

TK - Zymoetz 84 (1-3) A

Zymoetz River  
Geological Report  
May 1985

00248

ZYMOETZ RIVER GEOLOGICAL REPORT

NTS MAP SHEET:

93L/13

LATITUDE/LONGITUDE:

54° 30' / 127° 45' ✓

COAL LICENCES:

Group 322

4252, 4253, 4254, 4255, 4257

6172 and 6173

HELD BY:

SHELL CANADA RESOURCES LIMITED

OPERATED BY:

CROWS NEST RESOURCES LIMITED

EXPLORATION PERIOD:

SEPTEMBER, 1984

REPORT DATE:

MAY 1984

PROJECT GEOLOGIST:

DAVE HANDY

GEOLOGIST:

STEVE CAMERON

GEOLOGICAL TECHNOLOGIST:

JIM EISENMAN

DISTRICT

COAST RANGE 5

**CONFIDENTIAL**  
GEOLOGICAL BRANCH  
ASTORIA REPORT

00 248



March 26, 1985

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

Attention: Mr. P. Hagen  
Coal Administrator

Dear Sir:

Enclosed please find our report on the Zymoetz 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 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 Resources 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, all of 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

Enclosure

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APPENDIX

B.C. COAL LAND TENURE STANDING  
APPLICATION TO EXTEND COAL LICENCE

1.0 SUMMARY

The Zymoetz River Coal Project is contained within four coal licences. These licences are held by Shell Canada Resources Ltd. and operated by Crows Nest Resources Ltd.

The 1984 drilling program included the preparation of two drill sites and drilling two NQ diamond drill holes. The coordinates of the drill holes were located by air photos. The total expenditure for 1984 was \$50,196.91. All of this amount is being applied to the coal licences covered by this report.

2.0 INTRODUCTION

2.1 Location

Enclosure 1 - location and Index map. The property is located at the confluence of the Zymoetz river and Coal Creek.

N. Lat. 54° 30' 49' BP  
W. Long. 127° 45'

2.2 Tenure

The Zymoetz River Licences are contained in group number 322. The coal licence numbers included in this group are 4252, 4253, 4254 and 4255.

### 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. 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".<sup>1</sup>

<sup>1</sup> Tipper H.W. and Richards T.A., Jurassic Stratigraphy and History of North Central British Columbia, 1976, page 7.



#### 4.0 ZYMOETZ GEOLOGY

##### 4.1 Stratigraphy

The basement rocks of the Zymoetz property consist of Upper Jurassic/Lower Cretaceous volcanics of the Hazelton Group. The volcanics are unconformably overlain by Cretaceous sediments of the Skeena group. These sediments are composed of conglomerate, sandstone, siltstone, shale, mudstone, coal and minor lava flows. Younger intrusives in the form of dykes, sills and stocks are often present.

The Skeena sedimentary section at Zymoetz River varies in thickness but probably does not exceed 300 meters. A basal conglomerate overlies the basement volcanics. At least five coal seams are present with an aggregate coal thickness ranging from 4 meters to 8 meters. These seams vary in thickness and are not laterally extensive. All of the economic coal seams are in the Coal Creek area, and are contained in the lower part of the Skeena section.

##### 4.2 Structure

In the Coal Creek area of the Zymoetz property, the section dips to the west at an average 25°. To the West (down dip), the Skeena sediments are in fault contact with the Hazelton volcanics. Normal and reverse faults occur throughout the property.

5.0 SUMMARY OF PREVIOUS WORK

Work done in 1979

- 1:10 000 scale geological mapping
- Diamond drilling (two holes)
- Location survey of diamond drill holes
- Drill site reclamation

No exploration work was performed in 1980.

Work done in 1981

- 1:10 000 scale geological mapping
- Additional reclamation of 1979 drill sites

No exploration work was performed in 1982.

Work done in 1983

- One diamond drill hole
- Drill site reclamation

6.0 WORK DONE IN 1984

- Two diamond drill holes C.L. 4255 22401 & 22402
- Drill site reclamation
- Core stored at Bulkeley Valley Collieries
- JT THOMAS was contractor for drilling

} as per  
phone  
conversation  
with Steve  
Cameron

RP

## 7.0 MINEABILITY

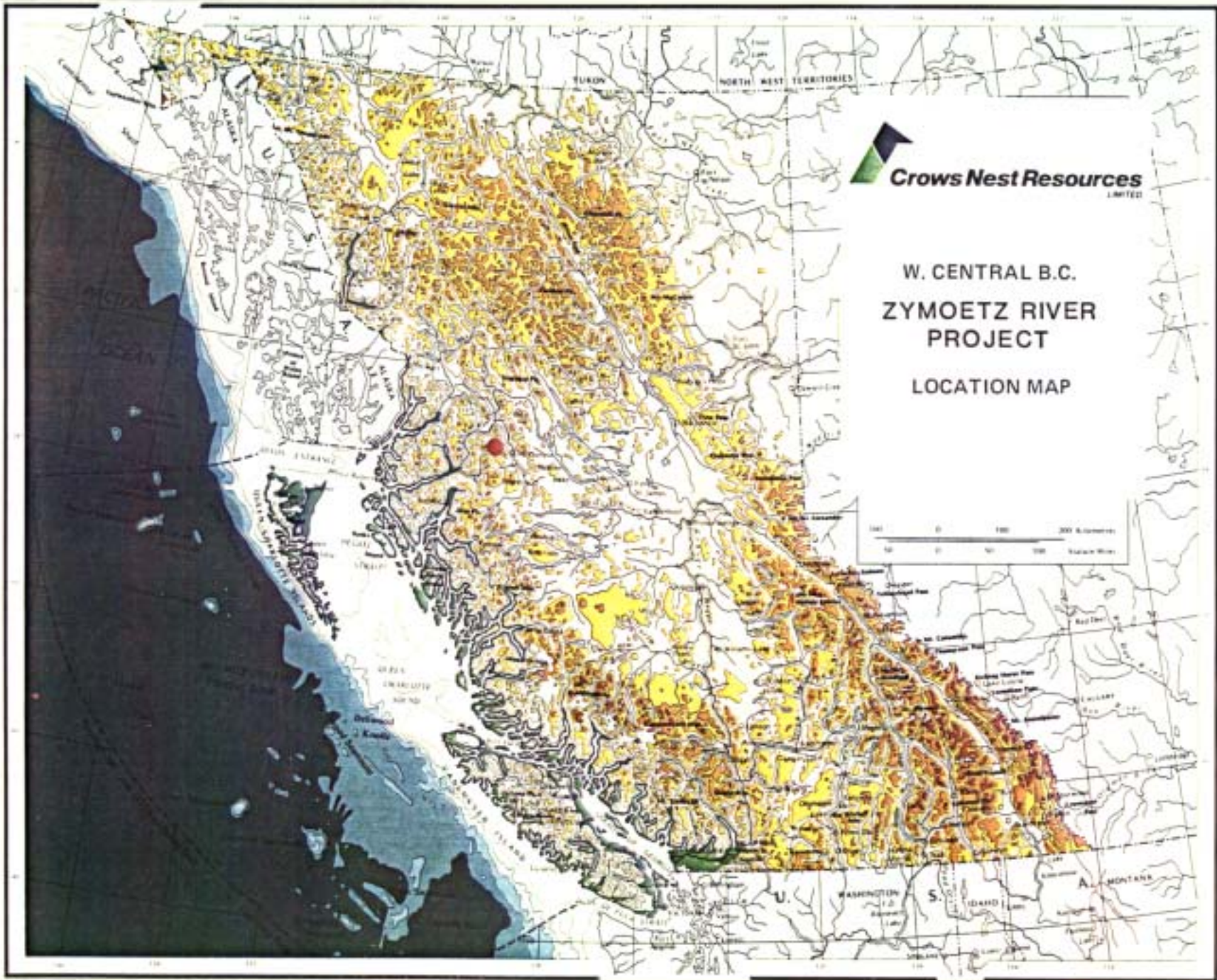
On the Zymoetz property five seams can be correlated over a strike length of approximately half a kilometer. The coal seams appear to be limited to the area directly adjacent to Coal Creek in the center of the licence block. Since the coal seams are dipping at an average 25° into the topography and have a limited strike length it is estimated that there is less than one million tonnes of surface mineable coal at ratios less than 7m<sup>3</sup>/raw tonne. Detailed reserve calculations have not been done.

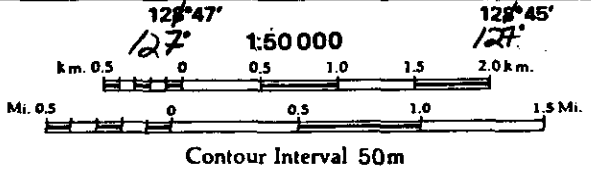
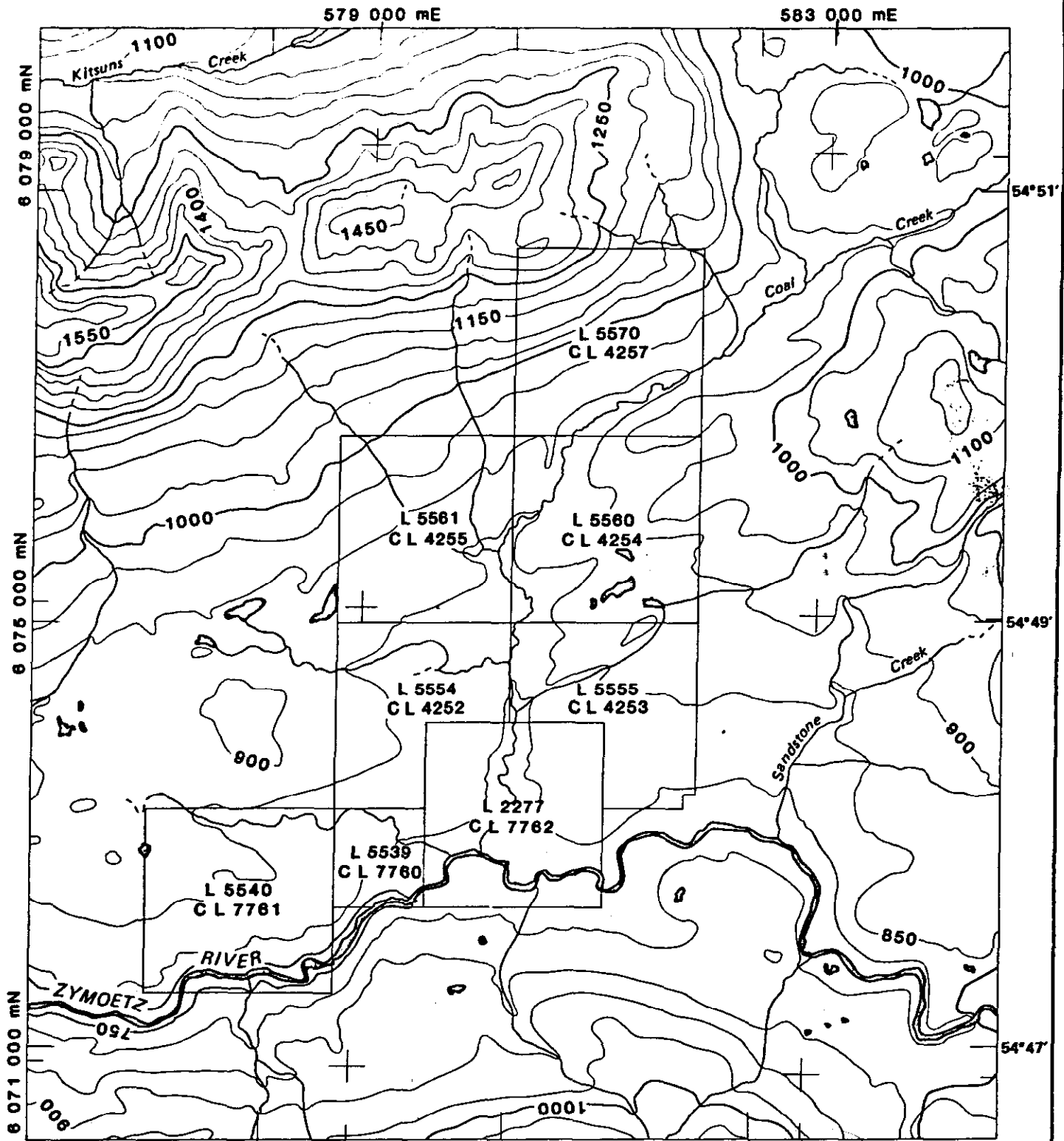
## 8.0 COAL QUALITY

No coal was intersected in ZZ 401 or ZZ 402.

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.G. - 1981: Late Mesozoic - Paleogene Bowser Basin Molasse and Cordilleran Tectonics, Western Canada, Geological Association 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.
- Handy, D.L. and Cameron, S.J. - 1983: 1983 Zymoetz River Geological Report.
- 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, Geological Association of Canada, Special Paper #23.
- Handy, D.L. and Richards, T.A. - 1976: Jurassic Stratigraphy and History of North Central British Columbia, Geological Survey of Canada, Bulletin 270.






Reference map produced by the Surveys and Mapping Branch, Department of Energy, Mines and Resources in 1973.

- Legend**
- Road: Highway, Main road .....
  - Road: Loose surface, Dry weather .....
  - Track or trail .....
  - Railway .....
  - River .....
  - Stream .....
  - Contours .....
  - Licence boundary .....



 **Crows Nest Resources Limited**

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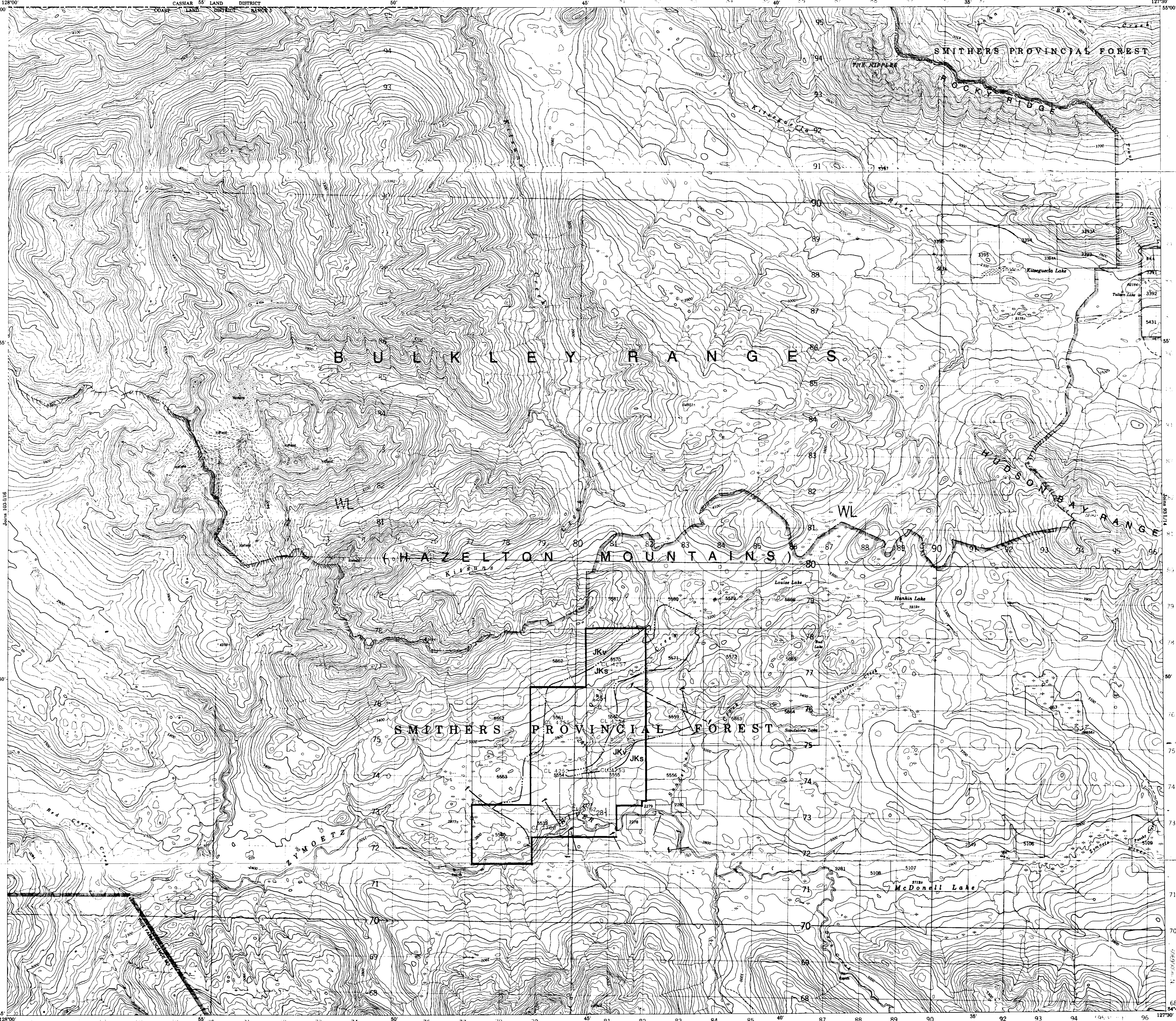
**ZYMOETZ RIVER PROJECT**

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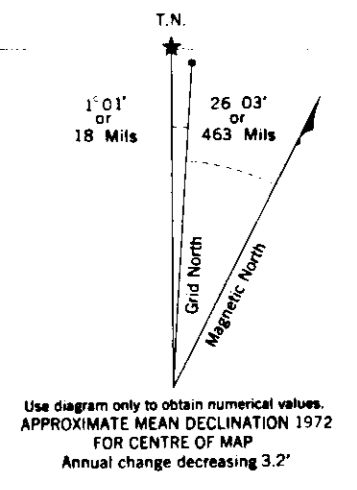
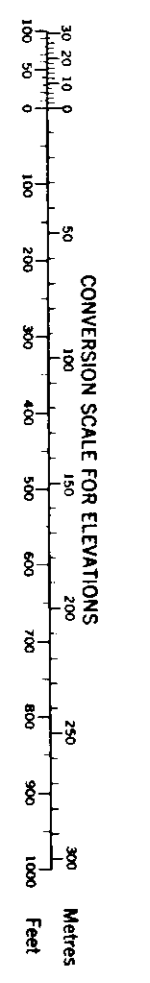
**LAND MAP**

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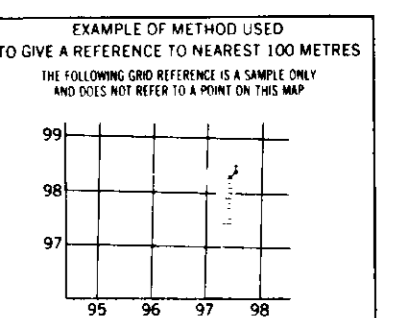
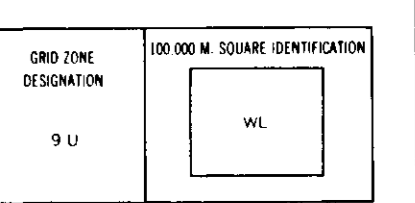
NTS-93L/13
UTM ZONE 9



Refer to this map as: 93 L/13 EDITION 1 MCE SERIES A 721



ONE THOUSAND METRE  
UNIVERSAL TRANSVERSE MERCATOR GRID  
ZONE 9



REFERENCE POINT: CHEERICHE (as above)

EASTING: Read number of gridline immediately to the right of the reference point.

NORTHING: Read number of gridline immediately below point.

EXAMPLE: Read number of gridline immediately to the right of the reference point.

EXAMPLE: Read number of gridline immediately below point.

EXAMPLE: Read number of gridline immediately to the right of the reference point.

EXAMPLE: Read number of gridline immediately below point.

Produced, 1976, by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES, from aerial photographs taken in 1968. Field survey 1968. Printed 1976.

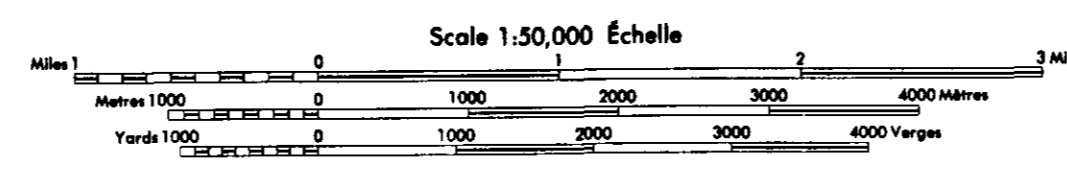
Copies may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, if your nearest map dealer.

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Roads: loose or stabilized surface, all weather; loose surface, city weather and unclassified streets; cart track; rail or portage.

Routes: gravel, aggregate, route season; dirt/gravel, route not set; full time class; dirt route; center or portage.

Water: open water, 1000 ft or more; open water, 500 ft or more; open water, 200 ft or more; open water, 100 ft or more; open water, 50 ft or more; open water, 20 ft or more; open water, 10 ft or more; open water, 5 ft or more; open water, 2 ft or more; open water, 1 ft or more; open water, 0.5 ft or more; open water, 0.2 ft or more; open water, 0.1 ft or more.



This Professional Map is equivalent to a standard map in accuracy of content.

Some names on this map are not an official Commission or address are issued by the Surveys and Mapping Branch.

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

GEOLOGICAL LEGEND

- JKs - Jurassic/Cretaceous Sediments
- JKv - Jurassic/Cretaceous Volcanics
- KTI - Cretaceous/Tertiary Intrusives
- Geological contact
- - - Geological fault
- f - Bedding attitude
- ~ ~ ~ Syncline

**Crows Nest Resources Limited**  
EXPLORATION

WEST CENTRAL BRITISH COLUMBIA  
SMITHERS PROJECT  
ZYMOETZ RIVER

**GEOLOGY COMPILATION MAP**

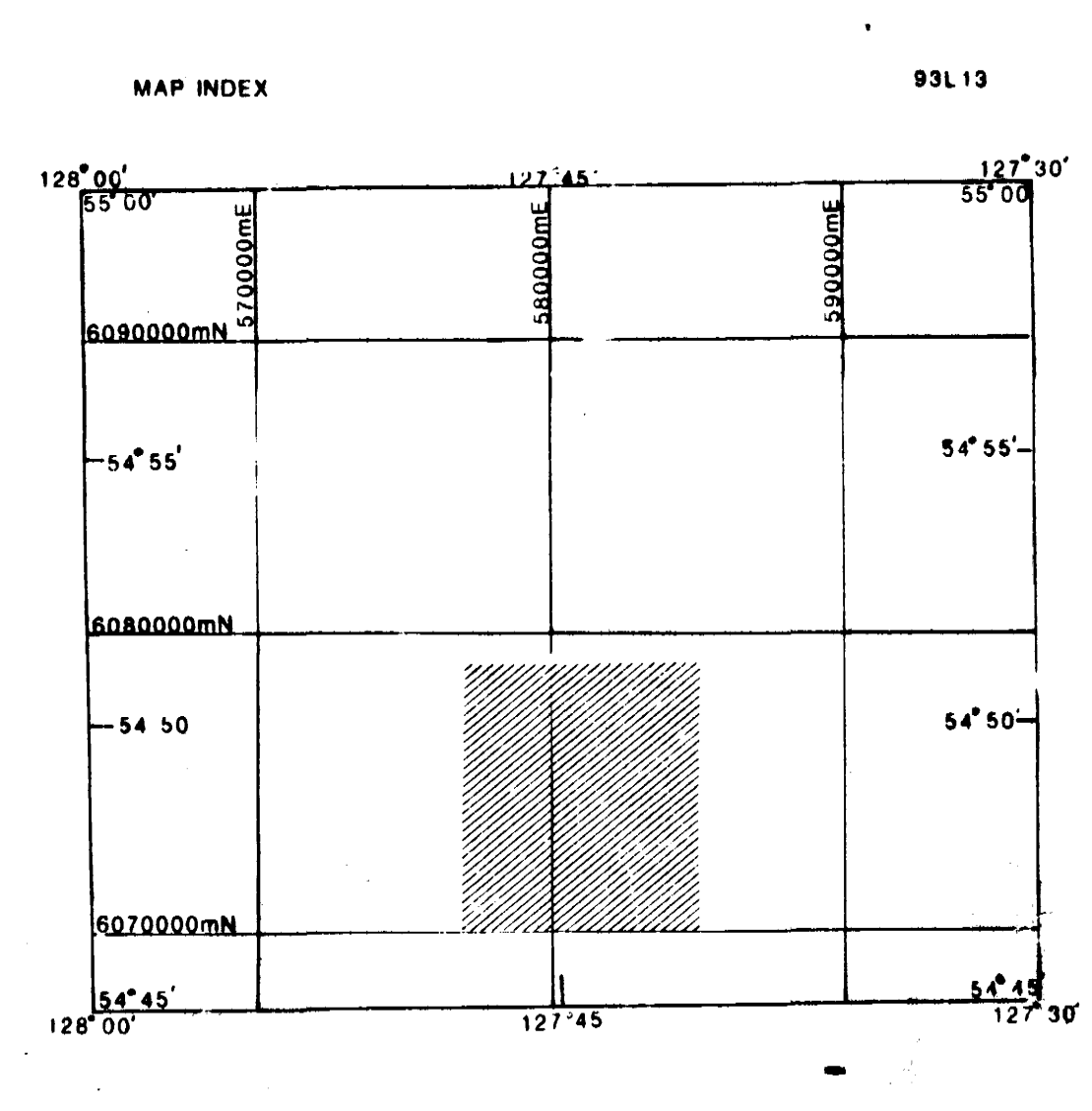
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AUTHOR: S. CAMERON SCALE: 1:50,000 ENCLOSURE No: 1

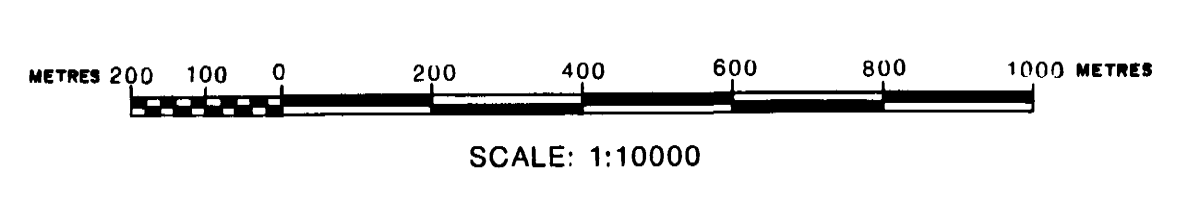
DATE: DEC 15, 1981 REVISION: 1

To Accompany 1983 GEOLOGICAL REPORT DRAWING No: S15U01

248



- LEGEND**
- Track or Trail
  - Trees
  - Lot Corners
  - Spot Height
  - Contours
  - Depression Contour
  - River
  - Intermittent Stream
  - Lake
  - Sand
- Note: Lot Corners Approx. Only



DATE OF PHOTOGRAPHY  
Topography 1974  
Planimetry 1974 & 1981  
Compilation 1978-1982 Cartography 1982

MAP PROJECTION: UNIVERSAL TRANSVERSE MERCATOR  
CENTRAL MERIDIAN REFERENCE: 129° W, ZONE 9  
NOTE: PHOTOGRAMMETRIC MAPPING BASED ON CONTROL TAKEN FROM NTS SHEET 93L13.

PREPARED BY: AERO GEOMETRICS LTD

- LEGEND**
- JKs UPPER JURASSIC/LOWER CRETACEOUS SEDIMENTS
  - JKv UPPER JURASSIC/LOWER CRETACEOUS VOLCANICS
  - JKi CRETACEOUS/TERTIARY INTRUSIVE
  - Bedding Attitude
  - Outcrop
  - Defined Fault
  - Possible Fault
  - Anticline
  - Diamond Drillhole
  - Hazelton Group

248

**Crows Nest Resources Limited**

ZVMOETZ PROJECT  
WEST CENTRAL B.C.

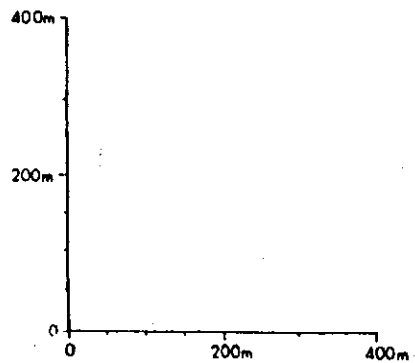
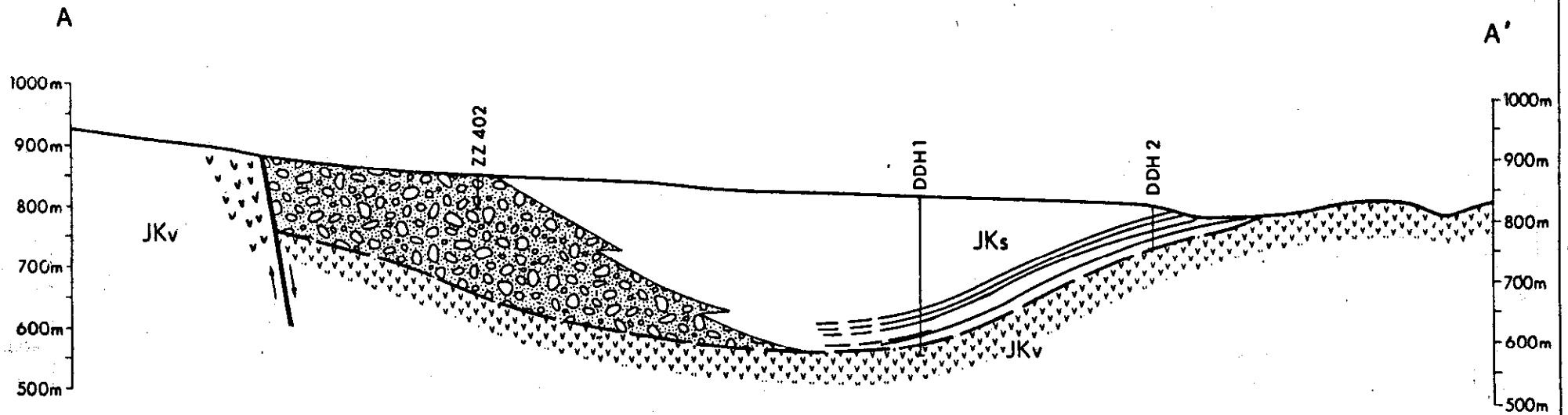
GEOLOGY MAP



UTM ZONE 9

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AUTHOR: CAMERON	SCALE: 1:10000	DRAWN BY: RGP
DATE: 85-04	REVISED:	DRAWING No: ZR3U01
To Accompany		



# 248



-  HAZELTON GROUP
-  SKEENA GROUP

 Crow's Nest Resources Limited

ZYMOETZ PROJECT  
WEST CENTRAL B.C.

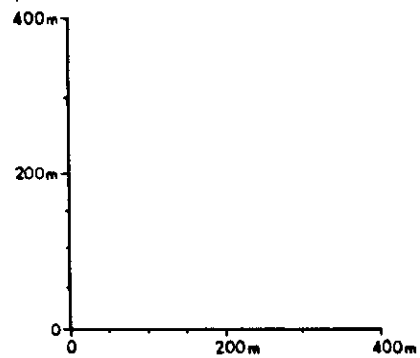
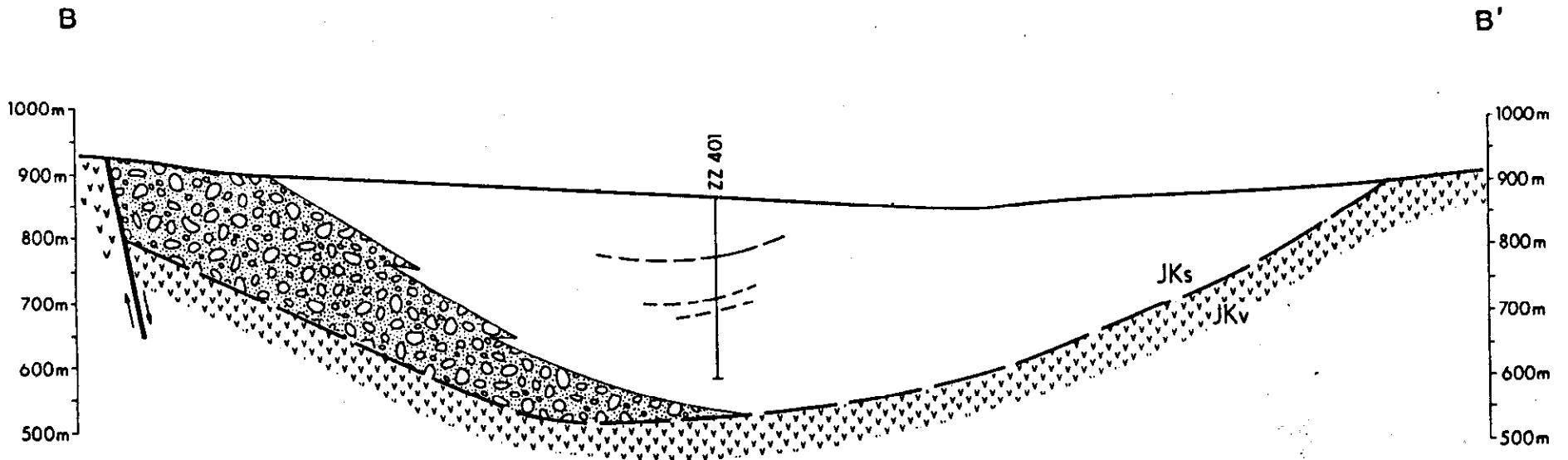
SECTION A - A'



NTS-93L/13


UTM ZONE 9

AUTHOR: CAMERON	SCALE: 1:10,000	DRAWN BY: RJP
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In Accordance		

248



-  HAZELTON GROUP
-  SKEENA GROUP

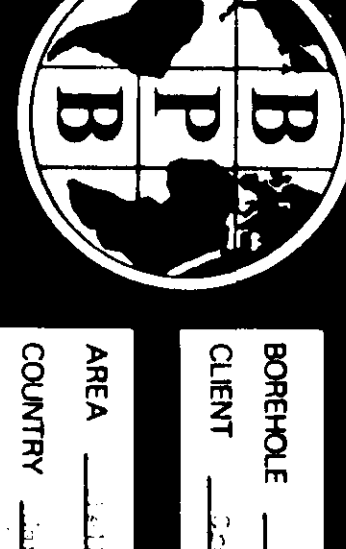
 Crow's Nest Resources Limited

ZYMOETZ PROJECT  
WEST CENTRAL B.C.

SECTION B- B'

NTS-93L/13 UTM ZONE 9

AUTHOR AMERON	SCALE 1:10,000	DRAWN BY RGP
DATE 85-04	REVISED	DRAWING NO AA-1109
To Accompany		



248 Log 1

BOREHOLE \_\_\_\_\_  
CLIENT \_\_\_\_\_ AREA \_\_\_\_\_  
COUNTRY \_\_\_\_\_ DATE LOGGED \_\_\_\_\_

BOREHOLE DATA  
REMARKS  
LOG NO. \_\_\_\_\_ DATE LOGGED \_\_\_\_\_

COAL LITHOLOGY LOG  
REMARKS  
LOG NO. \_\_\_\_\_ DATE LOGGED \_\_\_\_\_

SONDE TYPE \_\_\_\_\_  
SONDE \_\_\_\_\_  
COAL COMBINATION \_\_\_\_\_  
SONDE \_\_\_\_\_

LOG SITE \_\_\_\_\_  
LOG NO. \_\_\_\_\_  
LOG DATE \_\_\_\_\_

EQUIPMENT AND RECORDING DATA										
LOG	EQUIPMENT		TAPING	PANEL	CAL	DEPTH		SEAM LOG RUN	INTERNAL	
	SONDE	SOURCE				RECORD	REPLAY		FROM	TO

ADDITIONAL SONDES RUN				REMARKS
SONDE	LOG	GENERAL SCALE LOG	DETAIL LOG	
216				Lower run through pads therefore no collar curve is displayed and the collar have been changed accordingly.

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

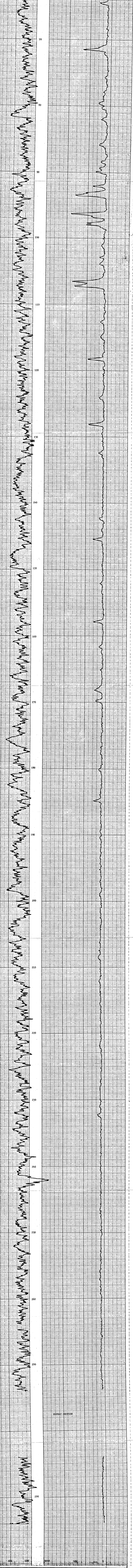
INTERNAL TO TOTAL

REFER TO ADDITIONAL HEADINGS

BPB COAL LITHOLOGY LOG

CALIBRATION DATA  
JG No 1 VALUE 77 @ 5' DAM JG CAL DATE 7/7/95 JG VALUE 41 SDU @ 6000

GAMMA RAY DEPTH LONG SPACED DENSITY



REPEAT SECTION

GAMMA RAY DEPTH LONG SPACED DENSITY

TK-Zimmerer Over BH17A 3



# CORE DESCRIPTION

248

PROJECT	ZYMOETZ
AREA	SMITHERS

DATE	BEGIN	
	END	Aug 30/84

HOLE NO.	ZZ401
----------	-------

PAGE 1  
OF 7

HOLE PARTICULARS

LOCATION	NORTHING:	6075 933 mN	(m)
	EASTING:	580 142 mE	(m)
ELEVATION	869m	HOLE BEARING (AZ <sup>o</sup> )	
TOTAL DEPTH	279.5m	HOLE ANGLE (°)*	Vertical

LOGGING

LOGS RUN	Gamma, LSD, Neutron - Neutron
LOGGED BY	BPB
OTHER TESTS	---

PRE-CORE INFORMATION

CASING LENGTH	27.4	(m)
OVERBURDEN DEPTH	29.4	(m)
OVERBURDEN TYPE		
WATER LEVEL		(m)

EXAMINATION

LOG USED	COAL LITHOLOGY
NO. OF SEAMS SAMPLED	0
EXAMINER (S)	B.M.&S.C
DATE	April 16&17/84

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
2	29.41	0	29.41		0	29.41						OB		OVERBURDEN
		29.41	32.92		29.41	32.3						SS	CONGL.	CONGLOMERATE AT BASE
		32.92	33.53		32.2	33.0						SH		COALY & CARBONACEOUS
		33.53	34.17		33.0	33.6						MDST		GREY, CARBONACEOUS, PLANT FRAGMENTS
		34.17	34.72		33.6	34.2						SH		COALY
		34.72	37.98		34.2	37.2						SS	CONGL.	FINE GRAINED WITH CONGLOMERATE AT BASE
		37.98	38.31		37.2	37.5						SS		FINE GRAINED WITH IRONSTONE BANDS
		38.31	41.06		37.5	39.8						MDST		COALY BANDS @ TOP
		41.06	43.34		39.8	42.0						SS		FINE GRAINED WITH INTERBEDDED MEDIUM GRAINED SANDSTONE
		43.34	44.41		42.0	43.0						SH		COALY
		44.41	45.17		43.0	43.9						SS		FINE GRAINED GRADING WITH MEDIUM GRAIN
		45.17	45.48		43.9	44.3						MDST		COALY
		45.48	48.37		44.3	47.2						SS		FINE GRAINED WITH COALY BLEBS & STRINGERS
		48.37	51.14		47.2	50.6						SS	CONGI	COARSE GRAINED WITH CONGLOMERATIC BANDS
		51.14	52.36		50.6	52.6						SLST		
		52.36	53.89		52.6	53.2						MDST		COALY
		53.89	54.99		53.2	54.2						SS		MEDIUM GRAINED
		54.99	56.39		54.2	56.2						MDST		
		56.39	56.78		56.2	57.0						SH		
		56.78	58.79		57.0	59.2						SS		FINING UPWARD, CONGLOMERATE @ BASE, COALY BLEBS IN CONGLOMERATE

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

248

CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		58.79	62.51		59.2	62.1						MDST		CARBONACEOUS, WITH OCCASIONAL COAL BAND
		62.51	67.85		62.1	67.8						SS	CONGL.	FINING UPWARD SEQUENCE
		67.85	69.19		67.8	69.3						MDST		MARKER BLOCK @ 69.19
		69.19	71.63		69.3	70.7						SS		FINE GRAINED WITH INTERBEDDED SILTSTONE
		71.63	73.15		70.7	72.2						SH		VERY COALY
		73.15	73.76		72.2	72.8						SLST		COARSENING AT BASE
		73.76	75.50		72.8	74.6						SS	CONGL	COARSENING AT BASE TO CONGLOMERATE
		75.50	76.72		74.6	76.2						SS		COARSENING AT BASE TO MEDIUM GRAINED SANDSTONE
		76.72	77.2		76.2	76.6						SH	COALY	
		77.2	77.96		76.6	77.3						SLST		
		77.96	78.61		77.3	78.2						SS		FINE GRAINED WITH INTERBEDDED IRONSTONE
		78.61	78.97		78.2	78.55						SH		COALY, SLICKED WITH MARKER BLOCK @ 78.33
		78.97	80.19		78.55	79.1						MDST		CARBONACEOUS
		80.19	80.50		79.1	79.4						SH		COALY
		80.50	81.41		79.4	80.6						MDST		
		81.41	82.63		80.6	81.9						SS		
		82.63	83.06		81.9	83.0						SH		COALY
		83.06	85.49		83.0	85.3						SS		IRONSTONE NODULES
		85.49	86.11		85.3	86.1						MDST		COALY
		86.11	88.27		86.1	88.1						SS		IRONSTONE NODULES
		88.27	88.57		88.1	88.6						SH		COALY
		88.57	90.10		88.6	90.1						MDST		SLICKED
		90.10	92.10		90.1	91.6						SS		
		92.10	93.0		91.6	92.2						COAL		VERY DIRTY, SLICKED, SHALFY. NOT SAMPLED

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		93.0	93.30		92.2	93.4						MDST		COALY STRINGERS AND SLICKED
		93.30	95.58		93.4	95.60						SS		FINEGRAINED WITH OCCASIONAL SILTSTONE BANDS OCCASIONALLY COALY
		95.58	95.89		95.60	95.90						MDST		CARBONACEOUS
		95.89	96.19		95.90	96.2						SH		DIRTY, COALY
		96.19	97.41		96.2	98.6						MDST		
		97.41	100.31		98.6	100.45						SS		FINE GRAINED, GREENISH TINGE. IRONSTONE CONCRETIONS
		100.31	100.61		100.45	100.80						SLST		
		100.61	101.83		100.80	101.4						SS		FINE GRAINED
		101.83	102.59		101.4	102.4						SS	CONGL	FINING UPWARD SEQUENCE
		102.59	109.60		102.4	109.4						SS		INTERBEDDED FINE GRAINED & MEDIUM GRAINED SANDSTONE
		109.6	111.07		109.4	110.85						SS	CONGL	FINING UPWARD SEQUENCE
		111.07	112.90		110.85	112.8						SLST		GRADES INTO COALY SHALE @ BASE
		112.9	114.12		112.8	113.95						SS		FINE GRAINED
		114.12	115.64		113.95	115.5						MDST		
		115.64	116.71		115.5	116.7	115.65	65				SS		FINE GRAINED, MASSIVE
		116.71	119.15		116.7	119.7						MDST		CARBONACEOUS, OCCASIONAL COALY BAND, SOME PYRITE
		119.15	122.35		119.7	121.9						SS		FINE GRAINED GREY, MASSIVE
		122.35	122.80		121.9	122.4						MDST		CARBONACEOUS
		122.80	123.72		122.4	123.2	123.0	70				SS		FINE GRAINED, OCCASIONALLY GRADES INTO MEDIUM SANDSTONE.
		123.72	124.45		123.2	124.3						MDST		CARBONACEOUS, SLICKED, COAL STRINGERS
		124.45	127.89		124.3	126.8						SS		FINE GRAINED IRONSTONE NODULES, OCCASIONAL COAL BLEBS.
		127.89	130.0		126.8	129.4						SLST		INTERBEDDED CARBONACEOUS SHALE & COALY SHALE
		130.0	132.77		129.4	132.2						SS		FINE GRAINED, OCCASIONAL IRONSTONE NODULES. GREY GREEN

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED



BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		132.77	133.68		132.2	133.3						SLST		SLICKED, GREY, CALCITE ON SLICKS
		133.68	134.75		133.3	135.9	133.6	60				SS		
		134.75	138.5		135.9	136.8						CONGL		FINING UPWARD BUT VERY CONGLOMERATE @ BASE
		138.5	139.6		136.8	138.9						SS		FINE GRAINED INTERBEDDED, CARRY SHALE
		139.6	140.97		138.9	139.7						CONGL		VERY CONGLOMERATE, POLYMIC TIC, COAL FRAGMENTS GREEN GREY MATRIX
		140.97	142.34		139.7	141.4						SS		FINE GRAINED INTERBEDDED WITH SILTSTONE
		142.34	142.95		141.4	142.5						MDST		GREY BLACK INTERBEDDED COAL STRINGERS, SLICKED
		142.95	143.86		142.5	143.8						SS		FINE GRAINED, MASSIVE OCCASIONAL MEDIUM GRAINED SANDSTONE, GREY GREEN, IRONSTONE NODULES
		143.86	144.81		143.8	144.2	144.0	65				MDST		OCCASIONAL COAL STRINGERS
		144.81	145.66		144.2	145.2						SS		FINE GRAINED AS AT 141.4
		145.66	147.16		145.2	146.8						MDST		AS AT 144.81
		147.16	148.10		146.8	147.8						SS		FINE GRAINED, GREY GREEN, MASSIVE
		148.10	149.32		147.8	148.8						SS		MEDIUM GRAINED, SALT & PEPPER
		149.32	150.81		148.8	149.9						CONGL		COAL STRINGERS THROUGHOUT, PEBBLE RANGE
		150.81	151.27		149.9	150.8						MDST		
		151.27	153.71		150.8	153.5						SS		FINE GRAINED WITH STRINGERS, CONGLOMERATE BANDS & IRONSTONE BANDS OCC, THIN CARBONACEOUS SHALE
		153.71	154.47		153.5	154.2						CONGL SS		FINING UPWARD SEQUENCE
		154.47	157.82		154.2	157.4						SS		FINE GRAINED WITH IRONSTONE NODULES THROUGHOUT
		157.82	158.59		157.4	158.4						MDST		BLACK
		158.59	160.57		158.4	160.2	158.8	65				SS		IRONSTONE NODULES, GREY GREEN
		160.57	161.18		160.2	161.2						SS		CONGLOMERATE WITH INTERBEDDED FINE TO MEDIUM GRAINED SANDSTONE
		161.18	163.07		161.2	162.9						SLST		OCCASIONAL COALY SHALE
		163.07	164.53		162.9	164.4						SS		FINEGRAINED, OCCASIONAL INTERBEDDED CARBONACEOUS SILTSTONE & MEDIUM GRAINED SANDSTONE
		164.53	165.59		164.4	165.6						SLST		GREY BLACK, IRONSTONE COALY BANDS

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.



CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED

278

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		165.59	166.76		165.5	166.6						SS		FINE GRAINED GRADING TO MEDIUM GRAINED @ BASE
		166.76	168.13		166.6	167.5						SLST		OCCASIONAL THIN COAL BANDS DARK GREY
		168.13	168.43		167.5	167.8						SH		COALY
		168.43	168.76		167.8	168.3						MDST		GREY-BLACK
		168.76	169.80		168.3	169.4						SS		FINE GRAINED, GREY-GREEN
		169.80	170.26		169.4	170.0						SH		CARBONACEOUS
		170.26	175.29		170.0	175.2						SS		OCCASIONAL CARBONACEOUS BAND, MASSIVE, FINE GRAINED GREY-GREEN
		175.29	176.20		175.2	176.3						VOLC		FELSIC
		176.20	176.63		176.3	176.7						SS		CONVOLUTED TEXTURE BIOTURBATED
		176.63	178.31		176.7	177.8	177.0	70				MDST		BLACK, COALY
		178.31	179.07		177.8	179.0						SS		CONGLOMERATE, OCCASIONAL FINEGRAINED SANDSTONE
		179.07	180.59		179.0	180.6						SLST		GREY, MASSIVE
		180.59	181.96		180.6	181.8						SS	SLST	MEDIUM GRAINED, SALT & PEPPER, INTERBEDDED SLTSTONE
		181.96	183.18		181.8	183.0						SS		THIN CONGLOMERATE BANDS & COALY STRINGERS
		183.18	186.32		183.0	186.3						SLST		INTERBEDDED MUDSTONE
		186.32	188.49		186.3	188.4						SS		FINE GRAINED INTERBEDDED WITH THIN CONGLOMERATE BANDS
		188.49	189.64		188.4	189.5						MDST		GREY-BLACK
		189.64	191.11		189.5	190.6						SS		FINE GRAINED, GREY-GREEN INTERBEDDED MUDSTONE & COAL STRINGERS
		191.11	192.97		190.6	192.8						CONGL	SS	FINING UPWARD SEQUENCE INTO MEDIUM GRAINED SANDSTONE
		192.97	194.64		192.8	194.4	193.0	78				SS		FINE GRAINED, INTERBEDDED SLTSTONE, CONGLOMERATE & COAL BANDS
		194.64	196.11		194.4	196.0						CONGL	SS	FINING UPWARD INTO FINE GRAINED SANDSTONE
		196.11	197.05		196.0	197.0						CONGL	SS	ANOTHER FINING UPWARD CYCLE
		197.05	198.06		197.0	198.4						CONGL	SS	ANOTHER FINING UPWARD SEQUENCE
		198.06	198.88		198.4	198.8	198.6	70				SS		FINE GRAINED THIN CARBONACEOUS STRINGERS, CONVOLUTED BEDDING

\* MEASURED FROM THE HORIZONTAL PLANE      ▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

TK-Zymoetz River 84(1\*)A (2)

CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		198.88	199.49		198.8	199.6						MDST		5 CM COAL BANDS. BLACK, SLICKED
		199.49	200.25		199.6	200.35						SLST		
		200.25	203.03		200.35	202.8						MDST		CARBONACEOUS BANDS. GREY-BLACK
		203.03	204.25		202.8	204.0						SS		FINE GRAINED
		204.25	205.46		204.0	205.4						SS		MEDIUM GRAINED
		205.46	206.38		205.4	206.2						SLST		GREY-BLACK
		206.38	207.9		206.2	207.8						SS		FINE GRAINED INTERBEDDED COARSE GRAINED SANDSTONE & CARBONACEOUS BANDS
		207.9	208.97		207.8	208.9						SLST		GREY-BLACK, VERY BROKEN
		208.97	212.47		208.9	212.1						SS		FINE GRAINED, MASSIVE GREY-GREEN
		212.47	222.5		212.1	222.1						SLST		GREY-BLACK, OCCASIONAL INTERBEDDED FINE GRAINED SANDSTONE & CARBONACEOUS SHALE
		222.5	223.11		222.1	222.8						SS		FINE GRAINED, OCCASIONAL BANDS OF CONGLOMERATE & COAL BLEBS
		223.11	225.39		222.8	225.2						SLST		
		225.39	226.01		225.2	226.0						SS		FINE GRAINED
		226.01	226.92		226.0	227.0						SS	CONGL	MEDIUM GRAINED FINING UPWARD SEQUENCE
		226.92	227.53		227.0	227.8						CONGL		
		227.53	228.45		227.8	228.3						SLST		MASSIVE, GREY
		228.45	232.26		228.3	232.2						SS		FINE GRAINED
		232.26	234.39		232.2	233.2						SLST		GREY-BLACK, OCCASIONAL SLICKS & CARBONACEOUS STRINGERS
		234.39	238.05		233.2	238.3						SS		CONGLOMERATE, SALT & PEPPER. UNIT CONSISTS OF MANY NEGATIVE FINING UPWARD SEQUENCES GOING FROM CONGLOMERATE @ BASE TO FINE GRAINED SANDSTONE @ TOP
		238.05	239.57		238.3	239.4	238.7	75				SS		FINE GRAINED GREY-GREEN, OCCASIONAL COAL & CARBONACEOUS STRINGERS
		239.57	242.01		239.4	241.5						SS	CONGL	SALT & PEPPER
		242.01	243.53		241.5	242.8						SLST		GREY-BLACK COAL FRAGMENTS
		243.53	246.58		242.8	246.6						CONGL	SS	PEBBLES UP TO 2.5 CM IN DIAM
		246.58	248.26		246.6	248.2						SS		MEDIUM GRAINED INTERBEDDED FINE GRAINED & COARSE

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

CORE DESCRIPTION

PROJECT ZYMOETZ

HOLE NO. ZZ401  
CONTINUED

298

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
														GRAINED SANDSTONE OCCASIONAL COAL STRINGER
		248.26	249.63		248.2	249.4						CONGL		INTERBEDDED MEDIUM GRAINED SANDSTONE & CARBONACEOUS STRINGERS
		249.63	253.29		249.4	253.8						SS		MEDIUM GRAINED WITH INTERBEDDED FINE GRAINED SANDSTONE & CARBONACEOUS MUDSTONE
		253.29	255.42		253.8	255.5						SS	CONGL	
		255.42	257.25		255.5	257.4						SS		MEDIUM GRAINED SALT & PEPPER OCCASIONAL THIN CONGLOMERATE SANDSTONE
		257.25	258.16		257.4	258.0						SS	CONGL	
		258.16	259.38		258.0	259.3						SS		MEDIUM GRAINED THIN INTERBEDS OF CARBONACEOUS SHALE & CONGLOMERATE SANDSTONE
		259.38	260.30		259.3	260.6						CONGL		FINING UPWARD SEQUENCE
		260.30	267.00		260.6	267.0	265.5	70				SS		MEDIUM GRAINED THIN INTERBEDS OF FINE GRAINED SANDSTONE & CONGLOMERATE SMALL SCALE NORMAL FAULTS several fining upward sequences
		267.00	269.14		267.0	268.9	267.5	0				MDST		BLACK EXTREMELY SHEARED THIN CLAY BANDS
		269.14	269.44		268.9	269.4						CONGL		MASSIVE
		269.44	270.66		269.4	270.6						MDST		BLACK
		270.66	272.49		270.6	272.3	271.5	40				SS		MEDIUM GRAINED THIN BEDS OF CONGLOMERATE SANDSTONE & CARBONACEOUS STRINGERS
		272.49	274.01		272.3	274.01						SLST		OCCASIONAL INTERBEDS OF MEDIUM GRAINED SANDSTONE
		274.01	275.53		274.01	275.53						SS		FINE GRAINED THIN INTERBEDS OF MEDIUM GRAINED SANDSTONE, ABUNDANT SMALL-SCALE FAULTING
		275.53	279.50		275.53	279.5	276.6	40				MDST		BLACK EXTREMELY SHEARED (C-FILLED SLICKS
														TD

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.

# CORE DESCRIPTION

PAGE 1 OF 1 248

PROJECT	ZYMOETZ
AREA	SMITHERS

DATE	BEGIN	
	END	Sept 2/84

HOLE NO.	ZZ402
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HOLE PARTICULARS

LOCATION	NORTHING: 6 075 358 mN (m)	
	EASTING: 579 427 mE (m)	
ELEVATION	857	HOLE BEARING (AZ <sup>o</sup> )
TOTAL DEPTH	61m	HOLE ANGLE (°)* VERTICAL

LOGGING

LOGS RUN	NONE
LOGGED BY	---
OTHER TESTS	---

PRE-CORE INFORMATION

CASING LENGTH	15.24 (m)
OVERBURDEN DEPTH	15.3 (m)
OVERBURDEN TYPE	
WATER LEVEL	(m)

EXAMINATION

LOG USED	NONE
NO. OF SEAMS SAMPLED	NONE
EXAMINER (S)	B.M.&S.C.
DATE	April 16/85

BOX NO.	DEPTH AT TOP OF BOX	MARKER BLOCKS			GEOPHYS DEPTH		BEDDING ANGLE ▲		SAMPLE NO.	SEAM NAME	SEAM RECOVERY	LITHO DESCRIPTION		
		FROM	TO	RECOVERY (m)	FROM	TO	DEPTH	ANGLE				MAIN	MINOR	AMPLIFIED
		0	15.3								OB			
		15.3	61.0								CONGL		GREY-GREEN SANDSTONE MATRIX. 1 INCH DIAMETER PEBBLES OF UNDERLYING HAZELTON GROUP. TD	

\* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE OF AXIS

HOLE NO.	
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TK Zymoetz Well 84(1')A 2

# Appendix

1

CROWS NEST RESOURCES LIMITED

ZYMOETZ RIVER: GROUP 375

1985 Tenure Status

<u>Licence</u>	<u>Hectares</u>	<u>Term</u>	<u>Base Date</u>	<u>Work Requirements/Credits (per hectare)</u>			
					<u>Work</u>		
				<u>Previous Credits</u>	<u>+ Current Credits</u>	<u>- Requirements = Credits Forward</u>	
4252	195	8	Feb.1/78	NIL	55.28	50.00	5.28
4253	195	8	Feb.1/78	NIL	55.28	50.00	5.28
4254	259	8	Feb.1/78	NIL	55.28	50.00	5.28
4255	259	8	Feb.1/78	NIL	55.28	50.00	5.28
	<u>908</u>						

Future Work Requirements

1986	40,605.76
1987	45,400.00
1988	45,400.00
1989	45,400.00



### APPLICATION TO EXTEND TERM OF LICENCE

I, Glenn C. Francis ..... agent for Shell Canada Resources Limited  
(Name) (Name)  
 ..... (same) ..... P.O. Box 100 .....  
(Address) (Address)  
 ..... Calgary, Alberta T2P 2H5  
 Valid FMC No. 207.568 .....

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 4257, 7760, 7761 and 7762 .....  
 for a further period of one year.

2. Property name Zymoetz River ..... GROUP NO. 375 .....

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

4. I have performed, or caused to be performed, during the period February 1, 1984 ..... to  
January 31, 1985 ....., work to the value of at least \$ 50,196.91 .....

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

**CATEGORY OF WORK**

CATEGORY OF WORK	Licence(s) No(s).	Apporportioned Cost
Geological mapping	.....	.....
Surveys: Geophysical	.....	.....
Geochemical	.....	.....
Other	.....	.....
Road construction	.....	.....
Surface work	.....	.....
Underground work	.....	600.00
Drilling	.....	39,302.40
Logging, sampling, and testing	.....	4,105.00
Reclamation	.....	716.45
Other work (specify)	.....	.....
Off-property costs	.....	5,473.06

5. I wish to apply \$ 50,196.91 ..... of this value of work on Coal Licence(s) No(s). 4252, 4253, 4254, 4255 .....

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

7. The work performed on the location(s) is detailed in the attached report entitled Zymoetz River Geological Assessment Report .....

March 20, 1985 .....  
(Date)

Se A H .....  
(Signature)

Supervisor .....  
(Position)

**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* ..... *30 m x 90 m* .....  
Total Cost \$ *600.00* .....

**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 ..... *NQ-3* ..... *2* ..... *340* ..... *39,302.40* .....  
Wireline .....  
Rotary: Conventional .....  
Reverse circulation .....  
Other\* (specify) .....  
Contractor .....  
Where is the core stored? *Bulkley Valley Collieries, Telkwa, B.C.* .....  
Total Cost \$ *39,302.40* .....

**LOGGING, SAMPLING, AND TESTING**

Yes  No

Lithology: Drill samples   
Logs: Gamma-neutron

Core samples   
Density

Bulk samples

Other\* (specify) .....  
Testing: Proximate analysis   
Carbonization   
FSI   
Petrographic   
Washability   
Plasticity   
Other\* (specify) .....  
Total Cost \$ *4,105.60* .....

**RECLAMATION**

Yes  No

Details *Bucking of Timber and Drill Site Clean up* ..... Total Cost \$ *716.45* .....

**OTHER WORK (Specify details)**

Yes  No

Cost

.....  
Total Cost \$ .....

**OFF-PROPERTY COSTS**

Yes  No

Details *Report Preparation* ..... Total Cost \$ *5473.06* .....

Total Expenditures \$ *50,196.91* .....

*March 20, 1985*  
(Date)

(Signature)

*Manager - Geology*  
(Position)

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