PINE PASS PROJECT

N.E. B.C.

COAL EXPLORATION 1989

Coal Licenses: COAL LICENSES 6262 & 6263 OF GROUP #369
PEACE RIVER LAND DISTRICT,
NORTHEASTERN B.C.

B.C. COAL LICENSES HELD BY SHELL
CANADA LIMITED OPERATED BY CROWS
NEST RESOURCES LIMITED

CONFIDENTIAL

National Topographic Series: 93 O/9 (MOUNT HULCROSS)

Latitude and Longitude: 55° 37' NORTH LATITUDE
122° 20' WEST LONGITUDE

Author: B. McKINSTRY

Submission Date: May 14, 1989

Work Done: August 1-27, 1989

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BWM2/al.1

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SUMMARY

The Pine Pass License Block consists of 15 coal licenses within Group #369.

During August 1989, eleven diamond drill holes were completed within the property for a total depth of 1095.5. The purpose of the drilling was to verify seam continuity and thickness from previous surface trenching or drilling. Results tended to confirm existing data. Of continued importance, the results did not conflict with the 1983 structural geology re-interpretation of east dipping thrust faults within the coal bearing Gething Formation on the property. Coal samples from the drilling program were submitted for analysis. Quality determinations indicate there are relatively thick low raw-ash (less than 15%) metallurgical/thermal coal seams in localized open-pit mineable situations within the license boundaries. The difficulty in seam correlation, steeply dipping seam altitudes, thickness variability and complexity of geology necessitate considerable angled drilling in future to properly assess the economic potential of the property.

1.0 INTRODUCTION

The Pine Pass property held by Shell Canada Resources Limited and operated by Crows Nest Resources Limited (a wholly owned subsidiary) consists of 15 coal licenses covering 4,395 hectares. It is located 70 km west of Chetwynd along the John Hart Highway.

Field work in 1989 consisted of drilling eleven shallow core holes. The results substantiated the 1983 re-interpretation and increase the volume of reliable coal quality data. In particular, it appears that certain seams of mineable thickness contain less than 10% raw ash in areas of open pit potential. However, complex geological structure, steeply dipping seams, seam continuity and correlation as well as a lack of marker units allows for difficult exploration on this property.

1.1 COAL LAND TENURE

Shell Canada Resources Limited holds 15 coal licenses (Group #369) covering 4,395 ha of land for the Pine Pass project in the Peace River Land District, Northeastern British Columbia (Enclosure 1). The property is operated by Crows Nest Resources Limited, a wholly owned subsidiary of Shell Canada Resources Limited.

1.2 LOCATION, GEOGRAPHY AND PHYSIOGRAPHY

The Pine Pass property is located contiguously north and south of the Pine River, about 45 air kilometers west of Chetwynd and 55 air kilometers southwest of Hudson Hope. The property is centered approximately 55° 37' North Latitude and 122° 20' West Longitude on N.T.S. Topographic sheet 93 O/9.

The coal licences under investigation are situated on the eastern slope of Mount Bickford on the north side of the Pine River. The area is characterized by relatively low, rounded, northwest-southeast trending ridges and valleys dissected by the northeast-southwest 1.5 kilometers wide Pine River Valley. The ridges are separated by creek incisements (Cleveland Creek, Fisher Creek and Noman Creek - in the north; and Willow Creek, Falling Creek and Beaudette Creek - in the south, all of which are tributaries of the Pine River).

Elevations throughout the licence area range from 655 meters in the Pine River Valley, to 1570 in the northwest part of the Noman Creek area.

The area is forested by poplar and some birch in lower elevations; fir and spruce are predominant at higher elevations. In wet areas willows and devils club are common. The timberline is approximately 1300 meters above sea level.

1.3 ACCESS

The property is accessible by the paved all-weather Highway #97 (John Hart Highway) that connects Prince George to Dawson Creek via Chetwynd. The town of Chetwynd is about 70 road kilometers east of the property.

The British Columbia Railway line is located south of the Pine River and connects the project area with the Vancouver and Prince Rupert sea ports. The two deep sea ports are both about 1200 kilometers from the licence block.

The project area is accessible on seasonal roads constructed during past and present programs of coal exploration, power line construction and logging operations.

In addition to the transportation facilities available, this property also contains power sources in the forms of natural gas and electricity. A natural gas pipeline operated by Westcoast Transmission Ltd. follows the John Hart Highway across the middle of the property. Two main B.C. Hydro power transmission lines traverse the property; one follows the Pine River valley, the other traverses from the north, along Fisher Creek then crosses the Noman Creek block to follow the Pine River to the southeast.

2.0 EXPLORATION

2.1 SUMMARY OF PREVIOUS WORK

Initial coal exploration in the area was conducted from 1946 to 1951. The British Columbia Department of Lands and Forests carried out a coal exploration program that included geological mapping, trenching and diamond drilling. Results of the exploration programs were used to estimate reserves of mineable coal that might be available contiguous to a proposed route of the Pacific Great Eastern Railroad into the Peace River District. Most of this work was concentrated in the following three areas: (1) Hasler Creek; (2) Willow Creek; and (3) Noman Creek. Since then a number of programs have been conducted in the area by various companies and governmental agencies.

A comprehensive review of this data can be found in White & Fietz, 1983.

2.2 1989 EXPLORATION PROGRAM

2.2.1 Scope and Objectives

A review of data collected during the 1983 and 1984 field seasons suggested that seams thicker than 2 meters often had ash contents low enough to allow for extraction without attendant coal cleaning. In addition, sulphur values are generally less than .80% and associated heat content is very high. Clearly, coal having these qualities are a desirable thermal export product. An analysis of the geology on licenses 6262 and 6263 suggested the following items as desirable for further investigation:

(a) Pursue on strike and down-dip extensions of Seam I, a 3 meter thick seam found close to the Moosebar-Gething contact.

(b) Obtain a better definition of the stratigraphy of the lower part of the Gething, particularly in the vicinity of hole 84-05, where numerous relatively thick low ash seams have been drilled.

(c) Gain a clearer understanding of the Gething formation stratigraphy in the Pine Pass area.

(d) Initiate development of a structural model encompassing the deformational elements controlling geological interpretation at Pine Pass.

2.2.2 Exploration Program

In August 1989 Mr. B. McKinstry supervised the drilling of eleven diamond holes totalling 1095.5 meters in depth. Upon completion of drilling, the holes were logged using downhole geophysical tools where feasible. The full length of each hole was cemented following the geophysical logging (Enclosure 12). In addition, the core recovered was logged and sampled (Enclosure 8). Subsequently, the coal samples were submitted to Loring Laboratories, Calgary, Alberta for assay (Enclosure 9). Finally, the drill sites were surveyed (Enclosure 11). All core has been stored on-site beside a small road spur near borehole 89-08. Access to most holes was gained through the use of existing exploration roads. However, .24 kilometers of new road was constructed to gain access to boreholes 89-04, 89-05 and 89-06 inclusive. A detailed summary of work and approximate expenditure for work performed upon the licenses is shown in Enclosure 2.

3.0 GEOLOGY

A review of the Pine Pass area geology as outlined in White & Fietz, (1983) follows:

3.1 REGIONAL GEOLOGY (Enclosure 3)

The area under consideration lies within the Rocky Mountain Foothills and trends northwesterly along the front of the Rocky Mountains in Northeastern British Columbia. The strata outcropping in the Pine River Valley area are of Mesozoic age, from Middle Triassic to Upper Cretaceous, and were deposited on the shelf of a miogeosyncline. These formations thin eastwards across the Foothills and into the Plains.

Triassic strata are marine in origin and consist of limestone, calcareous shale, siltstone and sandstone. Jurassic sediments of sandstones, shales and coal measures marked the end of marine deposition.

The coal bearing beds of Lower Cretaceous age outcrop extensively along the foothills of Alberta and Northeastern British Columbia. These sediments have been assigned to the Blairmore, Bullhead and Fort St. John groups. During the Columbian Orogeny these sediments were folded, thrusted, and uplifted into faulted, elongate, plunging anticlines and synclines.

The intensity of deformation varies from one region to another. The Peace River and Pine River areas are characterized by relatively broad synclines between sharply faulted anticlines. The strata are exposed in a series of folds and thrust belts trending northwest-southeast.

Regional stratigraphic studies have been conducted by the Geological Survey of Canada and published by Stott, 1982 (Table 1).

Several local stratigraphic and mapping projects have been completed within the area - both by the Geological Survey of Canada and by the British Columbia Ministry of Energy, Mines and Petroleum Resources. These are documented by Hughes (1964, 1967), MeLearn and Kindle (1950), McKechnie (1955) and Spivak (1944).

3.2 STRATIGRAPHIC DESCRIPTIONS

3.2.1 Bullhead Group

The Bullhead Group contains two formations: A basal conglomerate, the Cadomin Formation and the coal-bearing Gething Formation.

TABLE I

	HUGHES 1964	STOTT 1982	
FORT ST. JOHN GROUP	MOOSEBAR FM	MOOSEBAR FM	FORT ST. JOHN GROUP
CRASSIER GROUP	GETHING FM	GETHING FM	BULLHEAD GROUP
	DRESSER FM	CADOMIN FM	
		UNCONFORMITY	
	BRENOT FM	BICKFORD FM	MINNES GROUP
DISCONFORMITY			
BEAUDETTE GROUP	MONACH FM	MONACH FM	
	BEATTIE PEAKS FM	BEATTIE PEAKS FM	
	MONTEITH FM	MONTEITH FM	

3.2.1.1 Cadomin Formation

The laterally extensive (Peace River to Blairmore, Alberta) Cadomin Formation forms a distinctive marker in Lower Cretaceous sediments. In its type region near Cadomin Alberta, it is typically a massive resistant unit of conglomeratic, light to medium-grey weathering sandstone. The resistant nature of the Cadomin makes it a good marker for geologic mapping, as it often forms ridges or stands in relief from other strata in the area.

An erosional unconformity at the base of the Cadomin Formation, separates it from the underlying Minnes group. Although there are local angular relationships with the underlying beds the rocks on either side of the contact are generally structurally concordant (Stott, 1971).

3.2.1.2 Gething Formation

The Lower Cretaceous Gething Formation of the Bullhead Group is underlain by the Cadomin Formation and overlain by the Moosebar Formation in the foothills, Peace River area. It is comprised of a thick sequence of predominantly non-marine fine-grained sediments and coal. Shales, siltstone, fine-grained sandstones and coal seams are the characteristic lithologies found in the formation.

In the Peace and Pine River areas the Gething Formation is 450 to 550 meters thick. The section in the Peace River Canyon as measured by Stott (1969) is 550 meters thick. However, the thickest accumulation of Gething strata has been measured in the Carbon Creek area at 1036 meters (Gibson, 1985).

Numerous coal seams occur within the Gething Formation. Their best development appears to be in the Pine River - Moberly - Carbon Creek areas. To the northwest and southeast along the foothills coal belt, the seams generally are thinner and more discontinuous. The coal of the Gething Formation is reported to be of low to medium volatile bituminous rank with fair to good coking characteristics.

3.2.2 Moosebar Formation

The Gething Formation is conformably overlain by the Moosebar Formation of the Fort St. John Group.

The predominantly marine sediments consist of dark grey mudstones and shales with minor beds of argillaceous sandstone and ironstone bands. Thin layers of bentonite can occasionally be found.

The upper contact of the Moosebar Formation is gradational from marine shales through a sequence of interbedded shales and sandstones (passage beds) into the basal sandstone member of the Gates Formation. The contact is placed within the passage beds at the base of the first thick succession of sandstone.

The lower contact, with the Gething Formation is abrupt and is easily picked on downhole geophysical logs. The contact is commonly marked by a one to two meter pebble conglomerate or sandstone (See BH89-01). It is interpreted as representing the initial deposits of the transgressing Moosebar Sea, marking the end of a prolonged period of alluvial deposition in the area. This pebble conglomerate or pebble sandstone is the equivalent of the Bluesky Formation found in the plains and

is therefore commonly called the Bluesky Conglomerate. The five meters above the conglomerate is generally siltier than the main body of the Moosebar and contains a glauconitic zone near the top.

The Moosebar Formation is generally recessive, with outcrops only exposed in road cuts and stream and river banks.

3.3 PROJECT GEOLOGY

3.3.1 Stratigraphy

The Noman Creek area is underlain by strata of the Cadomin, Gething and Moosebar Formations. Numerous thrust repeats and poor exposure on the property have made measurement of the complete Gething section difficult. It is inferred from other areas however, that the Gething is approximately 500 meters thick in the license area. Exploration to date has concentrated on the upper 300 meters of section.

The Cadomin Formation outcrops near Cleveland Creek at the west edge of the property. In 1983 an excellent exposure of Cadomin strata was mapped beneath the power line on coal license 6263.

The Moosebar Formation outcrops along Fisher Creek. In addition, it has been exposed in various backhoe trenches. During 1983 the Moosebar was encountered in trenches TR83-11 and TR83-7 and in several "pot-holes" excavated in the logged out area on coal license 6265. In addition, drill hole PP83-1 was collared in Moosebar shales and cored ±22 meters of shale and mudstone, and ±3 meters of

Bluesky Conglomerate. More recently, this contact has been cored in boreholes 89-01, 89-04 and 89-06. In addition, the Bluesky Conglomerate has been intersected in trenches PN-E-1-81, PN-E-5-81, PN-E-6-81 and 1983 trench TR83-8. On the Pine Pass Property the Bluesky is a one to two meters thick, hard, tightly packed pebble conglomerate with sharp upper and lower contacts.

During the 1989 drilling program ±1095 meters of Gething strata were cored. The strata encountered were generally non-descript siltstones, mudstones and fine-grained sandstones with several coal and coaly shale zones.

Within these strata occur several tonstein bands. These fine-grained sediments are soft, light to medium grey and have a flaky texture. Probably of volcanic origin, they may be useful as marker beds within the Gething. One Tonstein in particular, a triple band in Seam E (Fisher Creek Tonstein) has been correlated over a large area in N.E. B.C. (Kilby, 1983), and may be present in PP83-02. As well, tonstein bands are interbedded with thin coal seams in the Seam F coal zone (boreholes 89-05 and 89-07).

3.3.2 Structural Geology

As discussed in the regional geology section of this report, the Cretaceous strata have been folded, thrusted and uplifted into faulted, elongate, plunging anticlines and synclines. Locally, the Gething formation within the Pine Pass property comprise part of the Fisher Creek syncline, a broad open structure with steeply dipping limbs. To date, most exploration has occurred on the west limb of this structure and careful examination of measured bedding attitudes as well as construction of selected cross-sections (Enclosure 6) suggest that a series of monoclinal rolls are superimposed on the west limb of the syncline. These rolls may

be related to the numerous west directed reverse faults developed out of the core of the syncline. These faults repeat Gething stratigraphy as exemplified by the structure contour map of Seam 'I' in coal licence #6262 (Enclosure 7). It appears that the faults trend in a northwest direction at an acute angle of about 10° to local bedding traces. A fault of significant displacement is located within an un-named drainage midway between Cleveland and Fisher Creeks on the west half of coal license #6262 (Enclosure 4). This high angle fault makes correlation of coal seam lithologies difficult between license 6262 and 6263. However, the suspicion is that this fault has repeated almost the entire Gething stratigraphy. A subsidiary syncline is developed on the west limb of this fault and may offer a sense of displacement direction for the feature. To date, little is known of the structural complexity north of coal license 6262 and 6263.

4.0 COAL

4.1 COAL GEOLOGY

Within the Fisher Creek syncline, only the Gething Formation contains economic coal seams. Coal seams have been reported in the Cadomin formation, but these are not thought to be economically feasible. Past evaluations and/or correlations of the coal seams keyed on two relatively thick lower coaly horizons known as seams '78' and '76'. Drilling information from 1983, 1984 and this past year allow for a revision of the coal stratigraphy east of the steeply dipping fault between Cleveland and Fisher Creek. Enclosure 5 graphically illustrates the coal stratigraphy from seam A to the Moosebar Formation contact. Seam A is thought to be the previously named seam '78'. The seam nomenclature is a change from that proposed in the 1984 report and places seam 'A' as the lowest-most coal seam in this section. This stratigraphy is subject to revision as drilling has yet to penetrate to the Cadomin Formation contact.

4.2 COAL QUALITY

In general, Seams A, B, C, I, and J all exhibit low raw ash values. Selective careful mining practices could extract these seams for marketing without further processing. Seams D (upper and lower), E, F, G, and H all require additional processing to obtain a low ash product. Raw sulphur values are directly related to stratigraphic position with sulphur content increasing towards the marine Moosebar formation contact. Sulphur values range from .3% to 1.5% on an air-dried basis. As expected,

there is a direct relationship between ash and calorific value which is illustrated in Enclosure 10. There is no clear relationship between depth of cover and free swelling index (coking ability). This is also true of the relationship between raw ash and FSI. Coking capability within individual seams appears to be dependent on variable oxidation levels and particular care will be required to define these boundaries of oxidation within each seam.

5.0 CONCLUSIONS AND RECOMMENDATIONS

During 1983, the data base of the Noman Creek license block was re-evaluated and re-interpreted, (White & Fietz, 1983). The review of data resulted in a modified set of geological maps, cross-sections and a revised structural style and seam nomenclature. A limited drilling program was initiated in 1984 and again in 1989 to substantiate this new interpretation and provide additional coal quality data. Although the drilling has reinforced the new interpretation, it has become clear that much additional drilling is required to begin understanding the complexity of seam correlation and structural geology. The lack of recognizable marker horizons in the Gething, other than the tonstein bands in Seams E and F, make the work that much more difficult. However, the presence of reasonably thick, low raw ash, medium volatile seams in potentially low ratio open-pit areas warrants further exploration for the Noman Creek property. However, this must be tempered with the knowledge that many of these "low raw ash" seams show variable levels of oxidation suggesting that significant volumes of extracted coal will be non-coking.

6.0 BIBLIOGRAPHY

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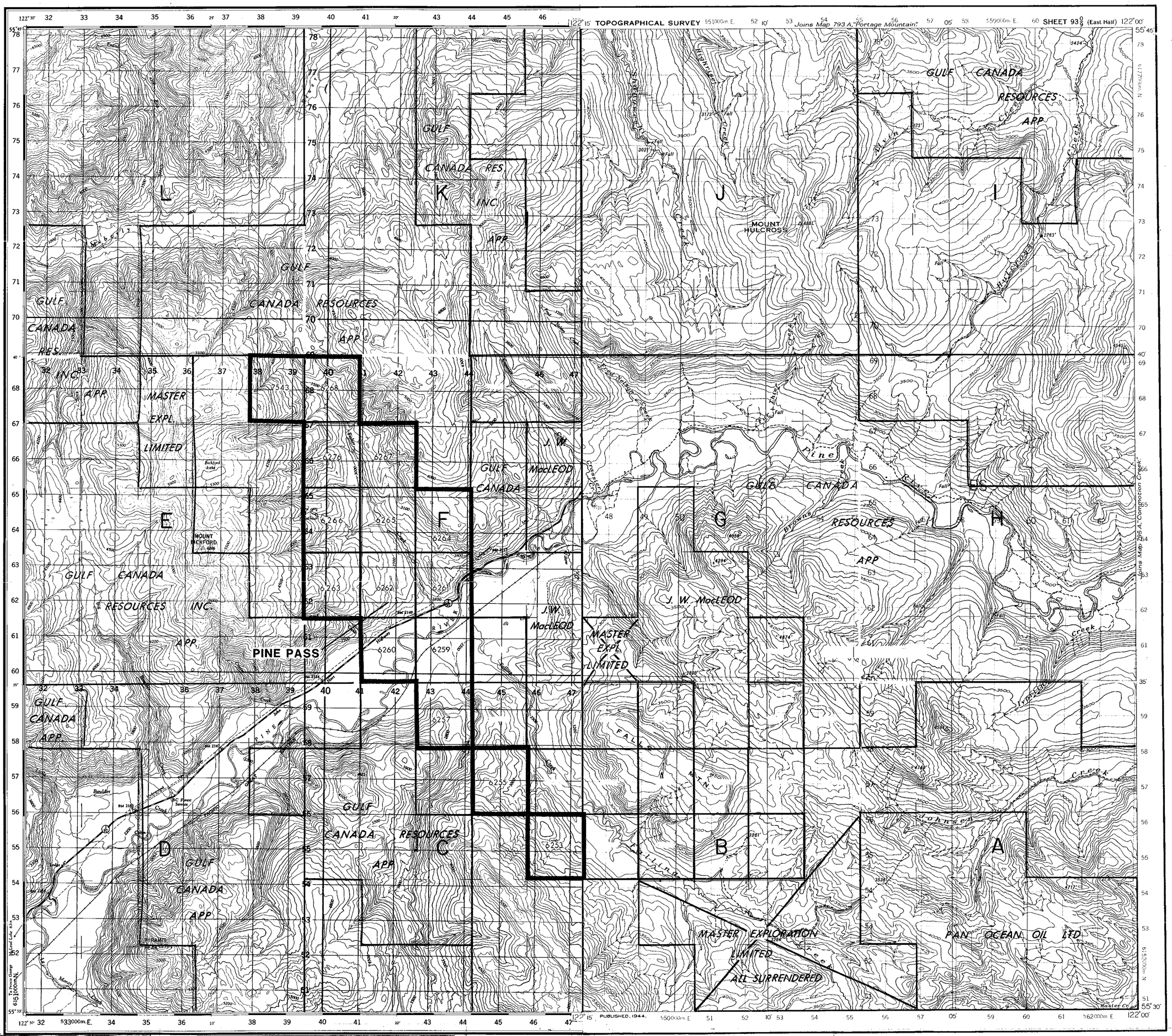
NATIONAL TOPOGRAPHIC SYSTEM 1:50,000 CANADA SECOND EDITION

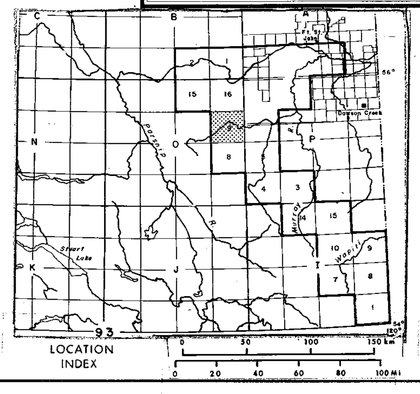
DEPARTMENT OF MINES AND RESOURCES

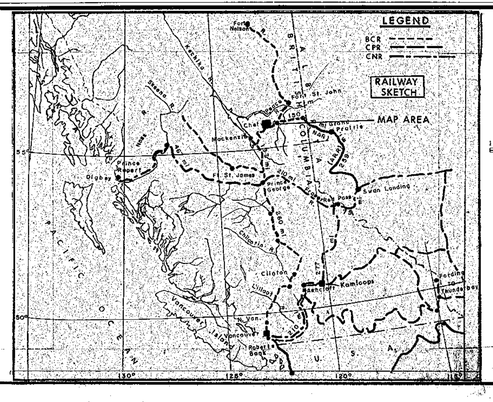
MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY

PROVISIONAL MAP







MOUNT HULCROSS

PEACE RIVER DISTRICT

BRITISH COLUMBIA

SCALE 1:50,000

1.25 inches to 1 mile approximately

Approximate magnetic declination, 29°32' East.

Copies may be obtained from the Map Distribution Office, Department of Mines and Technical Surveys, Ottawa.

INDEX TO ADJOINING SHEETS

930/1N CARBON CREEK	930/1M PORTAGE MOUNTAIN	93P/13 MOBERLY LAKE
930/2G CALLAZON CREEK	930/2F MOUNT HULCROSS	93P/12 COMMODORE CREEK
930/7 AZOUZETTA LAKE	930/8 LE MORAY CREEK	93P/5 BURNT RIVER

93 O/9 WEST

Crows Nest Resources Limited

MOUNT HULCROSS

NORTHEASTERN B.C.
PEACE RIVER LAND DISTRICT

COAL LAND DISPOSITION MAP

SHELL - CNRL. LICENCES : PINE PASS
NTS 93-O-9 BLK. B,C,F,G
MAP 1 of 1

NTS 930/9

AUTHOR: B. RYAN	SCALE: 1:50 000	ENCLOSURE No: 1 (one)
DATE: FEB. 1979	REVISED: 86-04	DRAWING No: RM5H30
To Accompany		

757

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources

APPLICATION TO EXTEND TERM OF LICENCE

I, Crows Nest Resources Limited (Name) agent for Shell Canada Limited (Name)

P.O. Box 2699, Station 'M' (Address) — 400 - 4th Avenue S.W. (Address)

Calgary, Alberta T2P 3Y9 — Calgary, Alberta

Valid FMC No. 207568

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). Group 369

for a further period of one year.

2. Property name Pine Pass

3. I am allowing the following Coal Licence(s) No(s). to forfeit none

4. I have performed, or caused to be performed, during the period July 28 to August 23, 1989, work to the value of at least $ 170,628.28

on the location of coal licence(s) as follows:

CATEGORY OF WORK

	Licence(s) No(s).	Apportioned Cost
Geological mapping		
Surveys: Geophysical		
Geochemical		
Other	6262, 6263	$ 5,725.00
Road construction	6262	21,761.30
Surface work		
Underground work		
Drilling	6262, 6263	101,197.21
Logging, sampling and testing	6262, 6263	26,027.30
Reclamation	6262, 6263	6,929.10
Other work (specify)	Truck Rental	4,125.86
Off-property costs		4,862.51

5. The work performed on the location(s) is detailed in the attached report entitled Pine Pass 1989 Geological Assessment Report

MAY 14, 1990 (Date)

(Signature)

Staff Geologist (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

757

GEOLOGICAL MAPPING Yes ☐ No ☒

	Area (Hectares)	Scale	Duration
Reconnaissance			
Detail: Surface			
Underground			
Other* (specify)			

Total Cost $

GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes ☒ No ☐

Method
Grid
Topographic
Other* (specify) Survey borehole locations

Total Cost $ 5,725.00

ROAD CONSTRUCTION Yes ☒ No ☐

Length 240m Width 7m
On Licence(s) No.(s) 6262
Access to Drill sites

Total Cost $ 21,761.30

SURFACE WORK Yes ☐ No ☒

	Length	Width	Depth	Cost
Trenching				
Seam Tracing				
Crosscutting				
Other* (specify)				

Total Cost $

UNDERGROUND WORK Yes ☐ No ☒

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits					
Other workings*					

Total Cost $

DRILLING Yes ☒ No ☐

	Hole Size	No. of Holes	Total Metres	Cost
Core: Diamond				
Wireline	NQ	11	1095	$101,197.21
Rotary: Conventional				
Reverse circulation				
Other* (specify)				

Contractor Tonto Drilling Ltd.
Where is the core stored? On property

Total Cost $ 101,197.21

LOGGING, SAMPLING AND TESTING Yes ☒ No ☐

Lithology:	Drill samples	☐	Core samples	☒	Bulk samples	☐
Logs:	Gamma-neutron	☒	Density	☒		
Other* (specify)						
Testing:	Proximate analysis	☐	FSI	☒	Washability	☐
	Carbonization	☐	Petrographic	☒	Plasticity	☒
Other* (specify)						

Total Cost $ 26,027.30

RECLAMATION Yes ☒ No ☐

Details See Pine Pass Reclamation Report - 1989

Total Cost $ 6,929.10

OTHER WORK (Specify details) Yes ☒ No ☐ Cost

Truck rental 4,125.86

Total Cost $

OFF-PROPERTY COSTS Yes ☒ No ☐

Details Accommodation, shipping charges, meals, etc.

Total Cost $ 4,862.51

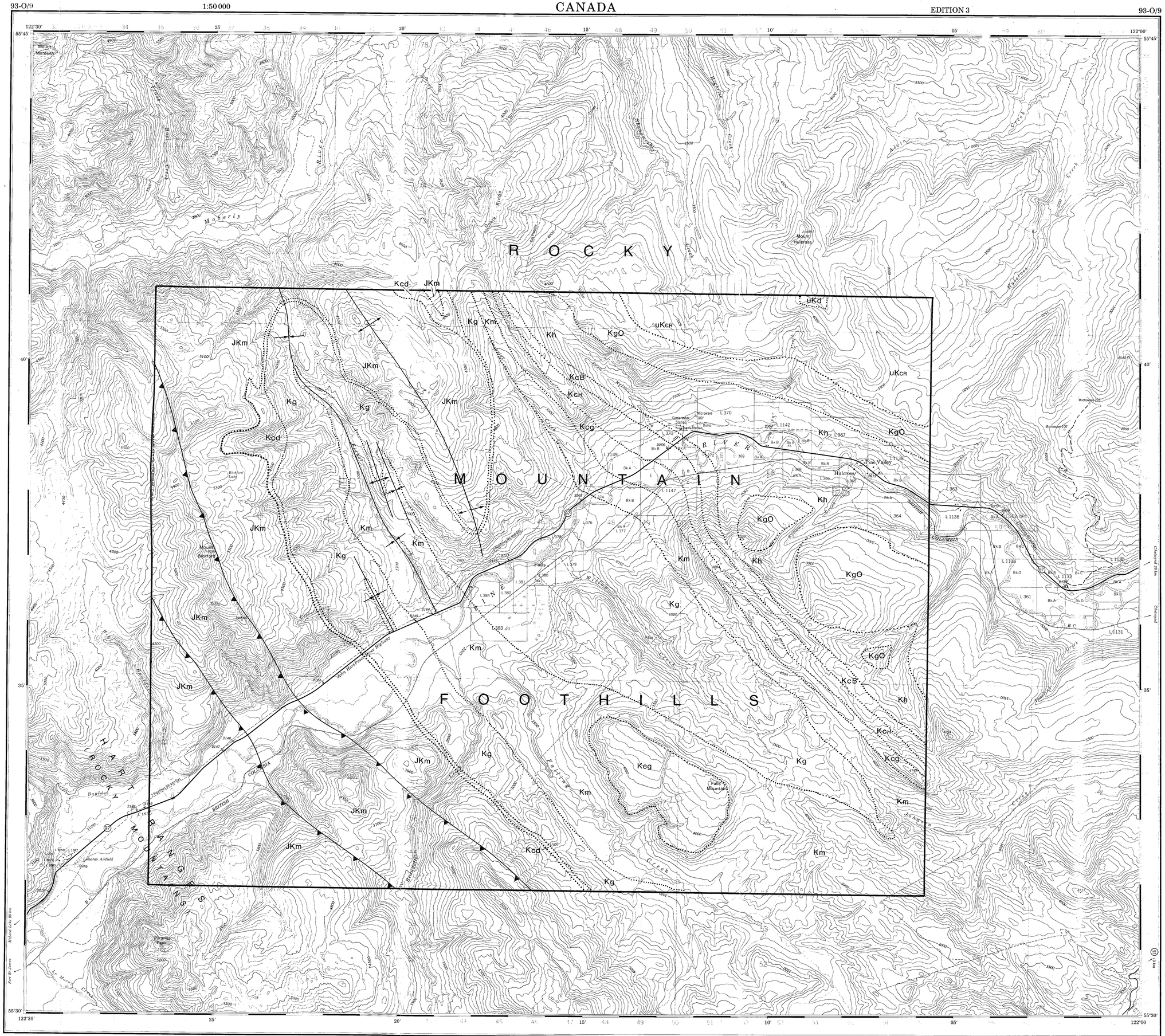
Total Expenditures $ 170,628.28

MAY 14 1990 (Date)

(Signature)

Staff Geologist (Position)

*A full explanation of other work is to be included.



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Copies may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, or your nearest map dealer.

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Roads:	Routes:		
hard surface, all weather	pavée, toute saison	dual highway 2 roadways separate	more than 2 lanes plus 2 or 2 roadways
hard surface, all weather	pavée, toute saison	2 lanes	less than 2 lanes
loose or stabilized surface, all weather	gravier, agglomeré, toute saison	2 lanes	more than 2 lanes
loose surface, dry weather	de gravier, temps sec	2 lanes or more	less than 2 lanes
unclassified streets	rues hors classe	2 lanes or more	more than 2 lanes
cart track	de terre		
trail, cut line or portage	sentier, percée ou portage		

FOR COMPLETE REFERENCE SEE REVERSE SIDE POUR UNE LISTE COMPLÈTE DES SIGNES, VOIR AU VERSO

MOUNT HULCROSS

PEACE RIVER LAND DISTRICT

BRITISH COLUMBIA

Scale 1:50 000 Échelle

Miles 1 — 0 — 1 — 2 — 3 Milles

Metres 1000 — 0 — 1000 — 2000 — 3000 — 4000 Mètres

Yards 1000 — 0 — 1000 — 2000 — 3000 — 4000 Verges

Information concerning location and precise elevation of bench marks can be obtained by writing to the Geodetic Survey, Surveys and Mapping Branch, Ottawa.

On peut obtenir des renseignements sur le lieu et l'altitude exacte des repères de nivellement en écrivant aux Levés géodésiques, Direction des levés et de la cartographie, Ottawa.

CONVERSION SCALE FOR ELEVATIONS

Metres 30 20 10 0 — 50 — 100

Feet 100 50 0 — 100 — 200 — 300 — 400 — 500 — 600 — 700 — 800 — 900 — 1000 Pieds

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

ÉQUIDISTANCE DES COURBES 100 PIEDS
Altitudes en pieds
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

Établie par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. Mise à jour à l'aide de photographies aériennes prises en 1977 et 1978. Vérification des ouvrages en 1979. Publiée en 1981.

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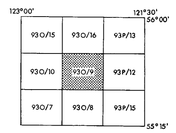


LEGEND

MESOZOIC

UPPER CRETACEOUS

- uKD — DUNVEGAN FORMATION
- uKCR — CRUISER FORMATION

LOWER CRETACEOUS

- KGO — GOODRICH FORMATION
- KH — HASLER FORMATION
- KCB — BOULDER CREEK FORMATION
- KCH — HULCROSS FORMATION
- KCG — GATES FORMATION
- KM — MOOSEBAR FORMATION
- KG — GETHING FORMATION } BULLHEAD GROUP
- KCD — CADOMIN FORMATION } BULLHEAD GROUP

JURASSIC/CRETACEOUS

- JKM — MINNES GROUP

THRUST FAULT (Teeth in dip direction)

ANTICLINE

SYNCLINE

GEOLOGICAL CONTACT (approximate)

Crows Nest Resources Limited
EXPLORATION

PINE PASS-WILLOW CREEK
N.E. B.C.

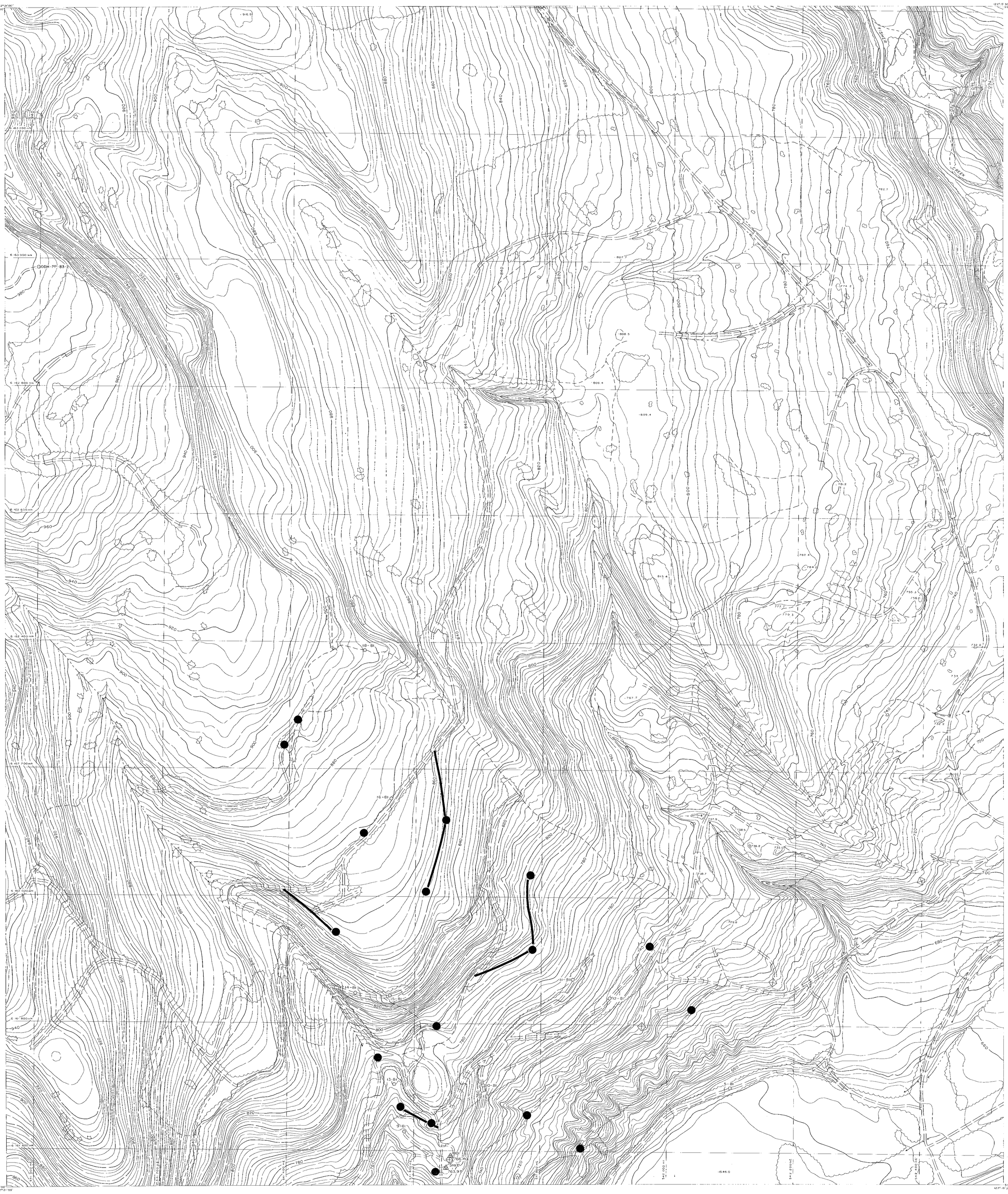
GEOLOGICAL COMPILATION MAP

NTS-93O/9 UTM ZONE 10

AUTHOR: McKINSTRY	SCALE: 1:50000	DRAWN BY: RGP
DATE: 85-03	REVISED:	DRAWING No: PP5U03
To Accompany		

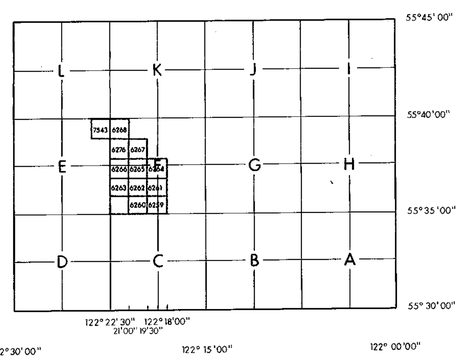
enclosure #3

757



MAP INDEX

93 O/9



REFERENCE

- ROADS, HARD SURFACE
- LOOSE SURFACE
- RAILWAY
- STREAM
- RIVER
- LAKE
- MARSH
- SAND
- TREE LINE
- CONTOURS — 660 — 650

T.N.
0° 43'
GRID NORTH

40 20 0 40 80 120 METRES

SCALE 1 : 2 000

CONTOUR INTERVAL: 2 METRES
DATE OF PHOTOGRAPHY: 17 SEPT. 1981
COMPILED BY: AERO GEOMETRICS LTD.
608 BLACKFORD ST.
NEW WESTMINSTER B.C.

Legend

- Proposed Drillhole
- New Road

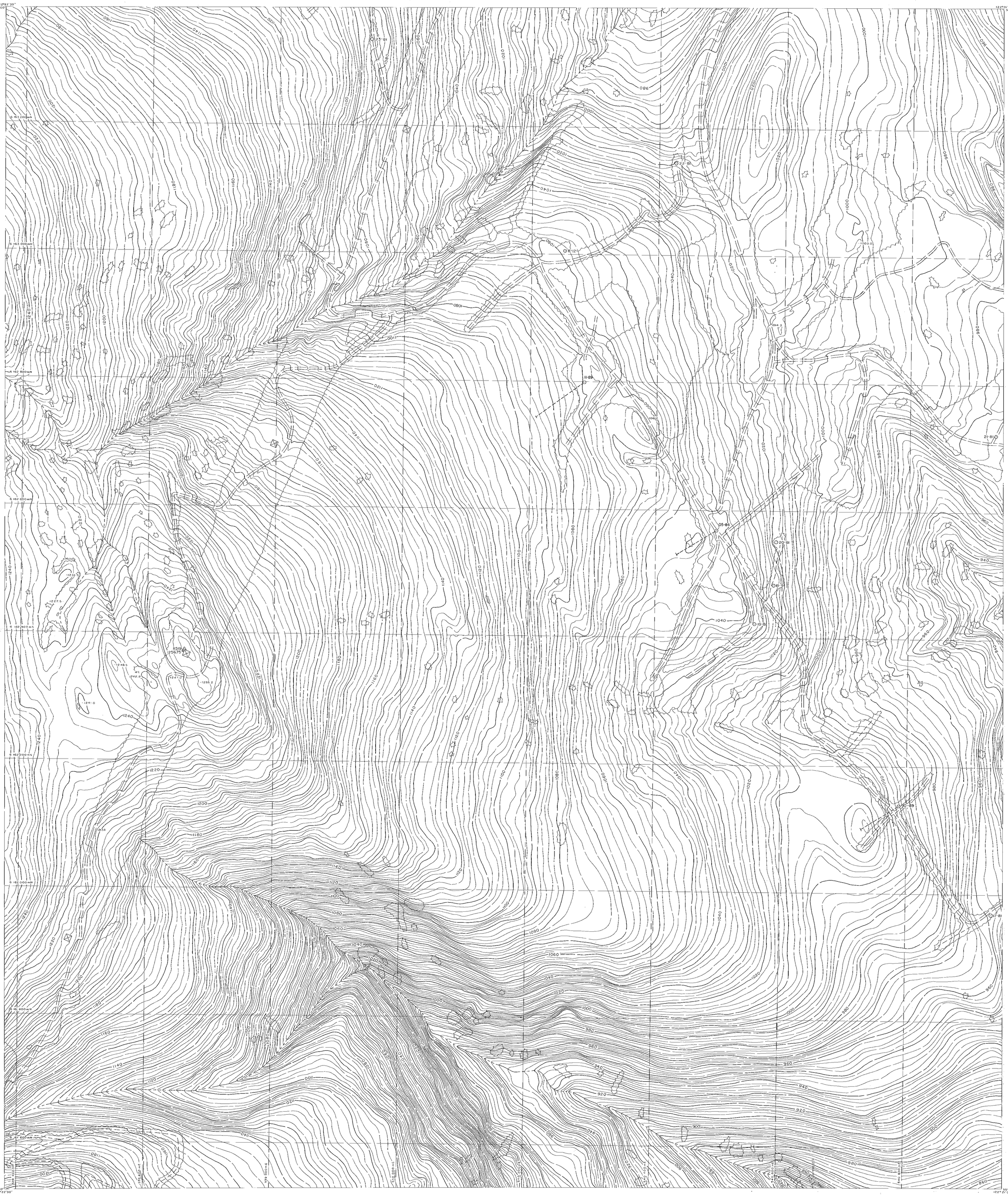
Crows Nest Resources Limited
EXPLORATION

PINE PASS
NOMAN CREEK AREA
N.E. BRITISH COLUMBIA

1989 Proposed Program

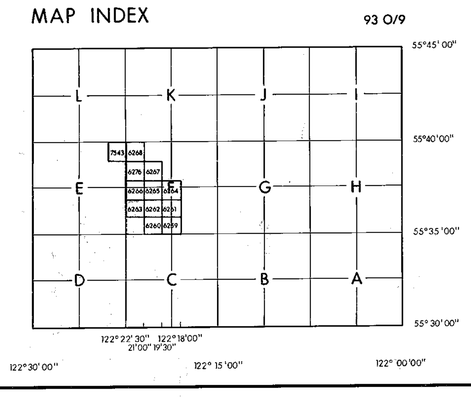
U.T.M. ZONE 10 | C.L. 6262 | N.T.S. 93O/9

AUTHOR: AERO GEOMETRICS	SCALE: 1:2000	ENCLOSURE No:
DATE: 83 - 06	REVISED:	DRAWING No: PP1T06
To Accompany		



MAP INDEX

93 O/9



REFERENCE

ROADS, HARD SURFACE

LOOSE SURFACE

RAILWAY

STREAM

RIVER

LAKE

MARSH

SAND

TREE LINE

CONTOURS 660 650

T.N.

0° 43'

GRID NORTH

40 20 0 40 80 120 METRES

SCALE 1 : 2 000

CONTOUR INTERVAL: 2 METRES
DATE OF PHOTOGRAPHY: 17 SEPT. 1981
COMPILED BY: AERO GEOMETRICS LTD.
608 BLACKFORD ST.
NEW WESTMINSTER B.C.

Crows Nest Resources Limited

EXPLORATION

PINE PASS
NOMAN CREEK AREA
N.E. BRITISH COLUMBIA

U.T.M. ZONE 10 | C.L. 6263 | N.T.S. 93O/9

AUTHOR: AERO GEOMETRICS	SCALE: 1:2000	ENCLOSURE No:
DATE: 83-06	REVISED: 1989-12-20	DRAWING No: PPIT03
To Accompany		

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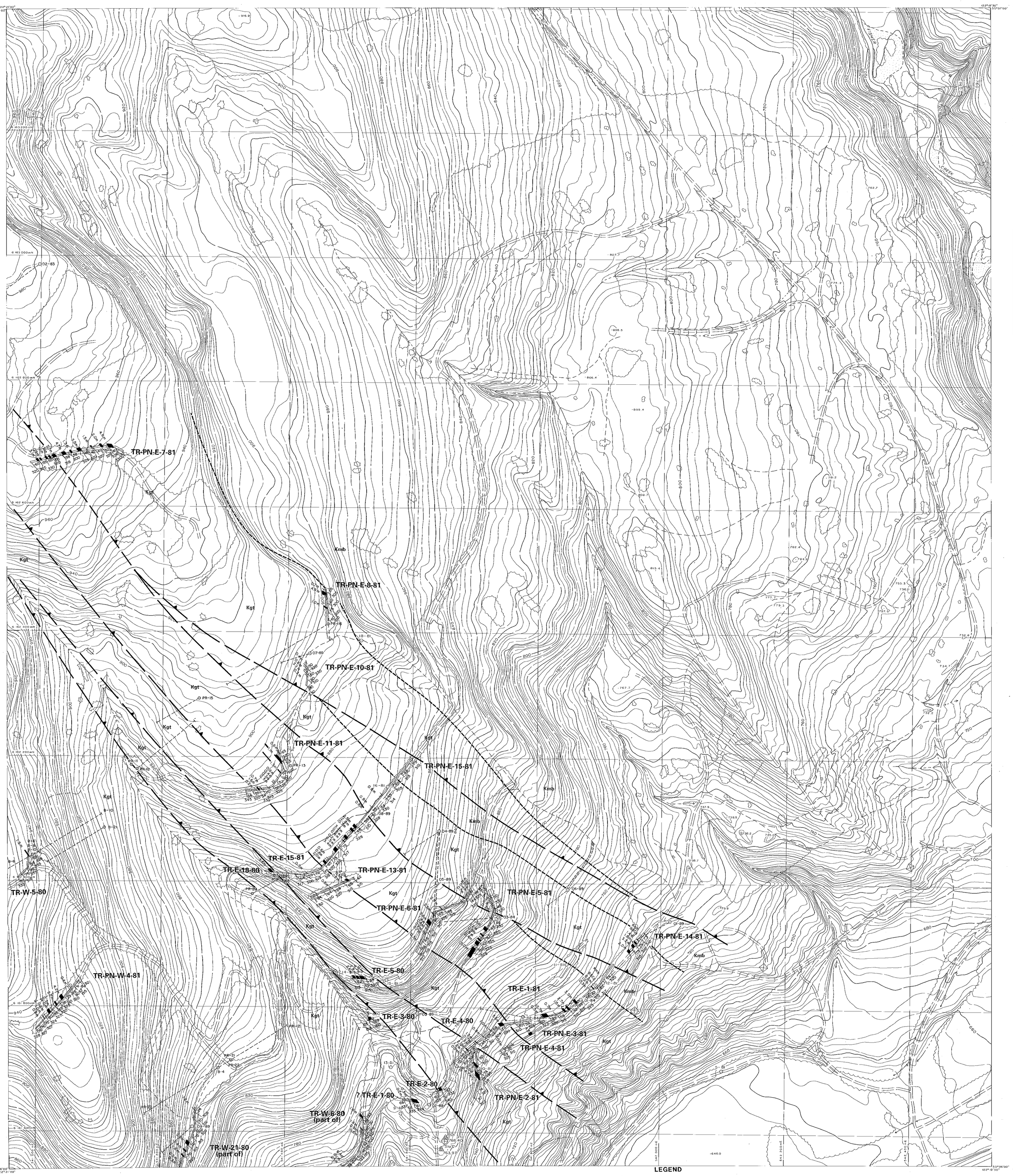
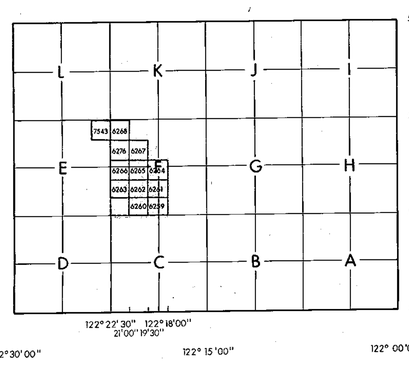
ENCLOSURE 4b



MAP INDEX

93 O/9



REFERENCE

- ROADS, HARD SURFACE
- LOOSE SURFACE
- RAILWAY
- STREAM
- RIVER
- LAKE
- MARSH
- SAND
- TREE LINE
- CONTOURS (660, 650)

T.N. 0° 43' GRID NORTH

40 20 0 40 80 120 METRES

SCALE 1 : 2 000

CONTOUR INTERVAL: 2 METRES
DATE OF PHOTOGRAPHY: 17 SEPT. 1981
COMPILED BY: AERO GEOMETRICS LTD.
608 BLACKFORD ST.
NEW WESTMINSTER B.C.

LEGEND

- DIAMOND DRILL HOLE
- ROTARY DRILL HOLE
- SURVEY REFERENCE POINT
- BACKHOE TRENCH
- THRUST FAULT (Indicates upthrown side)
- SYNCLINE
- ANTICLINE
- ANTICLINE, Overturned
- BEDDING ATTITUDE
- COAL SEAM WITH DESIGNATION
- SHALE OUTCROP
- SANDSTONE OUTCROP
- GEOLOGIC CONTACT

LOWER CRETACEOUS
FORT ST. JOHN GROUP

- Kmb — MOOSEBAR FORMATION
  - BLUESKY CONGLOMERATE

BULLHEAD GROUP

- Kgt — GETHING FORMATION
- Kcd — CADOMIN FORMATION

Crows Nest Resources Limited
EXPLORATION

PINE PASS
NOMAN CREEK AREA
N.E. BRITISH COLUMBIA

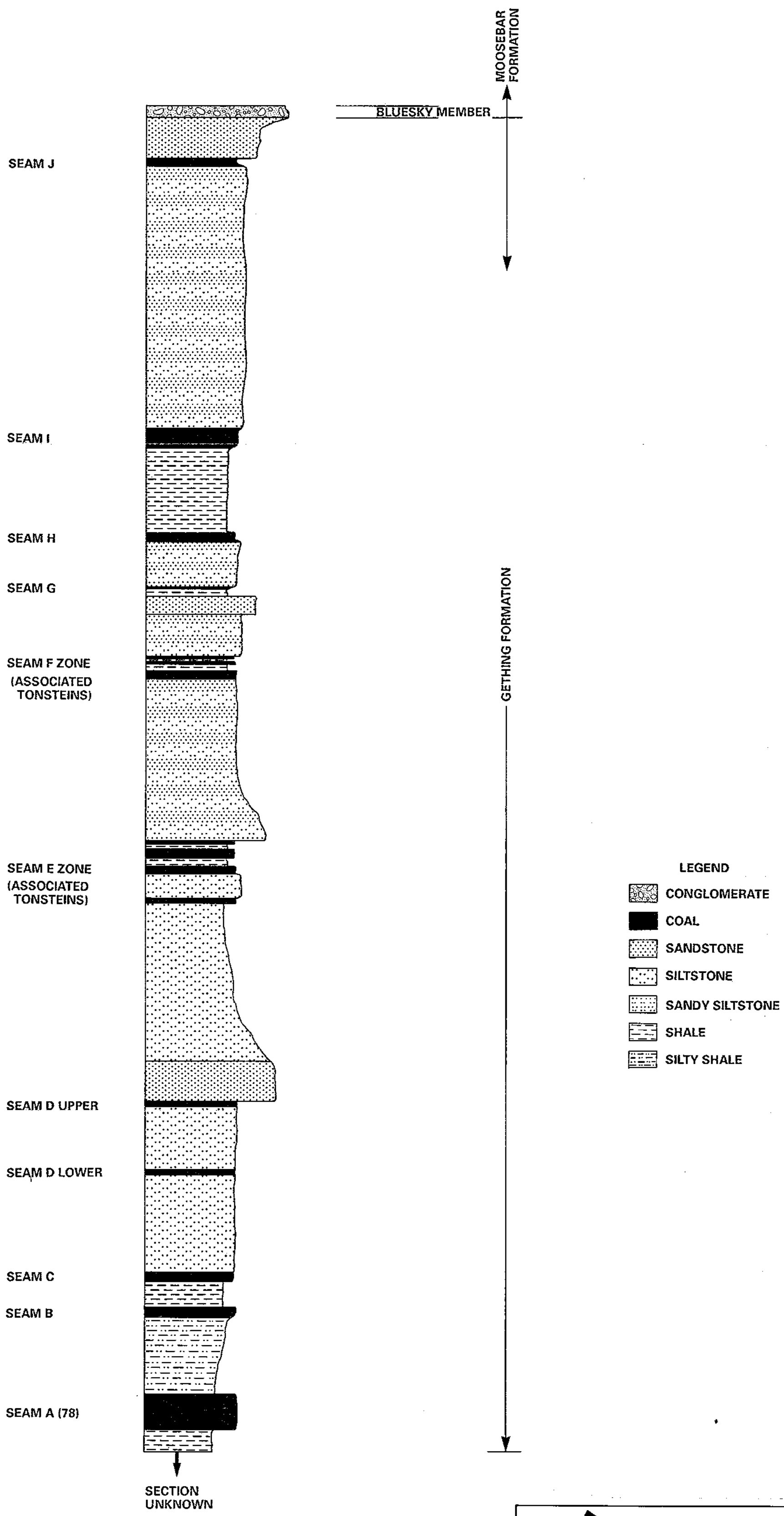
GEOLOGIC MAP

U.T.M. ZONE 10 — C.L. 6262 — N.T.S. 93O/9

AUTHOR: AERO GEOMETRICS	SCALE: 1:2000	ENCLOSURE No:
DATE: 83 · 06	REVISED: 1990-05	DRAWING No: PP1U20
To Accompany		

757 enclosure 4a

TOPO BASE PP1T06



VERTICAL SCALE 1:500

Crows Nest Resources Limited

enclosure #5

PINE PASS
N.E.B.C.

PARTIAL STRATIGRAPHIC SECTION
(COAL LICENCE 6262)

AUTHOR: B. MCKINSTRY	SCALE: 1:500 VERT.	DRAWN BY:
DATE: 1990-04	REVISED:	DRAWING No:
To Accompany		

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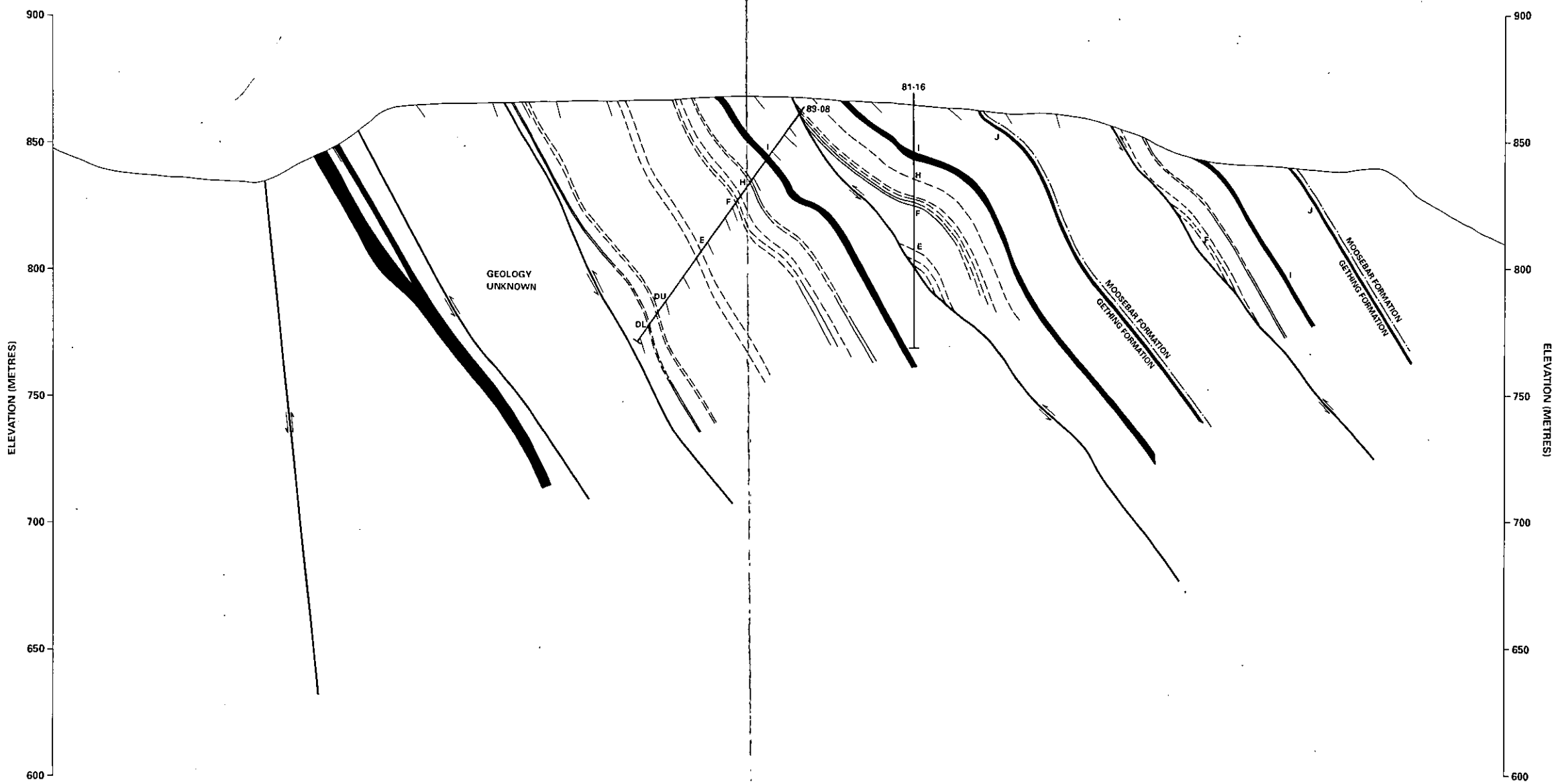

SCALE

0 50m

Crows Nest Resources Limited

PINE PASS
N.E.B.C.

SECTION C - D
(AZIMUTH 053)

AUTHOR: B. MCKINSTRY	SCALE: 1: 2 000	DRAWN BY:
DATE: 1990-94	REVISED:	DRAWING No:
To Accompany		

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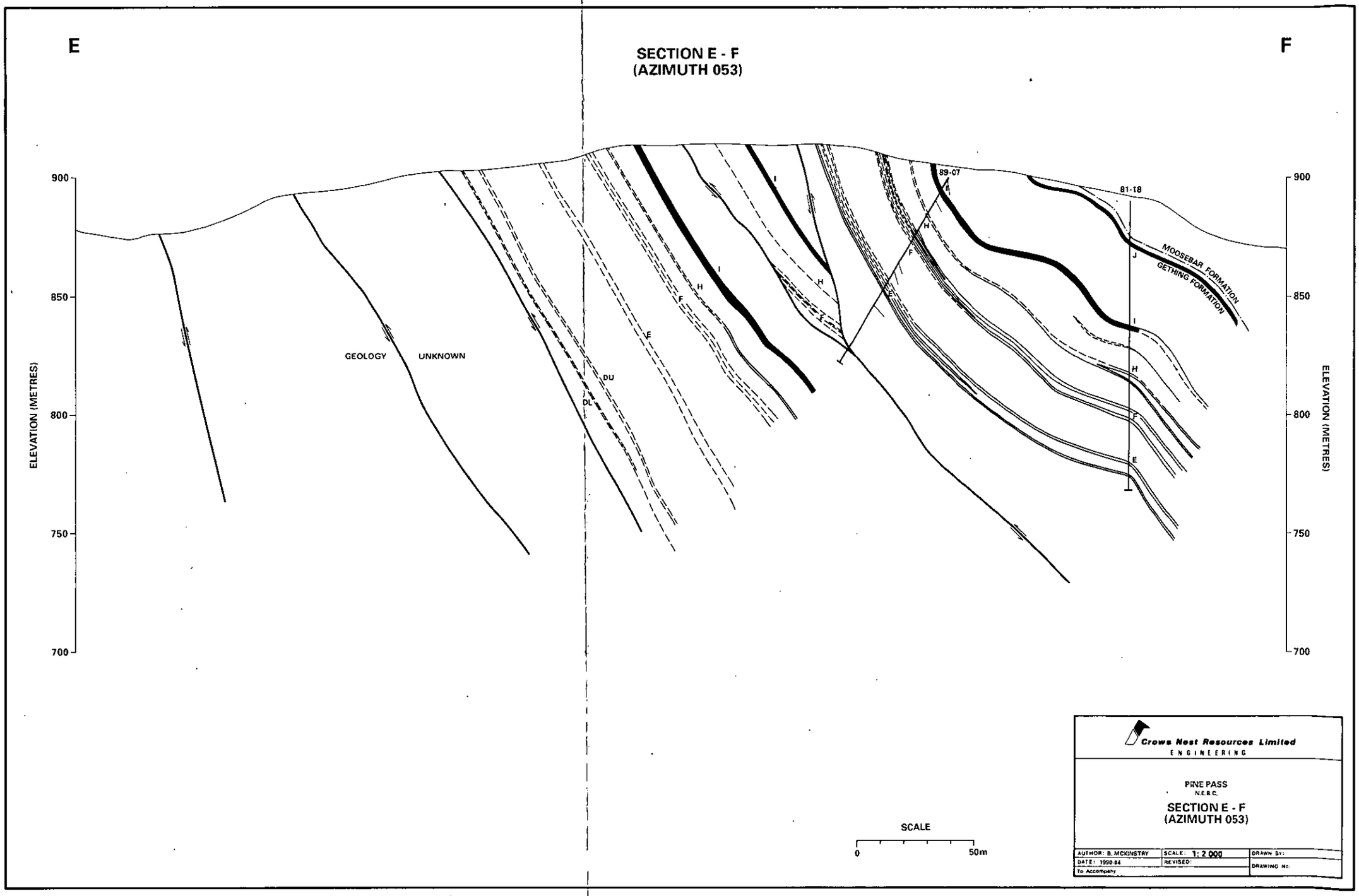
ENCLOSURE 6



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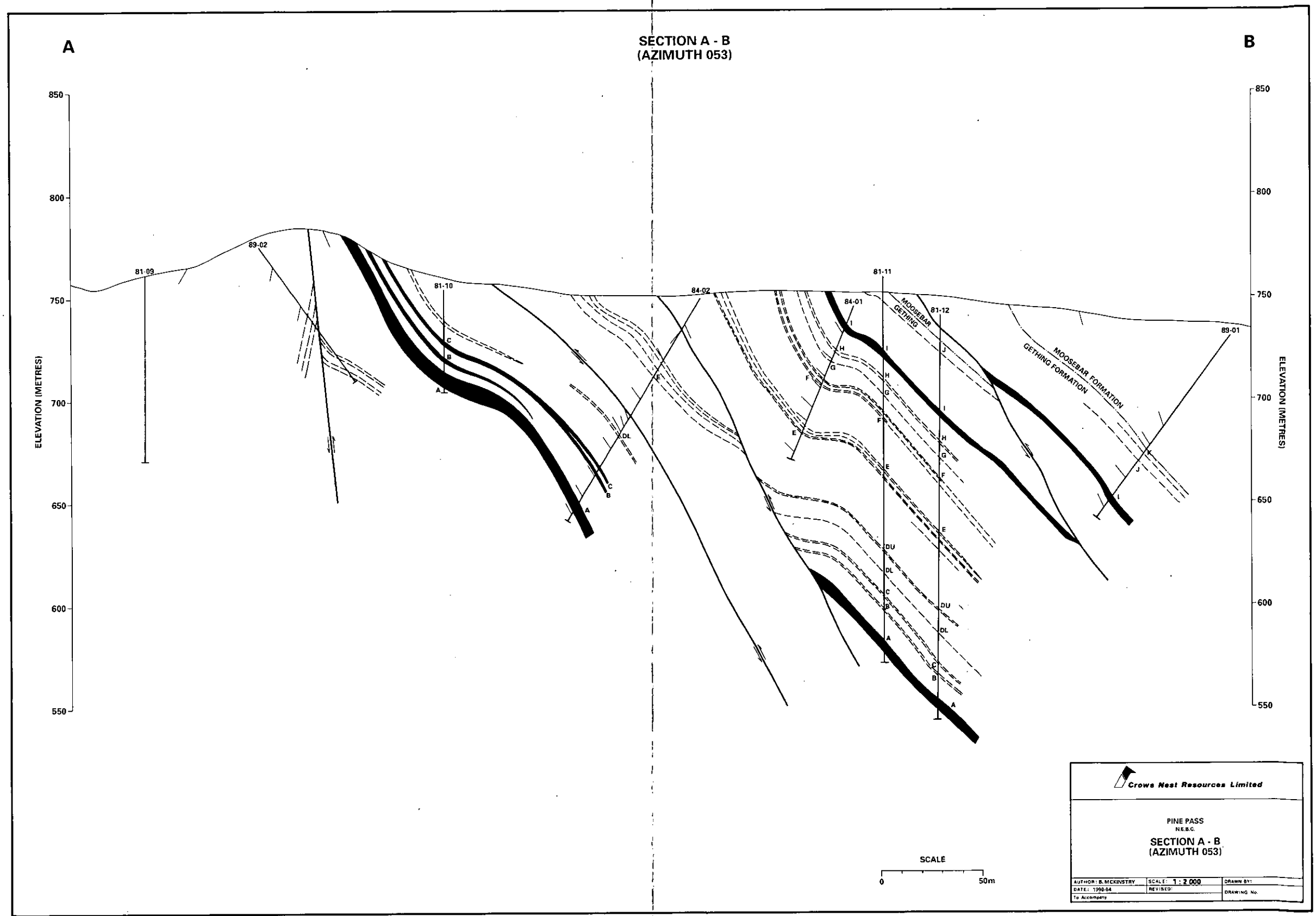
ENCLOSURE 6



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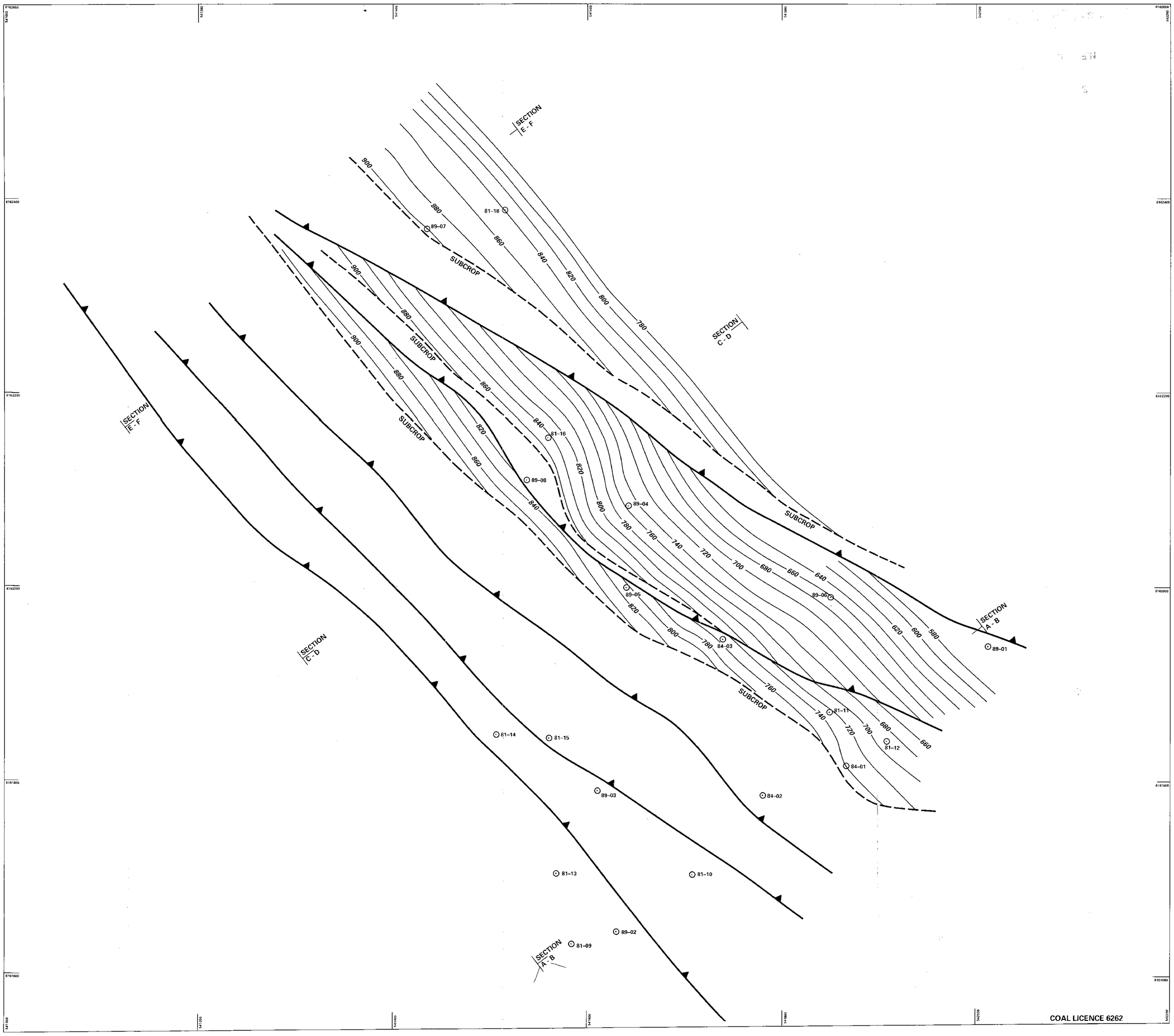


LEGEND

84-02	BOREHOLE CONTROL
640	STRUCTURE CONTOUR OF SEAM I FLOOR
	FAULT (TEETH ON UPTHROWN SIDE)
	SUBCROP LIMIT
	TRACE OF SECTION PROFILE

G.N.

T.N.

SCALE

0 50 100 m

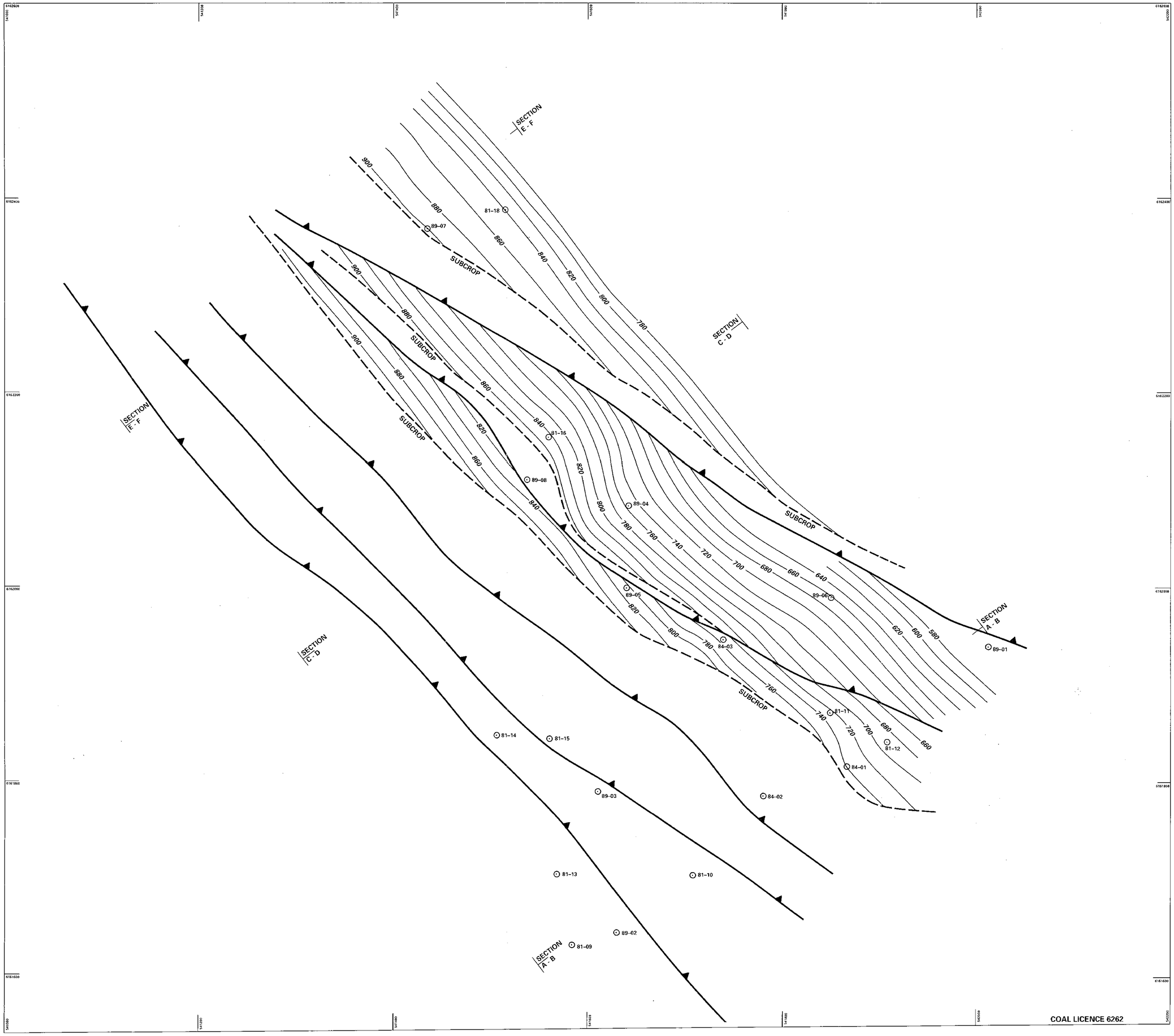
Crows Nest Resources Limited

PINE PASS
N.E. B.C.
STRUCTURE CONTOUR MAP
SEAM I FLOOR

AUTHOR: B. McKINISTRY	SCALE: 1:2 000	DRAWN BY:
DATE: 90-04	REVISED:	DRAWING No:
To Accompany		

757

ENCLOSURE 7



LEGEND

⊙ 84 - 07	BOREHOLE CONTROL
—640—	STRUCTURE CONTOUR OF SEAM I FLOOR
▲	FAULT (TEETH ON UPTHROWN SIDE)
— — —	SUBCROP LIMIT
⊢ — ⊣	TRACE OF SECTION PROFILE

G.N.

T.N.

Crows Nest Resources Limited

PINE PASS
N.E. B.C.

STRUCTURE CONTOUR MAP SEAM I FLOOR

enclosure #7

AUTHOR: B. McKINISTRY	SCALE: 1:2 000	DRAWN BY:
DATE: 90 - 04	REVISED:	DRAWING No:
To Accompany		

extra copy

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-01 **EXAMINER** B.McKinstry **DATE** Aug. 3, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	6.80	6.80	O.B.						
6.80	9.20	2.40	CONGL.		Polymictic white Qtz pebbles with dark SLST grains and pebbles. Grey groundmass.				
9.20	9.72	0.52	GOUGE.		Dark grey to black.Ground up Congl and SST. Bedding parallel to core axis at 11.1.				
9.72	16.10	6.38	SST		Light grey fine grained massive. Weak to wispy bedding parallel to core axis.Occasional thin white calcite cross fractures.	16.80	20°		
16.10	16.40	0.30	GOUGE.		As at 9.20				
16.40	17.00	0.60	CONGL.		As at 6.80 but smaller pebbles.				
17.00	62.40	45.40	MDST.		Brown,Fe stained.Very broken. Grey featureless and massive. Very thin light grey SLST wisps, thin white calcite veinlets and some carbonaceous slicks.Gouge from 48.32-48.41.	22.00 23.40 25.30 55.90 58.30 60.30	0° 0° 45° 57° 59° 53°		
62.40	62.80	0.40	CONGL		As at 6.80. Almost no groundmass. Very tightly packed pebbles of roughly equal size.				

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
62.80	65.90	3.10	SST		Fine grained grey with dark wisps of SLST and carbonaceous material giving an indistinct bedding. Fractures are Fe stained.Some thin calcite fractures.	65.90	68°		
65.90	66.10	0.20	COAL		Bright cleated sharp contact with SST.Indistinct contact with FW.			1	
66.10	66.84	0.74	MDST		Carbonaceous dark brown to dark grey. Pyrite stringers and blebs common at top.Some light grey SST wisps.				
66.84	67.44	0.60	SLST		Light and dark grey banded SLST with very fine grained SST bands.Calcite fractures.				
67.44	71.34	3.90	SST		Fine to very fine grained light grey to grey.Very thin dark grey SLST bands.White calcite fractures and carb lined fractures.				
71.34	72.08	0.74	COAL		Sharp HW contact with SST.Coaly indistinct contact with FW.Very clean,good,bright cleated coal.			2	100
72.08	72.30	0.22	MDST		Coaly,massive and carbonaceous.			3	
72.30	72.70	0.40	MDST		As at 72.09.				
72.70	76.15	3.45	SLST		Dark grey,grading to MDST at times. Very indistinct wispy bedding.White calcite fractures.				
76.15	76.35	0.20	COAL		Bright(dull at top).Thin calcite veinlet.			No sample	75

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
76.35	76.64	0.29	MDST		Very coaly and carbonaceous for top 0.16m.Grades into SLST.				
76.64	78.05	1.41	SLST		Grey with weak bedding becoming sandy at base.				
78.05	89.00	10.95	SST	SLST	Interbedded.Also 0.05-0.1m bands of medium grained SST.Numerous white calcite fractures,weakly bedded.. Some carb' bands.Rip up clasts and slump features.Becomes medium grained from 84.00-90.18m.X-bedding in medium grained SST.	80.30 81.70 83.10 87.40 88.70	60° 74° 70° 72° 72°		
89.00	97.38	8.38	MDST	SLST	Silty,dark grey to black carb'. Bioturbated.No bedding.	94.30	64°		
97.38	97.51	0.13	MDST	SLST	As above.			4	
97.51 100.40	100.40 100.60	2.89 o.20	COAL MDST		Bright,with cleat.Very clean.FW and HW contacts transitional. Sheared,coaly and slickensided.			5 6	
100.60	108.8	8.20	MDST		Coaly,dark grey to black.Numerous discontinuities,coal stringers and blebs.Carboaceous plant fragments. E.O.H.	104.10	62°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-02 **EXAMINER** B.McKinstry **DATE** Aug. 5, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	5.60	5.60	SST	SLST	Light and dark grey interbedded. Broken core.Calcite fractures common with small displacements. Fine grained.	3.20	47°		
5.60	9.00	3.40	MDST	SLST	Dark grey,weakly bedded.Numerous Carb plant fragments.White calcite fractures.	8.80	50°		
9.00	10.20	1.20	SST	SLST	Light and dark grey.Fine grained. Burrows common.				
10.2	13.65	3.45	MDST		Dark grey,massive.Very thin micro-bands of white calcite veinlets parallel to bedding.Silty.	12.80	53°		
13.65	15.40	1.75	SST	SLST	Dark and light grey banded,fine grained.Calcite annealed fault zone at 14.45m.Numerous calcite filled fractures parallel to fault zone. Fault at 92 to bedding.X-bedding, burrows.	14.50	51°		
15.40	19.50	4.10	MDST	SLST	Dark grey with occasional light grey silty bands.				
19.50	20.60	1.10	SLST	SST	Medium grey.Fine grained,banded Numerous white calcite fractures. Bedding is close to core axis.	19.60	32°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
20.60	25.80	5.20	MDST	SLST	Dark grey.Breccia zone of fractures 21.00m.Fault at 21.90m with white calcite annealing.Numerous thin white calcite fractures.	21.00 22.70 24.40	16° 40° 38°		
25.80	26.45	0.65	COAL		Broken dollar style.Clean and bright,with cleat.			7	26
26.45	29.00	2.55	MDST		Dark grey to black.Coal stringers Slicked fractures.Carb plant fragments.				
29.00	38.60	9.60	SLST	SST	Interbedded and fine grained.Light and medium grey.Reworked bedding. Burrows.Coal.Lenses of calcite.	30.70 34.10 36.40	55° 50° 50°		
38.60	39.57	0.97	MDST		Dark grey.Carbonaceous.Coaly.	38.00	52°		
39.57	40.22	0.65	COAL		Dull at top.Broken to rubble.White calcite fractures.			8	83
40.22	40.78	0.56	MDST		Carbonaceous.Black.				
40.78	41.78	1.00	SLST	SST	Thinly interbedded.Light and dark grey.Rootlets.Burrows.	41.40	47°		
41.78	43.41	1.63	MDST		As at 40.22,but occurring thin SLST bands.	43.00	48°		
43.41	44.15	0.74	COAL		Clean and bright.With cleat.			9	100
44.15	46.00	1.85	MDST		Dark grey to black.Coaly blebs and stringers.Carbonaceous.Massive.	45.2	67°		
46.00	46.39	0.39	COAL		Dull and bright.Powdery to semi-stick.			10	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
46.39	64.00	17.61	MDST		Dark grey,carbonaceous and coaly. White calcite veinlets and fractures. Blebs and stringers of coal.Very coaly from 57.90-61.00	47.3 49.2 49.7 51.20 53.30 55.20 56.70 58.00 59.40 62.40	62° 51° 24° 0° 0° 5° 20° 0° 0° 10°		
64.00	65.00	1.00	COAL					11	100
65.00	70.15	5.15	MDST		As at 46.39m.Massive,dark grey.	66.00 67.00 70.00	20° 20° 15°		
70.15	70.45	0.30	COAL		Slicked,dull with white calcite bands.0° CBA.			No sample	
70.45	73.00	2.55	MDST		As at 46.39.	72.40	11°		
73.00	75.60	2.60	COAL		Slicked and crushed.Powdery mush to slivers of coal.			12	98
75.60	82.00	6.40	SLST	SST	Light and dark grey bands.Weakly bedded.E.O.H.	77.70 82.00	13° 28°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-03 **EXAMINER** B.McKinstry **DATE** Aug. 7, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	6.10	6.10	O.B.						
6.10	26.26	20.16	Gravel		Boulders and gravel				
26.26	36.6	10.34	COAL		Broken to rubble to powder at base. Very clean.	27.30 29.00 31.00 34.50	25° 0° 21° 24°	Sample #13?	
36.6	39.3	2.70	MDST		Coaly stringers,carbonaceous.Black. E.O.H.				

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-04 **EXAMINER** B.McKinstry **DATE** Aug. 8, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	3.00	3.00			O.B.				
3.00	8.62	5.62	SST		Boulder,rubble and weathered rock. Fe stained at base.Grey to light grey.Fine to medium grained.Congl-omeratic for 0.10m at 7.80m.	6.20	35°		
8.62	9.37	0.75	CONGL		Similar to Hole 89-01. Round to sub-round tightly packed pebbles in very fine grained grey matrix.White Qtz pebbles common.				
9.37	10.20	0.83	SST		Brown,coaly,fine grained,weakly bedded.				
10.20	10.55	0.35	COAL		Soft dark brown to black mush.			No sample	
10.55	11.30	0.75	MDST		Dark grey to black,carbonaceous and coaly.Grades into underlying SLST.				
11.30	13.27	1.97	SLST	SST	Brown to grey,thinly bedded.Carb' bands.Light grey thin SLST bands.	12.10	75°		
13.27	13.62	0.35	SST		Fine to medium grained,light grey.	13.35	84°		
13.62	14.18	0.56	SLST	SST	As at 11.30.				
14.18	14.80	0.62	COAL		Bright,blocky.Dull and shaley at top for 0.07m.			14	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
14.80	15.20	0.40	MDST	SLST	Light grey SLST bands in black to dark grey MDST.Bedding is reworked and burrows are common in SLST.MDST is coaly.	15.00	79°		
15.20	15.47	0.27	COAL					No sample	
15.47	16.15	0.68	MDST		Grey to dark grey massive.Some brown staining.				
16.15	20.20	4.05	SLST	SST	Grey,weakly bedded.Occasional light grey thin fine to very fine grained SST bands.Calcite fractures.Strongly bioturbated.	16.40	86°		
20.2	21.1	1.9	SHALE	COAL	Carboniferous,black and coaly.				
21.1	34.06	12.96	SLST	SST	As at 16.15. SST lenses and beds associated with bioturbation.Some x-bedded layers.	22.85 25.8 27.1 27.8 32.1 33.8	60° 75° 72° 64° 74° 74°		
34.06	37.5	3.44	SST	SLST	Similar to above,but light grey fine grained laminations predominate.Top 0.1m is rusty coloured and thinly laminated; x-bedding is common.	35.8 36.5 37.5	68° 85° 68°		
37.5	41.84	4.34	SLST		Dark grey,occasionally light grey SST laminations.Almost a MDST at base.	39.5 40.1 40.3	43° 78° 70°		
41.84	42.04	0.20	SLST		HW sample.			15	
42.04	44.64	4.60	COAL		Rubble to powdery at top,then semi-stick.Very clean,bright and cleated.			16	

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
44.64	44.84	0.20	MDST		FW sample.Dark brown.			17	
44.84	50.80	5.96	MDST		Carbonaceous and coaly.Dark grey. Coaly blebs and stringers.Massive.	45.90 46.70 48.70	54° 66° 68°		
50.80	53.15	2.35	SLST	MDST	Light to medium grey SLST bands interbedded with dark grey MDST. Burrows common.MDST at base very coaly.	52.20	70°		
53.15	53.80	0.65	COAL		SST parting from 53.55-53.59m.COAL is very bright and cleated.			18	
53.80	56.20	2.40	MDST		Very coaly.Dark brown.Massive.				
56.2	58.80	2.60	SLST	SST	Medium grey,thinly interbedded. Burrows and bioturbation common.	56.80	74°		
58.80	59.01	0.21	MDST		As at 53.80.	58.90	70°		
59.01	59.18	0.17	MDST		HW sample.			19	
59.18	59.60	0.42	COAL		Mostly dull with some cleat.			20	100
59.60	59.80	0.20	MDST		FW sample.			21	
59.80	61.00	0.20	MDST		As above.				
61.00	61.16	0.16	MDST		HW sample			22	100
61.16	61.74	0.58	COAL		Well banded and cleated.Tonstein band from 61.76-61.78m.			23	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
61.74	61.92	0.18	MDST		Coaly,with Tonstein layer from 62.09-62.17.FW sample.			24	100
61.92	63.00	1.08	MDST		Coaly,with two Tonstein bands; 62.20-62.27/62.30-62.34m.COAL from 62.38-62.48m.	62.2	78°		
63.00	63.55	0.55	COAL					25	100
63.55	65.84	2.29	MDST		As at 11.92m; 0.06m COAL band at 64.50m.				
65.84	83.25	17.41	SLST	SST	Thinly interbedded.Extensive bio-turbation of bedding. Burrows common. Medium grey stick core. Occ'dark grey carb' bands and blebs. From 75.90m there are less SST interbeds and laminations; rock is medium grey weak bedded SLST. Becomes more of a MDST at base.	66.50 69.40 71.90 75.30 79.00 81.1	75° 70° 68° 72° 70° 72°		
83.25	83.60	0.35	COAL		Dull at top; bright and cleated at base.			26	100
83.60	86.60	3.00	MDST	COAL	Interbedded dark grey massive MDST and bright cleated COAL bands.				
86.60	87.67	1.07	COAL	MDST	Moderately bright and cleated with occ'brown to dark brown MDST bands; 0.30m thick and interbedded.			27	100
87.67	91.30	3.63	MDST	COAL	As at 83.60m.	88.00 91.3	70° 74°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
91.30	99.80	8.50	SST	SLST	Fine to medium grained,medium grey with dark grey SLST interbeds.Stick core.COAL bands and carb'stringers common between 96.00-97.50m.Rip up clasts at 99.00m.Calcite fractures common.	93.40 94.30 96.10 98.70 99.70	52° 66° 70° 78° 59°		
99.80	104.20	4.40	SLST		Medium grey weakly bedded.Occ' light grey SST interbeds,occ' calcite and slickenside fractures.	100.90 104.30	68° 67°		
104.20	111.20	7.0	MDST	COAL	Dark brown grey massive MDST,inter-bedded with 5-70mm COAL bands.Calcite fracture zone 100mm wide at 110.40m. E.O.H.	110.30	58°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-05 **EXAMINER** B.McKinstry **DATE** Aug. 9, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	9.10	9.10	O.B.						
9.10	13.40	4.30	SST	SLST	Interbedded medium to light grey with white calcite fractures; siltier at base.X-bedding.	9.30 11.20 12.7	63° 63° 65°		
13.40	14.20	0.80	MDST		Massive,silty,carbonaceous.				
14.20	16.88	2.68	SLST		Medium grey.Occ'light grey SST bands.	15.80	69°		
16.88	17.08	0.20	SLST		HW sample.			28	100
17.08	20.00	2.92	COAL		Bright and cleated, very clean.			29	82.2
20.00	20.20	0.20	MDST		FW sample.Coaly,massive.			30	100
20.20	27.00	6.80	MDST	COAL	1-20mm wide COAL bands in dark grey massive MDST.Some slicked fractures. COAL from 26.50-26.60m.	21.1 24.5	64° 66°		
27.00	29.37	2.37	SLST		Medium grey.Very thin laminations of light grey SLST,some bioturbation.	28.70	60°		
29.37	30.20	0.83	COAL		Last 0.25m of seam very shaly,and SLST/MDST parting from 29.30-29.46m. Otherwise bright and cleated.			31	100
30.20	32.35	2.15	MDST	COAL	As at 20.20				
32.35	36.10	3.75	SLST		Medium grey,bioturbated.Occ'light grey SLST bands.	34.90 35.20	65° 65°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
36.10	36.60	0.50	COAL		Somewhat shaly.			32	100
36.60	41.20	4.60	SLST		Medium grey.White calcite fractures. Weakly bedded.	37.00 37.60 39.40 40.70	54° 54° 30° 28°		
41.20	43.18	1.98	MDST		Dark grey to black,coaly.Carbonaceous plant fragments.	43.10	30°		
31.18	43.72	0.54	COAL		30mm Tonstein band at 43.50m.COAL is sheared and polished.			33	100
43.72	45.16	1.44	TONST'		Light grey,crystalline and coaly.	44.53	0°	34	59
45.16	45.86	0.70	COAL		Sheared.Bedding is 0° at top.			35	100
45.86	46.50	0.64	MDST		Coaly,sheared,black.			36	90
46.50	47.00	0.50	COAL		Shaly at top,but semi-stick and bright.			37	100
47.00	48.90	1.90	MDST	COAL	As at 20.20m.				
48.90	53.90	5.00	SLST		Bedding is strongly reworked.Medium grey.Burrows.	53.90	73°		
53.90	56.54	2.64	SST	SLST	Fine grained,thinly laminated.Rip up clasts at base,and medium grained coaly plant fragments.White calcite fractures.	55.40 56.50	68° 66°		
56.54	56.89	0.35	SLST		Dark grey,weakly bedded.				
56.89	57.90	1.01	SST	SLST	Interbedded,light and medium grey. Laminated.	57.00	69°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
57.90	66.99	9.09	SLST		Medium grey.Occ'light grey SLST laminations.	62.30 63.70	76° 77°	/	
66.99	68.12	1.13	COAL		Sheared,polished,rubbly.			38 7	69
68.12	77.70	9.58	MDST	COAL	As at 20.20m.Major change in CB at 70.10,to 0° to 10° .Maintained this CB to TD.Sheared polished surfaces common.Major fault encountered with significant loss of core.	70.20 77.00	0° 10°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-06 **EXAMINER** B.McKinstry **DATE** Aug. 10, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	3.00	3.00	O.B.						
3.00	12.40	9.40	O.B.		Weathered SST,fine grained,brown. Fragmented and cemented with a mud matrix.SST probably in place.				
12.40	20.70	8.30	SLST		Very weathered at top 0.6m,but becoming broken to semi-stick.Dark grey, featureless,occ' Fe stained bands.				
20.70	21.00	0.30	SLST		Dark grey,but with an apple green mineral associated with it.	21.00	76°		
21.00	27.70	6.70	SLST	SST	Medium grey with light grey interbeds and laminations of sandstone.Very thinly interbedded.Thin streaks of Pyrite.Very common bioturbation and burrowing.Soft sediment slumping. Possible carbonised shell fragments and small white fossils.	21.60 22.80 24.70 27.30	72° 74° 69° 68°		
27.70	28.60	0.90	CONGL'		Pebbles,polymictic,with most pebbles round to sub-round and equant.Light grey to black in colour.Almost no groundmass.				
28.60	30.70	2.10	SST	SLST	Brown for 0.30m at top,then medium grey with SIST interbeds,medium bedding.Carbonaceous for last 0.20m.	29.10 30.20	73° 62°		
30.70	30.83	0.13	COAL		Bright,cleated.			Not sample	

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
30.83	30.98	0.15	SHALE		Black,coaly,carbonaceous.				
30.98	31.60	0.62	SLST		Light and medium grey interbedded. Very thinly interbedded.Grades to SST at base.	31.30	73°		
31.60	33.50	1.90	SST	SLST	Fine grain medium to light grey with dark grey streaks and laminations. Strongly bioturbated from 32.80.Occ' Carb' bands.	32.40	71°		
33.50	34.04	0.54	COAL		Bright,cleated,very clean.			38 ?	100
34.04	34.80	0.76	MDST	COAL	Interbanded dark grey silty MDST and COAL bands.COAL is bright and cleated.0.10m COAL band from 34.00 to 34.10m.				
34.80	36.00	1.20	SLST		Medium grey.Bioturbated with bedding poorly preserved.				
36.00	37.40	1.40	SST		Medium to light grey with bioturb' and burrows common.	36.85	66°		
37.40	38.85	1.45	SLST		Dark grey,muddy.Bioturbated.White calcite fracture at base.	38.50	64°		
38.85	39.10	0.25	SHALE	COAL	Dark grey to black featureless SHALE(0.1m) overlying dirty broken to powdery COAL(0.15m).				

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
39.10	56.60	17.5	SLST	SST	Medium interbedded.Dark grey with occ' light grey laminations.Coaly plant fragments.Occ' X-bedded SST laminations.White calcite fractures, burrows and bioturbation common. Stick core.	39.70 43.00 44.00 45.50 46.90 49.90 54.30 55.70	71° 76° 74° 74° 66° 72° 70° 69°		
56.60	57.00	0.40	MDST		Dark grey,coaly,massive.				
57.00	60.40	3.40	SLST	SST	As at 39.10m.	57.90 58.80 59.30	71° 75° 73°		
60.40	60.50	0.10	SLST	SST	HW sample.			39	
60.50	63.40	2.90	COAL		Dull and bright interlaminated.Very clean.			40	
63.40	63.75	0.35	MDST	COAL	FW sample.			41	
63.75	68.60	4.85	MDST	COAL	Dark grey,carbonaceous MDST with thin COAL stringers and bands.Carb' plant fragments common.				
68.60	70.1	1.50	SLST		Medium to light grey,thinly laminated.White calcite fractures.Soft sediment deformation. E.O.H.	69.90	70°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-07 **EXAMINER** B.McKinstry **DATE** Aug. 12, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	3.00	3.00	O.B.						
3.00	4.64	1.64	MDST	COAL	Dark grey massive,Fe stained with occ' thin COAL blebs and bands.				
4.64	5.63	0.99	SLST		Sandy,dark brown,semi-stick.				
5.63	5.83	0.20	SLST		HW sample.			42	100
5.83	7.52	1.69	COAL		Clean,bright,cleated.			43	86
7.52	7.74	0.22	SHALE	COAL	FW sample.Dirty,dark grey.			44	100
7.74	10.00	2.26	MDST		Dark grey coaly massive.Slicked fracture surfaces.				
10.00	10.60	0.60	SST		Dark grey silty laminations.Thinly interbedded.	10.2 10.8	57° 54°		
10.60	11.60	1.00	SLST		Very muddy.Dark grey carbonaceous. Grades into MDST at base.				
11.60	15.20	3.60	MDST	COAL	As at 3.00m.	14.0	60°		
15.20	17.40	2.20	SLST		Thin light grey SST laminations. Thinly bedded,bioturbation and burrowing disrupt bedding.				
17.40	18.00	0.60	MDST		Dark grey,massive.carbonaceous.				
18.00	18.14	0.14	MDST		As at 17.40.			45	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
18.14	19.00	0.86	COAL		Bright,clean with slicked fractures.			46	81
19.00	19.30	0.30	SHALE	COAL	Sheared polished surfaces,dark grey to black.			47	100
19.30	20.00	0.70	SHALE	COAL	As above.				
20.00	27.09	7.09	SLST		Dark grey massive stick core. Burrowing common.Very disrupted bedding.	23.90 26.20	50° 51°		
27.09	27.31	0.22	SLST		HW sample.As above.			48	100
27.31	27.98	0.67	COAL		Bright,cleated.			49	100
27.98	28.50	0.52	MDST		Coaly,dark grey to black.			50	65
28.50	29.08	0.58	COAL		Bright,cleated.			51	100
29.08	29.33	0.25	TONST'		Grey to light grey,speckled.	29.20	58°	52	48
29.33	29.49	0.16	COAL		Bright,cleated.			53	100
29.49	29.73	0.24	TONST'		Light grey,coaly,speckled.			54	100
29.73	31.48	1.75	COAL		Shaly at 30.50m.Bright and cleated otherwise.			55	44
31.48	31.67	0.19	MDST	COAL	FW sample.	31.60	63°	56	100
31.67	36.20	0.53	MDST	COAL	As at 3.00m.Somewhat shaly in places and grades into SLST at base.	35.23	46°		
36.20	40.40	4.20	SST	SLST	Fine light and dark grey laminations. SLST rip-up clasts.X-bedding,medium grey.	37.80 39.50	48° 60°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
40.40	42.20	1.80	SLST		Very fine grained,dark grey,weakly bedded.Burrows.Occ' white calcite fracture.	41.8	46°		
42.20	47.55	5.35	SLST	SST	Medium grey.Numerous white calcite fractures.Light grey SST laminat'. Soft sedimentary deformation. Some burrows.	43.90 45.45 46.2	80° 60° 61°		
47.55	48.30	0.75	MDST		Silty,dark grey.				
48.30	49.23	0.93	SLST	SST	As at 42.20,coaly at base.	48.60	59°		
49.23	50.40	1.17	COAL		Dull with bright bands.Semi-stick.			57	93
50.40	50.53	0.13	MDST	COAL	FW sample.			58	100
50.53	56.60	6.07	MDST	COAL	Dark grey massive poorly bedded MDST with numerous thin lenses,pods and bands of bright cleated COAL.	53.00	59°		
56.60	59.00	2.40	SLST	SST	As at 42.20m	58.20	68°		
59.00	61.00	2.00	MDST	COAL	Silty,but as at 50.53m.				
61.00	62.40	1.40	SLST		Medium grey with occ' light grey bands.Weakly bedded.	62.1	71°		
62.40	63.80	1.40	MDST	COAL	As at 50.53m.				
63.80	69.80	6.00	SLST	SST	As at 61.00m.Stick core.	64.00 67.00 68.40	73° 58° 63°		
69.80	75.60	5.80	MDST	COAL	As at 50.53m.0.08m Pyrite band at at 74.14.Carb' and coaly plant fragments.	75.90	71°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
75.60	83.20	7.60	SLST		Dark to medium grey with occ' light grey laminations.Becoming sandier from 79.00m to base.Stick core.	75.90 77.30 78.80 80.60 81.70	71° 77° 72° 71° 75°		
83.20	83.85	0.65	SST		Fine to medium grained,medium grey. Grades to SLST at top.Occ' calcite fracture.Weakly bedded.				
83.85	87.80	3.95	MDST		Dark to medium grey.Massive.Stick core.Silty.Strong white calcite breccia zone at 87.23-87.36m.	84.00 86.20	60° 67°		
87.80	88.20	0.40	COAL		Bright,cleated.			Not sample	12
88.20	91.40	3.20	MDST	COAL	As at 50.53m. E.O.H.				

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-08 **EXAMINER** B.McKinstry **DATE** Aug. 15, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	3.00	3.00	O.B.						
3.00	19.30	16.30	SLST			5.26 7.40 11.85 13.84 14.90 17.70 18.47	73° 72° 70° 80° 80° 52° 75°		
19.30	19.96	0.66	MDST		Alternating crumbly and massive in 25mm bands.	19.50	73°		
19.96	23.06	3.10	SLST			21.70	75°		
23.06	23.22	0.16	MDST	SLST	HW sample			59	100
23.22	25.77	2.55	COAL					60	97
25.77	25.97	0.20	MDST		FW sample			61	100
25.97	31.40	5.43	MDST	COAL	MDST and dirty COAL bands=25mm.	29.60	85°		
31.40	35.11	3.71	SLST		Calcite veining 32.90-33.50m.Criss-crossing.	32.40 34.10	72° 60°		
35.11	35.24	0.13	SLST		HW sample.More muddy than above.	35.24	66°	62	100
35.24	36.40	1.16	COAL					63	71
36.40	36.90	0.50	MDST		FW sample			64	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
36.90	37.20	0.30	MDST		Gradual change to SLST at base.				
37.20	38.20	1.00	SLST		Muddy.				
38.20	39.00	0.80	MDST	COAL	COAL band from 38.50-38.57m				
39.00	42.00	3.00	SLST			40.80	90°		
42.00	42.50	0.50	MDST						
42.5	42.80	0.30	COAL					65	100
42.80	42.98	0.18	MDST						
42.98	43.80	0.82	SLST	MDST	Muddy SLST.	43.51	48°		
43.80	47.40	0.60	MDST	COAL	Bands of muddy COAL in competent MDST.				
47.40	49.20	1.80	MDST			47.70 47.92	50° 60°		
49.20	61.60	12.40	SLST		Vugs containing calcite crystals. Small MDST clasts at 53.50 and 55.10m.	50.54 52.10 53.16 54.80 55.10 57.20 59.15 61.10	53° 47° 60° 30° 55° 55° 55° 57°		
61.60	64.30	2.70	MDST	SLST	Grades to SLST at base.	64.26	65°		
64.30	66.30	2.00	SLST		Dark SLST band 65.00-65.76m.	65.00 66.20	62° 63°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
66.30	68.00	1.70	MDST	SLST		66.90 67.20	65° 64°		
68.00	77.60	9.60	MDST	COAL	Interbedded COAL and competent to crumbly MDST.	71.15 72.10 76.40	57° 56° 54°		
77.60	82.35	4.75	MDST	SLST		78.05	48°		
82.35	87.30	4.95	SLST		At 83.00m a 20mm calcite vein runs at 90° to the bedding.	82.96 83.30 84.90 85.80 86.65	65° 65° 63° 60° 58°		
87.30	89.00	1.70	MDST						
89.00	96.60	7.60	SLST		Irregular calcite veining from 90.50-90.90m.	93.05 94.22 96.25	50° 50° 50°		
96.60	98.91	2.31	MDST	COAL		97.00	75°		
98.91	99.12	0.21	SLST	MDST	HW sample.MDST grades into SLST and into very muddy COAL.			66	100
99.12	100.40	1.28	COAL					67	73
100.40	100.60	0.20	MDST		FW sample			68	100
100.60	104.70	4.10	MDST	COAL	Interbedded MDST and COAL.	104.37	50°		
104.70	104.93	0.23	MDST		HW sample.			69	100
104.93	106.08	1.15	COAL					70	69
106.08	106.29	0.21	MDST		FW sample.			71	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
106.29	106.60	0.31	MDST						
106.60	107.20	0.60	SLST						
107.20	111.20	4.00	MDST	SLST	Some minor COAL bands(30-50mm).	107.70	65°		
111.20	112.80	1.60	SLST		E.O.H.	111.67 111.70 112.47 112.75	60° 55° 48° 48°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-09 **EXAMINER** B.McKinstry **DATE** Aug. 17, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	3.10	3.10	O.B.						
3.10	8.59	5.49	SLST	MDST	Mainly SLST;some MDST layers up to 50mm.	4.04 7.90	60° 57°		
8.59	27.73	19.14	SLST		Some interbedded conformable muddy layers of a light browny orange colour.	9.20 13.50 14.10 14.80 17.90 19.40 21.76 24.10 25.50 26.05	55° 51° 50° 50° 45° 48° 53° 50° 52° 60°		
27.73	29.00	1.27	MDST	SLST	Interbedded.	27.75	60°		
29.00	29.60	0.60	SLST	MDST					
29.60	31.20	1.60	MDST						
31.20	37.00	5.80	SLST		With muddy layers.	31.70 32.50 35.10 35.63	40° 40° 50° 43°		
37.00	38.00	1.00	MDST						
38.00	39.61	1.61	SLST			39.00 39.40	43° 46°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
39.61	39.78	0.17	SLST		HW sample			72	100
39.78	41.78	1.00	COAL					73	84
41.78	42.18	0.40	MDST	COAL	FW sample			74	100
42.18	43.43	1.25	MDST	COAL	Lost COAL from 42.36-43.00m.				0
43.43	44.61	1.18	COAL					75	38
44.61	54.20	9.59	SLST		At 50.40m yellow colouring on SLST, possibly pyritic mineralisation.	45.10 46.03 49.30 50.20 52.20 52.90 54.20	40° 48° 50° 53° 40° 40° 43°		
54.20	54.58	0.38	MDST	COAL				not sampled	100
54.58	58.00	3.42	SLST			55.04 55.50 56.20 58.20	46° 45° 40° 42°		
58.00	59.20	1.20	MDST	COAL					
59.20	60.00	0.80	COAL					76	30
60.00	63.60	3.60	MDST	COAL	Occ' COAL bands up to 50mm.	62.00 62.60 63.30	30° 36° 53°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
63.60	73.81	10.21	SLST			64.40 65.85 67.60 68.90 70.55 72.05 73.00 73.55	60° 56° 56° 47° 39° 50° 37° 47°		
73.81	74.15	0.34	MDST			73.95	52°		
74.15	74.46	0.31	COAL					77	100
74.46	74.61	0.15	MDST						
74.61	79.30	4.69	SLST			76.40 77.60 79.00	48° 52° 38°		
79.30	79.75	0.45	MDST	COAL	Very minor COAL in hard MDST.				
79.75	85.40	5.65	SLST			80.25 82.06 83.22 84.60	45° 56° 45° 34°		
85.40	85.80	0.40	MDST						

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
85.80	111.00	25.20	SLST		Light grey.	86.70	43°		
						87.60	46°		
						89.80	40°		
						91.30	41°		
						92.10	50°		
						93.55	41°		
						95.30	45°		
						96.80	36°		
						97.15	42°		
						97.90	50°		
						99.40	51°		
						100.60	48°		
						102.33	30°		
						102.60	44°		
					From 105.20m SLST is softer and a darker grey.	105.20	34°		
						107.90	41°		
						108.50	42°		
						109.50	53°		
						110.70	38°		
					E.O.H. at 111.00m.	110.00	41°		

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-10 **EXAMINER** B.McKinstry **DATE** Aug. 19, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	6.10	6.10	O.B.						
6.10	6.18	0.08	MDST		Very soft.Malleable with fingers.				
6.18	7.80	1.62	SLST			6.50 7.20	57° 55°		
7.80	8.00	0.20	COAL	MDST	Soft muddy COAL.				
8.00	16.00	8.00	SLST			8.40 10.00 11.30 12.45 13.90 15.60	53° 55° 57° 60° 58° 58°		
16.00	17.21	1.21	MDST		Compact.				
17.21	17.52	0.31	MDST	COAL	HW sample			78	100
17.52	19.82	2.30	COAL					79	66
19.82	20.14	0.32	MDST	COAL	FW sample			80	100
20.14	20.70	0.56	MDST	COAL	HW sample.Not Shown On Photo (N.S.O.P.).			81	100
20.70	22.09	1.39	COAL		N.S.O.P.			82	59
22.09	22.35	0.26	MDST	COAL	FW sample.N.S.O.P.			83	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
22.35	32.40	10.05	SLST			22.80 23.30 23.60 24.60 25.63 27.20 29.40 31.08	57° 57° 56° 48° 58° 48° 53° 43°		
32.40	32.80	0.40	MDST	COAL		32.42	52°		
32.80	33.20	0.40	COAL					84	87
33.20	35.30	2.10	SLST		Dark grey,muddy.	34.22 35.23	57° 52°		
35.30	38.00	2.70	MDST	COAL					
38.00	40.60	2.60	SLST	MDST	Dark grey.Lighter and harder after 38.30m.	38.30 39.15 40.02 40.25	60° 51° 52° 63°		
40.60	41.60	1.00	MDST			40.9	56°		
41.60	43.20	1.60	SLST	MDST	Dark grey.	42.20 42.90	64° 60°		
43.20	44.20	1.00	MDST	COAL	Interbedded MDST and minor COAL.				
44.20	45.30	1.10	SLST			44.30 45.20	58° 60°		
45.30	46.20	0.90	MDST		Grades to SLST at base.	46.00	54°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
46.20	51.60	5.40	SLST		Sudden conformable boundary at base.	46.50 48.14 48.32 49.72 51.34 51.58	60° 76° 70° 58° 58° 63°		
51.60	53.00	1.40	SST	SLST	Coarser than above.Fines to SLST at 52.03m,then recommences.	52.03 52.90	62° 53°		
53.00	54.40	1.40	SLST			53.14 53.49	60° 58°		
54.40	56.10	1.70	SLST	MDST	Interbedded MDST and SLST with gradual boundaries.	55.00	53°		
56.10	57.10	1.00	SLST			56.74	58°		
57.10	57.22	0.12	MDST						
57.22	57.54	0.32	MDST	COAL	HW sample.			85	100
57.54	58.76	1.22	COAL					86	44
58.76	58.96	0.20	SLST	MDST	FW sample.			87	100
58.96	65.10	6.14	SLST			60.00 61.30 62.80 63.70 64.70	53° 60° 62° 59° 65°		
65.10	67.40	2.30	SST		Light grey,coarse.Very hard. Calcite vein at 67.00m;10mm thick.	65.60 67.20	61° 56°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
67.40	86.20	18.80	SLST		Dark to medium grey.Finer than SST above.	68.40 70.35 71.06 72.80 74.30 76.00 77.40 80.20 81.80 83.03 85.97	60° 45° 57° 60° 53° 68° 60° 58° 57° 60° 61°		
86.20	86.50	0.30	MDST						
86.50	86.70	0.20	COAL					88	100
86.70	87.05	0.35	MDST						
87.05	87.27	0.22	COAL					89	100
87.27	87.40	0.13	MDST						
87.40	88.30	0.90	SLST			87.79 88.30	64° 59°		
88.30	88.78	0.48	SLST	MDST	HW sample			90	100
88.78	89.71	0.93	COAL					91	78
89.71	90.02	0.31	MDST	SLST	FW sample.Minor COAL,MDST and SLST.	90.00	63°	92	100
90.02	91.06	1.04	MDST	SLST	Interbedded.				
91.06	91.33	0.27	MDST		HW sample.			93	100
91.33	92.29	0.96	COAL					94	52

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
92.29	92.49	0.20	MDST	COAL	FW sample			95	100
92.49	92.65	0.16	COAL	MDST	Dirty.				
92.65	94.18	1.53	SLST	MDST		93.54 93.84	60° 50°		
94.18	94.31	0.13	SLST	MDST	HW sample			96	100
94.31	95.12	0.81	COAL					97	95
95.12	95.27	0.25	SLST		FW sample			98	100
95.27	101.60	6.33	SLST			95.50 96.77 97.60 99.40 100.10 100.70	54° 51° 54° 48° 59° 60°		
101.60	102.04	0.44	MDST		Compact.				
102.04	102.20	0.16	MDST		HW sample			99	100
102.20	102.80	0.60	COAL					100	82
102.80	102.98	0.18	MDST		FW sample.			101	100
102.98	112.40	9.42	SLST			104.18 105.65 107.20 108.60 110.20 111.40 112.20	62° 54° 50° 55° 57° 58° 52°		

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
112.40	113.06	0.66	MDST	SLST	Compact.	112.60	57°		
113.06	113.27	0.21	MDST	COAL	FW sample.			102	100
113.27	116.38	3.11	COAL	MDST	80mm MDST band from 115.62-115.70m inside COAL sample.			103	54
116.38	116.75	0.37	MDST		Parting.			104	100
116.75	117.37	0.62	COAL					105	100
117.37	117.88	0.51	MDST	COAL	FW sample.100mm longer than on photo.			106	100
117.88	118.00	0.12	MDST	COAL	COAL is very minor.				
118.00	121.90	3.90	SLST			118.70 119.20 119.80 121.05 121.50 121.80	55° 58° 55° 61° 54° 60°		
					E.O.H.				

CORE DESCRIPTION

PROJECT Pine Pass **HOLE I.D.** PP-89-11 **EXAMINER** B.McKinstry **DATE** Aug. 20, 1989

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
0.00	6.10	6.10	O.B.						
6.10	14.50	8.40	SLST			6.72 7.77 9.65 11.70 12.10 13.00 13.85	57° 47° 58° 45° 35° 43° 60°		
14.50	15.76	1.26	MDST	SLST	Compact.				
15.76	16.08	0.32	MDST		HW sample.	15.80	54°	107	100
16.08	19.71	3.63	COAL		MDST band from 18.10-18.23m.			108	61
19.71	19.93	0.22	SLST	MDST	FW sample.			109	100
19.93	21.40	1.47	SLST			20.80	50°		
21.40	21.70	0.30	MDST	COAL					
21.70	25.90	4.20	SLST			21.80 22.70 24.98 25.80	78° 68° 63° 60°		
25.90	29.20	3.30	MDST	COAL	Minor COAL occ' in compact MDST.				

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
29.20	41.00	11.80	SLST			30.86 31.10 31.90 34.80 36.20 36.50 37.60 40.40	55° 53° 54° 50° 60° 53° 52° 63°		
41.00	42.12	1.12	COAL					110	22
42.12	42.42	0.30	MDST	SLST	Compact.Grading into SLST at base.	42.20	56°		
42.42	46.72	4.30	SLST			43.03 44.30 45.80	46° 60° 58°		
46.72	46.90	0.18	SLST	MDST	HW sample	46.76	60°	111	100
46.90	47.60	0.70	COAL					112	100
47.60	47.82	0.22	SLST		FW sample.			113	100
47.82	49.69	1.87	SLST			48.63 49.48	62° 63°		
49.69	49.95	0.26	SLST	MDST	HW sample			114	100
49.95	51.60	1.65	COAL		Very dirty seam.	50.00	63°	115	30
51.60	52.04	0.44	MDST	COAL	FW sample.			116	100
52.04	56.30	4.26	SLST	MDST	Very minor COAL. LC.Coal seam between 54.60-54.95m.	53.90 56.10	70° 56°		
56.30	56.60	0.30	COAL	MDST				Not sample	50

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
56.60	75.60	19.00	SLST	MDST	Compact. Bedding uneven at 67.5m.Three 20mm Calcite veins from 71.6-72.3m. 30mm Calcite vein at 74.82m;conformable with bedding.	57.50 61.80 62.40 63.05 63.85 65.50 67.25 68.35 68.90 70.80 72.70 74.90 75.80	56° 74° 73° 70° 59° 75° 61° 55° 70° 74° 63° 62° 61°		
75.60	80.39	4.79	MDST		Compact.	76.50 77.70 78.80	66° 70° 68°		
80.39	80.68	0.29	MDST		HW sample.			117	100
80.68	99.85	19.17	COAL		Variable bedding.	84.37 86.30 86.80	21° 26° 11°	118	51
99.85	100.25	0.40	MDST		FW sample			119	100
100.25	103.00	2.75	MDST			102.60	0°		
103.00	106.00	3.00	SLST			103.80 105.76	25° 25°		
106.00	110.19	4.19	MDST	COAL	MDST and COAL interbedded. COAL seam from 108.00-109.74m.			Not sample	0
110.19	110.54	0.35	MDST	COAL	HW sample.			120	100
110.54	111.58	1.04	COAL					121	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
111.58	111.78	0.20	MDST		FW sample.			122	100
111.78	114.40	2.62	SLST			113.75	35°		
114.40	118.90	4.50	MDST			115.30 118.10	15° 25°		
118.90	138.40	19.50	SLST			120.90 122.00 124.00 124.50 125.20 128.20 129.40 131.60 135.35 135.70 136.20 137.80	29° 16° 25° 25° 23° 26° 25° 22° 19° 18° 20° 31°		
138.40	140.29	1.89	MDST						
140.29	140.62	0.33	MDST		HW sample.			123	100
140.62	144.40	3.78	COAL					124	37
144.40	144.64	0.24	SLST		FW sample.			125	100

DEPTH (METRES)			LITHOLOGY			BEDDING ANGLE		SAMPLE	
FROM	TO	THICK-NESS	MAIN	MINOR	DESCRIPTION	DEPTH (M)	ANGLE	NUMBER	% RCVRY
144.64	168.63	23.99	SLST			147.40 148.80 150.40 154.50 157.90 158.50 161.50 163.10 164.80 166.00 166.50 166.90 167.50 168.30	32° 55° 30° 48° 53° 38° 26° 36° 45° 50° 51° 48° 48° 61°		
168.63	169.20	0.57	MDST		E.O.H.				

LORING LABORATORIES LTD.

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 33074
DATE : JANUARY 18, 1990
SAMPLE TYPE : CORE
PAGE 1

HOLES : 89-01/-03/-04/-05/-06/-07/-08/-09

SAMPLE	INTERVAL (M)		BASIS	% H20	% ASH	% V	% F.C.	H.G.I.
5	97.51	100.40	A.R.	4.66	4.75	25.24	65.35	
			A.D.	1.16	4.92	26.17	67.75	
			D.B.	-----	4.98	26.48	68.55	
13	26.26	36.60	A.R.	4.06	2.86	22.91	70.16	
			A.D.	1.40	2.94	23.55	72.11	79
			D.B.	-----	2.98	23.88	73.13	
16	42.04	44.64	A.R.	4.05	7.65	24.34	63.96	
			A.D.	0.92	7.90	25.13	66.05	
			D.B.	-----	7.97	25.36	66.66	
29	17.08	20.00	A.R.	4.34	5.17	24.47	66.03	
			A.D.	0.92	5.35	25.34	68.39	83
			D.B.	-----	5.40	25.58	69.03	
40	60.50	63.40	A.R.	3.80	4.87	25.29	66.04	
			A.D.	0.99	5.01	26.03	67.97	
			D.B.	-----	5.06	26.29	68.65	
43	5.83	7.52	A.R.	5.34	5.99	23.34	65.32	
			A.D.	1.63	6.23	24.26	67.88	73
			D.B.	-----	6.33	24.66	69.00	
60	23.40	25.90	A.R.	4.19	8.10	24.43	63.29	
			A.D.	0.94	8.37	25.26	65.43	87
			D.B.	-----	8.45	25.50	66.05	
73	39.70	42.44	A.R.	3.87	10.29	25.76	60.08	
			A.D.	0.66	10.63	26.62	62.09	89
			D.B.	-----	10.70	26.80	62.50	
79	17.64	19.65	A.R.	3.46	9.40	23.46	63.68	
			A.D.	0.96	9.64	24.07	65.33	79
			D.B.	-----	9.73	24.30	65.96	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 33074
DATE : JANUARY 18, 1990
SAMPLE TYPE : CORE

HOLES : 89-10/-11

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% V	% F.C.	H.G.I.
82	20.50	21.46	A.R.	4.91	7.18	20.92	66.99	
			A.D.	0.97	7.48	21.79	69.76	76
			D.B.	-----	7.55	22.00	70.44	
97	94.29	95.14	A.R.	3.69	14.29	19.72	62.29	
			A.D.	0.42	14.78	20.39	64.41	
			D.B.	-----	14.84	20.48	64.68	
100	102.52	103.72	A.R.	2.99	11.76	20.61	64.64	
			A.D.	0.50	12.06	21.14	66.30	
			D.B.	-----	12.12	21.25	66.63	
103	113.57	116.54	A.R.	8.83	22.61	16.19	52.37	
			A.D.	0.52	24.67	17.67	57.14	85
			D.B.	-----	24.80	17.76	57.44	
108	16.29	19.97	A.R.	7.72	23.66	16.17	52.46	
			A.D.	0.62	25.48	17.41	56.49	
			D.B.	-----	25.64	17.52	56.84	
110	41.21	41.46	A.R.	4.52	14.27	17.76	63.44	
			A.D.	0.57	14.86	18.50	66.07	
			D.B.	-----	14.95	18.61	66.45	
112	47.20	48.06	A.R.	4.07	19.15	19.15	57.63	
			A.D.	0.44	19.88	19.87	59.81	
			D.B.	-----	19.97	19.96	60.07	
118	81.54	101.00	A.R.	16.38	11.19	16.55	55.87	
			A.D.	0.64	13.30	19.67	66.39	87
			D.B.	-----	13.39	19.80	66.82	
124	141.68	143.80	A.R.	10.14	15.47	19.62	54.76	
			A.D.	0.64	17.11	21.70	60.55	
			D.B.	-----	17.22	21.84	60.94	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: STEVE CAMERON/BRIAN McKINSTRY
PROJECT : ~~TELKWA~~ PINE PASS

FILE # 33074
DATE : JANUARY 29, 1990
REPORTED BY : ARNO HOOGVELD

				MINERAL ANALYSIS OF ASH										
HOLE	INTERVAL (M)		SAMPLE	%SiO2	%Al2O3	%TiO2	%Fe2O3	%CaO	%MgO	%Na2O	%K2O	%P2O5	%SO3	%Undet.
89-03	26.26	36.60	13	42.60	22.88	0.96	13.75	8.20	2.62	2.22	0.78	0.92	4.05	1.02
89-05	17.08	20.00	29	51.70	28.04	1.18	9.62	1.79	1.30	1.19	1.41	1.08	1.21	1.48
89-07	5.83	7.52	43	49.81	31.83	0.95	7.42	1.76	0.59	0.87	0.93	1.85	1.22	2.77
89-08	23.40	25.90	60	57.04	30.16	1.05	3.32	1.23	0.94	0.85	2.13	0.74	0.93	1.61

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ATTN.: BRIAN McKINSTRY
PROJECT : ~~TELKWA~~ PINE PASS

FILE # : 33074
DATE : JANUARY 26, 1990
REPORTED BY : ARNO HOOGVEL

PAGE : 5 ASH FUSION

HOLE	SAMPLE	----- OXIDIZING ATMOSPHERE ----- (Temperatures in Centigrade) INITIAL	SOFTEN.	HEMISPH.	FLUID
89-03	13	1248	1295	1311	1327
89-05	29	1337	+1472	+1472	+1472
89-07	43	+1472	+1472	+1472	+1472
89-08	60	+1472	+1472	+1472	+1472

HOLE	SAMPLE	----- REDUCING ATMOSPHERE ----- (Temperatures in Centigrade) INITIAL	SOFTEN.	HEMISPH.	FLUID
89-03	13	1153	1198	1211	1274
89-05	29	1332	1419	1432	+1472
89-07	43	1464	+1472	+1472	+1472
89-08	60	+1472	+1472	+1472	+1472

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-01

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
1	65.90	66.10	A.R.	2.22	13.86	4.97	7181	
			A.D.	0.80	14.06	5.04	7286	7.5
			D.B.	-----	14.17	5.08	7345	
2	71.34	72.08	A.R.	3.75	4.49	1.27	7832	
			A.D.	1.09	4.61	1.30	8049	7.5
			D.B.	-----	4.66	1.31	8138	
	72.08	72.30	A.R.	2.49	63.98	0.33	2720	
			A.D.	0.72	65.14	0.34	2769	1.0
			D.B.	-----	65.61	0.34	2789	
4	97.38	97.51	A.R.	5.17	82.48	0.18	676	
			A.D.	1.50	85.67	0.19	702	0.0
			D.B.	-----	86.97	0.19	713	
5	97.51	100.40	A.R.	4.66	4.75	0.44	7710	
			A.D.	1.16	4.92	0.46	7993	6.5
			D.B.	-----	4.98	0.47	8087	
6	100.40	100.60	A.R.	4.43	57.93	0.21	2963	
			A.D.	1.17	59.91	0.22	3064	1.5
			D.B.	-----	60.62	0.22	3100	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-02

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
7	25.80	26.45	A.R.	3.24	26.03	0.69	5678	
			A.D.	1.54	26.49	0.70	5777	1.0
			D.B.	-----	26.90	0.71	5867	
8	39.57	40.22	A.R.	4.13	22.44	0.60	5965	
			A.D.	1.52	23.05	0.62	6127	0.5
			D.B.	-----	23.41	0.63	6222	
	43.41	44.15	A.R.	3.10	6.83	0.72	7681	
			A.D.	0.80	6.99	0.74	7863	5.0
			D.B.	-----	7.05	0.75	7926	
10	46.00	46.39	A.R.	2.56	20.52	0.86	6591	
			A.D.	0.80	20.89	0.88	6710	5.0
			D.B.	-----	21.06	0.89	6764	
11	64.00	65.00	A.R.	3.53	12.22	0.70	7254	
			A.D.	0.78	12.57	0.72	7461	7.0
			D.B.	-----	12.67	0.73	7520	
12	73.00	75.60	A.R.	1.87	22.26	0.74	6258	
			A.D.	0.91	22.48	0.75	6319	2.5
			D.B.	-----	22.69	0.76	6377	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-03

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
13	26.26	36.60	A.R.	4.06	2.86	0.42	8005	
			A.D.	1.40	2.94	0.43	8227	2.5
			D.B.	-----	2.98	0.44	8344	

HOLE : 89-04

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
14	14.18	14.80	A.R.	5.18	4.41	0.31	7284	
			A.D.	1.93	4.56	0.32	7534	2.5
			D.B.	-----	4.65	0.33	7682	
15	41.84	42.04	A.R.	4.84	84.69	0.95	462	
			A.D.	1.13	87.99	0.99	480	0.0
			D.B.	-----	89.00	1.00	485	
16	42.04	44.64	A.R.	4.05	7.65	0.20	7442	
			A.D.	0.92	7.90	0.21	7685	6.0
			D.B.	-----	7.97	0.21	7756	
17	44.64	44.84	A.R.	4.21	81.47	0.08	779	
			A.D.	1.22	84.02	0.08	803	0.0
			D.B.	-----	85.06	0.08	813	
18	53.15	53.80	A.R.	2.54	16.26	0.60	6879	
			A.D.	0.75	16.56	0.61	7006	8.0
			D.B.	-----	16.69	0.61	7059	

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PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-04

SAMPLE	INTERVAL	(M)	BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
19	59.01	59.18	A.R.	5.12	72.06	0.14	1443	
			A.D.	1.19	75.04	0.15	1503	0.0
			D.B.	-----	75.94	0.15	1521	
20	59.18	59.60	A.R.	2.35	24.50	0.41	~~[illegible]~~	
			A.D.	0.84	24.88	0.42	~~[illegible]~~ 5802	1.5
			D.B.	-----	25.09	0.42	~~[illegible]~~	
	59.60	59.80	A.R.	5.17	38.00	0.29	3490	
			A.D.	0.50	39.87	0.30	3662	2.0
			D.B.	-----	40.07	0.30	3680	
22	61.00	61.16	A.R.	5.71	70.76	0.14	1647	
			A.D.	1.31	74.06	0.15	1724	0.0
			D.B.	-----	75.04	0.15	1747	
23	61.16	61.74	A.R.	3.86	21.22	0.44	6262	
			A.D.	0.76	21.90	0.45	6464	3.5
			D.B.	-----	22.07	0.45	6514	
24	61.74	61.92	A.R.	3.93	69.11	0.14	1780	
			A.D.	0.89	71.30	0.14	1836	1.0
			D.B.	-----	71.94	0.14	1852	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-04

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
25	63.00	63.55	A.R.	2.84	10.59	0.43	7399	
			A.D.	0.77	10.82	0.44	7557	4.0
			D.B.	-----	10.90	0.44	7616	
26	83.25	83.60	A.R.	3.29	22.95	0.66	6325	
			A.D.	0.61	23.59	0.68	6500	5.5
			D.B.	-----	23.73	0.68	6540	
	86.60	87.67	A.R.	3.60	40.84	0.36	4409	
			A.D.	0.98	41.95	0.37	4529	3.5
			D.B.	-----	42.37	0.37	4574	

HOLE : 89-05

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
28	16.88	17.08	A.R.	3.40	82.07	0.20	757	
			A.D.	0.95	84.15	0.21	776	0.0
			D.B.	-----	84.96	0.21	783	
29	17.08	20.00	A.R.	4.34	5.17	0.47	7586	
			A.D.	0.92	5.35	0.49	7857	3.0
			D.B.	-----	5.40	0.49	7930	
30	20.00	20.20	A.R.	2.51	78.64	0.18	1248	
			A.D.	0.91	79.93	0.18	1268	0.0
			D.B.	-----	80.66	0.18	1280	

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PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-05

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
31	29.37	30.20	A.R.	2.29	27.62	0.66	5918	
			A.D.	0.74	28.06	0.67	6012	8.0
			D.B.	-----	28.27	0.67	6057	
32	36.10	36.60	A.R.	3.86	18.43	0.55	6600	
			A.D.	0.57	19.06	0.57	6826	3.5
			D.B.	-----	19.17	0.57	6865	
3	43.18	43.72	A.R.	2.33	24.20	0.47	6118	
			A.D.	0.70	24.60	0.48	6220	3.0
			D.B.	-----	24.77	0.48	6264	
34	43.98	45.16	A.R.	2.47	79.78	0.08	676	
			A.D.	0.73	81.20	0.08	688	0.0
			D.B.	-----	81.80	0.08	693	
35	45.16	45.86	A.R.	4.86	29.19	0.44	5425	
			A.D.	0.80	30.43	0.46	5656	5.0
			D.B.	-----	30.68	0.46	5702	
36	45.86	46.50	A.R.	2.06	69.21	0.17	2052	
			A.D.	0.93	70.01	0.17	2076	1.5
			D.B.	-----	70.67	0.17	2095	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 6, 1989
SAMPLE TYPE : CORE

HOLE : 89-05

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
37	46.50	47.00	A.R.	3.49	20.86	0.37	6374	
			A.D.	0.93	21.41	0.38	6543	5.0
			D.B.	-----	21.61	0.38	6604	
38	66.99	68.12	A.R.	3.43	19.88	0.69	6513	
			A.D.	0.92	20.40	0.71	6683	7.0
			D.B.	-----	20.59	0.72	6745	

HOLE : 89-06

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
38	33.50	34.04	A.R.	4.21	2.80	0.27	7806	
(REPEAT #)			A.D.	1.40	2.88	0.28	8035	4.5
			D.B.	-----	2.92	0.28	8149	
39	60.40	60.50	A.R.	6.51	78.08	0.22	965	
			A.D.	1.23	82.49	0.23	1019	0.0
			D.B.	-----	83.52	0.23	1032	
40	60.50	63.40	A.R.	3.80	4.87	0.46	7730	
			A.D.	0.99	5.01	0.47	7956	5.0
			D.B.	-----	5.06	0.47	8036	
41	63.40	63.75	A.R.	5.13	51.15	0.22	3507	
			A.D.	1.19	53.28	0.23	3653	2.5
			D.B.	-----	53.92	0.23	3697	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 13, 1989
SAMPLE TYPE : CORE

HOLE : 89-07

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
42	5.63	5.83	A.R.	4.90	83.91	0.15	559	
			A.D.	1.29	87.09	0.16	580	0.0
			D.B.	-----	88.23	0.16	588	
43	5.83	7.52	A.R.	5.34	5.99	0.47	7563	
			A.D.	1.63	6.23	0.49	7860	2.5
			D.B.	-----	6.33	0.50	7990	
	7.52	7.74	A.R.	3.71	56.06	0.22	2986	
			A.D.	1.26	57.49	0.23	3062	2.5
			D.B.	-----	58.22	0.23	3101	
45	18.00	18.14	A.R.	2.73	73.20	0.23	1619	
			A.D.	1.40	74.20	0.23	1641	1.5
			D.B.	-----	75.25	0.23	1664	
46	18.14	19.00	A.R.	3.15	6.89	0.60	7689	
			A.D.	1.00	7.04	0.61	7860	7.0
			D.B.	-----	7.11	0.62	7939	
47	19.00	19.30	A.R.	3.27	83.32	0.19	687	
			A.D.	1.26	85.05	0.19	701	0.0
			D.B.	-----	86.14	0.19	710	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 13, 1989
SAMPLE TYPE : CORE

HOLE : 89-07

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
48	27.09	27.31	A.R.	3.71	82.43	0.10	759	
			A.D.	1.16	84.62	0.10	779	0.0
			D.B.	-----	85.61	0.10	788	
49	27.31	27.98	A.R.	4.88	9.23	0.48	7325	
			A.D.	1.46	9.56	0.50	7588	1.0
			D.B.	-----	9.70	0.51	7700	
	27.98	28.50	A.R.	3.64	83.16	0.12	743	
			A.D.	1.28	85.20	0.12	761	0.0
			D.B.	-----	86.30	0.12	771	
51	28.50	29.08	A.R.	3.29	8.89	0.45	7375	
			A.D.	1.07	9.09	0.46	7544	3.0
			D.B.	-----	9.19	0.46	7626	
52	29.08	29.33	A.R.	2.76	75.82	0.08	1165	
			A.D.	0.80	77.35	0.08	1189	0.0
			D.B.	-----	77.97	0.08	1199	
53	29.33	29.49	A.R.	3.87	7.42	0.49	7533	
			A.D.	1.16	7.63	0.50	7745	4.5
			D.B.	-----	7.72	0.51	7836	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 13, 1989
SAMPLE TYPE : CORE

HOLE : 89-07

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
54	29.49	29.73	A.R.	3.83	79.71	0.06	450	
			A.D.	0.84	82.19	0.06	464	0.0
			D.B.	-----	82.89	0.06	468	
55	29.73	31.48	A.R.	5.06	20.92	0.36	6268	
			A.D.	1.04	21.81	0.38	6533	5.5
			D.B.	-----	22.04	0.38	6602	
[illegible]	31.48	31.67	A.R.	3.90	59.55	0.18	2570	
			A.D.	1.16	61.25	0.19	2643	1.5
			D.B.	-----	61.97	0.19	2674	
57	49.23	50.40	A.R.	4.44	9.05	0.60	7336	
			A.D.	1.28	9.35	0.62	7579	4.0
			D.B.	-----	9.47	0.63	7677	
58	50.40	50.53	A.R.	4.01	87.57	0.04	312	
			A.D.	1.60	89.76	0.04	320	0.0
			D.B.	-----	91.22	0.04	325	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 13, 1989
SAMPLE TYPE : CORE

HOLE : 89-08

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
59	22.10	23.40	A.R.	3.18	84.84	0.20	592	
			A.D.	1.19	86.58	0.20	604	0.0
			D.B.	-----	87.62	0.20	611	
60	23.40	25.90	A.R.	4.19	8.10	0.42	7440	
			A.D.	0.94	8.37	0.43	7692	4.0
			D.B.	-----	8.45	0.43	7765	
	25.90	26.20	A.R.	4.03	81.81	0.16	738	
			A.D.	1.13	84.29	0.16	760	0.0
			D.B.	-----	85.25	0.16	769	
62	35.30	35.46	A.R.	2.99	77.65	0.61	1338	
			A.D.	0.57	79.59	0.63	1371	0.5
			D.B.	-----	80.05	0.63	1379	
63	35.46	36.60	A.R.	3.54	33.74	0.54	4901	
			A.D.	0.88	34.67	0.56	5036	6.5
			D.B.	-----	34.98	0.56	5081	
64	36.60	37.10	A.R.	4.16	60.85	0.32	2779	
			A.D.	1.03	62.84	0.33	2870	2.0
			D.B.	-----	63.49	0.33	2900	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 13, 1989
SAMPLE TYPE : CORE

HOLE : 89-08

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
65	42.50	42.84	A.R.	2.68	2.75	0.64	8087	
			A.D.	0.72	2.81	0.65	8250	8.0
			D.B.	-----	2.83	0.65	8310	
66	99.10	99.31	A.R.	4.61	80.95	0.09	351	
			A.D.	0.73	84.25	0.09	365	0.0
			D.B.	-----	84.87	0.09	368	
67	99.31	100.66	A.R.	3.14	12.82	0.67	7174	
			A.D.	0.78	13.13	0.69	7349	4.0
			D.B.	-----	13.23	0.70	7407	
68	100.66	101.23	A.R.	4.46	88.80	0.04	229	
			A.D.	1.29	91.75	0.04	237	0.0
			D.B.	-----	92.95	0.04	240	
69	104.99	105.22	A.R.	4.07	83.14	0.10	756	
			A.D.	1.40	85.45	0.10	777	0.0
			D.B.	-----	86.66	0.10	788	
70	105.22	106.37	A.R.	3.06	31.27	0.37	5480	
			A.D.	0.86	31.98	0.38	5605	5.0
			D.B.	-----	32.26	0.38	5654	
71	106.37	106.58	A.R.	4.48	78.85	0.13	986	
			A.D.	1.37	81.42	0.13	1018	0.0
			D.B.	-----	82.55	0.13	1032	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 14, 1989
SAMPLE TYPE : CORE

HOLE : 89-09

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
72	39.53	39.70	A.R.	2.11	87.93	0.14	282	
			A.D.	1.11	88.83	0.14	285	0.0
			D.B.	-----	89.83	0.14	288	
73	39.70	42.44	A.R.	3.87	10.29	0.45	7251	
			A.D.	0.66	10.63	0.46	7493	4.5
			D.B.	-----	10.70	0.46	7543	
	42.44	42.85	A.R.	3.33	60.84	0.21	2807	
			A.D.	0.99	62.32	0.21	2875	2.0
			D.B.	-----	62.94	0.21	2904	
75	43.45	44.45	A.R.	3.29	34.83	0.42	5269	
			A.D.	0.88	35.70	0.43	5400	5.5
			D.B.	-----	36.02	0.43	5448	
76	60.60	61.07	A.R.	3.90	20.56	1.49	6561	
			A.D.	0.76	21.23	1.54	6775	8.5
			D.B.	-----	21.39	1.55	6827	
77	74.54	74.85	A.R.	18.04	23.76	0.34	4877	
			A.D.	0.85	28.74	0.41	5900	3.5
			D.B.	-----	28.99	0.41	5951	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 14, 1989
SAMPLE TYPE : CORE

HOLE : 89-10

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
78	17.33	17.64	A.R.	2.70	62.13	0.29	2722	
			A.D.	0.98	63.23	0.30	2770	1.0
			D.B.	-----	63.86	0.30	2797	
79	17.64	19.65	A.R.	3.46	9.40	0.43	7381	
			A.D.	0.96	9.64	0.44	7572	3.5
			D.B.	-----	9.73	0.44	7645	
	19.65	19.97	A.R.	6.14	78.18	0.09	897	
			A.D.	1.17	82.32	0.09	945	0.0
			D.B.	-----	83.29	0.09	956	
81	19.97	20.50	A.R.	3.73	72.92	0.19	1642	
			A.D.	1.14	74.89	0.19	1686	0.0
			D.B.	-----	75.75	0.19	1705	
82	20.50	21.46	A.R.	4.91	7.18	0.48	7312	
			A.D.	0.97	7.48	0.50	7615	2.0
			D.B.	-----	7.55	0.50	7690	
83	21.46	21.72	A.R.	2.70	79.74	0.17	956	
			A.D.	0.89	81.23	0.17	974	0.0
			D.B.	-----	81.96	0.17	983	

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TO : CROWSNEST RESOURCES LTD.
ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-10

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
84	33.09	33.36	A.R.	5.93	39.51	0.74	4549	
			A.D.	0.88	41.63	0.78	4793	7.0
			D.B.	-----	42.00	0.79	4836	
85	57.39	57.71	A.R.	2.34	61.93	0.31	2725	
			A.D.	0.76	62.93	0.31	2769	1.0
			D.B.	-----	63.41	0.31	2790	
	57.71	58.73	A.R.	2.21	26.51	0.68	5944	
			A.D.	0.62	26.94	0.69	6040	5.5
			D.B.	-----	27.11	0.69	6078	
87	58.73	58.93	A.R.	1.72	92.76	0.04	154	
			A.D.	0.79	93.64	0.04	155	0.0
			D.B.	-----	94.39	0.04	156	
88	86.57	86.84	A.R.	2.99	40.35	0.51	4675	
			A.D.	0.73	41.29	0.52	4784	1.0
			D.B.	-----	41.59	0.52	4819	
89	87.05	87.25	A.R.	2.64	13.52	0.75	6945	
			A.D.	0.44	13.83	0.77	7102	5.5
			D.B.	-----	13.89	0.77	7133	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-10

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
90	88.40	88.70	A.R.	1.08	86.13	0.16	303	
			A.D.	0.43	86.70	0.16	305	0.0
			D.B.	-----	87.07	0.16	306	
91	88.70	89.49	A.R.	2.67	7.93	0.73	7655	
			A.D.	0.58	8.10	0.75	7819	5.0
			D.B.	-----	8.15	0.75	7865	
	89.49	89.79	A.R.	3.77	72.78	0.17	1696	
			A.D.	0.62	75.16	0.18	1752	0.0
			D.B.	-----	75.63	0.18	1763	
93	90.98	91.26	A.R.	2.70	82.55	0.17	748	
			A.D.	0.72	84.23	0.17	763	0.0
			D.B.	-----	84.84	0.17	769	
94	91.26	92.20	A.R.	2.76	28.08	0.43	6046	
			A.D.	0.48	28.74	0.44	6188	2.0
			D.B.	-----	28.88	0.44	6218	
95	92.20	92.52	A.R.	2.94	66.23	0.25	2288	
			A.D.	0.86	67.65	0.26	2337	1.0
			D.B.	-----	68.24	0.26	2357	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-10

SAMPLE	INTERVAL (M)		BASIS	% H20	% ASH	% S	KCAL/KG	F.S.I.
96	94.16	94.29	A.R.	2.22	84.89	0.09	411	
			A.D.	0.62	86.28	0.09	418	0.0
			D.B.	-----	86.82	0.09	421	
97	94.29	95.14	A.R.	3.69	14.29	0.63	6983	
			A.D.	0.42	14.78	0.65	7220	3.0
			D.B.	-----	14.84	0.65	7250	
98	95.14	95.29	A.R.	1.66	88.50	0.04	161	
			A.D.	0.35	89.68	0.04	163	0.0
			D.B.	-----	89.99	0.04	164	
99	102.36	102.52	A.R.	2.47	85.47	0.07	547	
			A.D.	0.60	87.10	0.07	557	0.0
			D.B.	-----	87.63	0.07	560	
100	102.52	103.72	A.R.	2.99	11.76	0.83	7247	
			A.D.	0.50	12.06	0.85	7433	2.0
			D.B.	-----	12.12	0.85	7470	
101	103.72	103.85	A.R.	1.28	87.98	0.09	332	
			A.D.	0.35	88.81	0.09	335	0.0
			D.B.	-----	89.12	0.09	336	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-10

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
102	113.36	113.57	A.R.	2.79	84.95	0.10	384	
			A.D.	0.74	86.74	0.11	392	0.0
			D.B.	-----	87.39	0.11	395	
103	113.57	116.54	A.R.	8.83	22.61	0.59	5794	
			A.D.	0.52	24.67	0.64	6322	2.0
			D.B.	-----	24.80	0.64	6355	
1[illegible]	116.54	116.81	A.R.	2.54	73.84	0.23	1584	
			A.D.	0.71	75.22	0.23	1614	0.0
			D.B.	-----	75.76	0.23	1626	
105	116.81	117.45	A.R.	3.64	14.14	0.60	7002	
			A.D.	0.54	14.59	0.62	7227	2.5
			D.B.	-----	14.67	0.62	7266	
106	117.45	117.88	A.R.	5.14	57.13	0.47	2895	
			A.D.	0.60	59.87	0.49	3034	1.5
			D.B.	-----	60.23	0.49	3052	

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ATTN.: BRIAN MCKINSTRY
PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-11

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
107	15.97	16.29	A.R.	5.66	85.78	0.08	250	
			A.D.	0.50	90.47	0.08	264	0.0
			D.B.	-----	90.92	0.08	265	
108	16.29	19.97	A.R.	7.72	23.66	0.51	5852	
			A.D.	0.62	25.48	0.55	6302	2.0
			D.B.	-----	25.64	0.55	6341	
1[illegible]	19.97	20.19	A.R.	2.59	86.61	0.11	412	
			A.D.	0.39	88.56	0.11	421	0.0
			D.B.	-----	88.91	0.11	423	
110	41.21	41.46	A.R.	4.52	14.27	0.58	6874	
			A.D.	0.57	14.86	0.60	7159	1.0
			D.B.	-----	14.95	0.60	7200	
111	47.02	47.20	A.R.	1.41	83.40	0.13	274	
			A.D.	0.38	84.27	0.13	277	0.0
			D.B.	-----	84.59	0.13	278	
112	47.20	48.06	A.R.	4.07	19.15	0.63	6401	
			A.D.	0.44	19.88	0.65	6643	2.0
			D.B.	-----	19.97	0.65	6672	

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PROJECT : PINE PASS

FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-11

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
113	48.06	48.28	A.R.	1.81	84.61	0.07	92	
			A.D.	0.54	85.70	0.07	93	0.0
			D.B.	-----	86.17	0.07	94	
114	50.04	50.30	A.R.	1.92	84.81	0.13	163	
			A.D.	0.60	85.96	0.13	165	0.0
			D.B.	-----	86.48	0.13	166	
[illegible]5	50.30	50.80	A.R.	3.68	36.69	0.40	4995	
			A.D.	0.75	37.80	0.41	5147	2.0
			D.B.	-----	38.09	0.41	5186	
116	51.90	52.34	A.R.	3.38	72.01	0.18	1572	
			A.D.	0.90	73.86	0.18	1612	0.0
			D.B.	-----	74.53	0.18	1627	
117	81.25	81.54	A.R.	2.31	77.01	0.18	974	
			A.D.	0.88	78.14	0.18	988	0.0
			D.B.	-----	78.83	0.18	997	
118	81.54	101.00	A.R.	16.38	11.19	0.57	6108	
			A.D.	0.64	13.30	0.68	7258	1.5
			D.B.	-----	13.39	0.68	7305	

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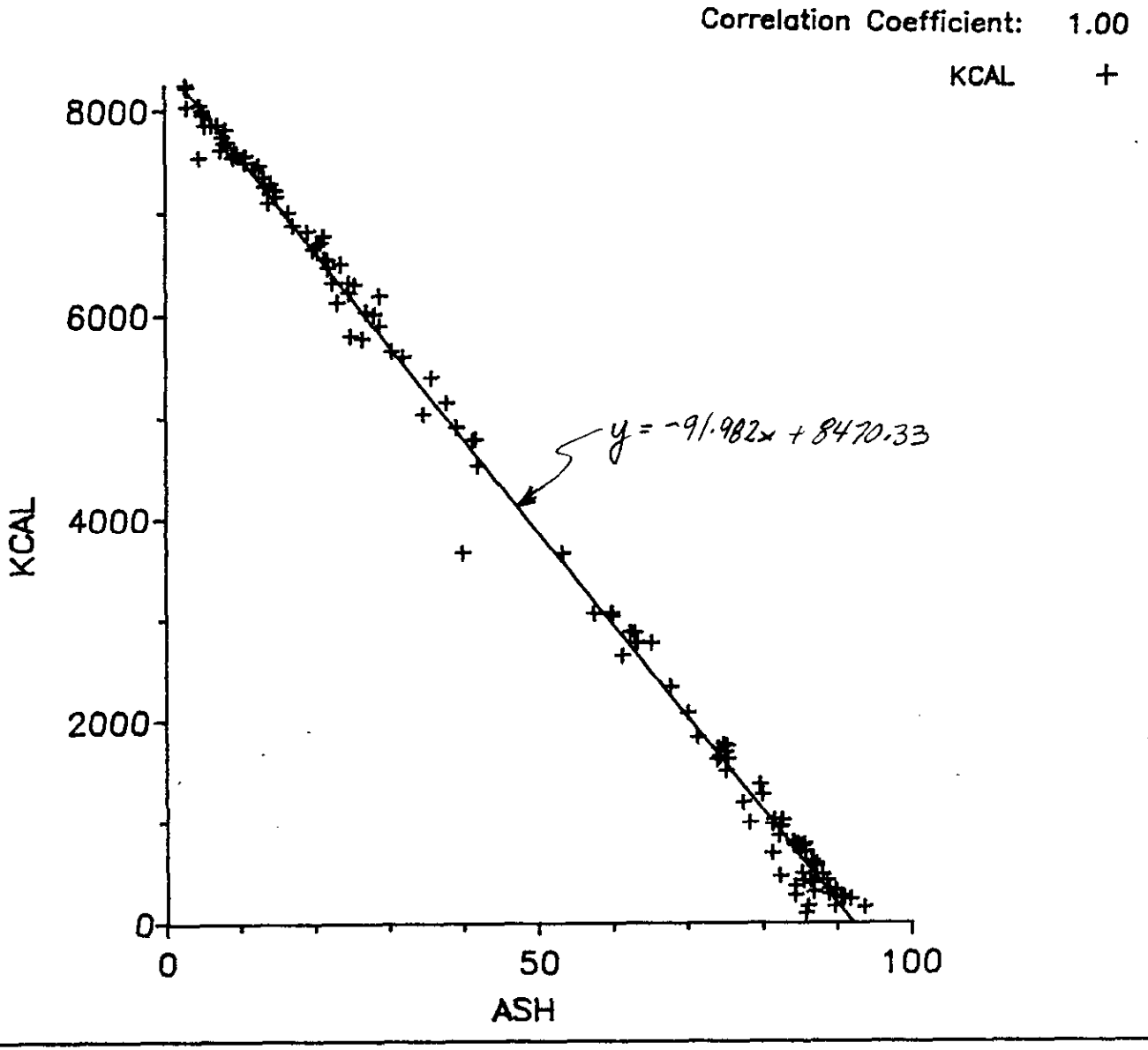
FILE # : 32723
DATE : SEPTEMBER 19, 1989
SAMPLE TYPE : CORE

HOLE : 89-11

SAMPLE	INTERVAL (M)		BASIS	% H2O	% ASH	% S	KCAL/KG	F.S.I.
119	101.00	101.40	A.R.	4.10	82.57	0.25	406	
			A.D.	0.80	85.42	0.26	420	0.0
			D.B.	-----	86.11	0.26	423	
120	109.40	109.85	A.R.	4.36	72.15	0.26	1699	
			A.D.	0.86	74.79	0.27	1761	0.0
			D.B.	-----	75.44	0.27	1776	
	109.85	112.70	A.R.	3.95	37.77	0.40	4746	
			A.D.	0.65	39.07	0.41	4909	1.5
			D.B.	-----	39.33	0.41	4941	
122	112.70	112.90	A.R.	2.66	83.53	0.68	482	
			A.D.	0.68	85.23	0.69	492	0.0
			D.B.	-----	85.81	0.69	495	
123	181.35	181.68	A.R.	4.89	78.88	0.36	825	
			A.D.	1.03	82.08	0.37	858	0.0
			D.B.	-----	82.93	0.37	867	
124	141.68	143.80	A.R.	10.14	15.47	0.57	6226	
			A.D.	0.64	17.11	0.63	6885	1.5
			D.B.	-----	17.22	0.63	6929	
125	143.80	144.02	A.R.	2.15	89.38	0.06	241	
			A.D.	0.54	90.85	0.06	245	0.0
			D.B.	-----	91.34	0.06	246	

PINE PASS QUALITY DATA
ASH VS HEAT CONTENT



CROWSNEST RESOURCES

1989 EXPLORATION PROGRAM - PINE PASS

DRILL HOLES

	Northing	Easting	Ground Elevation
89-1	6161940.36	542013.85	733.21
89-2	6161644.76	541629.91	777.70
89-3	6161792.34	541613.95	783.20
89-4	6162084.01	541642.83	845.62
89-5	6161999.26	541640.38	848.12
89-6	6161990.79	541850.26	769.64
89-7	6162368.07	541433.95	899.67
89-8	6162110.23	541536.81	873.59
89-9	6161609.32	541250.38	841.81
89-10	6162138.44	540788.97	998.95
89-11	6162798.64	540282.69	1069.68

COAL LITHOLOGY LOG

BOREHOLE: 89-01
CLIENT: CROWNSITE RESOURCES LTD.
AREA: STONE CREEK B.C.
COUNTRY: CANADA
DATE LOGGED: 1989-Jul-25
LOGGING UNIT: 1
OPERATOR: Jim Ausman

BOREHOLE TYPE: COAL
DIRECTION: VERTICAL
DOWNHOLE: 0.0 m
LOG SURVEY: GAMMA RAY
CALIPER
DENSITY

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT		SYNC			TIMEL			DEPTHS		SLAW LOG RUN
	SONDE	SOURCE	CAMERAS	LOG	RECORD	DIRECT	SPEED	CTS	NORM	FROM	TO	REMARKS
	1100											
GAMMA RAY			242	Y	9	D	9	1	-	6.6	105	0	190	-
BULK DENSITY		1010	0041	Y	9	D	9	1	7.66	-	107	2	185	-
CALIPER	1010	2**.2**		Y	9	D	9	1	-	-	107	2	185	-

COAL SEAM/SYSTEM THICKNESS LOG INTERVALS (Refer to column 1g)

FROM		INTERVAL
TO		TOTAL
ORIGINAL		

ADDITIONAL SONDES RUN			REMARKS
SONDE	S/N	CAMERA, 2" DIA. DUAL LIGHT BOX	
1214	0186	1/1080	
1216	1007		

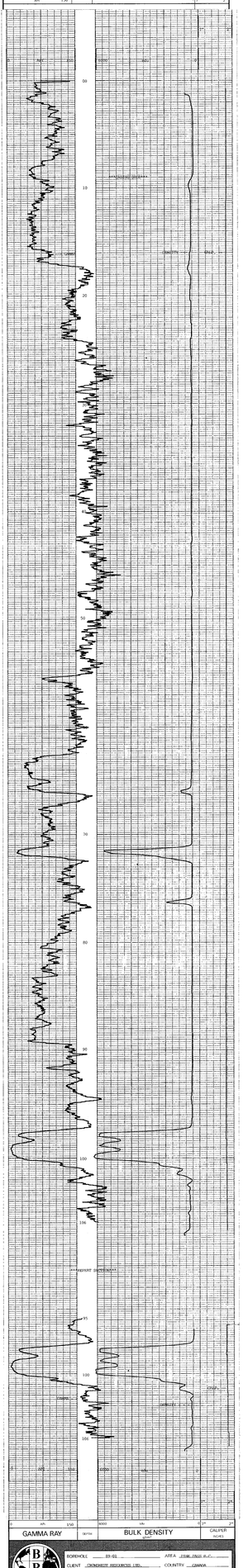
BPB COAL LITHOLOGY LOG

CALIBRATION DATA

AC No 242	VAULT(&S/2) 1 YEAR	AC CAL DATE 1/2/89	AC VALUE	SENS(S)	1** = 0.978
AC BLOK SHOWN AT ABOVE VALUE		AC No 0041	SPAN 699	NORM 6.6 / 7.66	1** = 0.842

GAMMA RAY | DEPTH | BULK DENSITY | CALIPER INCHES

HOLE SIZE CORRECTION DATA



GAMMA RAY | DEPTH | BULK DENSITY | CALIPER INCHES

BOREHOLE 89-01 AREA STONE CREEK B.C.
CLIENT CROWNSITE RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

NEUTRON POROSITY
GAMMA RAY

BOREHOLE 89-01
CLIENT CROWSNEST RESOURCES LTD.

DEPTH SCALE 1:100

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED 04/08/89

2 OF 4 LOGS

757

BOREHOLE DATA — REFER TO LITHOLOGY LOG

OPERATION DATA — REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

LOG	LOG TAPED	TAPING RECORD SPEED	DIRECT or REPLAY	PANEL SPEED	T C SECS	NORM	CAL COEFF
DSN	Y	9	D	9	2	10.1	-
GAMMA	Y	9	D	9	1	-	1.64
SONDE NO			514	SOURCE NO	5363		

REMARKS

GAMMA RAY	DEPTH	NEUTRON POROSITY
0 API 150		75% SANDSTONE POROSITY 0%

0 API 150		75% SANDSTONE POROSITY 0%
GAMMA RAY	DEPTH	NEUTRON POROSITY

BOREHOLE 89-01
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

MY 200081R

757

BOREHOLE 89-01
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED 04/08/89

DEPTH SCALE 1:20

3 OF 4 LOGS

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING			PANEL				SIDEWALL POSITION	
	LOG TAPED	RECORDING SPEED	RECORD REPLAY	SPEED	g/cc	NORM			
GAMMA RAY	Y	2	R	2	2	–			1.80
L.S. DENSITY	Y	2	R	2	1	7.66			–

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	102m	73m	
TO	96m	70m	
INTERVAL	6m	3m	
FROM			INTERVAL TOTAL
TO			
INTERVAL			

REMARKS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY L.S. DENSITY

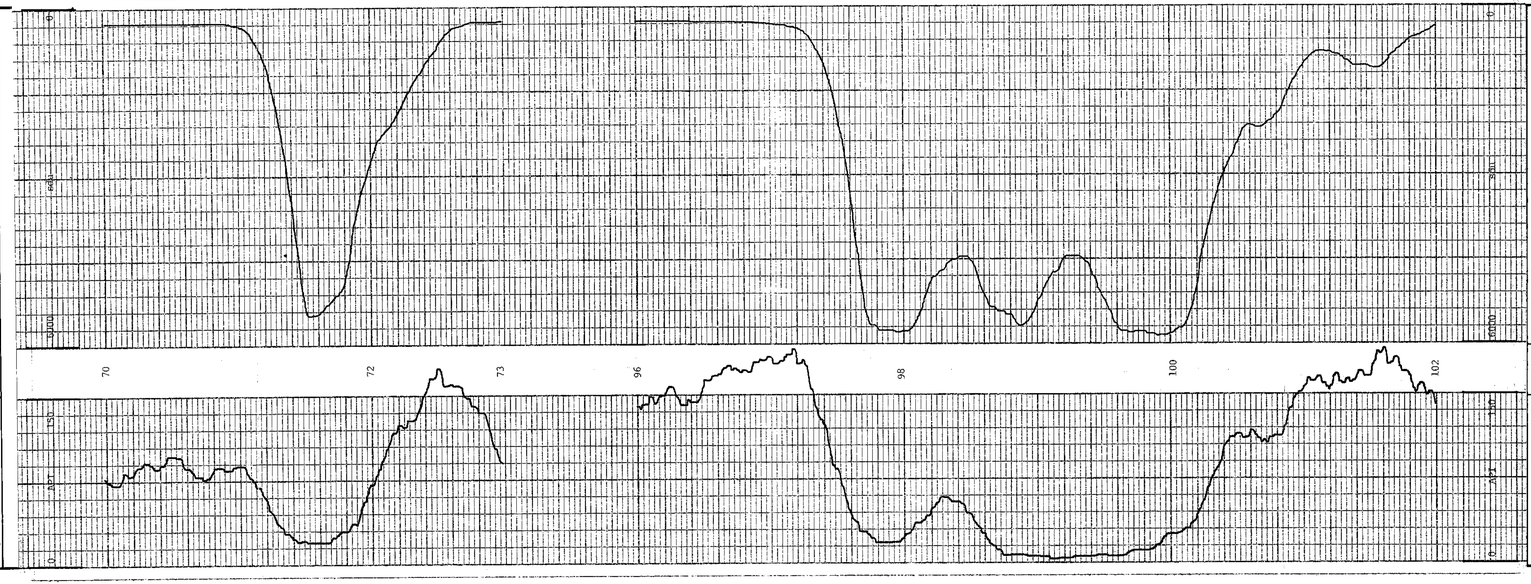
BPB COAL QUALITY LOG

DEPTH

COAL BULK DENSITY g/cm³

GAMMA RAY

HOLE SIZE CORRECTION DATA



COAL BULK DENSITY g/cm³

DEPTH

GAMMA RAY

BOREHOLE 89-01
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

COAL QUALITY LOG

MY (2) 137483 R

757

BOREHOLE 89-01

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED 04/08/89

DEPTH SCALE 1:20

4 OF 4 LOGS

SEAM THICKNESS LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	LOG TAPED	TAPING RECORDER SPEED	TAPING REC REPLAY	PANEL SPEED	PANEL TC SECS	PANEL NORM	LAY DEPTH
CALIPER	Y	2	R	2	.3	–	–
B.R. DENSITY	Y	2	R	2	.3	9.06	–

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

FROM	102m	73m
TO	96m	70m
INTERVAL	6m	3m
FROM		
TO		
INTERVAL		

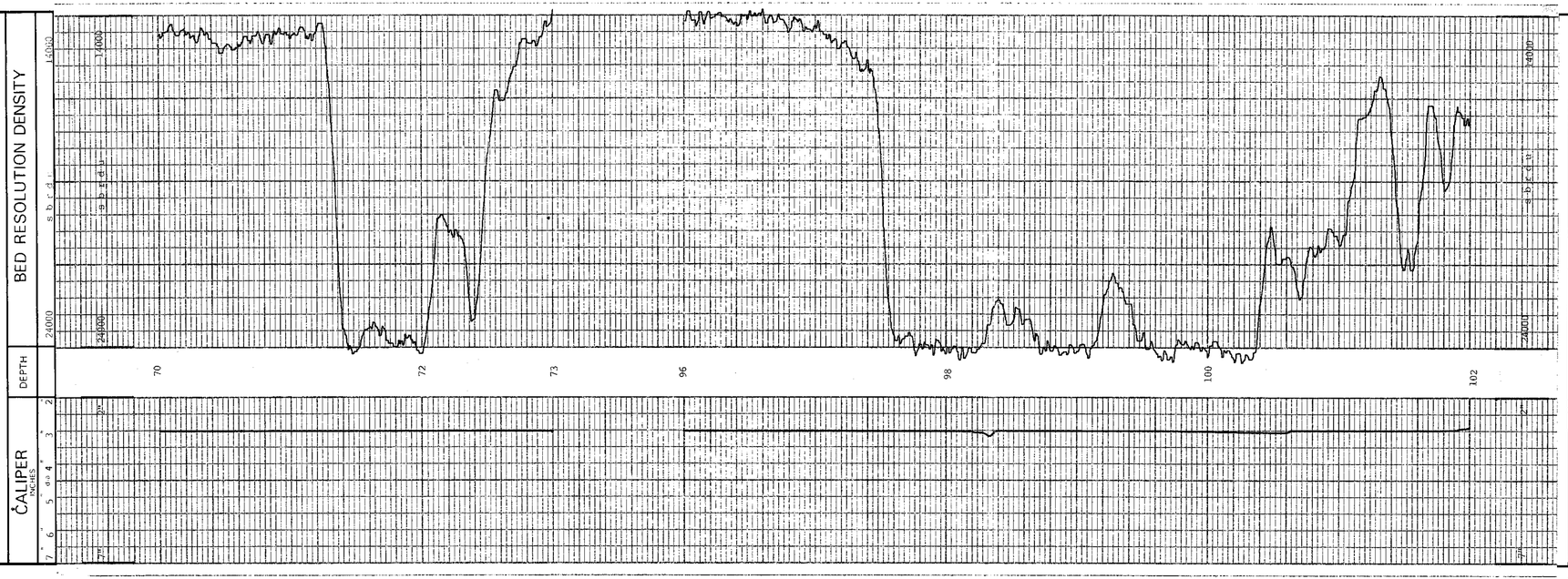
INTERVAL TOTAL

REMARKS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: CALIPER B.R. DENSITY

B P B SEAM THICKNESS LOG



BED RESOLUTION DENSITY
s b c d u
14000
24000
DEPTH
CALIPER
INCHES
2"
3"
4"
5" dia
6"
7"

BOREHOLE 89-01

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

SEAM THICKNESS LOG

MY 840028

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL			CAL. COEFF	DEPTHS			SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	T.C. SECS	NORM		FROM	TO	INTERVAL	
	205													
GAMMA RAY			242	Y	9	D	9	1	-	1.75	77	0	77	
L.S. DENSITY	SIDEWALL POSITION	0028	-	Y	9	D	9	.3	7.38	-	78	2	75	
CALIPER														

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM		INTERVAL TOTAL
TO		
INTERVAL		

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG	
236	VERT			REFER TO ADDITIONAL HEADINGS

REMARKS

CCS RUN THREW RODS, HOLE IN BAD CONDITION

BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No 242 VALUE 463 @ 5" DIAM | JIG CAL DATE | JIG VALUE | SDU @ g/cm³ | ins. cps.

JIG MARK SHOWN AT ABOVE VALUE - | JIG No. | SPAN | NORM SDU/CPS = | ins. cps.

GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

HOLE SIZE CORRECTION DATA

0 API 150		3500 sdu 0	
GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

BOREHOLE 89-02 AREA PINE PASS B.C.

CLIENT CROWSNEST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MY (1)137483 R

COAL LITHOLOGY LOG

SOURCE TYPE
COAL COMBUSTION SONDE

LOG SUITE
GAMMA RAY
DENSITY
CALIPER

BORHOLE	92-04
CLIENT	CHEMSHIST RESOURCES LTD.
AREA	FIRST PEAK B.C.
COUNTRY	CANADA
DATE LOGGED	20-Jun-2000

PROJECT NO.	1110
WITNESS	
DATE	20-Jun-2000

BOREHOLE DATA	
DRILLING CONTRACTOR	DONALDSON CO.
DRILLING METHOD	ROTARY AIR BLAST
BIT SIZE	6.5 in.
BOREHOLE DIAMETER	6.5 in.
CASING DIAMETER	6.5 in.
CASING DEPTH	105
CASING DEPTH	105
FLUID LEVEL	DRY
FLUID DENSITY	
FLUID TEMPERATURE	
FLUID LOSS	
FLUID DATA	
MUD	
PH	
VISC	
WL	
OPERATOR DATA	
RIG	DONALDSON CO.
DRILLER	
LOGGER	
PROBE NO.	
PROBE TYPE	
CALIBRATION	
PRE-LOG VERIFICATION	
POST-LOG VERIFICATION	
LOGGING DATE	20-Jun-2000
LOGGING TIME	11:00
LOGGING DIRECTION	DOWN
LOGGING SPEED	30 m/min
LOGGING DATE	20-Jun-2000
LOGGING TIME	11:00
LOGGING DIRECTION	UP
LOGGING SPEED	30 m/min

EQUIPMENT AND RECORDING DATA

COAL COMBUSTION SONDE

LOG	EQUIPMENT				TAPING			PARAS			LOG	DEPTHS		SEAM LOG RUN
	SONDE	SOURCE	CAMPARAM	LOG GAINED	RECORDED SPEED	DIRECT DEPLOY	UPLIFT	SEC. DEC.	NORM	COR.	FROM	TO	BRINGS	
GAMMA RAY	205		242	Y	9	D	9	1	-	1.75	105	00	105	
DENSITY		0028	3011	Y	9	D	9	.1	-	-	105	02	103	
CALIPER	SIDEWALL POSITION													

COAL QUALITY(SEAM THICKNESS, LOG INTERVALS, Water to referee log)

FROM	
TO	
INTERVAL	
INTERVAL TOTAL	

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE	DETAIL SCALE
235	VERIFY		
514	DEB	1:100	

REFER TO ADDITIONAL HEADINGS

REMARKS

** HOLE DUE TO POREHOLE CONDITIONS
COS RAN IN HOLE THIS OPEN HOLE
FROM 60m TO 20m . **

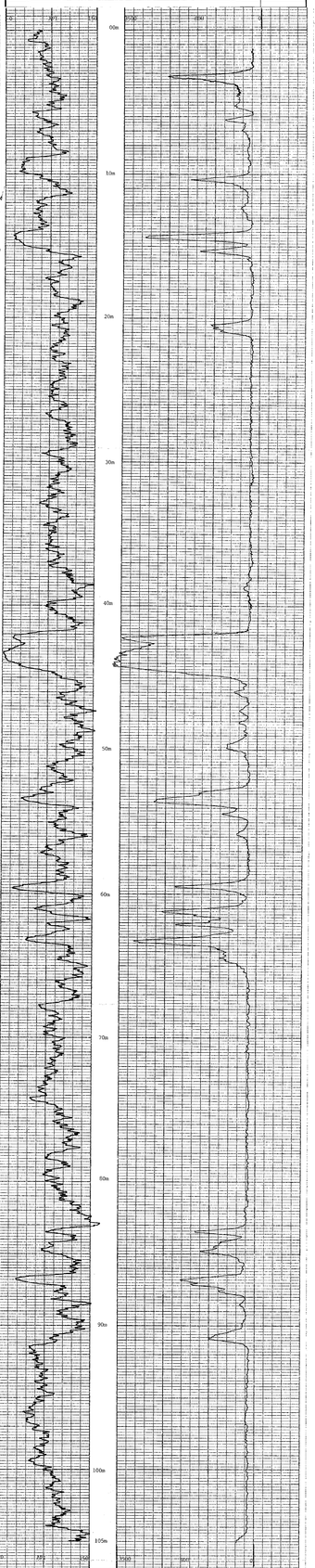
BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No. 242	VALUE 20 @ 5.0MM	JIG CAL DATE	JIG VALUE	DEN.@ 20/-	7 m. 896 gm
JIG MARK SHOWN AT ABOVE VALUE -		JIG No.	SPAN	NORM 20/-	2 m. 473 cps

GAMMA RAY (API) — DEPTH — BULK DENSITY (g/cm³) — CALIPER (INCHES)

HOLE SIZE CORRECTION DATA



GAMMA RAY (API) — DEPTH — BULK DENSITY (g/cm³) — CALIPER (INCHES)

BOREHOLE	92-04
AREA	FIRST PEAK B.C.
CLIENT	CHEMSHIST RESOURCES LTD.
COUNTRY	CANADA

COAL LITHOLOGY LOG

BPB Geophysics

757

NEUTRON POROSITY

GAMMA RAY

BOREHOLE 89-04

CLIENT CROWNNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED AUG 09/89

DEPTH SCALE 1:100

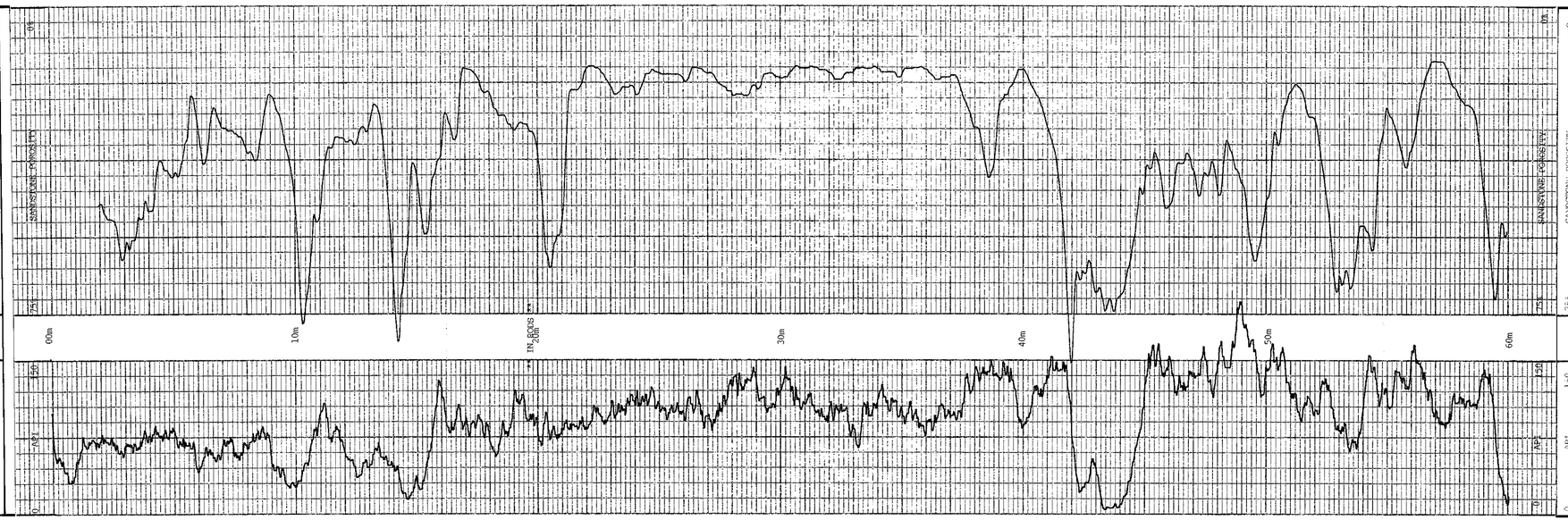
2 OF 5 LOGS

BOREHOLE DATA	REFER TO LITHOLOGY LOG	
OPERATION DATA	REFER TO LITHOLOGY LOG	

EQUIPMENT AND RECORDING DATA

LOG	TAPING				PANEL			CAL CODES
	LOG TAPED	RECORD SPEED	DIRECTION REPLAY	SPEED	T.C. SECS	NORM		
NSN	Y	9	D	9	2	10.1	-	
GAMMA	Y	9	D	9	1	-		
		SONDE NO 514		SUREF NO 5363				

REMARKS



AREA PINE PASS B.C.

COUNTRY CANADA

BOREHOLE 89-04

CLIENT CROWNNEST RESOURCES LTD.

757

BPB

BOREHOLE 89-04

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED AUG 09/89

DEPTH SCALE 1:20

3 OF 5 LOGS

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	TAPING			PANEL			CAL COEFF
	LOG TAPED	RECORD SPEED	DIRECT REPLAY	SPEED	T.C. SECS	NORM	
GAMMA RAY	Y	2	R	2	2	-	1.75
L.S. DENSITY	Y	2	R	2	.3	7.38	-

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	46m	
TO	40m	
INTERVAL	06m	
FROM		INTERVAL TOTAL
TO		
INTERVAL		06m

REMARKS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY L.S. DENSITY

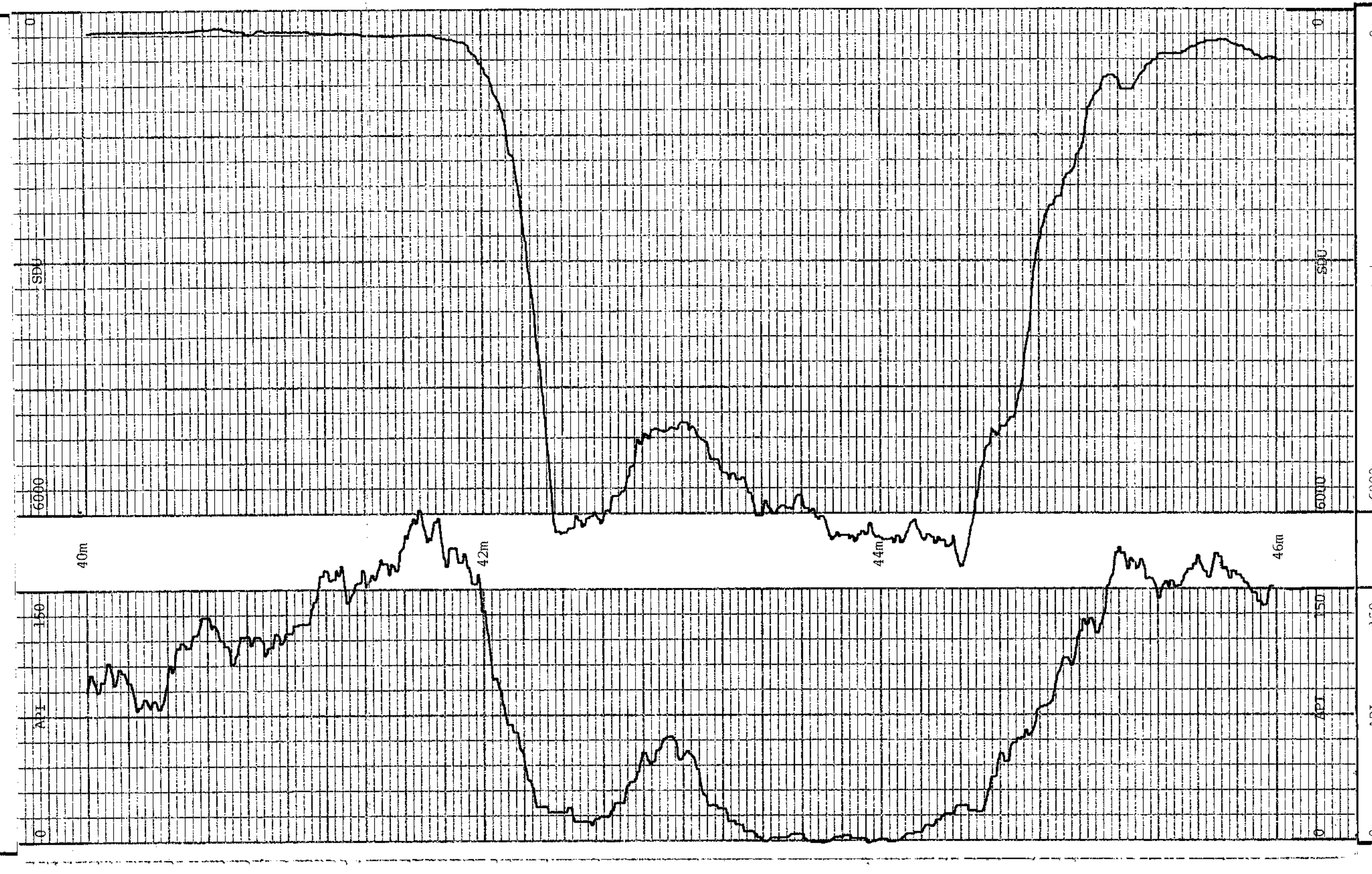
BPB COAL QUALITY LOG

DEPTH

GAMMA RAY

COAL BULK DENSITY g/cm³

HOLE SIZE CORRECTION DATA



COAL BULK DENSITY g/cm³

DEPTH

GAMMA RAY

BOREHOLE 89-04

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

COAL QUALITY LOG

BPB

MY (2) 137483 R

BPB

SEAM THICKNESS LOG

BOREHOLE 89-04
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 08/89

DEPTH SCALE 1:20

4 OF 5 LOGS

BOREHOLE DATA — REFER TO LITHOLOGY LOG
OPERATION DATA — REFER TO LITHOLOGY LOG
EQUIPMENT AND RECORDING DATA
COAL COMBINATION SONDE
SIDEWALL POSITION

LOG	TAPING: LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	PANEL: TC SECS	NORM	CAL COEFF
CALIPER	Y	2	R	2	.3		
BR DENSITY	Y	2	R	2	.3	8.05	

SOURCE SONDE AND CALIBRATION
REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

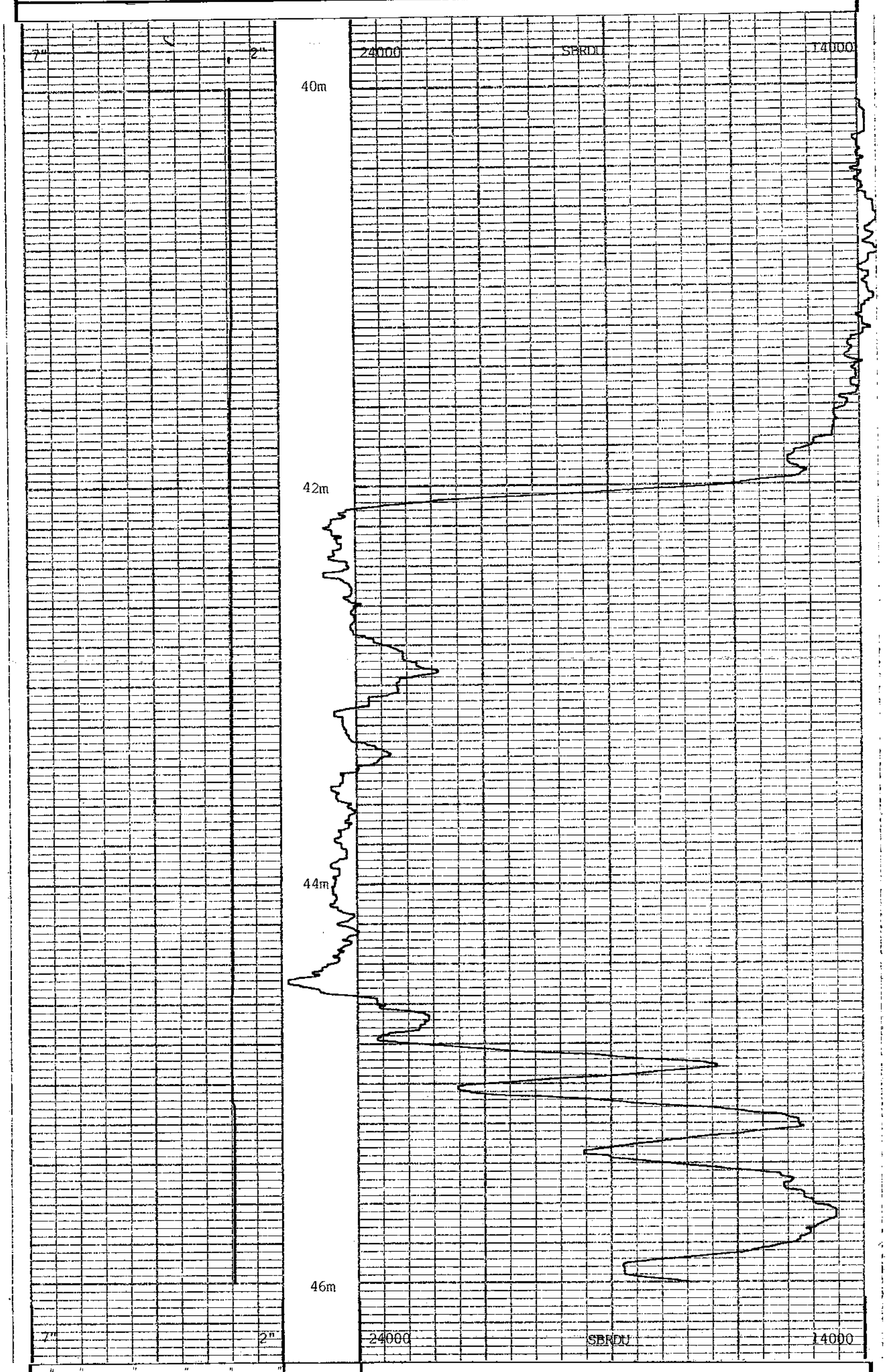
FROM	46m
TO	40m
INTERVAL	06m
FROM	
TO	
INTERVAL	
INTERVAL TOTAL	06m

REMARKS

SONDE TYPE
COAL
COMBINATION
SONDE

LOG SUITE
CALIPER
B.R.DENSITY

B P B SEAM THICKNESS LOG



BOREHOLE 89-04
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

SEAM THICKNESS LOG

MY 88002 R

757

GAMMA
DENSITY
CALIPER

BOREHOLE 89-04

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED AUG 09/89

DEPTH SCALE 1:100

5 OF 5 LOGS

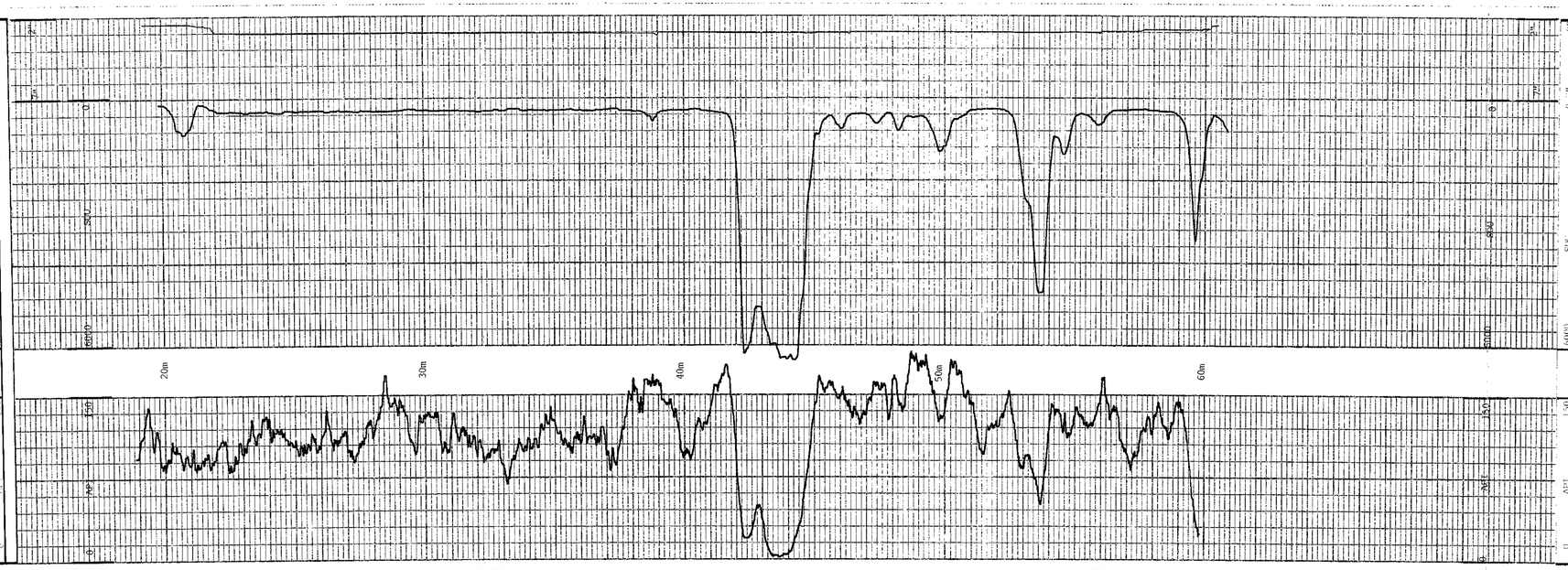
BOREHOLE DATA	REFER TO LITHOLOGY	LOG
OPERATION DATA	REFER TO LITHOLOGY	LOG

EQUIPMENT AND RECORDING DATA

LOG	TAPING			PANEL			CAL POSITION
	LOG TAPED	RECORD SPEED	DIRECTION REPLAY	SPEED	TYPE SERIES	NORM	
GAMMA	Y	2/9	D	2/9	2/1	-	1.75
DENSITY	Y	2/9	D	2/9	1/.3	7.28	-
CALIPER	Y	2/9	D	2/9	.3	-	-
		SONDE NO.	205	PART NO.	0028		

REMARKS

REFER TO LITHOLOGY IN RODS



AREA PINE PASS B.C.

COUNTRY CANADA

BOREHOLE 89-04

CLIENT CROWSNEST RESOURCES LTD.

COAL LITHOLOGY LOG

BOREHOLE 89-05
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 10/89
DEPTH SCALE 1:100
1 OF 4 LOGS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY, L.S. DENSITY, CALIPER

BOREHOLE DATA

PERMANENT DATUM	GROUND LEVEL	
ELEVATION OF P.D.	N/A	
	BPB	DRILLER
MEASUREMENTS FROM	G.L.	G.L.
DEPTH REACHED	77.6m	78.0m
CASING SHOE	9.1m	9.1m
BIT SIZES	1: 3" TO TD	2: TO
	3: TO	4: TO
CASING SIZES	1: HQ TO 9.1m	2: TO

FLUID DATA

NATURE	POLY
S.G.	N/A
LEVEL	10m
VISCOSITY	N/A
Rm at meas. temp.	N/A
B.H.T.	N/A

OPERATION DATA

FIRST READING	77m
LAST READING	00m
INTERVAL LOGGED	77m
UNIT-TRUCK No.	V223
ENGINEER	B. STEVENSON
WITNESS	MCKINSTRY

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT: SONDE	SOURCE	CALIBRATOR	TAPING: LOG TAPED	RECORD SPEED	DIRECT or REPLAY	PANEL: SPEED	T.C. SECS	NORM	CAL COEFF	DEPTHS: FROM	TO	INTERVAL	SEAM LOG RUN
GAMMA RAY	205		242	Y	9	D	9	1	-	1.75	76	00	76m	Y
L.S DENSITY		0028	-	Y	9	D	9	.3	7.38	-	77	01	76m	Y
CALIPER	SIDEWALL POSITION		7" 2"	Y	9	D	9	.3	-	-	77	01	76m	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM	69m	48m	31m	21m	INTERVAL TOTAL
TO	66m	42m	28m	16m	
INTERVAL	03m	06m	03m	05m	17m

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
514	DSN	1:100	
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No 242 VALUE 463 @ 5" DIAM.
JIG MARK SHOWN AT ABOVE VALUE →
JIG CAL. DATE JIG VALUE SDU @ g/cm³
JIG No SPAN NORM SDU/CPS =
7 ins. 896 cps
2 ins 439 cps

GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA

0 API 150 | 6000 sdu 0 | 7" 2"

GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

BOREHOLE 89-05 AREA PINE PASS B.C.
CLIENT CROWSNEST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MY (1)137483 R

757

NEUTRON POROSITY
GAMMA RAY

BOREHOLE 89-05
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 10/89

DEPTH SCALE 1:100

2 OF 4 LOGS

BOREHOLE DATA — REFER TO LITHOLOGY LOG

OPERATION DATA — REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

LOG	TAPING: LOG TAPED	TAPING: RECORD SPEED	PANEL: DIRECT or REPLAY	PANEL: SPEED	PANEL: T.C SECS	PANEL: NORM	CAL COEFF
DSN	Y	9	D	9	2	10.0	
GAMMA	Y	9	D	9	1	-	1.64
		SONDE NO	514	SOURCE NO	536		

REMARKS

GAMMA RAY	DEPTH	NEUTRON POROSITY
0 API 150		75% SANDSTONE POROSITY 15%

0 API 150		75% SANDSTONE POROSITY 15%
GAMMA RAY	DEPTH	NEUTRON POROSITY

BOREHOLE 89-05
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

MY 200081R

757

B P B

BOREHOLE	89-05
CLIENT	CROWSNEST RESOURCES LTD.
AREA	PINE PASS B.C.
COUNTRY	CANADA
DATE LOGGED	AUG 10/89
DEPTH SCALE	1:20
3 OF 4 LOGS	

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING: LOG TAPED	TAPING: RECORD SPEED	TAPING: DIRECT or REPLAY	PANEL: SPEED	PANEL: T.C. SECS	PANEL: NORM	SIDEWALL POSITION: CAL COEFF
GAMMA RAY	Y	2	R	2	2	-	1.75
L.S DENSITY	Y	2	R	2	1	7.38	-

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

SONDE TYPE: COAL COMBINATION SONDE

COAL QUALITY LOG INTERVALS

FROM	69m	48m	31m	21m	
TO	66m	42m	28m	16m	
INTERVAL	03m	06m	03m	05m	
FROM					INTER-VAL TOTAL
TO					
INTERVAL					17m

REMARKS

LOG SUITE: GAMMA RAY L.S. DENSITY

BOREHOLE	89-05
CLIENT	CROWSNEST RESOURCES LTD.
AREA	PINE PASS B.C.
COUNTRY	CANADA

COAL QUALITY LOG

757

BOREHOLE 89-001

CLIENT CROWNEST RESOURCES LTD.

AREA FINE PASS B.C.

COUNTRY CANADA

DATE LOGGED NOV. 10/89

DEPTH SCALE 1:20

4 OF 4 LOGS

SEAM THICKNESS LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING				SIDEWALL POSITION PANEL			NOTE
	CAL.	DENS.	SPEED	SPEED	s/s	NORM		
CALIPER	Y	2	8	2	3	–		
BR DENSITY	Y	2	8	2	3	8.05		–

SOURCE, SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

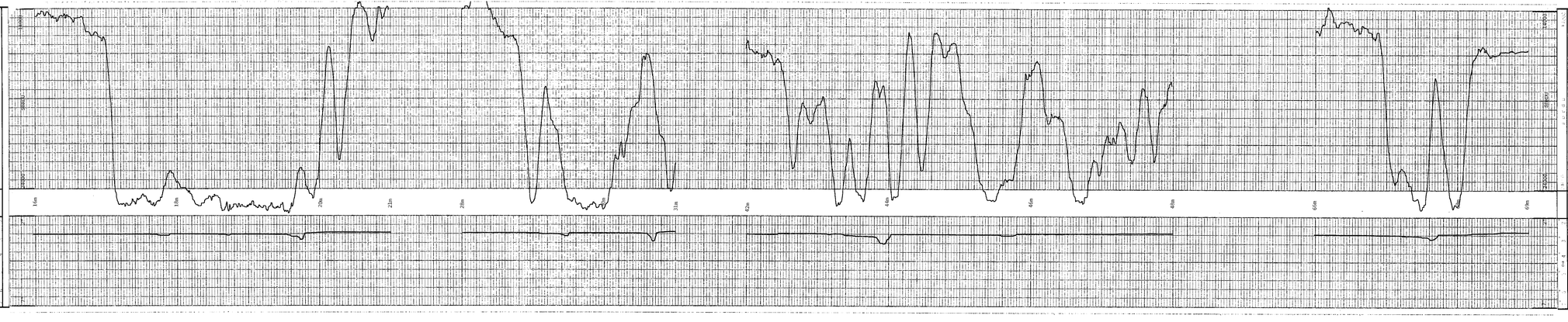
FROM	69m	48m	31m	21m
TO	66m	47m	28m	16m
INTERVAL	03m	16m	03m	05m
FROM				INTERVAL TOTAL
TO				
INTERVAL				

REMARKS

SONDE TYPE COAL COMBINATION SONDE

LOG SUITE CALIPER B.R. DENSITY

B P B SEAM THICKNESS LOG



BED RESOLUTION DENSITY

DEPTH

CALIPER INCHES

BOREHOLE 89-001

CLIENT

AREA FINE P

COUNTRY

SEAM THICKNESS LOG

COAL LITHOLOGY LOG

BOREHOLE	89-06
CLIENT	CHEMFUST RESOURCES LTD.
AREA	PINE PASS B.C.
COUNTRY	CANADA
DATE LOGGED	Nov 11/89
DEPTH SCALE	1:100

BOREHOLE DATA

DRILLING CO.	BOYD
DRILL MODEL	BOYD DIAMOND 1000
DRILL SIZE	BTW
DRILL INCLINATION	VERTICAL
DEPTH REACHED	70.4m
DATE DRILLED	Nov 11/89

FILMS DATA

CAMERA SERIAL			
FILM SIZE			
FILM TYPE			
FILM NO.			
FROM			
TO			

COAL LITHOLOGY LOG

SONDE TYPE	COAL COMBUSTION SONDE
LOG SUITE	GAMMA RAY DENSITY CALIPER

OPERATION DATA

OPERATOR	R. WARNOCK
LOGGER	G. DUNN, GOODFIELD
CALIBRATOR	G. DUNN
DATA PROCESSOR	R. WARNOCK
WITNESS	TIL WORTHERTY

BPB

EQUIPMENT AND RECORDING DATA

COAL COMBUSTION SONDE

LOG	EQUIPMENT			TAPING			PANEL			CAL. CODE	DEPTHS			SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPED	RECORD SPEED	DIRECT. REPLAY	SPEED	SENS. SCALE	NORM		FROM	TO	INTERVAL	
GAMMA RAY	205		242	Y	9	D	9	1	-	1.75	68.00	68m		Y
DENSITY	0028		-	Y	9	D	9	.3	7.38	-	68.00	68m		Y
CALIPER	SERVWALL POSITION		2"	Y	9	D	9	.3	-	-	68.00	68m		Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to ordinary log)

FROM	64m 35cm		INTERVAL
TO	53m 32cm		TOTAL
INTERVAL	27cm 03cm		08.1

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
116	EDR	1:100	
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

CALIBRATION DATA

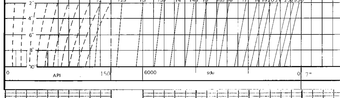
JIG No. 242	VALUE 1.75 S'DAMM	JIG CAL DATE	JIG VALUE SDU/cm g/cm³
JIG MARK SHOWN AT ABOVE VALUE -		JIG No. SPAN	NORM 7.38 g/cm³

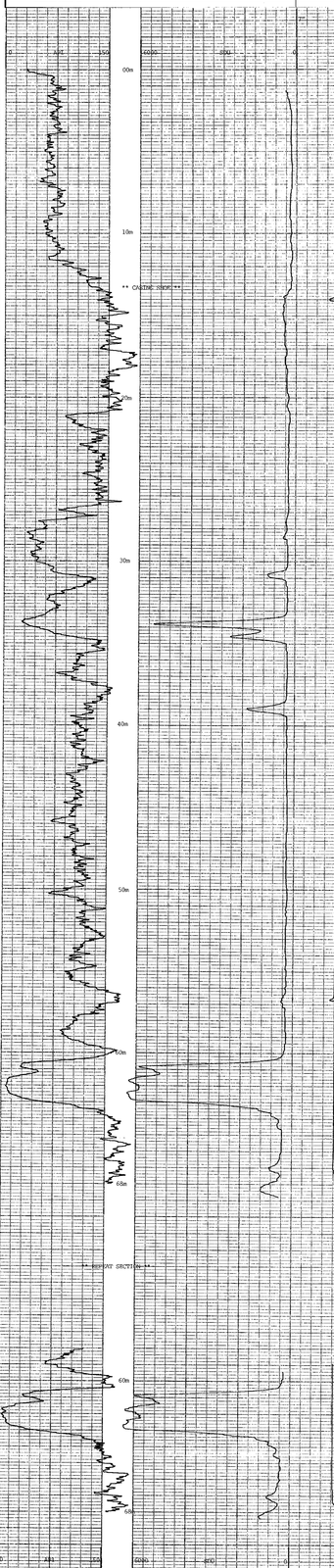
7 PPM 395 API
2 PPM 439 CPS

BPB COAL LITHOLOGY LOG

GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA





GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

BPB

BOREHOLE 89-06 AREA PINE PASS B.C.
CLIENT CHEMFUST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MT 1T1S1N1B1A

NEUTRON POROSITY
&
GAMMA RAY

BOREHOLE 89-06
CLIENT CROWNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 11/89

ELEVATIONS
K.B. 1700
D.F.
G.L.

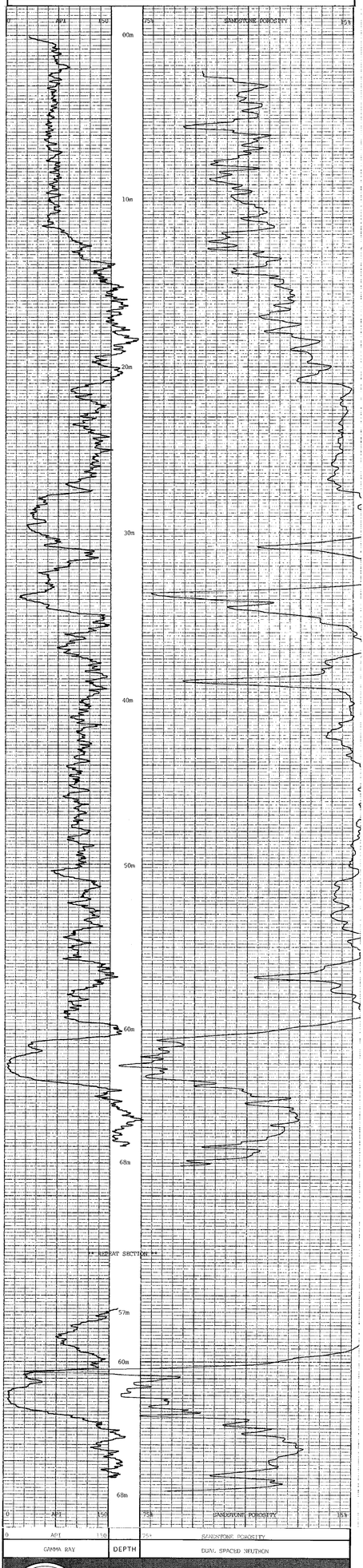
2-DH-4 (90)

BOREHOLE DATA RELATIVE TO LITHOLOGY LOG
OPERATION DATA RELATIVE TO LITHOLOGY LOG
EQUIPMENT AND RECORDING DATA

CSG							
	TYPE	DIAMETER	WEIGHT	SPEED	MAX.	TORQUE	
GAMMA	1-200	1.7	6	9	1	10-20	1.54
SSN	Y	6	D	9	1	10-20	-

REMARKS:

POOR 5.4 POOR 10.3



GAMMA RAY
DEPTH
DUAL SPACED NEUTRON

BOREHOLE 89-06
CLIENT CROWNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

MF 3000818

757

BOREHOLE 89-06
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 11/89

DEPTH SCALE 1:20

3 OF 4 LOGS

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING			PANEL			CAL COEFF
	LOG TAPED	RECORD SPEED	DIRECT REPLAY	SPEED	SECS	NORM	
GAMMA RAY	Y	2	R	2	1	-	1.75
L.S. DENSITY	Y	2	R	2	.3	7.38	-

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	64m	35m
TO	59m	32m
INTERVAL	05m	03m
FROM		INTERVAL TOTAL
TO		08m
INTERVAL		

REMARKS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY L.S. DENSITY

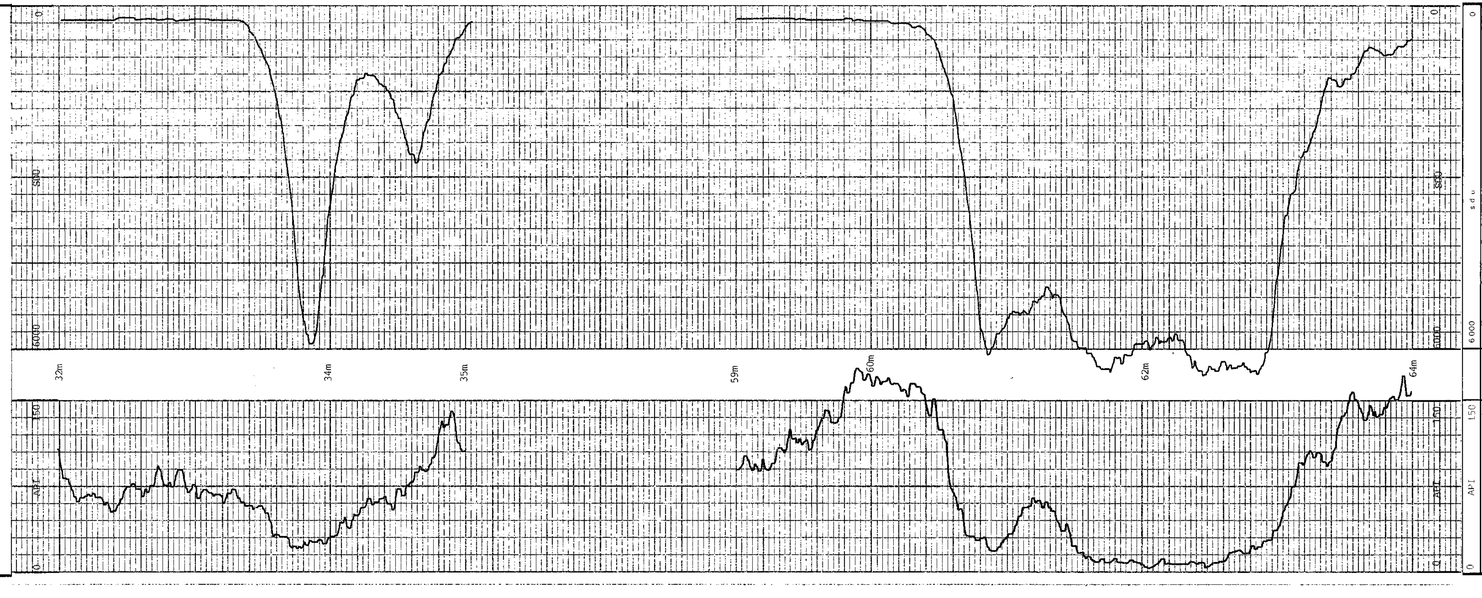
B P B COAL QUALITY LOG

DEPTH

COAL BULK DENSITY g/cm³

HOLE SIZE CORRECTION DATA

GAMMA RAY API



COAL BULK DENSITY g/cm³

DEPTH

GAMMA RAY API

BOREHOLE 89-06
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

COAL QUALITY LOG

MY (21) 137483 R

7557

BOREHOLE 89-06

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED AUG 11/89

DEPTH SCALE 1:20

4 OF 4 LOGS

SEAM THICKNESS LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	TAPING: LOG TAPED	RECORD SPEED	DIRECT/REPLAY	SPEED	PANEL: TC SECS	NORM	CAL COEFF
CALIPER	Y	2	R	2	.3	-	-
B.R. DENSITY	Y	2	R	2	.3	8.05	

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

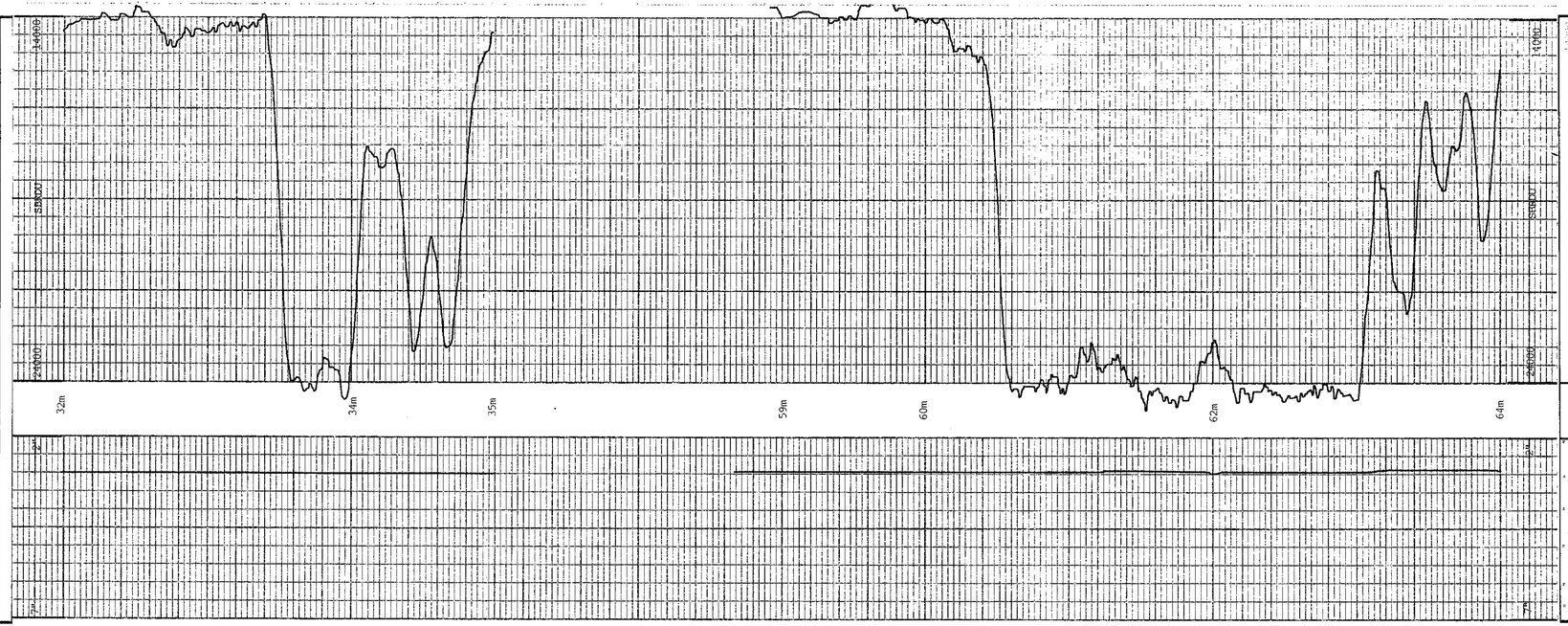
FROM	64m	35m
TO	59m	32m
INTERVAL	05m	03m
FROM		INTERVAL TOTAL
TO		
INTERVAL		08m

REMARKS

SONDE TYPE COAL COMBINATION SONDE

LOG SUITE: CALIPER B.R. DENSITY

B P B SEAM THICKNESS LOG



BED RESOLUTION DENSITY

DEPTH

CALIPER INCHES

BOREHOLE 89-06

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

SEAM THICKNESS LOG

MY89028

COAL LITHOLOGY LOG

BPB

BOREHOLE: 89-07
CLIENT: CROWNSNEST RESOURCES LTD.
AREA: FERNIE, PASS, B.C.
COUNTRY: CANADA
DATE LOGGED: 1-Jun-1989
BPB PROJECT: 89/1/PCR
LOG: 1 of 1

BOREHOLE CASING
PROJECTION: UNKNOWN
DATUM: UNKNOWN
COORDINATES: UNKNOWN
ELEVATION: UNKNOWN
DIP: 90.00
AZIMUTH: 0.00

SONDE TYPE: COAL COMBINATION SONDE

COAL COMBINATION SONDE
GAMMA RAY
L. S. DENSITY
CALIPER

OPERATION DATA

LOGGING UNIT	1
LOGGING ENGINEER	BRIAN SCHOOL
OPERATOR	ERIC HAMILTON
CALIBRATOR	ERIC HAMILTON
SONDE NO.	1
SONDE POSITION	DOWN HOLE
MAX. RECORDED TEMP.	30°C
MAX. RECORDED PRESS.	30 bar
CABLE NO.	1
CABLE LENGTH	1000m
CABLE TYPE	7 CONDUCTOR
CABLE HEAD	STANDARD
CABLE SPEED	10m/min
DEPTH CONTROL	ENCODER
DEPTH ZERO	GROUND LEVEL
DEPTH WITNESS	TAPE
LOG DATE	1-Jun-1989
LOG TIME	10:00
LOGGED BY	ERIC HAMILTON
INTERPRETED BY	ERIC HAMILTON
CHECKED BY	ERIC HAMILTON

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			SAMPLING				PANEL		COL CORR	DEPTH		SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG SCALE	RECORD SHIFT	DEPTH REPLAY	SPEED	TC SETS	NORM		FROM	TO	METRES
GAMMA RAY	2070		242	Y	9	0	9	1	-	1.22	89.00	0.0m	
DENSITY	3025		-	Y	9	0	9	.3	2.38	-	89.00	89m	
CALIPER	SOLIDTRACK MONITOR		2"	Y	9	0	9	.3	-	-	89.00	89.0m	

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to comment log)

FROM		INTERVAL VOAL
TO		
INTERVAL		

ADDITIONAL SONDES RUN

SONDE	LOG	CENTRE SCALE	DEPTH SCALE
514	EDIP	1:100	
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

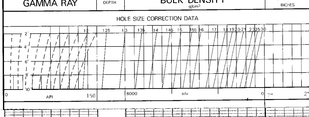
REMARKS

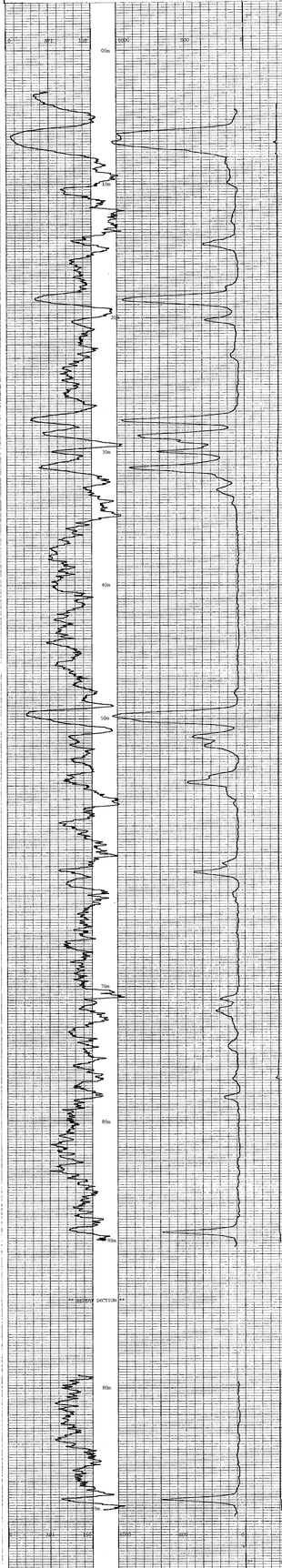
CALIBRATION DATA

JG No. 242	VALUE(S) @ 5 GAM	JG CAL GATE	JG VALUE	SOU @ 5 g/cm³	7 cps 896 cps
JG MARK SHOWN AT ABOVE VALUE		JG No.	SPAN	NORM 2.4 g/cm³	2 cps 479 cps

GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA





GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

BPB

BOREHOLE 89-07 AREA FERNIE, PASS, B.C.
CLIENT CROWNSNEST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MT 1/12/1989 A

757

NEUTRON POROSITY
GAMMA RAY

BOREHOLE 89-07
CLIENT CROWNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 13/89

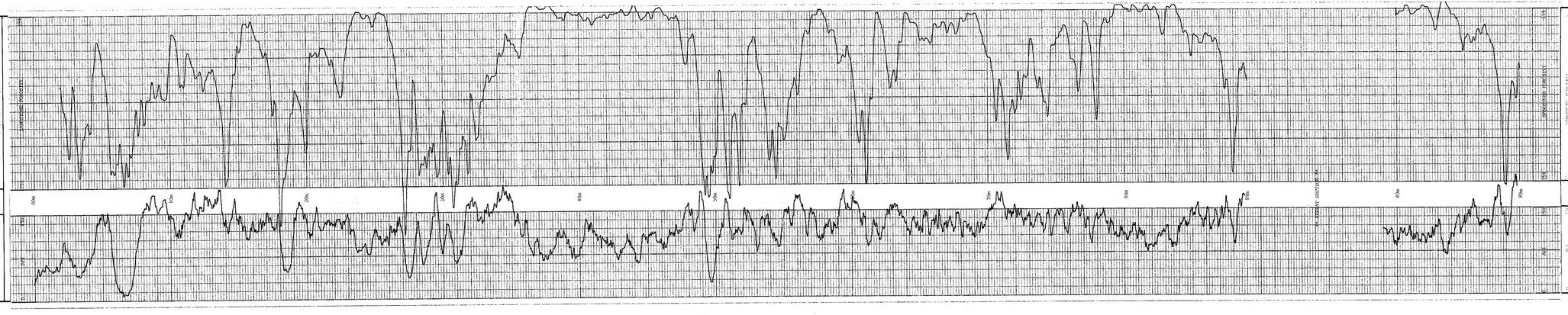
DEPTH SCALE 1:100
2 or 5 DOG

BOREHOLE DATA	REFER TO	LITHOLOGY LOG
OPERATION DATA	REFER TO	LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

LOG	TAPING				PANEL		LOG DATA
	LOG	RECORD	DEPTH	SPLICE		NORM	
GAMMA	Y	S	D	S	1	-	17.00
DEN	Y	S	D	S	1	10.01	-
		MODE	514	NORM	5163		

REMARKS



BOREHOLE
CLIENT
AREA
COUNTRY

757

BPB

BOREHOLE 89-07
CLIENT CROMBRIDGE RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED NOV 13/89

DEPTH SCALE 1:20
3 OF 4 LOGS

COAL QUALITY LOG

BOREHOLE DATA — REFER TO LITHOLOGY LOG
OPERATION DATA — REFER TO LITHOLOGY LOG
EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING	SIDEWALL POSITION PANEL								
		100	150	200	250	300	350	400		
GAMMA RAY	1	2	3				3		-	1.75
L.S.DENSITY	1		2				2	3	1.25	

SOURCE SONDE AND CALIBRATION
REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	53	33	31	08	
TO	48	26	17	05	
INTERVAL	05	07	04	03	METRE
FROM					FEET
TO					
INTERVAL					

REMARKS

SONDE TYPE
COAL COMBINATION SONDE

LOG SUITE
GAMMA RAY
L.S. DENSITY

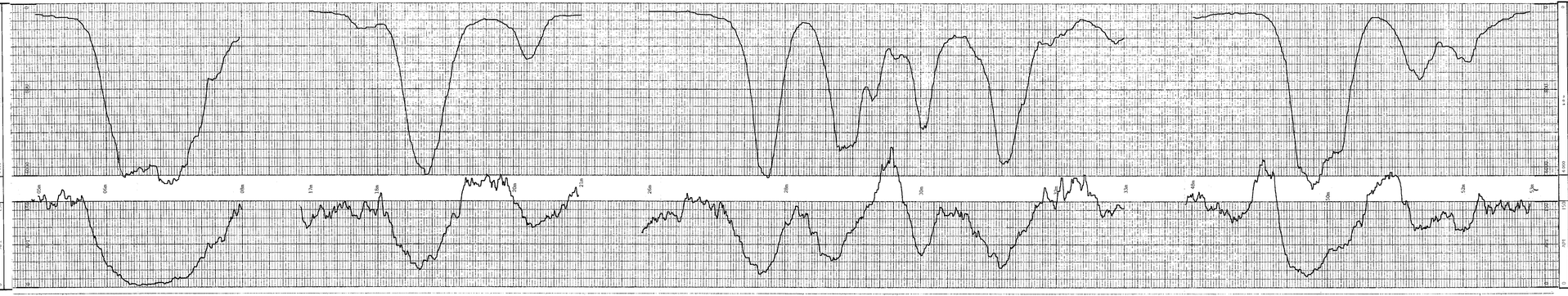
BPB COAL QUALITY LOG

COAL BULK DENSITY

DEPTH

GAMMA RAY

HOLE SIZE CORRECTION DATA



COAL BULK DENSITY

DEPTH

GAMMA RAY

BOREHOLE 89-07
CLIENT CROMBRIDGE RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

COAL QUALITY LOG

BPB

757

BPB

BOREHOLE 89-07
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE RIVER B.C.
COUNTRY CANADA
DATE LOGGED AUG 11/89

DEPTH SCALE 1:20
L or S LOG

SEAM THICKNESS LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING				PANEL			LOGS
	RAPID	SLOW	REPLAY	SPLICE	SLOW	NORM		NORM
CALIPER	Y	2	8	2	3	1		
B.R.DENSITY	Y	2	8	2	3	1		

SOURCE SONDE AND CALIBRATION
REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

FROM	53	33	21	08	
TO	48	26	17	05	
INTERVAL	05	07	04	03	INTERVAL TOTAL
FROM					
TO					
INTERVAL					19m

REMARKS

SONDE TYPE
COAL COMBINATION SONDE

LOG SUITE
CALIPER
B.R. DENSITY

B P B SEAM THICKNESS LOG

BED RESOLUTION DENSITY

DEPTH

CALIPER

COAL LITHOLOGY LOG

757

BOREHOLE 89-08
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 15/89
DEPTH SCALE 1:100
1 OF 4 LOGS

BOREHOLE DATA

PERMANENT DATUM	GROUND LEVEL	
ELEVATION OF P.D.	N/A	
MEASUREMENTS FROM	BPB	DRILLER
DEPTH REACHED	112.8m	112.8m
CASING SHOE	3.0m	3.0m
BIT SIZES 1	3" TO TD	2 TO
BIT SIZES 3	TO	4 TO
CASING SIZES 1	HQ TO 3.0m	TO

FLUID DATA

NATURE	GEL
S.G.	N/A
LEVEL	00m
VISCOSITY	N/A
Rm at meas. temp.	N/A
B.H.T.	N/A

OPERATION DATA

FIRST READING	110m
LAST READING	00m
INTERVAL LOGGED	110m
UNIT-TRUCK No.	V223
ENGINEER	B. STEVENSON
WITNESS	F. McKINNERY

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL			CAL. COEFF	DEPTHS			SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	TC SECS	NORM		FROM	TO	INTERVAL	
GAMMA RAY	205		242	Y	9	D	9	1	-	1.75	110	00	110	Y
L.S. DENSITY		0028	-	Y	9	D	9	.3	7.38	-	110	00	110	Y
CALIPER	SIDEWALL POSITION		7" 2"	Y	9	D	9	.3	-	-	110	00	110	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM		INTERVAL TOTAL
TO		
INTERVAL		

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
514	DSN	1:100	
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

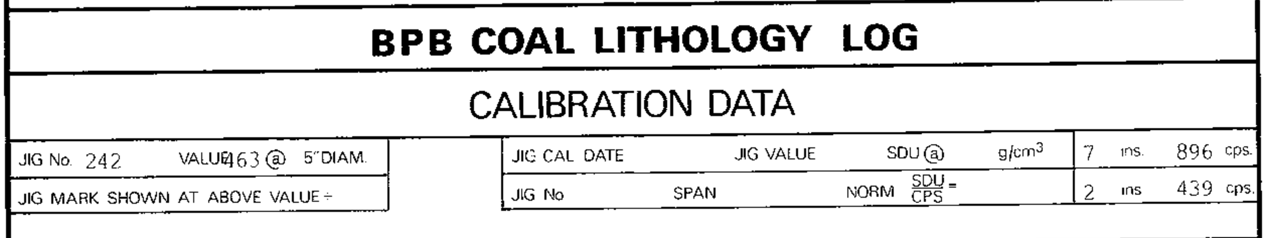
BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No. 242 VALUE 463 @ 5" DIAM.	JIG CAL DATE JIG VALUE SDU @ g/cm³	7 ins.	896 cps.
JIG MARK SHOWN AT ABOVE VALUE ÷	JIG No SPAN NORM SDU/CPS =	2 ins	439 cps.

GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

HOLE SIZE CORRECTION DATA



GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

BOREHOLE 89-08 AREA PINE PASS B.C.
CLIENT CROWSNEST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MY (1)137483 R

757

NEUTRON POROSITY
&
GAMMA RAY

BOREHOLE 59-08

CLIENT CROMBANK RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED NOV 15/89

REPRODUCIBLE 1:1000

3 OF 3 LOGS

BOREHOLE DATA	REFER TO	LITHOLOGY	LOG
OPERATION DATA	REFER TO	LITHOLOGY	LOG

EQUIPMENT AND RECORDING DATA

LOG	TAPING			PANEL				CPS
	SPD	SENS	TC	SENSITIVITY	F.S.	NORM		
GAMMA	Y	5	D	5	2		=	1.64
GRN	Y	5	D	5	2		10.0	

REMARKS

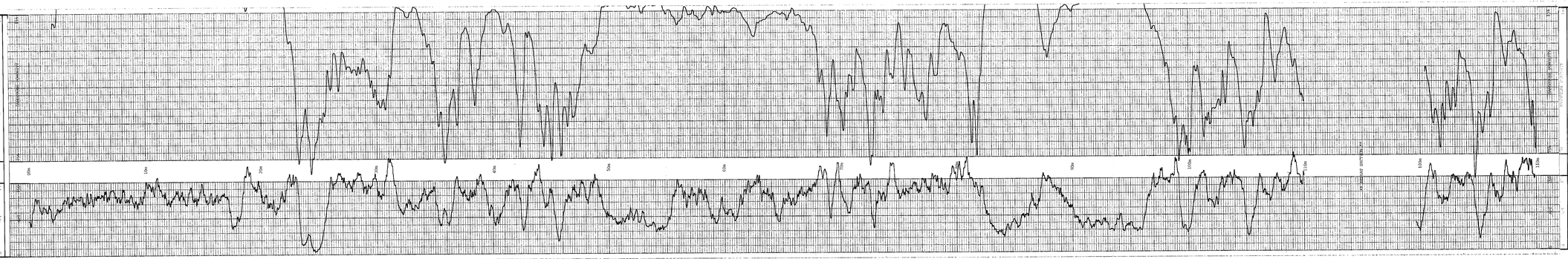
CAL 15% NORM 15%

FACE SPACED METRICK

DEPTH

GAMMA RAY

NEUTRON POROSITY



FACE SPACED METRICK

DEPTH

GAMMA RAY

NEUTRON POROSITY

(MAL SPACED METRICK)

BOREHOLE 59-08

CLIENT CROMBANK RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

COAL QUALITY LOG

BOREHOLE 89-08
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 15/89

DEPTH SCALE 1:20

3 OF 4 LOGS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY, L.S. DENSITY

BOREHOLE DATA

REFER TO LITHOLOGY LOG

OPERATION DATA

REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	PANEL SPEED	PANEL T.C. SECS	PANEL NORM	CAL COEFF
GAMMA RAY	Y	2	R	2	1	-	1.75
LS DENSITY	Y	2	R	2	.3	7.38	-

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	107	101	38	27	
TO	104	98	35	23	
INTERVAL	0.3m	0.3m	0.3	0.4m	
FROM					
TO					
INTERVAL					INTER-VAL TOTAL 1.3m

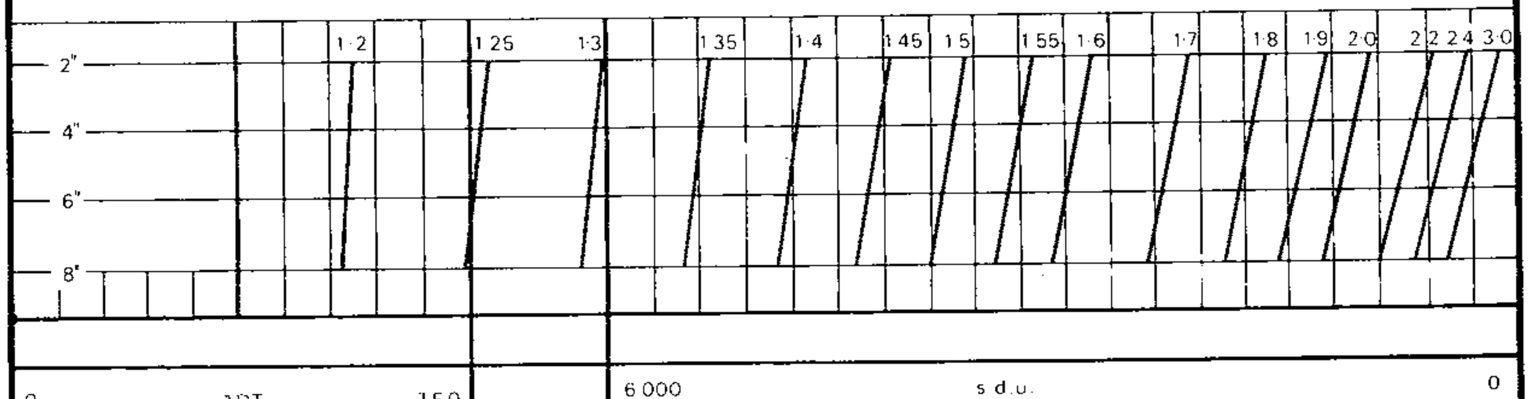
REMARKS

757

BPB COAL QUALITY LOG

GAMMA RAY	DEPTH	COAL BULK DENSITY g/cm3

HOLE SIZE CORRECTION DATA



0 API 150		6000 s.d.u. 0

0 API 150		6000 s.d.u. 0

GAMMA RAY		COAL BULK DENSITY g/cm3
	DEPTH	

BOREHOLE 89-08
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

COAL QUALITY LOG

MY (2) 137483 R

SEAM THICKNESS LOG

BPB

BOREHOLE 89-08
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED JUNE 17/91
DEPTH SCALE 1:200
1 of 1 LOGS

SONDE TYPE
COAL COMBINATION SONDE

LOG SUITE
CALIPER
BR DENSITY

BOREHOLE DATA
OPERATION DATA
REFER TO LITHOLOGY LOG
EQUIPMENT AND RECORDING DATA
COAL COMBINATION SONDE
SOFTWARE VERSION
PANEL
LOG
RUN NUMBER 1
DATE
TIME
DEPTH DRILLER
DEPTH LOGGER
BOTTOM LOGGED INTERVAL
TOP LOGGED INTERVAL
CASING DRILLER
CASING LOGGER
BIT SIZE
TYPE FLUID IN HOLE
DENSITY
VISCOSITY
PH
FLUID LEVEL
MAX. RECORDED TEMP.
ESTIMATED BHT
SOURCE SPACE AND CALIBRATION
REFER TO LITHOLOGY LOG

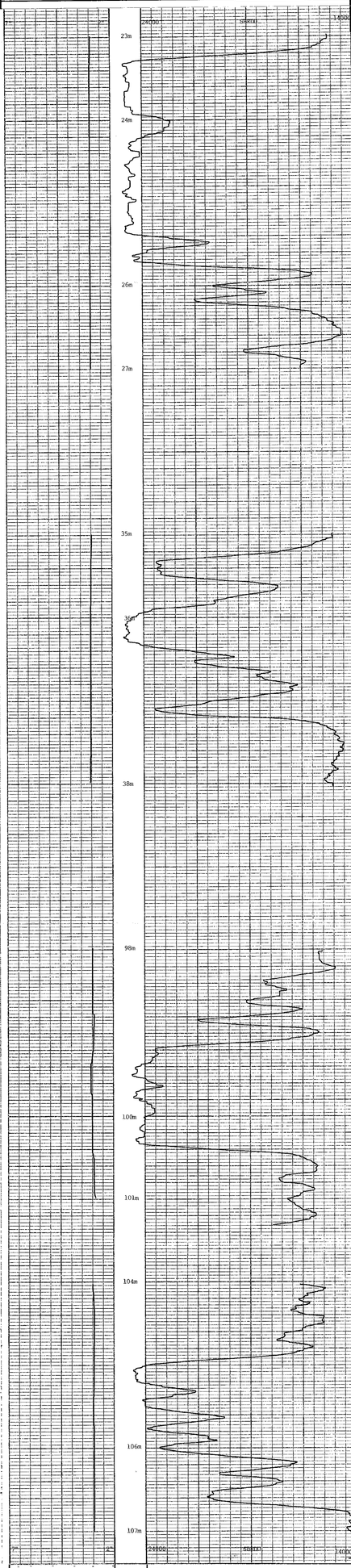
SEAM THICKNESS LOG INTERVALS

	FROM	TO
SEAM 1	107	101
SEAM 2	104	98
SEAM 3	35	27
SEAM 4	23	22
SEAM 5	0.5m	0.0m
SEAM 6		
SEAM 7		
SEAM 8		
SEAM 9		
SEAM 10		
TOTAL		1.3m

REMARKS

B P B SEAM THICKNESS LOG

CALIPER INCHES 7" 6" 5" 4" 3" 2" | DEPTH | BED RESOLUTION DENSITY 2400 SCPM 1400



CALIPER INCHES 7 6 5 4 3 2 | DEPTH | BED RESOLUTION DENSITY 2400 SCPM 1400

BPB

BOREHOLE 89-08
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

SEAM THICKNESS LOG

MT 88002 R

757

BPB

BOREHOLE: 89-09
CLIENT: CROWNSNEST RESOURCES LTD.
AREA: PINE PASS B.C.
COUNTRY: CANADA
DATE LOGGED: AUG 17/89
DEPTH SCALE: 1:100

COAL LITHOLOGY LOG

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY, BULK DENSITY, CALIPER

BOREHOLE DATA

DIAMOND DRILL HOLE NO.	89-09
BLADE NO. OF BIT	N/A
DIAMOND BIT	NATIONAL 1.625"
DRILLER	BPB
DRILLING CONTRACTOR	C.J.L.
CASING SIZE	3.5 cm
CASING SHOE	3.0m
BIT SIZES	1" TO 1.625"
CASING SIZES	1" TO 3.5cm
	2" TO
	3" TO

FLUID DATA

FLUID LEVEL	N/A
FLUID LOSS	0.0m
DENSITY	N/A
PH	N/A
VISCOSITY (Marsh funnel sec)	N/A
BH T	N/A

OPERATION DATA

START BEGINNING	60m
FAST RECORDED	0.0m
NATURAL LOGGED	60m
LAST RECORDED	0.0m
LOGGING UNIT No.	6723
ENGINEER	B. MACINTOSH
WITNESS	B. MACINTOSH

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT: SONDE	EQUIPMENT: SOURCE	EQUIPMENT: CALIBRATOR	TAPING: LOG TAPED	TAPING: RECORD SPEED	TAPING: DIRECT or REPLAY	PANEL: SPEED	PANEL: TC SECS	PANEL: NORM	CAL CONF	DEPTHS: FROM	DEPTHS: TO	DEPTHS: INTERVAL	SEAM LOG RUN
GAMMA RAY & DENSITY	205		242	Y	9	D	9	1	-	1.75	60	00	60m	Y
		0028		Y	9	D	9	.3	7.38	-	60	00	60m	Y
CALIPER	SIDEWALL POSITION		1" 2"	Y	9	D	9	.3	-	-	60	00	60m	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM		INTERVAL TOTAL
TO		
INTERVAL		

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

** NOTE DUE TO POOR BOREHOLE CONDITIONS CCS RUN FROM 60m ALSO NO DSN RUN. **

BPB COAL LITHOLOGY LOG

CALIBRATION DATA

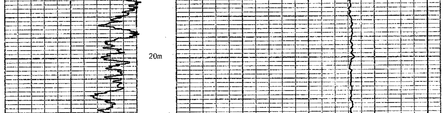
JIG No 242 VALUE 63 @ 5" DIAM.
JIG MARK SHOWN AT ABOVE VALUE -

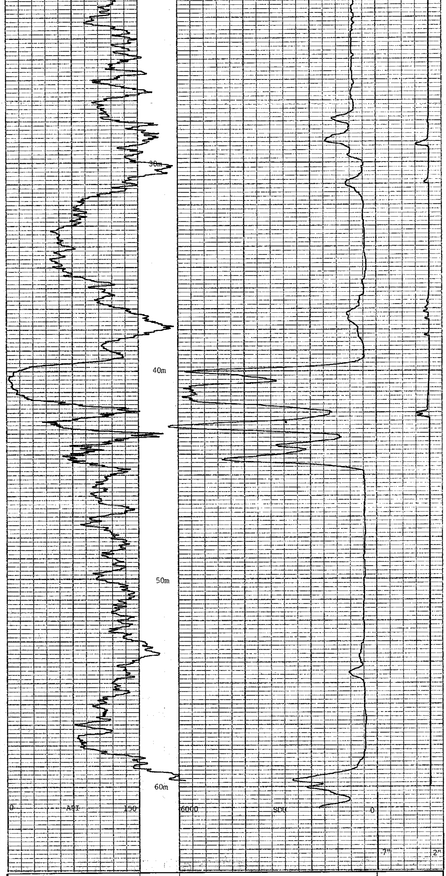
JIG CAL DATE | JIG VALUE | SDU @ g/cm³
JIG No | SPAN | NORM 2.4

7	KS	896 CDS
2	KS	439 CDS

GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA





GAMMA RAY | DEPTH | BULK DENSITY g/cm³ | CALIPER INCHES

BPB

BOREHOLE: 89-09 AREA: PINE PASS B.C.
CLIENT: CROWNSNEST RESOURCES LTD. COUNTRY: CANADA

COAL LITHOLOGY LOG

MY (11)127483 E

COAL LITHOLOGY LOG

LOG SUITE
COMBINATION SONDE

GAMMA RAY
BULK DENSITY
CALIPER

SONDE TYPE
COMBINATION

BORE	55-01 (FS ROSE)
CLIENT	CONSOLIDATED PETROLEUM LTD.
AREA	SOUTH PEACE RIVER
COUNTRY	CANADA
DATE LOGGED	AUG 17/88

BORE DATA

DRILLING FLUID	AIR
BOREHOLE DIAMETER	6 3/4
CASING DIAMETER	5 1/2
CASING DEPTH	106
DRILLER'S DEPTH	106
LOGGER'S DEPTH	106
BOREHOLE FLUID LEVEL	DRY

TIME SINCE CIRCULATION	
MAX. RECORDED TEMP.	
EQUIPMENT LOCATION	
RECORDED BY	
WITNESSED BY	

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL			DEPTHS			SUM LOG RUN
	SONDE	SOURCE	CALIBRATION	LOG DATA	RECORD SPEED	DIRECT. DEPTH	SPEED	LOG GAIN	NORM	FROM	TO	INTERVAL	
GAMMA RAY	205		242	9	0	0	9	1	-	3.75	106	00	106m
DENSITY	0029		-	9	0	0	9	.2	38	-	107	00	106m
CALIPER		SERVIMA POSITION											

COAL (SEAM) FLUID DATA

FROM	
TO	
INTERVAL	

COAL (SEAM) THICKNESS LOG INTERVAL S (Same as interval log)

INTERVAL TOTAL	

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE	DETAIL SCALE
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

** (CTS) (RUN IN HOLE) **

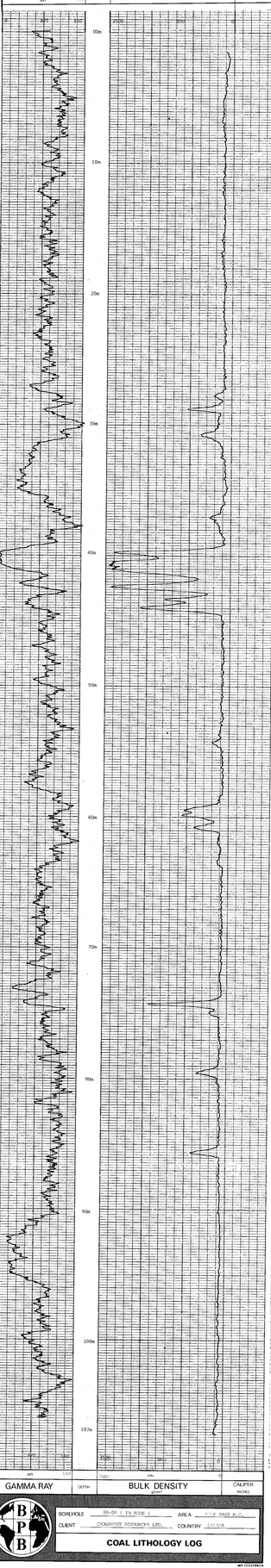
BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No. 247	VALUE(1) @ 5"DAM	JIG CAL DATE	SIZE(1) @ 5"DAM	AN	0A
JIG MARK SHOWN 4" ABOVE VALUE		JIG No. 5PAM	NORM 2000 (2)	BN	100

GAMMA RAY	DEPTH	BULK DENSITY (g/cm³)	CALIPER INCHES

HOLE SIZE CORRECTION DATA



GAMMA RAY	DEPTH	BULK DENSITY (g/cm³)	CALIPER INCHES

BORE	55-01 (FS ROSE)	AREA	SOUTH PEACE R.C.
CLIENT	CONSOLIDATED PETROLEUM LTD.	COUNTRY	CANADA

COAL LITHOLOGY LOG

257

757

BOREHOLE 89-09

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

DATE LOGGED AUG 17/89

DEPTH SCALE 1:20

3 OF 4 LOGS

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	TAPING			PANEL			CAL COEFF
	LOG TAPED	RECORD SPEED	DIRECTION OF RECORD	SPEED	TC SECS	NORM	
GAMMA RAY	Y	2	R	2	1	-	1.75
LS DENSITY	Y	2	R	2	.3	7.38	-

SIDEWALL POSITION

SOURCE SONDE AND CALIBRATION

REFER TO LITHOLOGY LOG

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY L.S. DENSITY

COAL QUALITY LOG INTERVALS

FROM	45m
TO	38m
INTERVAL	07m
FROM	
TO	
INTERVAL	
INTERVAL TOTAL	±07m

REMARKS

B P B COAL QUALITY LOG

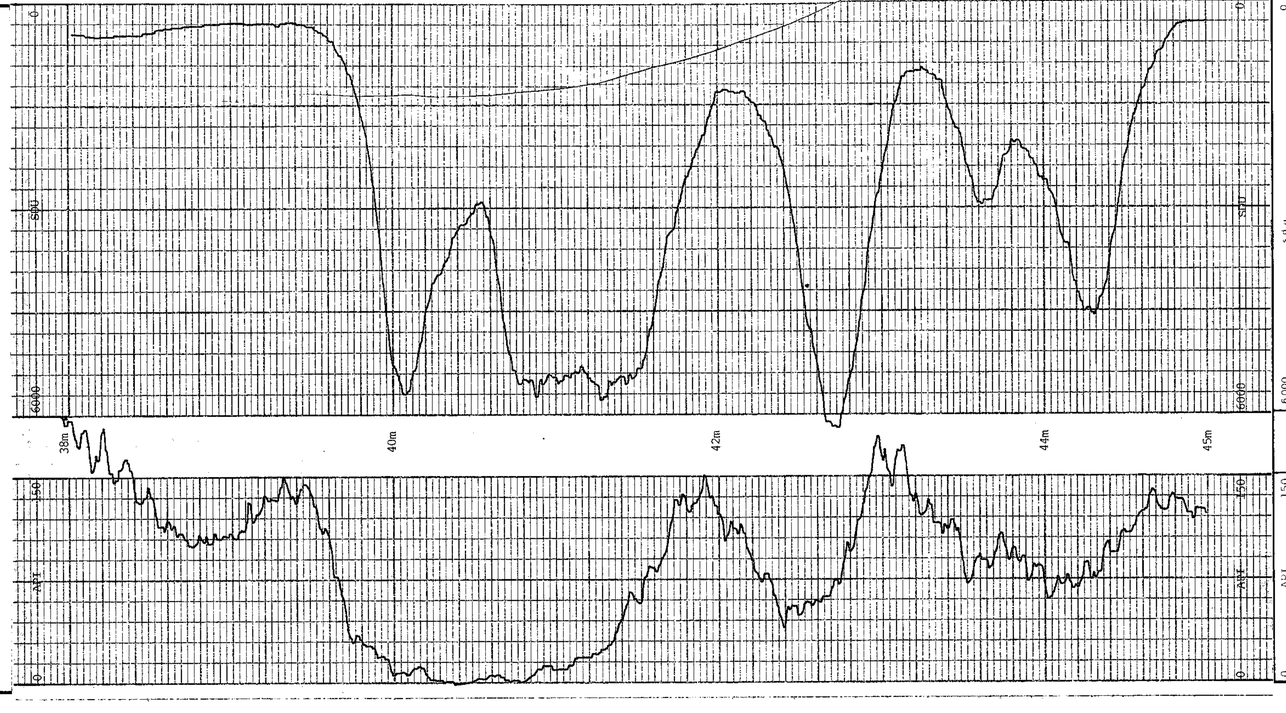
GAMMA RAY

COAL BULK DENSITY g/cm3

DEPTH

GAMMA RAY

HOLE SIZE CORRECTION DATA



COAL BULK DENSITY g/cm3

DEPTH

GAMMA RAY

BOREHOLE 89-09

CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.

COUNTRY CANADA

COAL QUALITY LOG

MY (2) 137483 2

SEAM THICKNESS LOG

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: CALIPER, B.R. DENSITY

BOREHOLE 89-09
CLIENT CROWSNEST RESOURCES LTD.

AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 17/89

DEPTH SCALE 1:20

4 OF 4 LOGS

BOREHOLE DATA — REFER TO LITHOLOGY LOG

OPERATION DATA — REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	TAPING				PANEL		
	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	TC SECS	NORM	CAL COEFF
CALIPER	Y	2	R	2	.3	-	-
BR DENSITY	Y	2	R	2	.3	8.05	-

SOURCE: SONDE AND CALIBRATION

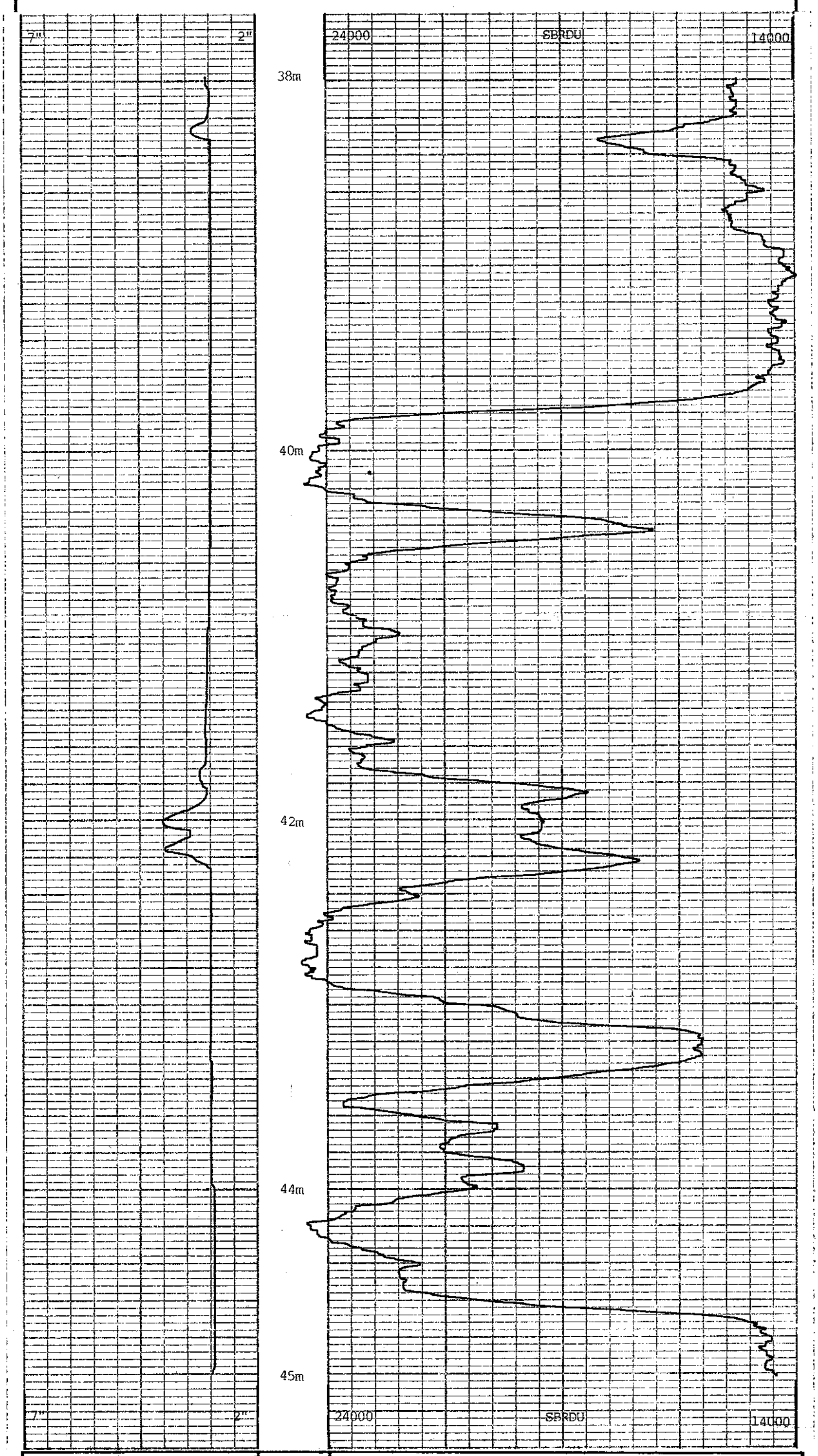
REFER TO LITHOLOGY LOG

SEAM THICKNESS LOG INTERVALS

	FROM	TO	INTERVAL
	45m	38m	07m
INTERVAL TOTAL			07m

REMARKS

B P B SEAM THICKNESS LOG



BOREHOLE 89-09
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA

SEAM THICKNESS LOG

MY 88002 R

COAL LITHOLOGY LOG

BOREHOLE: 89-10
CLIENT: CROWSNEST RESOURCES LTD.
AREA: PINE PASS B.C.
COUNTRY: CANADA
DATE LOGGED: AUG 19/89
DEPTH SCALE: 1:100
1 OF 4 LOGS

BOREHOLE DATA

PERMANENT DATUM: GROUND LEVEL
ELEVATION OF P.D.: N/A
MEASUREMENTS FROM: BPB — G.L.; DRILLER — G.L.
DEPTH REACHED: 121.1m; 121.9m
CASING SHOE: 6.0m; 6.0m
SIZES: 1: 3" TO TD
CASING SIZES: 1: [illegible] TO 6.0m

FLUID DATA

TYPE: CFL
N/A
00m
N/A
N/A

OPERATION DATA

120m
00m
120m
V223
B. STEVENSON
B. McKINISTRY

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL			CAL. COEFF.	DEPTHS			SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	T.C. SECS	NORM		FROM	TO	INTERVAL	
GAMMA RAY	205		242	Y	9	D	9	1	-	1.75	120	00	120m	Y
L.S. DENSITY		0028	-	Y	9	D	9	.3	7.38	-	120	00	120m	Y
CALIPER	SIDEWALL POSITION		7" 2"	Y	9	D	9	.3	-	-	120	00	120m	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM
TO
INTERVAL
INTERVAL TOTAL

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
514	DSN	1:100	
236	VERT	-	

REFER TO ADDITIONAL HEADINGS

REMARKS

BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No. 242 VALUE 463 @ 5" DIAM.
JIG MARK SHOWN AT ABOVE VALUE ÷
JIG CAL. DATE — JIG VALUE — SDU @ g/cm³
JIG No. — SPAN — NORM SDU/CPS =
7 ins 896 cps.
2 ins. 439 cps.

GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

HOLE SIZE CORRECTION DATA

0 API 150		6000 sdu 0	7" 2"
GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

BOREHOLE: 89-10 AREA: PINE PASS B.C.
CLIENT: CROWSNEST RESOURCES LTD. COUNTRY: CANADA

COAL LITHOLOGY LOG

MY (1)137483 R

BPB

SCHLUMBERGER
WELL SURVEY
CANADA

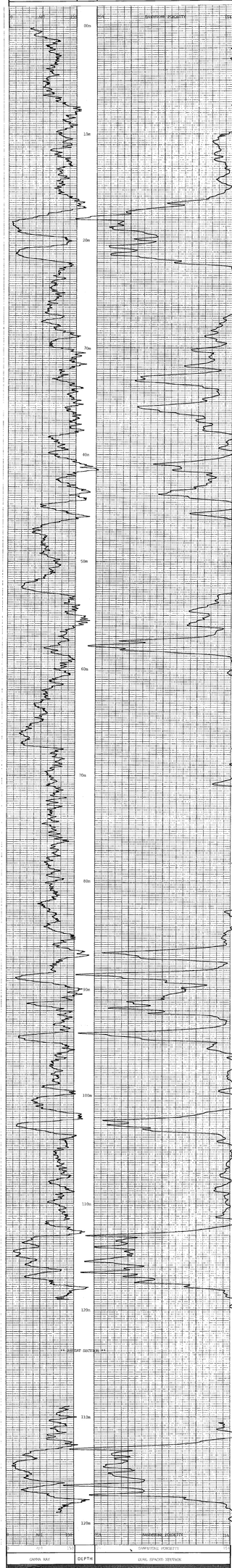
BOREHOLE	BP-10
CLIENT	CHEVRON RESOURCES LTD.
AREA	BIRCH LAKE
COUNTRY	CANADA
DATE	1-7-80
RUN	ONE
DEPTH-DRILLER	1200
DEPTH-LOGGER	1198
BOTTOM LOGGED INTERVAL	1198
TOP LOGGED INTERVAL	0
CASING-DRILLER	0
CASING-LOGGER	0
BIT SIZE	7 7/8
TYPE FLUID IN HOLE	WATER
DENSITY	
VISCOSITY	
PH	
FLUID LOSS	
SOURCE OF SAMPLE	
RM @ MEAS. TEMP.	
RMF @ MEAS. TEMP.	
RMC @ MEAS. TEMP.	
SOURCE RMF / RMC	
RM @ BHT	
TIME SINCE CIRC.	
MAX. REC. TEMP.	
EQUIPMENT LOCATION	
RECORDED BY	
WITNESSED BY	

RECORDS

RUN	BIT	FROM	TO
ONE	7 7/8	0	1198

TYPE	MAKE	SIZE	LOCATION
DIL			
BHC			
FDC			
CNL			

GAMMA RAY	DEPTH
0 API 100	DUAL SPACED SATURATION
	1 ARBITRARY 0



BOREHOLE	BP-10
CLIENT	CHEVRON RESOURCES LTD.
AREA	BIRCH LAKE
COUNTRY	CANADA

BP 3102018

454

757

COAL QUALITY LOG

BOREHOLE 89-10
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 19/89
DEPTH SCALE 1:20
3 OF 4 LOGS

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY, L.S. DENSITY

BOREHOLE DATA: REFER TO LITHOLOGY LOG

OPERATION DATA: REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA: COAL COMBINATION SONDE; SIDEWALL POSITION

LOG	LOG TAPED	RECORD SPEED	DIRECT OR REPLAY	SPEED	T.C. SECS	NORM	CAL COEFF
GAMMA RAY	Y	2	R	2	1	-	1.75
L.S DENSITY	Y	2	R	2	.3	7.38	-

SOURCE SONDE AND CALIBRATION: REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	118	96	59	23	
TO	112	88	57	17	
INTERVAL	06m	08m	02m	06m	INTERVAL TOTAL ≠22m

REMARKS

BPB COAL QUALITY LOG

	DEPTH	
GAMMA RAY		COAL BULK DENSITY g/cm3

HOLE SIZE CORRECTION DATA

1·2 1·25 1·3 1·35 1·4 1·45 1·5 1·55 1·6 1·7 1·8 1·9 2·0 2·2 2·4 3·0

2" 4" 6" 8"

0 API 150 | 6000 sdu 0

0 API 150 | 6000 sdu 0

GAMMA RAY		COAL BULK DENSITY g/cm3
	DEPTH	

BOREHOLE 89-10 AREA PINE PASS B.C.
CLIENT CROWSNEST RESOURCES LTD. COUNTRY CANADA

COAL QUALITY LOG

MY (2) 137483 R

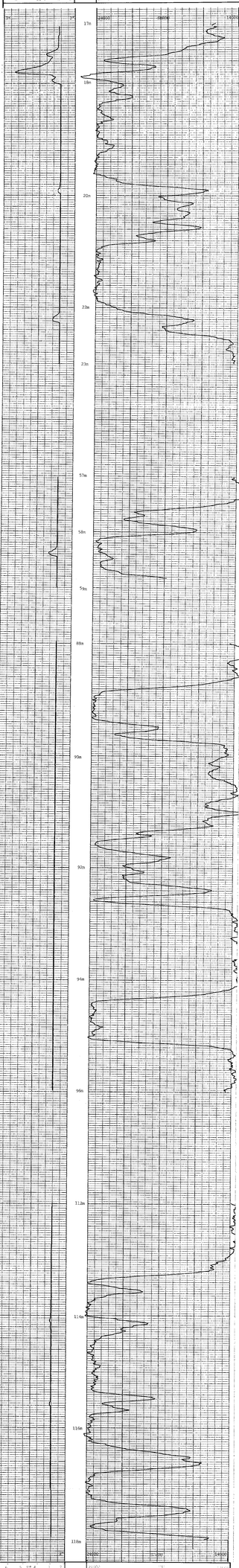
BPB

SEAM THICKNESS LOG

BOREHOLE DETAILS
CLIENT: CONSORTIUM HYDROCARBON LTD.
AREA: PRINCE RUPERT B.C.
COUNTRY: CANADA
DATE LOGGED: DEC 22/93
BOREHOLE DATA: BOREHOLE DIAMETER: 100
OPERATION DATA: MAXIMUM TOOL DIAMETER: 100
EQUIPMENT AND RECORDING DATA: LOG COMMENCED ON DEPTH: 0.0 METRES
LOG COMPLETED ON DEPTH: 118.0 METRES
LOGGING SPEED: 1.0 METRES PER MINUTE
LOGGING DIRECTION: DOWNWARDS
LOGGING DATA: LOG INTERVALS
LOG TYPE: DENSITY COMBINATION SONDE
LOGS: CALIPER, BED RESOLUTION DENSITY
LOG SUITE: CALIPER, BR DENSITY
REMARKS: NONE

B P B SEAM THICKNESS LOG

CALIPER (INCHES) 6 — 4 — 3 — 2 | DEPTH (METRES) | BED RESOLUTION DENSITY (G/CC) 2.600 — 2.500 — 2.400



CALIPER (INCHES) 6 — 4 — 3 — 2 | DEPTH (METRES) | BED RESOLUTION DENSITY (G/CC) 2.600 — 2.500 — 2.400

BPB

BOREHOLE: 93-10
CLIENT: CONSORTIUM HYDROCARBON LTD.
AREA: PRINCE RUPERT B.C.
COUNTRY: CANADA

SEAM THICKNESS LOG

MF4 8001 R

357

COAL LITHOLOGY LOG

BPB

BOREHOLE 89-11
CLIENT CROWSNEST RESOURCES LTD.
AREA PINE PASS B.C.
COUNTRY CANADA
DATE LOGGED AUG 20/89

DEPTH SCALE 1:100
1 OF 4 LOGS

757

SONDE TYPE: COAL COMBINATION SONDE

LOG SUITE: GAMMA RAY, L. S. DENSITY, CALIPER

BOREHOLE DATA

PERMANENT DATUM	GROUND LEVEL	
ELEVATION OF P.D.	N/A	
MEASUREMENTS FROM	BPB	DRILLER
DEPTH REACHED	G.L. 168.7m	G.L. 169.2m
CASING SHOE	1.0m	1.0m
BIT SIZES	1 3" TO TD	2 TO
	3 TO	4 TO
CASING SIZES	1 HW TO 1.0m	2 TO

FLUID DATA

NATURE	GEL
S.G.	N/A
LEVEL	00m
VISCOSITY	N/A
Rm at meas. temp.	N/A
BHT.	N/A

OPERATION DATA

FIRST READING	167m
LAST READING	00m
INTERVAL LOGGED	167m
UNIT-TRUCK No.	V223
ENGINEER	B. STEVENSON
WITNESS	B. MCKINISTRY

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL			CAL COEFF	DEPTHS			SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	T.C. SECS	NORM		FROM	TO	INTERVAL	
GAMMA RAY	205		242	Y	9	D	9	1	–	1.75	167	00	167m	Y
L.S. DENSITY		0028	–	Y	9	D	9	.3	7.38	–	167	00	167m	Y
CALIPER	SIDEWALL POSITION		7" 2"	Y	9	D	9	.3	–	–	167	00	167m	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM		INTERVAL TOTAL
TO		
INTERVAL		

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG	
514	DSN	1:100		REFER TO ADDITIONAL HEADINGS
236	VERT	–		

REMARKS

BPB COAL LITHOLOGY LOG

CALIBRATION DATA

JIG No. 242 VALUE 463 @ 5" DIAM.	JIG CAL. DATE	JIG VALUE	SDU @ g/cm³	7 ins. 896 cps.
JIG MARK SHOWN AT ABOVE VALUE ÷	JIG No.	SPAN	NORM SDU/CPS =	2 ins. 439 cps.

GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

HOLE SIZE CORRECTION DATA

GAMMA RAY	DEPTH	BULK DENSITY g/cm³	CALIPER INCHES

BPB

BOREHOLE 89-11 AREA PINE PASS B.C.
CLIENT CROWSNEST RESOURCES LTD. COUNTRY CANADA

COAL LITHOLOGY LOG

MY (1)137483 R

BP BB

DATA SERVICES
LEADING EDGE

COMPANY
CLIENT CHEVRON ASSOCIATES LTD.
WELL 22/2-2 (PAD 2)
COUNTY/PROV. OFF. SHORE
FIELD

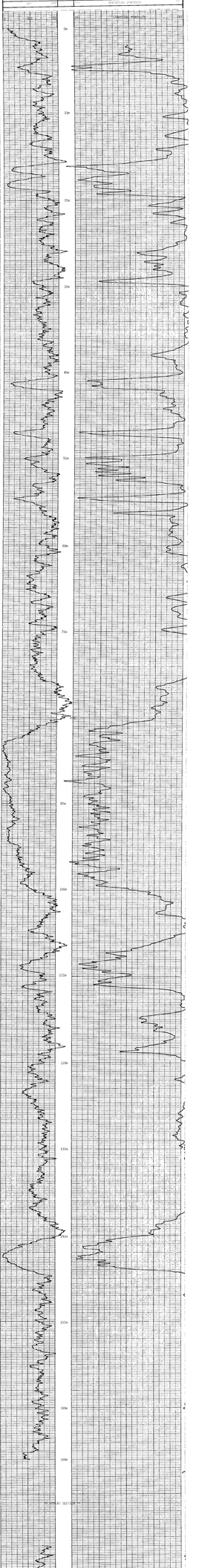
RUN 1 RUN 2 RUN 3

DATE 1-2-87 1-2-87 1-2-87

RECORDING
DATA
FORMAT
DENSITY
SPACING
UNITS

EQUIPMENT AND RECORDING DATA
BOREHOLE DATA
OPERATIONAL DATA
EQUIPMENT AND RECORDING DATA

GAMMA RAY | DEPTH | DUAL SPACED SECTION | SHORT SPACED SECTION



BP BB

BOREHOLE 22/2-2
CLIENT CHEVRON ASSOCIATES LTD.
AREA FIRST FIELD PLC.
COUNTRY NORWAY

BP 1000000

BPB

COAL QUALITY LOG

BOREHOLE: 55-11
AREA: PEE DEE
COUNTY: CHOWAN
DATE: 10/20/83

DATE FILE: 10/20/83
DATE PRINTED: 10/20/83
DATE PLOTTED: 10/20/83

DENSITY CALIBRATION COMMENTS
DENSITY BAR CALIBRATION
CALIBRATION BAR

DENSITY CALIBRATION DATA
DENSITY BAR CALIBRATION DATA
CALIBRATION BAR DATA

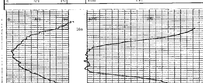
DENSITY HOLE SIZE CORRECTION DATA
DENSITY HOLE SIZE CORRECTION DATA

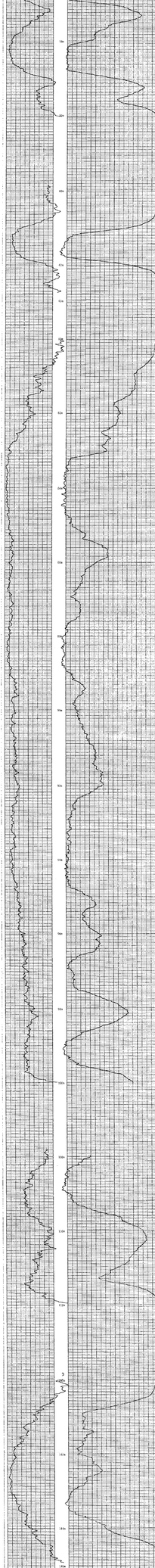
#57

BPB COAL QUALITY LOG

	DEPTH	
GAMMA RAY		COAL BULK DENSITY

HOLE SIZE CORRECTION DATA





	DEPTH	
GAMMA RAY		COAL BULK DENSITY

BPB

BOREHOLE: 55-11 AREA: PEE DEE
CLIENT: CONSOLIDATE RESOURCES ETC. COUNTY: CHOWAN

COAL QUALITY LOG

BPB

SEAM THICKNESS LOG

COMPANY: [illegible]
WELL: [illegible]
COUNTRY: [illegible]
DATE: [illegible]

BOREHOLE DIAMETER: [illegible]
DRILLING FLUID: [illegible]
MAX. TEMP.: [illegible]

COAL TYPE: [illegible]
DIAGENESIS: [illegible]

DATA SOURCE: [illegible]
DATA QUALITY: [illegible]

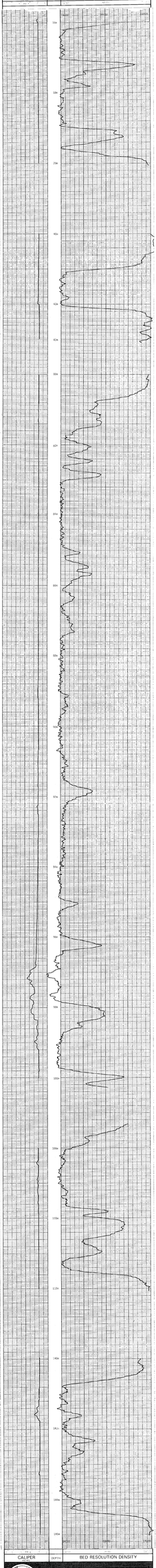
DATA ACQUISITION: [illegible]
DATA PROCESSING: [illegible]

DATA CHARACTERISTICS: [illegible]
DATA ATTRIBUTES: [illegible]

ESE

BPB SEAM THICKNESS LOG

CALIBER	DEPTH	BED RESOLUTION DENSITY
6 in		1.3 g/cc — 2.3 g/cc



CALIBER	DEPTH	BED RESOLUTION DENSITY
6 in		1.3 g/cc — 2.3 g/cc

BPB

BOREHOLE: [illegible] AREA: [illegible]
ELEVAT.: [illegible] COUNTRY: [illegible]

SEAM THICKNESS LOG

BP 6001/A

PINE PASS : 1989
DEVIATION DATA

	Depth	Azimuth	Inclination
PP89-01			
	10	241.9	54.61
	20	243.24	53.95
	30	243.82	53.33
	40	241.42	53.09
	50	239.40	53.10
	60	239.78	53.11
	70	241.38	52.50
	80	241.57	52.63
	90	231.00	52.95
	100	234.17	52.67
PP89-02			
	10	003.29	53.16
	20	036.16	53.84
	30	034.99	52.69
	40	035.16	52.61
	50	034.59	52.37
	60	034.99	52.19
	70	034.69	51.95
PP89-03			
	40	000.00	90.00
PP89-04			
	20	220.78	52.90
	30	229.83	52.85
	40	238.56	53.24
	50	240.14	53.13
	60	244.23	52.64
PP89-05			
	10	236.32	54.60
	20	237.62	54.87
	30	238.53	54.99
	40	237.80	54.88
	50	236.61	54.94
	60	233.99	54.78
	70	232.82	54.50

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PP89-06

15	237.26	55.90
20	234.69	56.03
30	231.27	56.44
40	230.74	56.61
50	230.29	56.25
60	232.42	55.93
70	149.44	34.16

PP89-07

10	242.35	57.81
20	252.17	58.49
30	251.28	58.62
40	253.67	58.47
50	252.99	58.45
60	252.57	58.27
70	254.15	58.02
80	253.65	58.15
90	252.57	58.05

PP89-08

10	235.54	55.11
20	237.59	55.09
30	235.82	55.09
40	235.84	55.18
50	235.53	55.19
60	234.99	54.97
70	234.08	55.48
80	233.67	55.22
90	231.10	54.50
100	233.09	54.07
110	233.15	54.00

PP89-09

10	229.28	56.29
20	228.89	56.52
30	228.35	55.95
40	231.37	55.66
50	231.71	56.06
60	229.02	56.61
70	228.39	56.41
80	227.94	55.79
90	228.95	55.97
100	227.76	56.42
110	288.72	57.68

PP89-10

20	237.59	56.45
30	237.37	56.61
40	238.41	55.72
50	238.82	55.70
60	238.52	55.75
70	240.64	55.09
80	239.75	54.99
90	236.50	55.24
100	235.18	55.05
110	233.31	55.09
120	231.77	55.64

PP89-11

20	234.06	56.88
30	234.30	57.49
40	233.60	57.58
50	233.70	57.14
60	236.21	56.44
70	234.71	56.88
80	234.12	57.13
90	234.62	56.74
100	234.85	57.06
110	236.07	56.87
120	235.34	56.08
130	233.28	55.82
140	231.31	56.13
150	230.40	56.39
160	231.94	56.34

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP89-01

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 5, 1989

6. Date of Sealing: AUG 5, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F. J. Kuikhoff

Date Aug-5-89

COMPANY:

Signature

Date

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REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP89-02

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 6, 1989

6. Date of Sealing: AUG 6, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuckhoff

Date Aug 6-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PC 89-03

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): VERTICAL, DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES LTD.

5. Date of Completion: AUG 7, 1989

6. Date of Sealing: AUG 7, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? No
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuckhoff.

Date Aug-7-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP89-04

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 9, 1989

6. Date of Sealing: AUG 9, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuckhoff

Date Aug-9-89

COMPANY: Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP89-05

2. Surface elevation:

3. Type (Vertical,diamond,rotary,size,etc.): 60°, DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 10, 1989

6. Date of Sealing: AUG 10, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? No
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuckhoff

Date Aug-10-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: Land District:

1. Drillhole ID: PP89-06

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 11, 1989

6. Date of Sealing: AUG 11, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kerkhoff

Date Aug-11-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP 89-07

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 13, 1989

6. Date of Sealing: AUG 13, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? No
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F. Hudkoff

Date Aug-13-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP 89-08

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 14, 1989

6. Date of Sealing: AUG 14, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kaulbach

Date Aug. 14-89

COMPANY: Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP 89-09

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 16, 1989

6. Date of Sealing: AUG 16, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? NO
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuikhoff

Date Aug - 16 - 89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP 89-10

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60°, DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 18, 1989

6. Date of Sealing: AUG 18, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? No
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? YES
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? YES
    (b) Details of any tests carried out

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F. J. Kuckhoff

Date Aug-18-89

COMPANY:

Signature

Date

REPORT ON THE SEALING OF DRILLHOLES:

Inspection District: Date of Report:

Company: CROWS NEST RESOURCES Land District:

1. Drillhole ID: PP89-11

2. Surface elevation:

3. Type (Vertical, diamond, rotary, size, etc.): 60° DIAMOND

4. Drilled by: Name of Contractor TONTO DRILLING
   Name of Exploration Company CROWS NEST RESOURCES

5. Date of Completion: AUG 20, 1989

6. Date of Sealing: AUG 20, 1989

7. Sealed by: Name of Contractor TONTO DRILLING

8. (a) Has any casing, drill pipe, drill bits, core barrel, etc. been left in the hole? No
   (b) If so, give details and location

9. (a) Was the drillhole sealed in the manner outlined in the Chief Inspectors Instructions? Yes.
   (b) If no, give reasons and details of variation

10. (a) Was the sealing effective? No
    (b) Details of any tests carried out Hole was cemented - then plugged & cemented over top. - water kept flowing - so hole was plugged with dry logs - (approx - 25') & cemented again - flow was stopped. Rig was moved off site - Flow started again a few hours later.

11. **DECLARATION:**
    I certify that the above drillhole has been effectively sealed in accordance with the instructions of the Chief Inspector of Mines.

CONTRACTOR:

Signature Frank F.J. Kuckhoff.

Date Aug - 20 - 89

COMPANY:

Signature

Date