 -268 27 10 14 0 30 14 1 6
0 24 2 80 24 2 110 24 1 130 24 1 140 14 1 160 34 0 210 34
2 260 52 3

1035 1568 4675 13995130224389 -367 4 55243 1 70238 1 7
5238 1 100223 1 115208 1 120198 1 125181 2 150174 3 175175
3 187170 4 200172 4 225175 4 250177 4 267179 5 270178 5 275
183 5 325188 5 350193 7 365194 7

1036 1618 4199 12856155935188 -228 6 10351 2 20349 2 3
0349 2 45347 2 50348 2 75342 2 100335 2 125325 2 150303
2 175284 2 200261 2 225269 2

1037 1628 5457 16497100429988 -258 84 100299 2 125290 2 15
0278 2 170288 3 175288 3 200288 3 225329 4 250330 5

1038 1638 4320 13485144016188 -209 6 15161 2 25164 2 3
5162 2 47168 2 50168 2 75180 2 100190 2 105193 3 125197
3 150201 3 175202 4 200202 5

1039 1728 5062 11980143726486 -440 3 25264 4 50264 4 7
5256 4 100254 4 125248 5 150245 5 175237 6 200236 7 225233
7 250231 7 275229 9 300226 9 32522510 35022510 37521910 400
22111 42521911 43521711

1040 1738 4975 14488119427888 -392 8 25278 2 50275 3 7
5272 3 100265 3 125259 3 150253 3 175249 3 200246 3 225245
3 250243 4 275241 5 300236 6 325232 6 350231 6 375229 7 390
227 7

1041 1748 5031 16566101233288 -261 81 25332 2 50332 2 7
5332 3 100332 3 113332 3 126295 3 147331 3 154332 3 175330
3 193324 3 200325 4 225321 4 250317 3

1042 2518 5621 16022101026890 -281 42 20268 1 40268 1 4
5268 1 60285 1 82288 1 96279 1 114299 0 120305 0 277328
0

1043 2528 5136 155041043 6890 -302 14 140343 0 150328 1 15
5331 1 160326 1 180337 1 200338 1 221332 1 232331 1 235333
1 242344 1 251324 2 260326 2 275325 2 280322 2 293326 2 298
322 2

1044 2538 5170 14948112116390 -419 3 60185 0 80195 1 10
0194 1 120191 1 140211 1 160222 1 180231 1 200233 1 220236
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238 2 328230 3 334241 3 350239 3 370239 3 379237 3 391246 3
395234 4 402251 4 410227 4 415219 4

1045 2548 4951 13403141731090 -257 2 120276 0 140355 1 16
4 7 2 166 7 2 180 11 2 200354 2 219359 1 221356 1 231355
1 233357 1 236346 1 238346 1 245347 1

1046 2558 4797 12527151831090 -362 9 84276 0 88271 1 10
0265 1 120253 1 132256 1 135252 1 147254 1 155256 1 180260
1 200257 2 207257 2 210256 2 217257 2 222257 2 236254 3 244
255 3 260256 3 272256 3 281256 4 293256 4 298256 4 320257 4
340253 4 353252 4 355252 4 358252 5

1047 2668 4612 15230113621390 -203 3 83232 0 86225 1 10
0225 1 120221 1 132242 1 142225 1 152220 1 160221 1 180224
1 193247 2 197244 2 199248 2

1048 1018 4333 15637114732989 -49 12 15329 1 25231 1 3
5251 1 40256 2 45251 2

1049 2148 4346 14260131034588 -52 5 20345 4 40 95 3 4
5 98 2 48 48 1

1050 2158 4274 14267132113389 -37 20 15132 2 20132 4 2
5132 5 30137 5 32140 5

1051 2168 4501 14317127322089 -110 10 20220 4 40220 5 6
0226 7 70219 7 80223 9 9021910 10022011 10522111

1052 2178 4469 142841279 9989 -61 21 22 99 3 24100 3 3
1111 2 37131 3 45166 4 50166 4 57170 4

1053 2198 4554 14364125718988 -86 5 10189 3 15180 4 2
6176 4 33175 4 40179 4 60196 4 71206 5 76209 4 82215
6

1054 2208 4526 14342126632689 -135 6 20326 2 34330 3 4
0340 2 60317 3 80316 5 90318 6 100308 8 110306 9 120300
9 130289 8 131291 8

1055 2218 4703 14389122418389 -267 14 15183 3 21182 3 4
0173 3 60173 6 77172 8 81176 9 9017810 9618110 1001831
0 12018710 14018910 14919411 15219311 15919811 17020911 189
22113 20022711 22024910 23525410 24625111 25025312 25125612
26325912

1056 2228 4773 16056103817689 -213 6 12176 2 17182 2 2
0193 2 37240 4 40243 4 60273 6 65274 7 69276 7 80283
7 100293 8 120304 9 14031010 16031411 18032313 20032014 210
31014

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0352 2 30355 3 40358 4 50 3 4 60351 4 70346 3 80344
4 85339 4 89336 4

1058 3228 4094 151001259 4189 -31 6 10 41 2 13 47 3 1
8 45 3 25 57 2 28 54 2

1059 3468 4849 16279103021790 -130 11 15217 0 30254 1 4
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1060 3508 5500 1580710161889 -232 27 15188 6 30188 7 4
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2 150 5024 160 5027 171 4427 177 4028 181 3830 190 3528 205
4131 221 3533
1061 3518 5362 157411022 3590 -274 24 15 35 0 30 35 0 4
5 35 3 60 18 5 75 17 9 90 1413 105 1114 120 1216 135 121
6 150 817 165 518 180 1017
1062 3528 5058 161721024 3090 -145 16 15 30 0 30 30 1 4
5 32 2 51 30 3 63 30 4 67 31 5 74 31 5 90145 6 101144
7 109147 8 125 77 0 140 32 5
1063 3538 5264 163911007 9790 -257 77 30 97 0 38 97 2 4
0 97 9 45 9717 55 9729 60 9730 75 9743 90 9743 105 241
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2 135273 4 150233 4 165299 5 180270 4 197270 4 21331113 225
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244 8 170253 9 18025110 190252 9 200257 9 210249 9 220254 9
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5 140320 5
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5 100337 5 110338 6 120333 6 130336 7 140334 7 150333 7 160
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23029011 24028111
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0208 0 40278 2 50245 3 60245 6 70236 8 80238010 902371
0 100241 9 110243 9 120238 9 13023310 140258 9 15024711
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0241 3 40202 4 50204 3 60232 4 70221 5 80248 4 90245
7 100239 6 110252 7 120244 9 130231 8 140234 8 150249 9
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5
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2 3 3 55341 3 62305 5 68297 5 74256 4 90164 0 97102
0
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0281 4 70290 5 80277 5 90273 7 100268 7 110273 7 120273
7 130273 7
1074 6168 4607 164691037 6489 -142 17 10 64 1 20 75 1 3
0 45 1 40 12 3 50356 6 60357 9 7035611 8035513 903531
3 10034613 11034713 12034313 13034613 14034513
1075 1038 4276 157441151 090 25 5 0
1076 1048 4255 157731150 090 12 12 0
1077 1058 4309 156871149 090 37 3 0
1078 1128 5038 165711010 090 1 1 0
1079 1158 3969 144741373 090 183 2 0
1080 1218 5031 165661012 090 63 62 0
1081 1578 3182 155111404 090 -208 9 11313 2 25317 2 5
0299 1 75310 1 90313 1 100327 1 150327 0 175162 1 200174
1

1082 1588 3425 145791466 090 176 5 0
1083 1598 2847 156441553 090 -240 4 20261 1 50293 1 6
0291 1 70349 1 80 15 9 235 8311
1084 2048 7453 160331008 090 -226 14 20 69 2 40358 3 6
0335 9 8032913 10032514 12032615 14033016 16033516 1803301
6 20033519 22033820 22233620
1085 2088 2561 159941458 090 -214 5 20356 5 40 3 7 6
0 910 75 1012 80 2812 100 2914 110 3014 120 3015 140 361
9 160 4321 180 4425 190 4128 200 4229 209 4230
1086 2098 6360 164561000 090 -273 39 40269 5 60312 4 8
0 1 6 90 11 9 100 2912 120 215 140 5720 150 5826 160 713
0 180 6032 190 5634 200 6135 210 5741 220 5945 240 6748 260
11555 26110751
1087 2108 1970 159941463 090 -197 5 20264 3 40241 7 6
023511 8023315 10023019 12022820 14022521 16022521 1802252
2 19322523
1088 2118 2226 160071433 090 -236 6 20 32 1 40307 1 5
9222 2 80228 3 185237 9 190238 9 200240 9 204241 9 220241
9 226243 9 22823810 23224110
1089 2268 4366 19956 959 090 -135 30 40222 3 60221 4 6
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1090 2328 7921 146741056 090 -306 5 20319 1 40308 3 6
0303 4 80298 5 100296 5 120295 6 140291 6 160291 6 180287
6 200284 6 220277 8 240269 8 260269 9 280265 8 302265 8
1091 2358 8048 147071045 090 5 4 0
1092 18 6838 16629 997 090 251 31
1093 118 2551 154751566 3361 337 12 0
1094 588 4498 156461120 090 100 4 0
1095 2598 5260 17506 958 090 101 101 0
1096 3078 4584 19373 934 090 104 70 0
1097 3088 4916 19031 933 090 91 91 0
1098 3108 4590 19037 932 090 120 96 0
1099 3128 4554 18424 936 090 73 73 0
1100 3138 4981 18422 937 090 61 61 0
1101 3148 5114 18013 939 090 79 79 0
1102 3158 4692 17992 940 090 60 60 0
1103 3178 4905 19031 933 090 -207 98 20243 1 40243 2 6
0243 2 80243 2 85243 3 90243 6 95243 9 10524312 1082481
2 11524312 12024713 13025313 14026413 15526612 16026714 170
26512 18025911 19026313 19528215 20029113
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0206 5 40232 6 50235 8 60247 5 70258 4 80261 5 90259
7 100259 8 110253 8 120246 7 130257 9 140254 9 150259 8 160
268 8 175261 8 186256 8
1105 3348 4796 19745 953 090 87 77 0
1106 3398 4788 19745 953 090 -177 86 10 29 1 30 29 1 4
0 29 1 70 29 2 90 29 2 100 26 2 109 38 3 115 33 4 120 26
4 130 26 5 140 23 5 150 26 6 160 17 9 165 16 9 170 1711
1107 3498 6750 164851001 090 -107 27 15191 2 30 8 2 4
5331 5 60318 8 67317 9 70313 9 8530412 10233014

1108	5078	4587	158961078	090	111	3	0
1109	5118	2797	172981286	090	428	3	0
1110	6158	4720	169171032	090	157	45	0
1111	6328	4494	156551120	090	148	3	0
1112	1518	6301	16999 992	090	267	35	
1113	1608	4388	129331576	090	240	5	
1114	2568	5422	115161353	090	435	12	
1115	2648	5653	17371 965	090	386	68	
1116	1028	4290	157121151	090	31	2	
1117	1148	3456	138191508	090	184	9	
1118	2058	5512	18053 947	090	269	18	
1119	2128	2739	140651629	090	232	6	
1120	2138	3067	135231642	090	239	0	
1121	2188	4637	143221243	090	12	12	
1122	3388	6197	17261 977	090	180	9	
1123	3408	6037	17484 978	090	183	6	
1124	3578	6499	169621001	090	67	36	
1125	3688	4215	157721159	090	32	6	
1126	5068	4076	146821399	090	54	6	
1127	4428	6186	17254 977	090	181	14	
1128	4448	6040	17472 979	090	192	7	
1129	4698	4216	157721158	090	31	6	
1130	6218	6056	17313 978	090	15	12	
1131	6228	6587	163431001	090	67	66	
1132	6258	5242	165461007	090	91	89	
1133	6268	5217	159001020	090	34	29	
1134	6348	6026	17293 978	090	254	15	
1135	6358	6017	17324 979	090	252	15	
1136	6428	6034	17299 979	090	252	13	
1137	3678	3563	134131604	090	165	1	

APPENDIX IV

DUKE PIT COMPILED DATA

OUTCROP AND DRILLHOLE DATA

```
>
>OUTCROP      1
> N  1.       4136.   21524.  1140.      0    0        0.     1
>  148     0      0        0      0    0     0    0
> 226 42   1.0000  0.0      0.0         0    0
>
>OUTCROP      2
> N  1.       4024.   21558.  1123.      0    0        0.     1
>  149     0      0        0      0    0     0    0
> 204 42   1.0000  0.0      0.0         0    0
>
>OUTCROP      3
> C  1.       3960.   21720.  1173.      0    0        0.     1
>  150     0      0        0      0    0     0    0
> 236 36   1.0000  0.0      0.0         0    0
>
>OUTCROP      4
> C  1.       3863.   21808.  1187.      0    0        0.     1
>  151     0      0        0      0    0     0    0
> 212 49   1.0000  0.0      0.0         0    0
>
>OUTCROP      5
> C  1.       3784.   21849.  1192.      0    0        0.     1
>  152     0      0        0      0    0     0    0
> 208 38   1.0000  0.0      0.0         0    0
>
>OUTCROP      6
> N  1.       3613.   21938.  1185.      0    0        0.     1
>  153     0      0        0      0    0     0    0
> 220 27   1.0000  0.0      0.0         0    0
>
>OUTCROP      7
> C  1.       3657.   21876.  1196.      0    0        0.     1
>  154     0      0        0      0    0     0    0
> 186 35   1.0000  0.0      0.0         0    0
>
>OUTCROP      8
> C  1.       3512.   21665.  1120.      0    0        0.     1
>  155     0      0        0      0    0     0    0
>  94 50   1.0000  0.0      0.0         0    0
>
>OUTCROP      9
> N  1.       3477.   21616.  1120.      0    0        0.     1
>  156     0      0        0      0    0     0    0
>  78 55   1.0000  0.0      0.0         0    0
>
>OUTCROP     10
> N  1.       1513.   18168.  1115.      0    0        0.     1
>  157     0      0        0      0    0     0    0
>  56 63   1.0000  0.0      0.0         0    0
>
>OUTCROP     11
> N  1.       3520.   21346.  1074.      0    0        0.     1
>  158     0      0        0      0    0     0    0
>  85 70   1.0000  0.0      0.0         0    0
>
>OUTCROP     12
> N  1.       3583.   21227.  1077.      0    0        0.     1
>  159     0      0        0      0    0     0    0
>  81 85   1.0000  0.0      0.0         0    0
>
>OUTCROP     13
> N  1.       3641.   20969.  1048.      0    0        0.     1
>  160     0      0        0      0    0     0    0
>  74 90   1.0000  0.0      0.0         0    0
>
>OUTCROP     14
> C  2.       3660.   20862.  1042.      0    0        0.     1
>  161     0      0        0      0    0     0    0
>  83 78   1.0000  0.0      0.0         0    0
>
>OUTCROP     15
> N  1.       3645.   20757.  1025.      0    0        0.     1
>  162     0      0        0      0    0     0    0
>  78 85   1.0000  0.0      0.0         0    0
>
>OUTCROP     16
> C  1.       3617.   20800.  1035.      0    0        0.     1
>  163     0      0        0      0    0     0    0
>  77 85   1.0000  0.0      0.0         0    0
```

```
>
>OUTCROP      17
> C  1.        3715.   20666. 1020.      0   0        0.    1
>  164     0     0      0     0     0    0   0   0
>  66 90     1.0000  0.0      0.0        0   0
>
>OUTCROP      18
> C  1.        3758.   20571.  987.      0   0        0.    1
>  165     0     0      0     0     0    0   0   0
>  66 82     1.0000  0.0      0.0        0   0
>
>OUTCROP      19
> B  1.        8588.   14750. 1068.      0   0        0.    1
>  166     0     0      0     0     0    0   0   0
> 240 22     1.0000  0.0      0.0        0   0
>
>OUTCROP      20
> S  1.        6945.   14125. 1079.      0   0        0.    1
>  167     0     0      0     0     0    0   0   0
> 172 20     1.0000  0.0      0.0        0   0
>
>OUTCROP      21
> S  1.        7106.   13939. 1094.      0   0        0.    1
>  168     0     0      0     0     0    0   0   0
> 247 22     1.0000  0.0      0.0        0   0
>
>OUTCROP      22
> S  1.        7484.   13719. 1092.      0   0        0.    1
>  169     0     0      0     0     0    0   0   0
> 238 14     1.0000  0.0      0.0        0   0
>
>OUTCROP      23
> S  1.        7424.   13834. 1086.      0   0        0.    1
>  170     0     0      0     0     0    0   0   0
> 261  6     1.0000  0.0      0.0        0   0
>
>OUTCROP      24
> S  1.        7474.   13792. 1085.      0   0        0.    1
>  171     0     0      0     0     0    0   0   0
> 197 16     1.0000  0.0      0.0        0   0
>
>OUTCROP      25
> S  1.        7420.   13793. 1101.      0   0        0.    1
>  172     0     0      0     0     0    0   0   0
> 186  6     1.0000  0.0      0.0        0   0
>
>OUTCROP      26
> S  1.        7437.   13755. 1103.      0   0        0.    1
>  173     0     0      0     0     0    0   0   0
> 291  6     1.0000  0.0      0.0        0   0
>
>OUTCROP      27
> S  1.        7520.   13467. 1105.      0   0        0.    1
>  174     0     0      0     0     0    0   0   0
> 290  4     1.0000  0.0      0.0        0   0
>
>OUTCROP      28
> S  1.        8366.   12686. 1118.      0   0        0.    1
>  175     0     0      0     0     0    0   0   0
> 290 10     1.0000  0.0      0.0        0   0
>
>OUTCROP      29
> S  1.        7679.   13158. 1132.      0   0        0.    1
>  176     0     0      0     0     0    0   0   0
> 285 10     1.0000  0.0      0.0        0   0
>
>OUTCROP      30
> G  1.        5883.   17787.  945.      0   0        0.    1
>    2     0     0      0     0     0    0   0   0
> 263 20     1.0000  0.0      0.0        0   0
>
>OUTCROP      31
> G  1.        6169.   17589.  943.      0   0        0.    1
>    4     0     0      0     0     0    0   0   0
> 259 48     1.0000  0.0      0.0        0   0
>
>OUTCROP      32
> G  1.        6123.   17472.  974.      0   0        0.    1
>  177     0     0      0     0     0    0   0   0
> 250 29     1.0000  0.0      0.0        0   0
```

```
>
>OUTCROP     33
> B  1.       2921.   13705. 1670.    0  0      0.   1
>  178     0     0       0      0     0    0  0  0
> 265 57    1.0000  0.0      0.0      0  0
>
>OUTCROP     34
> H  1.       2992.   13605. 1658.    0  0      0.   1
>    6     0     0       0      0     0    0  0  0
> 227 32    1.0000  0.0      0.0      0  0
>
>OUTCROP     35
> G  1.       3227.   13513. 1633.    0  0      0.   1
>  179     0     0       0      0     0    0  0  0
> 233 52    1.0000  0.0      0.0      0  0
>
>OUTCROP     36
> M  1.       3487.   13613. 1580.    0  0      0.   1
>  180     0     0       0      0     0    0  0  0
> 241 43    1.0000  0.0      0.0      0  0
>
>OUTCROP     37
> M  1.       3588.   13602. 1560.    0  0      0.   1
>  181     0     0       0      0     0    0  0  0
>  86 28    1.0000  0.0      0.0      0  0
>
>OUTCROP     38
> T  1.       3872.   13592. 1519.    0  0      0.   1
>  182     0     0       0      0     0    0  0  0
>  63 32    1.0000  0.0      0.0      0  0
>
>OUTCROP     39
> G  1.       4420.   13731. 1376.    0  0      0.   1
>  183     0     0       0      0     0    0  0  0
> 117 30    1.0000  0.0      0.0      0  0
>
>OUTCROP     40
> 4  1.       4242.   13450. 1465.    0  0      0.   0
>  184     0     0       0      0     0    0  0  0
>   0  0    0.0     0.0      0.0      0  0
>
>OUTCROP     41
> 3  1.       4197.   13455. 1465.    0  0      0.   0
>  185     0     0       0      0     0    0  0  0
>   0  0    0.0     0.0      0.0      0  0
>
>OUTCROP     42
> G  1.       4244.   13412. 1481.    0  0      0.   1
>  186     0     0       0      0     0    0  0  0
> 111 35    1.0000  0.0      0.0      0  0
>
>OUTCROP     43
> 3  1.       4211.   13403. 1490.    0  0      0.   1
>  187     0     0       0      0     0    0  0  0
> 120 32    1.0000  0.0      0.0      0  0
>
>OUTCROP     44
> 3  1.       4178.   13402. 1490.    0  0      0.   1
>  188     0     0       0      0     0    0  0  0
> 246 40    1.0000  0.0      0.0      0  0
>
>OUTCROP     45
> G  1.       4551.   13242. 1515.    0  0      0.   1
>  189     0     0       0      0     0    0  0  0
>  62 30    1.0000  0.0      0.0      0  0
>
>OUTCROP     46
> H  1.       4622.   13163. 1540.    0  0      0.   1
>    9     0     0       0      0     0    0  0  0
>  52 33    1.0000  0.0      0.0      0  0
>
>OUTCROP     47
> H  1.       4633.   13096. 1568.    0  0      0.   1
>   11     0     0       0      0     0    0  0  0
>  79 34    1.0000  0.0      0.0      0  0
>
>OUTCROP     48
> B  1.       4715.   12899. 1552.    0  0      0.   1
>  190     0     0       0      0     0    0  0  0
>  69 39    1.0000  0.0      0.0      0  0
```

```
>
>OUTCROP    49
> H  1.     4611.  12954. 1564.      0   0      0.   1
>  191    0    0      0      0    0   0      0
>  67 39    1.0000 0.0       0.0       0   0
>
>OUTCROP    50
> 4  1.     4155.  13122. 1600.      0   0      0.   1
>   13    0    0      0      0    0   0      0
>  77 35    1.0000 0.0       0.0       0   0
>
>OUTCROP    51
> 4  1.     4138.  13007. 1587.      0   0      0.   1
>  192    0    0      0      0    0   0      0
>  76 37    1.0000 0.0       0.0       0   0
>
>OUTCROP    52
> 4  1.     4221.  12841. 1560.      0   0      0.   1
>  193    0    0      0      0    0   0      0
>  59 36    1.0000 0.0       0.0       0   0
>
>OUTCROP    53
> H  1.     4769.  12554. 1520.      0   0      0.   1
>   15    0    0      0      0    0   0      0
>  72 38    1.0000 0.0       0.0       0   0
>
>OUTCROP    54
> H  1.     4766.  12440. 1509.      0   0      0.   1
>   17    0    0      0      0    0   0      0
>  71 38    1.0000 0.0       0.0       0   0
>
>OUTCROP    55
> H  1.     4857.  12383. 1518.      0   0      0.   1
>   19    0    0      0      0    0   0      0
>  72 31    1.0000 0.0       0.0       0   0
>
>OUTCROP    56
> B  1.     4953.  12218. 1485.      0   0      0.   1
>  194    0    0      0      0    0   0      0
>  60 34    1.0000 0.0       0.0       0   0
>
>OUTCROP    57
> E  1.     3798.  12590. 1466.      0   0      0.   1
>   22    0    0      0      0    0   0      0
>  62 20    1.0000 0.0       0.0       0   0
>
>OUTCROP    58
> E  1.     3628.  12647. 1453.      0   0      0.   1
>  195    0    0      0      0    0   0      0
> 280 50    1.0000 0.0       0.0       0   0
>
>OUTCROP    59
> E  1.     3610.  12603. 1445.      0   0      0.   1
>   26    0    0      0      0    0   0      0
> 258 50    1.0000 0.0       0.0       0   0
>
>OUTCROP    60
> E  1.     3662.  12529. 1442.      0   0      0.   1
>  196    0    0      0      0    0   0      0
> 244 50    1.0000 0.0       0.0       0   0
>
>OUTCROP    61
> E  1.     3635.  12441. 1427.      0   0      0.   1
>  197    0    0      0      0    0   0      0
> 276 40    1.0000 0.0       0.0       0   0
>
>OUTCROP    62
> E  1.     3577.  12489. 1431.      0   0      0.   1
>   28    0    0      0      0    0   0      0
> 260 56    1.0000 0.0       0.0       0   0
>
>OUTCROP    63
> E  1.     3611.  12340. 1407.      0   0      0.   1
>  198    0    0      0      0    0   0      0
> 256 50    1.0000 0.0       0.0       0   0
>
>OUTCROP    64
> C  1.     4637.  11518. 1313.      0   0      0.   1
>  199    0    0      0      0    0   0      0
>  76 26    1.0000 0.0       0.0       0   0
```

```
>
>OUTCROP     65
> M  1.       4446.   11543. 1325.       0   0         0.    1
>  200     0      0       0     0     0  0    0
>  92 56     1.0000 0.0      0.0         0   0
>
>OUTCROP     66
> E  1.       4411.   11041. 1438.       0   0         0.    1
>  201     0      0       0     0     0  0    0
>  78 33     1.0000 0.0      0.0         0   0
>
>OUTCROP     67
> E  1.       4327.   11101. 1285.       0   0         0.    1
>  202     0      0       0     0     0  0    0
>  75 24     1.0000 0.0      0.0         0   0
>
>OUTCROP     68
> E  1.       4220.   11034. 1256.       0   0         0.    1
>  203     0      0       0     0     0  0    0
>  66 24     1.0000 0.0      0.0         0   0
>
>OUTCROP     69
> N  1.       1291.   19330.  994.       0   0         0.    1
>  204     0      0       0     0     0  0    0
> 266 24     1.0000 0.0      0.0         0   0
>
>OUTCROP     70
> N  1.       1353.   19233. 1110.       0   0         0.    1
>  205     0      0       0     0     0  0    0
> 252 23     1.0000 0.0      0.0         0   0
>
>OUTCROP     71
> N  1.       1381.   19178. 1025.       0   0         0.    1
>  206     0      0       0     0     0  0    0
> 253 61     1.0000 0.0      0.0         0   0
>
>OUTCROP     72
> C  1.       1353.   19128. 1040.       0   0         0.    1
>  207     0      0       0     0     0  0    0
> 269 47     1.0000 0.0      0.0         0   0
>
>OUTCROP     73
> N  1.       1386.   19109. 1044.       0   0         0.    1
>  208     0      0       0     0     0  0    0
> 265 32     1.0000 0.0      0.0         0   0
>
>OUTCROP     74
> N  1.       1404.   19018. 1041.       0   0         0.    1
>  209     0      0       0     0     0  0    0
> 264 61     1.0000 0.0      0.0         0   0
>
>OUTCROP     75
> C  1.       1356.   18975. 1035.       0   0         0.    1
>  210     0      0       0     0     0  0    0
> 256 58     1.0000 0.0      0.0         0   0
>
>OUTCROP     76
> C  1.       1380.   18912. 1028.       0   0         0.    1
>  211     0      0       0     0     0  0    0
> 257 66     1.0000 0.0      0.0         0   0
>
>OUTCROP     77
> N  1.       1365.   18793. 1110.       0   0         0.    1
>  212     0      0       0     0     0  0    0
> 272 59     1.0000 0.0      0.0         0   0
>
>OUTCROP     78
> E  1.       1207.   18893.  996.       0   0         0.    1
>  213     0      0       0     0     0  0    0
> 263 66     1.0000 0.0      0.0         0   0
>
>OUTCROP     79
> E  1.       1238.   18803.  998.       0   0         0.    1
>  214     0      0       0     0     0  0    0
> 272 45     1.0000 0.0      0.0         0   0
>
>OUTCROP     80
> N  1.       1382.   18634. 1018.       0   0         0.    1
>  215     0      0       0     0     0  0    0
> 272 79     1.0000 0.0      0.0         0   0
```

```
>
>OUTCROP    81
> N  1.      1416.   18504. 1033.    0  0      0.   1
>  216     0    0       0      0   0   0  0
> 264 39    1.0000 0.0       0.0     0  0
>
>OUTCROP    82
> N  1.      1461.   18403. 1060.    0  0      0.   1
>  217     0    0       0      0   0   0  0
> 282 19    1.0000 0.0       0.0     0  0
>
>OUTCROP    83
> N  1.      1546.   18270. 1073.    0  0      0.   1
>  218     0    0       0      0   0   0  0
> 254 12    1.0000 0.0       0.0     0  0
>
>OUTCROP    84
> C  1.      1549.   18072. 1114.    0  0      0.   1
>  219     0    0       0      0   0   0  0
> 281 13    1.0000 0.0       0.0     0  0
>
>OUTCROP    85
> E  1.      1646.   17894. 1160.    0  0      0.   1
>  220     0    0       0      0   0   0  0
> 171 10    1.0000 0.0       0.0     0  0
>
>OUTCROP    86
> E  1.      1560.   18063. 1138.    0  0      0.   1
>  221     0    0       0      0   0   0  0
> 237 13    1.0000 0.0       0.0     0  0
>
>OUTCROP    87
> E  1.      1417.   18179. 1018.    0  0      0.   1
>  222     0    0       0      0   0   0  0
> 201  8    1.0000 0.0       0.0     0  0
>
>OUTCROP    88
> E  1.      1265.   18323. 1078.    0  0      0.   1
>  223     0    0       0      0   0   0  0
> 260 50    1.0000 0.0       0.0     0  0
>
>OUTCROP    89
> E  1.      1207.   18457. 1041.    0  0      0.   1
>  224     0    0       0      0   0   0  0
> 249 63    1.0000 0.0       0.0     0  0
>
>OUTCROP    90
> E  1.      1171.   18565. 1030.    0  0      0.   1
>  225     0    0       0      0   0   0  0
> 248 54    1.0000 0.0       0.C     0  0
>
>OUTCROP    91
> E  1.      1179.   18638. 1018.    0  0      0.   1
>  226     0    0       0      0   0   0  0
> 296 44    1.0000 0.0       0.0     0  0
>
>OUTCROP    92
> E  1.      1147.   18431. 1032.    0  0      0.   1
>  227     0    0       0      0   0   0  0
>  75 44    1.0000 0.0       0.0     0  0
>
>OUTCROP    93
> E  1.      1123.   18413. 1035.    0  0      0.   1
>  228     0    0       0      0   0   0  0
> 127 15    1.0000 0.0       0.0     0  0
>
>OUTCROP    94
> E  1.      1074.   18392. 1029.    0  0      0.   1
>  229     0    0       0      0   0   0  0
>  86 24    1.0000 0.0       0.0     0  0
>
>OUTCROP    95
> E  1.      1205.   18269. 1048.    0  0      0.   1
>  230     0    0       0      0   0   0  0
> 272 45    1.0000 0.0       0.0     0  0
>
>OUTCROP    96
> E  1.      1246.   18202. 1063.    0  0      0.   1
>  231     0    0       0      0   0   0  0
> 278 45    1.0000 0.0       0.0     0  0
```

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>
>OUTCROP    97
> E  1.        1225.   18136. 1070.    0   0      0.    1
>  232      0      0       0     0   0  0   0   0
> 250 42     1.0000  0.0     0.0      0   0
>
>OUTCROP    98
> E  1.        1276.   18029. 1100.    0   0      0.    1
>  233      0      0       0     0   0  0   0   0
> 254 24     1.0000  0.0     0.0      0   0
>
>OUTCROP    99
> E  1.        1205.   18029. 1080.    0   0      0.    1
>  234      0      0       0     0   0  0   0   0
> 270 52     1.0000  0.0     0.0      0   0
>
>OUTCROP   100
> E  1.        1093.   18197. 1095.    0   0      0.    1
>  235      0      0       0     0   0  0   0   0
> 297 16     1.0000  0.0     0.0      0   0
>
>OUTCROP   101
> E  1.        1048.   18274. 1055.    0   0      0.    1
>  236      0      0       0     0   0  0   0   0
> 104 24     1.0000  0.0     0.0      0   0
>
>OUTCROP   102
> E  1.         992.   18179. 1065.    0   0      0.    1
>  237      0      0       0     0   0  0   0   0
>  86 15     1.0000  0.0     0.0      0   0
>
>OUTCROP   103
> C  1.         926.   18216. 1060.    0   0      0.    1
>  238      0      0       0     0   0  0   0   0
> 127 23     1.0000  0.0     0.0      0   0
>
>OUTCROP   104
> C  1.         781.   18171. 1095.    0   0      0.    1
>  239      0      0       0     0   0  0   0   0
> 110 35     1.0000  0.0     0.0      0   0
>
>OUTCROP   105
> N  1.         736.   18108. 1074.    0   0      0.    1
>  240      0      0       0     0   0  0   0   0
> 102 36     1.0000  0.0     0.0      0   0
>
>OUTCROP   106
> N  1.         682.   18166. 1095.    0   0      0.    1
>  241      0      0       0     0   0  0   0   0
>  89 62     1.0000  0.0     0.0      0   0
>
>OUTCROP   107
> N  1.         671.   18254. 1130.    0   0      0.    1
>  242      0      0       0     0   0  0   0   0
>  77 62     1.0000  0.0     0.0      0   0
>
>OUTCROP   108
> N  1.         632.   18184. 1090.    0   0      0.    1
>  243      0      0       0     0   0  0   0   0
>  74 40     1.0000  0.0     0.0      0   0
>
>OUTCROP   109
> N  1.         593.   18574. 1105.    0   0      0.    1
>  244      0      0       0     0   0  0   0   0
>  91 57     1.0000  0.0     0.0      0   0
>
>OUTCROP   110
> C  1.         650.   18815. 1090.    0   0      0.    1
>  245      0      0       0     0   0  0   0   0
>  79 49     1.0000  0.0     0.0      0   0
>
>OUTCROP   111
> N  1.         666.   18964. 1058.    0   0      0.    1
>  246      0      0       0     0   0  0   0   0
>  66 18     1.0000  0.0     0.0      0   0
>
>OUTCROP   112
> C  1.         709.   18960. 1058.    0   0      0.    1
>  247      0      0       0     0   0  0   0   0
> 102 20     1.0000  0.0     0.0      0   0
```

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>
>OUTCROP   113
> M  1.       3202.   14651. 1538.      0   0       0.    1
>  248      0     0      0     0    0   0   0   0
> 247 34    1.0000  0.0       0.0       0   0
>
>OUTCROP   114
> G  1.       3062.   14762. 1553.      0   0       0.    1
>  249      0     0      0     0    0   0   0   0
> 244 34    1.0000  0.0       0.0       0   0
>
>OUTCROP   115
> 3  1.       3041.   14729. 1542.      0   0       0.    1
>  250      0     0      0     0    0   0   0   0
> 252 26    1.0000  0.0       0.0       0   0
>
>OUTCROP   116
> S  1.       3049.   14832. 1576.      0   0       0.    1
>  251      0     0      0     0    0   0   0   0
> 247 42    1.0000  0.0       0.0       0   0
>
>OUTCROP   117
> G  1.       3014.   14852. 1583.      0   0       0.    1
>  252      0     0      0     0    0   0   0   0
> 252 28    1.0000  0.0       0.0       0   0
>
>OUTCROP   118
> S  1.       3012.   14831. 1577.      0   0       0.    0
>  253      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
>
>OUTCROP   119
> S  1.       2963.   14832. 1590.      0   0       0.    0
>  254      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
>
>OUTCROP   120
> G  1.       2970.   14850. 1594.      0   0       0.    1
>  255      0     0      0     0    0   0   0   0
> 268 22    1.0000  0.0       0.0       0   0
>
>OUTCROP   121
> 4  1.       2951.   14866. 1600.      0   0       0.    1
>  256      0     0      0     0    0   0   0   0
> 267 90    1.0000  0.0       0.0       0   0
>
>OUTCROP   122
> S  1.       2924.   14810. 1588.      0   0       0.    0
>  257      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
>
>OUTCROP   123
> 4  1.       2966.   14707. 1539.      0   0       0.    1
>  258      0     0      0     0    0   0   0   0
> 257 29    1.0000  0.0       0.0       0   0
>
>OUTCROP   124
> 4  1.       2895.   14854. 1595.      0   0       0.    1
>  259      0     0      0     0    0   0   0   0
> 263 44    1.0000  0.0       0.0       0   0
>
>OUTCROP   125
> S  1.       2855.   14818. 1596.      0   0       0.    0
>  260      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
>
>OUTCROP   126
> G  1.       2844.   14815. 1595.      0   0       0.    1
>  261      0     0      0     0    0   0   0   0
> 256 54    1.0000  0.0       0.0       0   0
>
>OUTCROP   127
> S  1.       2866.   14663. 1553.      0   0       0.    0
>  262      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
>
>OUTCROP   129
> S  1.       2777.   14743. 1604.      0   0       0.    0
>  263      0     0      0     0    0   0   0   0
>   0   0   0.0       0.0       0.0       0   0
```

```
>
>OUTCROP   130
> S  1.       2793.   14756.   1600.     0  0      0.   0
>  264     0     0        0      0    0  0  0  0
>   0  0     0.0      0.0      0.0         0  0
>
>OUTCROP   131
> S  1.       2804.   14766.   1600.     0  0      0.   0
>  265     0     0        0      0    0  0  0  0
>   0  0     0.0      0.0      0.0         0  0
>
>OUTCROP   132
> G  1.       2800.   14833.   1614.     0  0      0.   1
>  266     0     0        0      0    0  0  0  0
> 268  40    1.0000   0.0      0.0         0  0
>
>OUTCROP   133
> H  1.       2673.   14939.   1675.     0  0      0.   1
>  267     0     0        0      0    0  0  0  0
> 239  53    1.0000   0.0      0.0         0  0
>
>OUTCROP   134
> G  1.       2762.   14740.   1608.     0  0      0.   1
>  268     0     0        0      0    0  0  0  0
> 268  55    1.0000   0.0      0.0         0  0
>
>OUTCROP   135
> B  1.       2659.   14866.   1670.     0  0      0.   1
>  269     0     0        0      0    0  0  0  0
> 227  48    1.0000   0.0      0.0         0  0
>
>OUTCROP   136
> H  1.       2675.   14608.   1603.     0  0      0.   1
>  270     0     0        0      0    0  0  0  0
> 272  33    1.0000   0.0      0.0         0  0
>
>OUTCROP   137
> B  1.       2543.   14626.   1617.     0  0      0.   1
>  271     0     0        0      0    0  0  0  0
> 251  37    1.0000   0.0      0.0         0  0
>
>OUTCROP   138
> B  1.       2616.   14689.   1633.     0  0      0.   1
>  272     0     0        0      0    0  0  0  0
> 247  40    1.0000   0.0      0.0         0  0
>
>OUTCROP   139
> B  1.       2594.   14793.   1662.     0  0      0.   1
>  273     0     0        0      0    0  0  0  0
> 242  33    1.0000   0.0      0.0         0  0
>
>OUTCROP   140
> B  1.       2441.   14927.   1655.     0  0      0.   1
>  274     0     0        0      0    0  0  0  0
> 263  43    1.0000   0.0      0.0         0  0
>
>OUTCROP   141
> B  1.       2585.   14895.   1683.     0  0      0.   1
>  275     0     0        0      0    0  0  0  0
> 261  44    1.0000   0.0      0.0         0  0
>
>OUTCROP   142
> B  1.       2553.   15017.   1685.     0  0      0.   1
>  276     0     0        0      0    0  0  0  0
> 245  35    1.0000   0.0      0.0         0  0
>
>OUTCROP   143
> H  1.       2560.   15156.   1654.     0  0      0.   1
>  277     0     0        0      0    0  0  0  0
> 240  47    1.0000   0.0      0.0         0  0
>
>OUTCROP   144
> B  1.       2522.   15256.   1631.     0  0      0.   1
>  278     0     0        0      0    0  0  0  0
> 227  43    1.0000   0.0      0.0         0  0
>
>OUTCROP   145
> E  1.       4293.   20918.   1042.     0  0      0.   1
>  279     0     0        0      0    0  0  0  0
> 211  30    1.0000   0.0      0.0         0  0
```

```
>
>OUTCROP   146
> C  1.       4803.   21483. 1165.        0   0          0.     1
>  280      0     0      0      0     0   0      0
> 242 35     1.0000 0.0         0.0        0   0
>
>OUTCROP   147
> C  1.       4881.   21377. 1171.        0   0          0.     1
>  281      0     0      0      0     0   0      0
> 247 48     1.0000 0.0         0.0        0   0
>
>OUTCROP   148
>  282      0     0      0      0     0   0      0
> 240 44     1.0000 0.0         0.0        0   0
>
>OUTCROP   149
> E  1.       4865.   21145. 1140.        0   0          0.     1
>  283      0     0      0      0     0   0      0
> 261 60     1.0000 0.0         0.0        0   0
>
>OUTCROP   150
> E  1.       5014.   21099. 1154.        0   0          0.     1
>  284      0     0      0      0     0   0      0
> 244 50     1.0000 0.0         0.0        0   0
>
>OUTCROP   151
> M  1.       4823.   21094. 1120.        0   0          0.     1
>  285      0     0      0      0     0   0      0
> 239 44     1.0000 0.0         0.0        0   0
>
>OUTCROP   152
> M  1.       4789.   21044. 1110.        0   0          0.     1
>  286      0     0      0      0     0   0      0
> 238 18     1.0000 0.0         0.0        0   0
>
>OUTCROP   153
> E  1.       4959.   21014. 1142.        0   0          0.     1
>  287      0     0      0      0     0   0      0
> 229 46     1.0000 0.0         0.0        0   0
>
>OUTCROP   154
> M  1.       4876.   20969. 1120.        0   0          0.     1
>  288      0     0      0      0     0   0      0
> 244 33     1.0000 0.0         0.0        0   0
>
>OUTCROP   155
> M  1.       4837.   20878. 1107.        0   0          0.     1
>  289      0     0      0      0     0   0      0
> 297 29     1.0000 0.0         0.0        0   0
>
>OUTCROP   156
> C  1.       5299.   20654. 1158.        0   0          0.     1
>  290      0     0      0      0     0   0      0
> 238 26     1.0000 0.0         0.0        0   0
>
>OUTCROP   157
> C  1.       5382.   20675. 1191.        0   0          0.     1
>  291      0     0      0      0     0   0      0
> 241 42     1.0000 0.0         0.0        0   0
>
>OUTCROP   158
> C  1.       5453.   20554. 1193.        0   0          0.     1
>  292      0     0      0      0     0   0      0
> 240 40     1.0000 0.0         0.0        0   0
>
>OUTCROP   159
> C  1.       5424.   20504. 1162.        0   0          0.     1
>  293      0     0      0      0     0   0      0
> 242 58     1.0000 0.0         0.0        0   0
>
>OUTCROP   160
> C  1.       5341.   20445. 1105.        0   0          0.     1
>  294      0     0      0      0     0   0      0
> 234 40     1.0000 0.0         0.0        0   0
>
>OUTCROP   161
> C  1.       5602.   20263. 1164.        0   0          0.     1
>  295      0     0      0      0     0   0      0
> 227 43     1.0000 0.0         0.0        0   0
>
```

```
>OUTCROP    162
> C  1.       5498.   20265.  1121.      0   0        0.    1
>  296      0    0       0       0    0   0      0
> 244 26     1.0000  0.0      0.0       0   0
>
>OUTCROP    163
> C  1.       5474.   20226.  1095.      0   0        0.    1
>  297      0    0       0       0    0   0      0
> 240 50     1.0000  0.0      0.0       0   0
>
>OUTCROP    164
> C  1.       5758.   19876.  1116.      0   0        0.    1
>  298      0    0       0       0    0   0      0
> 246 25     1.0000  0.0      0.0       0   0
>
>OUTCROP    165
> C  1.       5778.   19725.  1082.      0   0        0.    1
>  299      0    0       0       0    0   0      0
> 251 49     1.0000  0.0      0.0       0   0
>
>OUTCROP    166
> C  1.       5839.   19575.  1072.      0   0        0.    1
>  300      0    0       0       0    0   0      0
> 250 49     1.0000  0.0      0.0       0   0
>
>OUTCROP    167
> C  1.       5881.   19415.  1045.      0   0        0.    1
>  301      0    0       0       0    0   0      0
> 252 49     1.0000  0.0      0.0       0   0
>
>OUTCROP    168
> C  1.       5970.   19212.  1024.      0   0        0.    1
>  302      0    0       0       0    0   0      0
> 245 36     1.0000  0.0      0.0       0   0
>
>OUTCROP    169
> E  1.       6113.   18636.   985.      0   0        0.    0
>      0    0    0       0       0    0   0      0
>
>OUTCROP    170
> E  1.       6138.   18550.   987.      0   0        0.    1
>  303      0    0       0       0    0   0      0
> 281 24     1.0000  0.0      0.0       0   0
>
>OUTCROP    171
> M  1.       6057.   18389.   996.      0   0        0.    1
>  304      0    0       0       0    0   0      0
> 243 56     1.0000  0.0      0.0       0   0
>
>OUTCROP    172
> M  1.       6023.   18425.   990.      0   0        0.    1
>  305      0    0       0       0    0   0      0
> 262 50     1.0000  0.0      0.0       0   0
>
>OUTCROP    173
> G  1.       5834.   18534.   965.      0   0        0.    1
>  306      0    0       0       0    0   0      0
> 271 22     1.0000  0.0      0.0       0   0
>
>OUTCROP    174
> M  1.       5764.   18966.   990.      0   0        0.    1
>  307      0    0       0       0    0   0      0
> 254 68     1.0000  0.0      0.0       0   0
>
>OUTCROP    175
> G  1.       5536.   19129.   988.      0   0        0.    1
>  308      0    0       0       0    0   0      0
> 229 30     1.0000  0.0      0.0       0   0
>
>OUTCROP    176
> E  1.       5865.   19002.   995.      0   0        0.    1
>  309      0    0       0       0    0   0      0
> 255 43     1.0000  0.0      0.0       0   0
>
>OUTCROP    177
> E  1.       5836.   19105.   996.      0   0        0.    1
>  310      0    0       0       0    0   0      0
> 251 44     1.0000  0.0      0.0       0   0
>
>OUTCROP    178
```

```
> E  1.        5781.   19213.    998.      0   0      0.   1
>  311      0     0       0      0      0   0   0
> 256 34     1.0000   0.0       0.0      0   0
>
>OUTCROP    179
> E  1.        5727.   19403.   1015.     0   0      0.   1
>  312      0     0       0      0      0   0   0
> 238 45     1.0000   0.0       0.0      0   0
>
>OUTCROP    180
> E  1.        5664.   19530.   1029.     0   0      0.   1
>  313      0     0       0      0      0   0   0
> 246 52     1.0000   0.0       0.0      0   0
>
>OUTCROP    181
> E  1.        5626.   19650.   1035.     0   0      0.   1
>  314      0     0       0      0      0   0   0
> 233 46     1.0000   0.0       0.0      0   0
>
>OUTCROP    182
> E  1.        5572.   19742.   1045.     0   0      0.   1
>  315      0     0       0      0      0   0   0
> 243 50     1.0000   0.0       0.0      0   0
>
>OUTCROP    183
> C  1.        3794.   20267.    992.     0   0      0.   1
>  316      0     0       0      0      0   0   0
> 276 75     1.0000   0.0       0.0      0   0
>
>OUTCROP    184
> E  1.        3931.   20120.    995.     0   0      0.   1
>  317      0     0       0      0      0   0   0
>  92 83     1.0000   0.0       0.0      0   0
>
>OUTCROP    185
> C  1.        3825.   20058.    990.     0   0      0.   1
>  318      0     0       0      0      0   0   0
>  84 82     1.0000   0.0       0.0      0   0
>
>OUTCROP    186
> C  1.        3899.   19975.    990.     0   0      0.   1
>  319      0     0       0      0      0   0   0
>  91 77     1.0000   0.0       0.0      0   0
>
>OUTCROP    187
> C  1.        3916.   19846.    975.     0   0      0.   1
>  320      0     0       0      0      0   0   0
>  92 84     1.0000   0.0       0.0      0   0
>
>OUTCROP    188
> C  1.        3927.   19678.   1942.     0   0      0.   1
>  321      0     0       0      0      0   0   0
>  92 73     1.0000   0.0       0.0      0   0
>
>OUTCROP    189
> C  1.        4046.   17850.   1075.     0   0      0.   1
>   31      0     0       0      0      0   0   0
> 145 22     1.0000   0.0       0.0      0   0
>
>OUTCROP    190
> C  1.        3914.   17770.   1060.     0   0      0.   1
>  322      0     0       0      0      0   0   0
> 111 15     1.0000   0.0       0.0      0   0
>
>OUTCROP    191
> C  1.        3845.   17723.   1089.     0   0      0.   1
>  323      0     0       0      0      0   0   0
> 220 18     1.0000   0.0       0.0      0   0
>
>OUTCROP    192
> C  1.        3516.   17799.   1113.     0   0      0.   1
>  324      0     0       0      0      0   0   0
> 157 22     1.0000   0.0       0.0      0   0
>
>OUTCROP    193
> N  1.        3486.   17741.   1125.     0   0      0.   1
>  325      0     0       0      0      0   0   0
> 116 11     1.0000   0.0       0.0      0   0
>
>OUTCROP    194
```

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> C  1.     3294.   17659. 1138.    0  0        0.   1
>   33    0    0      0      0    0   0  0
> 166 13    1.0000 0.0      0.0     0  0
>
>OUTCROP   195
> N  1.     3275.   17727. 1093.    0  0        0.   1
>   36    0    0      0      0    0   0  0
> 123 17    1.0000 0.0      0.0     0  0
>
>OUTCROP   196
> C  1.     3265.   17564. 1152.    0  0        0.   1
>   38    0    0      0      0    0   0  0
>  60 44    1.0000 0.0      0.0     0  0
>
>OUTCROP   197
> C  1.     3254.   17487. 1173.    0  0        0.   1
>  326    0    0      0      0    0   0  0
>  86 16    1.0000 0.0      0.0     0  0
>
>OUTCROP   198
> C  1.     3198.   17450. 1186.    0  0        0.   1
>   40    0    0      0      0    0   0  0
> 185 14    1.0000 0.0      0.0     0  0
>
>OUTCROP   199
> C  1.     3140.   17393. 1227.    0  0        0.   1
>   44    0    0      0      0    0   0  0
> 215 38    1.0000 0.0      0.0     0  0
>
>OUTCROP   200
> C  1.     3014.   17349. 1262.    0  0        0.   1
>  327    0    0      0      0    0   0  0
>  39 17    1.0000 0.0      0.0     0  0
>
>OUTCROP   201
> C  1.     2889.   17363. 1277.    0  0        0.   1
>   46    0    0      0      0    0   0  0
> 165 20    1.0000 0.0      0.0     0  0
>
>OUTCROP   202
> C  1.     2773.   17289. 1285.    0  0        0.   1
>   49    0    0      0      0    0   0  0
> 131 10    1.0000 0.0      0.0     0  0
>
>OUTCROP   203
> C  1.     2615.   17385. 1298.    0  0        0.   1
>  328    0    0      0      0    0   0  0
> 323 11    1.0000 0.0      0.0     0  0
>
>OUTCROP   204
> C  1.     2529.   17376. 1296.    0  0        0.   1
>  329    0    0      0      0    0   0  0
> 333 17    1.0000 0.0      0.0     0  0
>
>OUTCROP   205
> C  1.     2567.   17293. 1296.    0  0        0.   1
>  330    0    0      0      0    0   0  0
>  78 11    1.0000 0.0      0.0     0  0
>
>OUTCROP   206
> C  1.     2402.   17470. 1277.    0  0        0.   1
>  331    0    0      0      0    0   0  0
> 224 33    1.0000 0.0      0.0     0  0
>
>OUTCROP   207
> C  1.     2410.   17606. 1268.    0  0        0.   1
>  332    0    0      0      0    0   0  0
> 223 40    1.0000 0.0      0.0     0  0
>
>OUTCROP   208
> C  1.     2341.   17629. 1262.    0  0        0.   1
>  333    0    0      0      0    0   0  0
> 199  4    1.0000 0.0      0.0     0  0
>
>OUTCROP   209
> C  1.     2224.   17655. 1242.    0  0        0.   1
>  334    0    0      0      0    0   0  0
> 216 35    1.0000 0.0      0.0     0  0
>
>OUTCROP   210
```

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> N  1.     2252.   17726. 1210.    0   0     0.   1
>  335    0     0      0      0    0   0   0
> 222 27    1.0000 0.0    0.0       0   0
>
>OUTCROP   211
> C  1.     2110.   17674. 1211.    0   0     0.   1
>  336    0     0      0      0    0   0   0
> 245 42    1.0000 0.0    0.0       0   0
>
>OUTCROP   212
> C  1.     2015.   17750. 1180.    0   0     0.   1
>  337    0     0      0      0    0   0   0
> 245 45    1.0000 0.0    0.0       0   0
>
>OUTCROP   213
> N  1.     2059.   17825. 1150.    0   0     0.   1
>  338    0     0      0      0    0   0   0
> 303 50    1.0000 0.0    0.0       0   0
>
>OUTCROP   214
> C  1.     1902.   17824. 1130.    0   0     0.   1
>  339    0     0      0      0    0   0   0
> 129  5    1.0000 0.0    0.0       0   0
>
>OUTCROP   215
> C  1.     1749.   17975. 1100.    0   0     0.   1
>  340    0     0      0      0    0   0   0
> 187 16    1.0000 0.0    0.0       0   0
>
>OUTCROP   216
> E  1.     1703.   17811. 1158.    0   0     0.   1
>  341    0     0      0      0    0   0   0
> 156 18    1.0000 0.0    0.0       0   0
>
>OUTCROP   217
> E  1.     1856.   17677. 1154.    0   0     0.   1
>  342    0     0      0      0    0   0   0
> 219 20    1.0000 0.0    0.0       0   0
>
>OUTCROP   218
> E  1.     1917.   17571. 1160.    0   0     0.   1
>  343    0     0      0      0    0   0   0
> 238 17    1.0000 0.0    0.0       0   0
>
>OUTCROP   219
> E  1.     2161.   17449. 1250.    0   0     0.   1
>  344    0     0      0      0    0   0   0
> 216 32    1.0000 0.0    0.0       0   0
>
>OUTCROP   220
> E  1.     2322.   17196. 1290.    0   0     0.   1
>  345    0     0      0      0    0   0   0
> 248 43    1.0000 0.0    0.0       0   0
>
>OUTCROP   221
> C  1.     2514.   17223. 1282.    0   0     0.   1
>  346    0     0      0      0    0   0   0
>  62 13    1.0000 0.0    0.0       0   0
>
>OUTCROP   222
> E  1.     2476.   17163. 1272.    0   0     0.   1
>  347    0     0      0      0    0   0   0
> 258 60    1.0000 0.0    0.0       0   0
>
>OUTCROP   223
> C  1.     2528.   17140. 1286.    0   0     0.   1
>  348    0     0      0      0    0   0   0
>  68 20    1.0000 0.0    0.0       0   0
>
>OUTCROP   224
> C  1.     2595.   17106. 1292.    0   0     0.   1
>  349    0     0      0      0    0   0   0
> 271 32    1.0000 0.0    0.0       0   0
>
>OUTCROP   225
> C  1.     2658.   16988. 1297.    0   0     0.   1
>  350    0     0      0      0    0   0   0
>  13 17    1.0000 0.0    0.0       0   0
>
>OUTCROP   226
```

```
> E  1.       2586.   16894. 1294.      0   0         0.    1
>  351      0      0       0      0    0    0   0
> 122 15      1.0000  0.0       0.0       0   0
>
>OUTCROP    227
> E  1.       2696.   16619. 1286.      0   0         0.    1
>  352      0      0       0      0    0    0   0
> 258 55      1.0000  0.0       0.0       0   0
>
>OUTCROP    228
> E  1.       2774.   16554. 1300.      0   0         0.    1
>  353      0      0       0      0    0    0   0
> 261 40      1.0000  0.0       0.0       0   0
>
>OUTCROP    229
> E  1.       2979.   16550. 1297.      0   0         0.    1
>  354      0      0       0      0    0    0   0
> 139 35      1.0000  0.0       0.0       0   0
>
>OUTCROP    230
> E  1.       3965.   16390. 1121.      0   0         0.    1
>   52      0      0       0      0    0    0   0
> 101 27      1.0000  0.0       0.0       0   0
>
>OUTCROP    231
> E  1.       3840.   16447. 1145.      0   0         0.    1
>   54      0      0       0      0    0    0   0
>  98 22      1.0000  0.0       0.0       0   0
>
>OUTCROP    232
> E  1.       3815.   16357. 1157.      0   0         0.    1
>   56      0      0       0      0    0    0   0
>  49 18      1.0000  0.0       0.0       0   0
>
>OUTCROP    233
> E  1.       3579.   16310. 1201.      0   0         0.    1
>   58      0      0       0      0    0    0   0
>  77 29      1.0000  0.0       0.0       0   0
>
>OUTCROP    234
> E  1.       3324.   16128. 1271.      0   0         0.    1
>  355      0      0       0      0    0    0   0
>   4  6      1.0000  0.0       0.0       0   0
>
>OUTCROP    235
> E  1.       3378.   16087. 1267.      0   0         0.    1
>   60      0      0       0      0    0    0   0
> 214  5      1.0000  0.0       0.0       0   0
>
>OUTCROP    236
> E  1.       2868.   16103. 1387.      0   0         0.    1
>  356      0      0       0      0    0    0   0
> 245  7      1.0000  0.0       0.0       0   0
>
>OUTCROP    237
> E  1.       2928.   16134. 1367.      0   0         0.    1
>  357      0      0       0      0    0    0   0
>  60 28      1.0000  0.0       0.0       0   0
>
>OUTCROP    238
> E  1.       2964.   15902. 1379.      0   0         0.    1
>  358      0      0       0      0    0    0   0
> 228  5      1.0000  0.0       0.0       0   0
>
>OUTCROP    239
>    1.       4510.   16319. 1276.      0   0         0.    1
>   62      0      0       0      0    0    0   0
> 112  8      1.0000  0.0       0.0       0   0
>
>OUTCROP    240
> M  1.       3004.   15227. 1488.      0   0         0.    1
>  359      0      0       0      0    0    0   0
> 228 35      1.0000  0.0       0.0       0   0
>
>OUTCROP    241
> G  1.       2931.   15237. 1502.      0   0         0.    1
>  360      0      0       0      0    0    0   0
> 261 11      1.0000  0.0       0.0       0   0
>
>OUTCROP    242
```

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> G  1.      2907.  15210. 1515.     0  0      0.   1
>   64     0     0      0      0      0     0    0
> 260 30    1.0000 0.0       0.0     0  0
>
>OUTCROP   244
> 3  1.      3018.  14944. 1612.     0  0      0.   1
>  361     0     0      0      0      0     0    0
> 208 17    1.0000 0.0       0.0     0  0
>
>OUTCROP   245
> 4  1.      2982.  14949. 1615.     0  0      0.   1
>  362     0     0      0      0      0     0    0
> 211 16    1.0000 0.0       0.0     0  0
>
>OUTCROP   246
> G  1.      2917.  15008. 1620.     0  0      0.   1
>  363     0     0      0      0      0     0    0
> 208 12    1.0000 0.0       0.0     0  0
>
>OUTCROP   247
> 4  1.      2866.  15169. 1542.     0  0      0.   1
>  364     0     0      0      0      0     0    0
> 272 41    1.0000 0.0       0.0     0  0
>
>OUTCROP   248
> S  1.      2840.  15229. 1525.     0  0      0.   0
>  365     0     0      0      0      0     0    0
>   0  0     0.0       0.0       0.0     0  0
>
>OUTCROP   249
> G  1.      2827.  15286. 1518.     0  0      0.   1
>  366     0     0      0      0      0     0    0
> 255 36    1.0000 0.0       0.0     0. 0
>
>OUTCROP   250
> 3  1.      2843.  15295. 1513.     0  0      0.   1
>  367     0     0      0      0      0     0    0
> 266 43    1.0000 0.0       0.0     0  0
>
>OUTCROP   251
> S  1.      2801.  15239. 1534.     0  0      0.   0
>  368     0     0      0      0      0     0    0
>   0  0     0.0       0.0       0.0     0  0
>
>OUTCROP   253
> S  1.      2732.  15246. 1546.     0  0      0.   0
>  369     0     0      0      0      0     0    0
>   0  0     0.0       0.0       0.0     0  0
>
>OUTCROP   254
> G  1.      2075.  14539. 1569.     0  0      0.   1
>  370     0     0      0      0      0     0    0
> 266 42    1.0000 0.0       0.0     0  0
>
>OUTCROP   255
> S  1.      2701.  15266. 1556.     0  0      0.   0
>  371     0     0      0      0      0     0    0
>   0  0     0.0       0.0       0.0     0  0
>
>OUTCROP   256
> G  1.      2718.  15293. 1544.     0  0      0.   1
>  372     0     0      0      0      0     0    0
> 264 51    1.0000 0.0       0.0     0  0
>
>OUTCROP   257
> G  1.      2664.  15329. 1555.     0  0      0.   1
>  373     0     0      0      0      0     0    0
> 259 22    1.0000 0.0       0.0     0  0
>
>OUTCROP   258
> S  1.      2624.  15323. 1568.     0  0      0.   0
>  374     0     0      0      0      0     0    0
>   0  0     0.0       0.0       0.0     0  0
>
>OUTCROP   259
> G  1.      2603.  15368. 1562.     0  0      0.   1
>  375     0     0      0      0      0     0    0
> 262 58    1.0000 0.0       0.0     0  0
>
>OUTCROP   260
```

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> H  1.      2538.  15363. 1588.     0  0       0.   1
>  376    0     0      0     0   0   0  0
> 262 40   1.0000 0.0     0.0        0  0
>
>OUTCROP  261
> H  1.      2472.  15416. 1577.     0  0       0.   1
>  377    0     0      0     0   0   0  0
> 241 43   1.0000 0.0     0.0        0  0
>
>OUTCROP  262
> S  1.      2783.  15517. 1495.     0  0       0.   0
>  378    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  263
> G  1.      2743.  15559. 1506.     0  0       0.   1
>  379    0     0      0     0   0   0  0
> 253 36   1.0000 0.0     0.0        0  0
>
>OUTCROP  264
> G  1.      2678.  15643. 1514.     0  0       0.   1
>  380    0     0      0     0   0   0  0
> 256 40   1.0000 0.0     0.0        0  0
>
>OUTCROP  265
> G  1.      2582.  15479. 1568.     0  0       0.   1
>  381    0     0      0     0   0   0  0
> 247 49   1.0000 0.0     0.0        0  0
>
>OUTCROP  266
> S  1.      2563.  15517. 1566.     0  0       0.   0
>  382    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  267
> S  1.      2568.  15573. 1555.     0  0       0.   0
>  383    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  268
> G  1.      2549.  15575. 1551.     0  0       0.   1
>  384    0     0      0     0   0   0  0
> 255 39   1.0000 0.0     0.0        0  0
>
>OUTCROP  269
> S  1.      2588.  15662. 1538.     0  0       0.   0
>  385    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  270
> G  1.      2494.  15638. 1518.     0  0       0.   1
>  386    0     0      0     0   0   0  0
> 271 51   1.0000 0.0     0.0        0  0
>
>OUTCROP  271
> G  1.      2537.  15671. 1527.     0  0       0.   1
>  387    0     0      0     0   0   0  0
> 248 44   1.0000 0.0     0.0        0  0
>
>OUTCROP  272
> G  1.      2572.  15708. 1531.     0  0       0.   1
>  388    0     0      0     0   0   0  0
> 258 40   1.0000 0.0     0.0        0  0
>
>OUTCROP  273
> S  1.      2619.  15732. 1515.     0  0       0.   0
>  389    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  274
> 4  1.      2602.  15805. 1505.     0  0       0.   0
>  390    0     0      0     0   0   0  0
>   0  0   0.0     0.0     0.0        0  0
>
>OUTCROP  275
> F  1.      2581.  15821. 1503.     0  0       0.   1
>  391    0     0      0     0   0   0  0
> 242 40   1.0000 0.0     0.0        0  0
>
>OUTCROP  276
```

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> G  1.      2541.  15808.  1506.     0   0       0.   1
>   392   0      0      0       0    0  0   0
> 252 40   1.0000  0.0      0.0      0   0
>
>OUTCROP  277
> G  1.      2486.  15742.  1497.     0   0       0.   1
>   393   0      0      0       0    0  0   0
> 233 46   1.0000  0.0      0.0      0   0
>
>OUTCROP  278
> H  1.      2306.  15572.  1536.     0   0       0.   1
>   394   0      0      0       0    0  0   0
>  68 18   1.0000  0.0      0.0      0   0
>
>OUTCROP  279
> G  1.      2295.  15632.  1525.     0   0       0.   1
>   395   0      0      0       0    0  0   0
>  37 20   1.0000  0.0      0.0      0   0
>
>OUTCROP  280
> G  1.      2185.  15594.  1542.     0   0       0.   1
>   396   0      0      0       0    0  0   0
>  34 21   1.0000  0.0      0.0      0   0
>
>OUTCROP  281
> G  1.      2398.  15767.  1470.     0   0       0.   1
>   397   0      0      0       0    0  0   0
> 239 22   1.0000  0.0      0.0      0   0
>
>OUTCROP  282
> G  1.      2388.  15819.  1460.     0   0       0.   1
>   398   0      0      0       0    0  0   0
> 233 40   1.0000  0.0      0.0      0   0
>
>OUTCROP  283
> G  1.      2404.  15876.  1447.     0   0       0.   1
>   399   0      0      0       0    0  0   0
> 247 44   1.0000  0.0      0.0      0   0
>
>OUTCROP  284
> G  1.      2586.  15879.  1481.     0   0       0.   1
>   400   0      0      0       0    0  0   0
> 280 58   1.0000  0.0      0.0      0   0
>
>OUTCROP  285
> G  1.      2589.  15923.  1473.     0   0       0.   1
>   401   0      0      0       0    0  0   0
> 264 53   1.0000  0.0      0.0      0   0
>
>OUTCROP  286
> G  1.      2624.  15949.  1464.     0   0       0.   1
>   402   0      0      0       0    0  0   0
> 255 55   1.0000  0.0      0.0      0   0
>
>OUTCROP  287
> S  1.      2578.  15983.  1461.     0   0       0.   0
>   403   0      0      0       0    0  0   0
>    0  0  0.0      0.0      0.0      0   0
>
>OUTCROP  288
> S  1.      2609.  15983.  1458.     0   0       0.   0
>   404   0      0      0       0    0  0   0
>    0  0  0.0      0.0      0.0      0   0
>
>OUTCROP  289
> G  1.      2647.  16044.  1449.     0   0       0.   1
>   405   0      0      0       0    0  0   0
> 263 40   1.0000  0.0      0.0      0   0
>
>OUTCROP  290
> C  1.      2704.  16015.  1451.     0   0       0.   1
>   406   0      0      0       0    0  0   0
> 288 46   1.0000  0.0      0.0      0   0
>
>OUTCROP  291
> C  1.      2639.  16086.  1442.     0   0       0.   1
>   407   0      0      0       0    0  0   0
> 256 44   1.0000  0.0      0.0      0   0
>
>OUTCROP  292
```

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> M  1.      2645.  16195. 1422.     0  0       0.    1
>  408    0     0      0      0    0  0   0
> 267 43   1.0000 0.0      0.0     0  0
>
>OUTCROP   293
> M  1.      2585.  16307. 1394.     0  0       0.    1
>  409    0     0      0      0    0  0   0
> 249 36   1.0000 0.0      0.0     0  0
>
>OUTCROP   294
> C  1.      2542.  16304. 1390.     0  0       0.    1
>  410    0     0      0      0    0  0   0
> 267 33   1.0000 0.0      0.0     0  0
>
>OUTCROP   295
> 4  1.      2352.  16267. 1372.     0  0       0.    1
>  411    0     0      0      0    0  0   0
> 237 34   1.0000 0.0      0.0     0  0
>
>OUTCROP   296
> G  1.      2357.  16166. 1385.     0  0       0.    1
>  412    0     0      0      0    0  0   0
> 256 24   1.0000 0.0      0.0     0  0
>
>OUTCROP   297
> S  1.      2351.  16118. 1397.     0  0       0.    0
>  413    0     0      0      0    0  0   0
>   0  0   0.0      0.0      0.0     0  0
>
>OUTCROP   298
> G  1.      2373.  16067. 1402.     0  0       0.    1
>  414    0     0      0      0    0  0   0
> 256 51   1.0000 0.0      0.0     0  0
>
>OUTCROP   299
> G  1.      2094.  15752. 1519.     0  0       0.    1
>  415    0     0      0      0    0  0   0
>  70 27   1.0000 0.0      0.0     0  0
>
>OUTCROP   300
> G  1.      2038.  15704. 1539.     0  0       0.    1
>  416    0     0      0      0    0  0   0
>  65 36   1.0000 0.0      0.0     0  0
>
>OUTCROP   301
> 4  1.      1864.  15819. 1465.     0  0       0.    1
>  417    0     0      0      0    0  0   0
>  87 32   1.0000 0.0      0.0     0  0
>
>OUTCROP   302
> G  1.      2039.  15886. 1501.     0  0       0.    1
>  418    0     0      0      0    0  0   0
>  62 26   1.0000 0.0      0.0     0  0
>
>OUTCROP   303
> S  1.      2071.  15878. 1500.     0  0       0.    0
>  419    0     0      0      0    0  0   0
>   0  0   0.0      0.0      0.0     0  0
>
>OUTCROP   304
> S  1.      2082.  15932. 1489.     0  0       0.    0
>  420    0     0      0      0    0  0   0
>   0  0   0.0      0.0      0.0     0  0
>
>OUTCROP   305
> G  1.      2042.  15976. 1478.     0  0       0.    1
>  421    0     0      0      0    0  0   0
>  76 16   1.0000 0.0      0.0     0  0
>
>OUTCROP   306
> G  1.      2050.  16035. 1456.     0  0       0.    1
>  422    0     0      0      0    0  0   0
>  93 24   1.0000 0.0      0.0     0  0
>
>OUTCROP   307
> G  1.      2020.  15989. 1470.     0  0       0.    0
>  423    0     0      0      0    0  0   0
>   0  0   0.0      0.0      0.0     0  0
>
>OUTCROP   308
```

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> G  1.     1961.   15946.  1468.    0  0       0.    1
>  424     0     0      0     0    0   0   0
>  80 28    1.0000  0.0     0.0      0  0.
>
>OUTCROP   309
> S  1.     1980.   15975.  1468.    0  0       0.    0
>  425     0     0      0     0    0   0   0
>   0  0    0.0     0.0     0.0      0  0
>
>OUTCROP   310
> G  1.     1843.   15968.  1430.    0  0       0.    1
>  426     0     0      0     0    0   0   0
>  90 32    1.0000  0.0     0.0      0  0
>
>OUTCROP   311
> S  1.     1824.   15966.  1420.    0  0       0.    0
>  427     0     0      0     0    0   0   0
>   0  0    0.0     0.0     0.0      0  0
>
>OUTCROP   312
> G  1.     1781.   16027.  1404.    0  0       0.    1
>  428     0     0      0     0    0   0   0
>  88 33    1.0000  0.0     0.0      0  0
>
>OUTCROP   313
> G  1.     1708.   16101.  1395.    0  0       0.    1
>  429     0     0      0     0    0   0   0
>  89 33    1.0000  0.0     0.0      0  0
>
>OUTCROP   314
> G  1.     1705.   16212.  1352.    0  0       0.    1
>  430     0     0      0     0    0   0   0
>  76 36    1.0000  0.0     0.0      0. 0
>
>OUTCROP   315
> M  1.     1545.   16518.  1278.    0  0       0.    1
>  431     0     0      0     0    0   0   0
> 106 24    1.0000  0.0     0.0      0  0
>
>OUTCROP   316
> M  1.     1453.   16596.  1257.    0  .0      0.    1
>  432     0     0      0     0    0   0   0
>  73 25    1.0000  0.0     0.0      0  0
>
>OUTCROP   317
> E  1.     1377.   16662.  1243.    0  0       0.    1
>  433     0     0      0     0    0   0   0
>  74 50    1.0000  0.0     0.0      0  0
>
>OUTCROP   318
> M  1.     1440.   16678.  1268.    0  0       0.    1
>  434     0     0      0     0    0   0   0
>  93 40    1.0000  0.0     0.0      0  0
>
>OUTCROP   319
> M  1.     1377.   16774.  1233.    0  0       0.    1
>  435     0     0      0     0    0   0   0
>  67 33    1.0000  0.0     0.0      0  0
>
>OUTCROP   320
> M  1.     1363.   16944.  1213.    0  0       0.    1
>  436     0     0      0     0    0   0   0
>  69 36    1.0000  0.0     0.0      0  0
>
>OUTCROP   321
> E  1.     1318.   16976.  1206.    0  0       0.    1
>  437     0     0      0     0    0   0   0
>  68 36    1.0000  0.0     0.0      0  0
>
>OUTCROP   322
> E  1.     1243.   17333.  1165.    0  0       0.    1
>  438     0     0      0     0    0   0   0
>  94 20    1.0000  0.0     0.0      0  0
>
>OUTCROP   323
> G  1.     1501.   17387.  1254.    0  0       0.    1
>  439     0     0      0     0    0   0   0
>  79 10    1.0000  0.0     0.0      0  0
>
>OUTCROP   324
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> G  1.       1726.   17372. 1256.       0   0        0.     1
>  440     0       0        0     0     0   0      0
> 205 10     1.0000  0.0        0.0         0   0
>
>OUTCROP   325
> G  1.       1859.   17316. 1254.       0   0        0.     1
>  441     0       0        0     0     0   0      0
> 194 15     1.0000  0.0        0.0         0   0
>
>OUTCROP   326
> G  1.       2001.   17197. 1230.       0   0        0.     1
>  442     0       0        0     0     0   0      0
> 120 10     1.0000  0.0        0.0         0   0
>
>OUTCROP   327
> M  1.       2076.   17248. 1240.       0   0        0.     1
>  443     0       0        0     0     0   0      0
> 237 27     1.0000  0.0        0.0         0   0
>
>OUTCROP   328
> G  1.       2050.   17093. 1254.       0   0        0.     1
>  444     0       0        0     0     0   0      0
> 129 20     1.0000  0.0        0.0         0   0
>
>OUTCROP   329
> C  1.       2104.   17087. 1245.       0   0        0.     1
>  445     0       0        0     0     0   0      0
> 226 28     1.0000  0.0        0.0         0   0
>
>OUTCROP   330
> G  1.       2087.   17017. 1255.       0   0        0.     1
>  446     0       0        0     0     0   0      0
> 257 27     1.0000  0.0        0.0         0   0
>
>OUTCROP   331
> M  1.       2317.   16895. 1310.       0   0        0.     1
>  447     0       0        0     0     0   0      0
> 271 38     1.0000  0.0        0.0         0   0
>
>OUTCROP   332
> C  1.       2290.   16836. 1303.       0   0        0.     1
>  448     0       0        0     0     0   0      0
> 249 35     1.0000  0.0        0.0         0   0
>
>OUTCROP   333
> G  1.       2279.   16735. 1309.       0   0        0.     1
>  449     0       0        0     0     0   0      0
> 229 32     1.0000  0.0        0.0         0   0
>
>OUTCROP   334
> C  1.       2366.   16710. 1320.       0   0        0.     1
>  450     0       0        0     0     0   0      0
> 252 30     1.0000  0.0        0.0         0   0
>
>OUTCROP   335
> C  1.       2390.   16637. 1329.       0   0        0.     1
>  451     0       0        0     0     0   0      0
> 265 28     1.0000  0.0        0.0         0   0
>
>OUTCROP   336
> 4  1.       2135.   16630. 1318.       0   0        0.     1
>  452     0       0        0     0     0   0      0
> 262 18     1.0000  0.0        0.0         0   0
>
>OUTCROP   337
> 4  1.       2224.   16462. 1340.       0   0        0.     1
>  453     0       0        0     0     0   0      0
> 237 21     1.0000  0.0        0.0         0   0
>
>OUTCROP   338
> G  1.       4588.   16031. 1070.       0   0        0.     1
>  454     0       0        0     0     0   0      0
> 111 24     1.0000  0.0        0.0         0   0
>
>OUTCROP   339
> 5  1.       4590.   15901. 1085.       0   0        0.     0
>  455     0       0        0     0     0   0      0
>   0  0     0.0     0.0        0.0         0   0
>
>OUTCROP   340
```

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> G  1.      4550.  15888. 1090.       0  0       0.    1
>  456     0     0      0     0    0   0     0
> 114 12    1.0000 0.0       0.0       0  0
>
>OUTCROP  341
> 4  1.      4349.  15912. 1125.       0  0       0.    1
>   67     0     0      0     0    0   0     0
> 114 24    1.0000 0.0       0.0       0  0
>
>OUTCROP  342
> G  1.      4272.  15916. 1137.       0  0       0.    1
>  457     0     0      0     0    0   0     0
> 110 28    1.0000 0.0       0.0       0  0
>
>OUTCROP  343
> G  1.      4237.  15613. 1167.       0  0       0.    1
>   69     0     0      0     0    0   0     0
>  82 34    1.0000 0.0       0.0       0  0
>
>OUTCROP  344
> G  1.      4838.  15590. 1070.       0  0       0.    1
>  458     0     0      0     0    0   0     0
> 112 23    1.0000 0.0       0.0       0  0
>
>OUTCROP  345
> G  1.      4946.  15424. 1068.       0  0       0.    1
>   77     0     0      0     0    0   0     0
>  83 26    1.0000 0.0       0.0       0  0
>
>OUTCROP  346
> H  1.      4950.  15062. 1117.       0  0       0.    1
>  459     0     0      0     0    0   0     0
>  74 22    1.0000 0.0       0.0       0  0
>
>OUTCROP  347
> G  1.      4575.  15298. 1130.       0  0       0.    1
>  460     0     0      0     0    0   0     0
>  92 42    1.0000 0.0       0.0       0  0
>
>OUTCROP  348
> G  1.      4486.  15328. 1150.       0  0       0.    1
>  461     0     0      0     0    0   0     0
>  77 38    1.0000 0.0       0.0       0  0
>
>OUTCROP  349
> 5  1.      4427.  15233. 1165.       0  0       0.    1
>  462     0     0      0     0    0   0     0
>  81 38    1.0000 0.0       0.0       0  0
>
>OUTCROP  350
> G  1.      4304.  15185. 1188.       0  0       0.    1
>   71     0     0      0     0    0   0     0
>  52 38    1.0000 0.0       0.0       0  0
>
>OUTCROP  351
> M  1.      3889.  15475. 1274.       0  0       0.    1
>   73     0     0      0     0    0   0     0
>  95 26    1.0000 0.0       0.0       0  0
>
>OUTCROP  352
> M  1.      3950.  15197. 1275.       0  0       0.    1
>   75     0     0      0     0   -0   0     0
> 107 24    1.0000 0.0       0.0       0  0
>
>OUTCROP  353
> T  1.      4055.  15181. 1245.       0  0       0.    1
>  463     0     0      0     0    0   0     0
> 119 21    1.0000 0.0       0.0       0  0
>
>OUTCROP  354
> G  1.      4149.  15035. 1265.       0  0       0.    1
>  464     0     0      0     0    0   0     0
>  89 42    1.0000 0.0       0.0       0  0
>
>OUTCROP  355
> G  1.      4260.  14970. 1263.       0  0       0.    1
>  465     0     0      0     0    0   0     0
>  74 38    1.0000 0.0       0.0       0  0
>
>OUTCROP  356
```

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> G  1.     4400.  14817. 1267.     0  0      0.   1
>  466    0    0     0     0    0   0   0
>  97 40   1.0000 0.0    0.0        0  0
>
>OUTCROP  357
> G  1.     4431.  14766. 1269.     0  0      0.   1
>   80    0    0     0     0    0   0   0
>  82 36   1.0000 0.0    0.0        0  0
>
>OUTCROP  358
> S  1.     4466.  14732. 1260.     0  0      0.   0
>  467    0    0     0     0    0   0   0
>   0  0   0.0    0.0    0.0        0  0
>
>OUTCROP  359
> G  1.     4459.  14654. 1270.     0  0      0.   1
>  468    0    0     0     0    0   0   0
>  70 25   1.0000 0.0    0.0        0  0
>
>OUTCROP  360
> G  1.     4595.  14504. 1212.     0  0      0.   1
>   82    0    0     0     0    0   0   0
>  69 57   1.0000 0.0    0.0        0  0
>
>OUTCROP  361
> G  1.     4565.  14473. 1215.     0  0      0.   1
>  469    0    0     0     0    0   0   0
>  60 65   1.0000 0.0    0.0        0  0
>
>OUTCROP  362
> G  1.     4490.  14432. 1238.     0  0      0.   1
>  470    0    0     0     0    0   0   0
>  55 58   1.0000 0.0    0.0        0  0
>
>OUTCROP  363
> 4  1.     4409.  14445. 1255.     0  0      0.   1
>   84    0    0     0     0    0   0   0
>  67 52   1.0000 0.0    0.0        0  0
>
>OUTCROP  364
> 4  1.     4334.  14460. 1276.     0  0      0.   1
>  471    0    0     0     0    0   0   0
>  75 52   1.0000 0.0    0.0        0  0
>
>OUTCROP  365
> G  1.     4341.  14418. 1264.     0  0      0.   1
>  472    0    0     0     0    0   0   0
>  76 47   1.0000 0.0    0.0        0  0
>
>OUTCROP  366
> 4  1.     4398.  14377. 1267.     0  0      0.   1
>  473    0    0     0     0    0   0   0
>  76 55   1.0000 0.0    0.0        0  0
>
>OUTCROP  367
> G  1.     4219.  14468. 1360.     0  0      0.   1
>  474    0    0     0     0    0   0   0
>   8 26   1.0000 0.0    0.0        0  0
>
>OUTCROP  368
> G  1.     4259.  14427. 1325.     0  0      0.   1
>  475    0    0     0     0    0   0   0
>  93 24   1.0000 0.0    0.0        0  0
>
>OUTCROP  369
> G  1.     4228.  14349. 1311.     0  0      0.   1
>   87    0    0     0     0    0   0   0
> 109 26   1.0000 0.0    0.0        0  0
>
>OUTCROP  370
> G  1.     4206.  14415. 1325.     0  0      0.   1
>  476    0    0     0     0    0   0   0
> 183 28   1.0000 0.0    0.0        0  0
>
>OUTCROP  371
> T  1.     4150.  14357. 1346.     0  0      0.   1
>  477    0    0     0     0    0   0   0
>  87 26   1.0000 0.0    0.0        0  0
>
>OUTCROP  372
```

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> T   1.      4121.   14418. 1335.     0  0       0.    1
>    91    0     0      0     0     0   0  0
>  137 25    1.0000 0.0     0.0        0  0
>
>OUTCROP   373
> M   1.      3839.   14412. 1388.     0  0       0.    1
>    93    0     0      0     0     0   0  0
>   45 24    1.0000 0.0     0.0        0  0
>
>OUTCROP   374
> M   1.      3805.   14481. 1394.     0  0       0.    1
>   478    0     0      0     0     0   0  0
>   70 16    1.0000 0.0     0.0        0  0
>
>OUTCROP   375
> M   1.      3754.   14415. 1398.     0  0       0.    1
>    95    0     0      0     0     0   0  0
>   97  8    1.0000 0.0     0.0        0  0
>
>OUTCROP   376
> G   1.      4448.   13839. 1357.     0  0       0.    1
>    97    0     0      0     0     0   0  0
>   86 25    1.0000 0.0     0.0        0  0
>
>OUTCROP   377
> G   1.      4499.   13901. 1336.     0  0       0.    1
>    99    0     0      0     0     0   0  0
>  100 26    1.0000 0.0     0.0        0  0
>
>OUTCROP   378
> G   1.      4475.   14005. 1300.     0  0       0.    1
>   101    0     0      0     0     0   0  0
>  131 12    1.0000 0.0     0.0        0  0
>
>OUTCROP   379
> G   1.      4592.   13965. 1340.     0  0       0.    1
>   479    0     0      0     0     0   0  0
>   52 31    1.0000 0.0     0.0        0  0
>
>OUTCROP   380
> G   1.      4524.   14049. 1290.     0  0       0.    1
>   480    0     0      0     0     0   0  0
>   61 32    1.0000 0.0     0.0        0  0
>
>OUTCROP   381
> G   1.      4549.   14078. 1286.     0  0       0.    1
>   481    0     0      0     0     0   0  0
>   57 35    1.0000 0.0     0.0        0  0
>
>OUTCROP   382
> G   1.      4671.   14038. 1290.     0  0       0.    1
>   482    0     0      0     0     0   0  0
>   87 68    1.0000 0.0     0.0        0  0
>
>OUTCROP   383
> G   1.      4607.   14148. 1265.     0  0       0.    1
>   483    0     0      0     0     0   0  0
>   54 54    1.0000 0.0     0.0        0  0
>
>OUTCROP   384
> G   1.      4628.   14206. 1255.     0  0       0.    1
>   484    0     0      0     0     0   0  0
>   62 50    1.0000 0.0     0.0        0  0
>
>OUTCROP   385
> G   1.      4656.   14205. 1254.     0  0       0.    1
>   485    0     0      0     0     0   0  0
>   54 60    1.0000 0.0     0.0        0  0
>
>OUTCROP   386
> G   1.      4662.   14548. 1190.     0  0       0.    1
>   486    0     0      0     0     0   0  0
>   74 43    1.0000 0.0     0.0        0  0
>
>OUTCROP   387
> G   1.      4751.   14512. 1217.     0  0       0.    1
>   487    0     0      0     0     0   0  0
>   38 56    1.0000 0.0     0.0        0  0
>
>OUTCROP   388
```

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> G  1.      4746.   14581. 1180.     0   0       0.     1
>  488     0     0       0      0     0     0   0
>  78 50     1.0000  0.0        0.0         0   0
>
>OUTCROP  389
> G  1.      4752.   14663. 1164.     0   0       0.     1
>  489     0     0       0      0     0     0   0
> 106 45     1.0000  0.0        0.0         0   0
>
>OUTCROP  390
> G  1.      4844.   14674. 1190.     0   0       0.     1
>  103     0     0       0      0     0     0   0
>  81 22     1.0000  0.0        0.0         0   0
>
>OUTCROP  391
> G  1.      4796.   14799. 1140.     0   0       0.     1
>  490     0     0       0      0     0     0   0
>  90 34     1.0000  0.0        0.0         0   0
>
>OUTCROP  392
> G  1.      4845.   14753. 1169.     0   0       0.     1
>  106     0     0       0      0     0     0   0
>  48 30     1.0000  0.0        0.0         0   0
>
>OUTCROP  393
> G  1.      4872.   14857. 1157.     0   0       0.     1
>  108     0     0       0      0     0     0   0
>  85 24     1.0000  0.0        0.0         0   0
>
>OUTCROP  394
> G  1.      4805.   14896. 1127.     0   0       0.     1
>  111     0     0       0      0     0     0   0
>  88 22     1.0000  0.0        0.0         0   0
>
>OUTCROP  395
> G  1.      4884.   14886. 1155.     0   0       0.     1
>  114     0     0       0      0     0     0   0
>  91 23     1.0000  0.0        0.0         0   0
>
>OUTCROP  396
> B  1.      4987.   14452. 1186.     0   0       0.     1
>  117     0     0       0      0     0     0   0
>  84 25     1.0000  0.0        0.0         0   0
>
>OUTCROP  397
> B  1.      5052.   14471. 1170.     0   0       0.     1
>  491     0     0       0      0     0     0   0
>  91 40     1.0000  0.0        0.0         0   0
>
>OUTCROP  398
> B  1.      5126.   14451. 1169.     0   0       0.     1
>  120     0     0       0      0     0     0   0
>  77 27     1.0000  0.0        0.0         0   0
>
>OUTCROP  399
> B  1.      5202.   14367. 1168.     0   0       0.     1
>  492     0     0       0      0     0     0   0
> 107 20     1.0000  0.0        0.0         0   0
>
>OUTCROP  400
> B  1.      5320.   14397. 1145.     0   0       0.     1
>  493     0     0       0      0     0     0   0
>  48 40     1.0000  0.0        0.0         0   0
>
>OUTCROP  401
> B  1.      5218.   14492. 1154.     0   0       0.     1
>  494     0     0       0      0     0     0   0
> 234 28     1.0000  0.0        0.0         0   0
>
>OUTCROP  402
> B  1.      5178.   14531. 1135.     0   0       0.     1
>  122     0     0       0      0     0     0   0
>  36 30     1.0000  0.0        0.0         0   0
>
>OUTCROP  403
> B  1.      5306.   14593. 1118.     0   0       0.     1
>  124     0     0       0      0     0     0   0
>  49 30     1.0000  0.0        0.0         0   0
>
>OUTCROP  404
```

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> B  1.        5444.  14550. 1120.       0   0         0.    1
>  495      0      0      0       0    0     0     0
> 159 37     1.0000 0.0       0.0        0   0
>
>OUTCROP   405
> B  1.        5480.  14558. 1120.       0   0         0.    1
>  127      0      0      0       0    0     0     0
> 140 10     1.0000 0.0       0.0        0   0
>
>OUTCROP   406
> S  1.        5515.  14627. 1110.       0   0         0.    1
>  496      0      0      0       0    0     0     0
> 164  7     1.0000 0.0       0.0        0   0
>
>OUTCROP   407
> B  1.        5558.  14574. 1109.       0   0         0.    1
>  497      0      0      0       0    0     0     0
> 159  7     1.0000 0.0       0.0        0   0
>
>OUTCROP   408
> B  1.        5845.  14638. 1070.       0   0         0.    1
>  129      0      0      0       0    0     0     0
>  51 10     1.0000 0.0       0.0        0   0
>
>OUTCROP   409
> S  1.        5519.  14381. 1148.       0   0         0.    1
>  498      0      0      0       0    0     0     0
>  78 14     1.0000 0.0       0.0        0   0
>
>OUTCROP   410
> S  1.        5624.  14189. 1167.       0   0         0.    1
>  499      0      0      0       0    0     0     0
>  65  5     1.0000 0.0       0.0        0   0
>
>OUTCROP   411
> S  1.        5386.  13809. 1242.       0   0         0.    1
>  500      0      0      0       0    0     0     0
>  81 84     1.0000 0.0       0.0        0   0
>
>OUTCROP   412
> S  1.        5400.  13779. 1245.       0   0         0.    1
>  501      0      0      0       0    0     0     0
>  71 90     1.0000 0.0       0.0        0   0
>
>OUTCROP   413
> S  1.        5426.  13720. 1250.       0   0         0.    1
>  502      0      0      0       0    0     0     0
> 241 79     1.0000 0.0       0.0        0   0
>
>OUTCROP   414
> S  1.        5428.  13636. 1271.       0   0         0.    1
>  503      0      0      0       0    0     0     0
>  83 89     1.0000 0.0       0.0        0   0
>
>OUTCROP   415
> S  1.        5467.  13505. 1285.       0   0         0.    1
>  131      0      0      0       0    0     0     0
>  82 30     1.0000 0.0       0.0        0   0
>
>OUTCROP   416
> S  1.        5487.  13400. 1295.       0   0         0.    1
>  133      0      0      0       0    0     0     0
>  76 40     1.0000 0.0       0.0        0   0
>
>OUTCROP   417
> S  1.        5496.  13220. 1317.       0   0         0.    1
>  136      0      0      0       0    0     0     0
> 252 30     1.0000 0.0       0.0        0   0
>
>OUTCROP   418
> S  1.        5537.  12996. 1333.       0   0         0.    1
>  139      0      0      0       0    0     0     0
>  82 35     1.0000 0.0       0.0        0   0
>
>OUTCROP   419
> S  1.        5724.  13636. 1229.       0   0         0.    1
>  504      0      0      0       0    0     0     0
>  75 40     1.0000 0.0       0.0        0   0
>
>OUTCROP   420
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> S  1.     6424.   13878. 1135.     0   0        0.    1
>  505    0     0      0     0    0     0   0
> 133 15   1.0000 0.0     0.0         0   0
>
>OUTCROP   421
> S  1.     6472.   13961. 1128.     0   0        0.    1
>  141    0     0      0     0    0     0   0
>  89 16   1.0000 0.0     0.0         0   0
>
>OUTCROP   422
> S  1.     6562.   14082. 1095.     0   0        0.    1
>  506    0     0      0     0    0     0   0
> 173  5   1.0000 0.0     0.0         0   0
>
>OUTCROP   423
> S  1.     6542.   14137. 1089.     0   0        0.    1
>  507    0     0      0     0    0     0   0
> 351 11   1.0000 0.0     0.0         0   0
>
>OUTCROP   450
> G  1.     5896.   17746.  950.     0   0        0.    1
>    3    0     0      0     0    0     0   0
> 271 32   1.0000 0.0     0.0         0   0
>
>OUTCROP   451
> G  1.     6170.   17550.  942.     0   0        0.    1
>    5    0     0      0     0    0     0   0
> 258 42   1.0000 0.0     0.0         0   0
>
>OUTCROP   452
> H  1.     3014.   13552. 1663.     0   0        0.    1
>    7    0     0      0     0    0     0   0
> 276 37   1.0000 0.0     0.0         0   0.
>
>OUTCROP   453
> H  1.     3052.   13493. 1640.     0   0        0.    1
>    8    0     0      0     0    0     0   0
> 234 38   1.0000 0.0     0.0         0   0
>
>OUTCROP   454
> H  1.     4624.   13134. 1554.     0   0        0.    1
>   10    0     0      0     0    0     0   0
>  50 29   1.0000 0.0     0.0         0   0
>
>OUTCROP   455
> B  1.     4646.   13009. 1571.     0   0        0.    1
>   12    0     0      0     0    0     0   0
>  77 34   1.0000 0.0     0.0         0   0
>
>OUTCROP   456
> 4  1.     4151.   13092. 1599.     0   0        0.    1
>   14    0     0      0     0    0     0   0
>  83 31   1.0000 0.0     0.0         0   0
>
>OUTCROP   457
> H  1.     4823.   12475. 1526.     0   0        0.    1
>   16    0     0      0     0    0     0   0
>  72 33   1.0000 0.0     0.0         0   0
>
>OUTCROP   458
> H  1.     4819.   12404. 1516.     0   0        0.    1
>   18    0     0      0     0    0     0   0
>  69 43   1.0000 0.0     0.0         0   0
>
>OUTCROP   459
> H  1.     4834.   12364. 1510.     0   0        0.    1
>   20    0     0      0     0    0     0   0
>  71 37   1.0000 0.0     0.0         0   0
>
>OUTCROP   460
> H  1.     4847.   12305. 1495.     0   0        0.    1
>   21    0     0      0     0    0     0   0
>  70 34   1.0000 0.0     0.0         0   0
>
>OUTCROP   461
> E  1.     3818.   12561. 1460.     0   0        0.    1
>   23    0     0      0     0    0     0   0
>  67 22   1.0000 0.0     0.0         0   0
>
>OUTCROP   462
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> E  1.      3818.  12546. 1459.     0   0      0.   1
>   24     0    0     0     0    0   0    0
>  71 28    1.0000 0.0      0.0        0   0
>
>OUTCROP  463
> E  1.      3839.  12497. 1457.     0   0      0.   1
>   25     0    0     0     0    0   0    0
>  66 17    1.0000 0.0      0.0        0   0
>
>OUTCROP  464
> E  1.      3604.  12580. 1442.     0   0      0.   1
>   27     0    0     0     0    0   0    0
> 259 49    1.0000 0.0      0.0        0   0
>
>OUTCROP  465
> E  1.      3613.  12469. 1426.     0   0      0.   1
>   29     0    0     0     0    0   0    0
> 264 55    1.0000 0.0      0.0        0   0
>
>OUTCROP  466
> E  1.      3618.  12433. 1419.     0   0      0.   1
>   30     0    0     0     0    0   0    0
> 262 60    1.0000 0.0      0.0        0   0
>
>OUTCROP  467
> C  1.      4049.  17817. 1075.     0   0      0.   1
>   32     0    0     0     0    0   0    0
> 172 20    1.0000 0.0      0.0        0   0
>
>OUTCROP  468
> C  1.      3357.  17642. 1146.     0   0      0.   1
>   34     0    0     0     0    0   0    0
>  94 14    1.0000 0.0      0.0        0  .0
>
>OUTCROP  469
> C  1.      3409.  17650. 1147.     0   0      0.   1
>   35     0    0     0     0    0   0    0
> 137 20    1.0000 0.0      0.0        0   0
>
>OUTCROP  470
> N  1.      3249.  17686. 1115.     0   0.     0.   1
>   37     0    0     0     0    0   0    0
> 184 12    1.0000 0.0      0.0        0   0
>
>OUTCROP  471
> C  1.      3349.  17531. 1122.     0   0      0.   1
>   39     0    0     0     0    0   0    0
>  98 38    1.0000 0.0      0.0        0   0
>
>OUTCROP  472
> C  1.      3195.  17428. 1202.     0   0      0.   1
>   41     0    0     0     0    0   0    0
> 136 19    1.0000 0.0      0.0        0   0
>
>OUTCROP  473
> C  1.      3206.  17417. 1202.     0   0      0.   1
>   42     0    0     0     0    0   0    0
> 193  9    1.0000 0.0      0.0        0   0
>
>OUTCROP  474
> C  1.      3221.  17396. 1202.     0   0      0.   1
>   43     0    0     0     0    0   0    0
> 154 16    1.0000 0.0      0.0        0   0
>
>OUTCROP  475
> C  1.      3101.  17390. 1240.     0   0      0.   1
>   45     0    0     0     0    0   0    0
> 165 38    1.0000 0.0      0.0        0   0
>
>OUTCROP  476
> C  1.      2847.  17350. 1284.     0   0      0.   1
>   47     0    0     0     0    0   0    0
> 171  8    1.0000 0.0      0.0        0   0
>
>OUTCROP  477
> C  1.      2806.  17319. 1287.     0   0      0.   1
>   48     0    0     0     0    0   0    0
> 171  9    1.0000 0.0      0.0        0   0
>
>OUTCROP  478
```

```
> C  1.      2737.  17315. 1282.      0  0        0.   1
>    50    0     0      0      0   0  0     0
> 217  5    1.0000 0.0      0.0         0  0
>
>OUTCROP  479
> C  1.      2689.  17298. 1286.      0  0        0.   1
>    51    0     0      0      0   0  0     0
> 101  4    1.0000 0.0      0.0         0  0
>
>OUTCROP  480
> E  1.      3983.  16386. 1180.      0  0        0.   1
>    53    0     0      0      0   0  0     0
> 267 27    1.0000 0.0      0.0         0  0
>
>OUTCROP  481
> E  1.      3882.  16408. 1130.      0  0        0.   1
>    55    0     0      0      0   0  0     0
>  57 15    1.0000 0.0      0.0         0  0
>
>OUTCROP  482
> E  1.      3799.  16345. 1162.      0  0        0.   1
>    57    0     0      0      0   0  0     0
>  52 15    1.0000 0.0      0.0         0  0
>
>OUTCROP  483
> E  1.      3601.  16234. 1220.      0  0        0.   1
>    59    0     0      0      0   0  0     0
>  46 27    1.0000 0.0      0.0         0  0
>
>OUTCROP  484
> E  1.      3350.  16077. 1273.      0  0        0.   1
>    61    0     0      0      0   0  0     0
> 210  6    1.0000 0.0      0.0         0  0
>
>OUTCROP  485
>    1.      4280.  16350. 1323.      0  0        0.   1
>    63    0     0      0      0   0  0     0
>  97  8    1.0000 0.0      0.0         0  0
>
>OUTCROP  486
> G  1.      2937.  15196. 1514.      0  0        0.   1
>    65    0     0      0      0   0  0     0
> 255 21    1.0000 0.0      0.0         0  0
>
>OUTCROP  487
> G  1.      2779.  15232. 1540.      0  0        0.   1
>    66    0     0      0      0   0  0     0
> 265 43    1.0000 0.0      0.0         0  0
>
>OUTCROP  489
> G  1.      4393.  15931. 1115.      0  0        0.   1
>    68    0     0      0      0   0  0     0
> 117 24    1.0000 0.0      0.0         0  0
>
>OUTCROP  490
> G  1.      4262.  15632. 1166.      0  0        0.   1
>    70    0     0      0      0   0  0     0
>  72 29    1.0000 0.0      0.0         0  0
>
>OUTCROP  491
> G  1.      4333.  15183. 1182.      0  0        0.   1
>    72    0     0      0      0   0  0     0
>  51 38    1.0000 0.0      0.0         0  0
>
>OUTCROP  492
> M  1.      3865.  15413. 1275.      0  0        0.   1
>    74    0     0      0      0   0  0     0
>  96 24    1.0000 0.0      0.0         0  0
>
>OUTCROP  493
> M  1.      3952.  15153. 1290.      0  0        0.   1
>    76    0     0      0      0   0  0     0
> 134 16    1.0000 0.0      0.0         0  0
>
>OUTCROP  494
> G  1.      4969.  15365. 1067.      0  0        0.   1
>    78    0     0      0      0   0  0     0
> 121 20    1.0000 0.0      0.0         0  0
>
>OUTCROP  495
```

```
> G  1.      4945.  15343. 1072.      0  0      0.   1
>   79    0       0      0      0  0  0   0
> 101 17   1.0000 0.0     0.0         0  0
>
>OUTCROP  496
> G  1.      4438.  14730. 1270.      0  0      0.   1
>   81    0       0      0      0  0  0   0
>  83 14   1.0000 0.0     0.0         0  0
>
>OUTCROP  497
> G  1.      4615.  14437. 1217.      0  0      0.   1
>   83    0       0      0      0  0  0   0
>  67 62   1.0000 0.0     0.0         0  0
>
>OUTCROP  498
> 5  1.      4417.  14463. 1261.      0  0      0.   1
>   85    0       0      0      0  0  0   0
>  67 55   1.0000 0.0     0.0         0  0
>
>OUTCROP  499
> 5  1.      4441.  14454. 1255.      0  0      0.   1
>   86    0       0      0      0  0  0   0
>  69 48   1.0000 0.0     0.0         0  0
>
>OUTCROP  500
> G  1.      4245.  14345. 1305.      0  0      0.   1
>   88    0       0      0      0  0  0   0
> 113 25   1.0000 0.0     0.0         0  0
>
>OUTCROP  501
> G  1.      4270.  14338. 1300.      0  0      0.   1
>   89    0       0      0      0  0  0   0
>  83 24   1.0000 0.0     0.0         0  0
>
>OUTCROP  502
> G  1.      4305.  14336. 1300.      0  0      0.   1
>   90    0       0      0      0  0  0   0
>  82 27   1.0000 0.0     0.0         0  0
>
>OUTCROP  503
> T  1.      4129.  14330. 1345.      0  0      0.   1
>   92    0       0      0      0  0  0   0
> 151 26   1.0000 0.0     0.0         0  0
>
>OUTCROP  504
> M  1.      3894.  14414. 1376.      0  0      0.   1
>   94    0       0      0      0  0  0   0
>  46 22   1.0000 0.0     0.0         0  0
>
>OUTCROP  505
> M  1.      3802.  14407. 1394.      0  0      0.   1
>   96    0       0      0      0  0  0   0
>  96  8   1.0000 0.0     0.0         0  0
>
>OUTCROP  506
> G  1.      4493.  13833. 1348.      0  0      0.   1
>   98    0       0      0      0  0  0   0
> 151 25   1.0000 0.0     0.0         0  0
>
>OUTCROP  507
> G  1.      4537.  13866. 1358.      0  0      0.   1
>  100    0       0      0      0  0  0   0
> 143 26   1.0000 0.0     0.0         0  0
>
>OUTCROP  508
> G  1.      4509.  13968. 1314.      0  0      0.   1
>  102    0       0      0      0  0  0   0
> 132 10   1.0000 0.0     0.0         0  0
>
>OUTCROP  509
> G  1.      4838.  14651. 1194.      0  0      0.   1
>  104    0       0      0      0  0  0   0
>  74 26   1.0000 0.0     0.0         0  0
>
>OUTCROP  510
> G  1.      4834.  14618. 1202.      0  0      0.   1
>  105    0       0      0      0  0  0   0
>  72 30   1.0000 0.0     0.0         0  0
>
>OUTCROP  511
```

```
> G  1.      4859.  14733. 1179.      0  0         0.    1
>  107     0     0      0       0  0      0   0
>  86 35    1.0000 0.0     0.0       0  0
>
>OUTCROP   512
> G  1.      4864.  14814. 1166.      0  0         0.    1
>  109     0     0      0       0  0      0   0
>  88 28    1.0000 0.0     0.0       0  0
>
>OUTCROP   513
> G  1.      4874.  14777. 1173.      0  0         0.    1
>  110     0     0      0       0  0      0   0
>  87 27    1.0000 0.0     0.0       0  0
>
>OUTCROP   514
> G  1.      4808.  14952. 1122.      0  0         0.    1
>  112     0     0      0       0  0      0   0
> 103 23    1.0000 0.0     0.0       0  0
>
>OUTCROP   515
> G  1.      4830.  14995. 1109.      0  0         0.    1
>  113     0     0      0       0  0      0   0
> 105 22    1.0000 0.0     0.0       0  0
>
>OUTCROP   516
> G  1.      4886.  14931. 1146.      0  0         0.    1
>  115     0     0      0       0  0      0   0
>  90 32    1.0000 0.0     0.0       0  0
>
>OUTCROP   517
> G  1.      4897.  14981. 1135.      0  0         0.    1
>  116     0     0      0       0  0      0   0
>  91 24    1.0000 0.0     0.0       0  0
>
>OUTCROP   518
> B  1.      4978.  14424. 1174.      0  0         0.    1
>  118     0     0      0       0  0      0   0
>  85 34    1.0000 0.0     0.0       0  0
>
>OUTCROP   519
> B  1.      5016.  14388. 1193.      0  0         0.    1
>  119     0     0      0       0  0      0   0
>  69 40    1.0000 0.0     0.0       0  0
>
>OUTCROP   520
> B  1.      5173.  14446. 1163.      0  0         0.    1
>  121     0     0      0       0  0      0   0
>  82 25    1.0000 0.0     0.0       0  0
>
>OUTCROP   521
> B  1.      5241.  14541. 1126.      0  0         0.    1
>  123     0     0      0       0  0      0   0
>  78 32    1.0000 0.0     0.0       0  0
>
>OUTCROP   522
> B  1.      5332.  14603. 1114.      0  0         0.    1
>  125     0     0      0       0  0      0   0
>  46 35    1.0000 0.0     0.0       0  0
>
>OUTCROP   523
> B  1.      5382.  14568. 1110.      0  0         0.    1
>  126     0     0      0       0  0      0   0
>  23 41    1.0000 0.0     0.0       0  0
>
>OUTCROP   524
> B  1.      5515.  14556. 1118.      0  0         0.    1
>  128     0     0      0       0  0      0   0
> 136  6    1.0000 0.0     0.0       0  0
>
>OUTCROP   525
> B  1.      5894.  14607. 1073.      0  0         0.    1
>  130     0     0      0       0  0      0   0
>  56 12    1.0000 0.0     0.0       0  0
>
>OUTCROP   526
> S  1.      5466.  13477. 1289.      0  0         0.    1
>  132     0     0      0       0  0      0   0
>  84 30    1.0000 0.0     0.0       0  0
>
>OUTCROP   527
```

```
> S  1.      5491.  13345. 1305.     0  0      0.    1
>  134    0    0      0      0    0   0    0
>  76 40   1.0000 0.0      0.0        0  0
>
>OUTCROP   528
> S  1.      5494.  13308. 1310.     0  0      0.    1
>  135    0    0      0      0    0   0    0
>  75 30   1.0000 0.0      0.0        0  0
>
>OUTCROP   529
> S  1.      5505.  13190. 1315.     0  0      0.    1
>  137    0    0      0      0    0   0    0
> 128 45   1.0000 0.0      0.0        0  0
>
>OUTCROP   530
> S  1.      5507.  13158. 1317.     0  0      0.    1
>  138    0    0      0      0    0   0    0
>  98 30   1.0000 0.0      0.0        0  0
>
>OUTCROP   531
> S  1.      5548.  12938. 1340.     0  0      0.    1
>  140    0    0      0      0    0   0    0
>  74 35   1.0000 0.0      0.0        0  0
>
>OUTCROP   532
> S  1.      6491.  14011. 1115.     0  0      0.    1
>  142    0    0      0      0    0   0    0
> 107 10   1.0000 0.0      0.0        0  0
>
>OUTCROP   533
> S  1.      6533.  14049. 1107.     0  0      0.    1
>  143    0    0      0      0    0   0    0
>  97  5   1.0000 0.0      0.0        0  0
>
>OUTCROP   534
> U  1.      4866.  15613. 1062.     0  0      0.    0
>  144    0    0      0      0    0   0    0
>   0  0   0.0      0.0      0.0        0  0
>
>OUTCROP   535
> U  1.      4041.  15132. 1265.     0  0      0.    0
>  145    0    0      0      0    0   0    0
>   0  0   0.0      0.0      0.0        0  0
>
>OUTCROP   536
> 9  1.      4698.  14057. 1270.     0  0      0.    0
>  146    0    0      0      0    0   0    0
>   0  0   0.0      0.0      0.0        0  0
>
>OUTCROP   537
> U  1.      4421.  13754. 1365.     0  0      0.    0
>  147    0    0      0      0    0   0    0
>   0  0   0.0      0.0      0.0        0  0
>
>BOREHOLE     1
>    6838.   16629.     997.      6838.  16629.    966.      6838.  16629.
>         6838.  16629.  958.
>   7     6838.  16629.  957.                                 742.
>         6838.  16629.  947.
>         6838.  16629.  946.
>         6838.  16629.  942.
>   6     6838.  16629.  941.
>         6838.  16629.  933.
>   5     6838.  16629.  931.
>         6838.  16629.  877.
>   4     6838.  16629.  871.
>         6838.  16629.  851.
>   3     6838.  16629.  847.
>         6838.  16629.  828.
>   2     6838.  16629.  827.
>         6838.  16629.  813.
>   1     6838.  16629.  810.
>   T     6838.  16629.  801.
>   M     6838.  16629.  786.
>
>BOREHOLE    11
>    2551.   15475.    1566.      2554.  15480.   1556.      2640.  15612.
>   G     2556.  15482. 1550.
>         2559.  15487. 1539.                                 1271.
>   9     2560.  15488. 1537.
```

```
>          2563.    15494.  1525.
>   8      2564.    15494.  1524.
>          2569.    15502.  1507.
>   7      2573.    15509.  1494.
>          2578.    15517.  1475.
>   6      2580.    15520.  1470.
>          2585.    15527.  1454.
>          2597.    15546.  1412.
>   4      2600.    15551.  1403.
>          2603.    15556.  1393.
>   3      2604.    15557.  1389.
>          2608.    15563.  1376.
>   2      2609.    15564.  1375.
>          2613.    15571.  1360.
>   1      2614.    15572.  1357.
>   T      2614.    15573.  1356.
>   M      2621.    15583.  1334.
>
>BOREHOLE     52
>    4738.    15005.    1139.        4737.   15005.    1117.      4727.  15004.
>          4737.   15006.  1099.
>   Y      4737.   15006.  1098.                                          863.
>          4736.   15006.  1082.
>   X      4736.   15006.  1078.
>          4736.   15006.  1061.
>   9      4735.   15006.  1058.
>          4735.   15006.  1044.
>   8      4735.   15006.  1043.
>          4734.   15007.  1028.
>   7      4734.   15007.  1026.
>          4734.   15007.  1011.
>   6      4734.   15007.  1011.
>          4733.   15007.   995.
>   5      4733.   15007.   993.
>          4732.   15007.   947.
>   4      4732.   15007.   936.
>          4731.   15006.   930.
>   3      4731.   15006.   925.
>          4731.   15006.   909.
>   2      4731.   15006.   908.
>          4730.   15006.   889.
>   1      4730.   15006.   886.
>   T      4730.   15006.   882.
>   M      4729.   15005.   858.
>
>BOREHOLE     53
>    3851.    15822.    1216.        3851.   15822.    1211.      3850.  15810.
>   E      3851.   15821.  1199.
>          3851.   15820.  1178.                                          1126.
>   0      3851.   15820.  1177.
>          3852.   15819.  1150.
>   0      3852.   15819.  1146.
>          3851.   15813.  1066.
>   0      3851.   15813.  1065.
>          3851.   15813.  1061.
>   0      3851.   15813.  1060.
>   C      3850.   15811.  1041.
>
>BOREHOLE     57
>    4814.    15549.    1074.        4814.   15549.    1070.      4811.  15548.
>          4814.   15549.  1066.
>   X      4814.   15549.  1062.
>          4814.   15549.  1044.                                          865.
>   9      4814.   15549.  1041.
>          4814.   15549.  1026.
>   8      4814.   15549.  1025.
>          4814.   15549.  1018.
>   7      4814.   15549.  1015.
>          4814.   15549.  1003.
>   6      4814.   15549.  1001.
>          4814.   15549.   987.
>   5      4814.   15549.   985.
>          4813.   15548.   942.
>   4      4813.   15548.   933.
>          4813.   15548.   921.
>   3      4813.   15548.   916.
>          4812.   15548.   899.
>   2      4812.   15548.   899.
>          4811.   15548.   886.
>   1      4811.   15548.   883.
```

```
>  T     4811.   15548.   881.
>
>BOREHOLE    58
>   4498.   15646.    1120.        4498.   15646.    1116.       4498.   15646.
>          4498.   15646.  1099.                                          1020.
>  5       4498.   15646.  1097.
>          4498.   15646.  1061.
>  4       4498.   15646.  1051.
>          4498.   15646.  1032.
>  3       4498.   15646.  1027.
>  T       4498.   15646.  1023.
>
>BOREHOLE   101
>   4333.   15637.    1147.        4333.   15637.    1135.       4332.   15637.
>          4333.   15637.  1135.                                          1098.
>  4       4333.   15637.  1133.
>          4333.   15637.  1112.
>  3       4332.   15637.  1104.
>
>BOREHOLE   102
>   4290.   15712.    1151.        4290.   15712.    1149.       4290.   15712.
>          4290.   15712.  1137.                                          1120.
>  3       4290.   15712.  1129.
>
>BOREHOLE   103
>   4276.   15744.    1151.        4276.   15744.    1146.       4276.   15744.
>          4276.   15744.  1142.                                          1126.
>  3       4276.   15744.  1134.
>
>BOREHOLE   104
>   4255.   15773.    1150.        4255.   15773.    1138.       4255.   15773.
>                                                                         1138.
>BOREHOLE   105
>   4309.   15687.    1149.        4309.   15687.    1146.       4309.   15687.
>          4309.   15687.  1125.                                          1112.
>  3       4309.   15687.  1117.
>
>BOREHOLE   112
>   5038.   16571.    1010.        5038.   16571.    1009.       5038.   16571.
>                                                                         1009
>BOREHOLE   114
>   3456.   13819.    1508.        3456.   13819.    1499.       3456.   13819.
>  P       3456.   13819.  1496.
>  E       3456.   13819.  1456.                                          1324.
>          3456.   13819.  1444.
>  0       3456.   13819.  1444.
>          3456.   13819.  1416.
>  0       3456.   13819.  1414.
>          3456.   13819.  1349.
>  0       3456.   13819.  1348.
>          3456.   13819.  1338.
>  0       3456.   13819.  1337.
>
>BOREHOLE   115
>   3969.   14474.    1373.        3969.   14474.    1371.       3969.   14474.
>  P       3969.   14474.  1315.
>  E       3969.   14474.  1284.                                          1190.
>          3969.   14474.  1264.
>  0       3969.   14474.  1261.
>          3969.   14474.  1233.
>  0       3969.   14474.  1230.
>          3969.   14474.  1210.
>  0       3969.   14474.  1208.
>
>BOREHOLE   121
>   5031.   16566.    1012.        5031.   16566.     950.       5031.   16566.
>                                                                          949.
>BOREHOLE   151
>   6301.   16999.     992.        6301.   16999.     957.       6301.   16999.
>  8       6301.   16999.   957.
>          6301.   16999.   940.                                          725.
>  7       6301.   16999.   939.
>          6301.   16999.   922.
>  6       6301.   16999.   920.
>          6301.   16999.   915.
>  6       6301.   16999.   914.
>          6301.   16999.   902.
>  5       6301.   16999.   898.
>          6301.   16999.   856.
>  4       6301.   16999.   850.
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>          6301.    16999.    831.
>   3      6301.    16999.    827.
>          6301.    16999.    790.
>   1      6301.    16999.    786.
>   T      6301.    16999.    778.
>   M      6301.    16999.    754.
>
>BOREHOLE   152
>    5183.   15985.    1021.        5184.   15985.      989.       5183.   15988.
>   F      5184.    15985.    989.                                          664.
>          5184.    15985.    982.
>   6      5184.    15985.    976.
>   F      5184.    15985.    972.
>          5184.    15985.    948.
>   5      5184.    15985.    946.
>          5185.    15985.    879.
>   F      5186.    15985.    871.
>   4      5186.    15985.    862.
>          5186.    15985.    852.
>   F      5186.    15985.    848.
>   F      5186.    15985.    843.
>   3      5186.    15985.    838.
>          5186.    15985.    818.
>   2      5186.    15985.    817.
>          5186.    15985.    815.
>   1      5186.    15985.    810.
>   T      5186.    15985.    804.
>   M      5186.    15985.    790.
>   F      5186.    15986.    753.
>   3      5186.    15986.    751.
>          5186.    15986.    730.
>   2      5186.    15986.    729.
>          5186.    15986.    726.
>   1      5185.    15986.    722.
>   T      5185.    15987.    718.
>   M      5185.    15987.    705.
>
>BOREHOLE   153
>    4837.   16475.    1022.        4837.   16475.     1001.       4832.   16492.
>   P      4838.    16475.    954.                                          691.
>   F      4838.    16475.    936.
>   P      4836.    16473.    866.
>   E      4836.    16475.    831.
>          4836.    16476.    823.
>   0      4836.    16477.    820.
>          4835.    16480.    789.
>   0      4835.    16481.    786.
>          4835.    16484.    760.
>   0      4835.    16484.    760.
>   C      4832.    16492.    695.
>
>BOREHOLE   154
>    4288.   15005.    1239.        4288.   15005.     1236.       4273.   14997.
>          4287.    15005.   1205.                                          538.
>   4      4286.    15005.   1194.
>          4286.    15005.   1181.
>   3      4286.    15006.   1174.
>          4285.    15006.   1156.
>   2      4285.    15006.   1156.
>          4284.    15006.   1136.
>   1      4284.    15006.   1134.
>   T      4284.    15006.   1132.
>   M      4283.    15005.   1100.
>   P      4281.    15004.   1022.
>   E      4279.    15004.    985.
>          4279.    15003.    974.
>   0      4278.    15003.    971.
>          4277.    15002.    936.
>   0      4277.    15002.    933.
>          4276.    15001.    910.
>   0      4276.    15001.    909.
>   C      4273.    14998.    842.
>
>BOREHOLE   155
>    4475.   14579.    1246.        4475.   14579.     1219.       4478.   14584.
>          4475.    14579.   1207.                                          478.
>   7      4475.    14579.   1204.
>          4475.    14580.   1189.
>   6      4475.    14580.   1185.
>          4476.    14581.   1167.
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>   5      4476.   14581.  1164.
>          4476.   14582.  1116.
>   4      4476.   14582.  1105.
>          4476.   14582.  1098.
>   3      4476.   14582.  1092.
>          4477.   14582.  1042.
>   2      4477.   14582.  1041.
>          4477.   14583.  1040.
>   1      4477.   14583.  1038.
>   T      4477.   14583.  1034.
>   M      4478.   14584.  1002.
>
>BOREHOLE   156
>   4675.   13995.     1302.        4675.   13995.    1298.      4673.   13975.
>          4675.   13995.  1291.                                            936.
>   8      4675.   13995.  1290.
>          4674.   13995.  1250.
>   7      4674.   13995.  1247.
>          4674.   13994.  1232.
>          4674.   13994.  1230.
>          4674.   13994.  1226.
>   6      4674.   13994.  1224.
>          4673.   13994.  1186.
>   5      4673.   13994.  1183.
>          4673.   13994.  1181.
>   5      4673.   13994.  1181.
>          4673.   13991.  1126.
>   4      4674.   13991.  1115.
>          4674.   13990.  1106.
>   3      4674.   13989.  1099.
>          4674.   13988.  1073.
>   2      4674.   13988.  1072.
>          4674.   13985.  1035.
>   1      4674.   13985.  1032.
>   T      4674.   13984.  1028.
>   M      4674.   13981.   986.
>
>BOREHOLE   157
>   3182.   15511.     1404.        3182.   15511.    1395.      3180.   15512.
>   P      3181.   15512.  1363.                                           1196.
>   E      3181.   15512.  1332.
>          3180.   15512.  1315.
>   0      3180.   15512.  1314.
>          3180.   15513.  1293.
>   0      3180.   15513.  1290.
>   C      3180.   15512.  1200.
>
>BOREHOLE   158
>   3425.   14579.     1466.        3425.   14579.    1461.      3425.   14579.
>   E      3425.   14579.  1430.                                           1290.
>          3425.   14579.  1413.
>   0      3425.   14579.  1410.
>          3425.   14579.  1385.
>   0      3425.   14579.  1381.
>   C      3425.   14579.  1298.
>
>BOREHOLE   159
>   2847.   15644.     1553.        2847.   15644.    1549.      2865.   15659.
>          2847.   15644.  1535.
>   5      2847.   15644.  1531.                                           1316.
>          2846.   15644.  1485.
>   4      2846.   15646.  1467.
>   F      2847.   15646.  1464.
>   4      2847.   15650.  1443.
>          2848.   15652.  1430.
>   3      2848.   15652.  1425.
>          2849.   15655.  1408.
>   2      2849.   15655.  1407.
>          2854.   15657.  1371.
>   1      2855.   15657.  1367.
>   T      2857.   15658.  1359.
>   M      2862.   15658.  1331.
>
>BOREHOLE   160
>   4388.   12933.     1576.        4388.   12933.    1571.      4388.   12933.
>          4388.   12933.  1565.
>   9      4388.   12933.  1562.                                           1336.
>          4388.   12933.  1511.
>   7      4388.   12933.  1510.
>          4388.   12933.  1498.
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> 6     4388.   12933.  1494.
>       4388.   12933.  1482.
> 5     4388.   12933.  1479.
>       4388.   12933.  1442.
>       4388.   12933.  1438.
>       4388.   12933.  1435.
> 4     4388.   12933.  1433.
>       4388.   12933.  1420.
> 3     4388.   12933.  1417.
>       4388.   12933.  1389.
> 2     4388.   12933.  1389.
>       4388.   12933.  1366.
> 1     4388.   12933.  1365.
> T     4388.   12933.  1360.
>
>BOREHOLE   161
>    4199.   12856.   1559.        4199.   12856.   1553.      4194.  12861.
>       4199.   12857.  1535.                                          1331.
>       4199.   12857.  1532.
>       4199.   12857.  1529.
> 4     4199.   12857.  1527.
>       4199.   12858.  1515.
> 3     4199.   12858.  1511.
>       4198.   12859.  1457.
> 1     4198.   12859.  1456.
> T     4198.   12860.  1452.
> M     4197.   12860.  1421.
> P     4195.   12861.  1359.
>
>BOREHOLE   162
>    5457.   16497.   1004.        5454.   16498.    920.      5448.  16503.
> H     5450.   16500.   803.                                           741.
>
>BOREHOLE   163
>    4320.   13485.   1440.        4320.   13485.   1434.      4318.  13475.
>       4320.   13484.  1413.                                          1231.
>       4320.   13484.  1409.
>       4320.   13484.  1407.
> 4     4320.   13484.  1403.
>       4320.   13483.  1393.
> 3     4321.   13483.  1389.
>       4320.   13482.  1338.
> 1     4320.   13481.  1336.
> T     4320.   13481.  1333.
> M     4320.   13480.  1303.
>
>BOREHOLE   172
>    5062.   11980.   1437.        5062.   11980.   1434.      5020.  11947.
> H     5061.   11980.  1418.                                          1001.
> G     5055.   11979.  1330.
>       5054.   11979.  1325.
> Z     5054.   11979.  1324.
>       5053.   11978.  1312.
> Y     5053.   11978.  1312.
>       5051.   11977.  1287.
> X     5051.   11977.  1286.
>       5050.   11977.  1269.
> 9     5049.   11976.  1264.
>       5048.   11975.  1249.
> 8     5048.   11975.  1248.
>       5044.   11973.  1209.
> 7     5044.   11973.  1209.
>       5043.   11972.  1198.
>       5043.   11972.  1196.
>       5042.   11971.  1193.
> 6     5042.   11971.  1193.
>       5041.   11970.  1181.
> 5     5041.   11970.  1175.
>       5038.   11968.  1152.
>       5038.   11967.  1149.
>       5037.   11967.  1146.
> 4     5037.   11967.  1144.
>       5035.   11965.  1128.
> 3     5035.   11964.  1123.
>       5030.   11960.  1087.
> 2     5030.   11960.  1087.
>       5028.   11958.  1072.
> 1     5028.   11958.  1071.
> T     5028.   11957.  1067.
> M     5025.   11954.  1046.
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>BOREHOLE   173
>    4975.   14488.    1194.        4975.   14488.    1186.     4951.   14477.
>   H      4974.   14488.  1169.                                           863.
>   G      4969.   14488.  1071.
>          4969.   14488.  1068.
>   Z      4969.   14488.  1067.
>          4967.   14488.  1030.
>   X      4967.   14488.  1029.
>          4966.   14487.   997.
>   9      4965.   14487.   995.
>          4965.   14487.   985.
>   8      4965.   14487.   984.
>          4964.   14486.   956.
>   7      4963.   14486.   954.
>          4963.   14486.   947.
>   6      4963.   14486.   943.
>          4961.   14485.   919.
>   5      4961.   14485.   917.
>          4957.   14482.   874.
>   4      4957.   14482.   866.
>          4956.   14481.   861.
>   3      4956.   14481.   856.
>          4955.   14480.   842.
>   2      4955.   14480.   841.
>          4952.   14478.   816.
>   1      4952.   14478.   814.
>   T      4952.   14478.   811.
>
>BOREHOLE   174
>    5031.   16566.    1012.        5029.   16569.     931.     5023.   16577.
>          5029.   16571.   899.                                           751.
>   F      5028.   16571.   893.
>   4      5028.   16571.   886.
>          5027.   16572.   864.
>   3      5027.   16572.   859.
>          5027.   16573.   844.
>   2      5027.   16573.   843.
>          5026.   16574.   819.
>   1      5026.   16574.   813.
>   T      5026.   16575.   807.
>   M      5025.   16576.   783.
>   P      5024.   16577.   760.
>
>BOREHOLE   204
>    7453.   16033.    1008.        7453.   16033.     994.     7432.   16075.
>   H      7454.   16033.   980.                                           788.
>   G      7447.   16046.   895.
>          7446.   16046.   894.
>   Z      7446.   16046.   893.
>          7446.   16047.   892.
>   Y      7446.   16047.   889.
>          7440.   16057.   851.
>   9      7440.   16057.   849.
>          7438.   16062.   830.
>   8      7437.   16063.   826.
>
>BOREHOLE   205
>    5512.   18053.     947.        5512.   18053.     929.     5512.   18053.
>          5512.   18053.   917.                                           678.
>   X      5512.   18053.   916.
>          5512.   18053.   892.
>   9      5512.   18053.   889.
>          5512.   18053.   881.
>          5512.   18053.   881.
>          5512.   18053.   876.
>   8      5512.   18053.   875.
>          5512.   18053.   872.
>   7      5512.   18053.   869.
>          5512.   18053.   839.
>   6      5512.   18053.   839.
>          5512.   18053.   800.
>   5      5512.   18053.   796.
>          5512.   18053.   796.
>   4      5512.   18053.   790.
>          5512.   18053.   767.
>   3      5512.   18053.   762.
>   F      5512.   18053.   759.
>          5512.   18053.   753.
>   3      5512.   18053.   750.
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>            5512.    18053.    719.
>    1       5512.    18053.    716.
>    T       5512.    18053.    711.
>    M       5512.    18053.    684.
>
>BOREHOLE   208
>    2561.    15994.    1458.        2561.   15994.    1453.       2590.   16040.
>            2561.    15994.  1456.                                         1254.
>            2561.    15994.  1453.
>            2561.    15994.  1444.
>    4       2561.    15995.  1440.
>    F       2561.    15995.  1439.
>            2561.    15995.  1438.
>    4       2561.    15995.  1432.
>            2561.    15997.  1418.
>    3       2561.    15998.  1412.
>            2561.    16001.  1393.
>    2       2561.    16001.  1391.
>            2562.    16004.  1376.
>    1       2563.    16005.  1372.
>    T       2563.    16006.  1368.
>    M       2567.    16012.  1337.
>    Q       2585.    16034.  1267.
>
>BOREHOLE   209
>    6360.    16456.    1000.        6358.   16456.     961.       6435.   16494.
>            6357.    16456.    950.                                        761.
>    Z       6357.    16456.    948.
>            6356.    16458.    918.
>    Y       6356.    16458.    918.
>            6357.    16461.    901.
>    X       6357.    16461.    900.
>            6358.    16463.    891.
>    9       6358.    16463.    889.
>            6362.    16471.    858.
>    7       6363.    16471.    857.
>            6371.    16474.    840.
>    6       6371.    16475.    840.
>            6375.    16476.    833.
>    5       6376.    16477.    830.
>            6404.    16494.    789.
>    4       6407.    16496.    785.
>            6421.    16499.    772.
>    3       6424.    16497.    770.
>
>BOREHOLE   210
>    1970.    15994.    1463.        1970.   15994.    1458.       1932.   15961.
>            1969.    15994.  1435.
>            1969.    15994.  1434.
>            1968.    15993.  1424.                                         1274.
>    6       1968.    15993.  1423.
>            1966.    15992.  1407.
>    5       1965.    15992.  1404.
>            1961.    15988.  1381.
>            1960.    15988.  1377.
>            1954.    15983.  1354.
>    4       1954.    15982.  1352.
>            1952.    15981.  1345.
>    3       1951.    15980.  1340.
>            1946.    15975.  1323.
>    2       1945.    15974.  1321.
>            1941.    15970.  1306.
>    1       1941.    15970.  1305.
>    T       1939.    15968.  1296.
>
>BOREHOLE   211
>    2226.    16007.    1433.        2226.   16007.    1427.       2209.   15996.
>            2226.    16007.  1410.
>    Y       2226.    16007.  1410.                                         1198.
>            2226.    16007.  1389.
>    X       2226.    16007.  1387.
>            2226.    16007.  1374.
>    9       2226.    16007.  1371.
>            2225.    16006.  1343.
>    8       2225.    16006.  1342.
>            2224.    16006.  1332.
>    7       2224.    16006.  1331.
>            2224.    16005.  1315.
>    6       2223.    16005.  1312.
>            2220.    16003.  1280.
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>           2220.    16003.  1277.
>           2220.    16003.  1275.
>   5       2219.    16002.  1274.
>           2218.    16001.  1262.
>   4       2218.    16001.  1260.
>           2216.    16000.  1249.
>   3       2215.    16000.  1244.
>           2212.    15998.  1222.
>   2       2212.    15998.  1220.
>           2211.    15997.  1208.
>   1       2210.    15997.  1207.
>   T       2210.    15997.  1202.
>
>BOREHOLE   212
>     2739.   14065.    1629.        2739.   14065.     1623.        2739.   14065.
>   H       2739.    14065.  1570.                                                1347.
>   G       2739.    14065.  1489.
>           2739.    14065.  1478.
>   Z       2739.    14065.  1476.
>           2739.    14065.  1465.
>           2739.    14065.  1464.
>           2739.    14065.  1462.
>   Y       2739.    14065.  1461.
>           2739.    14065.  1444.
>   X       2739.    14065.  1442.
>           2739.    14065.  1432.
>   9       2739.    14065.  1430.
>           2739.    14065.  1417.
>   8       2739.    14065.  1417.
>
>BOREHOLE   213
>     3067.   13523.    1642.        3067.   13523.     1642.        3067.   13523.
>           3067.    13523.  1612.                                                1403.
>   Z       3067.    13523.  1611.
>           3067.    13523.  1592.
>   Y       3067.    13523.  1590.
>           3067.    13523.  1575.
>   X       3067.    13523.  1573.
>           3067.    13523.  1562.
>   9       3067.    13523.  1560.
>   F       3067.    13523.  1559.
>           3067.    13523.  1555.
>   9       3067.    13523.  1552.
>   F       3067.    13523.  1552.
>           3067.    13523.  1552.
>   9       3067.    13523.  1550.
>           3067.    13523.  1533.
>   8       3067.    13523.  1532.
>           3067.    13523.  1496.
>   7       3067.    13523.  1494.
>           3067.    13523.  1482.
>   6       3067.    13523.  1480.
>           3067.    13523.  1459.
>   5       3067.    13523.  1452.
>           3067.    13523.  1432.
>   4       3067.    13523.  1429.
>           3067.    13523.  1423.
>           3067.    13523.  1418.
>
>BOREHOLE   214
>     4346.   14260.    1310.        4346.   14260.     1305.        4346.   14262.
>           4346.    14262.  1265.                                                1258.
>   1       4346.    14262.  1262.
>
>BOREHOLE   215
>     4274.   14267.    1321.        4274.   14267.     1301.        4275.   14266.
>           4275.    14267.  1301.                                                1284.
>   2       4275.    14267.  1300.
>           4275.    14266.  1293.
>   1       4275.    14266.  1291.
>
>BOREHOLE   216
>     4501.   14317.    1273.        4501.   14317.     1263.        4493.   14308.
>           4498.    14313.  1211.                                                1164.
>           4497.    14313.  1205.
>           4497.    14313.  1203.
>   4       4497.    14312.  1199.
>           4496.    14311.  1192.
>   3       4495.    14311.  1185.
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>BOREHOLE  217
>    4469.   14284.    1279.        4470.  14284.   1258.     4471.  14282.
>          4470.  14284.  1257.                                         1216.
>          4470.  14284.  1254.
>          4470.  14284.  1252.
>  4       4470.  14284.  1249.
>          4470.  14284.  1241.
>  3       4471.  14283.  1235.
>
>BOREHOLE  218
>    4637.   14322.    1243.        4637.  14322.   1231.     4637.  14322.
>
>BOREHOLE  219                                                         1231.
>    4554.   14364.    1257.        4554.  14364.   1252.     4553.  14358.
>          4554.  14364.  1247.
>  7       4554.  14363.  1244.                                         1171.
>          4554.  14362.  1229.
>          4554.  14362.  1229.
>          4554.  14362.  1227.
>  6       4554.  14362.  1225.
>          4553.  14359.  1186.
>  5       4553.  14359.  1182.
>
>BOREHOLE  220
>    4526.   14342.    1266.        4526.  14342.   1260.     4518.  14349.
>          4525.  14343.  1232.
>  5       4525.  14343.  1228.                                         1132.
>          4521.  14348.  1154.
>          4521.  14348.  1153.
>          4521.  14348.  1152.
>          4520.  14348.  1144.
>          4519.  14348.  1143.
>  4       4518.  14349.  1137.
>
>BOREHOLE  221
>    4703.   14389.    1224.        4703.  14389.   1210.     4686.  14358.
>          4703.  14388.  1208.
>  9       4703.  14388.  1204.                                         961.
>          4703.  14387.  1188.
>  8       4703.  14387.  1187.
>          4703.  14383.  1146.
>  7       4704.  14383.  1143.
>          4704.  14381.  1134.
>          4704.  14381.  1133.
>          4704.  14381.  1131.
>  6       4704.  14380.  1129.
>  F       4703.  14376.  1104.
>          4702.  14371.  1075.
>  7       4702.  14371.  1074.
>          4702.  14369.  1066.
>          4702.  14369.  1065.
>          4702.  14369.  1064.
>  6       4702.  14368.  1062.
>          4699.  14365.  1040.
>  5       4699.  14364.  1038.
>          4691.  14360.   990.
>          4690.  14359.   982.
>          4689.  14359.   977.
>  4       4688.  14359.   971.
>
>BOREHOLE  222
>    4773.   16056.    1038.        4773.  16056.   1032.     4750.  16070.
>          4773.  16056.  1026.
>  3       4773.  16055.  1021.
>          4772.  16055.  1002.                                         828.
>  2       4772.  16055.  1001.
>  F       4772.  16055.  1000.
>          4771.  16054.   985.
>  2       4771.  16054.   985.
>          4770.  16054.   971.
>  1       4769.  16055.   968.
>  T       4769.  16055.   965.
>  M       4765.  16056.   932.
>  P       4755.  16064.   861.
>  E       4750.  16070.   830.
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>  1       4364.  19954.   888.                                         824.
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>  M     4363.   19952.   866.
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>  H     7895.   14681.   771.
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>   8048.  14707.   1045.      8048.   14707.   1041.      8048.   14707.
>  S     8048.   14707.  1044.                                        1040.
>
>BOREHOLE  251
>   5621.  16022.   1010.      5620.   16022.    968.      5619.   16022.
>        5620.   16022.   927.                                        729.
>  4     5620.   16022.   914.
>        5619.   16022.   896.
>  3     5619.   16022.   890.
>        5619.   16022.   869.
>  2     5619.   16022.   869.
>  F     5619.   16022.   867.
>        5619.   16022.   857.
>  2     5619.   16022.   855.
>        5619.   16022.   844.
>  1     5619.   16022.   839.
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>  M     5619.   16022.   801.
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>        5136.   15504.  1008.
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>  X     5136.   15504.   962.
>        5136.   15504.   937.
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>        5136.   15504.   924.
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>        5136.   15504.   909.
>  7     5136.   15504.   907.
>        5136.   15504.   894.
>  6     5136.   15504.   888.
>        5136.   15504.   871.
>  5     5136.   15504.   870.
>        5135.   15505.   821.
>  4     5135.   15505.   812.
>        5135.   15505.   810.
>  3     5135.   15505.   803.
>        5135.   15506.   786.
>  2     5135.   15506.   785.
>        5135.   15506.   768.
>  1     5135.   15506.   765.
>  F     5134.   15507.   758.
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>  1     5134.   15507.   745.
>
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>  8     5167.   14945.   861.
>        5167.   14944.   830.
>  7     5166.   14944.   828.
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>  6     5166.   14944.   814.
>        5165.   14943.   793.
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>   Q        4951.   13403.  1323.
>   F        4951.   13403.  1315.
>   Q        4951.   13403.  1270.
>   G        4951.   13404.  1260.
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>   Z        4951.   13404.  1252.
>            4951.   13405.  1223.
>   Y        4951.   13405.  1222.
>            4951.   13406.  1198.
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>            4796.   12527.  1370.
>   9        4796.   12527.  1363.
>            4796.   12527.  1357.
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>   7        4795.   12526.  1308.
>            4794.   12526.  1301.
>            4794.   12526.  1299.
>            4794.   12526.  1298.
>   6        4794.   12526.  1297.
>            4793.   12526.  1280.
>   5        4793.   12526.  1276.
>            4792.   12526.  1246.
>            4792.   12526.  1243.
>            4791.   12526.  1240.
>   4        4791.   12526.  1238.
>            4790.   12525.  1224.
>   3        4790.   12525.  1219.
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>   1        4786.   12524.  1164.
>   T        4786.   12524.  1159.
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>   G        5422.   11516.  1203.                                        918.
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>   Y        5422.   11516.  1183.
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>   X        5422.   11516.  1156.
>            5422.   11516.  1137.
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>            5422.   11516.  1117.
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>            5422.   11516.  1083.
>   7        5422.   11516.  1082.
>            5422.   11516.  1062.
>            5422.   11516.  1059.
>            5422.   11516.  1055.
>   6        5422.   11516.  1055.
>            5422.   11516.  1041.
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>            5422.   11516.  1015.
>            5422.   11516.  1012.
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                                                                   857.
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>   Z    5653.   17371.   830.
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>   Y    5653.   17371.   802.
>        5653.   17371.   782.
>   X    5653.   17371.   781.
>        5653.   17371.   763.
>   9    5653.   17371.   760.
>        5653.   17371.   755.
>        5653.   17371.   754.
>        5653.   17371.   750.
>   8    5653.   17371.   749.
>        5653.   17371.   741.
>   7    5653.   17371.   740.
>        5653.   17371.   723.
>        5653.   17371.   722.
>        5653.   17371.   715.
>   6    5653.   17371.   714.
>        5653.   17371.   680.
>   5    5653.   17371.   677.
>        5653.   17371.   674.
>   4    5653.   17371.   667.
>        5653.   17371.   639.
>   3    5653.   17371.   635.
>        5653.   17371.   604.
>   1    5653.   17371.   600.
>   T    5653.   17371.   591.
>
>BOREHOLE  266
>    4612.  15230.    1136.      4612.  15230.   1133.     4610.  15229.
>        4612.   15230.  1115.                                     933.
>   9    4612.   15230.  1111.
>        4612.   15230.  1099.
>   8    4612.   15230.  1097.
>        4612.   15230.  1086.
>   7    4612.   15230.  1085.
>        4612.   15230.  1072.
>   6    4612.   15230.  1068.
>        4612.   15230.  1052.
>   5    4612.   15230.  1050.
>        4611.   15229.  1004.
>   4    4611.   15229.   994.
>        4611.   15229.   984.
>   3    4611.   15229.   977.
>        4611.   15229.   960.
>   2    4611.   15229.   959.
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>   1    4610.   15229.   939.
>   T    4610.   15229.   934.
>
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>        4584.   19373.   844.                                     836.
>   3    4584.   19373.   839.
>
>BOREHOLE  308
>    4916.  19031.     933.      4916.  19031.    842.     4916.  19031.
                                                                   842.
>
>BOREHOLE  310
>    4590.  19037.     932.      4590.  19037.    836.     4590.  19037.
                                                                   812.
>
>BOREHOLE  312
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>                                                                             863.
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>                                                                             876.
>BOREHOLE    314
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>                                                                             860.
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>                                                                             880.
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>         4895.   19026.   800.
>  Z      4894.   19026.   799.
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>         4894.   19026.   797.
>         4893.   19026.   794.
>  Y      4893.   19026.   794.
>         4888.   19026.   770.
>         4888.   19026.   770.
>         4887.   19026.   765.
>  X      4887.   19026.   765.
>         4886.   19025.   760.
>  9      4885.   19025.   758.
>
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>  H      7101.   15930.   967.
>  G      7091.   15926.   871.
>         7091.   15926.   868.
>  S      7091.   15926.   868.
>         7090.   15926.   866.
>  S      7090.   15926.   866.
>         7086.   15925.   839.
>  X      7086.   15925.   833.
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>  9      7085.   15925.   827.
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>         4352.   14928.  1237.
>  5      4352.   14928.  1235.                                              1151.
>         4352.   14931.  1172.
>         4352.   14932.  1165.
>         4351.   14932.  1164.
>  4      4351.   14932.  1160.
>
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>    4094.   15100.      1259.       4094.   15100.      1253.        4095.   15101.
>         4094.   15100.  1245.
>  1      4094.   15100.  1241.                                              1226.
>
>BOREHOLE    334
>    4796.   19745.       953.       4796.   19745.       876.        4796.   19745.
>                                                                             866.
>BOREHOLE    338
>    6197.   17261.       977.       6197.   17261.       968.        6197.   17261.
>         6197.   17261.   966.
>  8      6197.   17261.   966.                                               797.
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>         6197.   17261.   934.
>         6197.   17261.   932.
>         6197.   17261.   926.
>  6      6197.   17261.   926.
>         6197.   17261.   912.
>  5      6197.   17261.   905.
>         6197.   17261.   873.
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>   6037.   17484.     978.     6037.  17484.    972.     6037.  17484.
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>          6037.   17484.   952.
>          6037.   17484.   952.
>          6037.   17484.   948.
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>          6037.   17484.   862.
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>          6037.   17484.   834.
>  3       6037.   17484.   830.
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>          6749.   16487.   942.
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>  5       6748.   16488.   931.
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>   5500.   15807.    1016.     5500.  15805.    989.     5546.  15847.
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>  6       5504.   15804.   930.
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>  5       5508.   15806.   911.
>          5523.   15818.   862.
>          5525.   15820.   858.
>          5525.   15820.   857.
>  4       5527.   15821.   853.
>          5529.   15824.   846.
>  3       5530.   15825.   843.
>          5539.   15837.   818.
>  2       5539.   15837.   817.
>          5542.   15841.   809.
>  1       5544.   15843.   806.
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>          5363.   15744.   948.
>          5363.   15744.   946.
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>          5372.   15792.   778.
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>        5059.  16174.   957.
>  3     5059.  16174.   951.
>        5060.  16174.   936.
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>  1     5061.  16173.   919.
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>        5299.  16393.   901.
>        5300.  16393.   901.                                         779.
>        5300.  16394.   898.
>  6     5301.  16394.   897.
>        5305.  16395.   886.
>  5     5306.  16396.   883.
>        5327.  16401.   842.
>  4     5332.  16403.   833.
>        5341.  16410.   812.
>  3     5343.  16412.   806.
>        5348.  16416.   793.
>        5348.  16416.   792.
>        5349.  16418.   789.
>  2     5349.  16418.   789.
>
>BOREHOLE  357
>   6499.  16962.   1001.        6499.   16962.    965.      6499.   16962.
>        6499.  16962.   944.                                         934.
>  3     6499.  16962.   940.
>
>BOREHOLE  366
>   5033.  16987.   1002.        5026.   16987.    904.      5014.   17006.
>        5025.  16987.   878.                                         729.
>  1     5025.  16987.   877.
>  T     5024.  16988.   872.
>  M     5021.  16988.   824.
>  F     5020.  16988.   809.
>        5020.  16988.   805.
>  4     5018.  16989.   791.
>        5016.  16993.   771.
>        5016.  16993.   770.
>        5016.  16994.   769.
>        5016.  16995.   765.
>        5016.  16995.   764.
>
>BOREHOLE  367
>   3563.  13413.   1604.        3563.   13413.   1603.      3563.   13413.
>  P     3563.  13413.  1528.
>  E     3563.  13413.  1492.                                        1439.
>        3563.  13413.  1481.
>  0     3563.  13413.  1480.
>        3563.  13413.  1477.
>        3563.  13413.  1477.
>        3563.  13413.  1470.
>  0     3563.  13413.  1469.
>        3563.  13413.  1468.
>  0     3563.  13413.  1468.
>
>BOREHOLE  368
>   4215.  15772.   1159.        4215.   15772.   1153.      4215.   15772.
>  F     4215.  15772.  1144.
>        4215.  15772.  1139.                                        1127.
>  1     4215.  15772.  1135.
>
>BOREHOLE  442
>   6186.  17254.    977.        6186.   17254.    963.      6186.   17254.
>        6186.  17254.   947.
>  7     6186.  17254.   945.                                         796.
>        6186.  17254.   929.
>        6186.  17254.   928.
>        6186.  17254.   921.
```

```
>  6     6186.   17254.   921.
>        6186.   17254.   907.
>  5     6186.   17254.   901.
>        6186.   17254.   870.
>  4     6186.   17254.   864.
>        6186.   17254.   844.
>  3     6186.   17254.   840.
>        6186.   17254.   806.
>  1     6186.   17254.   802.
>
>BOREHOLE  444
>    6040.  17472.    979.      6040.   17472.    972.      6040.   17472.
>        6040.   17472.   959.                                        727.
>  9     6040.   17472.   956.
>        6040.   17472.   953.
>  8     6040.   17472.   948.
>        6040.   17472.   932.
>  7     6040.   17472.   929.
>        6040.   17472.   914.
>        6040.   17472.   913.
>        6040.   17472.   905.
>  6     6040.   17472.   904.
>        6040.   17472.   871.
>  5     6040.   17472.   867.
>        6040.   17472.   862.
>  4     6040.   17472.   855.
>        6040.   17472.   834.
>  3     6040.   17472.   830.
>        6040.   17472.   795.
>  1     6040.   17472.   792.
>
>BOREHOLE  460
>    4279.  15735.   1152.      4279.   15735.   1148.      4276.   15732.
>        4279.   15735.  1141.                                        1072.
>  3     4279.   15735.  1134.
>        4278.   15735.  1114.
>        4278.   15735.  1113.
>        4278.   15735.  1111.
>        4278.   15735.  1111.
>        4278.   15735.  1109.
>        4278.   15735.  1108.
>        4278.   15735.  1108.
>        4278.   15735.  1106.
>        4277.   15735.  1105.
>  1     4277.   15734.  1102.
>  T     4277.   15733.  1090.
>
>BOREHOLE  461
>    5057.  16169.   1024.      5057.   16169.   1000.      5055.   16170.
>        5057.   16170.   972.                                        934.
>  4     5057.   16170.   960.
>        5056.   16170.   956.
>  3     5056.   16170.   949.
>        5055.   16170.   934.
>  2     5055.   16170.   933.
>        5055.   16170.   929.
>
>BOREHOLE  469
>    4216.  15772.   1158.      4216.   15772.   1152.      4216.   15772.
>        4216.   15772.  1148.                                        1127.
>        4216.   15772.  1146.
>        4216.   15772.  1143.
>  2     4216.   15772.  1142.
>        4216.   15772.  1139.
>        4216.   15772.  1138.
>        4216.   15772.  1137.
>  1     4216.   15772.  1133.
>  T     4216.   15772.  1131.
>
>BOREHOLE  506
>    4076.  14682.   1399.      4076.   14682.   1393.      4076.   14682.
>        4076.   14682.  1358.                                        1345.
>  2     4076.   14682.  1357.
>        4076.   14682.  1356.
>  1     4076.   14682.  1354.
>  T     4076.   14682.  1351.
>
>BOREHOLE  507
>    4587.  15896.   1078.      4587.   15896.   1075.      4587.   15896.
>        4587.   15896.  1073.                                        967.
```

```
>  5     4587.   15896.  1071.
>        4587.   15896.  1040.
>  4     4587.   15896.  1031.
>        4587.   15896.  1012.
>  3     4587.   15896.  1008.
>        4587.   15896.   985.
>  2     4587.   15896.   985.
>        4587.   15896.   980.
>  1     4587.   15896.   977.
>  T     4587.   15896.   974.
>
>BOREHOLE   511
>   2797.   17298.    1286.      2797.   17298.    1283.      2797.   17298.
>  N     2797.   17298.  1240.                                         858.
>
>BOREHOLE   601
>   4062.   16044.    1160.      4062.   16044.    1157.      4039.   16034.
>  E     4057.   16041.  1070.                                         938.
>        4056.   16041.  1064.
>  0     4056.   16040.  1061.
>        4053.   16039.  1035.
>  0     4052.   16039.  1030.
>        4042.   16035.   957.
>  0     4042.   16035.   956.
>  C     4040.   16034.   944.
>
>BOREHOLE   603
>   4535.   17370.    1020.      4533.   17373.     968.      4528.   17380.
>  C     4529.   17379.   883.                                         872.
>
>BOREHOLE   604
>   4719.   16915.    1032.      4718.   16914.     989.      4701.   16928.
>  E     4715.   16915.   945.                                         784.
>        4716.   16916.   931.
>  0     4716.   16916.   927.
>        4714.   16919.   896.
>  0     4714.   16920.   890.
>  C     4703.   16928.   792.
>
>BOREHOLE   612
>   4064.   16045.    1160.      4064.   16045.    1157.      4054.   16047.
>  P     4062.   16046.  1102.                                        1027.
>  E     4059.   16047.  1068.
>        4058.   16047.  1061.
>  0     4058.   16047.  1059.
>        4054.   16047.  1030.
>  D     4054.   16047.  1029.
>
>BOREHOLE   615
>   4720.   16917.    1032.      4720.   16917.     987.      4720.   16917.
>  P     4720.   16917.   960.                                         875.
>  E     4720.   16917.   945.
>        4720.   16917.   925.
>  0     4720.   16917.   923.
>        4720.   16917.   887.
>  0     4720.   16917.   884.
>        4720.   16917.   883.
>  0     4720.   16917.   882.
>
>BOREHOLE   616
>   4607.   16469.    1037.      4607.   16469.    1020.      4604.   16489.
>  E     4607.   16480.   939.                                         897.
>        4606.   16481.   934.
>  0     4606.   16481.   931.
>        4605.   16488.   903.
>  0     4604.   16489.   899.
>
>BOREHOLE   621
>   6056.   17313.     978.      6056.   17313.     966.      6056.   17313.
>                                                                      963.
>BOREHOLE   622
>   6587.   16343.    1001.      6587.   16343.     935.      6587.   16343.
>                                                                      934.
>BOREHOLE   625
>   5242.   16546.    1007.      5242.   16546.     918.      5242.   16546.
>                                                                      916.
>BOREHOLE   626
>   5217.   15908.    1020.      5217.   15908.     991.      5217.   15908.
>                                                                      986.
>BOREHOLE   632
```

```
>    4494.   15655.    1120.       4494.   15655.    1117.       4494.   15655.
>           4494.   15655.  1101.                                          [illegible]
>   5       4494.   15655.  1099.
>           4494.   15655.  1064.
>   4       4494.   15655.  1054.
>           4494.   15655.  1036.
>   3       4494.   15655.  1029.
>           4494.   15655.  1013.
>   2       4494.   15655.  1012.
>           4494.   15655.  1005.
>   1       4494.   15655.  1002.
>   T       4494.   15655.  1001.
>
>BOREHOLE    633
>    4504.   15637.    1120.       4504.   15637.    1114.       4478.   15623.
>           4504.   15636.  1096.                                          866.
>   5       4504.   15636.  1094.
>           4502.   15634.  1059.
>   4       4502.   15633.  1049.
>           4501.   15633.  1031.
>   3       4500.   15632.  1026.
>           4498.   15632.  1009.
>   2       4498.   15632.  1008.
>           4497.   15631.  1001.
>   1       4497.   15631.   998.
>   T       4497.   15631.   996.
>
>BOREHOLE    634
>    6026.   17293.     978.       6026.   17293.     963.       6026.   17293.
>           6026.   17293.   951.                                          724.
>   X       6026.   17293.   950.
>           6026.   17293.   928.
>   9       6026.   17293.   925.
>           6026.   17293.   922.
>   8       6026.   17293.   917.
>           6026.   17293.   896.
>   7       6026.   17293.   895.
>           6026.   17293.   878.
>           6026.   17293.   877.
>           6026.   17293.   870.
>   6       6026.   17293.   869.
>           6026.   17293.   842.
>   5       6026.   17293.   838.
>           6026.   17293.   823.
>   4       6026.   17293.   816.
>           6026.   17293.   797.
>   3       6026.   17293.   793.
>           6026.   17293.   757.
>   1       6026.   17293.   753.
>
>BOREHOLE    635
>    6017.   17324.     979.       6017.   17324.     964.       6017.   17324.
>           6017.   17324.   955.                                          727.
>   X       6017.   17324.   954.
>           6017.   17324.   932.
>   9       6017.   17324.   929.
>           6017.   17324.   926.
>           6017.   17324.   925.
>           6017.   17324.   923.
>   8       6017.   17324.   922.
>           6017.   17324.   902.
>   7       6017.   17324.   899.
>           6017.   17324.   874.
>           6017.   17324.   874.
>           6017.   17324.   872.
>   6       6017.   17324.   872.
>           6017.   17324.   844.
>   5       6017.   17324.   839.
>           6017.   17324.   828.
>   4       6017.   17324.   820.
>           6017.   17324.   800.
>   3       6017.   17324.   796.
>           6017.   17324.   762.
>           6017.   17324.   758.
>
>BOREHOLE    641
>    4504.   15656.    1120.       4504.   15656.    1116.       4489.   15648.
>           4504.   15656.  1098.                                          965.
>   5       4504.   15656.  1096.
>           4503.   15656.  1060.
```

```
>   4     4502.   15655.  1051.
>         4499.   15653.  1033.
>   3     4498.   15653.  1027.
>         4496.   15652.  1012.
>   2     4496.   15652.  1011.
>         4495.   15651.  1003.
>   1     4495.   15651.  1000.
>   T     4495.   15651.   999.
>
>BOREHOLE   642
>    6034.   17299.      979.       6034.  17299.     966.      6034.  17299.
>         6034.   17299.   955.                                          727.
>   X     6034.   17299.   954.
>         6034.   17299.   932.
>   9     6034.   17299.   929.
>         6034.   17299.   925.
>         6034.   17299.   925.
>         6034.   17299.   922.
>   8     6034.   17299.   921.
>         6034.   17299.   898.
>   7     6034.   17299.   898.
>         6034.   17299.   880.
>         6034.   17299.   879.
>         6034.   17299.   871.
>   6     6034.   17299.   871.
>         6034.   17299.   843.
>   5     6034.   17299.   838.
>         6034.   17299.   824.
>   4     6034.   17299.   817.
>         6034.   17299.   797.
>   3     6034.   17299.   793.
>         6034.   17299.   757.
>   1     6034.   17299.   754.
#T=2.479  DR=0     $4.22,     $4.24T
#
```

APPENDIX V

DUKE PIT CONDENSED COORDINATE LISTING

OUTCROP AND DRILLHOLE DATA

```
#Invalid MTS command
#T=0.002 DR=0     $.05,     $.11T
#>DRAW LISTING
>
>PETRO-CAN DUKE PIT, DEC. 9, 1983
>
>DOMAIN MAP
>
```

ID	COORDINATES			ORIENTATION		HRZN
38	3872.	13592.	1519.	63.	32.	T
39	4420.	13731.	1376.	117.	30.	G
40	4242.	13450.	1465.	0.	0.	4
41	4197.	13455.	1465.	0.	0.	3
42	4244.	13412.	1481.	111.	35.	G
43	4211.	13403.	1490.	120.	32.	3
44	4178.	13402.	1490.	246.	40.	3
45	4551.	13242.	1515.	62.	30.	G
46	4622.	13163.	1540.	52.	33.	H
47	4633.	13096.	1568.	79.	34.	H
50	4155.	13122.	1600.	77.	35.	4
51	4138.	13007.	1587.	76.	37.	4
230	3965.	16390.	1121.	101.	27.	E
231	3840.	16447.	1145.	98.	22.	E
232	3815.	16357.	1157.	49.	18.	E
239	4510.	16319.	1276.	112.	8.	
338	4588.	16031.	1070.	111.	24.	G
339	4590.	15901.	1085.	0.	0.	5
340	4550.	15888.	1090.	114.	12.	G
341	4349.	15912.	1125.	114.	24.	4
342	4272.	15916.	1137.	110.	28.	G
343	4237.	15613.	1167.	82.	34.	G
344	4838.	15590.	1070.	112.	23.	G
345	4946.	15424.	1068.	83.	26.	G
346	4950.	15062.	1117.	74.	22.	H
347	4575.	15298.	1130.	92.	42.	G
348	4486.	15328.	1150.	77.	38.	G
349	4427.	15233.	1165.	81.	38.	5
350	4304.	15185.	1188.	52.	38.	G
351	3889.	15475.	1274.	95.	26.	M
352	3950.	15197.	1275.	107.	24.	M
353	4055.	15181.	1245.	119.	21.	T
354	4149.	15035.	1265.	89.	42.	G
355	4260.	14970.	1263.	74.	38.	G
356	4400.	14817.	1267.	97.	40.	G
357	4431.	14766.	1269.	82.	36.	G
358	4466.	14732.	1260.	0.	0.	S
359	4459.	14654.	1270.	70.	25.	G
360	4595.	14504.	1212.	69.	57.	G
361	4565.	14473.	1215.	60.	65.	G
362	4490.	14432.	1238.	55.	58.	G
363	4409.	14445.	1255.	67.	52.	4
364	4334.	14460.	1276.	75.	52.	4
365	4341.	14418.	1264.	76.	47.	G
366	4398.	14377.	1267.	76.	55.	4
367	4219.	14468.	1360.	8.	26.	G
368	4259.	14427.	1325.	93.	24.	G
369	4228.	14349.	1311.	109.	26.	G
370	4206.	14415.	1325.	183.	28.	G
371	4150.	14357.	1346.	87.	26.	T
372	4121.	14418.	1335.	137.	25.	T
373	3839.	14412.	1388.	45.	24.	M
374	3805.	14481.	1394.	70.	16.	M
375	3754.	14415.	1398.	97.	8.	M
376	4448.	13839.	1357.	86.	25.	G
377	4499.	13901.	1336.	100.	26.	G
378	4475.	14005.	1300.	131.	12.	G
379	4592.	13965.	1340.	52.	31.	G
380	4524.	14049.	1290.	61.	32.	G
381	4549.	14078.	1286.	57.	35.	G
382	4671.	14038.	1290.	87.	68.	G
383	4607.	14148.	1265.	54.	54.	G
384	4628.	14206.	1255.	62.	50.	G
385	4656.	14205.	1254.	54.	60.	G
386	4662.	14548.	1190.	74.	43.	G
387	4751.	14512.	1217.	38.	56.	G
388	4746.	14581.	1180.	78.	50.	G
389	4752.	14663.	1164.	106.	45.	G
390	4844.	14674.	1190.	81.	22.	G
391	4796.	14799.	1140.	90.	34.	G

> 392	4845.	14753.	1169.	48.	30.	G
> 393	4872.	14857.	1157.	85.	24.	G
> 394	4805.	14896.	1127.	88.	22.	G
> 395	4884.	14886.	1155.	91.	23.	G
> 396	4987.	14452.	1186.	84.	25.	B
> 397	5052.	14471.	1170.	91.	40.	B
> 398	5126.	14451.	1169.	77.	27.	B
> 399	5202.	14367.	1168.	107.	20.	B
> 400	5320.	14397.	1145.	48.	40.	B
> 401	5218.	14492.	1154.	234.	28.	B
> 402	5178.	14531.	1135.	36.	30.	B
> 403	5306.	14593.	1118.	49.	30.	B
> 404	5444.	14550.	1120.	159.	37.	B
> 405	5480.	14558.	1120.	140.	10.	B
> 406	5515.	14627.	1110.	164.	7.	S
> 407	5558.	14574.	1109.	159.	7.	B
> 408	5845.	14638.	1070.	51.	10.	B
> 409	5519.	14381.	1148.	78.	14.	S
> 410	5624.	14189.	1167.	65.	5.	S
> 411	5386.	13809.	1242.	81.	84.	S
> 412	5400.	13779.	1245.	71.	90.	S
> 413	5426.	13720.	1250.	241.	79.	S
> 414	5428.	13636.	1271.	83.	89.	S
> 415	5467.	13505.	1285.	82.	30.	S
> 416	5487.	13400.	1295.	76.	40.	S
> 417	5496.	13220.	1317.	252.	30.	S
> 419	5724.	13636.	1229.	75.	40.	S
> 454	4624.	13134.	1554.	50.	29.	H
> 455	4646.	13009.	1571.	77.	34.	B
> 456	4151.	13092.	1599.	83.	31.	4
> 480	3983.	16386.	1180.	267.	27.	E
> 481	3882.	16408.	1130.	57.	15.	E
> 482	3799.	16345.	1162.	52.	15.	E
> 485	4280.	16350.	1323.	97.	8.	
> 489	4393.	15931.	1115.	117.	24.	G
> 490	4262.	15632.	1166.	72.	29.	G
> 491	4333.	15183.	1182.	51.	38.	G
> 492	3865.	15413.	1275.	96.	24.	M
> 493	3952.	15153.	1290.	134.	16.	M
> 494	4969.	15365.	1067.	121.	20.	G
> 495	4945.	15343.	1072.	101.	17.	G
> 496	4438.	14730.	1270.	83.	14.	G
> 497	4615.	14437.	1217.	67.	62.	G
> 498	4417.	14463.	1261.	67.	55.	S
> 499	4441.	14454.	1255.	69.	48.	S
> 500	4245.	14345.	1305.	113.	25.	G
> 501	4270.	14338.	1300.	83.	24.	G
> 502	4305.	14336.	1300.	82.	27.	G
> 503	4129.	14330.	1345.	151.	26.	T
> 504	3894.	14414.	1376.	46.	22.	M
> 505	3802.	14407.	1394.	96.	8.	M
> 506	4493.	13833.	1348.	151.	25.	G
> 507	4537.	13866.	1358.	143.	26.	G
> 508	4509.	13968.	1314.	132.	10.	G
> 509	4838.	14651.	1194.	74.	26.	
> 510	4834.	14618.	1202.	72.	30.	G
> 511	4859.	14733.	1179.	86.	35.	G
> 512	4864.	14814.	1166.	88.	28.	G
> 513	4874.	14777.	1173.	87.	27.	G
> 514	4808.	14952.	1122.	103.	23.	G
> 515	4830.	14995.	1109.	105.	22.	G
> 516	4886.	14931.	1146.	90.	32.	G
> 517	4897.	14981.	1135.	91.	24.	G
> 518	4978.	14424.	1174.	85.	34.	B
> 519	5016.	14388.	1193.	69.	40.	B
> 520	5173.	14446.	1163.	82.	25.	B
> 521	5241.	14541.	1126.	78.	32.	B
> 522	5332.	14603.	1114.	46.	35.	B
> 523	5382.	14568.	1110.	23.	41.	B
> 524	5515.	14556.	1118.	136.	6.	B
> 525	5894.	14607.	1073.	56.	12.	B
> 526	5466.	13477.	1289.	84.	30.	S
> 527	5491.	13345.	1305.	76.	40.	S
> 528	5494.	13308.	1310.	75.	30.	S
> 529	5505.	13190.	1315.	128.	45.	S
> 530	5507.	13158.	1317.	98.	30.	S
> 534	4866.	15613.	1062.	0.	0.	U
> 535	4041.	15132.	1265.	0.	0.	U
> 536	4698.	14057.	1270.	0.	0.	9
> 537	4421.	13754.	1365.	0.	0.	U

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>DRAW LISTING
>
>PETRO-CAN DUKE PIT, DEC. 9, 1983
>
>DOMAIN MAP
>
>   ID        COORDINATES          ORIENTATION  HRZN
>
>   52     4738.  15005.  1139.           BORE
>   53     3851.  15822.  1216.           BORE
>   57     4814.  15549.  1074.           BORE
>   58     4498.  15646.  1120.           BORE
>  101     4333.  15637.  1147.           BORE
>  102     4290.  15712.  1151.           BORE
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>  104     4255.  15773.  1150.           BORE
>  105     4309.  15687.  1149.           BORE
>  112     5038.  16571.  1010.           BORE
>  115     3969.  14474.  1373.           BORE
>  121     5031.  16566.  1012.           BORE
>  152     5183.  15985.  1021.           BORE
>  153     4837.  16475.  1022.           BORE
>  154     4288.  15005.  1239.           BORE
>  155     4475.  14579.  1246.           BORE
>  156     4675.  13995.  1302.           BORE
>  162     5457.  16497.  1004.           BORE
>  163     4320.  13485.  1440.           BORE
>  173     4975.  14488.  1194.           BORE
>  174     5031.  16566.  1012.           BORE
>  214     4346.  14260.  1310.           BORE
>  215     4274.  14267.  1321.           BORE
>  216     4501.  14317.  1273.           BORE
>  217     4469.  14284.  1279.           BORE
>  218     4637.  14322.  1243.           BORE
>  219     4554.  14364.  1257.           BORE
>  220     4526.  14342.  1266.           BORE
>  221     4703.  14389.  1224.           BORE
>  222     4773.  16056.  1038.           BORE
>  251     5621.  16022.  1010.           BORE
>  252     5136.  15504.  1043.           BORE
>  253     5170.  14948.  1121.           BORE
>  254     4951.  13403.  1417.           BORE
>  264     5653.  17371.   965.           BORE
>  266     4612.  15230.  1136.           BORE
>  321     4352.  14928.  1243.           BORE
>  322     4094.  15100.  1259.           BORE
>  346     4849.  16279.  1030.           BORE
>  350     5500.  15807.  1016.           BORE
>  351     5362.  15741.  1022.           BORE
>  352     5058.  16172.  1024.           BORE
>  353     5264.  16391.  1007.           BORE
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>  461     5057.  16169.  1024.           BORE
>  469     4216.  15772.  1158.           BORE
>  506     4076.  14682.  1399.           BORE
>  507     4587.  15896.  1078.           BORE
>  601     4062.  16044.  1160.           BORE
>  603     4535.  17370.  1020.           BORE
>  604     4719.  16915.  1032.           BORE
>  612     4064.  16045.  1160.           BORE
>  615     4720.  16917.  1032.           BORE
>  616     4607.  16469.  1037.           BORE
>  625     5242.  16546.  1007.           BORE
>  626     5217.  15908.  1020.           BORE
>  632     4494.  15655.  1120.           BORE
>  633     4504.  15637.  1120.           BORE
>  641     4504.  15656.  1120.           BORE
#T=0.144  DR=0    $.27,    $.37T
#
```

A P P E N D I X V I

STATISTICAL PROCEDURES

4.0 THE TRIPOD SOFTWARE PACKAGE

The TRIPOD computer package consists of a main program and a series of sub-routines which are designed to assist the geologist with data handling and processing for interpreting complex, structurally deformed geological terrain. It is based upon the principle of cylindricity, a basic assumption being that most structures display the property of cylindricity, or that they can be divided into segments that are cylindrical. A cylindrical structure is one that maintains constant geometry along the length of its fold axis.

The package provides the facility to quickly, easily and efficiently retrieve data, process it and then display the results in a fashion that is readily usable by the structural geologist. The data may be displayed in the form of maps, cross-sections, tables or orientation diagrams. A wide variety of outcrop data and drill hole information can be stored, processed and displayed using this package.

5.0 METHODOLOGY

5.1 GENERAL

Structural interpretation studies using the TRIPOD software package require the use of good data, a common sense approach to data handling, knowledge of the statistical techniques used for analyses of data orientation, the ability to use the software and the ability to understand and interpret structural Geology. This system can be effectively utilized in any type of structural terrain because the computer only handles the data in the manner that it is instructed to, the structures interpreted are necessarily a product of the Geologist. The resultant interpretation is effected using greater amounts of data and thus should be more reliable and in greater detail than a comparable study completed without use of this software.

5.2 DATA COLLECTION

5.2.1 Outcrop Data

Field outcrop, trench and adit data should be collected in such a fashion that information is presented on all of the following:

Map Grid - *each data point should be located on a chosen map grid* such that the location is recorded as a northing, easting and elevation.

Lithologic description - this should contain the map symbol of the rock unit at the point of measurement and may be at a contact or within a unit.

Bedding Orientations - orientations should be recorded as dip direction/dip or right hand strike/dip and measured as degrees, grads, or radians. Normally, degrees are used with dip directions varying from 0° to 359° and dips from 0° to 90° with a special notation for overturned beds. Multiple bedding plane orientations should be collected within a more or less standard outcrop size; the size being dependent upon the detail of the mapping and the scale of structures to be represented. Additional data may be collected if mesoscopic scale structural features are in evidence.

Other Planar Features - if other planar features such as joints and faults are present, they should be measured and recorded in a similar fashion to bedding measurements.

Linear Features - all linear features such as slickenside striae require multiple measurements of their pitch on the surface on which they occur. In addition, notes and a diagram of the structure are very useful.

5.2.2 Drill Hole Data

Several types of drill hole information are required:

Collar Location - once again described by grid location and elevation

Drill Hole Deviation - any number of deviation measurements can be recorded and entered into the computer file for each drill hole.

Overburden Depth - the overburden depth is recorded to identify bedrock location.

Drill Hole Intersections - any number of intersections can be identified. Many of these units will, however, represent a stratigraphic zone rather than a contact.

Bedding Angles - these are commonly measured as "bedding to core normal" angles and are, at present, hand plotted on the sections. It is planned that this feature will be incorporated into future revisions of the program.

5.3 DATA HANDLING

5.3.1 Raw Data Files

The outcrop and the drill hole data are entered into 4 files, of which 2 each are used for outcrop and drill hole data. Generally, mine adit and trench data are considered to be outcrop data and are included in those files.

OUTCROP DATA

Outcrop Location File - This file contains the northing, easting and elevation data for each outcrop number.

Outcrop Data File - This file contains the required structural and stratigraphic data for each numbered outcrop.

DRILL HOLE DATA

Drill Hole Location File - This file contains the northing, easting, elevation, depth, and deviation data for each drill hole.

Drill Hole Data File - This file contains the drill hole stratigraphic and structural information.

5.3.2 Master Files

The raw data files are read in to the TRIPOD package and the data are then stored in 4 master data files, in an easily retrievable and processable format.

5.3.3 Errors

Upon compilation and entry of the basic data, the data base must be checked for errors. This is carried out in several ways:

(i) Data Listing - A listing of the data files will provide error messages for those types of errors of incorrect data entry; for example, if two outcrops have the same number, if drill hole depth measurements do not continually progress, if drill hole intersection numbers are not sequentially numbered, if an orientation direction of 360° is used, and if a dip measurement is >90°. If the data format is violated, an error message also occurs.

(ii) Map Review - Outcrop and drill hole maps are printed and generally checked for obvious errors.

(iii) Drill Holes - Drill holes are called up on the graphics terminal for each domain and viewed for completeness and correctness of data.

5.3.4 Data Handling on Computer

After the data files are created, the data can be recalled based upon:

- outcrop number
- drill hole number
- stratigraphic code
- type of orientation data
- an area outlined by a polygon

Commonly all of the outcrop data and/or drill hole data will be retrieved for a specified area (polygon), for example, a possible domain area. In addition, outcrop data can be restricted by type of orientation data, and/or by outcrop numbers. Recalled data within a domain may be projected parallel to the fold axis onto selected planes of profile which are used as the basis for cross-sections. Typically, all of the data within the domain are utilized. Composite sections may be prepared by projecting all of the data from several domains onto a composite line of section.

Some project areas have insufficient outcrop data to permit determination of domain boundaries and fold axis orientations, and some project areas consist of a large planar feature with an undeterminable fold axis orientation. On projects with these problems, the data from slices of selected widths can be projected onto lines of section. In such cases, the direction and angle of projection must be estimated and then checked against other projection directions with the use of interactive graphics. This technique is utilized on outcrop and drillhole data when difficulties are encountered during initial domain definition. These difficulties arise from 2 sources:

(a) poor identification of the stratigraphic horizons at each outcrop resulting in spurious stratigraphic codes being plotted on the profiles, and

(b) poor quality outcrop data

5.4 DOMAINS

Structural analysis and data handling must first be carried out on a domain by domain basis. The first step after data entry and proofing is to prepare a surface geological map with outcrops and all the structural and stratigraphic information, and then divide the map area into potential domains within which, by inspection, folding appears to be cylindrical. If folds cannot be identified the area should be divided into planar segments within which bedding appears to be of fairly constant orientation.

Upon selection of the domain boundaries, the outcrop data in each domain must be analyzed to determine whether or not the structure is cylindrical, and the fold axis orientation is calculated. Both of these functions are carried out by computer. The fold axis orientation provides:

(i) a quantitative description of folding, and

(ii) the trend and plunge to be used in preparing down-plunge projections

The Domain analysis involves determining whether a structure is cylindrical or not. A series of statistical tests and the geologist's judgement are the determining factors employed in order to test and accept or reject the hypothesis of cylindricity.

5.5 CYLINDRICITY

5.5.1 Defined:

A cylindrical fold is a fold that maintains similar shape along the trend of the fold axis. In such a case, all of the bedding poles lie in a plane normal to the fold axis. All data within this cylindrically folded area may be projected parallel to the fold axis onto a plane placed at any location and orientation within the "cylindrical" domain.

5.5.2 Testing Cylindricity

Several tests are used to determine whether or not a structure is cylindrical. In order to perform these tests however, the fold axis orientation must be calculated numerically and a number of associated statistics must be determined. The minimum eigen vector associated with a symmetric 3 x 3 matrix of summations of direction cosine products gives the fold axis orientation only if the folding is cylindrical. Therefore, the structural data must be viewed with the intent of delineating areas where the deformation can be considered cylindrical.

5.5.2.1 Eigen Values

In an ideal cylindrical fold, there is no scatter of bedding poles about the plane normal to the fold axis and the minimum eigen value ($\lambda 3$) is 0. When using real data some departure from this ideal situation can be expected and would be due to:

(a) measurement errors
(b) incongruent small-scale folds
(c) bedding plane roughness.

In addition, a cylindrical fold should also display a wide spread of bedding poles within the plane normal to the fold axis orientation. A uniform distribution would result in the maximum eigen value ($\lambda 1$) and the intermediate eigen value ($\lambda 2$) being equal.

In marked contrast to this, the orientations associated with homoclinal strata would result in λ_1 being very large and both λ_2 and λ_3 being very small and approaching 0 (Cruden, 1968, Charlesworth et al, 1976).

The minimum eigen value ($\lambda 3$) is equal to $\sum_{i=1,n} \cos^2 \phi_i$ where ϕ_i is is the angle between the fold axis and the ith of n poles to bedding. Therefore the variance and standard deviation of cos ϕ_i; are given by λ_3/n and $\sqrt{\lambda_3/n}$, respectively.

5.5.2.2 Standard Scattering Angle

The standard scattering angle is another measure of scatter about the plane normal to the fold axis and is given by the arcsine of the standard deviation mentioned above.

5.5.2.3 Chi-Square Test

One method used to determine how much deviation from the ideal situation may be allowed in a "cylindrical" fold uses a chi-square test to compare the variance at the outcrop scale, measured by the pooled estimate K of the concentration parameters of the repeated measurements at the outcrops with the variance in the whole area ($\lambda 3$). The hypothesis of cylindricity is rejected if K x $\lambda 3$ is greater than the appropriate chi-square value (Charlesworth et al, 1976).

5.5.2.4 F-Test

The F-test compares the variance in the area as a whole with that in two halves of the area. Firstly the variance in the 2 halves of the domain must be roughly equal, and secondly the minimum eigenvalue ($\lambda 3$) in the whole area cannot be significantly greater than the sum of $\lambda 3$ for the two halves (Charlesworth et al, 1976).

5.5.2.5. Cylindricity

In general, cylindricity can be assumed when:

(i) λ_2 is less than an order of magnitude smaller than λ_1 and more than an order of magnitude larger than λ_3.

(ii) the standard scattering angle is small.

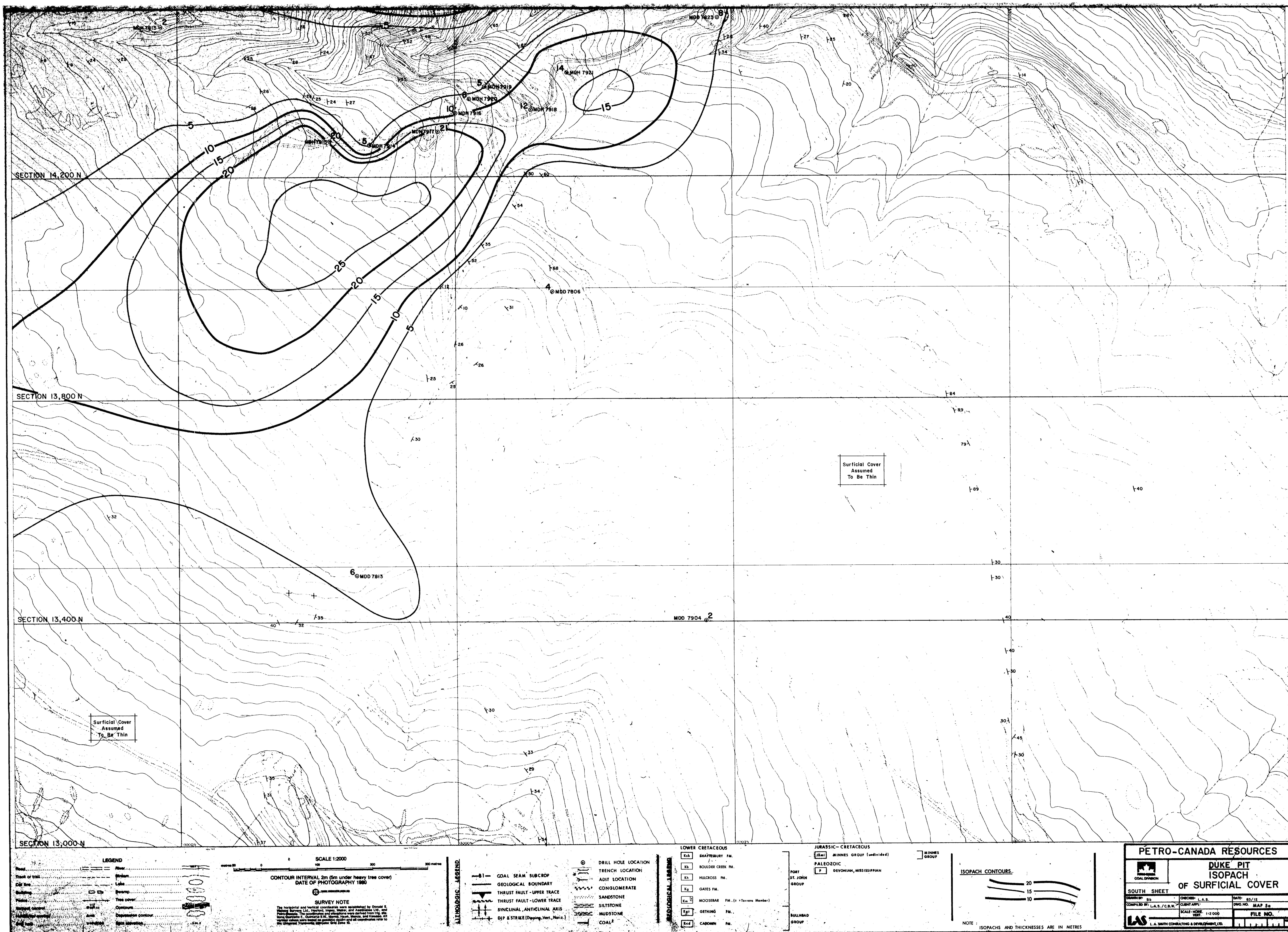
(iii) K (precision parameter) times λ_3 (minimum eigenvalue) is less than the appropriate chi-square value from the critical values of the chi-square distribution table, and

(iv) the F-Test, which compares the variance from the 2 halves of the domain is satisfied.

(v) λ_3 of a domain is not significantly greater than sum of λ_3 for each half of the domain.

5.6 DOMAIN PROFILE PLOTS

Upon completion of domain selection and receipt of positive proof that the domain is cylindrical, a line of section is chosen. This section can be oriented in any direction except parallel to the fold axis but is usually at 90° to the fold axis. In many cases, however, vertical profiles that are perpendicular to the regional strike are drawn. These section plots will contain all outcrop and drill hole data within the specified domain.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SECTION 13,800 N
SECTION 13,400 N
SECTION 13,000 N
MDD 7806
MDD 7815
MDD 7904
MDD 7923
MDH 7921
MDH 7918
MDH 7919
MDH 7920
MDH 7916
MDH 7914
Surficial Cover Assumed To Be Thin
Surficial Cover Assumed To Be Thin
LEGEND
SCALE 1:2000
CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980
SURVEY NOTE
LITHOLOGIC LEGEND
COAL SEAM SUBCROP
GEOLOGICAL BOUNDARY
THRUST FAULT - UPPER TRACE
THRUST FAULT - LOWER TRACE
SYNCLINAL, ANTICLINAL AXIS
DIP & STRIKE (Dipping, Vert., Horiz.)
DRILL HOLE LOCATION
TRENCH LOCATION
ADIT LOCATION
CONGLOMERATE
SANDSTONE
SILTSTONE
MUDSTONE
COAL
GEOLOGICAL LEGEND
LOWER CRETACEOUS
SHAFTESBURY FM.
BOULDER CREEK FM.
HULCROSS FM.
GATES FM.
MOOSEBAR FM.
GETHING FM.
CADOMIN FM.
FORT ST. JOHN GROUP
BULLHEAD GROUP
JURASSIC - CRETACEOUS
MINNES GROUP (undivided)
MINNES GROUP
PALEOZOIC
DEVONIAN, MISSISSIPPIAN
ISOPACH CONTOURS
20
15
10
NOTE : ISOPACHS AND THICKNESSES ARE IN METRES
PETRO-CANADA RESOURCES
COAL DIVISION
DUKE PIT
ISOPACH
OF SURFICIAL COVER
SOUTH SHEET
DRAWN BY: Bb
CHECKED: L.A.S.
DATE: 83/12
COMPILED BY: L.A.S. / C.B.W.
CLIENT APP'L:
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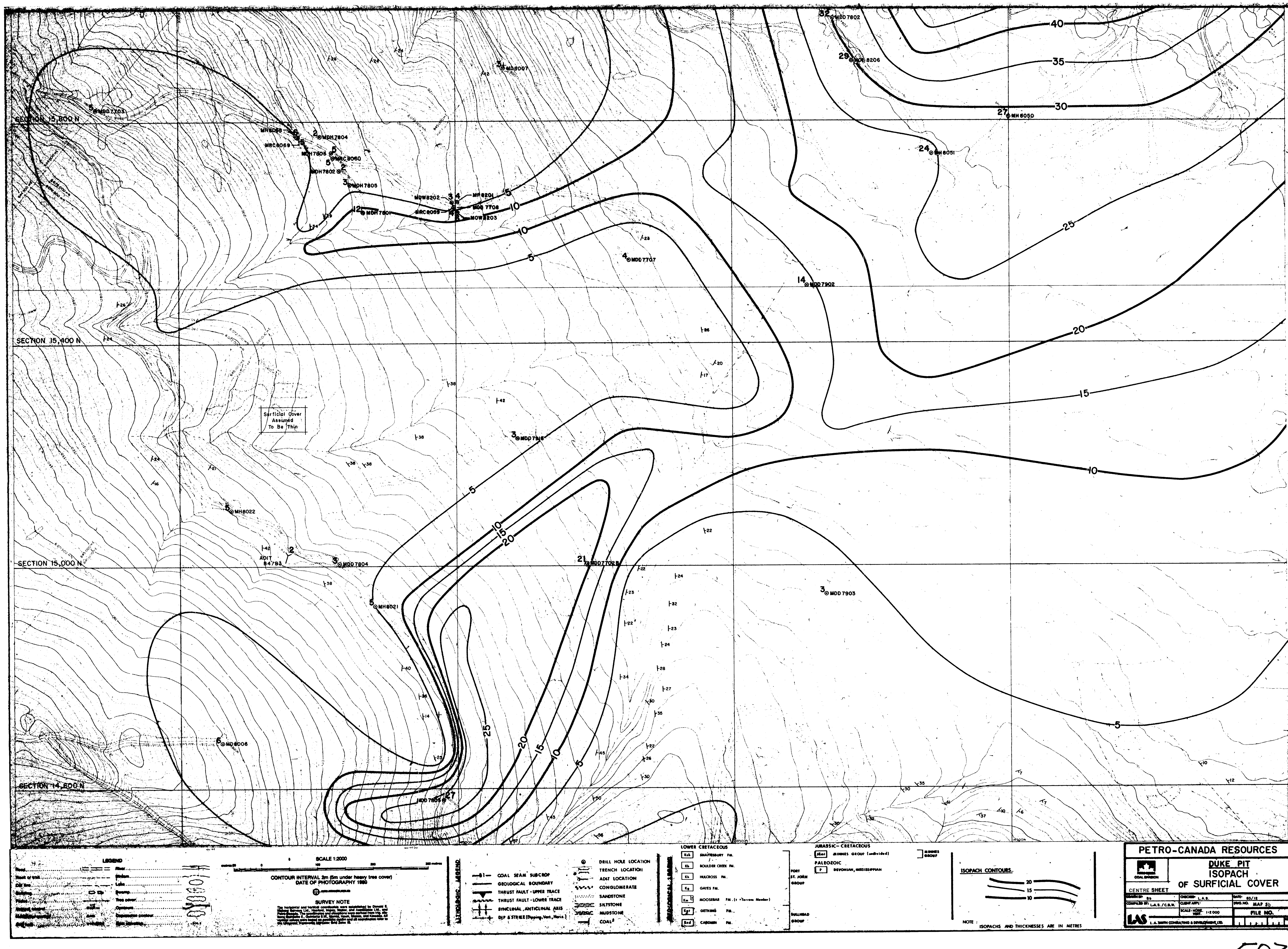
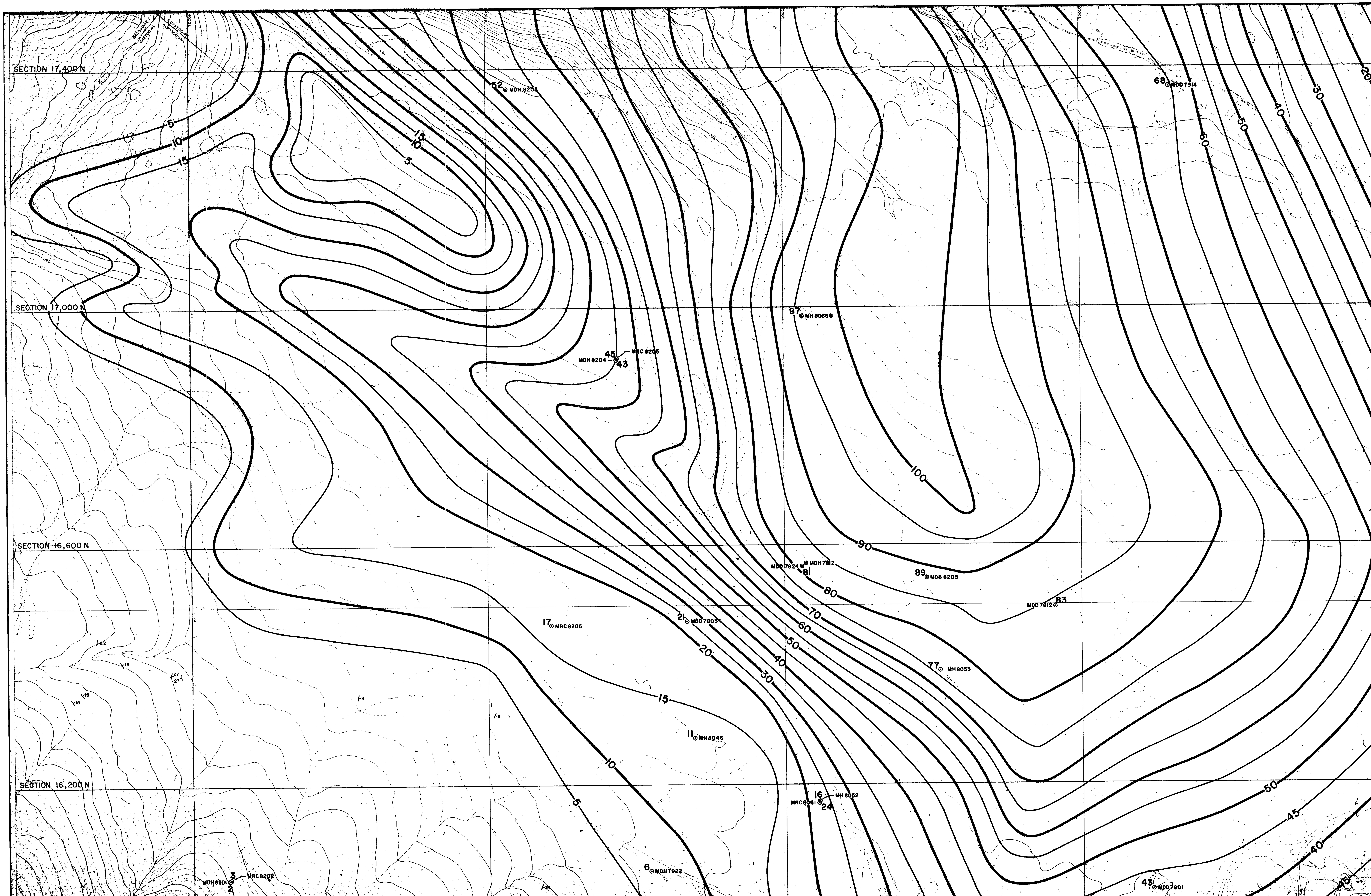
SCALE: HORIZ. VERT. 1:2 000
FILE NO.
LAS
L. A. SMITH CONSULTING & DEVELOPMENT LTD.

503


PETRO-CANADA RESOURCES
DUKE PIT
ISOPACH
OF SURFICIAL COVER
CENTRE SHEET
COAL DIVISION
CHECKED: L.A.S.
DATE: 83/12
COMPILED BY: L.A.S. / C.B.W.
DWG. NO. MAP 5b
SCALE: HORZ. VERT. 1:2000
FILE NO.
L. A. SMITH CONSULTING & DEVELOPMENT LTD.
ISOPACH CONTOURS
NOTE : ISOPACHS AND THICKNESSES ARE IN METRES
SCALE 1:2000
CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980
SURVEY NOTE
LEGEND
LITHOLOGIC LEGEND
COAL SEAM SUBCROP
GEOLOGICAL BOUNDARY
THRUST FAULT - UPPER TRACE
THRUST FAULT - LOWER TRACE
SYNCLINAL, ANTICLINAL AXIS
DIP & STRIKE
DRILL HOLE LOCATION
TRENCH LOCATION
ADIT LOCATION
CONGLOMERATE
SANDSTONE
SILTSTONE
MUDSTONE
COAL
LOWER CRETACEOUS
JURASSIC - CRETACEOUS
PALEOZOIC
SECTION 15,600 N
SECTION 15,400 N
SECTION 15,000 N
SECTION 14,600 N
Surficial Cover Assumed To Be Thin



LEGEND

SCALE 1:2000

CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980

SURVEY NOTE

LITHOLOGIC LEGEND

COAL SEAM SUBCROP
GEOLOGICAL BOUNDARY
THRUST FAULT - UPPER TRACE
THRUST FAULT - LOWER TRACE
SYNCLINAL, ANTICLINAL AXIS
DIP & STRIKE (Dipping, Vert., Horiz.)

DRILL HOLE LOCATION
TRENCH LOCATION
ADIT LOCATION
CONGLOMERATE
SANDSTONE
SILTSTONE
MUDSTONE
COAL

LOWER CRETACEOUS

Ksh SHAFTESBURY FM.
Kb BOULDER CREEK FM.
Kh HULCROSS FM.
Kg GATES FM.
Km MOOSEBAR FM.
Kgt GETHING FM.
Kcd CADOMIN FM.

FORT ST. JOHN GROUP
BULLHEAD GROUP

JURASSIC - CRETACEOUS

JKmt MINNES GROUP (undivided)

MINNES GROUP

PALEOZOIC

P DEVONIAN, MISSISSIPPIAN

ISOPACH CONTOURS

20
15
10

NOTE: ISOPACHS AND THICKNESSES ARE IN METRES

PETRO-CANADA RESOURCES

COAL DIVISION

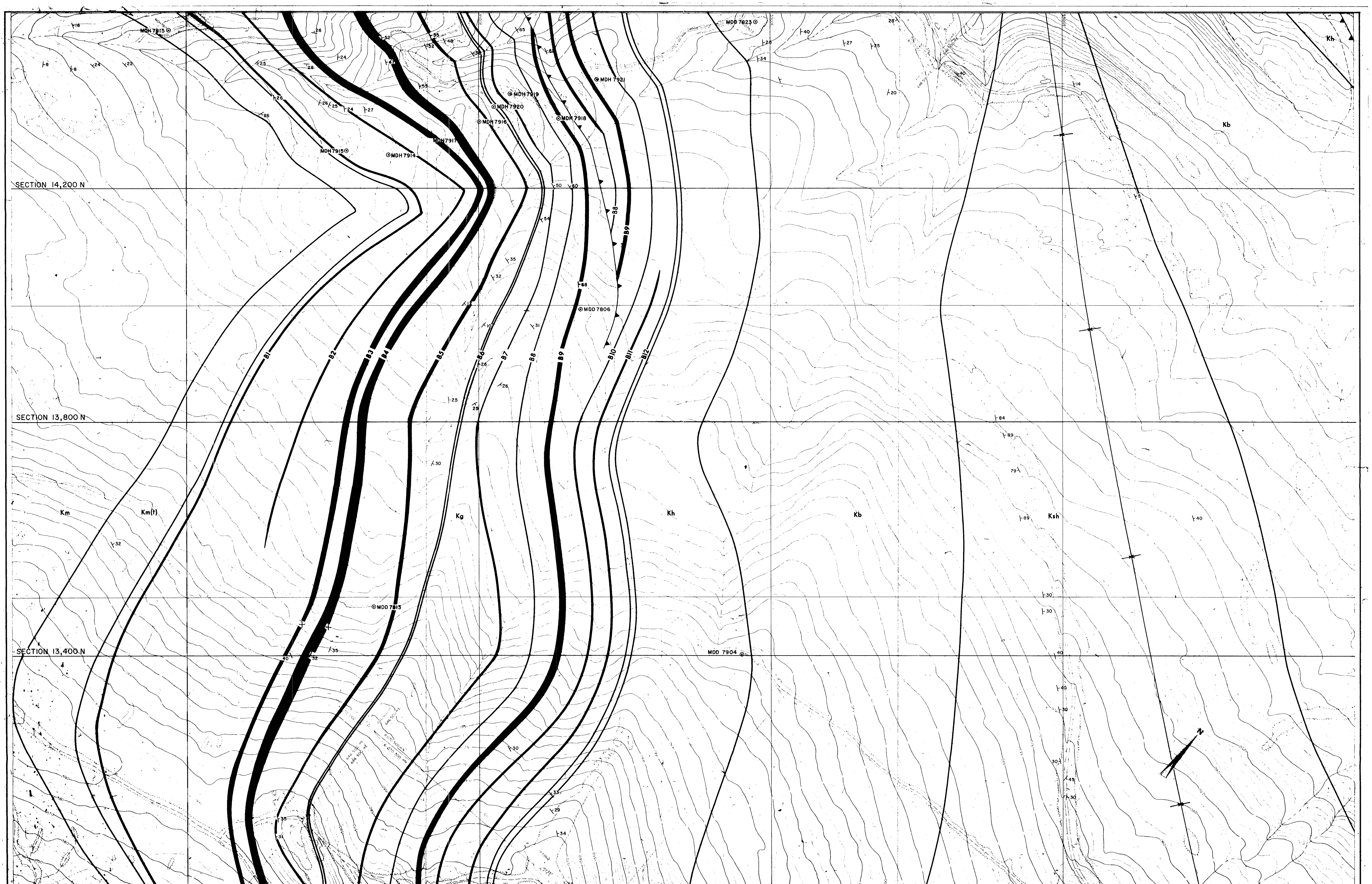
DUKE PIT
ISOPACH
OF SURFICIAL COVER

NORTH SHEET

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/12
COMPILED BY: L.A.S. / C.B.W.	CLIENT APP'L:	DWG. NO. MAP 5c
	SCALE: HORIZ. VERT. 1:2 000	FILE NO.

L. A. SMITH CONSULTING & DEVELOPMENT LTD.

503



LEGEND

Road
Track or trail
Cut line
Building
Fence
Vertical control
Horizontal control
Drill hole
River
Stream
Lake
Swamp
Tree cover
Contours
Depression contour
Spot elevation

SCALE 1:2000

metres 50 0 100 200 300 metres

CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980

SURVEY NOTE

The horizontal and vertical coordinates were established by Donald E. Watson Surveys Ltd., Hosford, Impey, Welter, and Associates Ltd., and Petro-Canada. The coordinates and elevations were derived from trig. stations Quintette E., Quintette S.W., Mamie, Hawk, Marcia, and Kinuseo. All vertical values were based on geodetic datum and all coordinates refer to the Universal Transverse Mercator Grid Zone 10.

LITHOLOGIC LEGEND

- B1 — COAL SEAM SUBCROP
- GEOLOGICAL BOUNDARY
- THRUST FAULT - UPPER TRACE
- THRUST FAULT - LOWER TRACE
- SYNCLINAL, ANTICLINAL AXIS
- DIP & STRIKE (Dipping, Vert., Horiz.)
- DRILL HOLE LOCATION
- TRENCH LOCATION
- ADIT LOCATION
- CONGLOMERATE
- SANDSTONE
- SILTSTONE
- MUDSTONE
- COAL

GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FM.	FORT ST. JOHN GROUP
Kb	BOULDER CREEK FM.	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	FORT ST. JOHN GROUP
Kg	GATES FM.	FORT ST. JOHN GROUP
Km t	MOOSEBAR FM. (t = Torrens Member)	FORT ST. JOHN GROUP
Kgt	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	BULLHEAD GROUP

JURASSIC– CRETACEOUS

JKmi	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

PETRO-CANADA RESOURCES

PETRO-CANADA COAL DIVISION

DUKE PIT

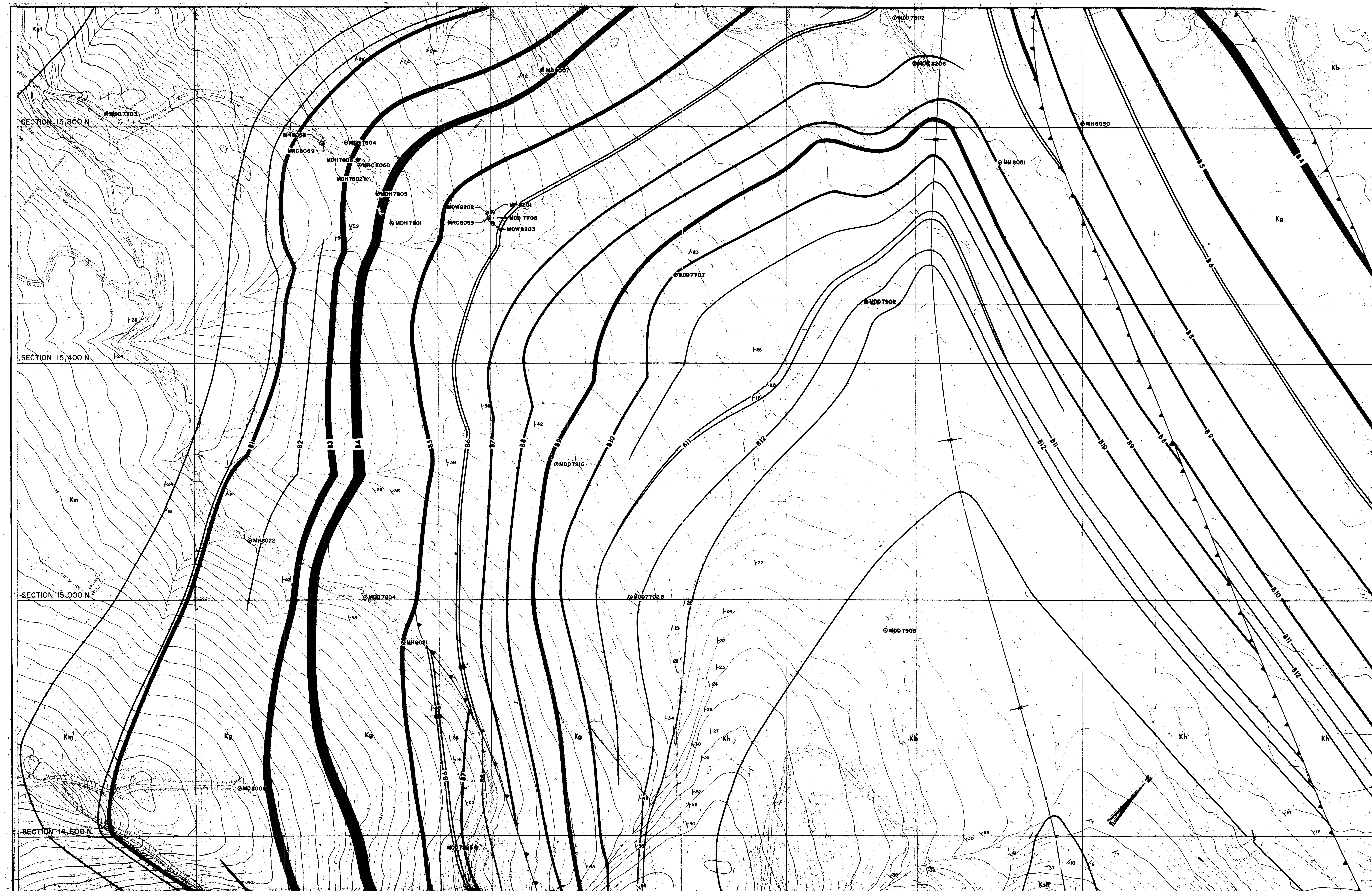
SUBCROP GEOLOGY MAP

SOUTH SHEET

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/12
COMPILED BY: L.A.S./C.B.W.	CLIENT APP'L:	DWG. NO. MAP 6a
	SCALE: HORIZ. VERT. 1:2 000	FILE NO.

L.A. SMITH CONSULTING & DEVELOPMENT LTD.

503



LEGEND

SCALE 1:2000

CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980

SURVEY NOTE

LITHOLOGIC LEGEND

- COAL SEAM SUBCROP
- GEOLOGICAL BOUNDARY
- THRUST FAULT - UPPER TRACE
- THRUST FAULT - LOWER TRACE
- SYNCLINAL, ANTICLINAL AXIS
- DIP & STRIKE (Dipping, Vert., Horiz.)
- DRILL HOLE LOCATION
- TRENCH LOCATION
- ADIT LOCATION
- CONGLOMERATE
- SANDSTONE
- SILTSTONE
- MUDSTONE
- COAL

GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksb	SHAFTESBURY FM.	
Kb	BOULDER CREEK FM.	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	
Kg	GATES FM.	
Km	MOOSEBAR FM. (t = Torrens Member)	
Kgt	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	

JURASSIC- CRETACEOUS

JKmi	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

PETRO-CANADA RESOURCES

COAL DIVISION

DUKE PIT

SUBCROP GEOLOGY
MAP

CENTRE SHEET

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/12
COMPILED BY: L.A.S./C.B.W.	CLIENT APP'L:	DWG. NO. MAP 6b
	SCALE: HORIZ. VERT. 1:2000	FILE NO.

L.A. SMITH CONSULTING & DEVELOPMENT LTD.

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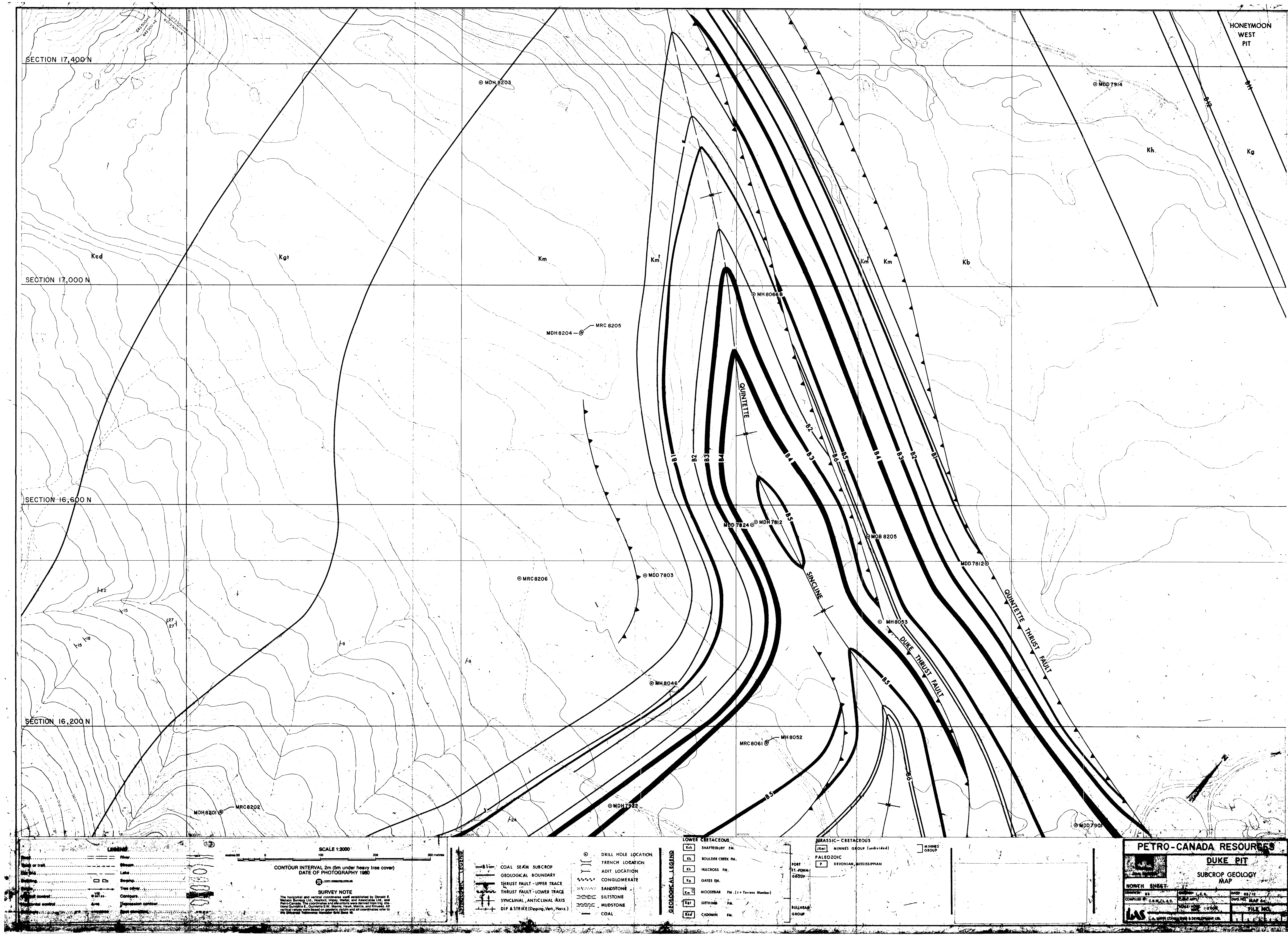
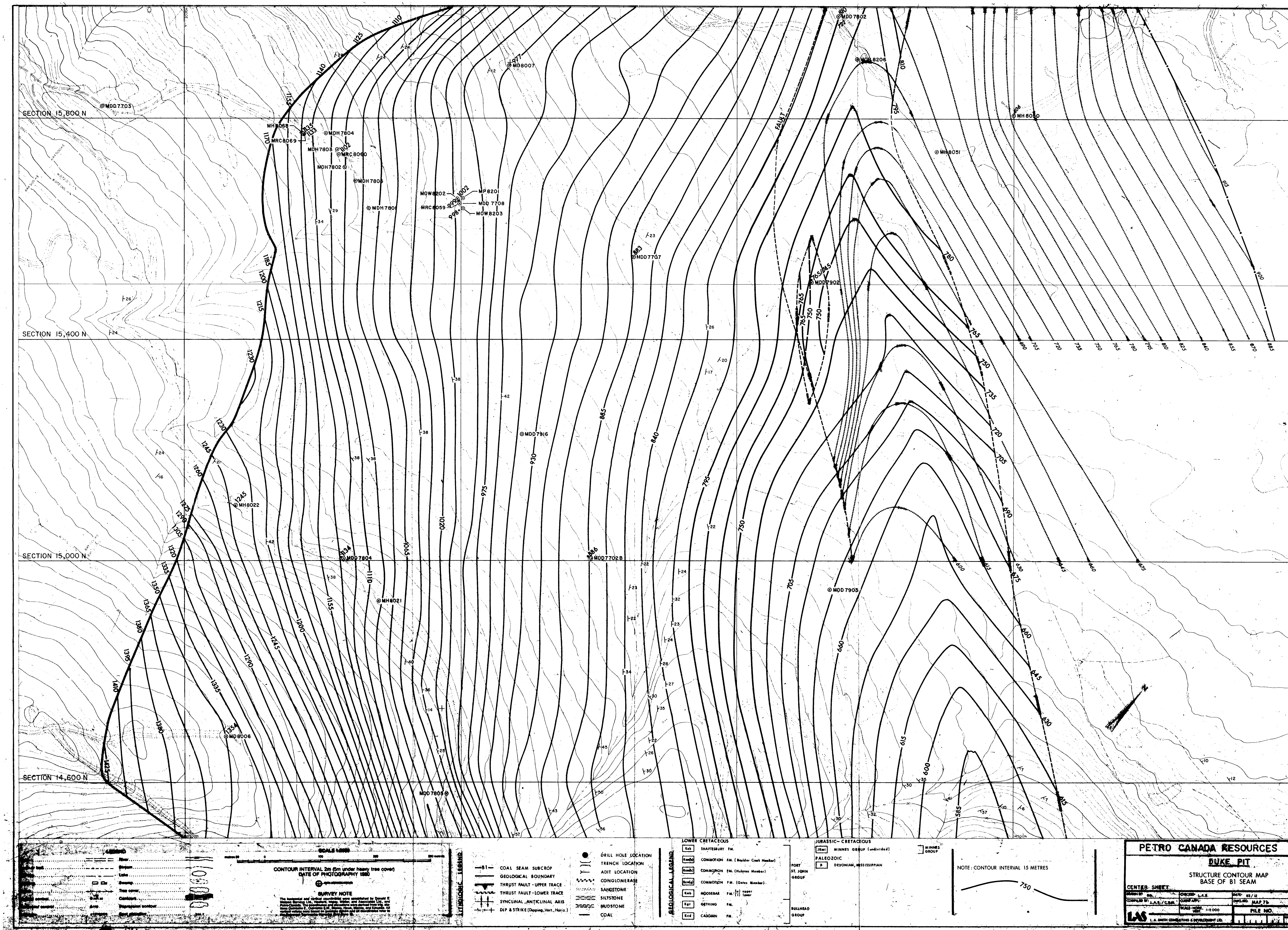

HONEYMOON
WEST
PIT
SECTION 17,400 N
SECTION 17,000 N
SECTION 16,600 N
SECTION 16,200 N
MDH 8203
MDD 7914
MH 8066 B
MDH 8204
MRC 8205
MDD 7824
MDH 7812
MDB 8205
MDD 7812
MRC 8206
MDD 7803
MH 8053
MH 8046
MRC 8061
MH 8052
MDH 7922
MDH 8201
MRC 8202
MDD 7901
Kcd
Kgt
Km
Km
Km
Km
Kb
Kh
Kg
B1
B2
B3
B4
B5
B6
QUINTETTE
SINCLINE
DUKE THRUST FAULT
QUINTETTE THRUST FAULT
LEGEND
River
Stream
Lake
Swamp
Tree cover
Contours
Depression contour
SCALE 1:2000
metres 50
0
100
200
300 metres
CONTOUR INTERVAL 2m (5m under heavy tree cover)
DATE OF PHOTOGRAPHY 1980
SURVEY NOTE
The horizontal and vertical coordinates were established by Donald E. Watson Surveys Ltd., Hosford, Impey, Welter, and Associates Ltd., and Petro-Canada. The coordinates and elevations were derived from trig. stations Quintette E., Quintette S.W., Mamie, Hawk, Marcia, and Kinuseo. All vertical values were based on geodetic datum and all coordinates refer to
COAL SEAM SUBCROP
GEOLOGICAL BOUNDARY
THRUST FAULT - UPPER TRACE
THRUST FAULT - LOWER TRACE
SYNCLINAL, ANTICLINAL AXIS
DIP & STRIKE (Dipping, Vert., Horiz.)
DRILL HOLE LOCATION
TRENCH LOCATION
ADIT LOCATION
CONGLOMERATE
SANDSTONE
SILTSTONE
MUDSTONE
COAL
GEOLOGICAL LEGEND
LOWER CRETACEOUS
Ksh SHAFTESBURY FM.
Kb BOULDER CREEK FM.
Kh HULCROSS FM.
Kg GATES FM.
Km MOOSEBAR FM. (t = Torrens Member)
Kgt GETHING FM.
Kcd CADOMIN FM.
FORT ST. JOHN GROUP
BULLHEAD GROUP
JURASSIC- CRETACEOUS
JKmi MINNES GROUP (undivided)
MINNES GROUP
PALEOZOIC
P DEVONIAN, MISSISSIPPIAN
PETRO-CANADA RESOURCES
DUKE PIT
SUBCROP GEOLOGY
MAP
NORTH SHEET
L.A.S.
DATE: 83/12
COMPILED BY: C.B.W./L.A.S.
DWG. NO. MAP 6c
FILE NO.


SECTION 15,800 N
SECTION 15,400 N
SECTION 15,000 N
SECTION 14,600 N
FAULT
MDD7703
MDD7802
MDD8007
MDH8206
MH8050
MH8051
MH8068
MRC8069
MDH7804
MDH7803
MRC8060
MDH7802
MDH7806
MDH7801
MOW8202
MP8201
MDD7708
MRC8059
MOW8203
MDD7707
MDD7902
MDD7916
MH8022
MDD7804
MDD7702B
MDD7903
MH8021
MD8006
MDD7805
LITHOLOGIC LEGEND
COAL SEAM SUBCROP
GEOLOGICAL BOUNDARY
THRUST FAULT - UPPER TRACE
THRUST FAULT - LOWER TRACE
SYNCLINAL, ANTICLINAL AXIS
DIP & STRIKE (Dipping, Vert., Horiz.)
DRILL HOLE LOCATION
TRENCH LOCATION
ADIT LOCATION
CONGLOMERATE
SANDSTONE
SILTSTONE
MUDSTONE
COAL
GEOLOGICAL LEGEND
LOWER CRETACEOUS
Ksh SHAFTESBURY FM.
Kcm(b) COMMOTION FM. (Boulder Creek Member)
Kcm(h) COMMOTION FM. (Hulcross Member)
Kcm(g) COMMOTION FM. (Gates Member)
Kmb MOOSEBAR FM. (u) upper (l) lower
Kgt GETHING FM.
Kcd CADOMIN FM.
FORT ST. JOHN GROUP
BULLHEAD GROUP
JURASSIC- CRETACEOUS
JKmi MINNES GROUP (undivided)
PALEOZOIC
D DEVONIAN, MISSISSIPPIAN
NOTE: CONTOUR INTERVAL 15 METRES
750
PETRO CANADA RESOURCES
DUKE PIT
STRUCTURE CONTOUR MAP
BASE OF B1 SEAM
CENTER SHEET
CHECKED: L.A.S.
DATE: 83/12
DWG. NO. MAP 7b
SCALE: HORIZ. VERT. 1:2000
FILE NO.
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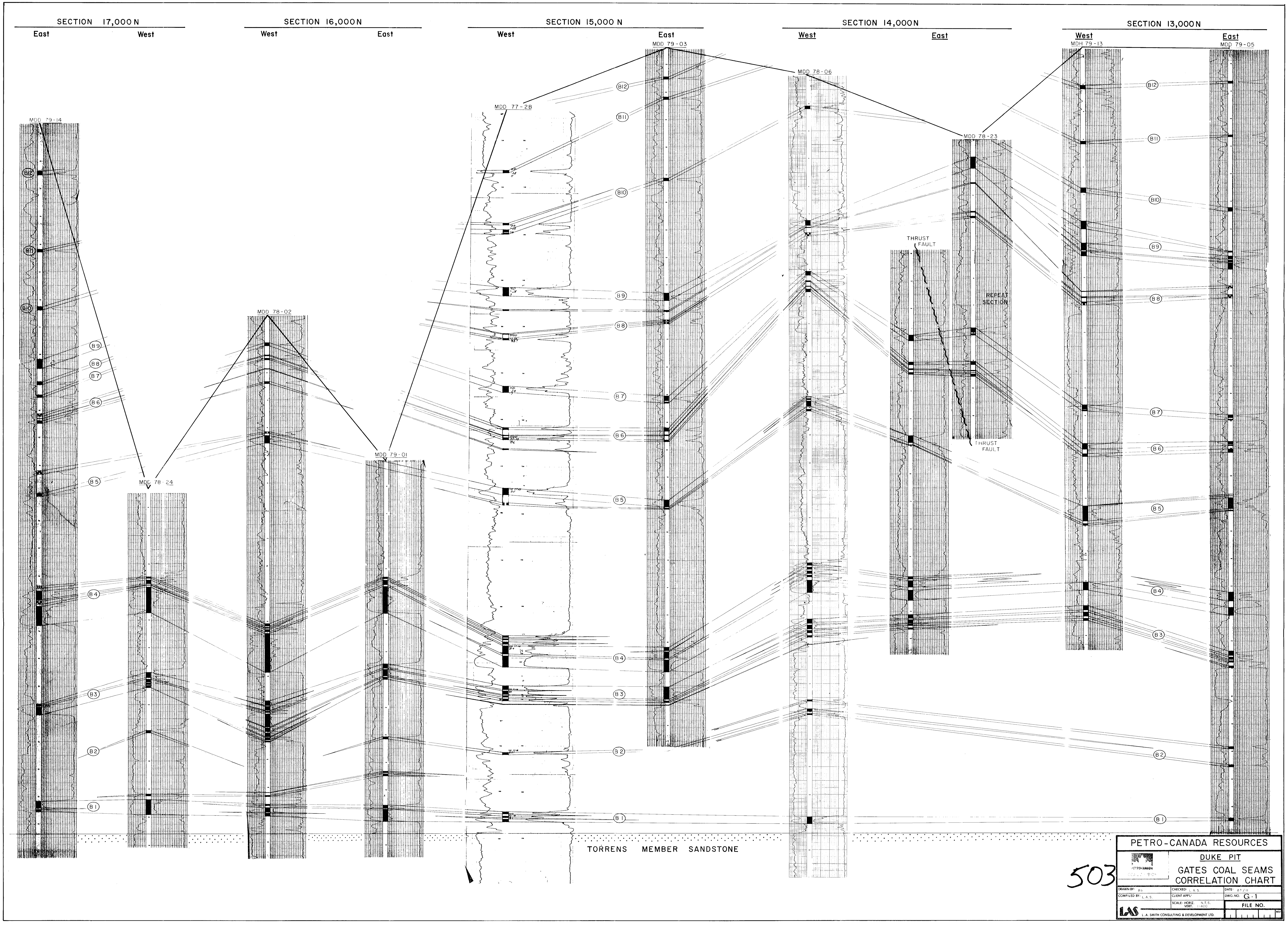
SECTION 17,000 N
East
West
SECTION 16,000 N
West
East
SECTION 15,000 N
West
East
SECTION 14,000 N
West
East
SECTION 13,000 N
West
East
MDD 79-14
MDD 78-24
MDD 78-02
MDD 79-01
MDD 77-28
MDD 79-03
MDD 78-06
MDD 78-23
MDH 79-13
MDD 79-05
B12
B11
B10
B9
B8
B7
B6
B5
B4
B3
B2
B1
THRUST FAULT
REPEAT SECTION
THRUST FAULT
TORRENS MEMBER SANDSTONE
503
PETRO-CANADA RESOURCES
PETRO-CANADA
DUKE PIT
GATES COAL SEAMS CORRELATION CHART
DRAWN BY: Bb
CHECKED: L.A.S.
DATE: 83/11
COMPILED BY: L.A.S.
CLIENT APP'L:
DWG. NO. G-1
SCALE: HORIZ. N.T.S.
VERT. 1:400
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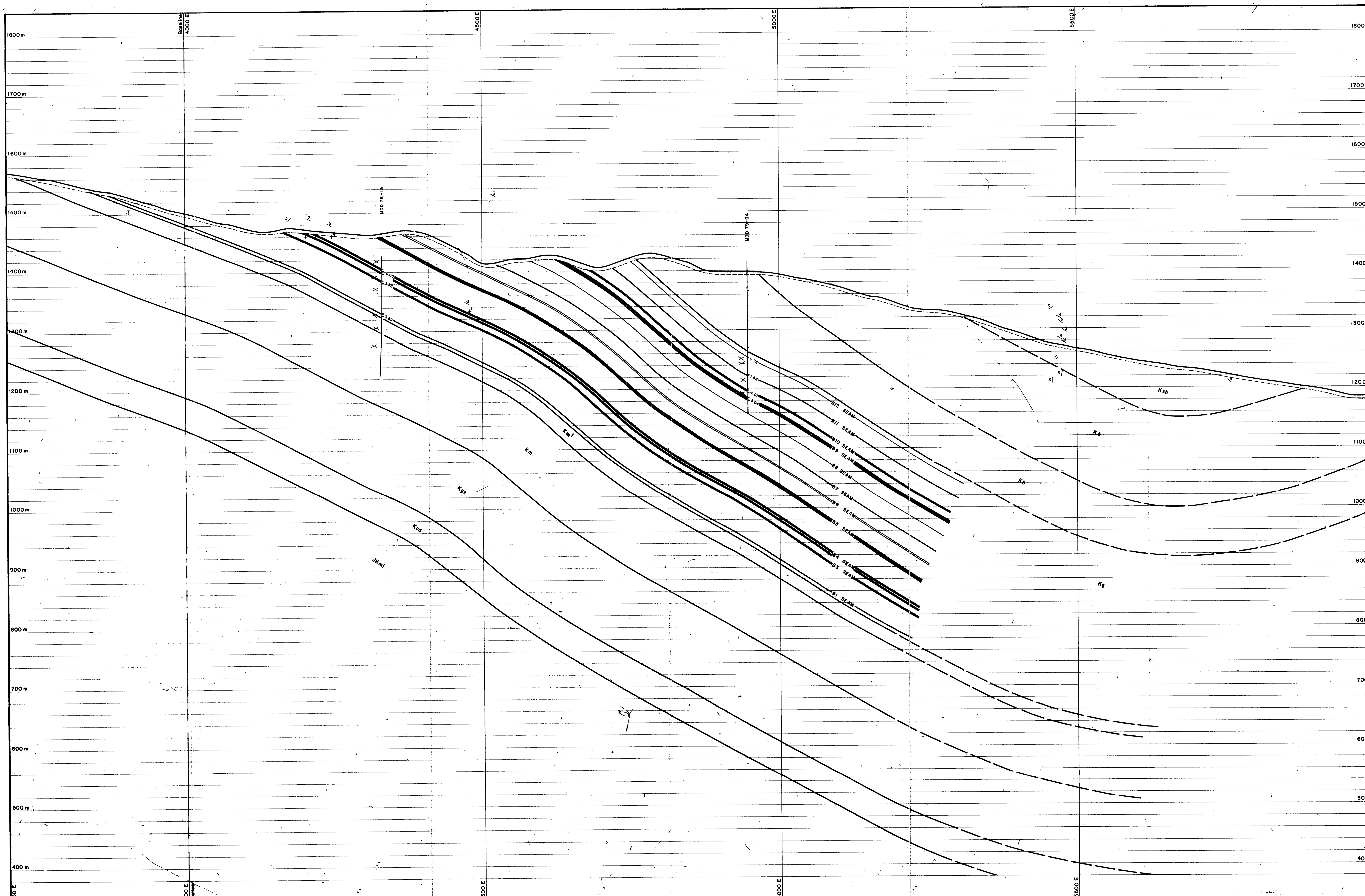
LAS
L.A. SMITH CONSULTING & DEVELOPMENT LTD.



GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FM.	FORT ST. JOHN GROUP
Kb	BOULDER CREEK FM.	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	FORT ST. JOHN GROUP
Kg	GATES FM.	FORT ST. JOHN GROUP
Km^t	MOOSEBAR FM. (t = Torrens Member)	FORT ST. JOHN GROUP
Kgr	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	BULLHEAD GROUP

JURASSIC–CRETACEOUS

JKml	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

metres 50 0 50 100 150 200 250 metres

PETRO-CANADA RESOURCES

DUKE PIT

SECTION 13,400 N

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/11
COMPILED BY: C.B.W./L.A.S.	CLIENT APP.:	DWG. NO.
LAS L.A. SMITH CONSULTING & DEVELOPMENT LTD.	SCALE: HORIZ. 1:2 000 VERT. 1:2 000	FILE NO.

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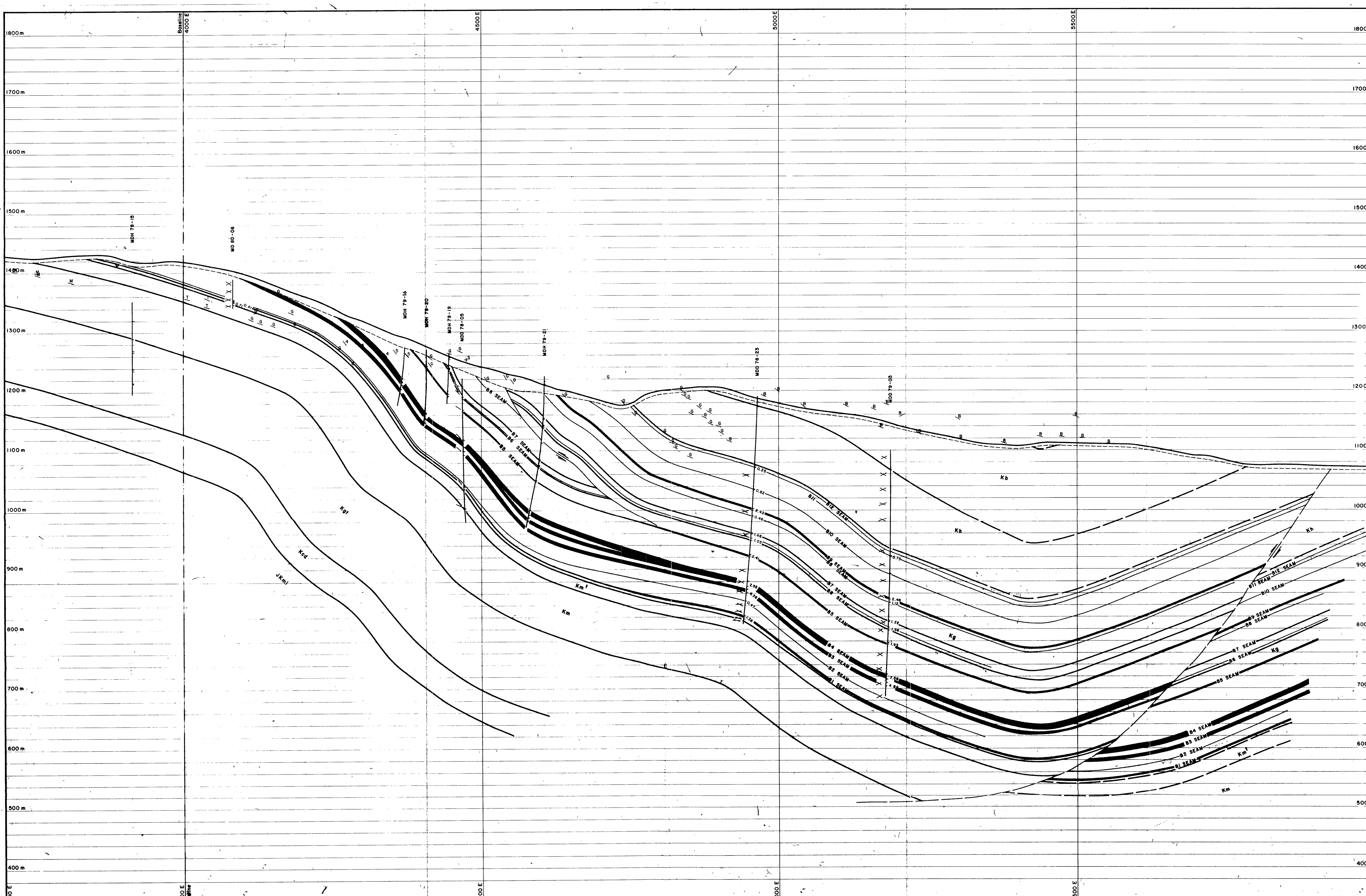

GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FM.	FORT ST. JOHN GROUP
Kb	BOUNIDER CREEK FM	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	FORT ST. JOHN GROUP
Kg	GATES FM.	FORT ST. JOHN GROUP
Km t	MOOSEBAR FM. (t = Torrens Member)	FORT ST. JOHN GROUP
Kgt	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	BULLHEAD GROUP

JURASSIC–CRETACEOUS

JKmi	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

metres 50 0 50 100 150 200 250 metres

PETRO-CANADA RESOURCES

COAL DIVISION

DUKE PIT

SECTION 14,600 N

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/11
COMPILED BY: C.B.W./L.A.S.	CLIENT APP'L:	DWG. NO.
LAS L.A. SMITH CONSULTING & DEVELOPMENT LTD.	SCALE: HORIZ. 1:2 000 VERT. 1:2 000	FILE NO.

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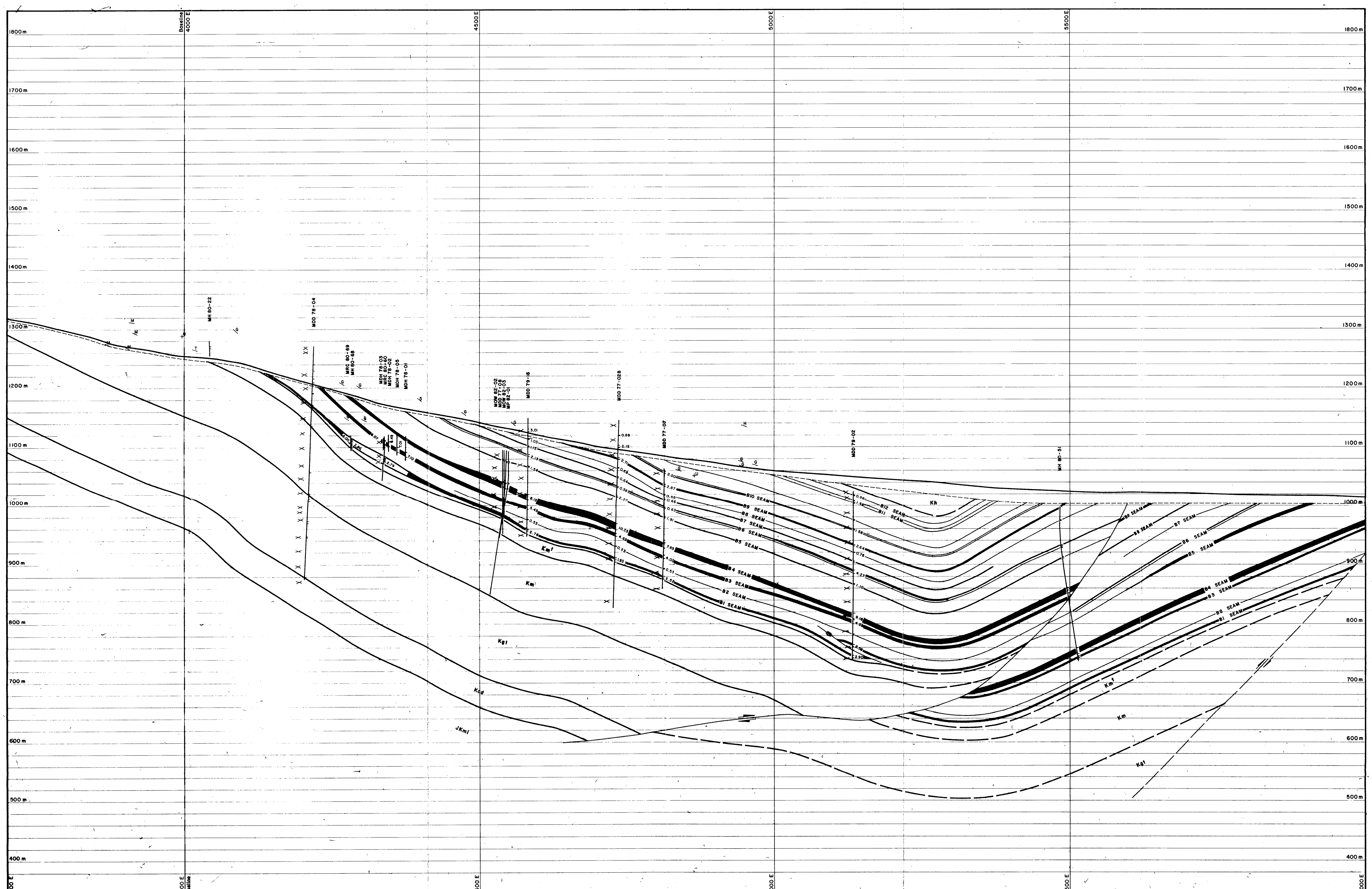

GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FM.	FORT ST. JOHN GROUP
Kb	BOULDER CREEK FM.	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	FORT ST. JOHN GROUP
Kg	GATES FM.	FORT ST. JOHN GROUP
Km t	MOOSEBAR FM. (t = Torrens Member)	FORT ST. JOHN GROUP
Kgt	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	BULLHEAD GROUP

JURASSIC– CRETACEOUS

JKml	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

PETRO-CANADA RESOURCES

COAL DIVISION

DUKE PIT

SECTION 15,400 N

DRAWN BY:	CHECKED: L.A.S.	DATE: 83/11
COMPILED BY: C.D.W./L.A.S.	CLIENT APP'L:	DWG. NO.
	SCALE: HORIZ. 1:2 000 VERT. 1:2 000	FILE NO.

LAS L.A. SMITH CONSULTING & DEVELOPMENT LTD.

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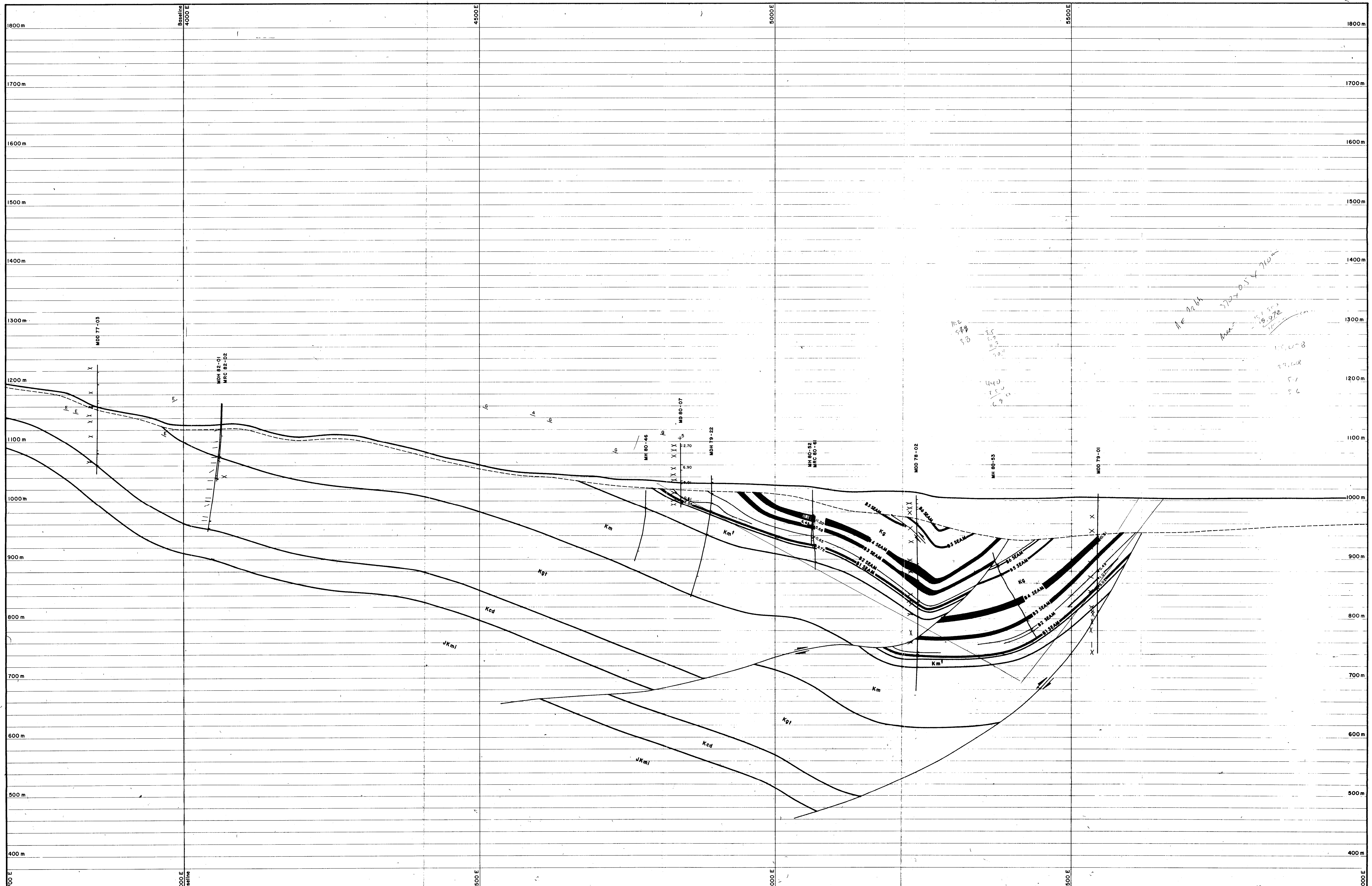

GEOLOGICAL LEGEND

LOWER CRETACEOUS

Ksh	SHAFTESBURY FM.	FORT ST. JOHN GROUP
Kb	BOULDER CREEK FM.	FORT ST. JOHN GROUP
Kh	HULCROSS FM.	FORT ST. JOHN GROUP
Kg	GATES FM.	FORT ST. JOHN GROUP
Km t	MOOSEBAR FM. (t = Torrens Member)	FORT ST. JOHN GROUP
Kgt	GETHING FM.	BULLHEAD GROUP
Kcd	CADOMIN FM.	BULLHEAD GROUP

JURASSIC– CRETACEOUS

JKmi	MINNES GROUP (undivided)	MINNES GROUP

PALEOZOIC

P	DEVONIAN, MISSISSIPPIAN

PETRO-CANADA RESOURCES

COAL DIVISION

DUKE PIT

SECTION 16,200 N

DRAWN BY: Bb	CHECKED: L.A.S.	DATE: 83/11
COMPILED BY: C.B.W./L.A.S.	CLIENT APP'L:	DWG. NO.
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LAS L.A. SMITH CONSULTING & DEVELOPMENT LTD.

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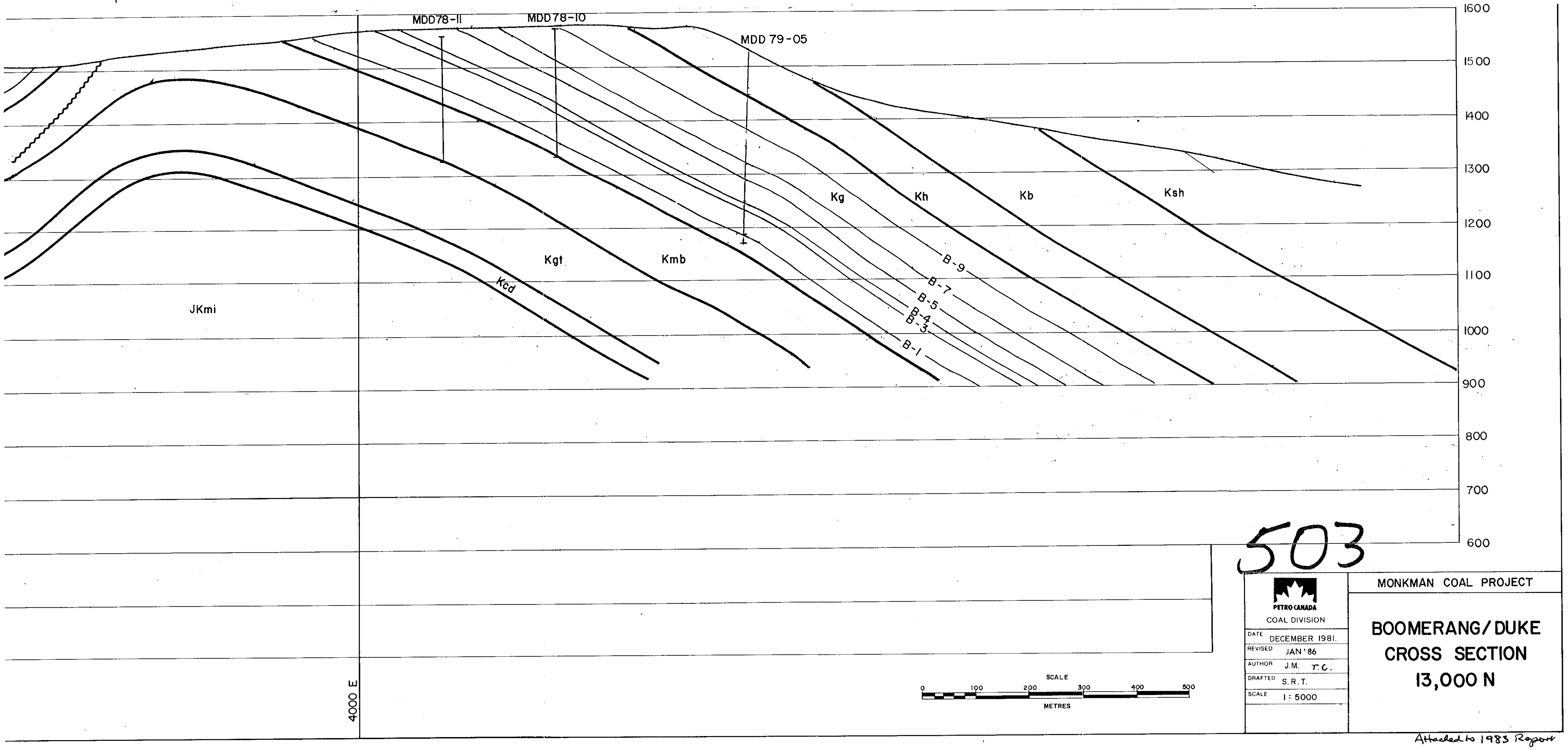
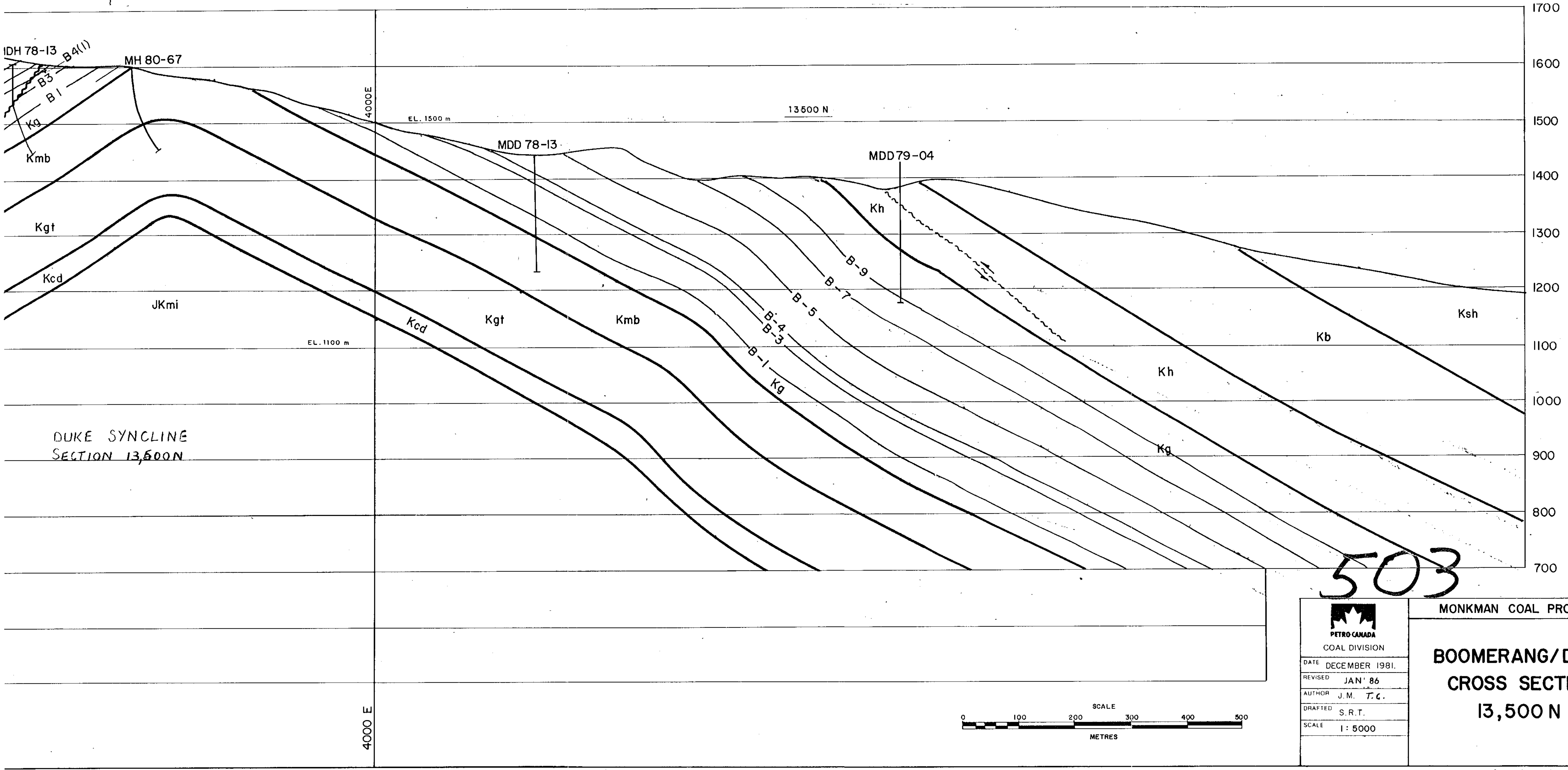
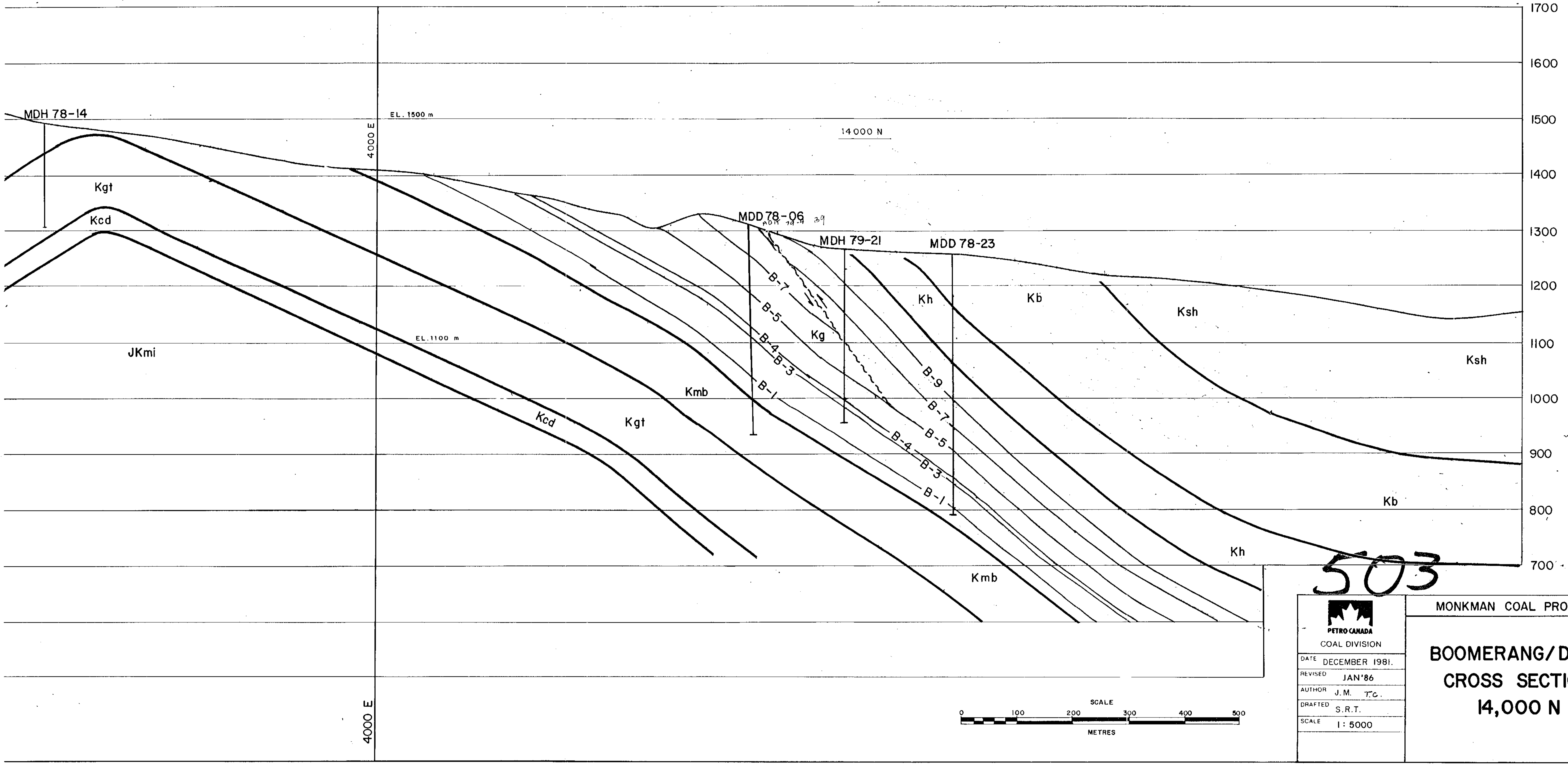


Attached to 1983 Report



PETRO CANADA COAL DIVISION	MONKMAN COAL PROJECT
DATE DECEMBER 1981.	BOOMERANG/DUKE CROSS SECTION 13,500 N
REVISED JAN' 86	
AUTHOR J.M. T.C.	
DRAFTED S.R.T.	
SCALE 1: 5000	

Attached to 1983 Report



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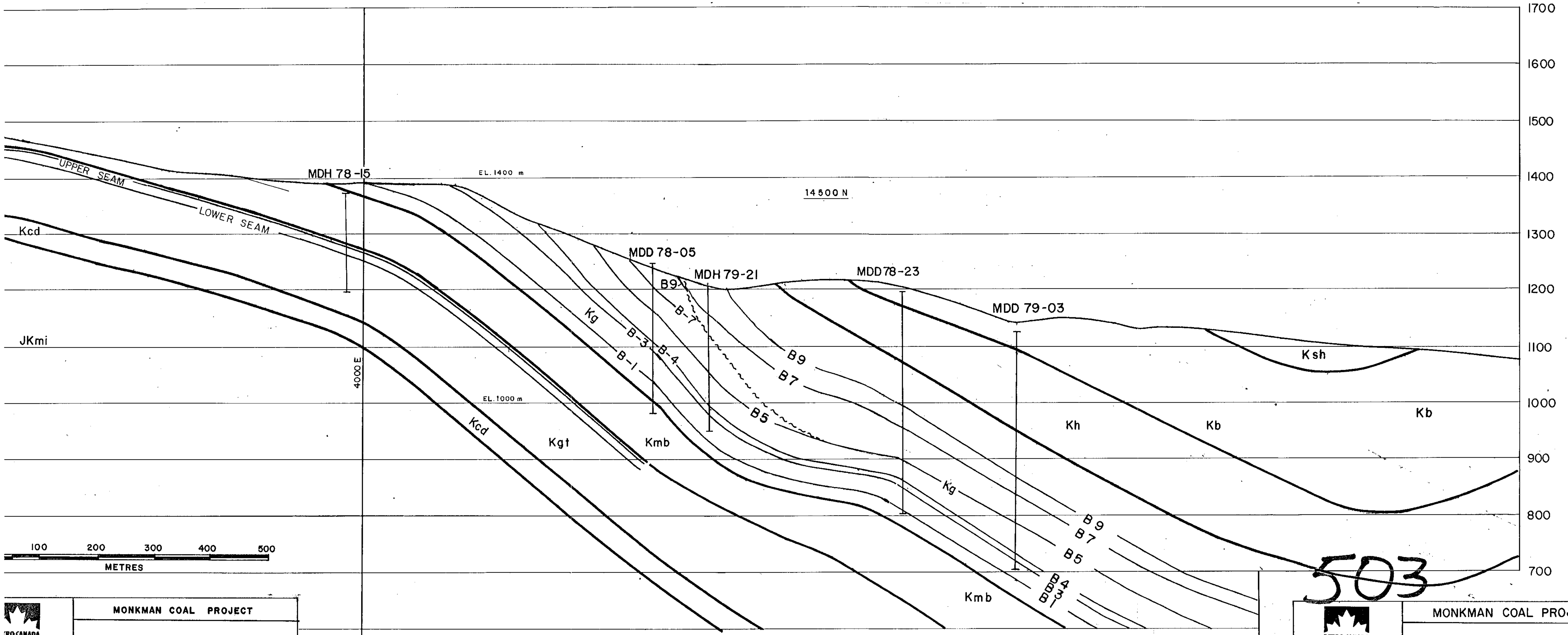
PETRO-CANADA
COAL DIVISION

DATE	DECEMBER 1981.
REVISED	JAN'86
AUTHOR	J.M. T.C.
DRAFTED	S.R.T.
SCALE	1 : 5000

MONKMAN COAL PROJECT

BOOMERANG/DUKE CROSS SECTION 14,000 N

Attached to 1983 Report



PETRO-CANADA
L DIVISION
UARY, 1981
NUARY,1986
E.P., W.P. T.C.
S.K.
1: 5000

MONKMAN COAL PROJECT

DUKE MOUNTAIN BLOCK
DUKE SYNCLINE AREA
CROSS SECTION 14,500 N.

4000 E

SCALE
0 100 200 300 400 500
METRES

PETRO-CANADA
COAL DIVISION

DATE	DECEMBER 1981.
REVISED	JAN '86
AUTHOR	J.M. T.C.
DRAFTED	S.R.T.
SCALE	1: 5000

MONKMAN COAL PROJECT

BOOMERANG/DUKE
CROSS SECTION
14,500 N

Attached to 1983 Report

PETRO-CANADA
COAL DIVISION

MONKMAN COAL PROJECT

DUKE MOUNTAIN BLOCK
DUKE SYNCLINE AREA
CROSS SECTION 15,000 N.

JANUARY, 1981
JANUARY, 1986
E.P, W.P. T.C.
S.K.
1:5000

503

PETRO-CANADA
COAL DIVISION

MONKMAN COAL PROJECT

DUKE AREA
CROSS SECTION 15,000N.

DATE	JANUARY, 1981
REVISED	JAN '86
AUTHOR	W.P. T.C.
DRAFTED	S.K.
SCALE	1:5000

Attached to 1983 Report

Attached to 1983 Report

503

...AL PROJECT

...NTAIN BLOCK
...CLINE AREA
...TION 16,000 N.

4,000
BASE LINE

PETRO-CANADA
COAL DIVISION

DATE	JANUARY, 1981
REVISED	JAN '86
AUTHOR	E.P., W.P. T.C.
DRAFTED	S.K.
SCALE	1:5000

MONKMAN COAL PROJECT

DUKE /
HONEYMOON AREA
CROSS SECTION 16,000N.

Attached to 1983 Report

PROJECT

N BLOCK
E AREA
16,500N.

503

PETRO CANADA
COAL DIVISION

DATE	JANUARY, 1981
REVISED	JAN '86
AUTHOR	E.P., W.P. T.C.
DRAFTED	S.K.
SCALE	1 : 5000

MONKMAN COAL PROJECT

DUKE/
HONEYMOON AREA
CROSS SECTION 16,500N.

SCALE
0 100 200 300 400 500
METRES

Attached to 1983 Report

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MONKMAN COAL PROJECT
PETRO CANADA
COAL DIVISION
HONEYMOON AREA
CROSS SECTION 17,000 N.
DATE JANUARY, 1981
REVISED JAN '86
AUTHOR E.P., W.P. Y.C.
DRAFTED S.K.
SCALE 1: 5000
SCALE
METRES
0
100
200
300
400
500
Attached to 1983 Report
N COAL PROJECT
OUNTAIN BLOCK
YNCLINE AREA
ECTION 17,000 N.
4,000
BASE LINE
DUKE THRUST
QUINTETTE THRUST
JKmi
Kmi
Kcd
Kgt
Kmb
Kb
Kh
Kg
B1
B2
B3
B4
B5
B8
B9
MH 80-66
MDD 78-01
MRC 80-57
MRC 80-56
MRC 80-58
MRC 80-66
MH 80-55
MH 80-54
MDH 78-08
MRC 80-62 & 64
MH 80-63
MDH 78-09
PUMP TEST HOLE
OWW1
MRC 80-25
OWW2
MDH 78-06
MH 80-20
MH 80-70
EL. 1100 m
EL. 700 m
6000 E
7000 E
8000 E
6500 m
17000 N
1400
1300
1200
1100
1000
900
800
700
600
500
400
500

MAN COAL PROJECT

MOUNTAIN BLOCK
SYNCLINE AREA
SECTION 17,500 N.

503

PETRO-CANADA
COAL DIVISION

DATE	JANUARY, 1981
REVISED	JANUARY, 1986
AUTHOR	E.P., W.P. T.C.
DRAFTED	S.K.
SCALE	1 : 5000

MONKMAN COAL PROJECT

HONEYMOON AREA
CROSS SECTION 17,500 N.

Attached to 1983 Report.

PETRO-CANADA

COAL DIVISION

MONKMAN COAL PROJECT

ANNUAL RECLAMATION REPORT - 1983

DO NOT FILM

MONKMAN ANNUAL RECLAMATION REPORT

DO NOT FILM

OPEN FILE

Denis E. Kerfoot

Mine Manager

Monkman Coal Project

FEBRUARY 1984

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CONTENTS

MONKMAN COAL PROJECT

ANNUAL RECLAMATION REPORT - 1983

1. INTRODUCTION

The Monkman Coal Project is a joint venture of Canadian Superior Oil Limited, McIntyre Mines Limited and Petro-Canada Inc. Annual exploration programmes have been undertaken on the property since 1975, with emphasis on the Duke Mountain Block where medium volatile bituminous coal has been demonstrated to exist in substantial quantity.

The 1983 exploration work was carried out during the first quarter of the year when access roads were prepared for a proposed drilling programme in the northern portion of the Duke Mountain area. The drilling programme was subsequently postponed due to unseasonably warm weather, and in June, 1983 a decision was made to suspend operations at the Monkman Camp in response to changes in the anticipated development schedule for the mine. Reclamation requirements for the property were determined as a result of field inspections and consultations in late May and early June with Mr. E. J. Hall, Reclamation Inspector-Technician, Ministry of Energy, Mines and Petroleum Resources. The camp facilities were removed from the site in July, 1983 and the reclamation work was completed in August, 1983.

2. PROPERTY LOCATION (PLAN NO. 1)

The Monkman Property is located in the southern part of the North East Coal Block approximately 630 km northwest of Vancouver, British Columbia.

Access to the property is provided by all-weather, gravel-surface roads from Tupper, B.C. and Beaverlodge, Alberta on Highway 2 which connects Dawson Creek, B.C. and Grande Prairie, Alberta. A third all-weather route, the Fellers Heights Road/Heritage Highway, starts approximately 16 km west of Dawson Creek and passes through the new town of Tumbler Ridge.

The Quasar airstrip is located 15 km by road to the north of the Monkman Camp site and provides year-round access for medium and light aircraft.

3. PROPOSED 1983 DRILLING PROGRAMME (PLAN NO. 2)

The proposed drilling programme covered an area of relatively flat ground on the northeastern side of Duke Mountain at elevations ranging from 925-1125 metres.

The lower slopes of Duke Mountain support a mixed forest cover of lodgepole pine (*Pinus contorta*), trembling aspen (*Populus tremuloides*), black cottonwood (*Populus trichocarpa*) and some immature white spruce (*Picea glauca*). The forested areas to the northwest contain a mixed timber growth of white spruce, lodgepole pine and alpine fir (Abies lasiocarpa). The lower, wet areas in the valley floors support a more-diverse vegetation cover consisting primarily of black spruce (Picca mariana) tamarack (Larix laricina), willow (Salix spp.) and alder (Alnus spp.).

The proposed drilling operations consisted of:

(a) a maximum of 13 open holes to be drilled to depths of up to 400 m for further assessment of coal reserves;

(b) flushing and re-logging of 3 previously - drilled holes (MDD 78-12, MH 80-53 and MH 80-66); and

(c) a total of 6-7 holes to be drilled to depths of 30 m for the installation of piezometers.

The precise number and sequence of drill holes for the further assessment of coal reserves was to be determined on the basis of geological information obtained during the field programme. In order to provide a measure of flexibility to this component of the work programme, a total of 19 drill sites (16 new, 3 existing) were prepared. No clearing was undertaken for the proposed installation of the piezometers.

4. CONSTRUCTION

Access to the locations of the drilling sites was designed to optimize the use of existing trails and roads, thereby minimizing the amount of surface disturbance. A D-6 caterpillar was used to remove the snow from approximately 12.93 km of existing roads and 3 drill sites.

A total of 1.71 km of new access roads was required in support of the proposed 1983 drilling programme. These new routes were traversed in the field to determine that the terrain conditions were suitable. Road development was commenced by slashing to a width of approximately 8 metres, followed by construction of the road surface with a bulldozer. During the latter procedure road grades were maintained at 10% or less to simplify erosion control procedures. In general, all slashed material was cut to a maximum length of 2 metres and wind-rowed with the stumps on the downhill side of the roadway.

The total new construction consisted of 1.71 km (1.36 ha) of roads and 16 drill sites (0.64 ha).

5. RECLAMATION (PLAN NO. 2)

All of the 1983 new construction sites were reclaimed during the months of May and June. A total of 2.00 ha (1.36 ha of roads and

0.64 ha at drillsites) was seeded and fertilized. In addition, 5.04 ha of existing roads (26N, 27D, 27E, 28A, 28S, 28N) and 0.12 ha at three existing drill sites prepared for use in the proposed 1983 exploration programme were reclaimed. Erosion bars were established on the access roads, stream courses were cleared of debris, and a total of 5.16 ha was seeded and fertilized.

The reclamation identified above was directly related to the clearing of new and existing sites in preparation for the proposed 1983 programme. Immediately following the decision to suspend operations at the Monkman Property, aerial and ground inspections of the entire property were made with Mr. E. J. Hall, Reclamation Inspector, Fort St. John on May 25, June 1 and June 3, 1983. As a result of these inspections, additional reclamation work was identified to enhance environmental stability on the property for the term of the project suspension. This work was completed prior to, or immediately following, the removal of the camp as follows:

- "Route 66" - culverts were removed and trenches or cross-ditches were cut at appropriate intervals along a 4 km section of the road to prevent erosion of the road bed. Dead trees in a 0.2 ha area subjected to earlier mudslides were felled. A deep trench was cut near the junction of "Route 66" and the McIntyre Road to divert surface water across the road and into its original channel.

- Adits - Partial subsidence was observed at the entrances to Adits B4-79-1, B1-79-2 and B5-79-3. The areas of subsidence were caved in and excavated with a backhoe and any accessible timbering was removed. The adit entrances were then sealed and backfilled and all disturbed surfaces were graded and seeded.

- Flowing Holes - Attempts were made to plug four holes (MH-80-72; MRC-80-73; MH-81-01 and MH-81-02) from which groundwater was observed to be flowing. Two holes (MH-81-01 and MH-81-02) were plugged but attempts to seal the remaining two holes were unsuccessful.

- Duchess Area - A "Bombi" all-terrain unit was used to provide access to trails 10, 10A and 10B which were seeded by hand.

  A backhoe was used to dig two large trenches across the first 1.5 km of the main access road to the Duchess Area to restrict public use of the road.

- o Fuel Drums - All fuel drums on the property were transported by helicopter to the camp for disposal.

- o Storage Area - All materials stored at the MH-80-23 drill site were removed.

- o Incinerator Site - Refuse pits were backfilled with a backhoe and the incinerator site (2.0 ha) was seeded.

- o Camp Site - all buildings, equipment and perishable materials were removed from the site in July, 1983. The camp foundations and miscellaneous stored materials were enclosed by a barbed-wire fence.

The additional work requirements were completed by August and a final inspection was conducted by Mr. Hall on September 13, 1983.

6. SEED TYPES AND FERTILIZERS

The seed mixtures used in the reclamation procedures were:

(a) Standard Forestry Mix:

Climax Timothy	-	20%
Creeping Red Fescue	-	40%
Red Top Fescue	-	15%
Alsike Clover	-	25%

(b) Alpine Mix:

Alsike Clover	-	15%
Boreal Creeping Red Fescue	-	25%
Meadow Foxtail	-	25%
Climax Timothy	-	20%
Kentucky Blue Grass	-	5%
Carlton Bromegrass	-	10%

Fertilizer Mix used consisted of:

Nitrogen	-	10 parts
Phosphates	-	30 parts
Sulphur	-	10 parts

In the 1983 reclamation programme, the Alpine Mix was used at the higher elevations in the Duchess area and the Standard Forestry Mix was used at all other sites.

7. RECLAMATION COSTS

The costs involved in the 1983 reclamation programme were as follows:

Equipment and Fuel	6,360.00
Helicopter and Fuel	4,406.14
Seed and Fertilizer	1,425.80
Contractor Labour	8,270.00
Labour Accommodation	3,575.00
TOTAL:	$24,036.94

8. SUMMARY

Reclamation work at the Monkman Property in 1983 included the restoration of areas disturbed in preparation for a proposed exploration programme and measures designed to achieve environmental stability on the property for the term of the project suspension.

Reclamation on the Monkman Property is now considered to be current. Periodic inspections will be made in consultation with the local office of the Ministry of Energy, Mines and Petroleum Resources, to ensure that environmental stability has been achieved.

PETRO-CANADA MONKMAN COAL PROJECT

ROADS AND DRILL SITES - 1983 RECLAMATION REPORT

NAME	ROADS EXISTING LENGTH (km)	ROADS EXISTING AREA (ha)	ROADS NEW LENGTH (km)	ROADS NEW AREA (ha)	DRILL SITES DRILL HOLE	DRILL SITES EXISTING AREA (ha)	DRILL SITES NEW AREA (ha)	RECLAMATION AREA RECONTOURED (ha)	RECLAMATION AREA SEEDED AND FERTILIZED (ha)	RECLAMATION TOTAL AREA WORKED (ha)
1983 PROGRAMME										
25A	0.08	0.06	0.25	0.20	II-19		0.04		0.24	0.24
26 SOUTH	2.68	2.14			II-14		0.04		0.04	0.04
26 NORTH	0.91	0.73			I-3		0.04		0.77	0.77
27	1.43	1.14							-	-
27A	0.75	0.60			I-9		0.04		0.04	0.04
27B			0.13	0.10	II-20		0.04		0 14	0.14
27C	0.40	0.32			I-8	0.04			0.04	0.04
27D	0.58	0.46			I-6	0.04			0.50	0.50
27E	0.21	0.17			I-7	0.04			0.21	0.21
27F			0.74	0.59	I-4		0.04		0.63	0.63
					II-5		0.04		0.04	0.04
28 SOUTH	2.71	2.17			II-16		0.04		2.21	2.21
					II-18		0.04		0.04	0.04
28 SOUTH	1.64	1.31			I-10		0.04		1.35	1.35
					II-11		0.04		0.04	0.04
28A	0.25	0.20			II-17		0.04		0.24	0.24
28B			0.48	0.38	I-1		0.04		0.42	0.42
					II-12		0.04		0.04	0.04
28C			0.11	0.09	II-13		0.04		0.13	0.13
ROUTE 66	1.29	1.03			I-2		0.04		0.04	0.04

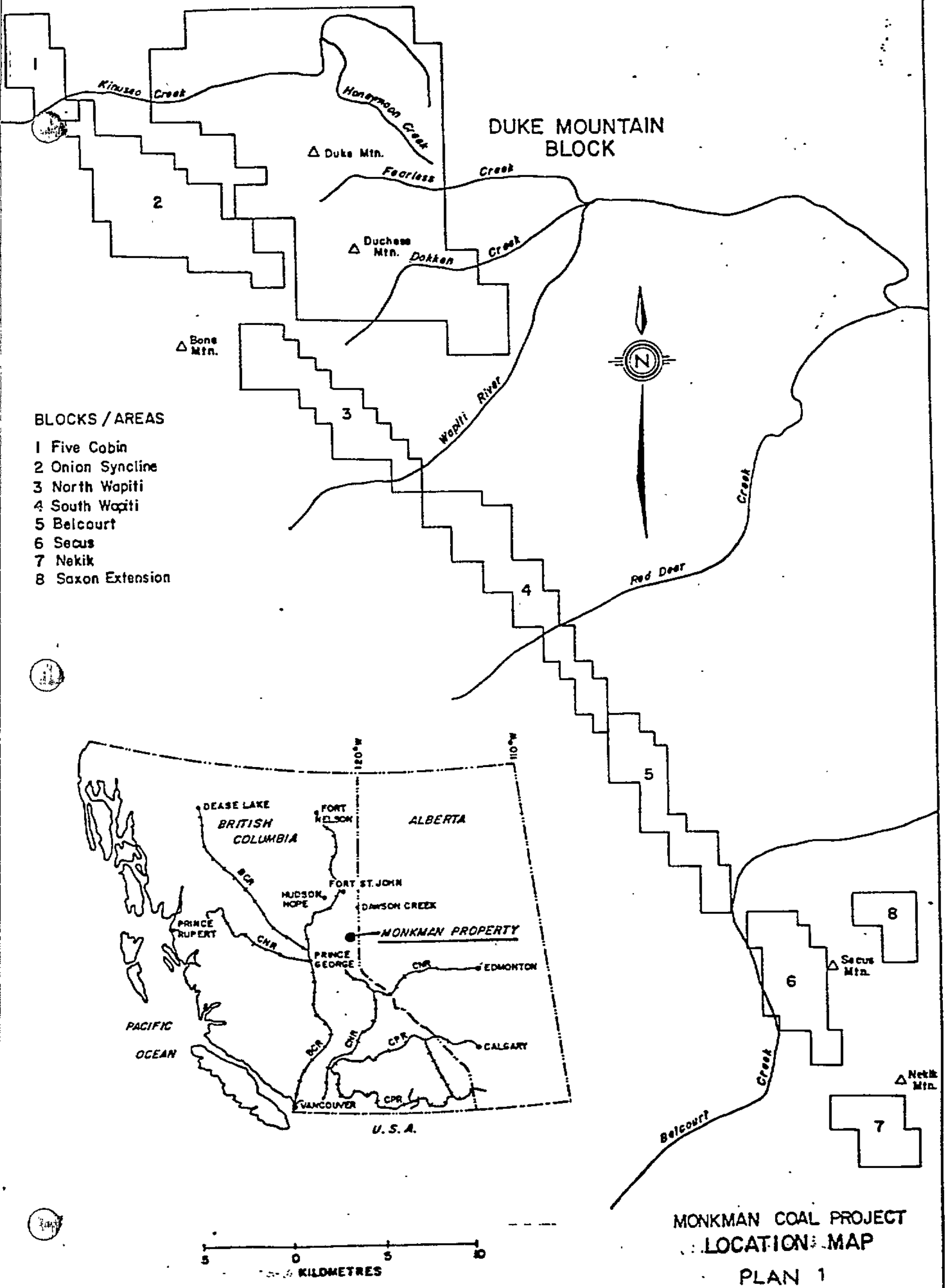
PETRO-CANADA MONKMAN COAL PROJECT

ROADS AND DRILL SITES - 1983 RECLAMATION REPORT

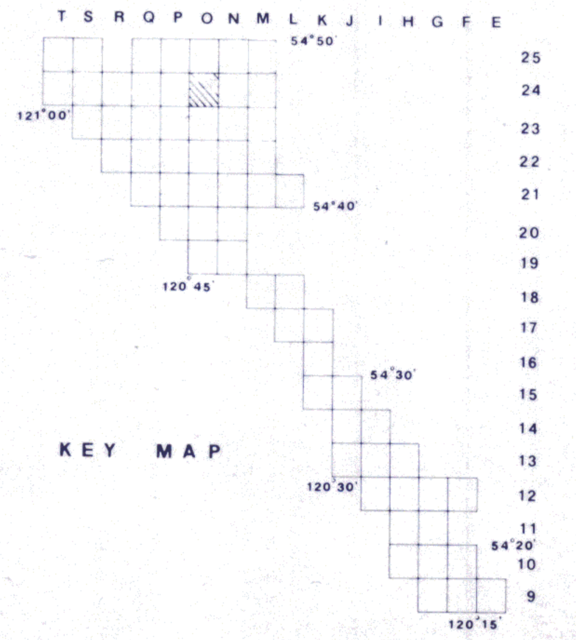
NAME	ROADS				DRILL SITES			RECLAMATION		
	EXISTING		NEW		DRILL HOLE	EXISTING	NEW	AREA RECONTOURED (ha)	AREA SEEDED AND FERTILIZED (ha)	TOTAL AREA WORKED (ha)
	LENGTH (km)	AREA (ha)	LENGTH (km)	AREA (ha)		AREA (ha)	AREA (ha)			
OTHER										
2A	0.40	0.32							0.32	0.32
10A	2.06	1.65							1.65	1.65
10A	0.80	0.64							0.64	0.64
10B	0.60	0.48							0.48	0.48
ADITS								1.00	1.00	1.00
INCINE-RATOR SITE								2.00	2.00	2.00
TOTALS	16.79	13.42	1.71	1.36		0.12	0.64	3.00	13.25	13.25

PETRO-CANADA MONKMAN COAL PROJECT
1983 RECLAMATION SUMMARY

TYPE OF DISTURBANCE	LENGTH (km)	AREA (ha)	RECLAMATION				BALANCE
			RECONTOURED	SEEDED & FERTILIZED	NATURAL	TOTAL	
NEW ROADS	1.71	1.36	0	1.36		1.36	0
EXISTING ROADS	16.79	13.42	0	8.13	5.29	13.42	0
ADITS	-	1.00	1.00	1.00		1.00	0
NEW DRILL SITES	16 (1)	0.64	0	0.64		0.64	0
EXISTING DRILL SITES	3 (1)	0.12	0	0.12		0.12	0
OTHER (2)	-	2.00	2.00	2.00		2.00	0
TOTAL	18.50	18.54	3.00	13.25	5.29	18.54	0



MONKMAN COAL PROJECT
LOCATION MAP
PLAN 1



LEGEND

Improved road	
Secondary road	
Track or trail	
Cut line	
Tree area	
River	
Steam	
Intermittent stream	
Swamp	
Contours	1300
Horizontal control	△ 390
Vertical control	○ V 1372.1
Spot elevation	1247.9
Iron Pin	◇ IP

CONTOUR INTERVAL: 5 METRES
DATE OF PHOTOGRAPHY: SEPTEMBER 1975
DATE OF SURVEY: 1977 - 1978
DATE OF MAPPING: 1977 - 1978

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.

LEGEND

- Existing Drill Holes
- Existing Access
- Proposed Rotary Hole Location
- Location Of Existing Hole To Be Flushed And Relogged Geophysically
- I I Priority Of Hole And Sequence In Program
- New Access To Be Built

0 50 100 200 300 400 500
METRES

503

PETRO-CANADA EXPLORATION, INC. COAL DIVISION	
MONKMAN COAL PROJECT	Date JANUARY 12, 1983
1983 PROPOSED DRILL PROGRAM DUKE PIT AREA	Revised
	Author
	Drafted S.K
	Scale 1: 5,000
	O 24

R.M. HARDY & ASSOCIATES LTD

PLAN No. 2.


DUKE MOUNTAIN
DUCHESS MOUNTAIN
KINUSEO CREEK
BASELINE 8,000 E
INCINERATOR SITE
CAMP AREA
STORAGE AREA
TOPOGRAPHIC LEGEND
MAIN ACCESS ROAD — DRY WEATHER
EXPLORATION ROAD
EXPLORATION TRAIL
AIR STRIP
SEISMIC LINE, CUT LINE
POWER TRANSMISSION LINE
RIVER
STREAM
LAKE
SWAMP
CONTOURS
DEPRESSION CONTOUR
GEOLOGICAL LEGEND
LOWER CRETACEOUS
Ksh SHAFTESBURY FORMATION
Kb BOULDER CREEK FORMATION
Kh HULCROSS FORMATION
Kg GATES FORMATION
Kmb MOOSEBAR FORMATION
Kgt GETHING FORMATION
Kcd CADOMIN FORMATION
FORT ST. JOHN GROUP
BULLHEAD GROUP
JURASSIC — CRETACEOUS
JKmi MINNES GROUP
SYMBOLS
PROPERTY BOUNDARY
GEOLOGICAL CONTACT
DIP AND STRIKE: REGULAR
VERTICAL
HORIZONTAL
OVERTURNED
THRUST: FLAGS SHOW DIP DIRECTION
AREA OF 20m+ OVERBURDEN
ANTICLINE, SYNCLINE
DRILL HOLE COLLAR
ADIT
PIT AREAS
KEY MAP
SURVEY NOTE
Control Survey was carried out for Photogrammetric Mapping to cover MONKMAN COAL PROJECT COAL LEASES. Mapping outside of the Coal Leases was taken from existing N.T.S. maps, and 25 metre contour intervals were interpolated.
CONTOUR INTERVAL 25m
R.M.HARDY & ASSOCIATES LTD.
1978
SCALE
503
PETRO-CANADA
COAL DIVISION
DATE DECEMBER, 1981
REVISED DECEMBER 1983
AUTHOR
DRAFTED S.R.T., S.K.
SCALE 1:25,000
MONKMAN COAL PROJECT
1983 RECLAMATION SUMMARY
ACCESS ROUTES
CROSS-DITCHES
DRILL SITES
FLOWING HOLES
ADITS
PLAN NO. 3