K-SHELL - LODGEPOLE 78(1)A

GEOLOGICAL REPORT "LODGEPOLE PROJECT"

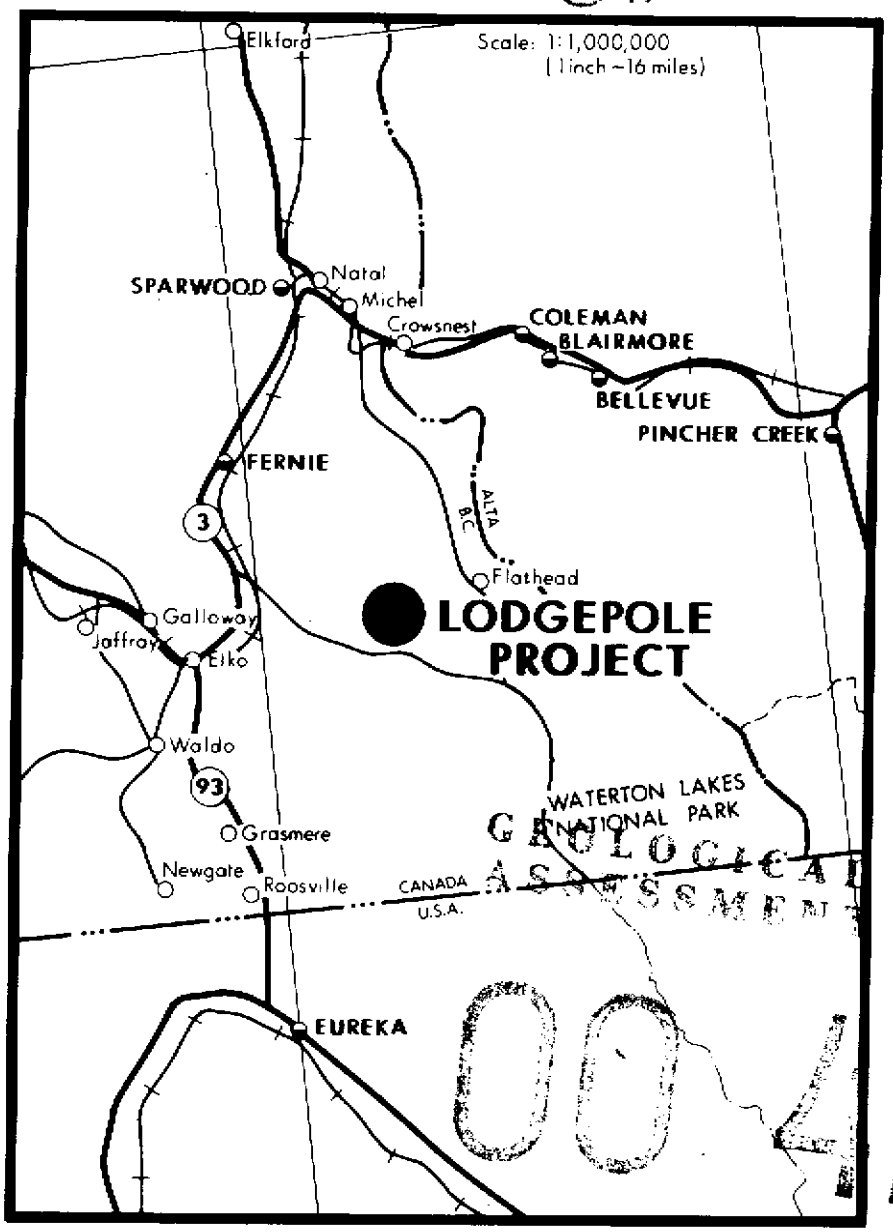
APPENDIX 1 - 1978 -

0426
pt. 1 of 6

CROWS NEST RESOURCES LIMITED
SHELL CANADA RESOURCES LIMITED

Report on Coal Licences

490 to 495 Inclusive



LODGEPOLE PROJECT

KOOTENAY DISTRICT B.C.

GEOLOGICAL REPORT ON THE LODGEPOLE PROJECT

COAL LICENSES NO. 490 to 495 INCLUSIVE

KOOTENAY DISTRICT
MAP REFERENCE: 82 G7

49° 18' to 49° 22' NORTHERN LATITUDE
114° 32' to 114° 47' WESTERN LONGITUDE

CROWS NEST RESOURCES LIMITED

SHELL CANADA RESOURCES LIMITED

CALGARY, ALBERTA

AUTHORS: J. Horachek, P. Eng.
D. Fietz, C.E.T.

EXPLORATION PERIOD: August and September, 1978

REPORT DATE: May, 1979

PROFESSIONAL VERIFICATION OF REPORT

Entitled: Geological Report on the
Lodgepole Project
Coal Licences Nos. 490 to
495 inclusive

SOUTHEASTERN BRITISH COLUMBIA, 1978

Mr. Jaro Horachek planned and carried out the geological field program of Shell Canada Resources Ltd. and Crows Nest Resources Ltd. - 1978 Lodgepole Project, and prepared this report under the general supervision of the undersigned.

Jaro Horachek, M.Sc., graduated in Geological Engineering from the Mining University of Ostrava, Cechoslovakia in 1969. Mr. Horachek is a member, as a Professional Engineer, of the Association of Professional Engineers, Geologists and Geophysicists of Alberta. His experience in Western Canada coal exploration since 1970 includes positions with:

- Scurry Rainbow Oil Ltd., Calgary, Alberta
- Energy Resources Conservation Board, Calgary, Alberta
- Shell Canada Resources Ltd., Calgary, Alberta
- Crows Nest Resources Ltd., Calgary, Alberta

He currently holds the position of Staff Geologist for Crows Nest Resources Ltd.

I consider Jaro Horachek to be well qualified to undertake the responsibilities he was assigned on this project. I am satisfied that the attached report dated May, 1979 has been competently prepared and justly represents the information obtained from this project.

June 18, 1979

J. J. Crabb, P. Eng.

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- Lodgepole Coal Area: Geology Map; Number MII of 2 ; 1:5000

ENCLOSURE 2 Lodgepole Project: 1978 Survey of Access Cut and Drill Sites

ENCLOSURE 3 LP-D101: Suite of Geophysical Logs

ENCLOSURE 4 LP-D102: Suite of Geophysical Logs

SUMMARY

The Lodgepole Project, encompassing an area of 1354± hectares, consists of coal licenses No. 490 to 495 inclusive.

The license block, lying near the headwaters of the Lodgepole and McLatchie Creeks, is located 32 air-km southeast of Fernie, B. C.

The licenses were originally issued to Crows Nest Industries Limited (CNI) in May of 1975; they were later (January, 1976) assigned to The Crows Nest Pass Oil and Gas Company Limited. In February, 1978 Shell Canada Resources Limited (SCRL) acquired CNI; the noted licences have since been transferred to Shell Canada Resources Limited.

During August and September, 1978 Crows Nest Resources Limited (CNRL), a subsidiary of SCRL, conducted an exploration program which consisted of:

- drilling two diamond core holes
- photogrammetric and geodetic surveying

The total 1978 expenditure was $216,735.

Coal seams lie within the Coal-Bearing Member of the Kootenay Formation. The Coal-Bearing Member may be up to 200 metres thick. Considering only those seams exceeding 1.0 metre (3.3 ft) thick, at least eight coal seams are known to be within the Project area.

The Lodgepole Project forms part of the East Kootenay synclinal Fernie Basin. The licenses control a major portion of the "Fernie - Kootenay" thrust block located between two major normal faults on the southeastern limb of the McEvoy syncline. Strata have an average

- strike.....N22^{o}E
- dip.....24^{o} West

The Lodgepole Project probably contains significant coal resources. The West Slope of McLatchie Ridge, in particular, may contain sizeable, low-ratio, dip-slope surface mineable coal reserves.

Further exploration activity is required in the Lodgepole Project and should include:

- exploration drilling in the area of the low ratio, dip slope surface mineable coal reserves
- continued geological mapping (including strata exposed on road cuts) and hand trenching

1 INTRODUCTION

1.1 LICENSES

During May of 1975 coal licenses numbered 490 to 495, inclusive, were issued to Crows Nest Industries Limited (CNI) of Fernie, British Columbia. In January 1976, these licenses were assigned to CNI's wholly owned subsidiary, The Crows Nest Pass Oil and Gas Company Limited.

Shell Canada Resources Limited, in February of 1978, acquired CNI. The above noted licenses have since been transferred tc Shell Canada Resources Limited.

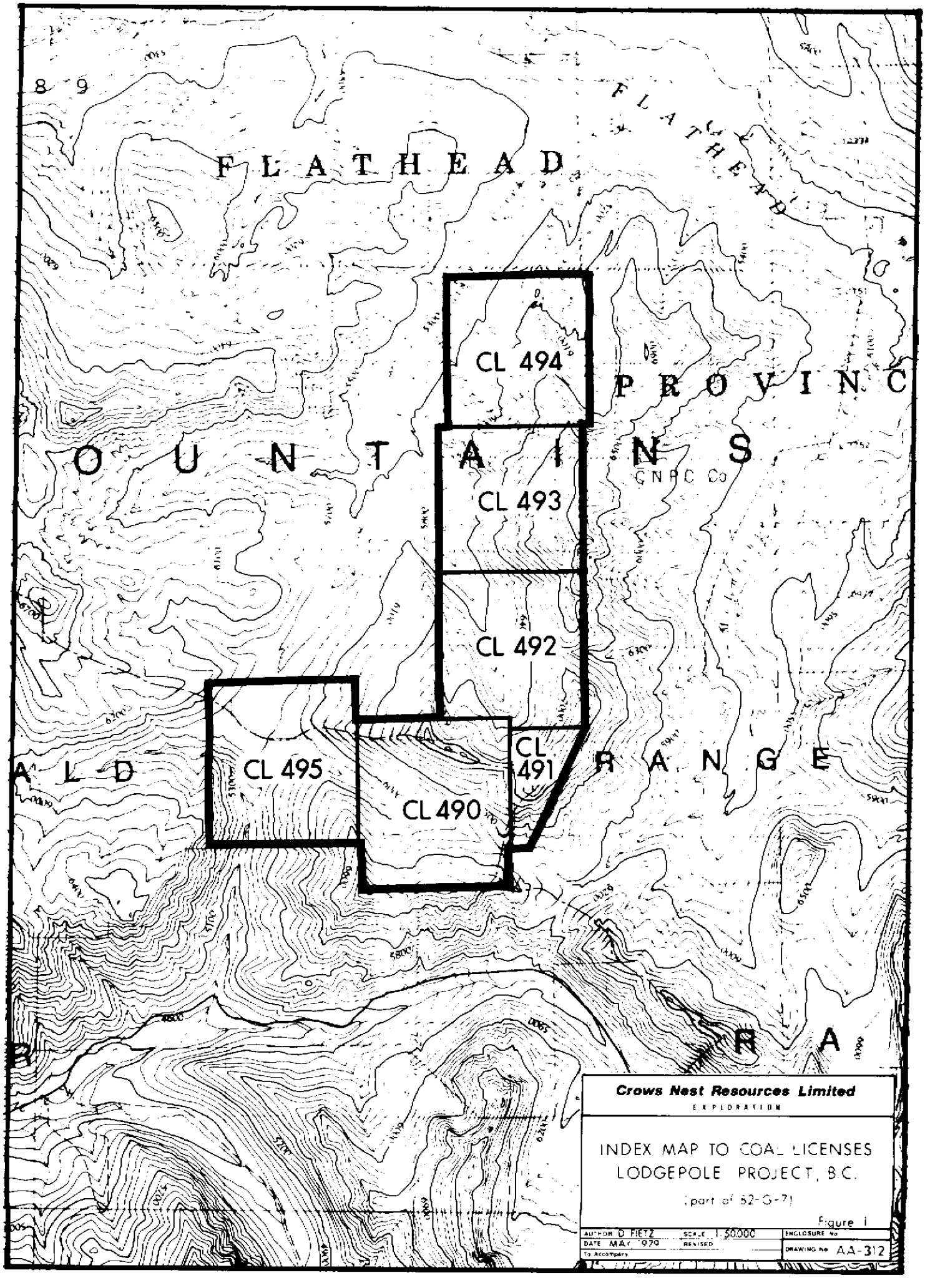
The licenses, lying near the headwaters of Lodgepole and McLatchie Creeks, are located in the southeast corner of British Columbia. The license area encompasses an approximate area of 1354± hectares or 3345± acres (Appendix One). The block of licenses has been designated as the LODGEPOLE PROJECT (Figure 1).

1.2 PREVIOUS WORK

The Lodgepole Project area was subject, in the late fifties and early sixties, to limited geological mapping activity. Mapping was conducted by:

- R. A. Price for the Geological Survey of Canada
- the Columbia Iron Mining Company (a subsidiary of the United States Steel Corporation)

Exploration activity, on adjoining coal licenses, was conducted by Kaiser Resources Limited during the late sixties and early seventies.



Crows Nest Resources Limited
EXPLORATION

INDEX MAP TO COAL LICENSES
LODGEPOLE PROJECT, B.C.
(part of 82-G-7)

Figure 1

AUTHOR D FIETZ	SCALE 1:50,000	ENCLOSURE No
DATE MAY 1979	REVISED	DRAWING No AA-312
To Accompany		

CNI commenced exploration of the Lodgepole Project area during 1975. Ridge "O", part of Coal License No. 493, was sectioned and hand trenched. In total some 168 m of stratigraphic section was measured; included were 7 hand trenches totalling 38 m.

During 1976, hand trenching and sectioning was again undertaken on the Project area. Exploration activity was confined to Coal Licenses No. 492 and 493. Some 610 m of stratigraphic section was measured; included were 23 hand trenches totalling 230 m.

Measuring of stratigraphic section and hand trenching continued during 1977. Coal Licenses' No. 490, 491 and 493 were subject to trenching activity. Trenching was also conducted on "Kaiser-held" coal licenses south of the Lodgepole Project area. In 1977, some 760 m of section was measured; included were 19 hand trenches and a number of "potholes" totalling 350 m.

Past exploration activity in the Project area has been discussed in greater detail, in the compilation, "Third Report on Coal Licenses Nos. 490 to 495 Inclusive, Lodgepole Area - May 16, 1978".

1.3 OBJECTIVES OF EXPLORATION PROJECT: 1978

Exploration activities, in 1978, were designed to:

- obtain coal core to derive quality data
- acquire sub-surface drill data to determine preliminary coal reserves (surface and underground)
- continue, as in the past, surface geological mapping and trenching programs
- construct a road into the presumed area of primary strippable coal reserves (Coal License No. 492)

1.4 ACCOMPLISHMENTS & INADEQUACIES: 1978

Field operations were initiated by Crows Nest Resources Limited (CNRL), a Shell Canada Resources Limited subsidiary. Exploration was conducted during the summer and early autumn and entailed

- diamond drilling
- photogrammetric and geodetic surveying

Two core holes were drilled within the license area; coal seams were sampled and analysed at the CNRL lab facilities in Fernie, British Columbia.

CNRL's geological staff, assigned to the Project area, were made responsible for the description and sampling of core; time spent on surface geological mapping was minimal; no hand trenching was undertaken.

To gain access to the drill sites, 7.2 km (4.5 miles) of existing access was upgraded; in addition, 4.5 km (2.8 miles) of new road was cut.

While approved, no access or drill sites were constructed in the area of the presumed, primary strippable coal reserves (Coal License No. 492). Existence of low-ratio, dip slope, surface mineable coal reserves in the license has yet to be proven or disproven.

In the latter part of the program, climatic conditions were less than ideal. During the inclement period, the on-site cat contractor was hard-pressed to maintain the existing road cuts in a reasonable, drivable condition.

2 REGIONAL SETTING

2.1 LOCATION (Figure 2)

The Lodgepole Project area is located 32 air-km (20 air-miles) southeast of Fernie.

Geographically, the licenses extend between:

- 114° 43' and 114° 47' of western longitude, and
- 49° 18' and 49° 22' of northern latitude.

The licenses are approximately bounded to the north, by the Flathead River; to the northwest and east, by the Flathead's tributaries, Foisey and McLatchie Creeks; to the south and west, by the forks of Lodgepole Creek (Figure 3).

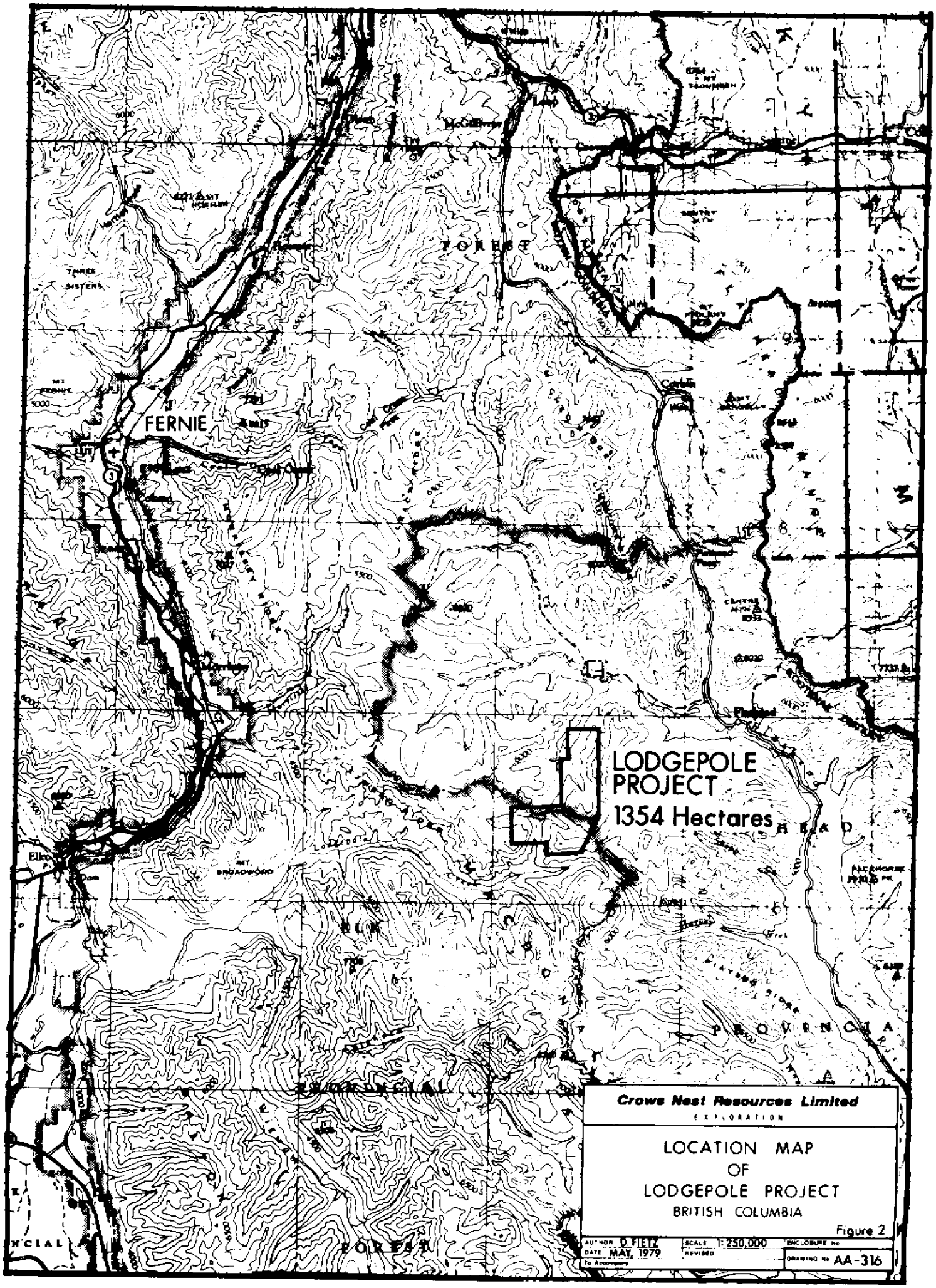
2.2 ACCESS AND INFRASTRUCTURE

2.2.1 ROADS (Figure 4)

The license area is located some 50+ road km (31+ miles) southeast of Fernie, B.C. From Morrissey Station, located 13 km (8 miles) south of Fernie via Provincial Highway No. 3, the Lodgepole and McLatchie Creek Forest Development Roads provide access to the Project.

From the junction of "Lodgepole" and "Lodgepole - North Fork" roads, some 7.2 km (4.5 miles) of existing access was upgraded; in addition 4.5 km (2.8 miles) of new road was cut.

During the 1978 exploration season, only the Lodgepole: North Fork was used to gain access to the license block. The "Kaiser

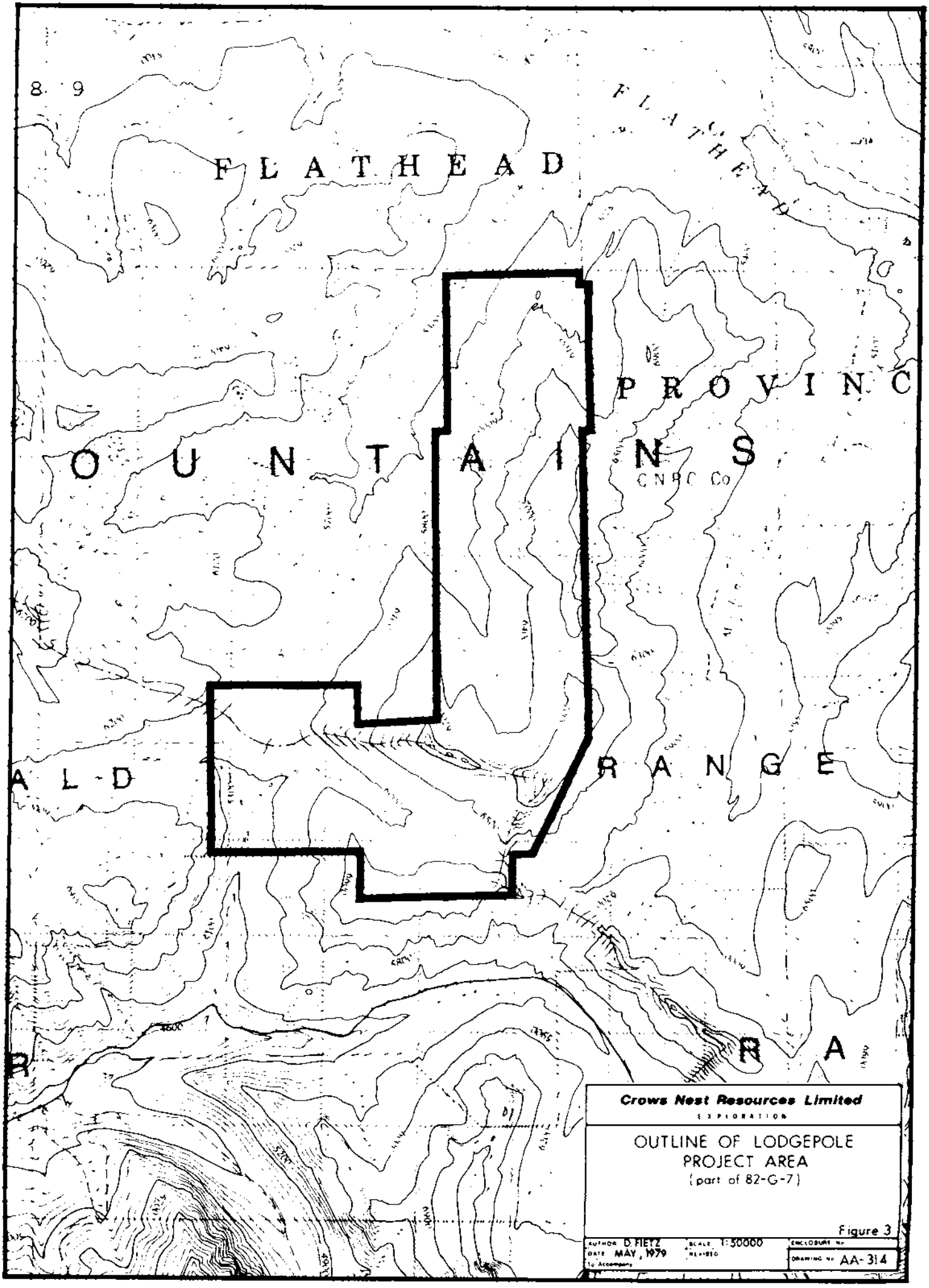


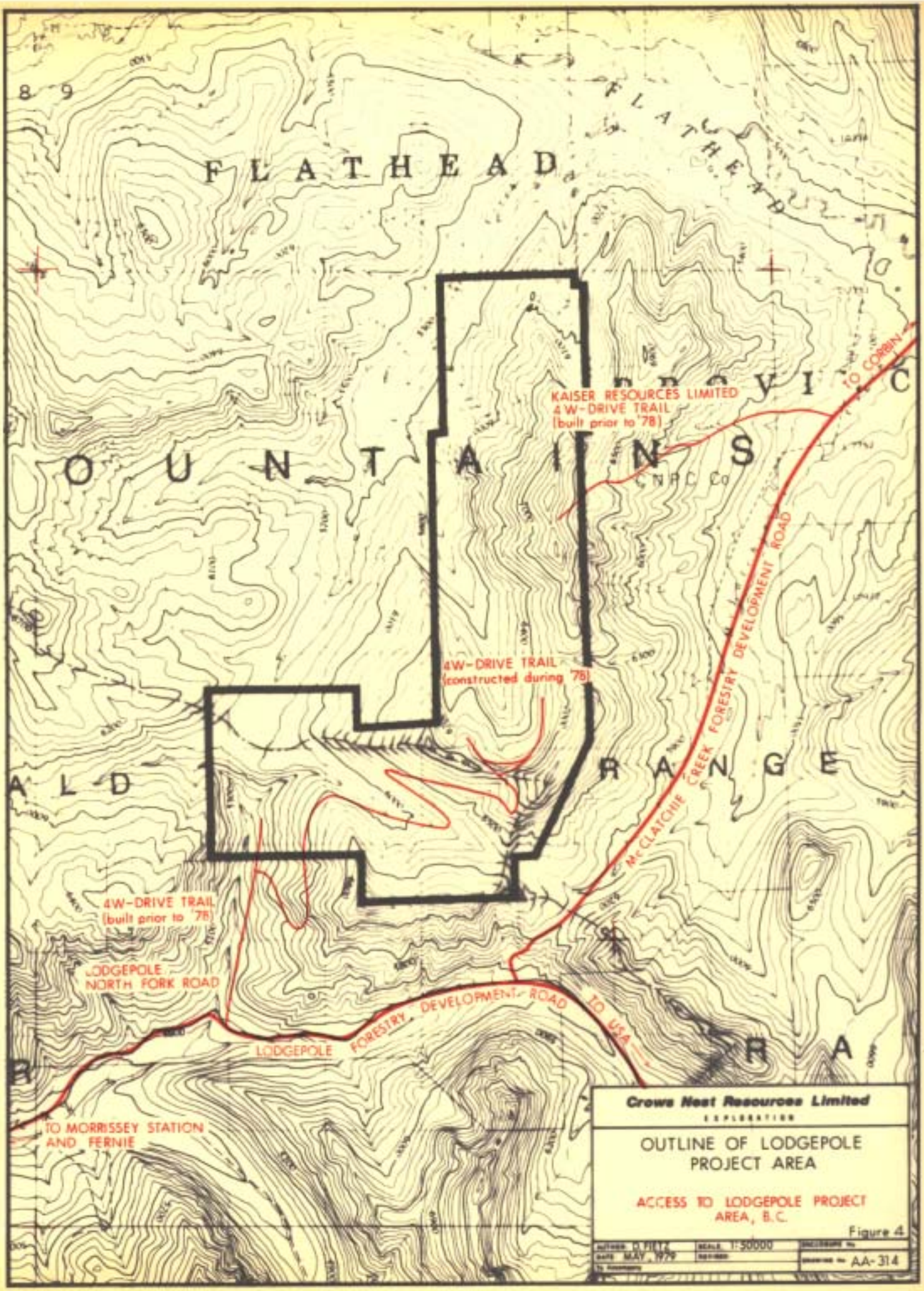
Crows Nest Resources Limited
EXPLORATION

LOCATION MAP
OF
LODGEPOLE PROJECT
BRITISH COLUMBIA

Figure 2

AUTHOR D. FIETZ | SCALE 1:250,000 | ENCLOSURE No
DATE MAY, 1979 | REVISED | DRAWING No AA-316
To Accompany


8 9
FLATHEAD
FLATHEAD
PROVINC
OUNTAINS
CNRC Co
RANGE
A L D
R
R A
Crows Nest Resources Limited
EXPLORATION
OUTLINE OF LODGEPOLE
PROJECT AREA
(part of 82-G-7)
Figure 3
AUTHOR D. FIETZ
DATE MAY, 1979
To Accompany
SCALE 1:50000
REVISED
ENCLOSURE No.
DRAWING No. AA-314


8 9
FLATHEAD
FLATHEAD
O U N T A I N S
R A N G E
KAISER RESOURCES LIMITED
4W-DRIVE TRAIL
(built prior to '78)
TO CORBIN
CNRC Co
4W-DRIVE TRAIL
(constructed during '78)
McCLATCHIE CREEK FORESTRY DEVELOPMENT ROAD
4W-DRIVE TRAIL
(built prior to '78)
LODGEPOLE
NORTH FORK ROAD
LODGEPOLE FORESTRY DEVELOPMENT ROAD
TO USA
TO MORRISSEY STATION
AND FERNIE
Crows Nest Resources Limited
EXPLORATION
OUTLINE OF LODGEPOLE
PROJECT AREA
ACCESS TO LODGEPOLE PROJECT
AREA, B.C.
Figure 4
AUTHOR H. FILTZ
DATE MAY, 1979
SCALE 1:50000
AA-314

built" access, lying west of the McLatchie Creek Forestry Development Road, was not utilized.

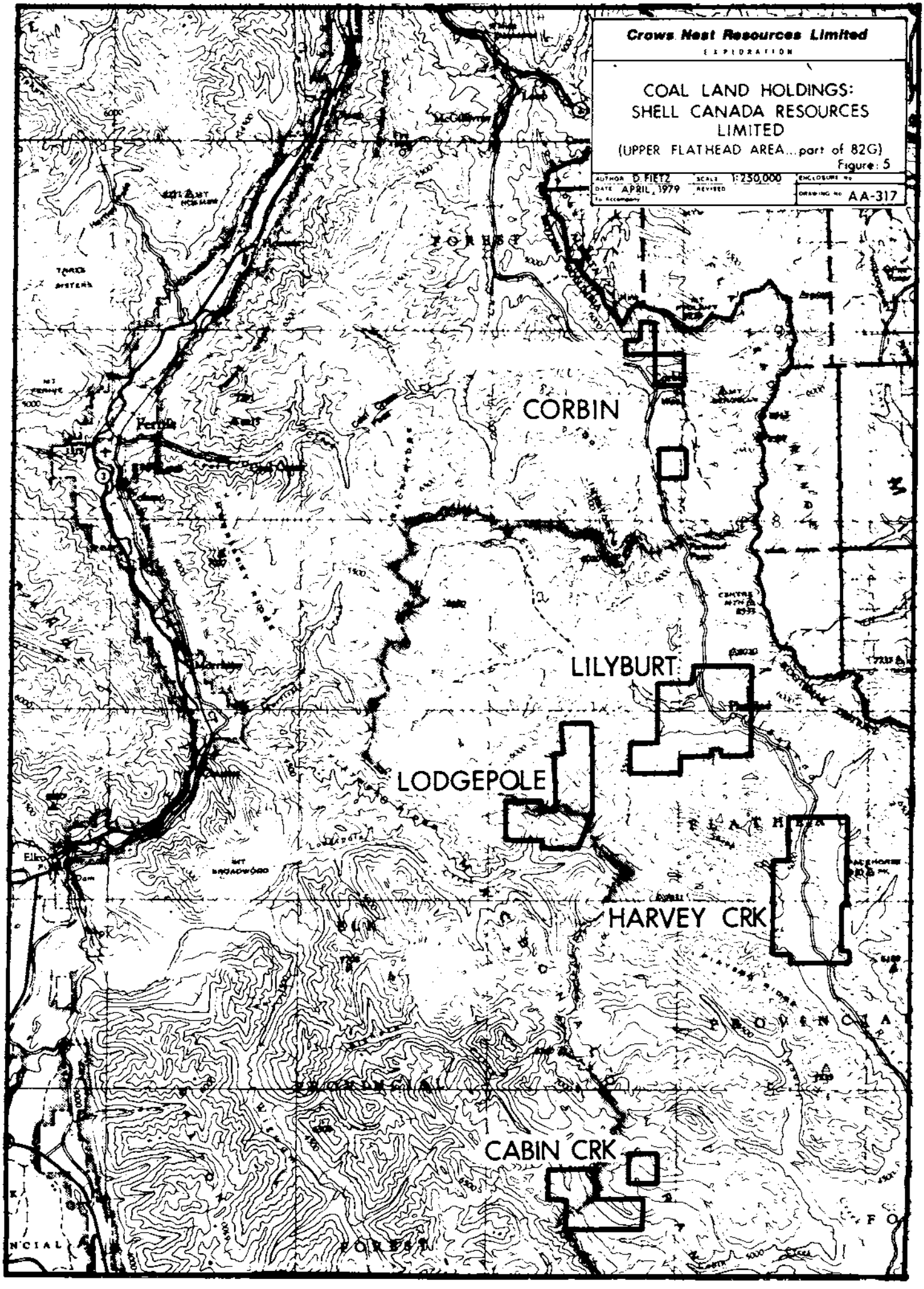
2.2.2 RAILWAY

The CPR Crows Nest line parallels Provincial Highway No. 3 at Morrissey Station; the distance from Morrissey to the license area is 37 km (23 miles).

3 PROPERTY DESCRIPTION AND OWNERSHIP (Figure 5)

The coal licenses (Nos. 490 to 495, inclusive) are located in the southeastern corner of the Fernie Coal Basin. In addition to the Lodgepole Project area, Shell Canada Resources Limited hold additional coal licenses in the vicinity:

- CABIN CREEK AREA ... located 20 air-km (13 air-miles) to the south
- HARVEY CREEK AREA ... located 13 air-km (8 air-miles) to the southeast
- LILYBURT AREA ... located 8 air-km (5 air-miles) to the northeast
- CORBIN AREA ... located 18 air-km (11 air-miles) to the north


Crows Nest Resources Limited
EXPLORATION
COAL LAND HOLDINGS:
SHELL CANADA RESOURCES
LIMITED
(UPPER FLATHEAD AREA...part of 82G)
Figure: 5
AUTHOR D. FIETZ
SCALE 1:250,000
DATE APRIL, 1979
REVISED
To Accompany
ENCLOSURE NO
DRAWING NO AA-317
CORBIN
LILYBURT
LODGEPOLE
HARVEY CRK
CABIN CRK
FLATHEAD
FOREST

4 GEOLOGICAL SETTING

4.1 GENERAL STATEMENT

The Lodgepole Project lies within the Fernie Coal Basin. Coal measures are confined to the Upper Jurassic - Lower Cretaceous Kootenay Formation. The strata, within the license area, forms part of the east flank of the McEvoy Sycline.

4.2 TABLE OF FORMATIONS (Figure 6)

See following page.

4.3 KOOTENAY FORMATION

The Formation consists predominantly of a nonmarine, interstratified sequence of dark grey to greyish brown weathering siltstone, sandstone, shale, conglomerate and coal. The Kootenay ranges in age from Late Jurassic to Early Cretaceous. The Kootenay conformably but abruptly overlies interbedded sandstone, siltstone and shale of the Jurassic "Passage Beds" of the Fernie Formation.+ The formation is subdivided into the Moose Mountain Member, the Coal-Bearing Member and the Elk Member.

The Coal-Bearing Member may be up to 200 metres thick. Considering only those seams exceeding 1.0 metre (3.3 feet) thick, at least eight coal seams are known to be within the Project area.

+ after GIBSON, 1977

In the Lodgepole Area, the conglomeratic sandstones of the Elk Member are not present. The thick succession of strata, overlying the Coal-Bearing Member, contain finer grained sandstones, siltstones and shales.

4.4 REGIONAL STRUCTURAL GEOLOGY (Figure 7)

The Lodgepole Project forms part of the East Kootenay synclinal Fernie Basin. The licenses control a major portion of the "Fernie-Kootenay" thrust block located between two major normal faults on the south-eastern limb of McEvoy syncline.

Within the license area Kootenay strata are bound on the north side by the Flathead Normal Fault and intersected in the southern half by the Harvey Normal Fault. The fault is well exposed on the Lodgepole Creek valley slope (south of Coal License 490) where it dips to the south-west and intersects the Kootenay and Fernie Formations. The stratigraphic separation along the Harvey Fault is some 330 m (Price, 1962).

A thrust fault branching off the Harvey Fault and striking to the north is suspected. It is designated as the "Cropco Fault"; the certainty of its existence has yet to be proven.

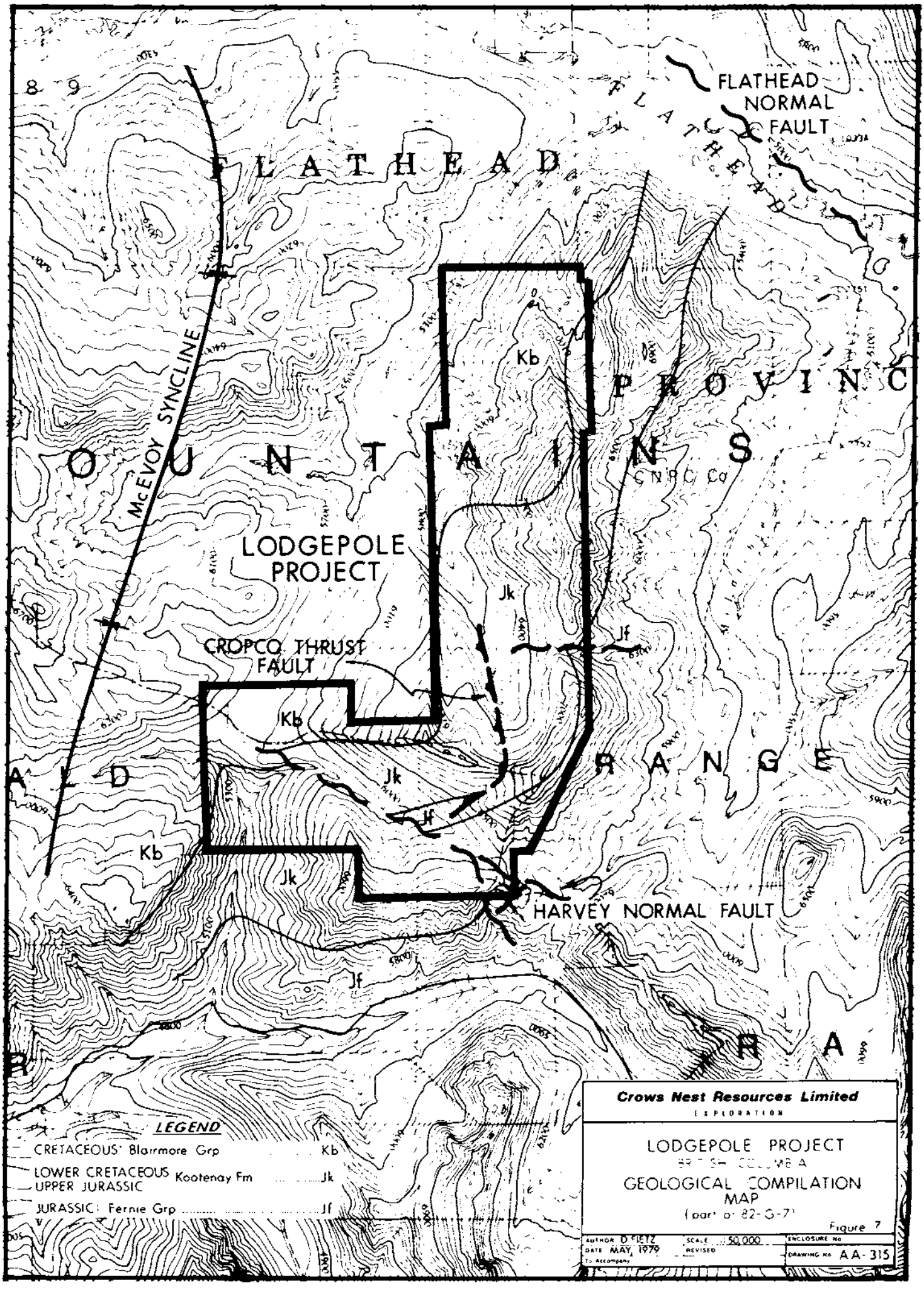
Kootenay strata within the license area generally strike $N22^{\circ}E$; beds have an average dip of 24° toward the west.

Figure 6

TABLE OF FORMATIONS

PERIOD OR EPOCH	FORMATION	LITHOLOGY	THICKNESS (m)
LOWER CRETACEOUS	CADOMIN FORMATION (Blairmore Group)	non-marine: sandstone, conglomerate and shale	360 - 1980
	Pocaterra Creek Member	non-marine: sandstones, conglomerate siltstone & shale	
LOWER CRETACEOUS AND JURASSIC	KOOTENAY FORMATION — ELK MEMBER	non-marine interbedded medium to coarse grain sandstone, chert-pebble conglomerate with minor siltstone, shale and coal	30 - 490
	KOOTENAY FORMATION — COAL BEARING MEMBER	non-marine & brackish: interbedded coal, siltstones, shales and sandstones	70 - 610
	KOOTENAY FORMATION — BASAL SANDSTONE UNIT OR MOOSE MOUNTAIN MEMBER (MMM)	non-marine: massive, cliff, forming sandstone	20 - 60
JURASSIC	FERNIE FORMATION	marine: shale, siltstone, sandstone and limestone	180 - 380

... after GIBSON 1977
PRICE 1961, 1965


FLATHEAD
NORMAL
FAULT
F L A T H E A D
O U N T A I N S
P R O V I N C
R A N G E
McEVOY SYNCLINE
LODGEPOLE
PROJECT
CROPCO THRUST
FAULT
HARVEY NORMAL FAULT
Kb
Jk
Jf
LEGEND
CRETACEOUS Blairmore Grp ..... Kb
LOWER CRETACEOUS Kootenay Fm ..... Jk
UPPER JURASSIC
JURASSIC Fernie Grp ..... Jf
Crows Nest Resources Limited
EXPLORATION
LODGEPOLE PROJECT
BRITISH COLUMBIA
GEOLOGICAL COMPILATION
MAP
(part of 82-G-7)
Figure 7
AUTHOR D PIETZ
DATE MAY, 1979
To Accompany
SCALE 1:50,000
REVISED
ENCLOSURE No
DRAWING No AA-315

5 EXPLORATION PROJECT: 1978

5.1 GENERAL STATEMENT

Two angle diamond core holes were drilled on the Lodgepole Project during the 1978 field season; the drilled length totalled 495.3 metres (1625 feet).

The original 1978 approved exploration program consisted of nine drill holes. Late commencement of the program, coupled with the wet weather, curtailed the drilling activity considerably.

The acquired sub-surface drill data has been subjected to minimal interpretation. To initiate sub-surface structural and stratigraphic interpretation, more data points (drill holes) are required. To this end, enhanced drilling activity is anticipated for the 1979 field season.

5.1.1 PLANNING, EXECUTION AND COMPILATION

In-office scheduling of the program commenced in mid-May, 1978. Exploration activities, on the Lodgepole Project were conducted during August and September, 1978; the program was run concurrent with the Harvey Creek Project.

Compilation of the technical report, including drafting and typing commenced in March, 1979. Due to changing priorities, time spent on the report was discontinous; the report was completed in May, 1979.

5.1.2 RESPONSIBILITY

J. J. Crabb, Manager of Exploration, CNRL was responsible for all exploration activities conducted in 1978. Frank Martonhegyi, Staff Geologist, reported to J. J. Crabb and directed all exploration projects in southeast B.C.

For the Lodgepole Project, Jaro Horachek, P. Eng., Senior Geologist was designated overall authority. Drafting services were provided by Shell Canada Resources Limited, more specifically, by Gerald Babiuk. Linda Anderson and Bette Olson capably assumed typing responsibilities.

5.1.3 MANPOWER

The geological field staff, assigned to the Lodgepole Area, consisted of the following personnel:

- Jaro Horachek, P. Eng., Senior Geologist (Project Geologist)
- Dale Fietz, Senior Geological Technologist
- John Fisher, Senior Geological Technologist
- Bob Aiello, Geological Technologist
- Andy Newson, Geological Consultant
- Ian Fraser, field assistant
- Jim Loader, field assistant
- Sherman Yellowfly, field assistant

5.2 FIELD OPERATIONS: 1978

The Lodgepole Project was carried out in the following chronological order:

DATE	ACTION

August 8	• cat contractor on site to upgrade, cut or construct
	  • access to drill sites
	  • drill sites

August 25	• diamond core rig arrives on site
August 26	• begin drilling LP-D101
September 8	• TD drill hole LP-D101 @ 368.8 m (1210 ft)
September 9	• LP-D101 logged by BPB
September 11	• begin drilling LP-D102
September 12, 13	• relocate geological field staff to exploration camp at Howell Creek
September 21	• TD drill hole LP-D102 @ 126.5 m (415 ft)
	• LP-D102 logged by BPB
post-September	• seeding and fertilizing of drill sites by "INTERIOR REFORESTATION CO. LTD."

5.2.1 AERIAL PHOTOGRAPHY & TOPOGRAPHIC MAPPING

North West Survey Corp. (Yukon) Ltd. from Edmonton, Alberta was contracted to produce a new series of air photographs and a topographic map (1:2 000) of the Project area.

High altitude air photographs (1:40 000) are available for the Lodgepole Project. The photos, applicable to the area are identified as:

NW 55678: No. 44 to 49 (inclusive)
Line: 5-S: Date: 27-06-78
and

NW 55678: No. 117 to 121 (inclusive)
Line: 6-S: Date: 28-06-78

Low altitude air photographs (1:20 000) are also available for the Lodgepole Project. The appropriate photos for the area are identified as:

NW 6478: No. 1 to 6 (inclusive)
Line: 1-S: Date: 20-07-78

and

NW 6478: No. 7 to 13 (inclusive)
Line: 2-N: Date: 20-07-78

The 1:20 000 air photographs, combined with ground survey control*, were used to produce the 1:2 000 topographic map. The new topographic base, due to its late arrival, was not incorporated into the contents of this report.

In 1977, Burnett Resource Surveys Limited of Calgary, were contracted to produce a:

- 1:10 000 base map of the Project area; the map has a 10 metre contour interval
- 1:5 000 base map encompassing Coal License 492 and surrounding area; the map has a 5 metre contour interval

Surface geological features, as observed and measured in the Lodgepole Project area prior to 1978, were transferred onto the Burnett base maps.

Because of the time constraint, the Burnett maps (Enclosure 1) have been utilized to show:

- access cut in 1978
- 1978 drill sites

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* contracted to the Survey Department - Shell Canada Resources Limited

5.2.2 SURVEYING

Ground survey control was contracted to Shell Canada Resources Limited. Control points used included:

- o B. C. Topographic stations
- o Federal Government geodetic control stations

Controlled traverses and conventional surveys were run to determine locations, elevations and coordinates* of drill holes:

- o LP-D101
- o LP-D102

For Report on geodetic survey and plan see Appendix Four and Enclosure 2.

5.2.3 DRILLING

Diamond drilling was contracted to Tonto Drilling Limited. Two holes were drilled between August 26 and September 21, 1978; in total 495.3 metres (1625 feet) were drilled.

Core holes had a drill designation of HQ:

- o Hole Diameter: 100 mm
- o Core Diameter: 75 mm

Core hole LP-D101, drilled to a total depth of 368.8 m (1210 feet), had an average hole azimuth of 110°; the angle of the hole, measured from the horizontal plane, was 61°.

Core hole LP-D102, drilled to a total depth of 126.5 m (415 feet), had an average hole azimuth of 110°; the angle of the hole, measured from the horizontal plane, was 65°.

---

* based on the Universal Transverse Mercator Grid system

Core recovery in coal varied:

- in LP-D101, the weighted average recovery was 76%
- in LP-D102, the weighted average recovery was 21%

In rock, core recovery was substantially higher and exceeded 80% in both holes.

5.2.4 LOGGING

When each of the core holes had been drilled to total depth, BPB ran a full suite of geophysical logs:

- LP-D101 (all logs run in "open hole")
  - COAL LITHOLOGY LOG+
    - Gamma Ray
    - L.S. Density
    - Caliper
  - NEUTRON-NEUTRON LOG+ & VERTICALITY PRINTOUT
  - FOCUSSED ELECTRIC+
  - SEAM THICKNESS LOG*
    - Caliper
    - B.R. Density
  - COAL QUALITY LOG*
    - Gamma Ray
    - L.S. Density
  - a full suite of logs is included in ENCLOSURE 3

+ General Scale Log: 1:100 scale

* Detail Scale Log: 1:20 scale

- LP-D102 (all logs run through the drill rods)
  - COAL LITHOLOGY LOG+
    - Gamma Ray
    - L.S. Density
  - NEUTRON-NEUTRON LOG+
  - SEAM THICKNESS LOG*
    - B.R. Density
  - COAL QUALITY LOG*
    - Gamma Ray
    - L.S. Density
  - a full suite of logs is included in ENCLOSURE 4

5.2.5 LOGISTICS

The Black Nugget Inn, Sparwood, B.C. was the base of 1978 field operations. A. P. Sampietro, Field Foreman for CNRL, was responsible for control of manpower, costs and safety; in addition, all in-field expediting was authorized through Mr. Sampietro.

Travel distance, from Sparwood to the license block, was long. For this reason, some members of the geological staff relocated to the Anco Motel, Fernie, B.C. In mid-September, the majority of the personnel were relocated to the CNRL exploration camp at Howell Creek[x]. Management of the camp was assigned to Mr. Barry Kaser, a Shell Canada Resources Limited employee.

+ General Scale Log: 1:100 scale

* Detail Scale Log: 1:20 scale

x the camp was established to provide lodging for personnel involved in the 1978 adit work on the CNRL: CABIN CREEK PROJECT

Four-wheel drive Chevrolet Blazers were used to transport geological staff to and from the license area.

Core, from LP-D101 and LP-D102 was washed, logged and sampled on site. Laboratory analyses of the coal core was conducted by staff of the CNRL lab in Fernie, B.C.

The field schedule, for the geological field staff, was based on a "10 day-on, 4 day-off" cycle. Time off was accrued for any scheduled holidays or extra days worked.

Rigid safety policies and procedures, as outlined at the outset of the field season, were generally adhered to by field personnel; on the Lodgepole Project, no serious injuries occurred.

6 EXPENDITURES

6.1 SUMMARY STATEMENT

The 1978 expenditure totalled $216,735.

The majority of the expenses were affiliated with:

- contractors' costs; 74%
- salaries for sampling and report preparation; 12%

6.2 COST BREAKDOWN

ITEM	$ SPENT			
	DRILLING	SURVEY	MAPPING & SAMPLING	TOTAL
WAGES*				22000
• sampling: 2 men @ 28 days @ $125 day			7000	
• road construction & drill supervision; 2 men @ 60 days @ $125 day	15000			
CONTRACTORS & CONSULTANTS*				160991
• drilling and associated	82575			
• road construction & associated	38170			
• survey		20907		
• trucking	12637			
• geophysical			6302	
• reclamation	400			
EQUIPMENT RENTALS*				2200
• office trailer			1400	
• power plant			800	
ACCOMODATION*				5984
• 56 man-days @ $34/day			1904	
• 168 man-days @ $34/day	4080			
MATERIALS*			1980	1980
TRANSPORATION & FUEL*				16550
• 4 truck-months (2 trucks @ 2 months) @ $1200/month			4800	
• 18 helicopter hours @ $375/hr.	6750			
• 4 helicopter hours @ $375/hr.			1500	
• fuel			3500	
CNRL LAB COSTS*			2030	2030
	TOTAL ON-PROPERTY COSTS:			211735
REPORT+				5000
• 40 man-days @ $125/day			5000	
	TOTAL OFF-PROPERTY COSTS:			5000
TOTAL	159612	20907	36216	216735

* on-property cost
\+ off-property cost

on the southern slope of the ridge). Dip angles appear to decrease on the lower northern slope of the ridge (south half of Coal License No. 490).

7.2.2 WEST AND McLATCHIE RIDGES

The Coal-Bearing Member of the Kootenay Formation maintains an overall northerly strike and an average dip of 24° West. Locally, dips vary from 15° to 45° west.

Small to medium scale thrust faulting as well as normal faulting have been observed on many locations. Fault mapping was initiated on four locations in 1977; more extensive, detail structural mapping is required.

Two preliminary cross sections have been drawn:

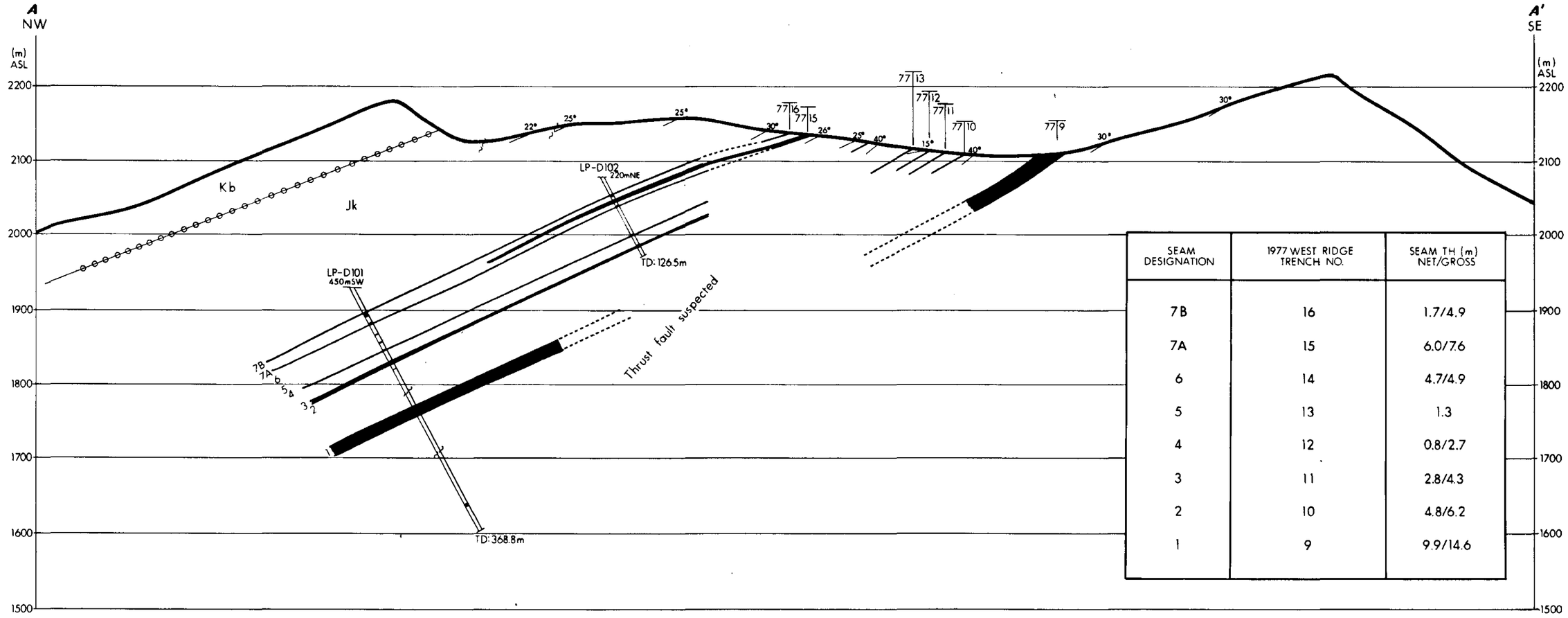
- A-A' (Figure 8) West Ridge Section
  - combines results of 1977 trenching - mapping program with data acquired from the 1978 drill holes: LP-D101 and LP-D102.
- B-B' (Figure 9) McLatchie Ridge Section
  - utilizes selected data of 1975 and 1976 trenching programs.

Locations of lines of section for A-A' and B-B' are indicated on the Burnett Geology Map MII of 2 (1:5 000) which forms part of ENCLOSURE 1.

Insert

426 ½

Maps 1 & 2



SEAM DESIGNATION	1977 WEST RIDGE TRENCH NO.	SEAM TH (m) NET/GROSS
7B	16	1.7/4.9
7A	15	6.0/7.6
6	14	4.7/4.9
5	13	1.3
4	12	0.8/2.7
3	11	2.8/4.3
2	10	4.8/6.2
1	9	9.9/14.6

LEGEND

77Tx : 1977 TRENCH LOCATION

LP-D10X : 1978 DIAMOND DRILL HOLE

Kb : BLAIRMORE GROUP

Jk : KOOTENAY FORMATION

Crows Nest Resources Limited
EXPLORATION

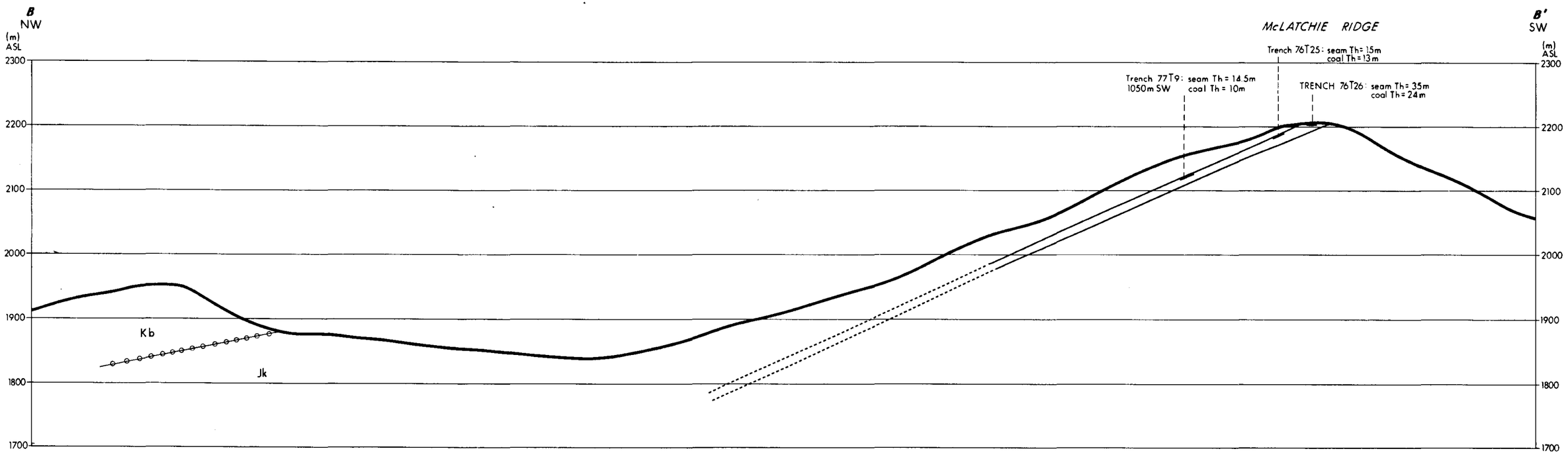
LODGEPOLE PROJECT

WEST RIDGE SECTION: A-A'

Figure 8

AUTHOR Fletz Horachek | SCALE 1:5000 | ENCLOSURE No.
DATE MAY, 1979 | REVISED | DRAWING No.
To Accompany

426/6 ①



LEGEND

Kb: BLAIRMORE GROUP

Jk: KOOTENAY FORMATION

Crows Nest Resources Limited
EXPLORATION

LODGEPOLE PROJECT

McLATCHIE RIDGE SECTION: B-B'

Figure 9

AUTHOR Fiala, Horachek | SCALE 1:5000 | ENCLOSURE No.
DATE MAY, 1979 | REVISED | DRAWING No.

426 ½ (2)

7.3 COAL SEAMS

Mapping, trenching and drilling activities have identified a minimum of eight coal seams in the Lodgepole Project area. These seams, range in thickness from less than one metre (3 feet) up to 25 metres (82 feet).

7.3.1 McLATCHIE RIDGE+

Seams, up to five in number, range in thickness from 2.1 m (7 feet) to 15.2 m (50 feet)*. The most complete measured section is located on Ridge 1. The two lower seams on Ridges 0 and 3 may correlate with:

- the two upper seams on Ridge 4
- the seam exposed on Ridge 7

It should be noted that the two seams are in a similar stratigraphic position above the basal Kootenay sandstone as the two main seams indentified on both West and Lodgepole Ridges.

Aggregate thicknesses of coal exposed in the McLatchie Ridge area vary. Thicknesses exposed are as follows:

- 11.4 m (37.2 ft) on Ridge 4
- 22.9 m (75.2 ft) on Ridge 1
- 27.0 m (88.5 ft) on Ridge 7

7.3.2 LODGEPOLE RIDGE+

Two seams, 13.7 m (45 ft.) and 8.2 m (27 ft.) thick, have been

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+ extracted from "THIRD REPORT ON COAL LICENSES NOS. 490 to 495 INCLUSIVE: LODGEPOLE AREA"; 16-05-1978

* does not include the 25 m (82 ft) thick coal zone on Ridge 7

sectioned and trenched on the southern slope of Lodgepole Ridge. The thicker, lower seam is some 45.7 m (150 ft.) above the basal Kootenay sandstone. The seam probably correlates with the 14.6 m (48 ft.) thick coal zone (designated as No. 1 Seam) as described on the West Ridge section.

The upper, thinner seam may correlate with the designated No. 2 Seam of the West Ridge section: the correlation possibility is suggested by:

- the similar stratigraphic distance between the two seams at both locales; i.e., 38.1 m (125 ft) and 54.9 m (180 ft)
- similar seam thicknesses; i.e., 8.2 m (27 ft) and 6.1 m (20 ft)

Aggregate thickness of coal exposed in the Lodgepole Ridge area is 21.9 m (72 feet).

7.3.3 WEST RIDGE

A relatively complete stratigraphic section was measured during the summer of 1977. Eight coal seams were trenched and identified in ascending order from No. 1 to 7A to 7B.

During 1978, two diamond core holes were drilled in the West Ridge area of the Lodgepole Project. Seams intersected in LP-D101 and LP-D102 have been correlated to seams sectioned and trenched during 1977.

Comparative seam thicknesses according to Seam No. designation, are presented in Figure 10. Thicknesses quoted refer to the gross coal zone interval and include non-carbonaceous partings within the "seams".

FIGURE 10

WEST RIDGE AREA
COMPARATIVE SEAM THICKNESSES ACCORDING
TO SEAM NO. DESIGNATION

1977 TRENCHING - SECTIONING PROGRAM		SEAM DESIGN	1978 DRILL PROGRAM			
			LP-D101		LP-D102	
TRENCH NO.	TH (m)		DEPTH* INTERVAL (m)	TH (m)	DEPTH* INTERVAL (m)	TH (m)
16	4.9	7B	42.2 - 46.0	3.8	34.0 - 35.6	1.6
15	7.6	7A	54.4 - 59.9	5.5	44.3 - 46.5 49.3 - 50.2	3.1
14	4.9	6	73.8 - 75.0	1.2	not present	
13	1.3	5	84.7 - 85.4	0.7	not present	
12	2.7	4	96.1 - 97.7	1.6	90.2 - 91.2	1.0
11	4.3	3	113.8 - 119.0	5.2	109.1 - 113.0	3.9
10	6.2	2	121.8 - 123.2	1.4	? TD : 126.5 m	?
9	14.6	1	180.8 - 194.4	13.6	–	–
–	–	–	264.1 - 264.4	0.3	–	–
–	–	?	325.6 - 328.8	3.2	–	–
			TD : 368.8 m			

* REFERENCE: BPB COAL LITHOLOGY
geophysical log

8 COAL QUALITY

Coal core recovery in LP-D101 was substantially higher than in LP-D102*. Because of the difference in coal recoveries, quality data has been based solely on LP-D101.

All designated coal seams (No. 1 thru to 7B), with the exception of Seam 6+, were sampled. In addition to the designated seams, an additional deep seam (325.6 to 328.8 m depth in LP-D101) was sampled.

Of the sampled units, all seams, excepting two, are low volatile bituminous coal. Seams 7A and 7B are medium volatile bituminous coal.

Weighted average analyses for the sampled units of LP-D101 follow:

SPECIFIC GRAVITY	% RESID MOISTURE	ASH % d.b.	VM % a.d.b.	F.S.I.	YIELD %
RAW	0.4	26.4	-	2.5	-
1.5 Float	0.8	9.1	19.2	4.0	52.4

Analytical results per sampled unit in LP-D101 and LP-D102 have been matched to their respective COAL LITHOLOGY geophysical logs (APPENDIX TWO ... LP-D101 & APPENDIX THREE ... LP-D102).

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* in LP-D101, the weighted average recovery in coal was 76%; in comparision, the weighted average recovery of coal in LP-D102 was 21%

+ the zone is a high ash unit; as reported in the core description, half of the 1.3 m interval (73.6 m to 74.8 m: LP-D101) is made up of shale bands.

9 COAL RESERVES

Coal reserves have yet to be determined in the Lodgepole Project area.

Computation of in-place coal reserves should be initiated after the next phase of exploration drilling. Drilling activity*, anticipated in 1979, will be aimed at confirming low-ratio, dip-slope, surface mineable coal reserves on the west slope of McLatchie Ridge (Coal Licence No. 492).

Present sub-surface information is limited to the two holes drilled in 1978 in the West Ridge area. The drill data basically correlates with the 1977, surface-measured West Ridge section. Additional structural disturbances, however, are suspected (Figure 8). Further drilling is required to:

- confirm suspected thrust fault(s)
- substantiate possible reserves' of the area

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* up to 6 holes may be drilled

10 CONCLUSIONS

Based on available data, the Lodgepole Project probably contains significant coal resources. The area of Coal License No. 492, located, in part, on the west slope of McLatchie Ridge, may be of particular interest; it may contain sizeable, low-ratio, dip slope, surface mineable coal reserves.

Subsurface data is limited; further drilling is imperative to enhance present data concerning:

- no. of seams
- thickness(es) of seam(s)
- coal quality
- structural disturbances
- stratigraphy

11 RECOMMENDATIONS

Further exploration activity in the Lodgepole Project area should include:

- exploration drilling in the area of Coal License 492 (lying in part on the west slope of McLatchie Ridge)
- road mapping of the 1978 cut-access; surveying, to determine elevations and coordinates, of footwalls and hanging walls of exposed coal seams would also be advantageous
- continued road mapping (as above) on new access to be cut
- continued geological mapping and hand trenching (to check continuity of coal seams) in the McLatchie Ridge area

The above recommendations, if carried out, should provide sufficient data to:

- correlate coal seams between McLatchie and West Ridges
- establish an initial set of structural cross-sections across the property
- determine a preliminary reserves estimate

APPENDIX ONE

COAL LICENSES HELD BY SHELL CANADA RESOURCES LIMITED
IN THE LODGEPOLE PROJECT AREA

LICENSE NO.	DATE	HECTARES±	ACRES±
490	May 16, 1975	259	640
491	May 16, 1975	71	175
492	May 16, 1975	247	610
493	May 16, 1975	259	640
494	May 16, 1975	259	640
495	May 16, 1975	259	640
6 Licenses		1354± hectares	3345± acres

K-SHELL COOKEPOLK 71(B)A

BORE HOLE DATA

APPENDIX 2 AND 3 -1978-

426
pt. 2 of 6

APPENDIX TWO

DRILL HOLE : LP-D101

NOTE: The core of LP-D101 was logged in the field without the geophysical COAL LITHOLOGY LOG. Minor variances were later noted when the geophysical log was to be matched to the core description*. The COAL LITHOLOGY LOG, aided by the core description, was independently interpreted for lithology. Lithologies, depth intervals and thicknesses, of the log and core description, were summarized into a tabular format. APPENDIX TWO contains, for drill hole LP-D101, a

- copy of the core description
- BPB : COAL LITHOLOGY LOG with interpretation of lithology
- tabulation of geophysical tops vs logged tops

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* in future programs, it is strongly recommended that the core be logged, in the field, using the geophysical COAL LITHOLOGY LOG; this hopefully will eliminate the minor variances and descrepancies.

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
0	15.4	15.4	CASING	0	15.8	15.8
15.4	15.7	0.3	SANDSTONE			
15.7	16.1	0.4	SILTSTONE	15.8	15.9	0.1
			SANDSTONE	15.9	17.9	2.0
16.1	16.7	0.6	SHALE			
16.7	17.4	0.7	SILTSTONE			
17.4	17.7	0.3	SHALY COAL	17.9	18.1	0.2
17.7	18.0	0.3	SHALE	18.1	18.3	0.2
18.0	18.5	0.5	SILTSTONE			
18.5	20.2	1.7	SHALE, silty			
20.2	21.1	0.9	SANDSTONE	18.3	20.7	2.4
21.1	21.5	0.4	SILTSTONE	20.7	21.0	0.3
21.5	22.0	0.5	SHALE	21.0	21.6	0.6
22.0	24.3	2.3	SANDSTONE	21.6	24.0	2.4
24.3	24.7	0.4	SHALE			
24.7	25.4	0.7	SILTSTONE			
			SHALE w/ minor COAL	24.0	25.6	1.6
25.4	25.6	0.2	SHALY COAL	25.6	26.1	0.5
25.6	25.9	0.3	SILTSTONE			
25.9	26.8	0.9	SHALE	26.1	27.6	1.5
26.8	29.4	2.6	SILTSTONE	27.6	28.9	1.3
			SHALE, silty	28.9	29.6	0.7
29.4	30.2	0.8	SANDSTONE	29.6	30.3	0.7
30.2	32.4	2.4	SILTSTONE	30.3	30.7	0.4
32.4	34.4	2.0	SHALE	30.7	34.8	4.1
34.4	34.8	0.4	SILTSTONE			
34.8	36.2	1.4	SANDSTONE			
36.2	39.6	3.4	SILTSTONE	34.8	38.5	3.7
39.6	41.5	1.9	SHALE	38.5	41.8	3.3
41.5	41.7	0.2	COAL, shaly	41.8	42.0	0.2
41.7	42.1	0.4	SHALE	42.0	42.4	0.4

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
42.1	43.0	0.9	COAL	42.4	43.3	0.9
43.0	43.5	0.5	SHALE	43.3	43.8	0.5
43.5	44.1	0.6	COAL, shaly	43.8	44.2	0.4
44.1	45.3	1.2	SHALE	44.2	45.5	1.3
45.3	46.0	0.7	COAL, shaly	45.5	46.1	0.6
			SHALE, silty	46.1	47.2	1.1
46.0	47.0	1.0	SILTSTONE			
			SHALE, silty w/ SS & SLTST	47.2	50.4	3.2
47.0	49.1	2.1	SANDSTONE			
49.1	50.3	1.2	SILTSTONE			
50.3	54.4	4.1	SHALE, silty	50.4	54.9	4.5
			SHALE and COAL	54.9	57.9	3.0
54.4	55.2	0.8	COAL, shaly			
55.2	56.4	1.2	SHALE			
56.4	56.7	0.3	COAL			
56.7	57.1	0.4	COAL, shaly			
57.1	58.3	1.2	COAL	57.9	60.2	2.3
58.3	59.0	0.7	SHALE, carbonaceous	60.2	60.4	0.2
59.0	59.8	0.8	COAL	60.4	60.5	0.1
59.8	60.3	0.5	SILTSTONE			
60.3	61.2	0.9	SANDSTONE			
61.2	62.3	1.1	SILTSTONE			
62.3	63.0	0.7	SANDSTONE			
63.0	63.3	0.3	SILTSTONE			
63.3	64.2	0.9	SANDSTONE			
64.2	64.7	0.5	SILTSTONE			
64.7	67.3	2.6	SANDSTONE	60.5	67.4	6.9
67.3	67.6	0.3	SHALE	67.4	67.7	0.3
67.6	68.0	0.4	SILTSTONE	67.7	68.0	0.3
68.0	70.5	2.5	SANDSTONE	68.0	70.6	2.6
70.5	73.4	2.9	SANDSTONE and SLTST interbedded	70.6	73.5	2.9

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
73.4	74.0	0.6	SHALE	73.5	74.0	0.5
74.0	74.3	0.3	COAL w/ Shale partings	74.0	74.4	0.4
74.3	74.9	0.6	SHALY COAL	74.4	74.8	0.4
74.9	75.4	0.5	SHALE	74.8	75.4	0.6
			SILTSTONE	75.4	84.6	9.2
75.4	84.6	9.2	SILTSTONE and Shales interbedded			
84.6	84.9	0.3	SHALY COAL			
84.9	85.1	0.2	SHALE			
85.1	85.5	0.4	COAL	84.6	86.2	1.6
85.5	85.9	0.4	SHALE			
85.9	86.5	0.6	COALY SHALE, silty	86.2	86.3	0.1
86.5	93.0	6.5	SANDSTONE			
93.0	96.1	3.1	SILTSTONE & SS interbeds	86.3	96.1	9.8
96.1	96.5	0.4	SHALY COAL			
96.5	96.9	0.4	SHALE			
			COAL ZONE (broken down into detail)	96.1	97.8	1.7
96.9	97.7	0.8	COAL			
97.7	102.5	4.8	SILTSTONE			
102.5	103.4	0.9	SANDSTONE			
103.4	108.1	4.7	SILTSTONE			
108.1	108.4	0.3	SHALE			
108.4	110.5	2.1	SILTSTONE	97.8	110.6	12.8
110.5	111.1	0.6	SANDSTONE	110.6	111.4	0.8
111.1	113.3	2.2	SILTSTONE	111.4	113.8	2.4
113.3	113.7	0.4	SHALE	113.8	113.9	0.1
			COAL ZONE (broken down into detail)	113.9	119.2	5.3
113.7	114.1	0.4	SHALY COAL			
114.1	114.7	0.6	SHALE			
114.7	115.3	0.6	SHALY COAL			

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
115.3	116.8	1.5	COAL			
116.8	117.2	0.4	SHALY COAL			
117.2	117.9	0.7	COAL			
117.9	118.2	0.3	SHALY COAL			
118.2	119.0	0.8	COAL			
119.0	119.8	0.8	SILTSTONE			
			SHALE	119.2	119.8	0.6
119.8	120.5	0.7	COALY SHALE	119.8	120.5	0.7
120.5	121.3	0.8	SHALE...minor coal	120.5	121.1	0.6
121.3	121.8	0.5	COALY ZONE	121.1	121.8	0.7
121.8	122.2	0.4	COAL			
122.2	122.6	0.4	SHALY COAL			
122.6	123.2	0.6	COAL	121.8	123.2	1.4
123.2	126.3	3.1	SHALE...w/ minor coal	123.2	126.2	3.0
126.3	126.7	0.4	SHALY COAL	126.2	126.5	0.3
126.7	127.7	1.0	COALY SHALE	126.5	127.6	1.1
127.7	128.1	0.4	SHALE	127.6	128.0	0.4
			SANDSTONE	128.0	130.6	2.6
128.1	131.6	3.5	SILTSTONE	130.6	131.5	0.9
131.6	132.8	1.2	SHALE	131.5	132.3	0.8
132.8	133.4	0.6	SILTSTONE			
133.4	143.4	10.0	SANDSTONE	132.3	143.5	11.2
143.4	144.2	0.8	SHALE	143.5	144.3	0.8
144.2	147.4	3.2	SANDSTONE ...shaly in places	144.3	146.8	2.5
			SHALE	146.8	149.0	2.2
147.4	149.4	2.0	SILTSTONE	149.0	149.5	0.5
			SANDSTONE	149.5	161.2	11.7
			SILTSTONE	161.2	162.6	1.4
149.4	170.8	21.4	SANDSTONE	162.6	170.7	8.1
170.8	180.7	9.9	SHALE	170.7	180.2	9.5
			COAL ZONE	180.2	194.2	14.0

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
180.7	181.7	1.0	COAL			
181.7	182.2	0.5	SHALY COAL			
182.2	186.8	4.6	COAL			
186.8	188.4	1.6	SHALY COAL			
188.4	189.7	1.3	COAL			
189.7	190.1	0.4	SHALY COAL			
190.1	191.0	0.9	COAL			
191.0	192.1	1.1	SHALY COAL...sandy...?			
192.1	192.8	0.7	COAL			
192.8	193.9	1.1	SHALY COAL			
193.9	194.4	0.5	Carbonaceous SHALE			
194.4	196.0	1.6	SILTSTONE			
196.0	196.8	0.8	SHALE			
196.8	197.7	0.9	SILTSTONE			
197.7	202.0	4.3	SHALE, silty	194.2	204.2	10.0
			CLAY...FAULT GOUGE	204.2	205.2	1.0
202.0	206.8	4.8	SANDSTONE	205.2	207.5	2.3
206.8	207.4	0.6	SILTSTONE			
207.4	207.8	0.4	SANDSTONE			
207.8	210.3	2.5	SILTSTONE	207.5	210.2	2.7
210.3	222.8	12.5	SANDSTONE	210.2	231.9	21.7
222.8	224.2	1.4	SILTSTONE			
224.2	232.3	8.1	SANDSTONE			
232.3	233.2	0.9	SHALE	231.9	233.4	1.5
233.2	251.4	18.2	SANDSTONE	233.4	251.1	17.7
			SHALE	251.1	251.4	0.3
251.4	251.7	0.3	SILTSTONE			
251.7	255.0	3.3	SANDSTONE	251.4	254.7	3.3
255.0	256.3	1.3	SHALE	254.7	256.0	1.3
256.3	264.1	7.8	SANDSTONE, silty and shaly in places	256.0	263.4	7.4

1978

LODGEPOLE

DRILL HOLE: LP-D 101

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
264.1	264.5	0.4	COAL	263.4	264.0	0.6
264.5	266.0	1.5	SHALE	264.0	266.3	2.3
266.0	270.1	4.1	SANDSTONE	266.3	269.8	3.5
			SHALE w/ fine grain SS	269.8	272.0	2.2
270.1	272.1	2.0	SILTSTONE w/ fine grain SS			
272.1	296.7	24.6	SANDSTONE	272.0	296.9	24.9
269.7	298.5	1.8	SILTSTONE & Sandstone	296.9	300.4	3.5
298.5	300.8	2.3	SILTSTONE			
300.8	319.0	18.2	SANDSTONE	300.4	318.5	18.1
319.0	320.5	1.5	SHALE	318.5	322.4	3.9
320.5	321.0	0.5	CARBONACEOUS SHALE			
321.0	322.0	1.0	SILTSTONE			
322.0	325.6	3.6	SANDSTONE	322.4	324.9	2.5
325.6	328.8	3.2	COAL ZONE	324.9	328.3	3.4
328.8	364.8	36.0	SANDSTONE	328.3	362.6	34.3
364.8	368.8	4.0	SHALE, sandy and silty	362.6	368.8	6.2
	TD				TD	

APPENDIX THREE

DRILL HOLE : LP-D102

NOTE: The core of LP-D102 was logged in the field without the geophysical COAL LITHOLOGY LOG. Minor variances were later noted when the geophysical log was to be matched to the core description*. The COAL LITHOLOGY LOG, aided by the core description, was independently interpreted for lithology. Lithologies, depth intervals and thicknesses, of the log and core description, were summarized in a tabular format. APPENDIX THREE contains, for drill hole LP-D102, a

- copy of the core description
- BPB : COAL LITHOLOGY LOG with interpretation of lithology
- tabulation of geophysical tops vs logged tops

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* in future programs, it is strongly recommended that the core be logged, in the field, using the geophysical COAL LITHOLOGY LOG; this hopefully will eliminate the minor variances and descrepancies.

Golder Associates' Hardness Code	Field Estimation of Hardness
R5	Requires many blows of geological hammer to break.
R4	Requires a few blows of geological hammer to break.
R3	Breaks under single blow of geological hammer.
R2	0.5 cm indentations with sharp end of geological pick.
	Too hard to cut by hand into triaxial specimen.
R1	Crumbles under firm blows of geological pick.
S5	May be broken in the hand with difficulty.
S4	Indented by fingernail.
S3	Cannot be moulded in fingers.
S2	Moulded with strong pressure of fingers.
S1	Easily moulded with fingers.

Rock Quality Designation

The Rock Quality Designation or "RQD" is the total length of solid core pieces exceeding 10 cm. in length divided by the run length. RQD is usually expressed as a percentage, with the histogram shaded from the left.

All fractures, natural and mechanical, are considered in the calculation, and core lengths are measured from the centre of the fracture along the core axis.

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - NORTH SLOPE

DATE	
BEGIN	1978-09-11
END	1978-09-21

HOLE No. LP - D 102

PAGE 1 OF 5

HOLE PARTICULARS

LOCATION	Ref. Meridian 117°; 5465071.98m N 664449.30 m E		
ELEVATION	2086.6m ASL	HOLE BEARING (AZ°)	110°
TOTAL DEPTH	126.5 m	HOLE ANGLE (°)*	65°

LOGGING

LOGS RUN	GAMMA-DENSITY, NEUTRON, BRD
LOGGED BY	BPB
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		HQ
TOTAL	CORE RECOVERED	
	LENGTH CORED	
	CORE RECOVERY	%

EXAMINATION

LOG USED	-
No. OF SEAMS SAMPLED	3
EXAMINER (S)	JH, JF, DWF
DATE	

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % o.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
1	18.0	0	18.0		CASING												Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		18.0	19.6	1.6	SLTST	broken core, dark grey to black;	85										RQD: 0
		19.6	35.2	15.6	SS	initial 3.5 m fine to medium gray, somewhat											R4
2	21.6					laminated; coarse grain to very coarse grain; salt											
3	24.8					and pepper, core broken to 30 m; the core											
4	29.7					is very broken from 33.5 to 35.1 m	80										
5	33.1					● joint at 33m : 15°											
		35.2	36.3	1.1	SLTST	fine grain; black; somewhat shaly at mid interval; at base grading to very fine grain sandstone											
6	39.2	36.3	41.8	5.5	SS	fine grain; with siltstone interbeds; at 39.8 m depth, calcite infilled fractures parallel to core axis											R3
						NOTE: interval 33.5 - 37.5 m ... RQD: 0											
						37.5 - 38.1 m ... RQD: 50											
						38.1 - 39.2 m ... RQD: 0											
						39.2 - 41.1 m ... RQD: 50											
						● jointing at 15° to core axis											
		41.8	42.6	0.8	SHALE	carbonaceous at base; black; broken core; recovery: 38%											
		42.6	46.6	4.0	COAL	recovery: recovered/cut: 0.37m/4.0m = 9%			1	0.88	5.61	22.97			39.76	6.5	
						NOTE: there was severe circulation problems on this hole below the drilled depth of 34 m ● that core recovered: 44.3 - 46.3 m ?											
7	46.6	46.6	50.5	3.9	SHALE	and siltstone interbedded; more shaly at 48.5 - 50 m depth; coal stringer at 48.8 - 48.9 m depth				NOTE: All quality data is based on washed coal @ S.G. = 1.5							RQD: 10 R3
8	51.3	50.5	52.5	2.0	SS	very fine grain; dark grey; grading to siltstone at base of interval											
9	54.9	52.5	56.2	3.7	SLTST	fine grain; dark grey; with minor sandy intervals throughout interval from 53.7 - 54.9m; core is broken into larger polygonal fragments ... breaking along joint systems at 17° 55° 8° (to the 17° system)											RQD: 18

UNITS USED m☒ ft☐

* : MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

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

• RQD — ROCK QUALITY DESIGNATION (%)

HOLE No. LP - D 102

FILE No. 8A-211

CROWS ..ST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - NORTH SLOPE

HOLE No. LP - D 102 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)	BEDDING ANGLE (▲)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
...	cont.	52.5	56.2	3.7	SLTST	• jointing planes are weathered and iron stained											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		56.2	56.3	0.1	SHALE	black; sheared to pulverized; contains minor coaly debris											RQD: 0
		56.3	57.3	1.0	SHALE	silty; black; contains minor coaly debris; slickensided ; joints: 5°											RQD: 73; R3
		57.3	58.0	0.7	SLTST	olive grey; fine grain; calcitic cement; calcite infilling in fractures											RQD: 50
		58.0	59.8	1.8	SHALE	black; sandy intervals; calcite cement; calcite infilling in fractures; minor coaly debris; increasing sand content near base of interval;; joints: 85° ... (10) Bedding Plane?											RQD: 80; R3
10	58.5																
		59.8	62.2	2.4	SLTST	grey; very fine grain; iron stained along fractures; calcite infilling along fractures; core badly broken from: 60.2 - 60.5 m 61.9 - 62.2 m some good cross-bedding; joints: 35° (5) 10° 75° (4) calcite											
						coaly debris infills											RQD: 40; R3
11	62.2	62.2	62.5	0.3	SLTST	grey; very fine grain; iron stained along fractures; badly broken											
		62.5	63.1	0.6	SHALE	black; slickensided ; core badly broken and rubbly; core contains coaly debris											
12	65.9	63.1	72.4	9.3	SHALE	silty; grey; very fine grain; calcareous cement											RQD: 30; R3
13	70.0					calcite infilling in fractures; iron stain in fractures; ; jointing: parallel to axis 18° to axis 35° to axis (calcite) core broken: 67.6 - 67.8 m 69.9 - 70.2 m											
		72.4	73.9	1.5	SS	grey; fine grain; good cross-bedding; bedding defined by laminations of 85°; joints 85° ...(7)	85										
14	73.9					bedding plane joints; joint 40°; calcitic cement											
		73.9	74.9	1.0	SS	As above; joint system @ 18°..2, 1 is calcite filled; at 74.7m, ..04m silty soft shale	85										
		74.9	76.3	1.4	SS	fine to medium grained laminated brown/dark grey; calcitic cement; calcite infilled fractures; core badly broken and rubbly	75										RQD: 10; R3

UNITS USED: m☒ ft☐

† •R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 102 CONTINUED

CROW. .ST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - NORTH SLOPE

HOLE No. LP - D 102 CONTINUED

BOX No	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		76.3	79.3	3.0	SS	fine grain; grey to beige; calcitic cement; cal-	75										Flow of Water Yes☐ or Gas? No☐ Indicate Depth
15	77.5					cite infilling in some fractures; bedding lam-											
						inations well defined by colour contrast; iron											
						staining in some fractures; joint systems											
						• 28° (2)											
						• 0° (3)											
						very minor carbonaceous material											
		79.3	80.2	0.9	-SS	medium to fine grain; grey to buff; calcitic											
						cement; calcite infills; joint system at	80										RQD: 100; R3
						• 10° (calcite infilling)											
						• 80° (2)											
		80.2	80.50	0.3	SS	As above; core badly broken											
		80.5	82.3	1.8	SS	fine to medium grain; grey; calcitic cement;	60										RQD: 93; R3
16	81.6					calcite infilling in some fractures; minor	90										
						coaly debris; strong and very homogeneous;											
						joint system at • 10° (calcite infilling)											
						• 25°											
		82.3	84.7	2.4	SS	As above but core is much more broken											RQD: 11; R3
		84.7	85.5	0.8	SS	fine to medium grain; grey; calcite infilling											RQD: 0; R3
						and iron stained along fracture surfaces; core											
						badly broken to rubbly; increasing coaly debris											
						to base of interval											
17	85.5	85.5	85.7	0.2		As above											
		85.7	88.4	2.7	SHALE	silty; beige to grey; core very badly broken											
						except for upper 0.6 m; occasional sandy lam-											
						ination; jointing at 0°											
		88.4	88.8	0.4	SHALE	black; iron stained on fractures; core badly											
						broken; minor coaly debris at base of interval											RQD: 0
18	88.8	88.8	89.2	0.4	SHALE	black; calcite infilled fractures; minor coaly											
						debris; joint system @ 15° ... calcite infilled											RQD: 25; R3
		89.2	90.0	0.8	SHALE	as above, but extremely broken and rubbly											
		90.0	90.9	0.9	COAL	recovery% = recovered/cut = .33m/0.9m = 37%			2		0.96	6.03	22.78		8	64.71	
						of the coal recovered, upper 0.17m bright,											
						banded coal; coal core appears intact; Lower					NOTE:	All quality data is based					
						0.16 m is ground and pulverized						on washed coal at S.G.: 1.5					
		90.9	91.3	0.4	SHALE	black; carbonaceous in lower half; grading to											RQD: 25; R3
						sandy at top of interval											

UNITS USED · m☒ ft☐

† •R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 102 CONTINUED

CROWS[illegible]ST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - NORTH SLOPE

HOLE No. LP - D 102 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)	▲ BEDDING ANGLE (°)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS*
19	93.2	91.3	96.1	4.8	SLTST	very fine grain; grey; iron stained along fractures; calcitic cement and calcite infilling along fractures; occasional sandy laminations and sandstone-siltstone interbeds; joint systems at: 10° (3) 40° (3..some calcite infilled) at 93.3 - 94.4 m: soft, pliable, clay	80											Flow of Water Yes☐ or Gas? No☐ Indicate Depth RQD: 32; R3
20	96.7	96.1	97.4	1.3	SLTST	very fine grain; beige to grey; calcitic cement; core is extremely broken and rubbly											RQD: 0; R3
		97.4	99.4	2.0	SLTST	grading to shaly at base of interval; calcitic cement; calcite infilling in some fractures; some fractures have surfaces that are iron stained; jointing at: • 50° • 20° (iron stained..2) slickensides along some joints											RQD: 51; R3
		99.4	100.0	0.6	SHALE	black; badly broken; minor carbonaceous debris near base of interval											
		100.0	100.2	0.2	COAL	Recovered: 0.12/0.2 - 60%: dull; minor bright bands; minor pyritic inclusions											R3
21	100.2	100.2	102.0	1.8	SHALE	black; lower 0.5 m of interval grading to silty; at 101.2 m, 0.1 m coaly and carbonaceous material badly broken and crushed; at 101.5 - 101.7m core broken and badly slickensided; calcite cement and infilling; joints at • 40° • 75° (?..bedding plane)											RQD: 15; R3
22	104.1	102.0	104.5	2.5	SS/SLTST	interbedded; very fine grain to fine grain; beige to grey; calcitic cement; calcite infilling in some fractures; some fractures iron stained; good bedding laminations; joint systems at • 30° (calcite infilled) • 10° • 75° (6..?Bedding plane)	75										RQD: 37; R3
		104.5	106.4	1.9	SLTST	shaly; grading to shale at top of interval; beige to grey; calcitic cement; calcite infilling of fractures; lower 0.4 m badly broken; joint systems at • 80° (7..?Bedding plane) • 70° (2)											RQD: 0; R3
		106.4	107.9	1.5	SHALE	black; minor carbonaceous material; minor slickensides; core broken											RQD: 11

UNITS USED: m☒ ft☐

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

*RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 102 CONTINUED

CROW_ .EST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - NORTH SLOPE

HOLE No. LP 102 D 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)	BEDDING ANGLE (°) ▲	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b	F.C. % a.d.b	F.S.I.	% Yield	REMARKS †
		107.9	108.8	0.9	SHALE	coaly; core recovered/core cut = 0.8m/0.9m = 89% recovery; core badly broken; rubbly; slickensided			3	NOTE:	1.01	82.27			0		Flow of Water Yes☐ or Gas? No☐ Indicate Depth
											Sample 3 Quality data is based on the raw sample						ROD: 0
		108.8	109.7	0.9		No recovery (may be coal?)											
23	109.7	109.7	110.9	1.2	COAL	core recovered/core cut = 1.0m/1.2m = 83% recovery: 0.30m; sheared & pulverized; 0.14m; soft, sheared, pulverized; 0.20m; sheared, pulverized, soft; 0.23m; sheared, soft, (banded?); 0.13m; pulverized, sheared, soft			4	NOTE:	0.80	2.84	22.03		5.5	89.28	
											Sample 4 quality data is based on washed coal at S.G.: 1.5						
		110.9	112.6	1.7	COAL ?	note on marker block: "soft coal", no recovery											
		112.6	114.6	2.0	SHALE	black; minor silty intervals at 114.3m, 0.1m soft, pliable clay/shale; core badly broken; joint systems at • 30° (4) • 75° (4..bedding planes)											ROD: 5; R3
		114.6	115.2	0.6	SS	very fine grain; grey; calcareous cement; calcite infilling in fractures; minor carbonaceous debris; core broken; joint systems at • 20° • 30°											
		115.2	115.5	0.3	COAL	shaly; core recovered/core cut = 0.13m/0.30m = 43% recovery; core badly broken to pulverized											
24	115.7	115.5	115.8	0.3	SHALE	black; minor coaly debris											ROD: 60; R3
		115.8	119.3	3.5	SLTST	very fine grain; dark grey to black; calcareous cement; calcite infilling in some fractures; iron stained on some fracture surfaces; joint systems at • 05° (3) c some calcite filling • 85° (6..bedding planes?) recovery at 117.7-118.9m is badly broken (0.15m core recovered)											ROD: 10; R3
25	121.1	119.3	121.7	2.4	SS	very fine grain to fine grain; grey to off-white; calcareous cement; calcite infilling in fractures; good cross-bedding; upper 0.4 m of core homogeneous; joint systems at: • 80° (9..some calcite infilling; bedding plane joints (?)) • 10° (calcite infilled)											ROD: 77; R3
		121.7	126.5	4.8	SHALE	black; minor carbonaceous debris; core badly broken and rubbly, especially from 123.4-126.5m											
		END OF HOLE				(abandoned due to poor hole conditions)											
						Sept. 21/78 DWF											

UNITS USED: m☒ ft☐

† :•R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D CONTINUED 102

FILE No 8A-212

1978

LODGEPOLE

DRILL HOLE: LP-D 102

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
0	18.0	18.0	CASING	0	18.0	18.0
			SILTSTONE	18.0	19.6	1.6
18.0	32.7	14.7	SANDSTONE	19.6	35.2	16.4
32.7	32.9	0.2	COAL			
32.9	34.1	1.2	SANDSTONE			
34.1	34.3	0.2	COAL			
34.3	34.7	0.4	SHALY COAL			
34.7	35.4	0.7	COAL			
			SILTSTONE	35.2	36.3	1.1
35.4	36.3	0.9	SHALY COAL			
			SANDSTONE	36.3	41.8	5.5
36.3	36.6	0.3	SILTSTONE			
36.6	37.2	0.6	COALY SHALE			
37.2	39.2	2.0	SILTSTONE			
39.2	39.6	0.4	Coaly SHALE			
39.6	40.8	1.2	SANDSTONE			
40.8	41.1	0.3	COALY SHALE			
41.1	41.8	0.7	SILTSTONE			
41.8	42.8	1.0	SANDSTONE			
42.8	44.3	1.5	SILTSTONE			
			SHALE	41.8	42.6	0.8
44.3	45.2	0.9	COAL	42.6	46.6	4.0
45.2	45.7	0.5	SHALY COAL			
45.7	46.3	0.6	COAL			
46.3	48.5	3.1	SHALE & SILTSTONE interbedded	46.6	50.5	3.9
48.5	48.8	0.3	COALY SHALE			
48.8	49.4	0.6	SILTSTONE			
49.4	49.7	0.3	COAL			
49.7	50.3	0.6	SILTSTONE			
50.3	51.4	1.1	SHALE			
			SANDSTONE	50.5	52.5	2.0

1978

LODGEPOLE

DRILL HOLE: LP-D 102

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
51.4	51.9	0.5	SILTSTONE			
51.9	52.1	0.2	COALY SHALE			
52.1	56.5	4.4	SILTSTONE w/ sandy intervals	52.5	56.2	3.7
56.5	57.5	1.1	SHALE	56.2	57.3	1.1
			SILTSTONE	57.3	58.0	0.7
				58.0	59.8	1.8
57.5	62.0	4.5	SANDSTONE			
62.0	62.6	0.6	SILTSTONE	59.8	62.5	2.7
62.6	64.1		SHALE	62.5	63.1	0.6
			SHALE, silty	63.1	72.4	9.3
64.1	64.6	0.5	SANDSTONE			
64.6	65.2	0.6	SHALE			
65.2	66.1	0.9	SILTSTONE			
66.1	68.0	1.9	SANDSTONE			
68.0	68.8	0.8	SHALE			
68.8	69.9	1.1	SANDSTONE			
69.9	72.4	2.5	SILTSTONE			
72.4	85.9	13.5	SANDSTONE	72.4	85.7	13.3
			SHALE, silty	85.7	90.0	4.3
85.9	90.2	4.3	SILTSTONE			
90.2	91.2	1.0	COAL	90.0	90.9	0.9
			SHALE	90.9	91.3	0.4
			SILTSTONE	91.3	99.4	8.1
			SHALE	99.4	100.0	0.6
91.2	99.9	8.7	SANDSTONE			
99.9	100.2	0.3	SILTSTONE	100.0	100.2	0.2
100.2	100.7	0.5	SHALY COAL			
			SHALE	100.2	102.0	1.8
100.7	101.8	1.1	COALY SHALE			
101.8	102.2	0.4	SILTSTONE			
102.2	102.6	0.4	COALY SHALE			

1978

LODGEPOLE

DRILL HOLE: LP-D 102

GEOPHYSICAL TOPS vs LOGGED TOPS

September, 1978

BPB COAL LITHOLOGY LOG			LITHOLOGY DESCRIPTION	IN-FIELD EXAMINATION (marker blocks)		
INTERVAL		TH		INTERVAL		TH
from	to	(m)		from	to	(m)
102.6	107.7	1.1	SANDSTONE/SILTSTONE	102.0	104.5	2.5
			SILTSTONE	104.5	106.4	0.9
			SHALE	106.4	107.9	1.5
107.7	108.0	0.3	COALY SHALE	107.9	108.8	0.9
			NO CORE RECOVERED	108.8	109.7	0.9
108.0	109.1	1.1	SANDSTONE			
109.1	113.0	3.9	COAL ZONE	109.7	112.6	2.9
			SHALE	112.6	114.6	2.0
113.0	116.2	3.2	SILTSTONE, w/ Sandstone			
116.2	118.0	1.8	SANDSTONE	114.6	115.2	0.6
BOTTOM OF LOGGED			COAL	115.2	115.5	0.3
INTERVAL			SHALE	115.5	115.8	0.3
			SILTSTONE	115.8	119.3	3.5
			SANDSTONE	119.3	121.7	2.4
			SHALE	121.7	126.5	4.8
					TD	

Golder Associates' Hardness Code	Field Estimation of Hardness
R5	Requires many blows of geological hammer to break.
R4	Requires a few blows of geological hammer to break.
R3	Breaks under single blow of geological hammer.
R2	0.5 cm indentations with sharp end of geological pick.
	Too hard to cut by hand into triaxial specimen.
R1	Crumbles under firm blows of geological pick.
S5	May be broken in the hand with difficulty.
S4	Indented by fingernail.
S3	Cannot be moulded in fingers.
S2	Moulded with strong pressure of fingers.
S1	Easily moulded with fingers.

Rock Quality Designation

The Rock Quality Designation or "RQD" is the total length of solid core pieces exceeding 10 cm. in length divided by the run length. RQD is usually expressed as a percentage, with the histogram shaded from the left.

All fractures, natural and mechanical, are considered in the calculation, and core lengths are measured from the centre of the fracture along the core axis.

CRO WEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE: SOUTH SLOPE

DATE		
BEGIN	1978-08-26	
END	1978-09-09	

HOLE No. LP - D 101

Pg. 1 OF 21

HOLE PARTICULARS

LOCATION	Ref Meridian 117°, 5 464 647.60 m N 663 806.01 m E		
ELEVATION	1931.8m ASL	HOLE BEARING (AZ°)	110°
TOTAL DEPTH	368.8 m	HOLE ANGLE (°)*	61°

LOGGING

LOGS RUN	FE, Gamma, LSD, Neutron, Cal, BRD, Neutron, Cal, BRD,
LOGGED BY	Verticality BPB
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		HQ
TOTAL	CORE RECOVERED	
	LENGTH CORED	
	CORE RECOVERY	%

EXAMINATION

LOG USED	
No. OF SEAMS SAMPLED	8
EXAMINER (S)	JH, DWF, AN
DATE	

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
						NOTE: Top 15.8 m (52 feet) drilled with tri-cone rock bit...surface casing set; cored interval begins at ~15.8 m												Flow of Water Yes☐ or Gas? No☐ Indicate Depth
1	15.8	15.8	15.9	0.1	SLTST	very fine grain; black; core is badly broken											R4; RQD: 29
		15.9	17.1	1.2	SS	very fine grain; grey to dark; calcite infillings in fractures	75										R4
		17.1	17.4	0.3	SS	very fine grain to fine grain; grey to dark grey	70										R4; RQD: 32
		17.4	17.5	0.1	SS	very fine grain; dark grey; core is badly broken											R4
		17.5	17.6	0.1	SS	fine grain; white grey to dark grey; cross-bedded	70										R4
		17.6	17.7	0.1	SS	fine grain; dark grey to black	80										R4
		17.7	17.9	0.2	SS	fine grain; dark grey to black: core is badly broken	90										R4
		17.9	18.0	0.1	COAL	bright; friable; badly crushed											
		18.0	18.1	0.1	SH/COAL	interbedded; black; core is badly broken											R3
		18.1	18.3	0.2	SHALE	black; minor calcite infillings											R3
		18.3	18.4	0.1	SS	very fine grain; black to grey; calcite infillings in fractures											
		18.4	19.0	0.6	SS	very fine grain; black to grey; massive											R4; RQD: 71
		19.0	19.2	0.2	SS	fine grain; interbedded white grey to black; cross-bedded; lower half interval of core is broken; slickensided surfaces	90										R4
		19.2	20.0	0.8	SS	very fine grain; black to grey; calcite infillings in fractures											
2	20.0	20.0	20.7	0.7	SS	very fine grain; black to grey; calcite infillings in fractures											R4; RQD: 63
		20.7	21.0	0.3	SLTST	very fine grain; black; grading to a black shale at bottom of interval; unit not as hard as sandstone interval above it											R3

UNITS USED mEXHO

* : MEASURED FROM THE HORIZONTAL PLANE

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

• RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101

FILE No BA-211

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (°) ▲	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
		21.0	21.1	0.1	SHALE	black; with minor very thin coaly bands (ie, < 0.01 m thick) R3	80										Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		21.1	21.6	0.5	SHALE	black; minor coaly debris; pyrite infilling in fractures											R3
		21.6	21.6	0.1	SHALE	black; minor coaly debris; core is badly broken and rubbly											
		21.6	23.0	1.4	SS	fine grain; grey to black; calcareous cement; cross-bedded; very minor coaly debris throughout											R4
		23.0	24.0	1.0	SS	fine grain; grey to black; calcareous cement; calcite infillings in fractures; cross-bedded											R4; RQD: 63
3	24.0	24.0	24.4	0.4	SHALE	black; very minor coaly debris throughout; calcareous cement; calcite infillings in fractures											R4
		24.4	24.5	0.1	SH/COAL	interbedded; coaly units ≥ 0.02 m thick											
		24.5	25.6	1.1	SHALE	black; minor coaly debris; calcareous cement; minor pyrite infillings in fractures; calcite infillings in fractures											R3; RQD: 51
		25.6	26.1	0.5	SH/COAL	interbedded; black; coal core at top of interval is badly crushed; coaly intervals are ≤0.10 m thick; calcareous cement											R3
		26.1	26.7	0.6	SHALE	with minor coal; black; calcareous cement; calcite infillings in fractures; core is badly broken											R4; RQD: 35
		26.7	27.6	0.9	SHALE	with minor coaly debris; black; calcareous cement; core is continous except for a 0.13 m rubble interval 0.47 m below top of unit											R3
4	28.1	27.6	28.9	1.3	SLTST	very fine grain; black; calcite infillings in fractures; calcareous cement											R3
		28.9	29.1	0.2	SHALE	dark brown to black; core is badly broken and rubbly											R3
		29.1	29.6	0.5	SHALE	black; core is badly broken and rubbly											RQD: 0
		29.6	30.3	0.7	SS	fine grain; grey to beige; calcareous cement; calcite infilling in fractures; unit is softer and more silty at top of interval											
		30.3	30.7	0.4	SLTST	fine grain; grey to black; calcareous cement: core is broken and rubbly											R3; RQD: 59

UNITS USED: m☑ ft☐

† :•R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (▲)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b	F.C. % a.d.b	F.S.I.	% Yield	REMARKS †
5	32.14	30.7	32.9	2.2	SHALE	black; calcareous cement; calcite infilling in fractures; minor coaly debris within interval; R4; RQD: 41											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		32.9	33.5	0.6	SHALE	with coal; black; % of coaly debris increases with depth											R3
		33.5	34.8	1.3	SHALE	with coal; black; coal bands <0.02 m thick											R3; RQD: 48
		34.8	35.1	0.3	SLTST	fine grain; black; minor pyrite along fracture planes; minor coaly debris within interval											R3
6	36.3	35.1	36.4	1.3	SLTST	fine grain; black; minor coaly debris throughout interval	70										R3; RQD: 73
		36.4	37.4	1.0	SLTST	fine grain; black; slightly calcareous cement; evidence of slickensiding near base of interval											
		37.4	38.0	0.6	SLTST	fine grain; black; slightly calcareous cement; minor coaly debris throughout interval											R3; RQD: 62
		38.0	38.5	0.5	SLTST	fine grain; black; small fractures infilled with calcite											R3
		38.5	39.0	0.5	SHALE	black; small fractures infilled with calcite; slightly calcareous cement; core is broken and rubbly											
		39.0	39.9	0.9	SHALE	black; small fractures infilled with calcite; slightly calcareous cement											R3; RQD: 51
		39.9	40.1	0.2	SHALE	black; iron staining along fractures; core is broken and rubbly											R3
7	40.2	40.1	40.8	0.7	SHALE	black; core is broken and rubbly											
		40.8	41.1	0.3	SHALE	black; slickensided surface abundant...core is pulverized											
		41.1	41.6	0.5	SHALE	black; small fractures infilled with calcite; slightly calcareous cement; core is broken and rubbly											R3; RQD: 27
		41.6	41.8	0.2	SHALE	black											
		41.8	42.0	0.2	COAL												
		42.0	42.3	0.3	SHALE												R3
		42.3	42.3	0.1	COAL	STRINGER											

UNITS USED m☒ ft☐

† :R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWSNEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		42.3	42.4	0.1	SHALE												Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		42.4	42.4	0.1	COAL	dull											
		42.4	42.4	0.1	COAL	banded											
		42.4	42.5	0.1	SHALE												
		42.5	42.5	0.1	SHALY COAL				1		0.52	5.78	21.84		8	66.63	
		42.5	42.7	0.2	COAL	bright; hard											
		42.7	42.9	0.2	COAL	bright to bright banded											
		42.9	42.9	0.1	COAL	dull banded											
		42.9	43.3	0.4	COAL	bright; friable; separation with shale below is good											
		43.3	43.5	0.2	SHALE												
		43.5	43.5	0.1	COAL-SHALE-COAL STRINGER				2		0.19	79.96			0		
		43.5	43.8	0.3	SHALE												
		43.8	43.9	0.1	COAL												
		43.9	44.0	0.1	COALY SHALE				3		0.47	10.62	22.24		8.5	43.32	
		44.0	44.1	0.1	COAL	banded; hard											
		44.1	44.2	0.1	COAL	dull banded to dull; lower interval may be shaly(?)											
8	44.2	44.2	45.6	1.4	SHALE	black with minor coal stringers											
		45.6	45.7	0.1	COAL	recovered only 0.08 m											
		45.7	46.2	0.5	SH/COAL	recovered only 0.36m; observed litho and thickness: Th(m) 0.08 Coal; 0.04 Shale; 0.20 Coal; 0.02 Shale²; 0.02 Coal			NOTE: Samples' 1 and 3 quality data is based on washed coal at S.G.: 1.5 Sample 2 quality data is based on the raw sample								
		46.2	47.2	1.0	SHALE	dark grey; calcareous cement; increasing silty material at base of unit	70										R3
9	48.6	47.2	50.4	3.2	SHALE	silty interbedded with fine grain sandstone and siltstone; grey; core very solid											R3; RQD: 80

UNITS USED: m☒ ft☐

†: R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS' NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS'
10	52.7	50.4	54.9	4.5	SHALE	somewhat silty; dark grey to black; 0.3 m core broken into larger fragments at 52.8 m; fractured core at 53.3 m ; 100% recovery											Flow of Water Yes☐ or Gas? No☐ Indicate Depth RQD: 70; R3
		54.9	56.4	1.5	SH/COAL	recovered/cut: 0.40m/1.5m: 27% recovery; upper portion shale - then coal			NOTE:	Samples' 4 & 5 quality data is based on washed coal at S.G.: 1.5							
		56.4	57.9	1.5	COAL/SH	recovered/cut: 0.30m/1.50m: 20% recovery; mainly shale; carbonaceous; few coal fragments recovered in upper part of interval											
		57.9	58.0	0.1	COAL	recovered/cut: 0.14m/0.10m: 140% recovery; large fragments; some may belong to previous core cut (?); coal is bright banded											
		58.0	58.4	0.4	COAL	recovered/cut: 0.20m/0.40m: 50% recovery; bright ;broken			4		1.14	3.68	21.25		6.5	88.32	
		58.4	58.8	0.4	COAL	recovered/cut: 0.40m/0.40m = 100%; bright; soft; small fragments to pulverized											
11	59.1	58.8	59.4	0.6	COAL	recovered/cut: 0.60m/0.60m = 100% recovery; sheared to pulverized; 0.03 m harder coal in lower half; bright											
		59.4	60.2	0.8	COAL	recovered/cut: 0.80m/0.80m = 100% recovery; bright(?); sheared with some slightly harder thin sections			5		0.57	6.06	20.50		6.0	63.47	
		60.2	60.4	0.2	SHALE	carbonaceous			6		0.11	87.90			0		
		60.4	60.5	0.1	COAL												
12	62.5	60.5	64.0	3.5	SS	fine grain; grey to black; core is broken and rubbly											RQD: 18; R3-4
		64.0	65.5	1.5	SS	as above			NOTE:	Sample 6 quality data is based on the raw sample							R3
13	66.3	65.5	67.4	1.9	SS	fine grain; grey to black; calcareous cement; calcite infilling in fractures; cross-bedded	70										RQD: 85; R3
		67.4	67.5	0.1	SHALE	with minor coaly debris; black; slickensided surfaces; core is rubbly and broken											
		67.5	67.7	0.2	SHALE	black; calcareous cement; minor coaly debris within interval											
		67.7	68.0	0.3	SLTST	very fine grain; black; calcareous cement											
		68.0	70.6	2.6	SS	fine grain; dark grey; calcareous cement; calcite infilling of fractures; laminations present											

UNITS USED: m☒ ft☐

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

*RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROW'S NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG.	SAMPLE No	ANALYTICAL DATA MOIST % o.c.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
...Cont.		68.0	70.6	2.6	SS	at 69.22 - 69.95 m depth core is disturbed; slickensided; badly broken ; RQD: 21											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		70.6	70.7	0.1	SLTST												
14	70.7	70.7	71.6	0.9	SLTST	fine grain; dark grey to black; very homogeneous solid core	80										
		71.6	73.6	2.0	SLTST/SS	siltstone and fine grain sandstone interbedded; fine grain; dark grey with light grey sandstone laminations											R3; RQD: 93
		73.6	73.6	0.1	COAL STRINGER												
		73.6	74.0	0.4	SHALE	black; hard											
		74.0	74.2	0.2	COAL	banded											
		74.2	74.3	0.1	SHALE	black; hard											
		74.3	74.5	0.2	COAL	with minor black shale partings											
		74.5	74.6	0.1	SHALE	coaly											
		74.6	74.8	0.2	COAL	sheared with thin shale partings											
15	74.9	74.8	75.4	0.6	SHALE	with two minor coal stringers											
16	79.2	75.4	84.6	9.2	SLTST	fine grain; dark grey to black; interbedded with fine grain sandstone; very homogeneous; solid core ● 2 joints in close promimity at 77.7 m at 10° to core axis ● joint at 79.0 m at 12° to core axis	85										R3; RQD: 87
17	83.4																
		84.6	85.0	0.4	COAL	recovery: 50%; sheared to pulverized; bright											
		85.0	85.6	0.6	COAL	recovery: 42%; coal and shale fragments; shale is slickensided; coal is dull			7		0.67	6.48	20.84		8	27.19	
		85.6	86.2	0.6	COAL	recovery: 23%; flaky and sheared; very soft; shiny											
		86.2	86.3	0.1	SHALE	black; hard; silty			NOTE: Sample 7 quality data is based on washed coal at S.G. : 1.5								
18	88.2	86.3	96.1	9.8	SLTST/SH	siltstone and fine grain - medium grain sandstone interbedded; fine grain; dark grey with light grey sandstone laminations ● at 87.2m - 88.0m ..disturbance..broken core; 10 promiment fractures in this interval; measured from core axis: 1 set is at 40°;											R3; RQD: 55
19	92.1																
20	96.0																

UNITS USED: m☒ ft☐

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

•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS' NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % o.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
...	cont	86.3	96.1	9.8	SLST/SS	1 set is at 20°; 1 fracture lies ∥ along core axis; 1 fracture at 88° • at 89.2 m - 89.8 m ... 5 joints at 10° to core axis • at 92.1m ... 1 joint ... broken core • at 93.3 - 93.9 m ... 3 joints at 10° to core axis ... broken core • at 94.3 m ... joint at 10° • at 95.7 m ... minor movement ... slickensided surfaces											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		96.1	97.8	1.7	COAL	recovery: 91%											
						Th(m) Description											
						0.30 Shale and coal fragments											
						0.15 Coal; dull											
						0.05 Shale; carbonaceous											
						0.12 Coal; dull banded											
						0.14 Shale; hard; slickensided; black											
						0.05 Shaly Coal			8		0.41	9.20	19.44		7.5	43.42	
						0.18 Coal; flaky; soft; bright; sheared											
						0.04 Coaly Shale											
						0.34 Coal; bright banded; hardness S5											
						0.33 recovered 0.17 m only; coal; dull banded											
									NOTE	Sample 8 quality data is based on washed coal at S.G. = 1.5							
						NOTE: separation with floor → GOOD											RQD: 12
		97.8	99.3	1.5	SLTST	fine grain; grey to black; core is broken and rubbly											
		99.3	99.8	0.5	SLTST	fine grain; grey to black											
		99.8	99.9	0.1	COAL STRINGER												
21	100.3	99.9	100.6	0.7	SLTST	fine grain; grey to black • at 99.4 m shale stringer; slickensided; sheared to flakes • at 99.5 m joint at 30° to core axis • in total: interval has 9 joints											R3
		100.6	102.9	2.3	SLTST	as above • at 100.6 m ... disturbance ... broken core	70										
						• at 100.8 m ... coaly shale ... sheared ... flaky ... 0.03 m thick • at 102.1 m ... broken core											
		102.9	103.5	0.6	SLTST	fine grain; grey to black; very badly broken core; • at 103.2 m ... clay ... brown ... soft ... 0.03 m thick											
		103.5	104.3	0.8	SHALE	black; silty; slickensided; core broken into 0.02 - 0.04 m thick intervals; slickensided ~~planes at 60 - 70° to core axis~~											RQD: 0

UNITS USED: m☒ ft☐

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

• RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWSNEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (▲)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
22	104.4	104.3	110.6	6.3	SLTST	fine grain: dark grey to light grey; laminated with thin; fine grain, sandstone beds											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
23	108.5					• at 107.6m - 108.8 m ... interval is somewhat shaly											
						• at 106.6 m - 106.7 m ... 0.10 m coal											
						• at 105.5 m ——→	75										R3
		110.6	111.4	0.8	SS	fine grain; grey; minor fractures infilled with calcite											R4
24	112.8	111.4	113.8	2.4	SLTST	fine grain; dark grey; with fine grain, thin sandstone laminations; more shaly at bottom of interval											ROD: 100
		113.8	113.9	0.1	SHALE	black; carbonaceous; good separation with roof of coal seam			NOTE: Sample 9 quality data is based on washed coal at S.G. 1.5								ROD:0 ; R2
25	118.2	113.9	119.2	5.3	COAL	Recovered/Cut:3.80/5.27 m : 72% recovery											
						Th(m) Cut Lost — Description											
						0.40 0.15 Coal; lost core probably in mid interval; recovered 0.25 m											
						0.80 0.30 Coal:											
						0.13m Coal; dull; flaky											
						0.12m Shale; slickensided											
						0.25m Coal; shiny; flaky; sheared											
						0.70 0.12 Coal; lost core probably at top of interval											
						0.48m Coal; bright to bright-banded; good core but FRAGILE; soft and pyritic at top of interval			9		0.63	7.88	19.79		6.0	67.73	
						0.02m Shale											
						0.08m Coal; bright											
						1.50 0.20 0.05m Coal; bright banded; hard											
						0.15m Coal; bright banded; fragile											
						0.80m Coal; banded to bright banded; soft; fragile; crumbles to small fragments; good core											
						0.30m Coal; crushed; pulverized at base of unit											
						1.60 0.68 Coal; lost core probably at top of interval...lower segment of core relatively solid											
						0.05m Coal; fragments											
						0.08m Coal; dull banded											
						0.15m Coal; dull banded to banded											
						0.03m Coal; pulverized core											
						0.07m Coal; dull banded											
						0.03m Coal											
						0.02m Shale											

UNITS USED · m☒ ft☐

† :•R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	BEDDING ANGLE (▲)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
..	cont	115.0	119.2		COAL	Th(m)											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
						Cut Lost Description			9								
				cont		1.60 0.68 0.08m Coal											
						0.15m Coal; dull banded; hard											
						0.07m Coal; dull											
						0.14m Coal; dull banded			10		0.45	10.31	17.70		1.5	73.39	
						0.05m Coal; dull											
						0.25 0 0.07m Coal; dull banded											
						0.18m Coal; sheared											
		119.2	119.6	0.4	SHALE	black; hard; silty											R3
		119.6	119.8	0.2	SHALE	with thin coaly interbeds											
		119.8	120.1	0.3	COAL	with coaly shale interbeds											
		120.8	120.5	0.4	COAL	recovered/cut: 0.10m/0.40m: 25% recovered											
		120.5	120.7	0.2	SHALE				NOTE:	Samples' 10 & 11 quality data is based on washed coal at S.G.: 1.5							
		120.7	121.1	0.4	SH/COAL	interbedded; core fragmented											
		121.1	121.8	0.7	COALY	ZONE recovered/cut: 0.66m/0.70m = 94% recovery											
						Th(m) Description											
						Cut Lost											
						0.70 0.04 0.05m Coal: fragmented											
						0.03m Shale											
						0.09m Coaly Shale											
						0.08m Shale											
						0.03m Coal											
						0.08m Coaly Shale											
						0.12m Coal											
						0.05m Shale: carbonaceous											
						0.13m Coal: banded											
26	122.6	121.8	123.2	1.4	COAL	here 1.5 m of core was recovered but the block markers indicate an interval of 1.3 m: 121.8 m (399.5 ft) to 123.1 m (404 ft); error?; 1.4 m coal - with a few shale partings			11		0.27	9.63	18.35		5.0	67.58	
						• 0.10 m of fissile shale below coal seam											
		123.2	125.9	2.7	SHALE	with minor, thin coal stringers											RQD: 10
		125.9	126.0	0.1	COAL												
		126.0	126.3	0.2	SHALE												
		126.3	126.5	0.2	COAL	sheared											
27	126.8	126.5	127.1	0.6	SH/COAL	recovered/cut: 0.40m/0.60m = 67% recovery											

UNITS USED: m☒ ft☐

† :•R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CRO.. . NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
cont...		126.5	127.1	0.6	SH/COAL	Th(m) Description 0.30 Shale 0.10 Coal; sheared											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		127.1	127.6	0.5	SH/COAL	recovered/cut: 0.40m/0.50m: = 80% recovered Th(m) Description 0.07 Shale; slickensided 0.14 Coal 0.05 Shale 0.02 Coal 0.12 Shale											RQD: 16
		127.6	128.0	0.4	SHALE	black; somewhat disturbed at base of interval											
		128.0	130.6	2.6	SS	fine grain to very fine grain; grey • at 128.0 - 129.2 m ... 4 - 5 fractures running at 15° to core axis and intersecting one another	90										
28	130.8	130.6	131.5	0.9	SLTST	fine grain; grey at base of interval...joint at 10° to core axis											R3
		131.5	132.3	0.8	SHALE	grey to black: ... silty • at ~ 132m: disturbed; sheared; 0.05m of very soft shale and/or clay											
29	135.6	132.3	138.7	6.4	SS	fine grain at top of interval but primarily medium grain; grey to off-white; laminated	85 - 90										R4
30	138.7	138.7	142.3	3.6	SS	coarse grain; grey-almost salt and pepper; very hard; lightly laminated - a few joints almost parallel to or at 10° angle to core axis at 140.3 - 140.8 m; including silt and coal fragments fractured at 140.7m: 2 cm of coal at 140.8m; last 50 cm of core is broken into 2 to 5 cm long pieces	78											R4; RQD: 60
		142.3	143.5	1.2	SS	same sandstone as above - this interval highly fractured especially the upper half - includes traces of coal; initial 30 cm of core is very broken into fragments of varying sizes											
		143.5	144.3	0.8	SHALE	very homogeneous; no bedding; black; broken into larger fragments; there appear to be 3 joint systems: 1st nearly parallel with core (5-10°); 2nd at 35°; 3rd at 140°											R3; RQD: 0
		144.3	144.7	0.4	SS&SHALE	this interval is a part of a thrust of sandstone into the upper shale unit - fractured; calcite and clay filled											

UNITS USED: m☒ ft☐

† GARR/ORS — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWSNEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No.	LP - D 101
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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
31	142.6	144.7	145.2	0.5	SS	medium grain; lightly laminated; grey; including 2 calcite filled joints (at 13°)	70										Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		145.2	145.7	0.5	SHALE	disturbed; stressed interval; shale mixed with sandstone; core fragmented RQD=0											
32	146.3	145.7	146.8	1.1	SHALE/SS	silty shale interbedded with sandstone - more sandstone to the end of the interval	72										R3; RQD: 50
		146.8	149.0	2.2	SHALE	black or dark grey; overall quite broken core, breaking caused by 2 or 3 fracture systems one at 20°, other ?; also along bedding at 148.3 to 148.5m the shale is very sheared, almost flaky... fault plane?											R3; RQD: 0-3
33	149.5	149.0	149.5	0.5	SLTST/SS	siltstone grading quickly into sandstone											
34	153.4	149.5	154.8	5.3	SS	medium grain; lightly laminated; in places crossbedded; a few joints: calcite sealed overall; the core is fairly solid: more broken at 154.7-154.9m and at 153.4-153.9m at; 151.2m, 15 cm zone of fine multidirectional calcite filled fractures-fine, web-like - (stress); similar feature at 153.9 - 154.1 m	75										R4; RQD: 30
		154.8	155.5	0.7	SS	same sandstone as above; more disturbed and broken; slickensided; initial 15 cm almost "mylonized"											
		155.5	157.0	1.5	SS	this interval obviously a fault zone; rock is very broken to crushed; core is a form of fragments of very small size - the rock is saturated with water; bedding is rapidly changing; 70 cm of core was lost	72 40										RQD: 0
		157.0	157.4	0.4	SS	very sheared; fractured; bedding	40										
		157.4	158.1	0.7	SS	fairly solid core at 157.7 to 158m; the bedding turns; last 10 cm very broken											
		158.1	158.3	0.2	SS	shaly similar to sheared sandstone from 157 - 157.4 m; very soft; at 158.3 m change to solid rock bedding	60										
		158.3	159.1	0.8	SS	laminated; disturbed; bedding at 158.6 m; at the end an abrupt change of bedding	46 65 40										RQD: 0
		159.1	159.3	0.2	SS	20 cm of more solid sandstone											
		159.3	159.5	0.2	SHALE	silty very sheared; slickensided; almost flaky	35										

UNITS USED: m☒ ft☐

† :R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101
CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No.	LP - D
CONTINUED	101

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	BEDDING ANGLE (▲)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS[1]
		159.5	161.0	1.5	SS	upper part somewhat disturbed; lower broken into larger pieces at 160.2 m	22										Flow of Water Yes☐ or Gas? No☐ Indicate Depth
35	160.4																
		161.0	161.2	0.2	SS	fine grain; broken into small fragments (disturbed)											
36	161.0																
		161.2	162.6	1.4	SLTST	calcareous; with shale interbeds; occasional carby fragments; some calcite filled fractures; transitional below; Joints: 30° - calcite and slicks: 33° - bedding plane; Rec.: 1.0m/1.34m=75%	33										R3: RQD: 0
37	164.5	162.6	165.3	2.7	SS	fine grained; calcareous; carbonaceous; with well developed bedding defined by carbonaceous material; occasional calcite filled fractures; shaley zones; abrupt below; Joints: 20°, 50° - bedding plane; sheared zone 163.18 - 163.28 m Rec.: 100%	50										R3-4: RQD:37
		165.3	170.7	5.4	SS	medium grained; moderately calcareous; moderate bedding defined by carbonaceous material; some disturbance of bedding; abrupt below; joints ± 27° - calcite and slicks; 55° - bedding plane 60° - calcite; Rec. 100%; broken zone 166.67 - 166.87 m	55										R4: RQD: 28
38	168.4																
39	172.2	170.7	175.5	4.8	SHALE	silty at top; becoming very carbonaceous after first meter, with numerous shear zones with sheared and broken core between 173.10 - 175.46m; no bedding; transitional below: Joints: 20°, 0°; Rec.: 4.0m/4.76m = 85%											R3: RQD: 11
40	176.2	175.5	180.1	4.8	SHALE	homogeneous: silty with occasional very carbonaceous and coaly zones: these appear to control shearing: slicked in part: no bedding: Rec. 4.5m/4.75m = 95%: Joints: 60° - bedding plane?											R3: RQD: 40
41	180.2			0.1	COAL	sheared: broken Recovery:											
				0.3	SHALE	carbonaceous; broken; slickensided 0.7m/1.0m = 70%											
		180.7		0.3	COAL	sheared: broken to powdery											
		181.2	MARKER BLOCK						12		0.71	8.71	17.35		2.0	55.44	
				0.3	COAL	dull: sheared: broken Recovery:											
				0.4	COAL	sheared: powdery: shaly? 1.2m/1.4m = 86%											
				0.5	COAL	dull: sheared: powdery											
		182.6	MARKER BLOCK														

UNITS USED: m☒ ft☐

[1] •R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D
CONTINUED 101

CROW NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE [*]	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS [†]
				1.6	COAL	sheared: powdery: shaly?			13		0.56	7.32	18.03		1.0	48.64	Flow of Water Yes☐ or Gas? No☐ Indicate Depth
		184.3	MARKER BLOCK														
				0.7	COAL	sheared — Recovery 3.1m/3.3m = 94%											
42				0.3	COAL	sheared: shaly			14		1.31	6.35	19.01		3.0	58.52	
				0.1	SHALE	broken											
				0.4	COAL	sheared: broken to powdery											
		185.9	MARKER BLOCK														
				0.1	COAL	dull: sheared: powdery											
				0.1	COAL	shaly: powdery — Recovery 1.4m/1.5m = 93%			15		1.13	9.02	17.89		2.0	49.97	
				0.8	COAL	sheared: powdery											
				0.4	COAL	sheared											
		187.4	MARKER BLOCK														
				0.2	COAL	sheared: broken to powdery											
				0.1	SHALE	broken											
				0.6	COAL	sheared: broken — Recovery 1.6m/1.6m = 100%			16		1.51	8.54	19.35		2.5	54.40	
				0.1	SHALE	broken											
				0.6	COAL	sheared: broken: powdery											
		189.0	MARKER BLOCK														
				0.1	SHALE	sheared: carbonaceous											
				0.2	COAL	sheared: powdery — Recovery 0.9m/1.5m = 60%			17		1.19	9.01	18.44		1.5	38.77	
43				0.6	COAL	shaly: sheared											
		190.5	MARKER BLOCK														
				0.5	COAL	sheared											
				0.1	COAL	sheared and powdery: shaley											
				0.1	SHALE	carbonaceous: sheared — Recovery 1.0m/1.5m = 67%			18		1.22	10.61	22.86		1.5	32.64	

NB: unless otherwise noted all coal 180.21m - 194.16m is S2 in hardness

UNITS USED: m☑ ft☐

† :-R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION [%]

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

NOTE: LODGEPOLE LP - D 101 (180.1 - 194.4 m)

because the core (consisting of coal and shale) in the interval 180.1 m (top of Box 41) to 194.4 m (top of Box 44) was badly broken, sheared and pulverized, it was not possible to determine the core recovery per litho unit; it is for the same reason that depth intervals were not derived per litho unit*, it should be noted, therefore, that:

- o the figures in the "TH" column are RECOVERED THICKNESSES as observed & measured in the core boxes
- o % RECOVERY = $\frac{\text{Length of core recovered between marker blocks (m)}}{\text{Core cut between marker blocks (m)}} \times 100\%$

* APPROX depths were determined when interval was subject to sampling

D. W. Fietz
October 26/78

CROW NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (°) ▲	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
				0.2	COAL	powdery											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
				0.1	SHALE	carbonaceous; broken			18								
		192.0		MARKER BLOCK													
				0.9	COAL	broken to powdery Recovery .9m/0.9m = 100%			19		1.07	10.84	17.38		1.5	57.98	
		192.9		MARKER BLOCK													
				0.1	SHALE	carbonaceous; broken: sheared											
				0.3	COAL	sheared; powdery											
				0.2	COAL	very shaly; broken stick Recovery 1.2m/1.3m = 92%			20		0.96	12.31	17.50		1.0	31.84	R2
				0.1	COAL	shaly; sheared; broken											
				0.3	COAL	sheared; powdery											
				0.2	COAL	very shaly; broken; sheared											
		194.2		MARKER BLOCK													R3
				0.1	SHALE	carbonaceous Recovery: 0.1m/0.3m = 33%			NOTE: Samples' 12 to 20 (inclusive) quality data is based on washed coal at S.G.: 1.5								
44	194.4	194.4	202.8	8.4	SHALE	silty with siltstone interbeds; poorly bedded; transitional below; broken shear zones at: 197.86 - 198.16m, 201.57 - 201.67m; carbonaceous fragments; jointing: at 35°, 28°, 58° (bedding plane), 20° (3); recovery: 100%	65?										RQD: 75; R3
45	197.1																
46	202.6																
		202.8	204.2	1.4	SHALE	as above: broken core: jointing at 20°, 70° (bedding plane)											RQD: 0
		204.2	205.2	1.0	CLAY	sandy: numerous sub angular rock fragments: FAULT GOUGE											S2
47	206.2	205.2	207.5	2.3	SS	grey; medium to fine grain; mod bedded with small scale cross-bedding with right way up; slightly calcite cement; interbedded with occasional minor shale beds..contacts abrupt below; jointing: at 25° (3); at 68° (4...bedding plane); Recovery: 100%	65										RQD: 19; R4
48	209.9	207.5	210.2	2.7	SLTST	with very fine grain sandstone interbedded: moderate fine bedding; small scale cross-bedding: traces of carbonaceous material: abrupt below:	70										RQD: 45; R4

UNITS USED: m☑ ft☐

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

•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No.	LP - D 101
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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
cont...		207.5	210.2	2.7	SLTST	jointing: at 20° (2); 70° (3) bedding plane; Recovery: 86%											Flow of Water Yes☐ or Gas ? No☐ Indicate Depth
49	214.0	210.2	216.7	6.5	SS	grey; medium to fine grain; moderately bedded in parts; carbonaceous with numerous coaly stringers; calcareous cement in places; fault breccia at 216.0 m depth; jointing: 27° (5) with some calcite infilling	40 at top 60 at base										RQD: 20; R4
		216.7	217.6	0.9	SS	as above; very broken core											RQD: 0
		217.6	218.2	0.6	SS	as above...poorly bedded; jointing: 25°, 45° (2), 20° (calcite filled)											RQD: 60
50	218.2	218.2	218.8	0.6	SS	grey; medium grain to coarse grain; occasional grit size bands; trace carbonaceous stringers; poorly bedded; jointing at: 20° (2), 40°, 68° (?...may be bedding plane); occasional shale interclasts; abrupt below											RQD: 50; R3
		218.8	219.1	0.3	SS	grey; fine grain; with siltstone interbeds; well bedded defined by carbonaceous layers; abrupt below	70										R3
51	221.9	219.1	222.3	3.2	SS	grey; medium grain; mod well bedded; homogeneous throughout; carbonaceous in part; transitional below; jointing at 20° (3), 70° (5, bedding plane); Recovery 100%	70										RQD: 73; R3
		222.3	222.8	0.5	SS	grey; medium grain to coarse grain, with numerous clasts; occasional coaly stringers; grain size becoming more coarse at base; abrupt below	65										RQD: 40; R4
		222.8	222.9	0.1	SHALE	black; with coarse grain sandstone interbeds; disturbed; trace of slickensides; Recovery: 100%											RQD: 100
		222.9	225.3	2.4	SS	very fine grain; shaly; grey to black; broken to powdery; with 0.05m soft clay at base; Recovery 57%											RQD: 12
52	226.2	225.3	226.6	1.3	SS	grey; medium grain; carbonaceous; very broken; transitional below; jointing at 20° (6)											RQD: 0; R3
53	230.2	226.3	230.7	4.1	SS	grey; medium grain to coarse grain; poorly bedded; occasional carby stringers toward base; homogenous with minor scattered shaly clasts throughout; transitional below at 227.12 - 227.22 m; is weathered along joints; soft; broken zone at 227.42 - 227.82 m; recovery 100%; jointing at 20°, 70° (5, bedding plane)	70										RQD: 44; R3

UNITS USED: m☑ ft☐

†=R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROW NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		230.7	231.8	1.1	SS	as above; broken; with occasional carbonaceous zones; abrupt below; RQD: 46; R3											Flow of Water or Gas? Yes☐ No☐ Indicate Depth
		231.8	231.9	0.1	CONGL	sub-angular; shaly pebbles in sandy matrix; carbonaceous at base; some slickensided surfaces											
		231.9	233.4	1.5	SHALE	silty to carbonaceous; black; becoming increasingly sheared at base; Recovery: 57%											RQD: 0; R1-3
		233.4	234.7	1.3	SS	fine grain; grey; carbonaceous stringers; poorly bedded; broken due to jointing; Recovery 36%											RQD: 8; R3
54	234.7	234.7	235.3	0.6	SS	medium grain; grey; numerous carbonaceous stringers; transitional below; broken; Recovery 100%											RQD: 16
		235.3	238.1	2.8	SS	grey; medium grain to fine grain; moderately bedded; occasional minor carbonaceous wisps; shale clasts; abrupt below; jointing: at 25°, 10° (2..calcite infilled), 70° (2..bedding plane); Recovery: 100%	70										RQD: 67; R3
		238.1	238.9	0.8	SS	grey; fine grain; with interbedded shales; well bedded with minor carbonaceous layers; zone of large shale clasts at base; transitional below; Recovery: 100%; jointing at 70° (5..bedding plane), 25°, 30°	70										RQD: 96; R3
55	238.9	238.9	239.3	0.4	SS	grey; medium grain; carbonaceous in part; with occasional shaly clasts; poorly bedded											RQD: 0; R3
56	242.7	239.3	244.1	4.8	SS	grey; medium grain; occasional carbonaceous partings; with moderate to poor bedding; transitional below; slickensided surfaces present along partings; scattered small shaly clasts; jointing at 28° (3..calcite infilled), 70° (5..bedding plane)	70										RQD: 66; R3
		244.1	245.4	1.3	SS	as above; broken; Recovery 100%											RQD: 0
57	246.9	245.4	251.1	5.7	SS	grey; medium grain; homogeneous with occasional carbonaceous partings; no bedding; broken by numerous joints; Recovery 100%; jointing at 25° with calcite and gypsum(?) infilling; 45° with calcite and gypsum(?) infilling											RQD: 17; R3
		251.1	251.2	0.1	SHALE	grey-black; very homogeneous; with minor calcite infilled fractures											RQD: 0; R3
		251.2	251.4	0.2	SHALE	silty; carbonaceous; minor coaly stringers; slickensided; abrupt below											RQD: 65; R3

UNITS USED: m☐ ft☐

† :R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROW NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (▲)	SEAM DESIG.	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		251.4	252.3	0.9	SS	grey; medium grain to fine grain; numerous shaly clasts; jointing at 35°...calcite infilled; RQD: 84; R4											Flow of Water or Gas? Yes☐ No☐ Indicate Depth
		252.3	253.1	0.8	SS	grey; numerous shale interbeds and clasts; coaly stringers; broken; sheared zone											RQD: 0; R2
		253.1	253.4	0.3	SS	grey; medium to coarse grain; occasional minor carbonaceous stringers; Recovery 100%; jointing at 30°, 52°, 50° (carbonaceous infilling)											RQD: 50; R4
		253.4	253.5	0.1	SHALE	carbonaceous; sheared; broken; coaly stringers											
		253.5	254.7	1.2	SS	grey; medium grain to coarse grain; abrupt below; occasional carbonaceous stringers; Recovery 100%; jointing at 30° (4...calcite infilled), 45° (2...bedding plane?)											RQD: 59; R4
59	255.0	254.7	256.0	1.3	SHALE	grey; silty in parts; sheared throughout; slickensided at base with soft calcite infilling											RQD: 0
		256.0	257.8	1.8	SS	grey; medium grain to coarse grain; numerous carbonaceous stringers; very broken with numerous sheared surfaces; calcite infilled joints; Recovery: 100%											RQD: 0; R2
60	258.5	257.8	259.5	1.7	SS	grey; medium to coarse grain; moderate bedding defined by carbonaceous stringers; broken with numerous joints and slickensided surfaces; Recovery 100%; jointing at 30° (2..slickensided)	10										RQD: 41; R3
		259.5	259.8	0.3	SS	as above; very broken	25										
		259.8	260.0	0.2	SHALE	silty; very sheared											RQD: 0; R1
		260.0	260.3	0.3	SS	grey; medium grain; numerous carbonaceous stringers; calcite infilled joints											RQD: 0
		260.3	260.5	0.2	SHALE	sheared; broken											
61	262.2	260.5	263.0	2.5	SS	grey; medium grain; carbonaceous stringers; broken by numerous joints several of which show weathering R2 hardness; recovery: 100%	80										RQD: 0; R3
		263.0	263.4	0.4	SS	grey; fine grain; broken; carbonaceous stringers sheared at top											RQD: 0; R2
		263.4	264.0	0.6	COAL	dull with bright bands; sheared; broken; Recovery: 80%											RQD: 0; S3

UNITS USED: m☒ ft☐

† =R#/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

FILE No 8A 212

CROW... NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	▲ BEDDING ANGLE (°)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		264.0	266.0	2.0	SHALE	carbonaceous; with coaly stringers; abrupt below; sheared with numerous listric surfaces; Recovery 80%											Flow of Water Yes☐ or Gas? No☐ Indicate Depth
62	266.7	266.0	269.8	3.8	SS	grey; medium grain; very carbonaceous with numerous carby stringers and coaly wisps; broken with slickensided surfaces; numerous joints; transitional below; recovery 100%; jointing at 22° (5..with carbonaceous material), 45° (3), 80° (2...bedding plane..?)											R3
63	271.0	269.8	272.0	2.2	SHALE	with interbedded medium grain-fine grain; sandstone; moderately well bedded; abrupt below; contains 2 shear zones at 269.81 - 269.91m, 271.00 - 271.50 m; recovery 90%	85										RQD: 17; R3
		272.0	274.4	2.4	SS	grey; medium grain; poorly bedded with numerous large shaly clasts; carbonaceous stringers defining bedding; broken by numerous joints; Recovery 100%; jointing at 65° (7...slickensided bedding plane), 20° (4 ... with carbonaceous material)	65										RQD: 29; R3
64	274.8	274.4	279.2	4.8	SS	grey; medium grain to coarse grain; carbonaceous;											
65	278.9					poorly bedded; transitional below; broken with joints; occasional weathered zones R2; jointing at 20° (4...calcite infilled in part), 50° (4..slickensided); shear zone: 276.95 - 277.15m slickensided in part; 100% Recovery	70										RQD: 23; R3
66	283.2	279.2	287.1	7.9	SS	grey; medium grain; occasional carbonaceous stringers; mod. bedded; broken in part with softer weathered zone along joints 285.3 - 285.45m; jointing at 20° (12), 75° (6..bedding planes); Recovery 100%	75										RQD: 27; R3
67	287.1	287.1	294.2	7.1	SS	grey; medium grain; occasional carbonaceous blebs;											RQD: 29; R3-4
68	291.9					mod bedded; some fractures infilled with calcite; some fractures infilled with pyritic material; broken; broken with softer weathered material at 288.35 - 288.85 m depth; jointing at 34° (5), 8°, 70°, (10..bedding plane..?), 16° (3), 25°	70										
69	295.2	294.2	296.9	2.7	SS	grey; medium grain; occasional carbonaceous stringers at bottom of interval; transitional below; in part, core is broken with softer weathered zone at 294.2 - 294.6 m depth; good bedding; jointing at 18°, 8° (2), 80° (11... bedding plane)	80										RQD: 4; R3
		296.9	297.1	0.2	SLTST/SS	interbed; grey; fine grain - medium grain; carbonaceous at top of interval with minor coaly particles; abrupt below; jointing at 0°	50										RQD: 0; R3

UNITS USED: m☐ ft☐

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

•RQD -- ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

FILE No BA - 212

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (°) ▲	SEAM DESIG	SAMPLE No.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
70	299.0	297.1	300.4	3.3	SLTST/SS	very fine grain; dark grey to black; shaly in places; occasional carbonaceous blebs; some fractures infilled with chert (?); mod. bedding, cross-bedded in portions; core is badly broken; slickensided; jointing at 85° (9..bedding plane) 15°, 74° (3..,chert. filled)	85										Flow of Water Yes☐ or Gas? No☐ Indicate Depth RQD: 20; R3
		300.4	300.6	0.2	SS	as above; but very badly broken											RQD: 0
		300.6	300.7	0.1	SHALE	carbonaceous; silty; pyrite blebs <0.01 m in diameter throughout											RQD: 0; S5
		300.7	303.3	2.6	SS	fine grain; dark grey to black; occasional carbonaceous blebs; good bedding; broken with softer weathered material at 302.63 - 302.87m depth; cross-bedded; very minor coaly debris at base of interval; jointing at 80° (9..bedding plane), 10°, 0°	10 80										
71 72	303.3 307.0	303.3	307.4	4.1	SS	medium grain; moderatly bedded; broken; with weathered zones at 303.78 - 303.91 m, at 305.9-306.05 m; both are S2 in hardness; Recovery 90%; jointing at 74° (7..bedding plane), 10° (3), 26° (4)	74										RQD: 7; R3
73 74	311.0 315.5	307.4	318.5	11.1	SS	medium grain to coarse grain; mod to poorly bedded; with occasional carbonaceous stringers; abrupt below; some calcite infilling of fractures; some pyriteand quartz infilling of fractures; Recovery 95%; jointing at 10° (5..calcite/quartz/pyrite infilling; trace of slickensiding), 30° (6...pyrite infilling in some), 80° (9... bedding plane)	80										RQD: 69; R4
		318.5	319.7	1.2	SHALE	carbonaceous; black; homogenous with some very poorly defined beddings; trace of slickensiding											RQD: 20; R4
75	319.7	319.7	322.4	2.7	SHALE	carbonaceous at base; black; slickensided and broken at 320.00 - 320.18 in depth; light colored shale clasts showing stress...? MYLONITE; abrupt below; jointing at 55° (6..carbonaceous..?.. bedding plane)											RQD: 11; R3
76	322.4	322.4	324.9	2.5	SS	carbonaceous; no bedding planes evident; homogeneous throughout; abruptbelow numerous slickensided surfaces; broken by jointing; minor calcite veining; jointing at 55° (5..carbonaceous), 25° (4); both are slickensided											RQD: 0; R4

UNITS USED: m☒ ft☐

† :-R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (▲)	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS†
		324.9	325.0	0.1	SHALE	carbonaceous; slickensided; broken; RQD: 0; R2											Flow of Water or Gas? Yes☐ No☐ Indicate Depth
				0.1	COAL	shaly; very broken and sheared											
				0.1	COAL	shaly; very broken and sheared			21		0.75	17.26	18.41		3.5	23.21	
				0.2	COAL	shaly; very broken and sheared											
				0.1	COAL	dull; broken — Recovery 1.0m/1.2m = 83%											
				0.1	COAL	dull; very sheared			22		0.69	14.31	18.16		3.0	35.10	
				0.3	COAL	dull; shaly in part; broken											
		326.1	MARKER BLOCK														
				0.3	COAL	dull; broken			23		0.66	15.79	17.82		1.5	70.58	
				0.1	COAL	dull; sheared; powdery — Recovery 0.9m/1.3m = 69%											
				0.3	COAL	with shaly interbeds; sheared and broken			24		0.67	15.63	17.06		1.0	15.19	
				0.2	COAL	"soupy"; as above; powdery											
		327.4	MARKER BLOCK														
				0.1	COAL	as above											
77	327.6			0.3	COAL	dull; sheared; broken — Recovery 0.7m/0.9m = 77%			25		1.00	17.12	18.51		3.0	39.02	
				0.3	COAL	shaly; sheared; broken to powdery											
78	331.7	328.3	347.2	18.9	SS	medium grain; grey; homogeneous; very poorly defined bedding in part; extremely broken and jointed, but does form "stick core"; in zones of weathering core becomes very soft...S4; numerous slickensiding on joint surfaces with frequent calcite fracture infillings especially from 336.5 m and downwards; weathered zones at 331.53 - 333.95m , 334.58 - 334.98 m , 336.2 - 336.5 m, 342.9 - 343.4 m ; jointing at 45° & 20°, (both are calcite infilled in part with some slickensiding), 80° ... bedding plane; Recovery 100%	80										RQD: 10: R4
79	336.0								NOTE: Samples' 20 to 25 (inclusive) quality data is based on washed coal at S.G.: 1.5								
80	337.7																
81	343.5																
82	347.2																
83	351.6	347.2	356.4	9.2	SS	medium grain; dark grey; quite homogeneous (no lamination); overall little solid core; this interval is disturbed in the followingpositions:											

UNITS USED: m☑ ft☐

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

•RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	LODGEPOLE
AREA	WEST RIDGE - SOUTH SLOPE

HOLE No. LP - D 101 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)	BEDDING ANGLE (°) ▲	SEAM DESIG	SAMPLE No	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH % d.b.	V.M. % a.d.b.	F.C. % a.d.b.	F.S.I.	% Yield	REMARKS †
cont...		347.2	356.4	9.2	SS	• at 347.9m: 5 cm thick zone-very sheared; flaky to pulverized; shale-like material angled at 60° to the hole		fault									Flow of Water Yes☐ or Gas? No☐ Indicate Depth
84	355.1					• at 348.4 to 348.8m: zone of powdery, soaked sand with fragments of sandstone in the lower part of the segment (below this is solid sandstone)		fault zone									when the sandstone is solid R-3-4 Elsewhere it is softer as a result of tect. disturbance
						• at 352.3 to 352.9m: very broken to sheared core; upper 25 cm: shale, slickensided											
						• solid, good core (sandstone) down to 353.9m; at 354m: 20 cm very fragmented core											RQD: 10
						• at 354.8 - 355.2 m: very broken, fragmented, almost flaky sandstone											
						• 355.6 - 356.1m: very fractured; easy breaking, soft, semi-soaked zone of sandstone (core still holding together)											
		356.4	357.2	0.8	SS	zone of weathered, pulverized sandstone with a mix of sand and clay-including some small fragments of sandstone		fault zone									
		357.2	357.6	0.4	SS	fine grained; broken											
		357.6	357.9	0.3	SS	very fine grain; appears shaly; very slickensided; breaking into shiny somewhat flaky fragments		fault zone									
		357.9	361.3	3.4	SS	fine grain; grey - most of the core quite broken except somewhat more solid positions at 358.5-358.7m; at 359.3-360.2m and at 360.6 - 361.0m depth, the core is fragmented but has more regular, larger pieces, ; very sheared zones are at: 358.8-359.0m, small fragments, to powdery; 359.2-359.3m, almost flaky; 360.4-360.6m, very broken to crushed; 361.1-361.3m, shale-very slickensided, breaking into larger flaky fragments	60										
		361.3	361.4	0.1	SS	very fine grain	58										
		361.4	362.6	1.2	SS	fine grain; slightly laminated, with some, thin calcite infilled fractures at 15°, 68°, 133° and along the bedding planes											
		362.6	368.8	6.2	SHALE	interbedded with a few thin sandstone layers; the core is quite broken or sheared; intensive slickensiding; flaky at 363.8 - 365.1 m (almost powdery)											RQD: 0 shales S2-S1
			368.8			END OF THE HOLE											

UNITS USED: m☒ ft☐

† : R&/OR S — GOLDER ASSOCIATES HARDNESS CODE
*RQD — ROCK QUALITY DESIGNATION (%)

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. LP - D 101 CONTINUED

K - SHELL - LODGEPOLE '78 (10) A

GEODETIC SURVEY

APPENDIX 4 1978

426
pt 3 of 6

APPENDIX FOUR

REPORT ON GEODETIC SURVEY

WORK DONE FROM JUNE 27, 1978 TO JANUARY 31, 1979

LODGEPOLE PROJECT

KOOTENAY LAND DISTRICT, B.C.

B.C. COAL LICENCES

NOS. 490 TO 495 INCLUSIVE

GROUP #6

HELD BY SHELL CANADA RESOURCES LIMITED

OPERATED BY CROWS NEST RESOURCES SLIMITED

NTS 82G/7

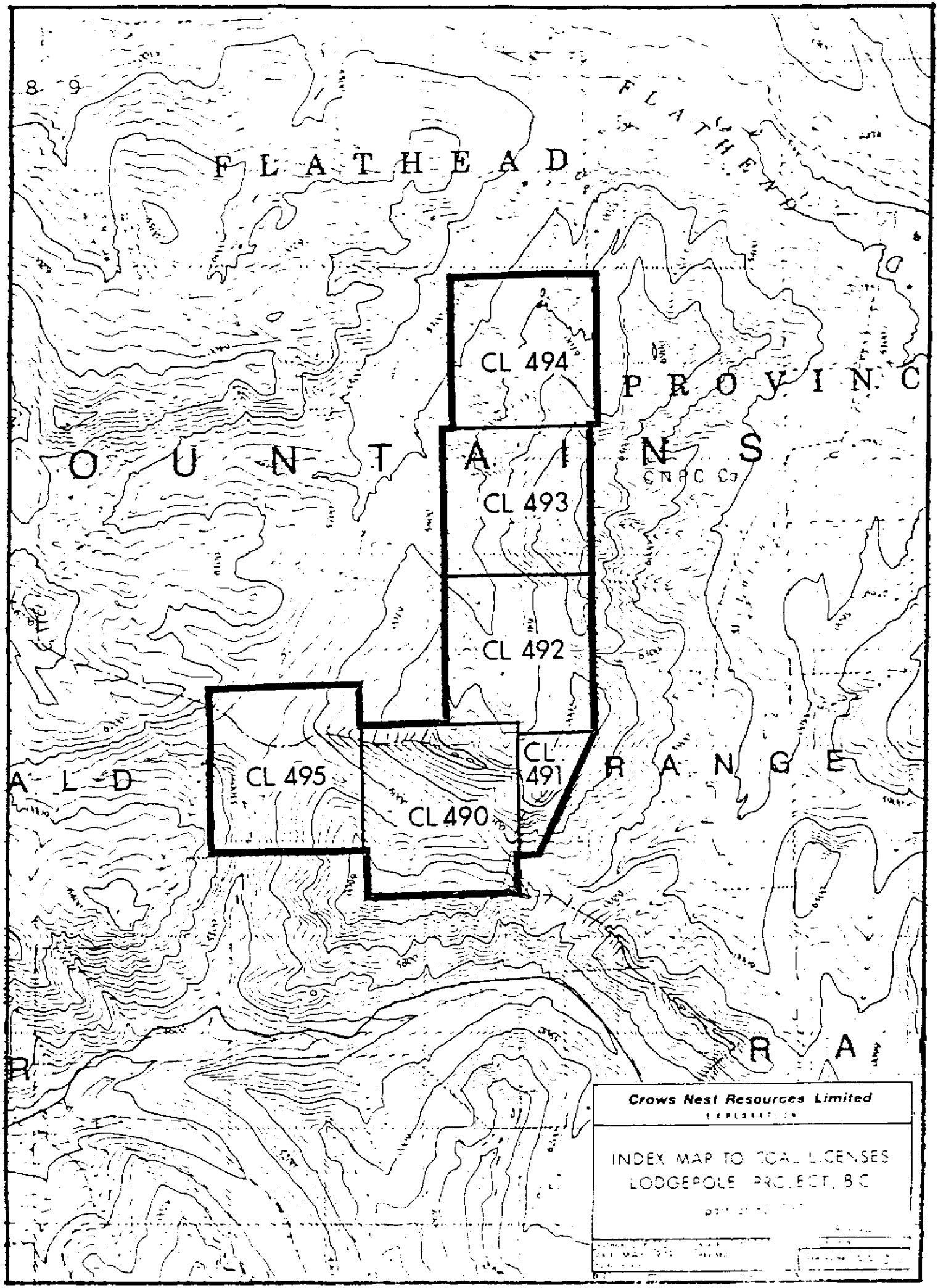
NORTHER LATITUDE 49° 18' TO 49° 22'
WESTERN LONGITUDE 114° 32' TO 114° 47'

BY
SHELL CANADA RESOURCES LIMITED - SURVEYING DEPARTMENT
GENERAL SURVEY CONTRACTOR

NORTHWEST SURVEY CORPORATION (YUKON) LIMITED
SUBCONTRACTOR ON PHOTOGRAMMETRIC MAPPING

1979-05-31

T A B L E O F C O N T E N T



Crows Nest Resources Limited

EXPLORATION

INDEX MAP TO COAL LICENSES
LODGEPOLE PROJECT, B.C.

REFERENCE

THESE REPORTS COVER IN ONE UNIT ALL B.C. COAL LICENCES IN SOUTH-EASTERN BRITISH COLUMBIA

HELD BY SHELL CANADA RESOURCES LIMITED
OPERATED BY CROWS NEST RESOURCES LIMITED

TWO SETS WERE FILED WITH:

ADMINISTRATOR FOR COAL
MINISTRY OF ENERGY, MINES & PETROLEUM RESOURCES
GOVERNMENT OF BRITISH COLUMBIA
VICTORIA, B.C.

ON APRIL 30, 1979, TO WHOM FURTHER COPIES WILL BE SUPPLIED UPON REQUEST.

CROWS NEST RESOURCES LIMITED

REPORTS ON GEODETIC SURVEY

WORK DONE FROM JUNE 27, 1978 TO JANUARY 31, 1979

SURVEY CONTROL FOR CROWS NEST RESOURCES LIMITED

FERNIE - SPARWOOD, BRITISH COLUMBIA

PHOTOGRAMMETRIC MAPPING PROJECT (1978)

FERNIE - SPARWOOD AREA - S.E. BRITISH COLUMBIA

COVERING ALL COAL LAND IN S.E. BRITISH COLUMBIA

HELD BY SHELL CANADA RESOURCES LIMITED

OPERATED BY CROWS NEST RESOURCES LIMITED

MORRISSEY FREEHOLD

B.C. COAL LICENCES

264 TO 313 INCL., 365 TO 373 INCL., 408, 412 TO 414 INCL.

490 TO 495 INCL., 588 TO 601, 1299 - 1302 INCL., 4080 TO 4089 INCL., 4090, 4092

KOOTENAY LAND DISTRICT, B.C.

NTS 82G AND 82J

LAT. 49° 05; TO 50° 10' N, LONG. 114° 30' TO 115° 10' W

BY
SHELL CANADA RESOURCES LIMITED - SURVEYING DEPARTMENT
GENERAL SURVEY CONTRACTOR

NORTHWEST SURVEY CORPORATION (YUKON) LIMITED
SUBCONTRACTOR ON PHOTOGRAMMETRIC MAPPING

1979-04-26

T A B L E O F C O N T E N T

CROWS NEST RESOURCES LIMITED - EXPLORATION
SHELL CANADA RESOURCES LIMITED - SURVEYING

GROUND CONTROL SURVEY AND PHOTOGRAMMETRIC MAPPING
SOUTHEASTERN BRITISH COLUMBIA

DISTRIBUTION OF AFE Z4670: UNDIVIDED COSTS
TO PROJECTS AND GROUPS OF LICENCES
ON THE BASIS OF HOLDING ACREAGES

*HOLDINGS/PROJECTS	AFE	ACREAGE	%	$ COSTS
NORTH BLOCK=GROUP "NA"	4853A	7,840	8.0	29,440
CENTRAL BLOCK NORTH	4851J	10,264	10.5	38,640
HORESESHOE RIDGE	4851E	6,532	6.7	24,656
LINE CREEK J.V.	4851D	1,854	1.9	6,992
(Central Block Total)		(18,650)	(19.4)	(71,392)
(Group "CA")		(6,088)	(6.2)	(22,816)
(Group "CB")		(8,082)	(8.6)	(31,648)
(Group "CS")		(4,480)	(4.6)	(16,928)
CROWN MOUNTAIN TOTAL	4851Z	6,317	6.5	23,920
(Group #31)		(3,117)	(3.2)	(11,776)
(Group #32)		(3,200)	(3.3)	(12,144)
CORBIN=GROUP #6	4851Q	1,760	1.8	6,629
(Coal Mountain)		(640)	(0.7)	(2,578)
(Tent Mountain)		(1,120)	(1.1)	(4,051)
MORRISSEY FREEHOLD	4851U	43,200	44.1	162,288
LODGEPOLE=GROUP #104	4851S	3,345	3.4	12,512
LILLYBURT	4851R	6,122	6.3	23,184
HARVEY CREEK TOTAL	4851T	7,307	7.5	27,600
(Group #105 Renewal)		2,992	(3.1)	11,408
(Remainder)		4,315	(4.4)	16,192
CABIN CREEK=Group #106	4851V	3,200	3.3	12,144
TOTAL	Z4670	97,741	100.0	368,000
		= 39,556ha		$3.77/acre
				$9.30/ha

*All B.C. Coal Licences except Morrissey Freehold

1979-01-31

F. Martonhegyi
Exploration

D. Poulsom
Surveying

H. Hofer
Finance Analyst

J. J. Crabb
Manager - Exploration

REPORT ON GEODETIC SURVEY

WORK DONE FROM AUGUST 8, 1978 TO SEPTEMBER 30, 1978

LOCATION SURVEYS

LODGEPOLE BLOCK - SPARWOOD AREA - S.E. B.C.

KOOTENAY LAND DISTRICT, B.C.

B.C. COAL LICENCES NOS. 490 TO 495 INCLUSIVE

HELD BY SHELL CANADA RESOURCES LIMITED

OPERATED BY CROWS NEST RESOURCES LIMITED

NTS 82G/7

NORTHER LATITUDE 49° 18' TO 49° 22'
WESTERN LONGITUDE 114° 32' TO 114° 47'

BY
SHELL CANADA RESOURCES LTD. - SURVEYING DEPARTMENT
GENERAL SURVEYING CONTRACTOR

1979-05-27

Geodetic Location (drill holes) Survey for Crows Nest Resources Limited (CNRL - operator) was done on the Lodgepole Project, Kootenay Land District, Southeastern British Columbia. B.C. Coal Licences 490 to 495 incl. held by Shell Canada Resources Limited (SCRL) from August 8, to November 30, 1978. This work was done under my direction by SCRL - Surveying Department, General Surveying Contractor for CNRL.

I verify that the Contractor is in the commercial surveying business, have full facilities, qualified staff and carried out the work professionally according to prevailing standards. The report given by SCRL Surveying Department is a true account of the work done.

May 31, 1979

J. J. Crabb, P. Eng.

INTER-OFFICE CORRESPONDENCE

DATE MAY 7, 1979

TO CROWS NEST RESOURCES LIMITED (C.N.R.L.)

FROM SHELL CANADA RESOURCES LIMITED (S.C.R.L.) - SURVEYING SECTION

SUBJECT LOCATION SURVEYS
LODGEPOLE BLOCK - FERNIE - SPARWOOD AREA, S.E. BRITISH COLUMBIA

A total of 28 Geological Reference points and 2 Drill Hole locations were surveyed along with approximately 5.8 kilometres of road traverse.

Two Reference stations, GROUSE and LODGEPOLE, were established by triangulation from B.C. TOPO. STA. QUEST and SQUAW and were GALS adjusted holding QUEST and SQUAW fixed. The survey was conducted by conventional Triangulation and ground-traverse using theodolites and electronic distance measuring equipment. The Datum is B.C. TOPO.STA. QUEST which is tied to SCRL, DOPPLER - SATELLITE STA 78-49 which was established as part of the ground control for the 1978 photogrametric mapping project. What appears to be a Datum shift between QUEST and DOPPLER STA. 78-49 is indicated by the following difference of coordinates.

STA. 78-49 (Traverse from Quest)	5464318.27	663911.61	1845.21
STA. 78-49 (Doppler Satellite)	5464310.63	663906.27	1843.43
Difference	+7.64	+5.34	+1.78

If and when more drilling is scheduled for this area it is suggested that; STA'S. QUEST and SQUAW be tied into the Photo Control net to confirm a positive shift, STA'S LODGEPOLE and GROUSE be closed by triangulation and their coordinates adjusted accordingly. Bearings and distances to STA'S. Lodgepole and Grouse were reduced to U.T.M. plane but the traverse to the Drill Holes and Reference points was left at surface and these points should not be used as Control Datum for future work.

Results of the survey were presented to C.N.R.L. in tabular and plan form copies of which are attatched.

The total cost attributed to the Lodgepole Block was $216,735 including the survey costs.

D.C. Poulsom

DCP:cw

Attachments

LODGEPOLE DRILL HOLES

GEOLOGICAL REFERENCE POINTS

U.T.M. REFERENCE MERIDIAN - 117°

DRILL HOLE*	NORTHING	EASTING	ELEVATION (m)
DH.#1	5464647.60	663806.01	1931.8
DH.#2	5465071.98	664449.34	2086.6
REFERENCE POINT			
PT.#1	5464513.81	663940.38	
PT.#2	5464547.78	663907.18	
PT.#3	5464555.33	663899.93	
WRS.B1	5464784.42	663721.45	
WRS.B2	5464761.97	663768.60	
WRS.B3	5464748.83	663798.87	
WRS.B4	5464572.48	664464.19	
WRS.B5	5464589.45	664285.55	
WRS.B6	5464639.81	664098.22	
WRS.B7	5464648.44	664059.83	
WRS.C1	5464662.10	664920.74	
WRS.C2	5464653.38	664931.51	
WRN.D1	5464718.50	664782.99	
WRN.D2	5464731.28	664761.33	
WRN.D3	5464753.21	664714.11	
WRN.D4	5464765.37	664696.31	
WRN.D5	5464785.05	664667.39	
WRN.D6	5464876.73	664557.50	
WRN.D7	5464868.13	664564.81	
WRN.D8	5464897.10	664541.69	
WRN.D10	5464989.77	664525.56	
WRN.D11	5465027.76	664532.51	
WRN.D12	5465052.78	664526.21	
WRN.D13	5465064.61	664520.99	
WRN.E4	5464765.42	665008.55	
WRN.E5	5464814.67	665115.95	
WRN.E6	5464878.09	665198.71	
WRN.E7	5464973.61	665254.73	

* for drill holes and roads location plan see Enclosure 2 of the Report.

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GORDON A. SCHWARTZ (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)

P. O. BOX 100 (Address) — P. O. BOX 100 (Address)

CALGARY, ALBERTA T2P 2H5 — CALGARY, ALBERTA T2P 2H5

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s). 490 to 495 inclusive, six licences covering approximately 3,345 acres or 1,354 hectares. for a further period of one year.

2. I have performed, or caused to be performed, during the period June 24, 1978 to May 14, 19 79, work to the value of at least $ 216,735 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Approximate Cost
Geological mapping	NONE	NIL
Surveys: Geophysical	NONE	NIL
Geochemical	NONE	NIL
Other Geodetic	490 to 495 inclusive	20,912
Road construction	490,491	45,853
Surface work	NONE	NIL
Underground work	NONE	NIL
Drilling	490, 491	102,492
Logging, sampling, and testing	490, 491	47,078
Reclamation	490, 491	400
Other work (specify)	NONE	NIL

3. I wish to apply $ 216,735 of this value of work on Coal Licence(s)* 490 to 495 inclusive, existing Group #104 called Lodgepole Creek Project

4. I wish to pay cash in lieu of work in the amount of $ - on Coal Licence(s) No(s). N.A.

5. I wish to apply $ - of this value of work to claim a refund of cash in lieu of work in the amount of $ - which was paid to extend the term of Coal Licence(s) No(s). N.A. from ____ to ____, 19____. Mining Receipt No. ____ for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Survey Control for CNRL, Photogrammetric Mapping Project (1978) Fernie-Sparwood area, S.E. B.C. dated April 26, 1979 filed on April 30, 1979; Geological report on the Lodgepole Project 1978 will be filed in ninety days.

May 14, 1979 (Date)

G. A. Schwartz (Signature and position)
Landman

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ ____ Value of work applied on licences $ ____

Value of work approved $ ____ Value of credit remaining $ ____

Work performed. Yes [X] No [ ]

The program of operations detailed hereunder was carried out during the period from June 24, 1978 to May 14, 1979. Total costs are $ 216,735, an average of $ 64.79 per acre.

GEOLOGICAL MAPPING Yes [ ] No [X] Cost $ NIL

	Area (Acres)	Scale	Time
Reconnaissance			
Detail: Surface			
Underground			
Other (specify)			

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [X] Cost $ NIL

Method _____ Line miles _____

OTHER SURVEYS Yes [X] No [ ] Cost $ 20,912

Grid _____ Topographic GEODETIC GROUND CONTROL AND LOCATION SURVEY, Other PHOTOGRAMMETRIC MAPPING

ROAD CONSTRUCTION Yes [X] No [ ] Cost $ 45,853

Length: On Licences 2.8 miles Access (off licences) 4.5 miles (upgrading & maintenace)

SURFACE WORK Yes [ ] No [X] Cost $ NIL

	Length	Licence Number(s)
Trenching		
Seam tracing		
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [X] Cost $ NIL

Test adits: Number _____ Average length _____ Total footage _____

Other workings: Area _____ Total footage _____

DRILLING Yes [X] No [ ] Cost $ 102,492

	Hole Size	Number of Holes	Total Footage
Core: Diamond [X] Wireline [X]	HQ	2	1718
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor Tonto Drilling Where core stored CNRL Lab, Fernie, B.C.

LOGGING, SAMPLING, AND TESTING (check) Yes [X] No [ ] Cost $ 47,028

Lithology: Drill samples [ ] Core samples [X] Bulk samples [ ]

Logs: Gamma-Neutron [X] Density [X] Other [X]

Testing: Prox. analysis [X] FSI [X] Washability [X]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) _____ Cost $ NIL

REPORTS:

Reclamation work (Permit No. 56) Detail of work* EROSION BARS, SEEDING, FERTILIZING DRILL SITES AND SIDE ROADS

Cost $ 400

OPERATIONS:

Work was supervised by JARO HORACHEK Position SENIOR GEOLOGIST

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [X]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from JAN. 1, 1978 to Dec. 31, 1978

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	4	125	44	22,000
Machine operators and support				
Miners				
Other				

Total operator's costs $ 22,000

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
Tonto Drilling	Core Drilling	78,575
Drain Bros	Bulldozer Work	33,670
Gallant Trucking	Water Trucking	9,637
B & R Drilling	Drilling Supervision	4,000
PATH FINDER	Bulldozer Supervision	4,500
SCRL Surveying Dept.(incl. subcontractor Northwest Survey)	Geodetic Ground Control & Location Survey, Photogrammetric Mapping	20,912

Total contractor and consultant costs $151,294

3. EQUIPMENT AND INSTRUMENTS USED: Owned ... Rented X

Type	Rented From	Amount
Office Trailer	ATCO	1400
Power Plant	"	800

Total equipment and instrument rentals $ 2200

4. FIELD CAMP COSTS:

		Amount
Food	$16 x 176 man days	2814
Accommodation	$18 x 176 man days	3168
Fuel		3500
Other		

Total field camp costs $ 9484

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount
Downhole Geophysical Logging	R.P.B. Industries	6302
Analysis, Tests	CNRL Lab. Fernie	2030

Totals, samplings, analysis, and testing $ 8332

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	-
Operating and maintenance supplies	1275
Office and technical supplies	-
Other supplies and materials	700

Total, supplies and materials $ 1975

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
2-4x4 Trucks	Minchuck	$1200/MO 2/MO	$4800
1	Kiki Trucking	$25/HR 120 Hrs.	$3000

Air support details:

Aircraft Type	Owner	Charter		
206 B Helicopter	Kenting	$375/hr.	22 hrs.	$8250

Total transportation costs $ 16,050

8. RECLAMATION WORK:

Interior Reforestation $ 400

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
included as overhead in the $125/man-day		N.A.

Total travel expenditures $

Total costs $ 211,735

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from June 24, 1978 to May 14, 19 79

		Amount
(a) Logistics and field support	included as overhead in $125/man-day	$ N.A.
(b) Technical and feasibility studies		NIL
(c) Preparation of reports	40 man days @ $125/man day	$5000
(d) Supplies and services	included as overhead in $125/man-day	N.A.
(e) Mobilization and demobilization of equipment		NIL
(f) Travelling expenses (Itemize)	Calgary - Property - Calgary travelling is included as overhead in the $125/man-day, no other travelling has been considered	

Total $ 5,000

Supporting Cost Statements Attached

	Amount
All supporting cost is included in the $125/man-day	

Total supporting costs $ N.A.

SUMMARY

On-property costs	$ 211,735
Off-property costs	$ 5,000
Total costs	$ 216,735

Statement of costs verified by Accounting Division, Finance & Administration, SCRL

1979-05-14 (Date)

(Signature and position)

Anayst, Administration & Planning

CNRL

2M-675-5196

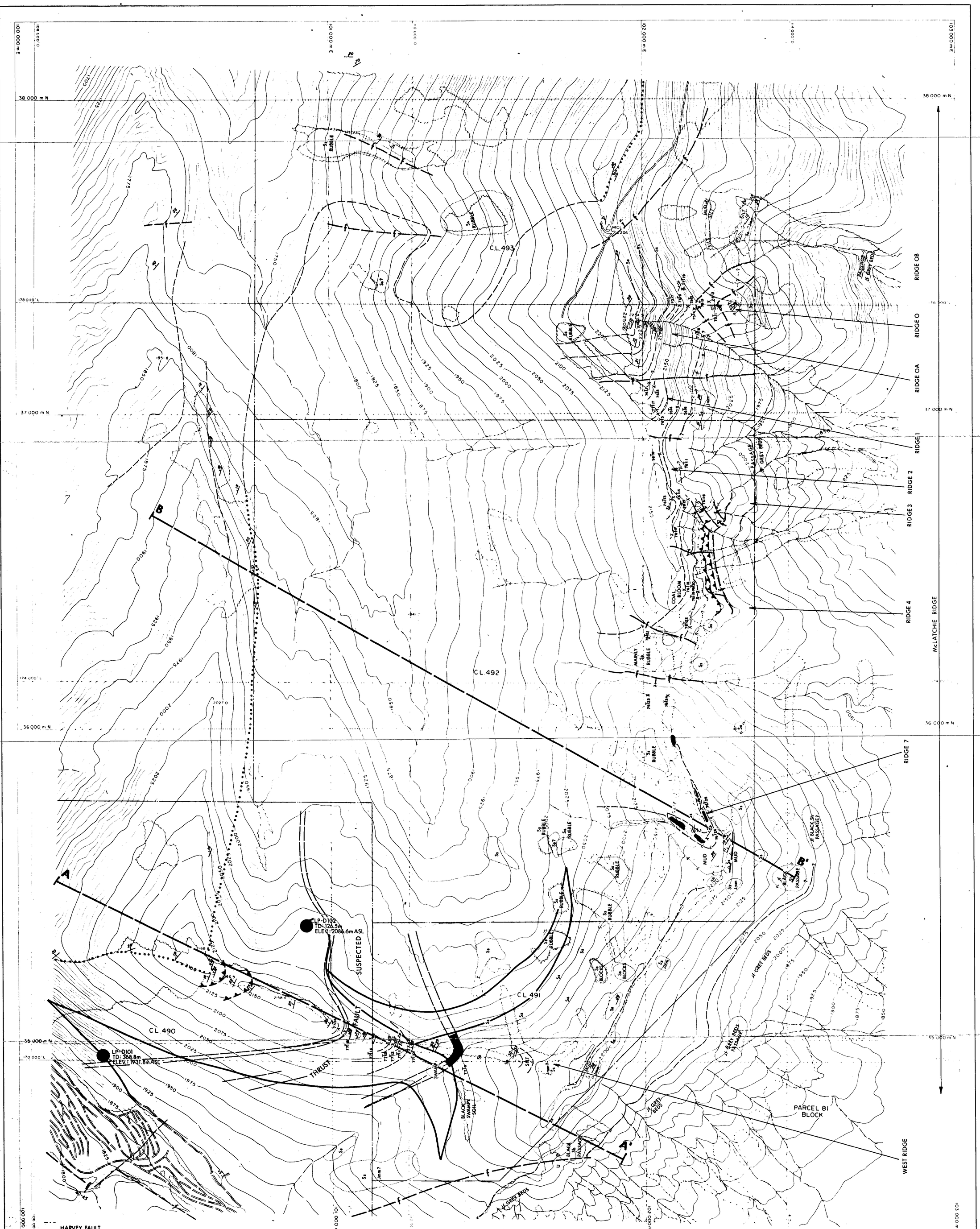
K. SHELL LODGE FILE 78(2)A.

- MAPS.

ENCLOSURE 1 AND 2 1971 -

426

pt. 6 of 6



LEGEND

- BUILDING
- FORESTRY ROAD
- ACCESS ROAD
- EXPLORATION ROAD
- TREE LINE
- STREAM
- CREEK
- CONTOURS — 2000
- SPOT ELEVATION — 2123
- COAL LICENCE NUMBER — C.L.493
- COAL LICENCE BOUNDARY
- PARCEL 81 BLOCK BOUNDARY
- CONTROL POINT
- PHOTO CENTRE (BURNETT, B.C. Gov't.) — BNB 239
- METRIC GRID — 35 000 mN
- KAISER / UNDERHILL GRID — 170 000 L
- ACCESS CUT, 1978
- DRILL SITE, 1978
- LINE OF SECTION — X X'

NOTE: Metric Grid is based on 49° lat. equalling 0 m North and 114° 45' long. equalling 100,000 m East. Horizontal and Vertical information derived from N.T.S. 1:50,000 Map and selected Kaiser Resources Control Points.

ENCLOSURE 1

CROWS NEST RESOURCES LIMITED

LODGEPOLE COAL AREA

BRITISH COLUMBIA

GEOLOGY MAP

NUMBER MII of 2

DATE NOVEMBER, 1977

CONTOUR INTERVAL - 5 m
SCALE 1:5,000

100 0 100 200 300 400 500 metres

K-SHELL LODGEPOLE 78(2)A.

42b 6/6 (1)

KEY

- PROMINENT CONGLOMERATE (BLAIRMORE/KOOTENAY CONTACT)
- TOP OF MOOSE MOUNTAIN MEMBER
- BOTTOM OF MOOSE MOUNTAIN MEMBER (KOOTENAY/FERNIE CONTACT)
- COAL SEAMS exposed, approx., assumed
- OTHER UNITS — OUTCROP
- — CONTACT exposed, approx., assumed
- FAULTS — GRAVITY exposed, approx., assumed
- — TEAR exposed, approx., assumed
- — THRUST exposed, approx., assumed
- TRENCH & NUMBER — X 77/16
- SYMBOLS — CGL SS SILT MUD SH COAL

SHEET INDEX

1 2 3 4 — 37 000 mN — 100 000 mE

FILE No. VQ-24D

ENC 1

CROWS NEST RESOURCES LIMITED

DRILL HOLES AND GEOLOGICAL REFERENCE POINTS

LODGEPOLE AREA

S.E. BRITISH COLUMBIA

CONTROL STATIONS CO-ORDINATES

U.T.M. GRID COORDINATES - REFERENCE MERIDIAN 117°

* NOTE : 500,000 m. FALSE EASTING

STATION	LATITUDE	LONGITUDE	U.T.M. NORTHING	U.T.M. EASTING	ELEVATION
QUEST (Geodetic)	49° 26' 11.94"	114° 42' 28.17"	5,478,304.927	666,183.584	2,444.496 m
SQUAW MTN (Geodetic)	49° 23' 37.08"	114° 39' 51.22"	5,473,620.36	669,492.16	2,365.248 m
GROUSE (Geo)	49° 19' 50.90"	114° 47' 47.02"	5,466,347.63	660,106.336	2,096.036 m
LODGEPOLE (Geo)	49° 19' 01.26"	114° 44' 29.79"	5,464,947.402	664,131.994	2,176.00 m
SCRL - 49 (Sur.) 1978	49° 18' 41.35"	114° 44' 41.91"	5,464,310.63	663,906.27	1,843.43 m

COORDINATES IN THE FOLLOWING TABLE ARE BASED ON THE ORIGINAL PUBLISHED VALUE FOR STA. QUEST AND REFLECT A DATUM SHIFT AT STA., SCRL 49 TO THE 1978 SATELLITE DOPPLER OBSERVATIONS (SEE STA. SCRL 49 IN ABOVE TABLE) THESE COORDINATES ALSO, ARE NOT STRICTLY TRUE U.T.M. IN THAT DISTANCES WERE NOT CORRECTED FOR SEA LEVEL OR SCALE FACTOR AND SHOULD NOT BE USED WHERE 3rd ORDER ACCURACY OR BETTER IS REQUIRED.

U.T.M. COORDINATES - REFERENCE MERIDIAN 117°

TRAVERSE STATIONS			GEOLOGICAL REF. POINTS		
STATION	NORTHING	EASTING	STATION	NORTHING	EASTING
SCRL-49	5,464,318.28	663,911.60	PT # 1	5,464,513.81	663,940.38
L - 1	5,464,188.56	664,101.59	PT # 2	5,464,547.78	663,907.18
L - 2	5,464,167.51	664,265.08	PT # 3	5,464,353.33	663,899.93
L - 3	5,464,229.61	664,197.31	WRS-R1	5,464,784.45	663,721.48
L - 4	5,464,304.65	664,177.55	WRS-R2	5,464,761.97	663,768.60
L - 5	5,464,389.48	664,114.88	WRS-R3	5,464,748.83	663,798.87
L - 6	5,464,476.83	663,976.80	WRS-R4	5,464,572.48	664,464.19
L - 7	5,464,823.01	663,625.15	WRS-R5	5,464,589.65	664,285.55
L - 8	5,464,706.39	663,893.94	WRS-R6	5,464,639.81	664,098.22
L - 9	5,464,636.83	664,084.23	WRS-R7	5,464,648.44	664,059.83
L - 10	5,464,620.05	664,182.13	WRS-C1	5,464,662.10	664,920.74
L - 11	5,464,588.70	664,261.99	WRS-C2	5,464,653.38	664,931.51
L - 12	5,464,572.84	664,389.56	WRN-D1	5,464,718.50	664,782.99
L - 13	5,464,569.94	664,453.78	WRN-D2	5,464,731.28	664,761.33
L - 14	5,464,565.21	664,557.63	WRN-D3	5,464,753.21	664,714.11
L - 15	5,464,559.62	664,580.21	WRN-D4	5,464,765.37	664,696.31
L - 16	5,464,584.20	664,703.95	WRN-D5	5,464,785.05	664,667.39
L - 17	5,464,588.45	664,789.04	WRN-D6	5,464,876.73	664,557.50
L - 18	5,464,657.83	664,871.10	WRN-D7	5,464,868.13	664,564.81
L - 19	5,464,338.80	664,901.69	WRN-D8	5,464,897.10	664,541.69
L - 20	5,464,503.26	664,942.88	WRN-D10	5,464,989.77	664,525.56
L - 21	5,464,541.22	664,958.77	WRN-D11	5,465,027.76	664,532.51
WRS-C2	5,464,653.38	664,931.51	WRN-D12	5,465,052.78	664,526.21
L - 22	5,464,679.80	664,888.48	WRN-D13	5,465,064.61	664,520.98
L - 23	5,464,706.38	664,792.93	WRN-E4	5,464,765.42	665,008.35
L - 24	5,464,730.92	664,772.82	WRN-E5	5,464,814.67	665,113.93
WRN-D4	5,464,765.37	664,696.31	WRN-E6	5,464,878.09	665,198.71
L - 25	5,464,847.78	664,585.04	WRN-E7	5,464,973.61	665,254.73
L - 26	5,464,930.34	664,518.55	D.H. # 1	5,464,647.60	663,806.01
L - 27	5,465,034.41	664,536.39	D.H. # 2	5,465,071.98	664,469.34
L - 28	5,465,074.67	664,518.04			
L - 29	5,465,100.40	664,470.00			
L - 30	5,465,076.36	664,472.16			
L - 50	5,464,710.43	664,859.59			
L - 51	5,464,760.62	664,988.11			
L - 52	5,464,787.74	665,043.85			
L - 53	5,464,831.25	665,140.47			
L - 54	5,464,878.09	665,198.71			
L - 55	5,464,936.30	665,231.13			
L - 56	5,465,031.51	665,289.48			
L - 57	5,465,124.36	665,305.90			
L - 58	5,465,213.27	665,293.15			
L - 59	5,465,237.66	665,288.06			
L - 60	5,465,275.81	665,284.26			
L - 61	5,465,211.39	665,265.86			
L - 62	5,465,137.33	665,266.00			
L - 63	5,464,999.35	665,186.35			
L - 64	5,464,965.98	665,126.79			
L - 65	5,464,891.93	665,063.09			
L - 66	5,464,859.07	665,020.39			
L - 67	5,464,805.32	664,888.47			
L - 68	5,464,798.70	664,859.09			
L - 69	5,464,820.42	664,732.89			
L - 70	5,464,876.42	664,600.17			
L - 71	5,464,934.01	664,541.08			
L - 72	5,464,984.66	664,529.30			

SURVEY PERFORMED BY SHELL CANADA RESOURCES LIMITED
SEPTEMBER 1978

CERTIFIED CORRECT

D.C. Coulson — Surveyor

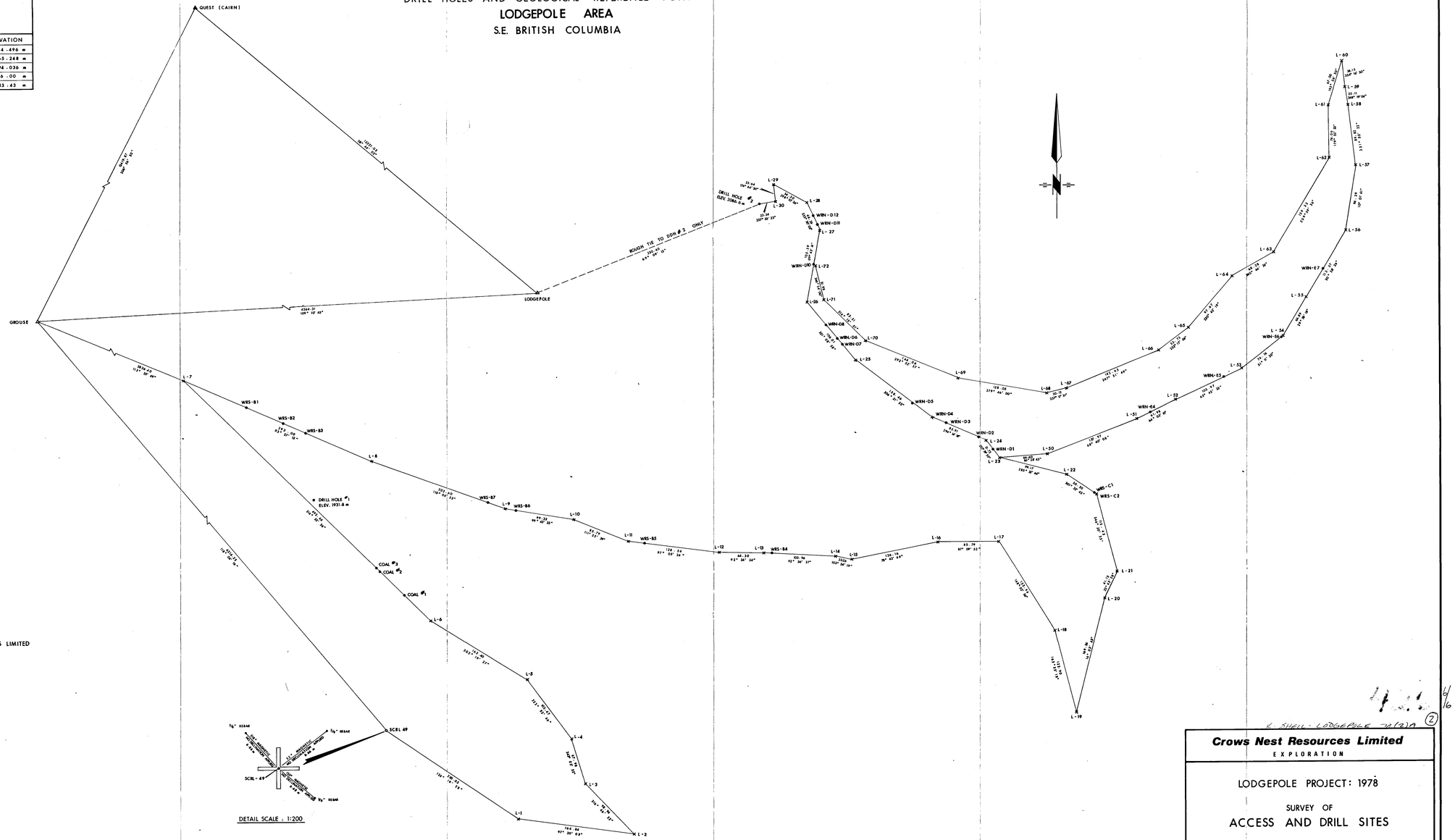
AZIMUTHS ARE GRID AND ARE REFERRED TO THE ASTRONOMIC MERIDIAN THROUGH 117° WEST LONGITUDE.

DISTANCES SHOWN ARE IN METRES AND DECIMALS THEREOF AND ARE HORIZONTAL SURFACE (i.e. NOT CORRECTED FOR SEA LEVEL AND SCALE FACTOR).

GEODETIC MONUMENT FOUND ---------- ▲
MONUMENT PLANTED ---------- △
IRON POST PLANTED ---------- ⊙
12" SPIKE PLANTED ---------- ×
GEOLOGICAL REF. POINTS ---------- +

SCALE : 1:2000

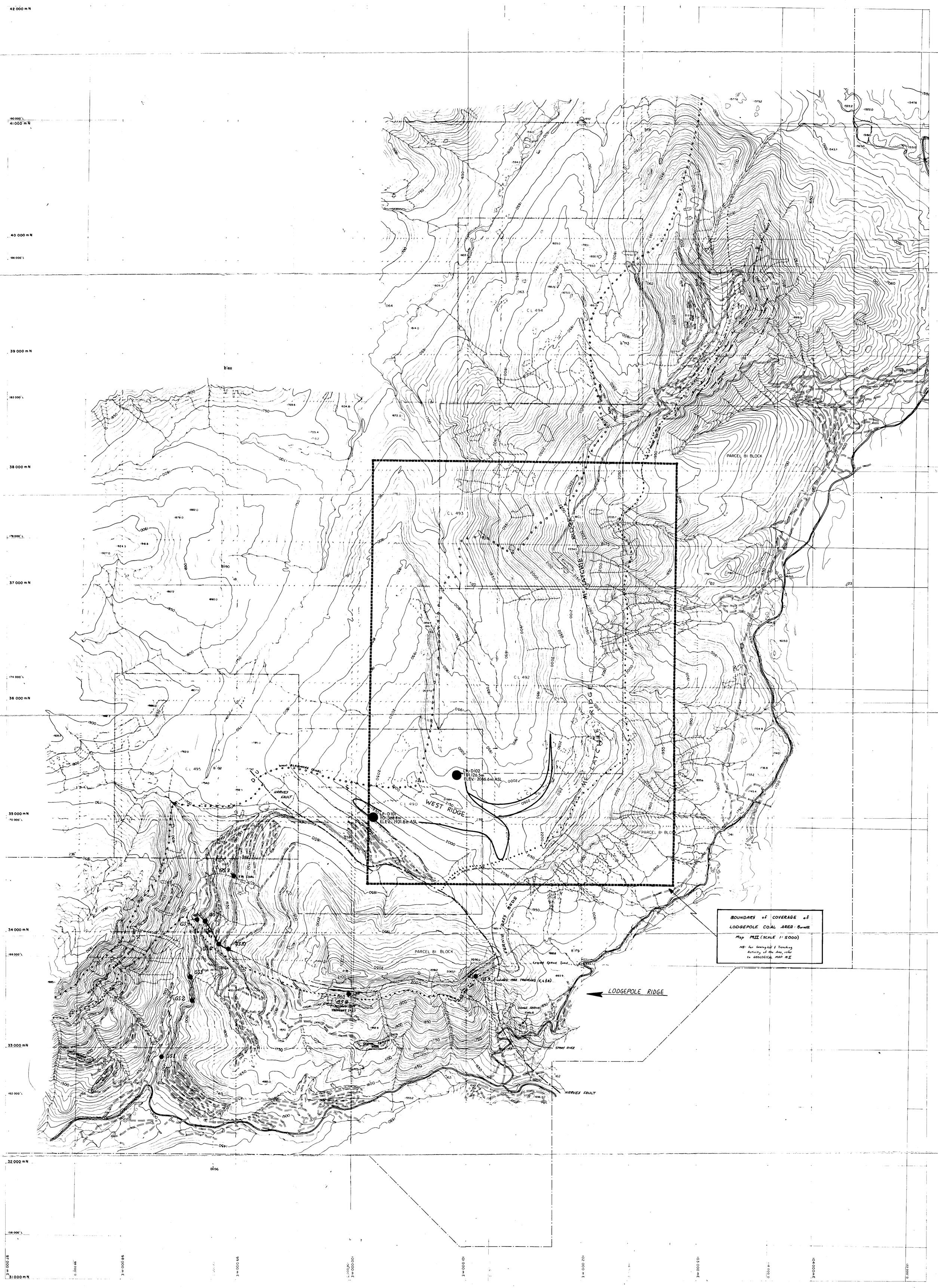
DRAWN BY : M.M. DATE : NOV. 14, 1978



K. SHELL - LODGEPOLE - 78/79 (2)

Crows Nest Resources Limited	
EXPLORATION	
LODGEPOLE PROJECT: 1978	
SURVEY OF	
ACCESS AND DRILL SITES	
AUTHOR: D. FIETZ	SCALE: 1: 2000
DATE: MAY, 1979	REVISED:
To Accompany	
ENCLOSURE No: 2	
DRAWING No: HH-24	

7028



LEGEND

- BUILDING
- FORESTRY ROAD
- ACCESS ROAD
- EXPLORATION ROAD
- TREE LINE
- STREAM
- CREEK
- CONTOURS — 2000 —
- SPOT ELEVATION
- COAL LICENCE NUMBER — C.L. 493
- COAL LICENCE BOUNDARY
- PARCEL 81 BLOCK BOUNDARY
- CONTROL POINT △
- PHOTO CENTRE (BURNETT, B.C. Gov't.) — BP6 239
- METRIC GRID — 35 000 m N
- KAISER / UNDERHILL GRID
- ACCESS CUT, 1978
- DRILL SITE, 1978 ●

NOTE: Metric Grid is based on 49° lat. equalling 0 m North and 114° 45' long. equalling 100,000 m East. Horizontal and Vertical information derived from N.T.S. 1:50,000 Map and selected Kaiser Resources Control Points.

ENCLOSURE 1

CROWS NEST RESOURCES LIMITED

LODGEPOLE COAL AREA

BRITISH COLUMBIA

GEOLOGY MAP

NUMBER MI of 2

DATE NOVEMBER, 1977

SCALE 1:10,000
CONTOUR INTERVAL - 10 m

KEY

- PROMINENT CONGLOMERATE (BLAIRMORE/KOOTENAY CONTACT)
- TOP OF MOOSE MOUNTAIN MEMBER
- BOTTOM OF MOOSE MOUNTAIN MEMBER (KOOTENAY/FERNIE CONTACT)
- COAL SEAMS exposed, approx., assumed
- OTHER UNITS — OUTCROP
- — CONTACT exposed, approx., assumed
- FAULTS — GRAVITY exposed, approx., assumed
- — TEAR exposed, approx., assumed
- — THRUST exposed, approx., assumed
- TRENCH & NUMBER x 77/16
- SYMBOLS — CGL, SS, SILT, MUD, SH, COAL
- GEOLOGICAL SITE MEASURED, field season: 1977 ● GS

FILE No. VP-24B

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K-SHELL LODGEPOLE 78(2)A.