TK-DENY'S CREEK 83(1)A

224

7(6)a)

DENY'S CREEK

1983 GEOLOGICAL REPORT

N.T.S. Map Sheet:	93L/6
Land District:	Coast Range 5
Latitude/Longitude:	54° 25'/127° 15'
Coal Licences:	Group 324
	4247, 4248, 4250, 6884, 6886 & 6887
Held by:	Shell Canada Resources Limited
Operated by:	Crows Nest Resources Limited
Exploration Period:	August 1983
Report Date:	March 1984
Project Geologist:	Dave Handy
Geologist:	Steve Cameron

C3/r.1

DENY'S CREEK 1983 GEOLOGICAL REPORT

TABLE OF CONTENTS

			Page
		Letter of Professional Verification	
1.0		Summary	1
2.0		Introduction	1
	2.1	Location	1
	2.2	Tenure	2
3.0		Regional Geology	2
4.0		Deny's Creek Geology	3
	4.1	Stratigraphy	3
	4.2	Coal Stratigraphy	4
	4.3	Structure	4
5.0		Summary of Previous Work	5
6.0		Work Done in 1983	5
7.0		Mineability	6
8.0		Coal Quality	6
9.0		References	7

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 224

LIST OF ENCLOSURES

	SCALE	ENCLOSURE
Location and Index Map	Scale as shown	A
Land Map	1:50000	1
Geology Compilation Map	1:50000	2
Geology Map	1:10000	3
DC301 Seam Thickness Log	1:20	4
DC301 Coal Quality Log	1:20	5
DC301 Coal Lithology	1:100	6
DC301 Gamma Ray and Neutron Neutron Log	1:100	7
DC301 Drill Core Description		8
Coal Quality Analysis	(CONFIDENTIAL)	9

LIST OF APPENDICES

APPENDIX 1	B.C. Coal Land Tenure Standing
APPENDIX 2	Application to Extend Coal Licence
APPENDIX 3	Drill Hole Cementing Report

Crows Nest Resources LIMITED
Eau Claire Place, 525 - 3rd Avenue S.W., Calgary, Alberta (403) 232-4355
P.O. Box 2699, Station M, Calgary, Alberta T2P 2M7 Telex 03-822505

March 28, 1984

Ministry of Energy, Mines and Petroleum Resources
617 Government Street
Victoria, B.C.
V8V 1X4

Attention: Mr. P. Hagen
Coal Administrator

Dear Mr. Hagen:

Enclosed please find our report on the Deny's Creek Coal Project.

This report has been prepared by Mr. D. Handy and Mr. S. Cameron, both of whom are employed by Crows Nest Resources Limited as geologists.

Mr. D. Handy, Honours B.Sc., graduated in Geology from the University of Waterloo in 1977. Prior to his graduation, Mr. Handy worked as an assistant for two geotechnical companies and after graduation, as a geologist for a major exploration company in Saskatchewan. Mr. Handy has been employed by Crows Nest Resources Limited as a Project Geologist since 1979.

Mr. S. Cameron, B.Sc., in Geology graduated from the University of Calgary in 1981. Prior to graduation Mr. Cameron worked as an assistant for a major exploration company in the North West Territories. He also worked for Crows Nest Resouces Limited as a geological assistant in 1980. Mr. Cameron has been employed by Crows Nest Resources Limited as a Geologist since May 1981.

In my opinion, these personnel are fully qualified, by training and experience to prepare this report and this account of work done under their direct supervision.

Yours very truly

H.G. Rushton
Vice President - Development

HGR/sc

1.0 Summary

The Deny's Creek Project is contained within six coal licences. These licences are held by Shell Canada Resources Limited and operated by Crows Nest Resources Limited.

The 1983 exploration program included the preparation of one drill site and drilling one NQ Diamond Drill hole to a depth of 288.63 metres. This site was reclaimed upon abandonment. The coordinates of the drill hole were located by ground survey methods.

The total field expenditure for 1983 was $44,557.00. All of this amount is being applied to the coal licences covered by this report.

2.0 Introduction

2.1 Location

Enclosure A - Location and Index Map.

The property is located along Deny's Creek, north of its confluence with the Thautil River.

N. Lat. 54° 25'

W. Long. 127° 15'

7(6)c) (i) access to Deny's Creek is by helicopter (see Index Map).

(ii) SCRL acquired the licences in 1979. Licences are held by SCRL and operated by CNRL.

Due to high overburden ratios and the very small area of the coal resources at Deny's Creek, CNRL believes the property is uneconomic for open pit mining. Detailed reserve calculations have not been done but it is estimated that there is less than 1 million tonnes of open pit mineable reserves. CNRL has decides to surrender the licences.

(iii) (C) one diamond drill hole NQ3.

(E) the drill hole was decided upon with the use of aerial photographs. No geodetic survey was undertaken.

(G) A 30m x 90m site was prepared. This site was subsequently reclaimed and inspected.

2.2 Tenure

The Deny's Creek licences are all contained in Group number 324. The coal licence numbers included in this group are 4247, 4248, 4250, 6884, 6886, and 6887.

Enclosure 1 of this report contains a "Coal Land Disposition Map".

Appendix 1 of this report contains a tabulation of "B.C. Coal Land Tenure Standing" for the group of licences stated above.

3.0 Regional Geology

Mesozoic successor basins developed in the Intermontane Belt between the Columbian and Pacific Orogens in the B.C. Cordillera. These deeply subsiding troughs usually had both marine and fresh water depositional environments. Fresh water lakes could have developed in areas of poor drainage and provided sites for thick peat accumulation. Coal-bearing clastic sequences also accumulated in areas of dip-slip and strike-slip faulting in the troughs.

The Skeena Group successor basin is filled with interbedded marine and non-marine sedimentary and volcanic strata. This assemblage was deposited on the folded and faulted terrane of the Bowser Lake and older groups such as the Hazelton. Sediments of the Skeena Group are distinguishable from the Bowser Lake and Hazelton sediments by the presence of fine detrital

muscovite. "In the Late Jurassic to Early Cretaceous, prior to deposition of the Skeena Group sediments,the Hazelton Group underwent a period of uplift, deformation and erosion. During the Mid Early Cretaceous, the sea readvanced from the west, in the area of Skeena Valley, inundating the non-marine, Late Lower Cretaceous coal basins such as Telkwa and Lake Kathlyn. The sediments of the Skeena Group were derived from an uplifted Pinchi-belt - Columbian Orogen. They were deposited in a southwesterly direction, across the Skeena Arch, which apparently had little influence on the shape of the basin receiving the Skeena Clastics."[1]

4.0 Deny's Creek Geology

4.1 Stratigraphy

The basement rocks of the Deny's Creek property consists of upper Jurassic/lower Cretaceous volcanics of the Hazelton Group. These volcanics consist mainly of basalt, andesite, trachyte, rhyolite and agglomerate.

The volcanics are unconformably overlain by upper Jurassic/lower Cretaceous sediments of the Hazelton Group. These sediments are composed of conglomerate, sandstone, siltstone, shale, mudstone, coal and minor lava flows.

1 Tipper H.W. and Richards T.A., Jurassic Stratigraphy and History of North Central British columbia, 1976, page 7.

Young intrusive rocks in the form of dykes and sills will often occupy fault zones. The intrusives are often oriented parallel to joints and mainly trend northeasterly.

The sedimentary section varies greatly in thickness over the Deny's Creek area, from 0 metres to at least 250 metres. Individual beds tend to lens and pinch out over relatively short distances making correlation difficult. A basal conglomerate sandstone often overlies the basement volcanics, whereas the upper part of the section is dominated by shales and siltstones.

4.2 Coal Stratigraphy

In the Deny's Creek area the number of coal seams is variable. Diamond drilling and mapping indicate that four seams may be present in the south-central part of the property. Aggregate thickness of the seams in the south ranges from 3 metres to greater than 4 metres. In the northern part of the property fewer seams are present. It is not known whether the seams present in the south are truncated by the unconformity or pinch out stratigraphically toward the north.

4.3 Structure

On the basis of photogeology, a northeasterly trending normal fault has been interpreted. Two small synclines southeast of this fault have also been interpreted by photogeology. The presence and magnitude of these synclinal structures on the northwest side of the fault is unknown.

5.0 Deny's Creek Property

Summary of Previous Work

During the 1979 field season the following exploration work was performed:

- 1:10,000 scale geological mapping
- hand trenching

No exploration work was performed during 1980.

Work done in 1981

The 1981 field operations were supervised by Dave Handy of Crows Nest Resources Limited. The following exploration work was performed:

- 1:10,000 scale geological mapping
- diamond drilling
- location survey of diamond drill holes
- drill site reclamation

No exploration work was performed during 1982.

6.0 Work Done in 1983

- one diamond drill hole
- drill site reclamation

7.0 Mineability

Present geological information indicates that the Deny's Creek property has limited potential for open pit mining due to high overburden ratio. However, some of the area in the southwest portion of the property may have potential open pit reserves.

8.0 Coal Quality

The Deny's Creek coal samples were obtained from NQ diamond drill core. Analysis of the 1983 samples has not been completed at this time. These results will be submitted in a subsequent report covering exploration work done for the following term of the coal licences. A summary of the coal quality obtained from core samples taken in 1981 is tabled in Enclosure 9.

13(6)

Hole Location	- Northing 6030989 Easting 611885
Azimuth & Indication	- Vertical
Diameter	- NQ-3 (2" Diameter)
Collar Elevation	- 1160m

9.0 References

Dowling, D.B.
1915: Coal Fields of British Columbia, Canada Dept. of Mines, No. 57, Geological Series, pp. 167-189.

Eisbacher, G.H.
1974: Evolution of Successor Basins in the Canadian Cordillera, Society of Economic Paleontologists and Mineralogists, Special Publication 19.

Eisbacher, G.H.
1981: Late Mesozoic - Paleogene Bowser Basin Molasse and Cordilleran Tectonics, Western Canada, Geol. Assoc. Canada, Special Paper #23.

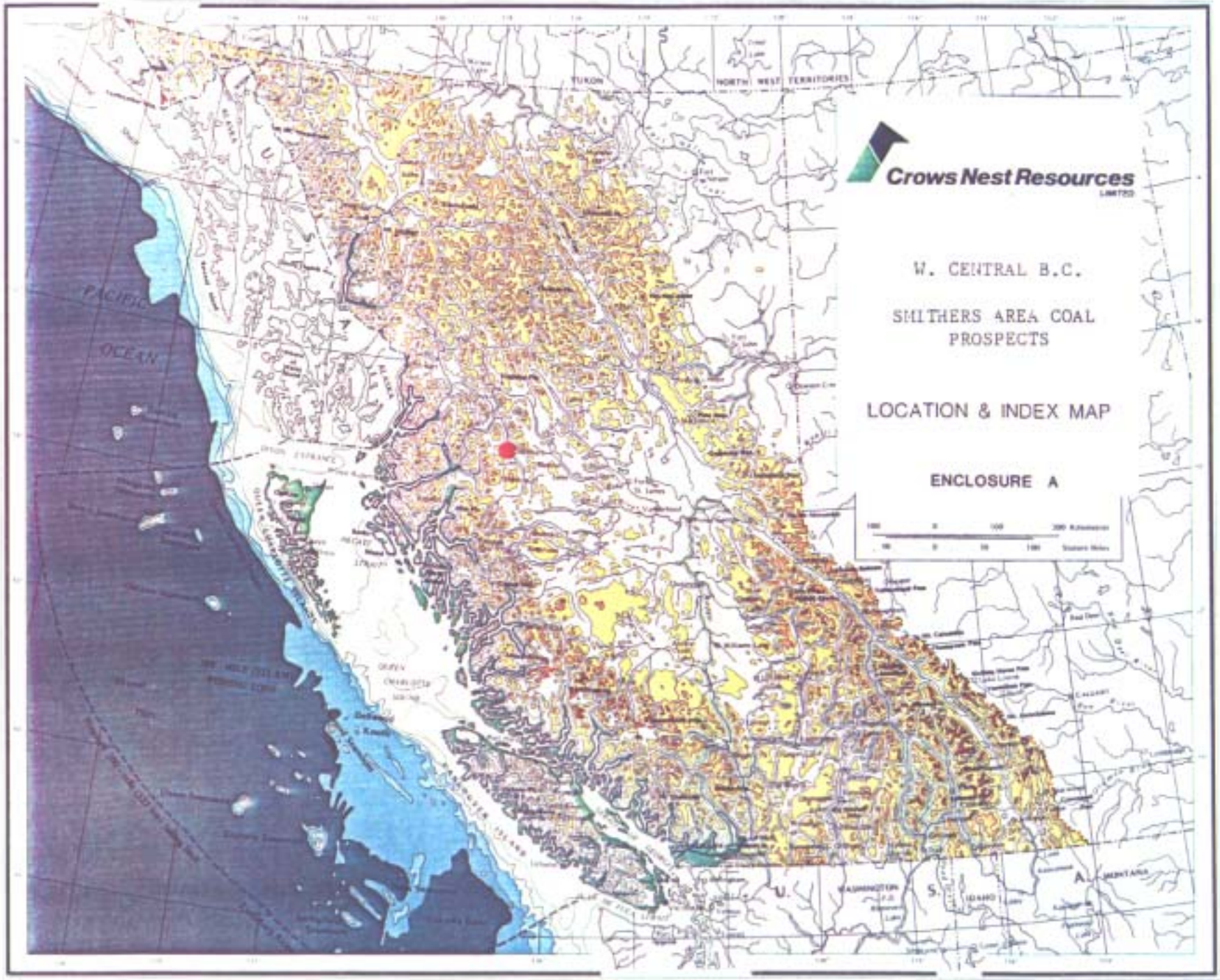
Handy, D.L.
1979: Geological Report - Smithers Area Coal Prospects Crows Nest Resources Limited

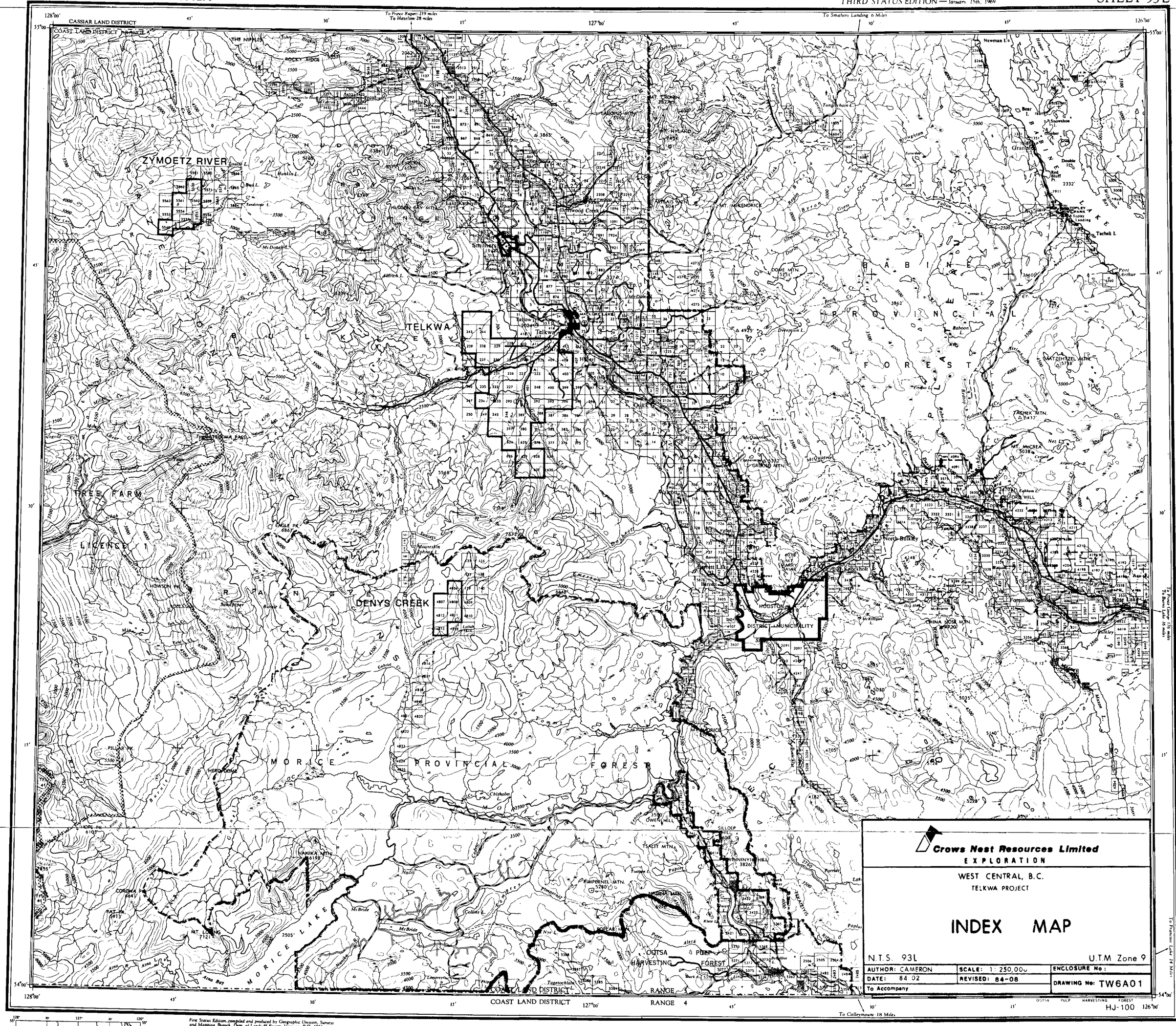
Handy, D.L. and Cameron, S.J.
1981: Geological Report - Smithers Area Coal Prospects Crows Nest Resources Limited

Koo, J and Matheson, A.
1983: Economic Coal Potential of the Southern Bowser Basin in West Central British Columbia, CIM District 6 Meeting, Smithers B.C. Paper No. 22.

Long, D.G.F.
1981: Dextral Strike Slip Faults in the Canadian Cordillera and Depositional Environments of Related Fresh-Water Intermontane Coal Basins, Geol. Assoc. Canada, Special Paper #23.

Tipper, H.W. and Richards, T.A.
1976: Jurassic Stratigraphy and History of North Central British Columbia, Geol. Surv. Canada, Bulletin 270.


Crows Nest Resources
LIMITED
W. CENTRAL B.C.
SMITHERS AREA COAL
PROSPECTS
LOCATION & INDEX MAP
ENCLOSURE A
PACIFIC
OCEAN
YUKON
NORTH WEST TERRITORIES
ALASKA
MONTANA
IDAHO



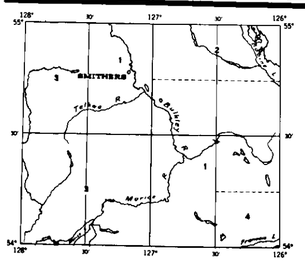
Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL, B.C.
TELKWA PROJECT

INDEX MAP

N.T.S. 93L — U.T.M Zone 9

AUTHOR: CAMERON	SCALE: 1:250,000	ENCLOSURE No:
DATE: 84 02	REVISED: 84-08	DRAWING No: TW6A01
To Accompany		



RELIABILITY DIAGRAM

1. Standard Provincial Topographic Surveys, 1:31,680, 1950-51.
2. Provincial Air Survey, Interim Mapping, 1:31,680, 1951.
3. Planimetry compiled from B.C. Gov't. Air Photos, 1949.
4. Contours adapted from Mines and Technical Surveys, Ottawa, 1936.
5. Planimetry compiled from B.C. Gov't. Air Photos, 1949. Contours from Mines and Technical Surveys, Ottawa, 1951.

Roads revised from B.C. Gov't. air photos, 1968.

First Status Edition, compiled and produced by Geographic Division, Surveys and Mapping Branch, Dept. of Lands & Forests, Victoria, B.C., 1953.
Third Status Edition revised 1969

REFERENCE

Land alienated or covered by application under the Land Act	
Surveyed Timber or Pulp Lease, Timber or Pulp Licence	T.L. or P.L.
Indian Reserve	
Government Reserve	G.R.
Land District Boundary	
Provincial Forest Boundary	
Tree Farm Licence	
Municipality	
Water Supply Area	
Park	
Park less than 40 acres	
Campground	
Forest Service Lookout	
Settlement or Locality	
Post Office	P.O.
School	Sch.
Hospital	Hosp.
Mine	
Dyke	
Historic Monument	
Mile Post	
International Boundary and Monument	INTL. B'DY

SMITHERS

BRITISH COLUMBIA

COAST LAND DISTRICT — RANGE 5

Scale 1:250,000 or approximately 1 Inch to 4 Miles

Miles 5 0 5 10 15 20 Miles

Scale of Kilometres

5 0 5 10 15 20 25 30

Magnetic Declination approximately 26°45' East of Centre of sheet, 1969. Decreasing approximately 3'41" annually

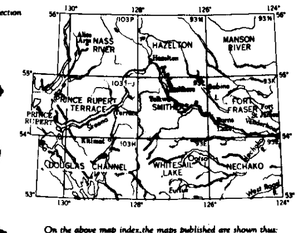
Maps and indexes with price lists may be obtained from the Map Production Division, British Columbia Lands Service, Parliament Buildings, Victoria, B.C.

LITHOGRAPHED IN CANADA BY E. M. MACDONALD, QUEEN'S PRINTER, VICTORIA, BRITISH COLUMBIA

REFERENCE

Road, Hard Surface, All Weather	Route No.
" Loose Surface, All Weather	All Weather
" Loose Surface, Less than 2 lanes	Dry Weather
" Private (Logging, Mining etc.)	
" Four Wheel Drive	
Trail	
Railway	Flag Stop
Main Telephone Line	Along Road
Main Electric Power Line	Wooden Poles
Horizontal Control Station	Steel Poles
Contours (Interval 500 feet)	2500
Elevation in feet above mean sea-level	5215'
Intermittent Stream	
Intermittent Lake or Seasonal Inundation	
Swamp or Marsh	
Glacier or Icefield	
Spring	
Dam	Dam / Cont.
Customs Office	
Lighthouse (occupied)	
Airport or Airstrip	
Airharbour or Seaplane Anchorage	
Abandoned Railway	

Universal Transverse Mercator Projection



On the above map index, the maps published are shown thus:

With District lot land status

Without

(1) Land Commissioners' Offices are located in Smithers and Burns Lake.

Mineral Claims are not shown on this sheet.

District land lots, 5 acres or less may not be shown due to the scale of this map.

93L

TL - DENY'S CREEK 83 (1)+A 90

COAL TITLES REFERENCE MAP 101

COAL TITLES REFERENCE MAP NTS 93L/6E&W

224 (2)

TK-DENY'S CREEK 83(2)*A (1)

Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL B.C.
DENY'S CREEK
LAND MAP
SHELL - CNRL LICENCES
DENY'S 93-L-6E,6W

AUTHOR D. Handy	SCALE 1:50,000	ENCLOSURE No
DATE FEB. 1970	REVISED: 84.03	DRAWING No HH-18D(Red)
To Accompany 1984 WORK APPLICATION		

TW5H3

R/C

CANADA

93 L/6 | 1:50,000 | EDITION 1 | 93 L/6

Refer to this map as: 93 L/6 EDITION 1 MCE SERIES A 721

Joins 93 L/11 E

Joins 93 L/7 E

Joins 93 L/6 W

Joins 93 L/2 E

SMITHERS PROVINCIAL FOREST

BULKLEY RANGES (HAZELTON MOUNTAINS)

TELKWA RANGES

DENY'S CREEK GROUP 324

MORICE PROVINCIAL FOREST

THAUTIL RIVER

CHISHOLM LAKE

BULKLEY RANGES (HAZELTON MOUNTAINS)

MORICE PROVINCIAL FOREST

OOTSA PULP HARVESTING FOREST

TAGETCHILAN LAKE

WL XL

WK XK

JKs - Jurassic/Cretaceous Sediments

JKv - Jurassic/Cretaceous Volcanics

KTi - Cretaceous/Tertiary Intrusives

Geological contact

Geological fault

Bedding attitude

Syncline

COAST LAND DISTRICT RANGE 5

COAST LAND DISTRICT RANGE 4

Joins 93 E/14

Produced, 1970 by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES, from aerial photographs taken in 1968. Field surveys 1968. Printed 1974.

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

© Canada Copyrights Reserved 1974.

Roads / Routes

loose or stabilized surface, all weather — gravier aggloméré, toute saison — 2 lanes or more / 2 voies ou plus — less than 2 lanes / moins de 2 voies

loose surface, dry weather and unclassified streets — de gravier, temps sec et rues non classé

cart track — de terre

trail or portage — sentier ou portage

LAMPREY CREEK

BRITISH COLUMBIA

Scale 1:50,000 Échelle

Miles 0 1 2 3 Miles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

This Provisional Map is equivalent to a standard map in accuracy of contents.

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

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

Cette carte provisoire équivaut une carte régulière au point de vue précision de l'information.

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au dessus du niveau moyen de la mer
Système de référence géodésique nord américain 1927
Projection transverse de Mercator

Établie en 1970, par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES, d'après des photographies aériennes prises en 1968. Levés sur le terrain en 1968. Imprimée en 1974.

Ces cartes sont en vente au Bureau des Cartes du Canada, ministère de l'Energie, des Mines et des Ressources, Ottawa, ou chez le vendeur le plus prèsr.

© Canada 1974, tous droits réservés

CONVERSION SCALE FOR ELEVATIONS
Metres / Feet

TN
1° 25' or 25 Mils
25° 02' or 445 Mils
Grid North
Magnetic North

Use diagram only to obtain numerical values.
APPROXIMATE MEAN DECLINATION 1972
FOR CENTRE OF MAP
Annual change decreasing 3.1'

ONE THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 9

GRID ZONE DESIGNATION	100 000 m SQUARE IDENTIFICATION
9U	WL XL / WK XK

EXAMPLE OF METHOD USED TO GIVE A REFERENCE TO NEAREST 100 METRES
THE FOLLOWING GRID REFERENCE IS A SAMPLE ONLY AND DOES NOT REFER TO A POINT ON THIS MAP

REFERENCE POINT	CHURCH (as above)
EASTING Read number on grid line immediately to left of point	97
Estimate tenths of a square from this line eastward to point	5
	975
NORTHING Read number on grid line immediately below point	98
Estimate tenths of a square from this line northward to point	4
	984

EXAMPLE MILITARY GRID REFERENCE 975984

Nearest similar grid reference 100 000 metres (about 61 miles)

224 ③

IK- Deny's Creek 83 ⅛(2)A ⅛(1)

Crows Nest Resources, Limited

EXPLORATION

West Central British Columbia
SMITHERS PROJECT

DENYS CREEK
THAUTIL RIVER
CHISHOLM LAKE

GEOLOGY COMPILATION MAP

AUTHOR: HANDY/CAMERON	SCALE: 1:50,000	ENCLOSURE No: 2	
DATE: DEC 15, 1981	REVISED: DEC 1983	DRAWING No: HK-100 B	
To Accompany 1983 GEOLOGICAL REPORT			

SI5U02

DENY'S CREEK AREA
GEOLOGY MAP

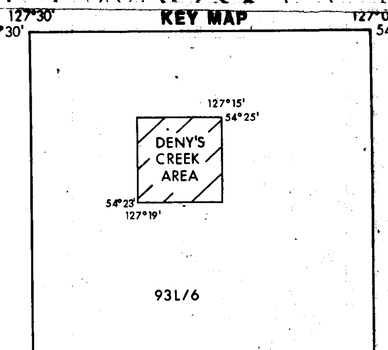
Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL BRITISH COLUMBIA
TK. DENY'S CREEK 83(2)A *(1)

NTS.-93L/6 — 224 (4) — UTM ZONE 9

AUTHOR: D. HANDY	SCALE: 1:10 000	ENCLOSURE No 3.
DATE: NOV 29, 1979	REVISED: DEC. 31, 1983	DRAWING No: HH-39 B
To Accompany 1983 GEOLOGICAL REPORT		

KEY MAP



DRILL HOLE	NORTHING	EASTING	ELEVATION
DC 301	6 030 993 mN	611 887 mE	1162m

True North — Grid North 1°.01' — Magnetic North 25°.34'

TOPOGRAPHIC LEGEND
- CONTOURS
- INTERMITTENT STREAM
- RIVER OR LAKE
- TREED AREA
- ROAD
- TRAIL
- APPROXIMATE COAL LICENCE BOUNDARY

GEOLOGIC LEGEND
AIR PHOTO OBSERVED DIP
- 1° - 3°
- 3° - 10°
- 10° - 25°
- 25° - 45°
- 45° – NEARLY VERTICAL
- JKs — U. JURASSIC / L. CRETACEOUS SEDIMENTS — HAZELTON GP.
- JKv — U. JURASSIC / L. CRETACEOUS VOLCANICS — HAZELTON GP.
- BEDDING ATTITUDE
- OUTCROP (SEDIMENTARY)
- OUTCROP (VOLCANIC)
- UNCONFORMABLE CONTACT (MOSTLY INFERRED FROM AIR PHOTO INTERPRETATION)
- DEFINED FAULT
- POSSIBLE FAULT
- DIAMOND DRILL HOLE (BETHLEHEM COPPER 1968)
- BOREHOLE (PRINCE RUPERT COAL FIELDS 1915)
- DIAMOND DRILL HOLE (1981 & 1983)
- CLEARED DRILL SITE (1981)

0 500 1000m
1:10 000

COAL QUALITY LOG

BPB

LOG SUITE
GAMMA RAY
L S DENSITY

SONDE TYPE
COAL COMBINATION SONDE

BOREHOLE
CLIENT
AREA
COUNTRY
DATE LOGGED
DEPTH DRILLER
DEPTH LOGGER

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

COAL QUALITY LOG INTERVALS
REFER TO LITHOLOGY LOG

REMARKS

LOG 01

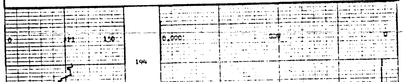
BPB COAL QUALITY LOG

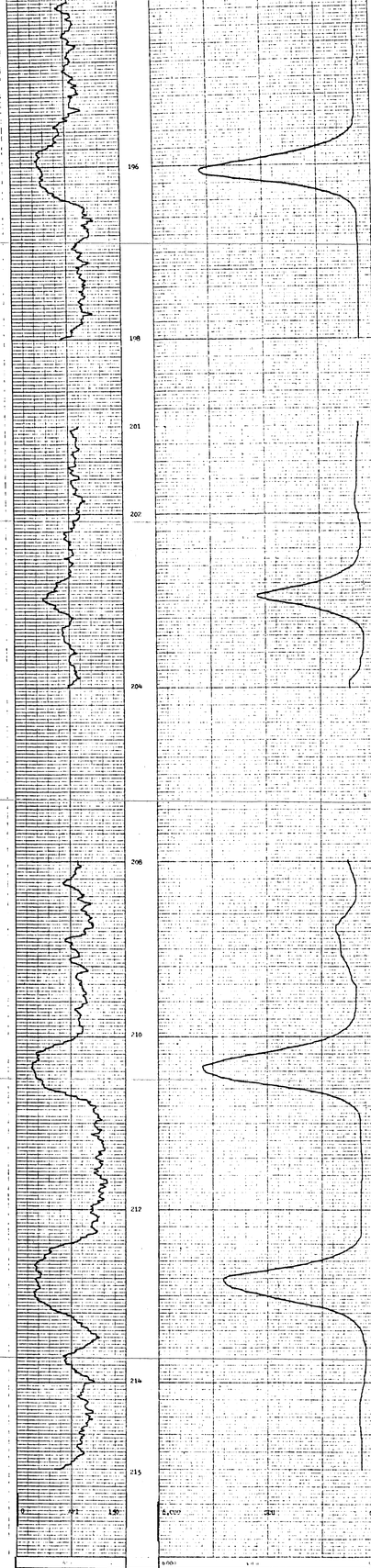
DEPTH

COAL BULK DENSITY g/cm³

Gamma Ray

HOLE SIZE CORRECTION DATA





COAL BULK DENSITY g/cm³

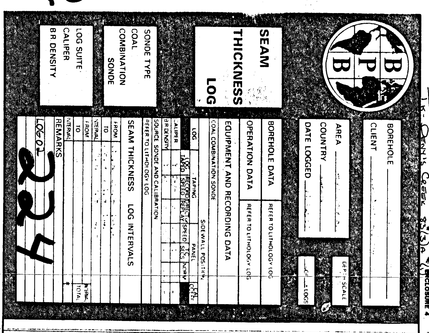
DEPTH

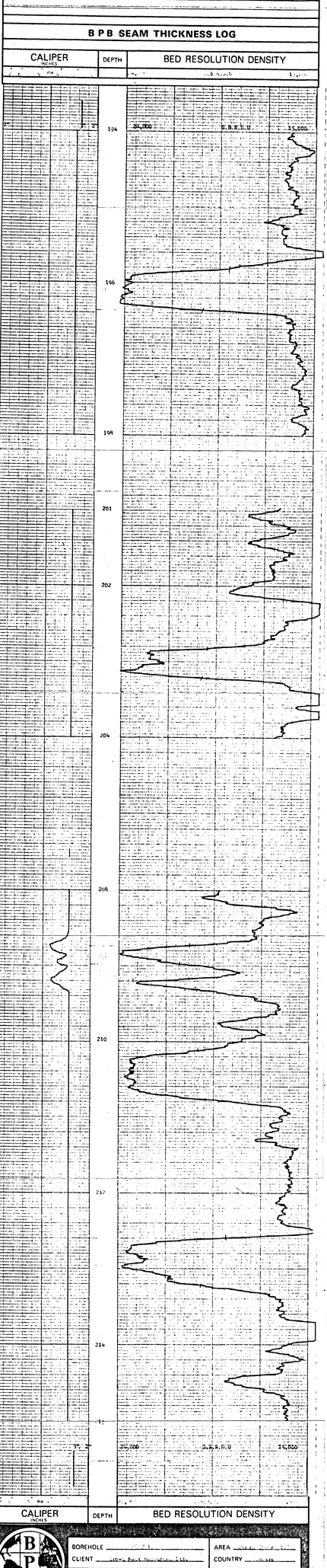
BPB

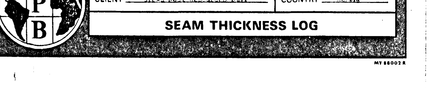
BOREHOLE
CLIENT
AREA
COUNTRY

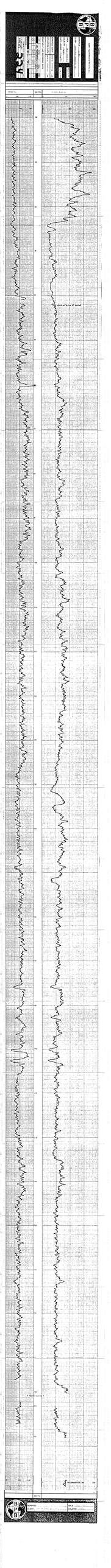
COAL QUALITY LOG

PC

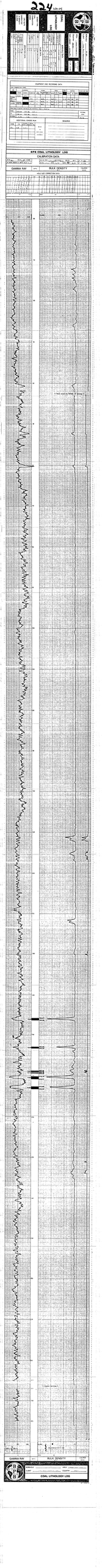

SEAM THICKNESS LOG
BPB
LOG SUITE
CALIPER
BPB DENSITY
SONDE TYPE
COAL COMBINATION SONDE
SEAM THICKNESS LOG INTERVALS
FROM
TO
REMARKS
LOG 02
OPERATION DATA
EQUIPMENT AND RECORDING DATA
BOREHOLE DATA
BOREHOLE
CLIENT
AREA
COUNTRY
DATE LOGGED


B P B SEAM THICKNESS LOG
CALIPER
INCHES
DEPTH
BED RESOLUTION DENSITY
G.R.E.D.U
194
196
198
201
202
204
206
210
212
214


CALIPER
INCHES
DEPTH
BED RESOLUTION DENSITY
G.R.E.D.U
BPB
BOREHOLE
CLIENT
AREA
COUNTRY
SEAM THICKNESS LOG



224 cont


RUN NO.
DATE
TIME
LOG MEASURED FROM
DRILLING MEASURED FROM
PERMANENT DATUM
ELEVATION
ELEVATION
ELEVATION
CASING DRILLER
CASING LOGGER
BOTTOM LOGGED INTERVAL
TOP LOGGED INTERVAL
TYPE FLUID IN HOLE
DENSITY
VISCOSITY
PH
FLUID LOSS
SOURCE OF SAMPLE
RM @ MEAS. TEMP.
RMF @ MEAS. TEMP.
RMC @ MEAS. TEMP.
SOURCE OF RMF
SOURCE OF RMC
RM @ BHT
TIME SINCE CIRC.
MAX. REC. TEMP.
EQUIP. LOCATION
RECORDED BY
WITNESSED BY
EQUIPMENT AND RECORDING DATA
RUN
BIT
FROM
TO
CASING
BORE
WEIGHT
VISCOSITY
FLUID LOSS
DENSITY
LEVEL
SOURCE
R @ MEAS. TEMP.
R @ BHT
TIME CIRC.
TIME LOGGED
MAX. REC. TEMP.
EQUIP. NO. LOCATION
RECORDED BY
WITNESSED BY
REMARKS
BPB COAL LITHOLOGY LOG
CALIBRATION DATA
GAMMA RAY
BULK DENSITY
HOLE SIZE CORRECTION (CH)
CALIPER
GAMMA RAY
BULK DENSITY
COMPANY
WELL
FIELD
COUNTY
STATE
COAL LITHOLOGY LOG

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS B.C.

DATE	
BEGIN	
END	

HOLE No. DC-301

HOLE PARTICULARS

LOCATION			
ELEVATION		HOLE BEARING (AZ°)	
TOTAL DEPTH		HOLE ANGLE (°)*	-90°

LOGGING

LOGS RUN	
LOGGED BY	
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		
TOTAL	CORE RECOVERED	
	LENGTH CORED	
	CORE RECOVERY	%

EXAMINATION

LOG USED	LSD/BRD
No. OF SEAMS SAMPLED	
EXAMINER (S)	D. HANDY
DATE	SEPT 2/83

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
		0.00	26.50	26.50	OB				depth										
		26.50	58.50	32.00	MDST	Dark grey, massive, weathered for first 7.5m, thereafter stick to broken stick, poorly developed bedding planes.		74°	34.20										
								76°	36.00										
								76°	50.90										
								75°	56.50										
		58.50	102.20	43.70	SLST	Medium grey, massive, stick to broken stick,		75°	88.50										
						96.50-96.60 - SS1		70°	96.50										
		102.20	104.17	1.97	SS1	Green SS1, massive bedded, stick minor pyrite blebs, coal stringers													
		104.17	150.80	46.63	SS1	SLST, Light grey, minor dark carbonaceous silt layers, cross bedded, stick, occasionally bioturbated zones, occasional coaly stringer with $CaCO_3$		67°	107.00										
								63°	133.50										
								60°	142.30										
		150.80	152.30	1.50	SLST	Medium grey, very weathered													
		152.30	155.30	3.00	SS1	Light green, massive, minor calcite on fractures													
		155.30	156.17	0.87	MDST	Carbonaceous, Weathered, highly sheared, possible fault zone													
		156.17	169.07	12.90	SS1	Green, massive, minor pyrite nodules minor coaly stringers, stick													
		169.07	169.37	0.30	SS1	Fossiliferous - shell fragments													
		169.37	171.30	1.93	SS1	Green, as above													
		171.30	171.50	0.20	COAL	Shaley, Shaley hard stick, dull Recovery = 100% No sample taken													
		171.50	171.76	0.26	MDST	Carbonaceous, medium grey													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 301

FILE No 8A-267
REVISED Feb. 1981
FORMERLY FILE No. 8A-211A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	DENY'S CREEK
AREA	SMITHERS, B.C.

HOLE No. 301 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V
		171.76	172.01	0.25	COAL	Dull with thin bright vitrain, hard, stick		depth											
						Recovery=100% Sample Number 880													
		172.01	195.01	23.00	SLST	SSI, Dark grey light grey SSI interbedded	45°	175.0											
						thin bedded	45°	177.5											
						stick	40°	179.0											
		195.01	196.36	0.55	COAL	Dull with bright, broken stick to powdery	28°	186.50											
						Recovery=0.55/0.55=100% Sample Number 881													
		196.36	202.83	6.47	SLST	SSI/IRST As above with occasional ironstone													
						nodules	65°	200.0											
		202.83	203.22	0.39	COAL	Recovery=0.39/0.39=100% Sample Number 882													
						dull with bright, hard, stick													
		203.22	207.27	4.05	SLST	MDST/IRST/CARBONACEOUS Medium grey, massive													
						stick, weathered near bottom occasional thin													
						coal stringers and carbonaceous dark grey sections													
		207.27	208.37	1.10	SSI	SLST., light grey SSI, dark grey SLST interbedded													
		208.37	210.12	1.75	MDST	SLST., Dark grey, mudstone, minor thin siltstone	76°	208.00											
						interbedded													
		210.12	210.77	0.65	COAL	Recovery=0.65/0.65=100% Sample Number 883													
						Broken fragments - hard clean coal dull with													
						bright													
		210.77	212.60	1.83	MDST	Medium grey, massive													
		212.60	213.22	0.62	COAL	Recovery=0.62/0.62=100% Sample Number 884													
						Broken fragments, stick near bottom hard dull													
						with bright good FW/HW separation													
							75°	220.00											
		213.22	288.60	75.38	SLST	CARBONACEOUS, Medium grey, massive, occasional	85°	237.50											
						thin SSI interbedded occasional ironstone/	84°	278.00											
						calcite filled fractures. END OF HOLE													

ALL LINEAR UNITS IN METRES

° : MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

ff — FRACTURE FREQUENCY

HOLE No. 301

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

TK-DENY'S CREEK 33A

ENCLOSURE 9
(CONFIDENTIAL
COAL ANALYSES)

CONFIDENTIAL

Denny's Creek

LORING LABORATORIES LTD.

CERTIFICATE OF COAL TESTING

COMPANY	CROWSNEST RESOURCES LTD.
ATTENTION	T. Cole
PROJECT	Telkwa
FILE NO.	23117
DATE	February 22/82
PAGE	1 of 1

SAMPLE NUMBER	SAMPLE TYPE	% RECOVERY SINK	% RECOVERY FLOAT	BASIS OF ANALYSIS	REC'D % H_2O	% H_2O	% V.M.	% ASH	% F.C.	% S	Btu/lb	F.S.I	NOTES
DC-81D 101 Composite													
1001	Raw			Air Dried		1.39		14.29					
				Dry Basis		-		14.49					
	1.60 Flt			Air Dried		2.31	30.24	9.95	57.50	.44	12,354	½	
				Dry Basis		-	30.95	10.19	58.86	.45	12,646		
1002	Raw			Air Dried		1.10		42.08					
				Dry Basis		-		42.55					
	1.60 Flt			Air Dried		1.45	29.18	15.83	53.54	.64	11,750	1½	
				Dry Basis		-	29.61	16.06	54.33	.65	11,923		
1003	Raw			Air Dried		0.86		60.23					
				Dry Basis		-		60.75					
	1.60 Flt			Air Dried		1.38	30.19	11.88	56.55	1.67	11,984	1	
				Dry Basis		-	30.61	12.05	57.34	1.69	12,152		

CONFIDENTIAL

PURCHASE ORDER NUMBER: CN 20928

ANALYST: P. Endes

FILE NO. AA-467

Crows Nest Resources LIMITED

B.C. COAL LICENCES

TENURE STANDING

PROJECT: DENY'S CREEK YEAR: 1983

DATE: MARCH 1984

GROUP	LICENCE			ACQ/ADM		RENTALS		ANNIVERSARY	WORK REQUIREMENT				TOTAL EXPLORATION			REMARKS
NO.	NO.	LEGAL DESCRIPTION	AREA TOTAL/HA	YEAR	FEES	ANNUAL	TOTAL NEXT ANN.	DATE	EXPIRED	CURRENT	LIC. TERM	EXC. CREDIT	YEAR	AMOUNT	CASH IN LIEU	
324	6		1554		110	7770	58,275	DECEMBER 31	109,428	48,563			78-79	25,994		THE LICENCES ARE
	4247	LOT 4806	259	78							6	$15.42/HA	79-80	455	12,267	IN GOOD STANDING
	4248	LOT 4808	259	78							6	$15.42/HA	80-81	139,801		ON DECEMBER 31st
	4250	LOT 4811	259	78							6	$15.42/HA	83	44,557		1983. RENT IS
	6884	LOT 4807	259	81							3	$44.92/HA				PAID FOR 1984 THE
	6886	LOT 4812	259	81							3	$44.92/HA				EXCESS CREDIT ON
	6887	LOT 4813	259	81							3	$44.92/HA				78 LICENCES $15.42
																/HA FOR 1984.
																ON 81 LICENCES
																WORK COVERED FOR
																84 & 85 PLUS $7.42/
																HA CREDIT FOR 1986.

BA-312

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

APPLICATION TO EXTEND TERM OF LICENCE

I, Leslie V. Gramantik (Name) agent for Shell Canada Resources Limited (Name)
P.O. Box 100 (Address) Calgary (Address)
Alberta T2P 2M7

Valid FMC No. 266248

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 4247, 4248, 4250, 6884, 6886, 6887. 6 Licences, 1,554 Hectares.

for a further period of one year.

2 Property name Deny's Creek, Group #324, Coast Range 5 Land District

3. I am allowing the following Coal Licence(s) No(s). to forfeit 4246, 4249

4 I have performed, or caused to be performed, during the period December 31, 1982 to March 31, 19 84, work to the value of at least $ 44,557

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

CATEGORY OF WORK	Licence(s) No(s).	Apportioned Cost
Geological mapping	-	-
Surveys: Geophysical	-	-
Geochemical	-	-
Other	-	-
Road construction	-	-
Surface work	4248	1,400
Underground work	-	-
Drilling	4248	36,910
Logging, sampling, and testing	4248	5,407
Reclamation	4248	400
Other work (specify)	-	-
Off-property costs		440

5 I wish to apply $ 44,557 of this value of work on Coal Licence(s) No(s). 4247, 4248, 4250, 6884, 6886, 6887

6. I wish to pay cash in lieu of work in the amount of $ NA on Coal Licence(s) No(s).

7 The work performed on the location(s) is detailed in the attached report entitled Deny's Creek, 1983 Geological Report.

March 28th, 1984 (Date)

(Signature)

Assistant Landman (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

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)

Total Cost $

ROAD CONSTRUCTION Yes ☐ No ☒

Length Width
On Licence(s) No.(s)
Access to

Total Cost $

SURFACE WORK Yes ☒ No ☐

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

Total Cost $ 1,400

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		1	288.63	36,910
Rotary	Conventional				
	Reverse circulation				

Other* (specify)
Contractor J.T. Thomas Diamond Drilling Ltd.
Where is the core stored? Bulkley Valley Collieries

Total Cost $ 36,910

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 $ 5,407

RECLAMATION Yes ☒ No ☐

Details Lop & scatter timber in a manner acceptable to the B.C.F.S. and District Mines Inspector. Total Cost $ 400

OTHER WORK (Specify details) Yes ☐ No ☒ Cost

Total Cost $

OFF-PROPERTY COSTS Yes ☒ No ☐

Details Geological Report Total Cost $ 440

Total Expenditures $ 44,557

26/11/84
(Date)

(Signature)

Manager - Accounting, CNRL
(Position)

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

Report on the Sealing of Drillholes

Inspection District #9 Date of Report AUGUST 22, 1983

Company CROWS NEST RESOURCES LTD Land District COAST #5

Coal Map Number NTS 93 L 6 Licence Number 4248

1. Number of Drillhole DC 301 Bags of Cement 35

2. Surface elevation 1162

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

4. Drilled by: Name of Contractor: J.T. THOMAS DIAMOND DRILLING LTD

   Name of Exploration Company CROWS NEST RESOURCES LTD

5. Date of Completion: AUGUST 20 1983

6. Date of Sealing: AUGUST 21 1983

7. Sealed by: Name of Contractor: J.T. THOMAS DIAMOND DRILLING LTD

   Name of Exploration Company CROWS NEST RESOURCES LTD

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

Signature: Robert Keller

Designation: FIELD COORDINATOR

Date: AUGUST 22 1983

Countersignature:

Designation: OPERATIONS MANAGER

Date: AUGUST 22 1983