SRC 040802008
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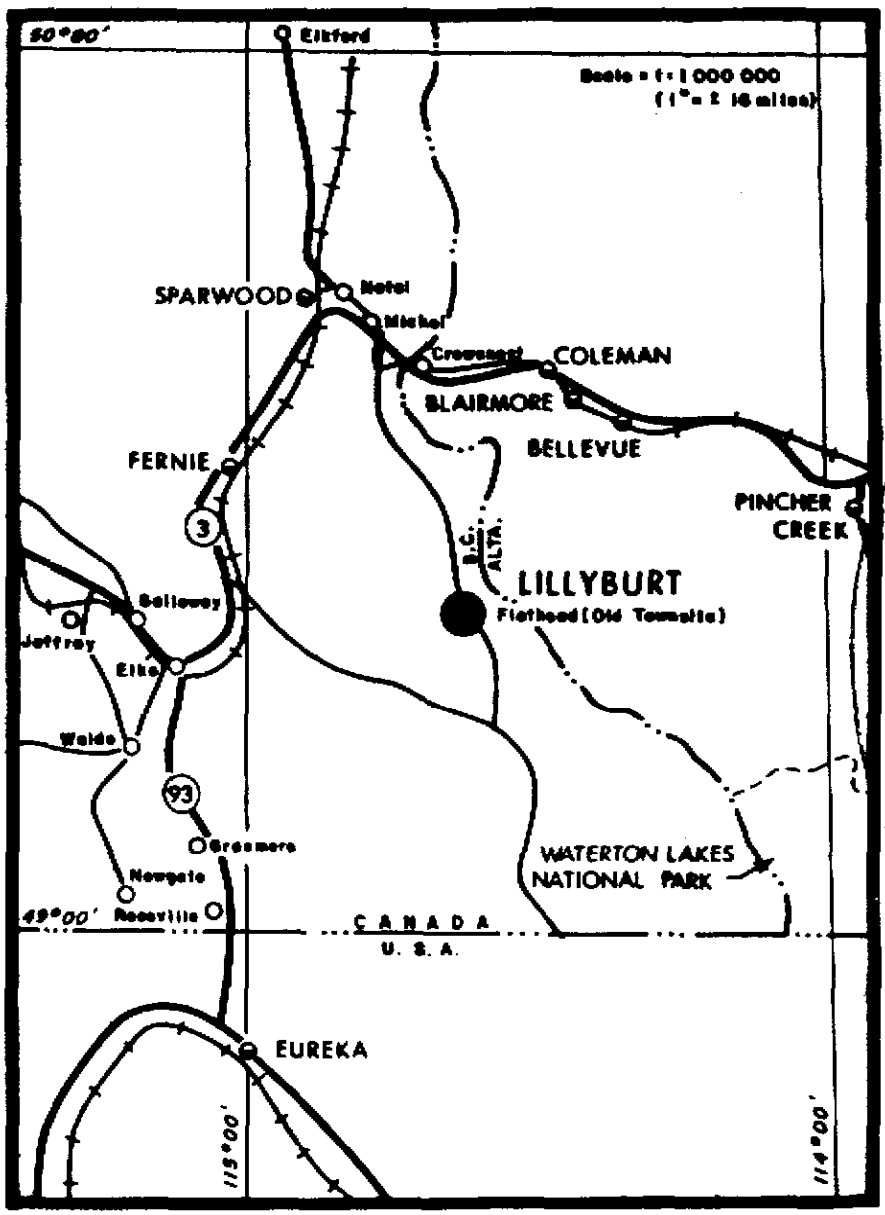
406

LILLYBURT COAL PROSPECT



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REPORT ON COAL LICENSES 4080 TO 4089 INCLUSIVE KOOTENAY LAND DISTRICT, BRITISH COLUMBIA

on work done period of June 9, 1980 to September 21, 1980

Held by : SHELL CANADA RESOURCES LIMITED

Operated by : CROWS NEST RESOURCES LIMITED

Lat 49°20' to 49°23'30" NTS 82G7 Long. 114°41'30"

March 25, 1981

Author:

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Geologist
Crows Nest Resources Ltd.

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1.0 SUMMARY

The Lillyburt coal property is located within British Columbia coal licences 4080 through 4089 inclusive, covering some 2459 hectares of land (Enclosure #2). The licences are located in the northeast end of the Flathead River Valley in southeastern B.C. Access to the property is obtained via the Corbin Valley forestry access road from the Corbin coal loading facilities (15 kilometers) or via the Lodgepole forestry access road from Morrissey Station on the main C.P.R. railway line (45 kilometers; see Enclosure #1). Total rail distance to Roberts Bank, Vancouver, is approximately 1150 kilometers.

The coal licences have been held since 1978 by Shell Canada Resources Limited with operations carried out by its wholly-owned subsidiary, Crows Nest Resources Limited. Exploration to date has included 22 rotary holes, numerous backhoe trenches, geological mapping, ground control and location surveys and photogrammetric mapping.

The property is bounded by normal faults to the north, east, and south and by a thrust fault to the west. An additional thrust fault separates the property into east and west blocks (see Enclosure #3). Limited exploration within the west block suggests a succession of Jurassic-Cretaceous Fernie and Kootenay Formation rocks have been folded into a tight, symmetric, overturned anticlinal structure trending southwest-northeast, plunging steeply northward.

Currently, the east block is of more economic interest. Drilling data indicate Jurassic-Cretaceous Fernie, Kootenay and Blairmore stratigraphy have been folded into an open, asymmetric syncline with axial plane trending east-west, and fold axis plunging eastward. Thickness of the coal-bearing member of the Kootenay Formation is 260 meters on the south limb of this syncline but reduced to 180 meters on the north limb. Within the coal-bearing member, there are five seams of economic interest totalling 40 meters in aggregate thickness. All seams exceed 1 meter; with the thickest averaging 18 meters, being the third seam in an ascending order from the Fernie-Kootenay contact.

Total indicated resources of coal underlying the east block of the property are estimated to be some 133 million tonnes. Geological in place "reserves" are calculated to be 24.8 million tonnes with an overburden ratio of 3.8 cubic meters rock per tonne coal. Resource calculations for the western block have not been attempted due to insufficient data.

Analyses from rotary cuttings for 1979 drilling indicate coal at Lillyburt to be medium volatile bituminous. Quality data from 1980 were not available for submission at the time of this report. However, detailed information from the 1979 drilling program are submitted at this time.

2.0 INTRODUCTION

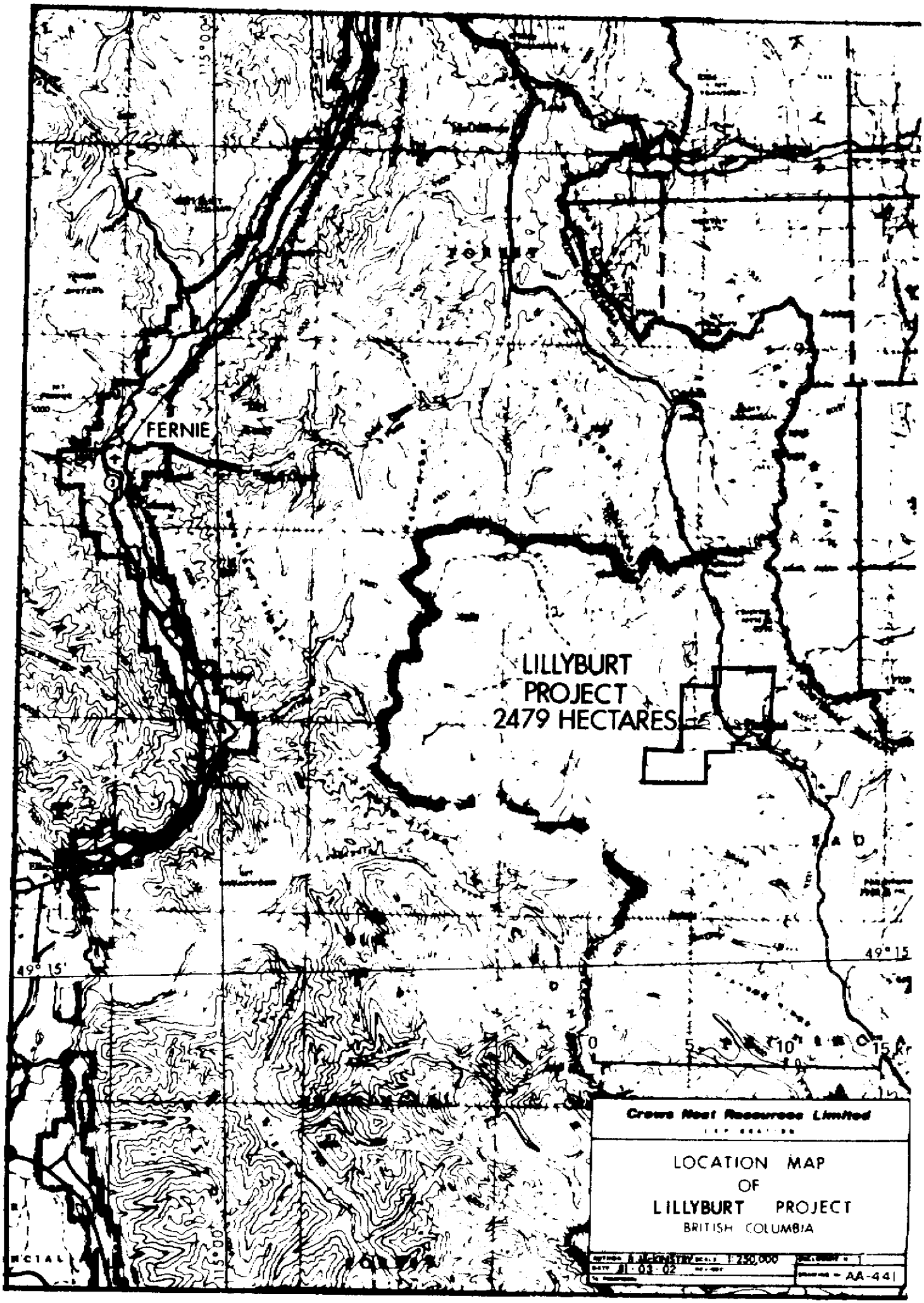
2.1 Location and Access (Enclosure #1) NTS 826/7

The Lillyburt Coal Prospect is located in and near the Flathead River Valley in the Front Range of the Rocky Mountains of southeastern British Columbia.

The prospect is 40 and 15 kilometers from the nearest railway points at Morrissey Station and the Corbin Mine Loop respectively. In addition, it is 60 kilometers by logging and forestry access roads from the towns of Sparwood and Fernie. The port of Vancouver is approximately 1150 kilometers by rail from the property. Most of the project area has been extensively logged providing a dense network of roads throughout the property. These roads have been utilized for drilling access and backhoe trenching.

2.2 Geography and Physiography

Topography in the area is of relatively moderate relief ranging from 1480 meters near the Flathead River increasing to 1720 meters at the northern boundary. The Flathead River forms a natural boundary to the south while Squaw Creek bisects the property into east and west halves. Extensive logging operations have removed a substantial percentage of forest vegetation. The abandoned townsite of Flathead is located on Coal Licence #4087 within the property.

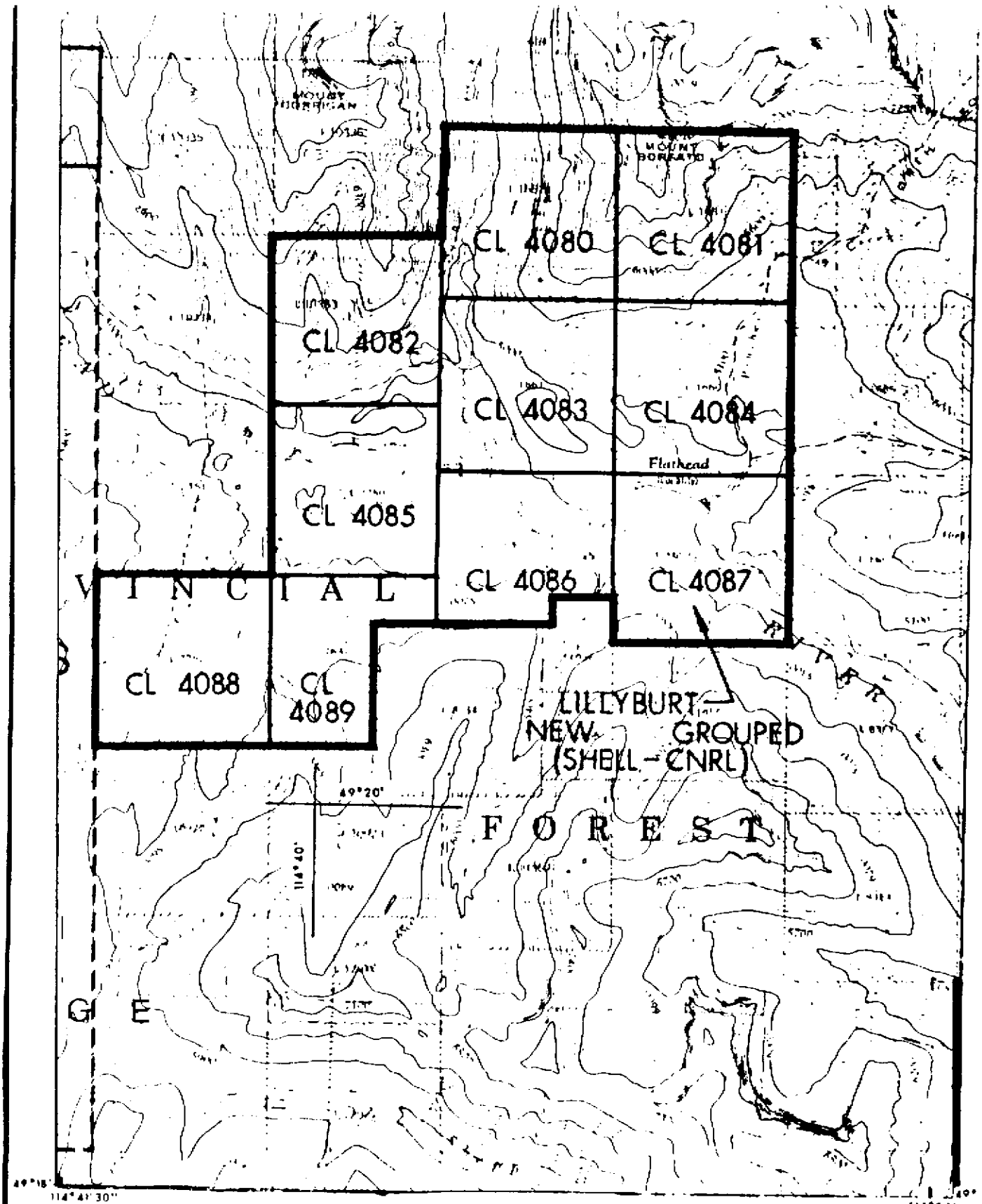

FERNIE
LILLYBURT
PROJECT
2479 HECTARES
49° 15'
115° 00'
0
5
10
15 Km
Crows Nest Resources Limited
LOCATION MAP
OF
LILLYBURT PROJECT
BRITISH COLUMBIA
1:250,000
03 02
AA-441

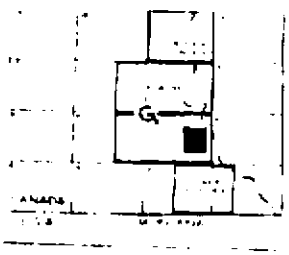
2.3 Environmental Considerations

Extensive logging operations in previous years have greatly facilitated access within the property. Past policy has been to direct drill and trench activity onto log landings or old logging roads wherever possible. This procedure has allowed for minimal environmental disturbance throughout most of the property. As a matter of course, trench sites have been filled in immediately after geological examination. All trenches and drill sites off existing logging roads were fertilized and re-seeded at the end of the field season. A separate report on reclamation work performed within the property is being submitted to the B.C. Ministry of Energy, Mines and Petroleum Resources concurrently.

2.4 Tenure of Land and Coal Rights (Enclosure #2)

The Lillyburt Coal Property consists of 10 B.C. Coal Licences, held by Shell Canada Resources Limited (SCRL) and operated under Crows Nest Resources Limited, a wholly-owned subsidiary of SCRL (Appendix I). The licences (occupying some 2459 hectares of land) were acquired by SCRL in 1978 and have been recently grouped (#243).





Crows Nest Resources Limited

EXPLORATION

LILLYBURT PROJECT
Index Map to Coal Licenses
(Part of 82 G 7)

M. D'ORSAY 1:50000
NOV 1979
AA-364

3.0 WORK DONE

3.1 Summary of Previous Work

In 1978, aerial photography and ground control surveys were done on photogrammetric topographic maps which were constructed at a scale of 1:5000 with five-meter contour intervals.

Reconnaissance geological mapping at a scale of 1:5000 was initiated in 1979. Preliminary rotary drilling was carried out on the property in three localities totalling 571 meters. In addition, three backhoe trenches and six hand trenches were dug for a total length of 30 meters.

3.2 Scope and Objectives of 1980 Exploration

Preliminary results from the previous year's work (1979) suggested significant geological in-situ reserves within the Lillyburt coal prospect. Objectives for the 1980 exploration period included:

(a) completion of geological mapping of the property at 1:5000 scale.

(b) expansion of the drilling program to further delineate the structure and geology of the property and obtain additional coal samples for quality analysis.

(c) continuation of hand and machine trenching to facilitate geological mapping.

3.3 Work Accomplished, 1980

Nineteen rotary holes were drilled throughout the property (LBR-200 to LBR-218) within the period July 17th and September 20, 1980. Total drilling amounted to 3388 meters. All holes were drilled from the vertical and were reverse circulation, dual-walled (Appendices II & III).

Seventeen of the holes (LBR-200 to LBR-216 inclusive) were drilled with a Gardner-Denver 1700 drill rig while LBR-217 and LBR-218 were completed using a Schramm 65. Cuttings from five holes (LBR-200, LBR-201, LBR-205, LBR-217 and LBR-218) were logged and their descriptions are included with this report (Appendix IV). Coal intersections were sampled and have been sent for analysis to the Crows Nest Resources Laboratory, Fernie, B.C. Holes were geophysically logged by Roke and Davies Exploration at a general scale log of 1:100 and a detail scale of 1:20 (Appendix V). A full suite of logs included:

- Neutron Neutron
- Long Spaced Density
- Natural Gamma
- Caliper
- High Resolution Density

3.3 (continued)

Drill holes were systematically logged through the rods using the neutron-neutron and natural gamma tools. The drill rods were then removed, and an attempt to log the open hole was made using the natural gamma, caliper and high resolution density tools. Open hole logging was not always successful due to caving problems in large seams, leading to varying unique geophysical log types for each hole.

Assay results for the 1980 drilling program were not available at the time of compilation of this report but 1979 drill results are submitted herein (Appendix VI).

In addition to drilling, three backhoe trenches were dug for a total length of 275 meters. Equipment used included a Caterpillar 225 and a John-Deere Extendable. Sites of recent machinery work were surveyed conventionally and reclaimed after completion of work. Road upgrading and construction was accomplished with the use of a Caterpillar D8-K bulldozer.

All surveying was contracted to Sheltech Canada. Conventional survey methods using a 1-inch theodolite and electronic distance measuring equipment were used to obtain coordinates and elevations for drill holes, trenches and control survey points (Appendix XI).

3.3 (continued)

Drill sites located off existing logging roads and a new access road were fertilized and seeded. Due to previous logging operations, access to most drill sites involved minimal surface disturbance.

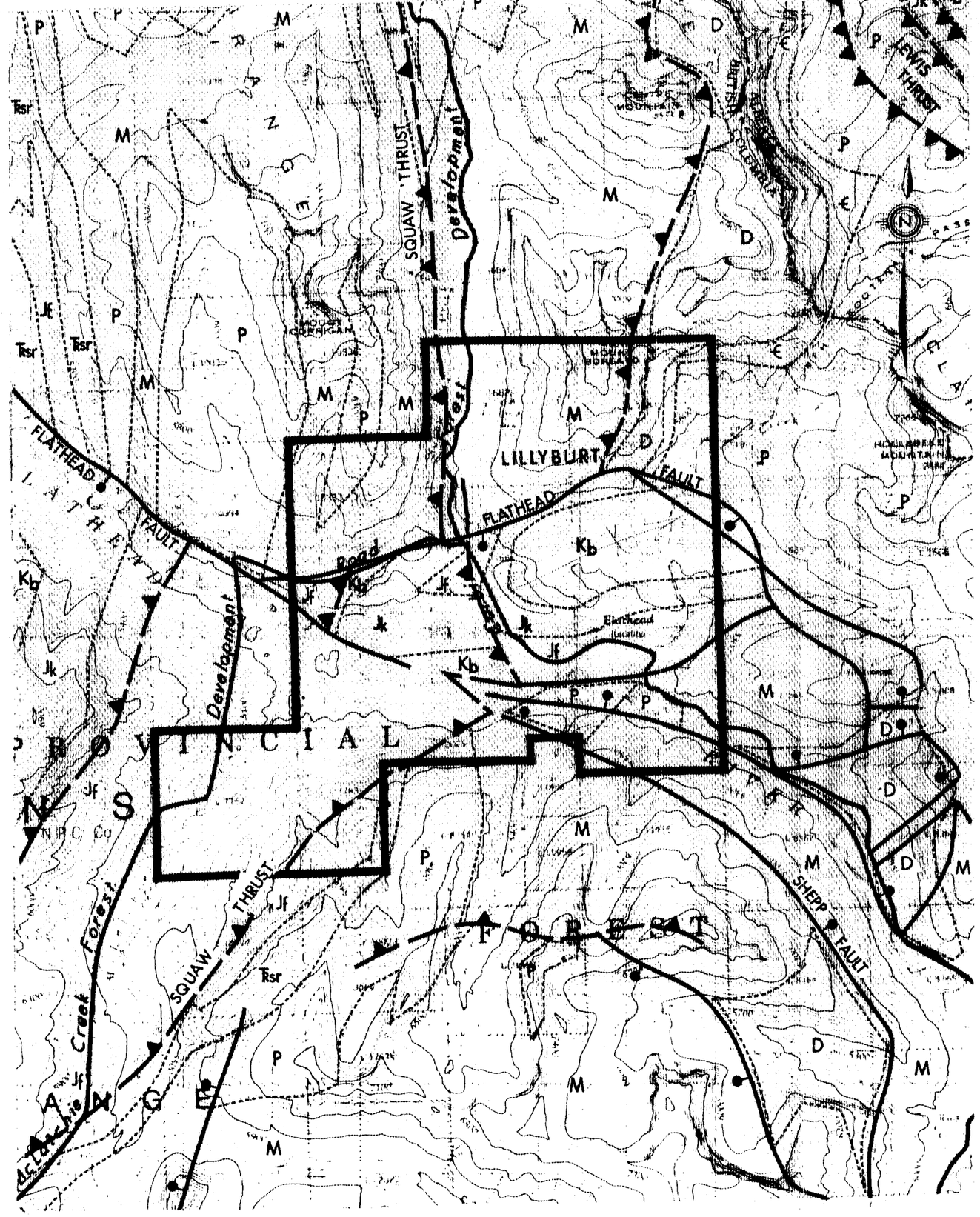
3.4 Costs of Work Done, 1980

Total expenditure as of December 31, 1980, for the 1980 field season was $318,891. A detailed summary of expenditures can be found in Appendix I.

4.0 GEOLOGY

4.1 Regional Geology

The Lillyburt Coal Prospect is located in the Flathead Valley graben structure as outlined by Price (1965). The property is bounded by the south-dipping Flathead normal fault to the north and east and a north-dipping normal fault located in the Flathead River to the south. Westward, coal-bearing strata are confined by the Squaw Thrust. Strata to the north and south of the property consists of Cambrian to Pennsylvanian carbonates. Shales of the Jurassic Fernie Formation are dominant west of the Squaw Thrust. Precambrian Purcell sandstones, argillites and limestones outcrop to the east of the property. Thrusting and associated folding are dominant structural features within the strata surrounding the Lillyburt prospect but are of minimum importance within the property.



Kb CRETACEOUS - BLAIRMORE GROUP, SANDSTONE, MUDSTONE, CONGLOMERATE.

Jk JURASSIC - KOOTENAY FORMATION, SANDSTONE, SILTSTONE, SHALE, CONGLOMERATIC SANDSTONE AND COAL.

Jf JURASSIC - FERNIE GROUP, SILTSTONE, SHALE, SANDSTONE AND SANDY LIMESTONE.

Tsr TRIASSIC - SPRAY RIVER FORMATION, SILTSTONE, SANDSTONE AND SHALE.

P PENNSYLVANIAN - ROCKY MOUNTAIN FORMATION, QUARTZITE, SANDSTONE AND CHERTY DOLOMITE.

M MISSISSIPIAN - RUNDLE GROUP AND BANFF FORMATION, PREDOMINANTLY LIMESTONE AND SHALE.

D DEVONIAN - INCLUDES PALLISER AND ALEXO FORMATIONS, AND FAIRHOLME GROUP, MAINLY LIMESTONE AND DOLOMITE WITH SOME SANDSTONE.

€ CAMBRIAN - ELKO AND FLATHEAD FORMATIONS, CRYSTALLINE DOLOMITE AND LIMESTONE, QUARTZITE AND QUARTZ SANDSTONE.

P PROTEROZOIC - PURCELL GROUP ROCKS INCLUDES THE KINTLA, SHEPPARD, SIYEH AND GRINNELL FORMATIONS.

GEOLOGICAL CONTACT (APPROXIMATE)

GRAVITY FAULT (APPROXIMATE - SOLID CIRCLE INDICATES DOWNTHROWN SIDE)

THRUST FAULT (ASSUMED - TEETH INDICATE UPTHRUST SIDE)

SCALE 1 : 50,000

MILES 0 2

METRES 0 1000 2000

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
KOOTENAY LAND DISTRICT
S.E. B.C.

GEOLOGICAL COMPILATION MAP

AUTHOR MCKINSTRY | SCALE 1 : 50,000 | ENCLOSURE No. 3
DATE FEB 1980 | REVISED | DRAWING No. HJ-68D
To Accompany

4.2 Lillyburt Stratigraphy (Appendix VII)

Coal at Lillyburt occurs in the upper Jurassic to Lower Cretaceous Coal Bearing Member of the Kootenay Formation. Lack of complete stratigraphic sections exposed on the property and diamond drill core prevent the determination of the true stratigraphic position of all the coal seams with respect to the Basal (Moose Mountain Member) sandstone.

Shales of the Fernie Formation underlying Kootenay strata outcrop on the west end of the property on both sides of the Flathead River. The presence of the Basal sandstone could not be established with certainty, although sequences exposed near the Flathead River may belong to this unit.

Evidence from drill holes such as LB-1 and LBR-214 suggest a true total thickness of 260 meters for Kootenay strata along the south limb of the Lillyburt syncline. This figure may be reduced to 180 meters in the north part of the property close to the Flathead normal fault. A regular stratigraphic sequence can be seen at the north end of the property (Enclosure #4). This sequence extends from the Cadomin conglomerate of the Cretaceous Blairmore Group to the upper part of the Coal Bearing Member of the Kootenay Formation. Drilling has detailed five coal measures of economic interest ranging from 1 meter to 18 meters true thickness. Between these seams are siltstones, sandstones and shales typical of the Kootenay sequence (Appendices VIII and IX).

4.3 Structural Geology

Lillyburt, located within the Flathead Valley graben structure, is characterized by small and large scale gravity faulting. The Flathead normal fault is the predominant structure in the area, separating Jurassic-Cretaceous Kootenay and Blairmore strata from surrounding Pre-Cambrian to Pennsylvanian carbonates to the north and east. Displacement on this fault has been estimated to be approximately 1200 meters near the Flathead townsite (Price, 1965). Associated with this major structure are several strike-slip wrench faults sub-parallel to the main fault system. Disruption within the Kootenay stratigraphy is in the order of tens of meters. The southern margin of the property is again defined by a large scale gravity fault which juxtaposes Jurassic Fernie shales against Pennsylvanian and Mississippian carbonates. Displacement and attitude of this structure are as yet unknown. The western boundary of the property is defined by the Squaw Thrust which has transposed Jurassic Fernie strata over Cretaceous Blairmore rocks. A subsidiary thrust may be present within Squaw Creek (see Appendix VII). Its existence is postulated on the basis of repetition of a Jurassic Fernie-Kootenay succession from west to east across the property. Within the major structural block, east of Squaw Creek and north of the Flathead River, the coal-bearing sedimentary rocks have been folded into a tight, asymmetric, east-plunging syncline.

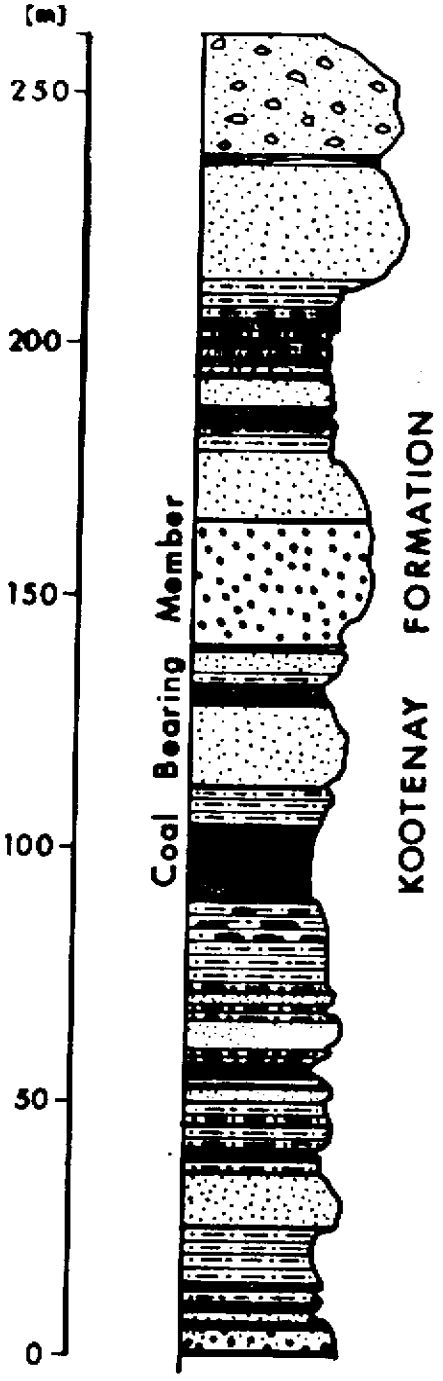
4.3 (continued)

This syncline is characterized by a moderate dipping (30^{o}) south limb and steeply-dipping ($60-80^{o}$) north limb. The axial plane of this fold trends approximately east-west and dips northward 80^{o}. Evidence suggests the fold axis of the syncline flattens out eastward and may in fact be gently warped. Intense brecciation and minor folding and fracturing are minor structures associated with the major normal faulting.

West of Squaw Creek, the Kootenay-Fernie strata appear to have been folded into a tight steeply plunging overturned anticline trending northeast-southwest. Outcrop exposure and limited drilling preclude any further assessment of this area at this time.

4.4 Coal Geology (Enclosure 4)

1980 rotary drilling has defined five seams of economic interest at Lillyburt. Geophysical log interpretation suggests Seam E, the highest seam in the sequence, is more of a coal zone than a seam. Numerous shale and siltstone partings up to two meters thick separate these coal partings from each other. The zone can be up to 15 meters thick but may only contain four meters of coal.



Cadomin Formation (conglomerate)

	COAL Net / Gross
SEAM "F"	2.4m/6.0m
SEAM "E"	1.9m/1.95m
SEAM "D"	1.9m/1.95m
SEAM "C"	13.9m/15.3m
SEAM "B"	0.8m/2.6m
SEAM "A"	3.0m/4.5m

Moose Mountain Member ?? (Sandstone)

LILLYBURT
B.C.
TYPICAL
STRATIGRAPHIC SECTION

Enclosure No. 4 SCALE 1:1500

4.4 (continued)

Seam D, 36 meters below Seam E in section, has a very consistent geophysical signature from drill hole to drill hole. It averages two meters thick, with a distinct half-meter shale parting in the middle.

Seam C is the thickest seam on the property, attaining an aggregate thickness of 35 meters in one locality. However, thickness tends to vary from 12 to 18 meters along strike westward on the south limb of the syncline. A very prominent 13-meter split is evident on the east end of the south limb but pinches out westward over an 800 meter strike length. Aside from this split, located in the middle of the seam, contamination of the seam is slight. Seam C is approximately 40 meters downsection from Seam D.

A further 40 meters downsection is Seam B. It is from four to seven meters thick with either a three-meter split in the middle or numerous thin shale partings disrupting the coal.

Forty to 65 meters downsection from Seam B is Seam A. This seam varies from 2-1/2 to 8-1/2 meters thick and can be quite shaley in places. This seam may rest on the Kootenay Basal sandstone but diamond drill coring is needed to substantiate this.

5.0 MINEABILITY AND COAL RESERVES

5.1 Reserves

Coal reserves are always difficult to ascertain with complete accuracy. However, two sets of calculations have been performed on the Lillyburt data in an attempt to obtain a better working knowledge of the economics of the property.

5.1a Calculation #1

Initially, the first set of calculations were carried out on the basis of mineability of the entire syncline. Certain assumptions and considerations are implicit in this approach. The following are some of the more pertinent points:

(a) The synclinal structure is continuous from south limb to north limb.

(b) The fold axis plunge flattens with depth from west to east.

(c) The coal thickness does not vary dramatically with strike length.

(d) Reserves are calculated from the nose of the fold where it outcrops in the west to section line 4300 in the east.

5.1a (continued)

(e) Stratigraphy is continuous throughout the syncline.

(f) Strike length of influence from one section to the next is scaled proportionally, based upon surface and drilling information.

(g) All seams are mineable.

Discussion: Of the above points, the assumption that structure is continuous from south to north may not be entirely correct. The possibility of other, as yet undiscovered, east-west trending normal faults disrupting the synclinal structure must be taken into account. Further drilling in 1981 should hopefully resolve this question. There is strong geological evidence to suggest a flattening of the synclinal fold axis from west to east. In addition, stratigraphy appears to be correlative from section to section. However, coal thickness in some of the seams, particularly Seams E, C and A, show significant variability.

The accompanying chart (Enclosure 5) details the numbers used in the above calculation. Total inferred in-situ geological resources are determined to be 133,383 tonnes of coal with an overburden-coal ratio of 6.3 m^3/tonne.

5.1b Calculation #2

The second set of calculations are of a more detailed nature, incorporating an open-pit design along the limbs of the syncline. Pit depth was predetermined to be approximately 150 meters. Pit design incorporated a high wall angle of 45^{o} for the south limb structure and a high wall angle of 50^{o} for the north limb. Width of the pit at the bottom was set at 80 meters. Assumptions and considerations for these calculations are the following:

(a) Seam thicknesses are constant from section to section.

(b) Small-scale normal faulting has been accounted for in the calculations.

(c) All seams are mineable.

(d) Strike length of influence from one section to the next is scaled proportionately based upon surface and drilling information.

(e) Stratigraphy is continuous from section to section.

(f) A small section at right angles to the trend of strata near section 2500 on the south limb of the syncline was constructed to facilitate computations around the nose of the fold. This section is omitted from this report.

5.1b (continued)

A discussion of the above assumptions has been made in the previous set of calculations. Enclosures 6 and 7 detail the numbers used in Calculation #2. The more detailed nature of these computations suggest total geological in-situ indicated reserves for Lillyburt are 24.8×10^6 tonnes of coal at an overburden-coal ratio of 3.8 m^3/tonne, under the constraints of this pit design.

5.2 Mineability

Due to the valley setting and moderate elevations of Lillyburt, there are no topographic limitations to the mining potential of the property. Consideration, however, must be given to the proximity of Squaw Creek and the Flathead River. These water-courses raise potential flood problems to any pit design. In addition, mining activity must be of such a nature as to have minimal impact on the ecology of the river systems.

It should be stressed here that due to the folded nature of the strata, coal seams dip away from both the Flathead River and Squaw Creek. Mining activity then would tend to move away from both river systems. With careful mine design incorporating hydrological studies, mining of Lillyburt coal with minimal environmental disturbance could be achieved.

5.2 (continued)

In summary, then, reserves and location make Lillyburt an attractive coal property. However, mine design must interact with and compensate for the existing fluvial system adjacent to the property.

6.0 COAL QUALITY

Enclosed with this report are trench and drill hole coal analyses obtained during the 1979 exploration field season (Appendix VI).

Preliminary results suggest that Lillyburt is a medium volatile bituminous coal property. Table I presents proximate analytical information on Seam C. Table II is a listing of more detailed tests carried out on a composite sample comprising Seams B, C and D.

TABLE I

SEAM 'C'

AS RECEIVED

	RANGE
MOISTURE:	8.6 - 13.3%
INHERENT MOISTURE:	.32 - .72 %
ASH:	28.3 - 40.4%
FSI:	1.0

PROXIMATE* ANALYSIS (1.6 S.G.)

	RANGE
ASH:	7.5 - 13.9%
VOLATILE MATTER:	21.0 - 23.5%
FIXED CARBON:	64.3 - 68.3%
HEAT CONTENT:	-
SULPHUR:	-
YIELD:	42.0 - 58.0%

* Air Dry Basis

TABLE I

SEAMS B, C AND D (COMPOSITE)

ULTIMATE ANALYSIS*	
Carbon	76.01
Hydrogen	4.02
Sulphur	0.32
Nitrogen	0.96
Ash	13.32
Oxygen (by difference)	5.37

* Dry Basis

Grindability Index = 86

Mean Reflectance = 1.2

ASH FUSABILITY*	
Initial	2370
Softening	2700
Hemispherical	2700+
Fluid	+

* Reducing

TRACE ANALYSIS (ppm)	
Cd	0.80
Pb	10.50
Ni	14.50
Hg	0.09
Be	1.20
Cr	12.50
As	0.80
Sb	0.78
Se	0.87

ASH ANALYSIS (%)	
S_1O_2	55.33
AC_2O_3	25.60
Fe_2O_3	4.43
T_1O_2	1.75
P_2O_5	0.49
CaO	4.01
MgO	1.86
SO_3	2.50
Na_2O	0.15
K_2O	0.90
SrO	0.07
BaO	0.34
Mn_3O_4	-
LOF	0.28

7.0 RECOMMENDATIONS FOR FURTHER WORK

Further exploration work is required on the Lillyburt project and in brief should include the following:

(a) Further drilling to define:

- i) Reserves.
- ii) Coal Quality.
- iii) Structure.
- iv) Stratigraphy.
- v) Overburden Depth and Ratio.

(b) Geological Mapping (Scale 1:2000):

- i) Detailed mapping of all outcrops on the property.
- ii) Correlation of coal seam outcrops.
- iii) Structural analysis of the geology.

(c) Geotechnical:

- i) Study of hydrology; installation of piezometers.
- ii) Geotechnical core logging.

(d) Trenching:

- i) Describe new coal seam exposures.
- ii) Aid geological correlations.

8.0 BIBLIOGRAPHY

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PRICE, R.A., 1965 — Flathead Map Area, British Columbia and Alberta, Geological Survey Canada Memoir 336

ROBERTSON, W.F., 1909 — Report of the Ministry of Mines, British Columbia, p 175.

	SECTION O/C TO 2500					SECTION 2500 TO 3100					SECTION 3100 TO 3300					SECTION 3300 TO 3500					SECTION 3500 TO 3900					SECTION 3900 TO 4300				
SEAM	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
COAL AVERAGE THICKNESS (m)	6.70	2.2	24.6	1.5		5.06	2.74	21.81	2.86	6.17	4.45	3.13	18.92	3.32	6.95	4.32	3.12	17.7	3.12	5.67	4.88	2.56	16.57	2.42	4.51	5.46	2.09	15.4	1.8	4.3
STRIKE LENGTH OF INFLUENCE (m)	500	425	325	250		1500	1375	1150	950	775	1937.5	1950	1700	1475	1325	2087.5	2100	1850	1700	1500	2225	2112.5	1887.5	1775	1612.5	1240	1237.5	1187.5	1150	1100
DIP SLOPE LENGTH (m)	330	200	120	50		560	560	560	560	560	200	200	200	200	200	200	200	200	200	200	400	400	400	400	400	400	400	400	400	400
VOLUME OF COAL ($\times 10^3 m^3$)	1106	187	959	19		4250	2110	14046	1522	2678	1724	1221	6433	979	1842	1804	1310	6549	1061	1701	4343	2163	12510	1718	2909	2708	1035	7315	828	1892
MASS OF COAL ($\times 10^3$ TONNES)	1659	280.5	1438.5	28.5		6375.5	3165	21069	2283	4017	2586	1831.5	9649.5	1486.5	2763	2706	1965	9823.5	1591.5	2551.5	6514.5	3244.5	1876.5	2577	4363.5	4062	1552.5	10972.5	1242	2838

WASTE & COAL

	SECTION O/C TO 2500	SECTION 2500 TO 3100	SECTION 3100 TO 3300	SECTION 3300 TO 3500	SECTION 3500 TO 3900	SECTION 3900 TO 4300
AREA (m^2)	71938	349044	589207	687390	730632	413051
STRIKE LENGTH BETWEEN SECTIONS (m)	330	560	200	200	400	400
VOLUME ($\times 10^6 m^3$)	23.7	195.5	117.8	137.5	292.3	165.2

TOTAL COAL = 86922 m^3 OR 133383 TONNES

TOTAL WASTE & COAL = $932 \times 10^6 m^3$
(LESS) COAL = $88.9 \times 10^6 m^3$
TOTAL WASTE = $843.1 \times 10^6 m^3$

RATIO OVERBURDEN TO COAL IS $843.1 \times 10^6 / 88.9 \times 10^6 = 9.5 : 1\ m^3/m^3$
OR $843.1 \times 10^6 / 133.38 \times 10^6 = 6.32 : 1\ m^3$ / TONNE

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EXPLORATION

LILLYBURT
S.E. B.C

GEOLOGICAL IN SITU RESOURCE CALCULATIONS

(LILLYBURT SYNCLINE)

AUTHOR: B.McKINSTRY	SCALE:	ENCLOSURE No:
DATE 81-03-09	REVISED:	DRAWING No: BA-278
To Accompany		

	SECTION O/C TO 2500					SECTION 2500 TO 3100					SECTION 3100 TO 3300					SECTION 3300 TO 3500					SECTION 3500 TO 3900					SECTION 3900 TO 4300				
SEAM	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
COAL AVERAGE THICKNESS (m)	6.70	2.2	24.6	1.5		5.06	2.74	21.81	2.86	6.17	4.45	3.13	18.92	3.32	6.95	4.32	3.12	17.7	3.12	5.67	4.88	2.56	16.57	2.42	4.51	5.46	2.09	15.4	1.8	4..
STRIKE LENGTH OF INFLUENCE (m)	500	425	325	250		1500	1375	1150	950	775	1937.5	1950	1700	1475	1325	2087.5	2100	1850	1700	1500	2225	2212.5	1887.5	1775	1612.5	1240	1237.5	1187.5	1150	110
DIP SLOPE LENGTH (m)	330	200	120	50		560	560	560	560	560	200	200	200	200	200	200	200	200	200	200	400	400	400	400	400	400	400	400	400	40
VOLUME OF COAL ($\times 10^3 m^3$)	1106	187	959	19		4250	2110	14046	1522	2678	1724	1221	6433	979	1842	1804	1310	6549	1061	1701	4343	2163	12510	1718	2909	2708	1035	7315	828	189
MASS OF COAL ($\times 10^3$ TONNES)	1659	280.5	1438.5	28.5		6375.5	3165	21069	2283	4017	2586	1831.5	9649.5	1486.5	2763	2706	1965	9823.5	1591.5	2551.5	6514.5	3244.5	1876.5	2577	4363.5	4062	1552.5	10972.5	1242	283

WASTE & COAL

	SECTION O/C TO 2500	SECTION 2500 TO 3100	SECTION 3100 TO 3300	SECTION 3300 TO 3500	SECTION 3500 TO 3900	SECTION 3900 TO 4300
AREA (m^2)	71938	349044	589207	687390	730632	413051
STRIKE LENGTH BETWEEN SECTIONS (m)	330	560	200	200	400	400
VOLUME ($\times 10^6$ m^3)	23.7	195.5	117.8	137.5	292.3	165.2

TOTAL COAL = 88922 m^3 OR 133383 TONNES

TOTAL WASTE & COAL = $932 \times 10^6 m^3$
(LESS) COAL = $88.9 \times 10^6 m^3$
TOTAL WASTE = $843.1 \times 10^6 m^3$

RATIO OVERBURDEN TO COAL IS $843.1 \times 10^6 / 88.9 \times 10^6 = 9.5 : 1$ m^3/m^3
OR $843.1 \times 10^6 / 133.38 \times 10^6 = 6.32 : 1$ m^3/ TONNE

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Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B.C.

GEOLOGICAL IN SITU RESOURCE CALCULATIONS

(LILLYBURT SYNCLINE)

AUTHOR B.McKINSTRY	SCALE:	ENCLOSURE No:
DATE: 81-03-09	REVISED:	DRAWING No: BA-27
To Accompany		

COAL

	SECTION 2900 TO 3100					SECTION 3100 TO 3300					SECTION 3300 TO 3500					SECTION 3500 TO 3900				
SEAM	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
COAL AVERAGE THICKNESS (m)	5.6	2.6	18.0	2.6	4.0	3.0	1.0	18.0	2.6	4.0	—	1.0	18.0	2.6	4.0	—	1.0	18.0	2.6	4.0
STRIKE LENGTH OF INFLUENCE (m)	170	135	105	165	160	152	355	300	337	337	—	220	220	210	200	—	390	390	390	390
DIP SLOPE LENGTH (m)	40	135	157	133	118	30	130	185	175	150	—	128	200	166	115	—	190	202	174	130
VOLUME OF COAL (m^3)	772158	47385	296730	57057	75520	13680	46150	999000	153335	202200	—	28160	792000	90636	92000	—	74100	1418040	176436	202800
MASS OF COAL (× 10 TONNES)	1158.2	71.08	445.1	85.58	113.3	20.5	69.22	1498.5	230	303.3	—	42.24	1188	135.9	138	—	111.15	2127	264.65	304.2

COAL & WASTE

	SECTION 2900 TO 3100	SECTION 3100 TO 3300	SECTION 3300 TO 3500	SECTION 3500 TO 3900
AREA (m^2)	28194.7	29930.4	26749.4	26048
STRIKE LENGTH BETWEEN SECTIONS (m)	150	244	225	412
VOLUME ($\times 10^6$ m^3)	4,229,200	7,303,010	6,018,610	10,731,776

LILLYBURT RESERVES (GEOLOGICAL IN SITU)

Total Coal : 25.85 $\times 10^6$ TONNES

Total Waste: 95.15 $\times 10^6$ m^3

Ratio is $\frac{95.15 \times 10^6}{25.85 \times 10^6}$ = 3.7 : 1 m^3/TONNES

TOTAL COAL = 5518000 m^3 OR 8277000 TONNES

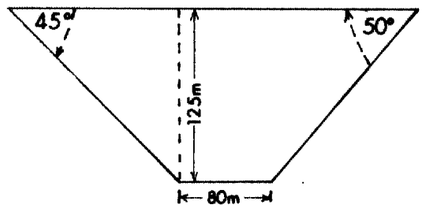
TOTAL WASTE & COAL = 28282596 m^3

(LESS) COAL = 5518000 m^3

TOTAL WASTE = 22764596 m^3

RATIO OVERBURDEN TO COAL IS $\frac{22764596}{5518000}$ = 4.1:1 m^3/m^3

OR $\frac{22764596}{8277000}$ = 2.75:1 m^3/TONNE



PIT CONFIGURATION

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Crows Nest Resources Limited
EXPLORATION

LILLYBURT
S.E. B.C.

GEOLOGICAL IN SITU RESERVE CALCULATIONS

(NORTH LIMB)

AUTHOR B.McKINSTRY	SCALE	ENCLOSURE No.
DATE 81·03·09	REVISED	DRAWING No. BA-280
To Accompany		

COAL

SEAM	SECTION FAULT TO 700					SECTION 700 TO 1100					SECTION 1100 TO 2500					SECTION 2500 TO 3100					SECTION 3100 TO 3300					SECTION 3300 TO 3500					SECTION 3500 TO 3900					SECTION 3900 TO 4300				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	* A	* B	* C	D	E	A	B	* C	D	E
COAL AVERAGE THICKNESS (m)		2.0	13.0	2.6	2.0	4.5	2.0	15.5	2.6	2.0	9.0	2.6	24.0	2.6	4.0	5.6	2.6	18.0	2.6	4.0	5.6	2.6	18.0	2.6	4.0	5.6	2.6	18.3	2.6 1.6	3.5 4.3	3.2 4.3 2.6	1.73	12.6 2.6	18.3	1.6	3.5	4.3 4.75	1.73	12.6	1.6	4.85
STRIKE LENGTH OF INFLUENCE (m)		300	300	290	200	200	420	420	410	416	600	515	432	356	285	521	466	428	385	350	210	205	205	200	200	200	200	200	200 60	115 205	190 150 100	200 173	200 200		400	400	75 277	400	160 240	400	400
DIP SLOPE LENGTH (m)		140	110	65	20	270	140	110	65	20	268	175	110	65	30	246	200	145	100	70	270	240	190	150	110	330	295	208	168 118	80 113	190 110 173	118 105	118 118		80	40.5	73 74	75	118 70	80	40.5
VOLUME OF COAL (m^3)		84000	429000	49010	11200	243000	117600	716100	69290	16640	1447200	234325	1140480	60164	34200	717730	242320	1117080	100100	98000	317520	127920	701100	78000	88000	369600	153400	761280	99688	131809	221990	146999	729240	51200	56700	120908	51900	449568	51200	78570
MASS OF COAL ($\times 10^3$ TONNES)		126	643.5	73.5	16.8	364.5	176.4	1074.1	103.9	24.96	217.1	351.48	171.07	90.25	51.3	1076.6	363.5	1675.5	150.15	147	476.3	191.88	1051.6	117	132	554.4	230.1	1141.9	149.5	197.7	332.98	220.5	1093.9	76.8	85.05	181.35	77.85	674.3	76.8	117.86

* Double & triple figures due to faulting influence, requiring piecemeal calculations

COAL & WASTE

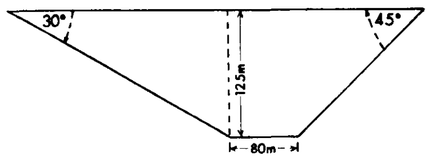
	SECTION FAULT TO 700	SECTION 700 TO 1100	SECTION 1100 TO 2500	SECTION 2500 TO 3100	SECTION 3100 TO 3300	SECTION 3300 TO 3500	SECTION 3500 TO 3900	SECTION 3900 TO 4300
AREA (m^3)	13142.5	21295	* 9600 9987.5 10750	* 11600 13282.5 13750	52312.5	47205	35392.5	25389
STRIKE LENGTH BETWEEN SECTIONS (m)	290	400	403 295 470	400 350 465	200	200	400	400
VOLUME ($\times 10^6$ m^3)	3,811,325	8,518,000	11,867,612	15,682,675	10,462,500	9,441,000	14,157,000	10,155,600

* Multiple figures due to folding influence, requiring piecemeal calculations

TOTAL COAL = 11714029 m^3 OR 17571044 TONNES

TOTAL WASTE & COAL = $84.095 \times 10^6 m^3$
(LESS) COAL = $11.714 \times 10^6 m^3$
TOTAL WASTE = $72.381 \times 10^6 m^3$

RATIO OVERBURDEN TO COAL IS $\frac{72.381 \times 10^6}{11.714 \times 10^6} = 6.2 : 1\ m^3/m^3$
OR $\frac{72.381 \times 10^6}{17.571 \times 10^6} = 4.1 : 1\ m^3/\text{TONNE}$



PIT CONFIGURATION

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406 1/3 (1)

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
S.E. B.C

GEOLOGICAL IN SITU RESERVE CALCULATIONS
(SOUTH LIMB)

AUTHOR: B.McKINSTRY	SCALE:	ENCLOSURE No:
DATE: 81-03-09	REVISED:	DRAWING No: BA-279
To Accompany		

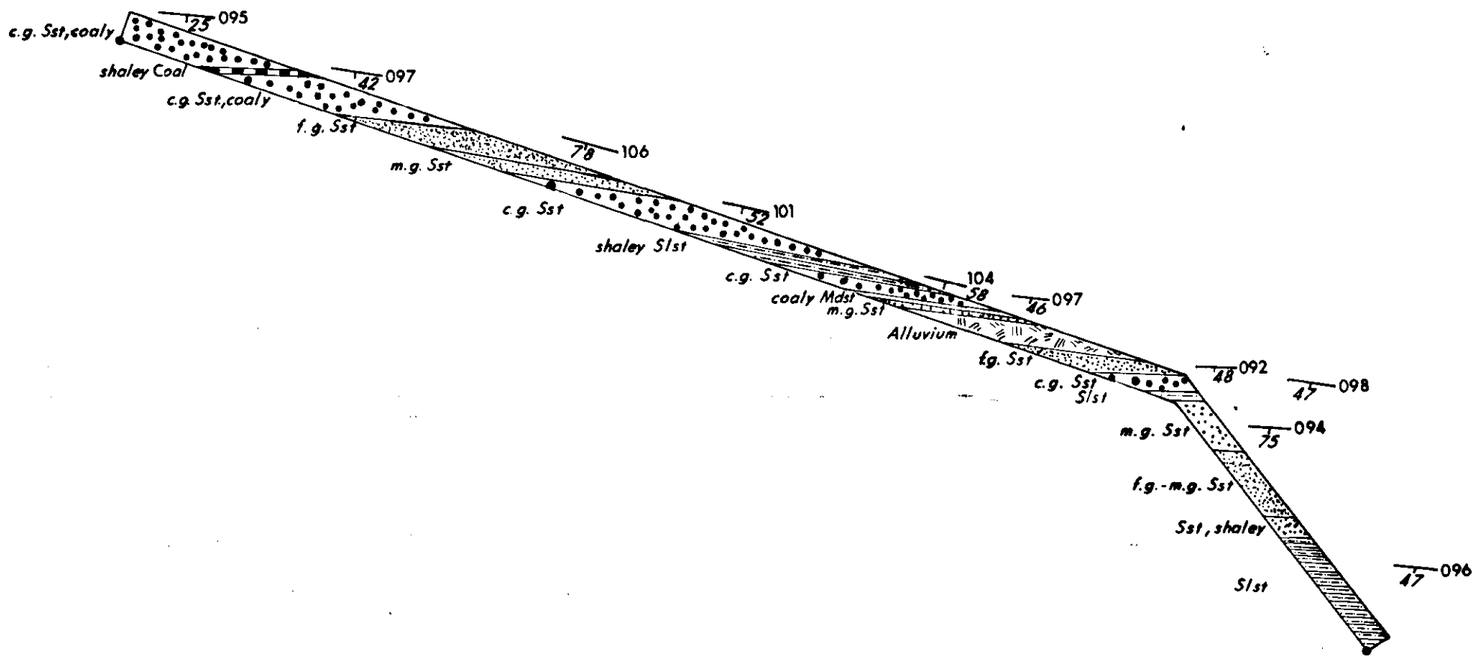
ENCLOSURE 8

672625

5471800

672775

5471800



5471700

672625

Scale 1:5

0 10 20 30 40 50

(Meters)

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672775

5471700

NOTE : TRENCH WIDTH IS EXAGGERATED TWO AND ONE-HALF TIMES FOR ILLUSTRATIVE PURPOSES

106 1/3

Crows Nest Resources Limited
EXPLORATION

LILLYBURT

(2) PLAN VIEW OF
TRENCH 80-03

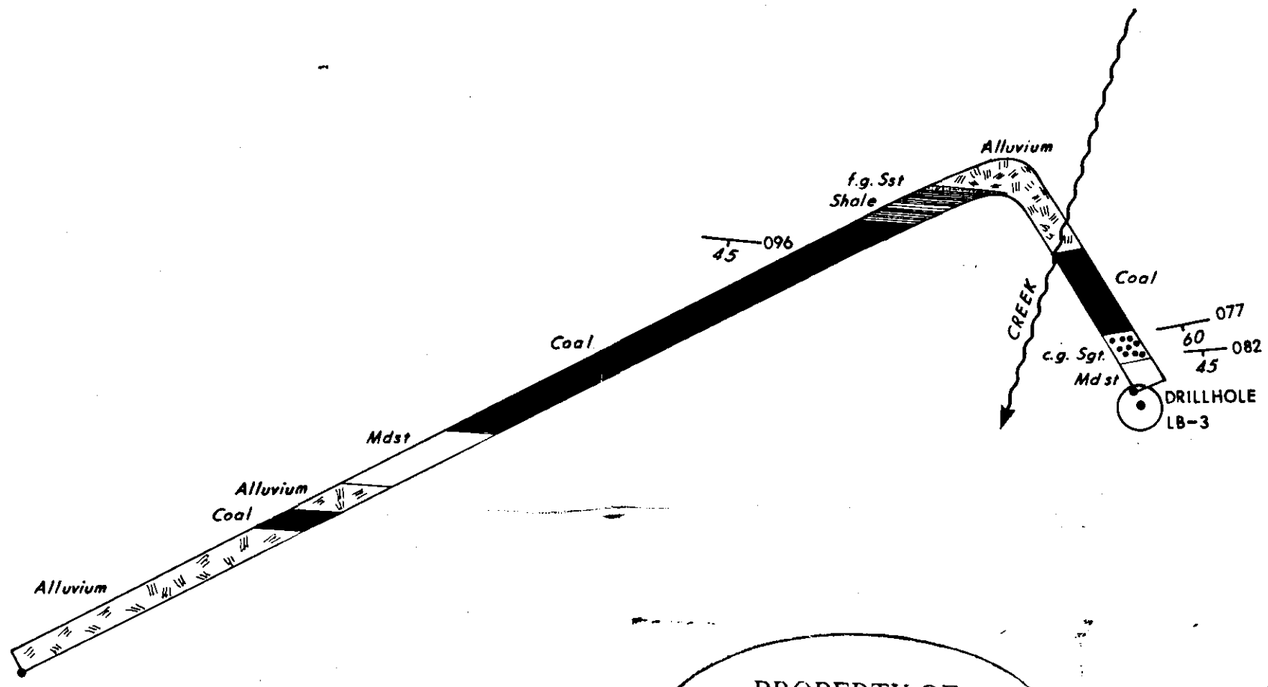
AUTHOR: McKINSTRY	SCALE:	ENCLOSURE No:
DATE: 81 03 12	REVISED:	DRAWING No: HC-70B
To Accompany		

672250

5471650

672380

5471650



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INFORMATION CENTRE

DRILLHOLE
LBR-203

5471550

672250

5471550

672380

Scale 1:5

0 10 20 30 40 50

(Meters)

NOTE: TRENCH WIDTH IS EXAGGERATED TWO AND ONE-HALF TIMES FOR ILLUSTRATIVE PURPOSES

Crows Nest Resources Limited
EXPLORATION
LILLYBURT

(3) PLAN VIEW OF
TRENCH 80-01

AUTHOR: Mc KINSTRY	SCALE:	ENCLOSURE No:
DATE: 81 03 12	REVISED:	DRAWING No: HC-70
To Accompany		

406 2/3

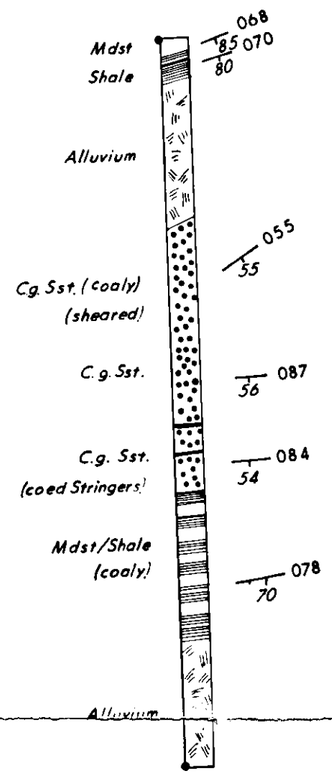
672500

5471750

672600

5471750

DRILLHOLE
LBR - 204



N

5471600

672500

Scale 1:5

0 10 20 30 40 50

(Meters)

672600

5471600

NOTE: TRENCH WIDTH IS EXAGGERATED TWO AND ONE-HALF TIMES FOR ILLUSTRATIVE PURPOSES

Crows Nest Resources Limited
EXPLORATION

LILLYBURT

PLAN VIEW OF
TRENCH 80-02

(4)

AUTHOR McKINSTRY	SCALE	ENCLOSURE No.
DATE 81 03 12	REVISED	DRAWING No. HC-70A
To Accompany		

406 1/3

LILLYBURT PROJECT

1900

KOOTENAY DISTRICT
B.C.

VOLUME III

B. McKINSTRY

82 G/7

406 3 of 3

APPENDIX VI

MAY 2 5 1981
C.N.R.L.
RECORD CENTRE

RECEIVED
MAY 2 5 1981
C.N.R.L.
RECORD CENTRE

RETURN TO
C. N. R. L. Records
CENTRE

CROWS NEST RESOURCES ALYSIS REPORT

AREA: LILYBURT HOLE NO. ~~TRENCH~~ DATE: ~~August 2, 1979~~ ANALYST ~~Bernie Hudyma~~

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC BASI
79-80	M1 Plastic			RAW	13.71	3.99	66.77							ADB
						17.15								ARB
							69.54							DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-81	M2			RAW	18.52	7.44	41.69	24.06	26.81					ADB
						24.58								ARB
							45.04	25.99	28.97					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-82	M3			RAW	16.34	2.75	84.36							ADB
						18.64								ARB
							86.75							DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES ALYSIS REPORT

AREA: LILYBURT HOLE NO. TRENCH DATE: August 2, 1979 ANALYST BERNIE HUDYMA

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC BASI
79-83	M4			RAW	16.50	3.91	67.98							ADB
						19.77								ARB
							70.75							DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-109	M6			RAW	8.25	6.07	34.45	23.00	36.48					ADB
						13.82								ARB
							36.68	24.49	38.83					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-110	M7			RAW	5.81	6.73	37.87	23.07	32.33					ADB
						12.15								ARB
							40.60	24.74	34.66					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES ALYSIS REPORT

AREA: LILYBURT HOLE NO. TRENCH DATE: August 2, 1979 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC. BASIS
79-111	M8			RAW	4.79	7.37	34.92	22.18	34.53					ADB
						11.81								ARB
							38.78	23.95	37.27					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-122	T1	OUTCROP		RAW		8.20	24.48	28.97	38.35					ADB
														ARB
							26.67	31.56	41.77					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
79-123	M9	OUTCROP		RAW		7.44	23.92	27.18	41.46					ADB
														ARB
							25.84	29.37	44.79					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES ANALYSIS REPORT

AREA: LILYBURT HOLE NO. TRENCH DATE: August 2, 1979 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CAL BAS
79-124	H1	ROADCUT-OUTCROP		RAW		9.49	23.32	30.58	36.61					AD
														AR
							25.77	33.78	40.45					DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB
79-125	F1			RAW		1.88	28.92	19.84	49.36					AD
														AR
							29.47	20.22	50.31					DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB
79-126	T2			RAW		4.58	42.69	22.56	30.17					AD
														AR
							44.74	23.64	31.62					DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB
				FLOAT										AD
														DB

CROWS NEST RESOURCES ALYSIS REPORT

AREA: Lilyburt (Trench Samples) HOLE NO. _____ DATE: June 28, 1979 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC BASIS
9-45			46 Trench Map Card A-4	RAW	26.46	4.97	50.48	22.07	22.37	0				ADB
						30.12	37.12	16.23	16.53					ARB
							53.12	23.22	23.66					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
9-46			65 Coal Spoil	RAW	.44	1.21	23.40	17.59	57.80	1				ADB
						1.65								ARB
							23.69	17.81	58.50					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				RAW										ADB
														ARB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES — ANALYSIS REPORT

AREA: LILLY BURT HOLE NO. LB-3 DATE: March 25/80 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC. BASIS
-707			4-52 Drill Cuttings	RAW	7.97	.72	28.29			1				ADB
														ARB
							28.49							DB
				1.6 FLOAT		.79	9.27	22.83	67.11	1		42		ADB
		C					9.34	23.01	67.65					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-708			52-61 Drill Cuttings	RAW	7.50	.74	65.09			0				ADB
														ARB
							65.57							DB
				1.6 FLOAT		.59	15.51	21.84	62.06	2		8		ADB
		C					15.60	21.97	62.43					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-10	Composite of 79-707+708		4-61	RAW		1.08	30.55			1				ADB
														ARB
							30.88							DB
				1.6 FLOAT		1.94	9.28	22.24	66.54	1		39		ADB
		C					9.46	22.68	67.86					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES - ANALYSIS REPORT

AREA: Lilly Burt HOLE NO. LB-2 DATE: March 25/80 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC BASI
-702			140-143 Drill Cuttings	RAW	.73	.57	59.16			1				ADB
														ARB
							59.50							DB
		D		1.6 FLOAT		.58	17.46	23.03	58.93	5½		32		ADB
							17.56	23.16	59.28					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-703			176-178 Drill Cuttings	RAW	9.52	.61	33.46			1				ADB
														ARB
							33.66							DB
		C		1.6 FLOAT		.67	7.50	23.51	68.32	3		58		ADB
							7.55	23.67	68.78					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-704			178-193 Drill Cuttings	RAW		.32	40.29			1				ADB
														ARB
							40.42							DB
		C		1.6 FLOAT		.97	11.59	22.51	64.93	1½		49		ADB
							11.70	22.73	65.57					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

CROWS NEST RESOURCES - ALYSIS REPORT

AREA: Lilly Burt HOLE NO. LB-2 DATE: March 28/80 ANALYST Bernie Hudyma

LAB. NO.	SAMPLE NO.	SEAM	INTERVAL (METRES)	FRACTION	% AIR DRY LOSS	% MOISTURE	% ASH	% V.M.	% F.C.	F.S.I.	SULFUR	% YIELD	BTU/ LB	CALC. BASIS
-705			193-195 Drill Cuttings	RAW	12.87	.51	36.42			1				ADB
														ARB
							36.61							DB
		C		1.6 FLOAT		.77	13.89	21.03	64.31	1		55		ADB
							14.00	21.19	64.81					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-706			225-227	RAW	16.91	.48	28.34			1				ADB
														ARB
							28.48							DB
		B		1.6 FLOAT		.56	9.76	21.42	68.28	1½		66		ADB
							9.81	21.54	68.65					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB
-9			Composite of 79-702+703+704+705 + 706	RAW		.83	42.68			1				ADB
														ARB
							43.03							DB
				1.6 FLOAT		1.19	12.03	22.17	64.61	1		48		ADB
							12.17	22.44	65.39					DB
				FLOAT										ADB
														DB
				FLOAT										ADB
														DB

SOLID FUEL ANALYSIS LABORATORY
REPORT OF ANALYSIS
HEAD: W.J. MONTGOMERY

SAMPLE NUMBER 2691-80
I.D. NUMBER LILLYBURN.
DATE REC'D 31-03-80

****

	AS REC'D	DRY
PROXIMATE ANALYSIS		
Moisture	1.81	
Ash	13.08	13.32
Volatile Matter	21.55	21.95
Fixed Carbon (By Difference)	63.56	64.73
ULTIMATE ANALYSIS		
Carbon	74.63	76.01
Hydrogen	3.95	4.02
Sulphur	0.31	0.32
Nitrogen	0.94	0.96
Ash	13.08	13.32
Oxygen (By Difference)	5.28	5.37
CALORIFIC VALUE		
Calories per gm.	7118	7249
BTU per lb.	12812	13048

ASH FUSABILITY	OXIDIZING	REDUCING
Initial		2370
Softening		2700
Hemispherical		2700+
Fluid		+

KHUR DILATOMETER DATA

Dilatation

Ti	- Soft Temp.	C	0
Tii	- Max. Cont. Temp.	C	0
Tii	- Max. Dil. Temp.	C	0
Contraction		%	0.0
Dilatation		%	0.0

PETROGRAPHIC DATA

VITRINOID TYPES

TYPE	PERCENT
09	0.0
10	0.0
11	7.3
12	22.0
13	7.3
14	0.0
15	0.0
16	0.0
17	0.0

PETROGRAPHIC COMPOSITION

REACTIVE COMPONENTS	VOLUME %
Total Vitrinoid	36.6
Reactive Semi-Fus.	20.7
Exinoid+Resinoid	0.0
Total Reactive Comp.	57.3

PETROGRAPHIC INDICES

Mean Reflectance	1.2
Balance Index	0.0
Strength Index	0.0
Stability Index	0.0

INERT COMPONENTES

Inert Semi-Fus.	20.8
Micrinoids	3.2
Fusinoids	11.1
Mineral Matter	7.6
Total Inert Comp.	42.7

*

DOC. NO. 80117

SOLID FUEL ANALYSIS LABORATORY
REPORT OF ANALYSIS
HEAD: W.J. MONTGOMERY

SAMPLE NUMBER 2691-80
I.D. NUMBER LILLYBURT
DATE REC'D 31-03-80

****

ASH ANALYSIS

COMPONENT	%
SiO2	55.33
Al2O3	25.60
Fe2O3	4.43
TiO2	1.75
P2O5	0.49
CaO	4.01
MgO	1.86
SO3	2.50
Na2O	0.15
K2O	0.90
SrO	0.07
BaO	0.34
Mn3O4	----
LOF	0.28

Chlorine 0.17
Fluorine 94 ppm

TRACE ANALYSIS

COMPONENT	PPM
Cd	0.80
Pb	10.50
Ni	14.50
Hg	0.09
Be	1.20
Cr	12.50
As	0.80
Sb	0.78
Se	0.87

GRINDABILITY INDEX(HARDGROVE) 86

REPORTED BY: W.J. Montgomery DATE: 10-07-80

669 500 670 000 670 500 671 000 671 500 672 000 672 500 673 000 673 500 674 000

5 471 500
5 471 000
5 470 500
5 470 000
5 469 500
5 469 000

FLATHEAD FAULT

COAL BLOOM
COAL SPOIL
TRENCH
D-SEAM
C-SEAM
B-SEAM
A SEAM
Kb
JKkb
Jf

REFERENCE

MAIN ROAD		RIVER, LAKE	
SECONDARY ROAD		INTERMITTENT RIVER	
TRACK OR TRAIL		TREED AREA	
RAILWAY		LINE OF TREES	
HEDGE FENCE		INDIVIDUAL TREES	
BRIDGE, CULVERT		VERTICAL INTERVAL	50 m
CUT, FILL		DEPRESSION	
SWAMP		SPOT HEIGHT	1611
DRILL HOLE	△	CONTROL POINT	△

MAP PROJECTION : UNIVERSAL TRANSVERSE MERCATOR
CENTRAL MERIDIAN REFERENCE 117° W.

PREPARED BY
NORTH WEST SURVEY CORPORATION (YUKON) LTD.

LEGEND

GEOLOGICAL BOUNDARY (defined, approximate, inferred)
BEDDING (strike/dip; inclined, vertical).
THRUST FAULT (teeth in direction of dip; defined, approximate)
NORMAL FAULT (solid circle indicates downthrown side; defined, approximate)
STRIKE - SLIP FAULT (solid circle indicates downthrown side; arrows indicate direction of movement, defined, approximate)
SYNCLINE (dip of axial plane indicated; arrow indicates pitch direction)
COAL (bloom, spoil, occurence)
ROTARY HOLE (vertical, angle)
TRENCH

FORMATION SYMBOLS

Kb	— BLAIRMORE GROUP
JKk	— KOOTENAY FORMATION
JKke	— ELK MEMBER
JKkeb	— COAL BEARING MEMBER
JKkb	— BASAL SANDSTONE MEMBER
Jf	— FERNIE FORMATION

METRES 100 50 0 100 200 300 400 500 METRES

SCALE 1 : 5 000

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
SE BRITISH COLUMBIA

DOC. NO 00113

GEOLOGY OF LILLYBURT COAL PROSPECT

406 3/3 (1)

AUTHOR: B. MCKINSTRY	SCALE: 1:5000	ENCLOSURE No:
DATE: MARCH, 1988	REVISED:	DRAWING No: HJ-68
To Accompany		

669 500 670 000 670 500 671 000 671 500 672 000 672 500 673 000 673 500 674 000

5 471 500

5 471 000

5 470 500

5 470 000

5 469 500

5 469 000

000 100 200 300 500 700 900 1100 1300 1500 1700

2300 2500 2700 2900 3100 3300 3500 3700 3900 4100 4300 4500

N

REFERENCE

MAIN ROAD		RIVER, LAKE	
SECONDARY ROAD		INTERMITTENT RIVER	
TRACK OR TRAIL		TREED AREA	
RAILWAY		LINE OF TREES	
HEDGE FENCE		INDIVIDUAL TREES	
BRIDGE CULVERT		VERTICAL INTERVAL	
CUT FILL		DEPRESSION	
SWAMP		SPOT HEIGHT	
DRILL HOLE	△	CONTROL POINT	△

MAP PROJECTION : UNIVERSAL TRANSVERSE MERCATOR
CENTRAL MERIDIAN REFERENCE 117° W.

PREPARED BY
NORTH WEST SURVEY CORPORATION (YUKON) LTD

METRES 100 50 0 100 200 300 400 500 METRES

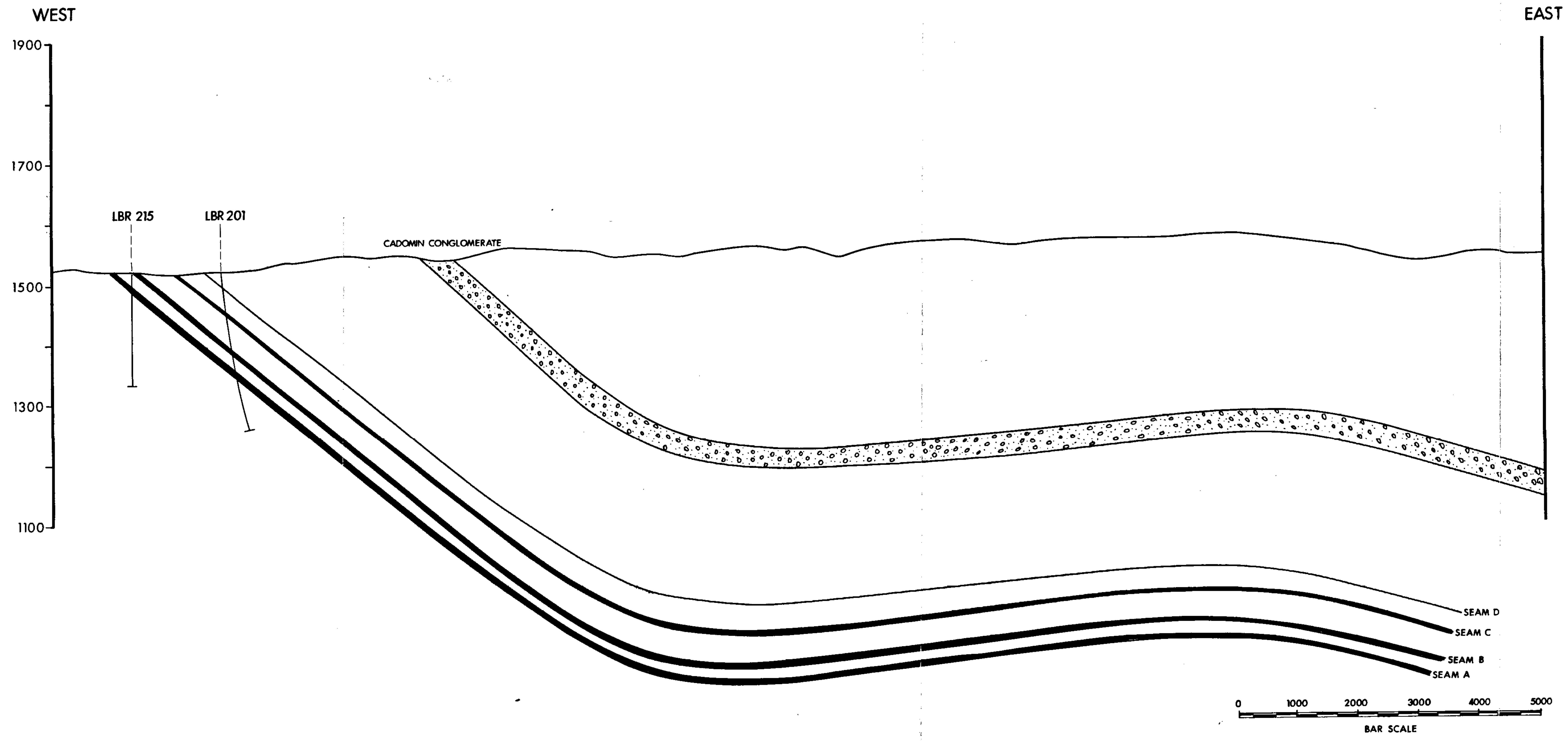
SCALE 1 : 5 000

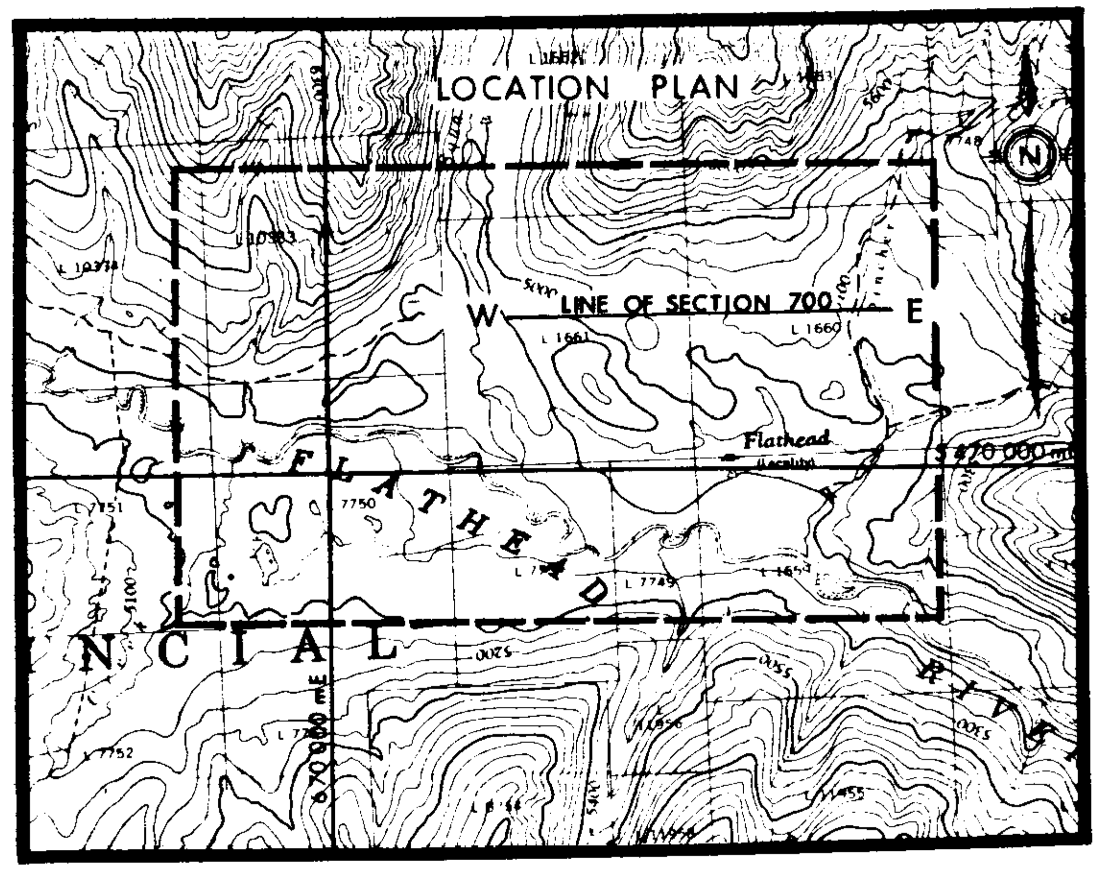
Crows Nest Resources Limited
EXPLORATION

LILLYBURT
SE BRITISH COLUMBIA

CROSS - SECTION
GRID 406 3/3 (2)

AUTHOR: B. MC KINSTRY	SCALE: 1:5000	ENCLOSURE No.:
DATE: MARCH, 1981	REVISED:	DRAWING No: HJ-68B
To Accompany		





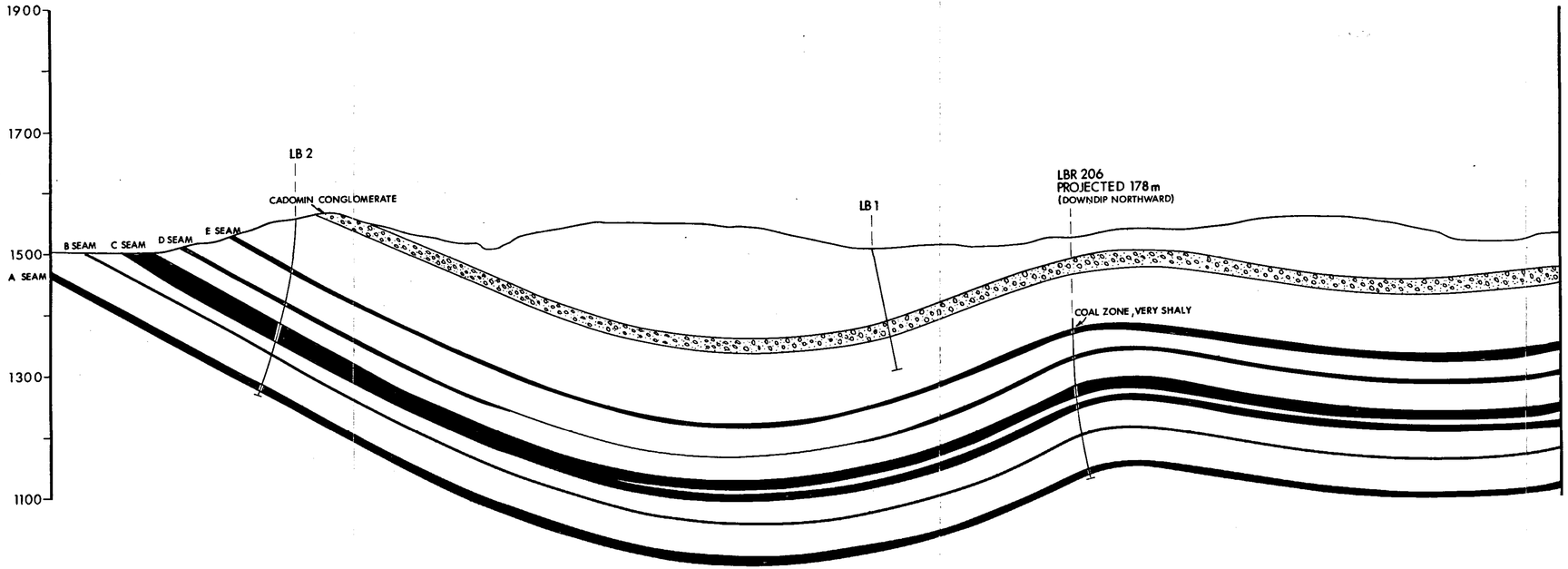
Crows Nest Resources Limited
EXPLORATION

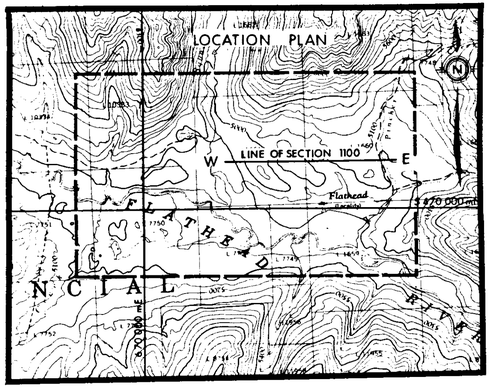
LILLYBURT
B.C.
CROSS SECTION 3/3 406
700
(3)

AUTHOR: B McKINSTRY	SCALE: 1: 5000	ENCLOSURE No:
DATE: 81-2-25	REVISED:	DRAWING No: HJ-59F
To Accompany		

WEST

EAST





0 1000 2000 3000 4000 5000 (m)

BAR SCALE

DOC. NO. 80 117

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B.C.

406 3/3

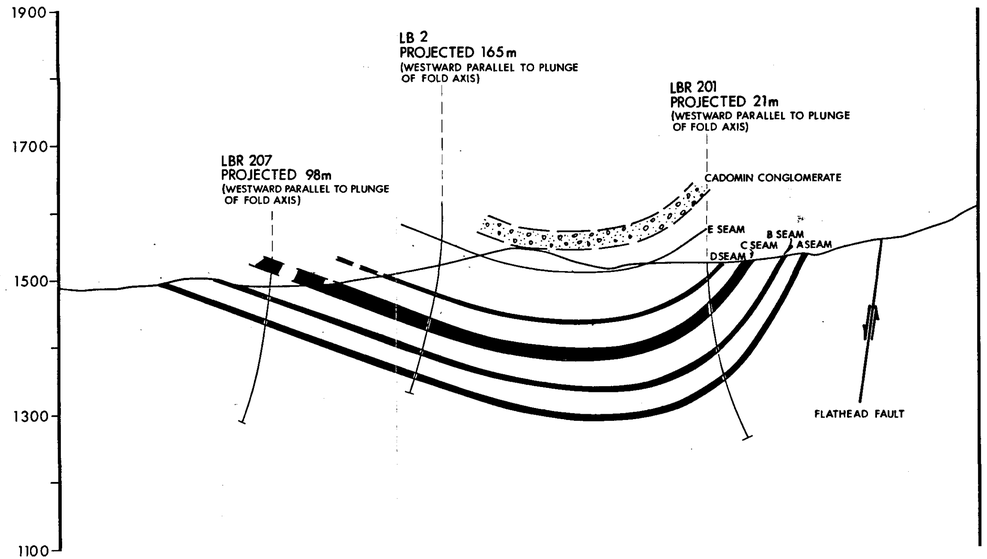
CROSS SECTION 1100

(4)

AUTHOR: B.M. KINSTRY	SCALE: 1:5000	ENCLOSURE No:
DATE: 81 02 23	REVISED	DRAWING No: HJ-59H
To Accompany		

SOUTH

NORTH



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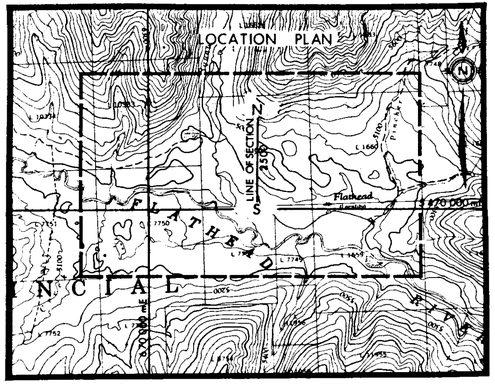
BAR SCALE



Crows Nest Resources Limited

EXPLORATION

LILLYBURT
B. C.

406 3/3

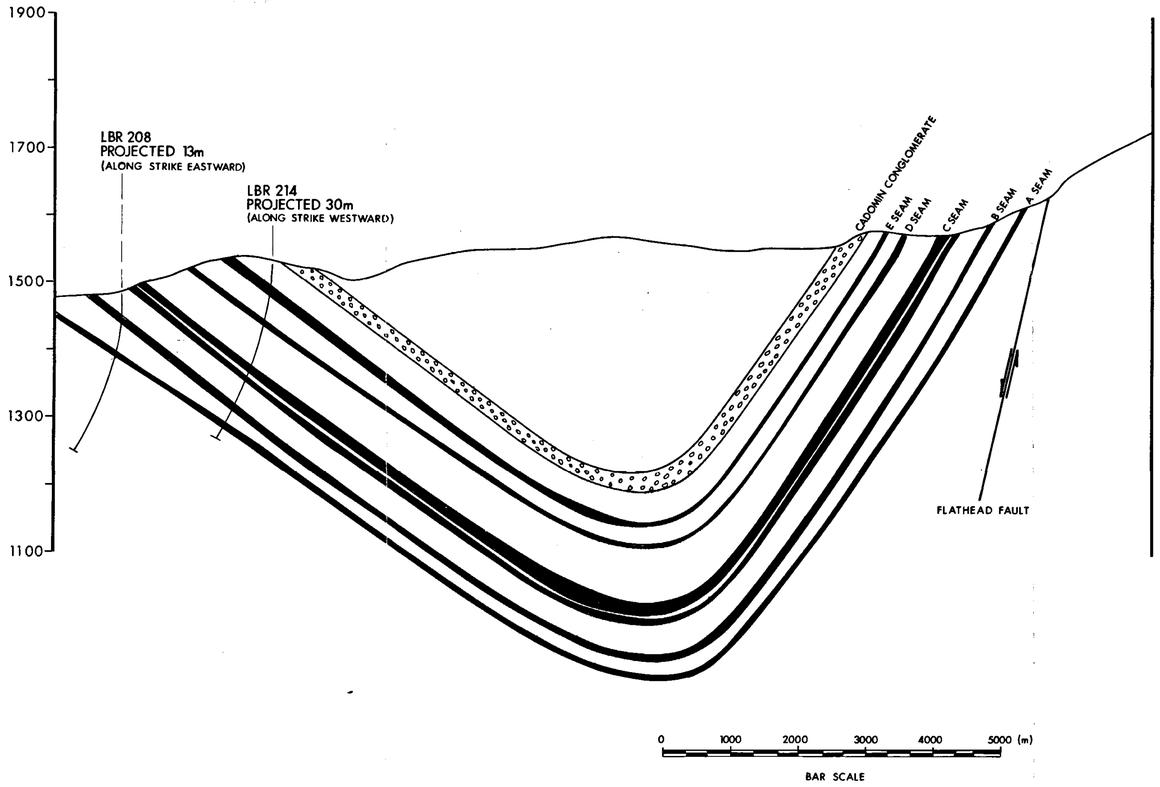
CROSS SECTION
2500

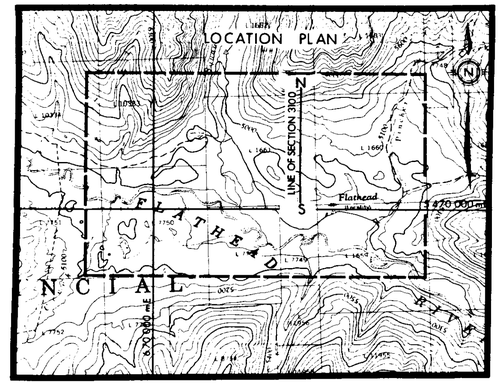
(5)

AUTHOR B.McKINSTRY	SCALE 1:5000	ENCLOSURE No.:
DATE: 81.2.23	REVISED:	DRAWING No: HK-59B
To Accompany		

SOUTH

NORTH





Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B.C.

406 3/8

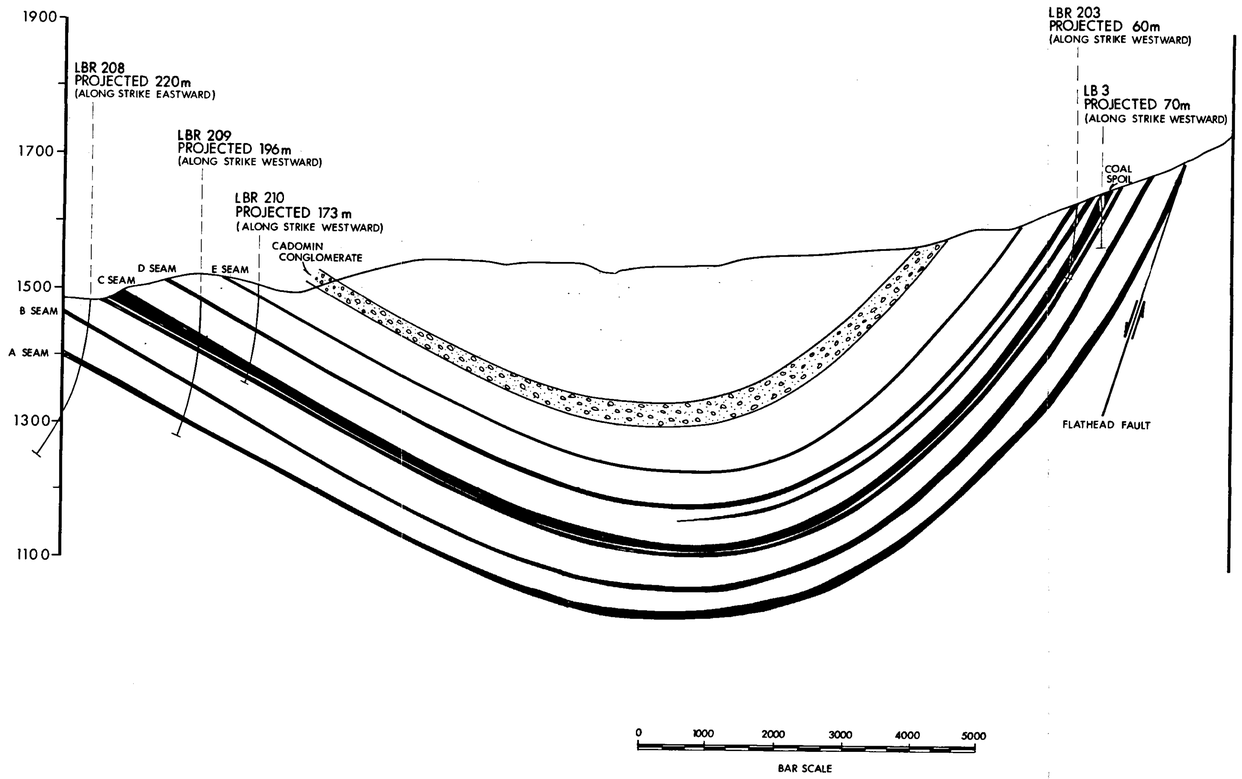
CROSS SECTION
3100

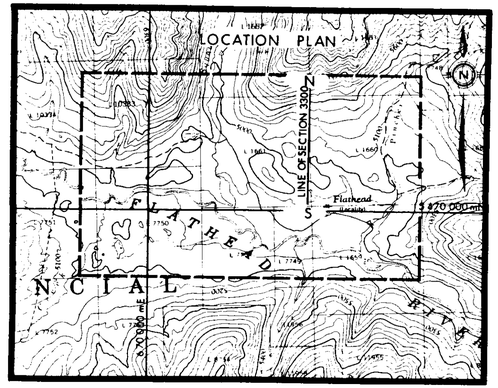
(6)

AUTHOR B. MacKINSTRY	SCALE 1:5000	ENCLOSURE No.
DATE 81.5.23	REVISED	
To Accompany		DRAWING No. HK-59E

SOUTH

NORTH





DOC. NO. 80 117

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B. C.

406 3/5

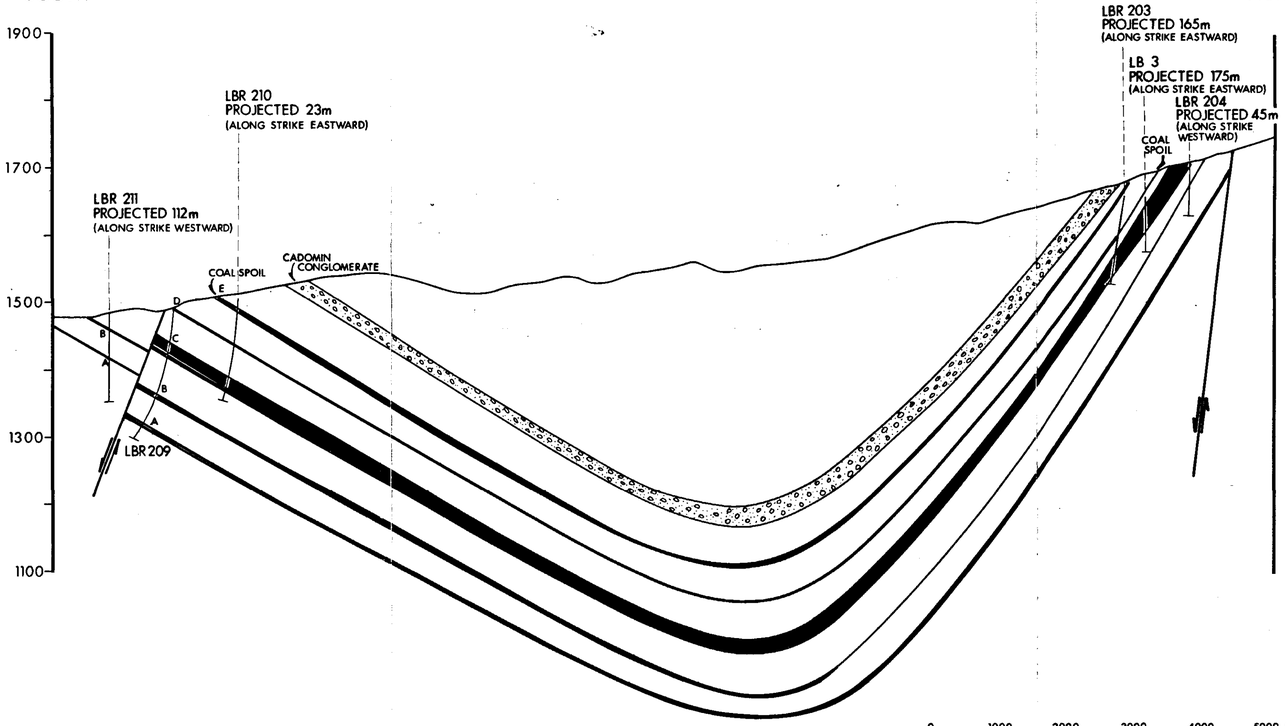
CROSS SECTION
3300

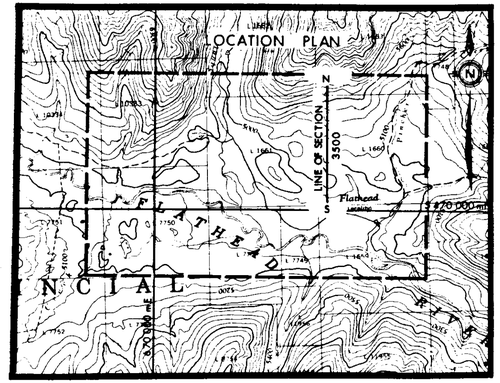
(7)

AUTHOR B McKINSTRY	SCALE: 1:5000	ENCLOSURE No:
DATE: 81 2 23	REVISED:	DRAWING No. HK-59F
To Accompany		

SOUTH

NORTH





Crows Nest Resources Limited
EXPLORATION

LILLYBURT P.C.
406 3/3

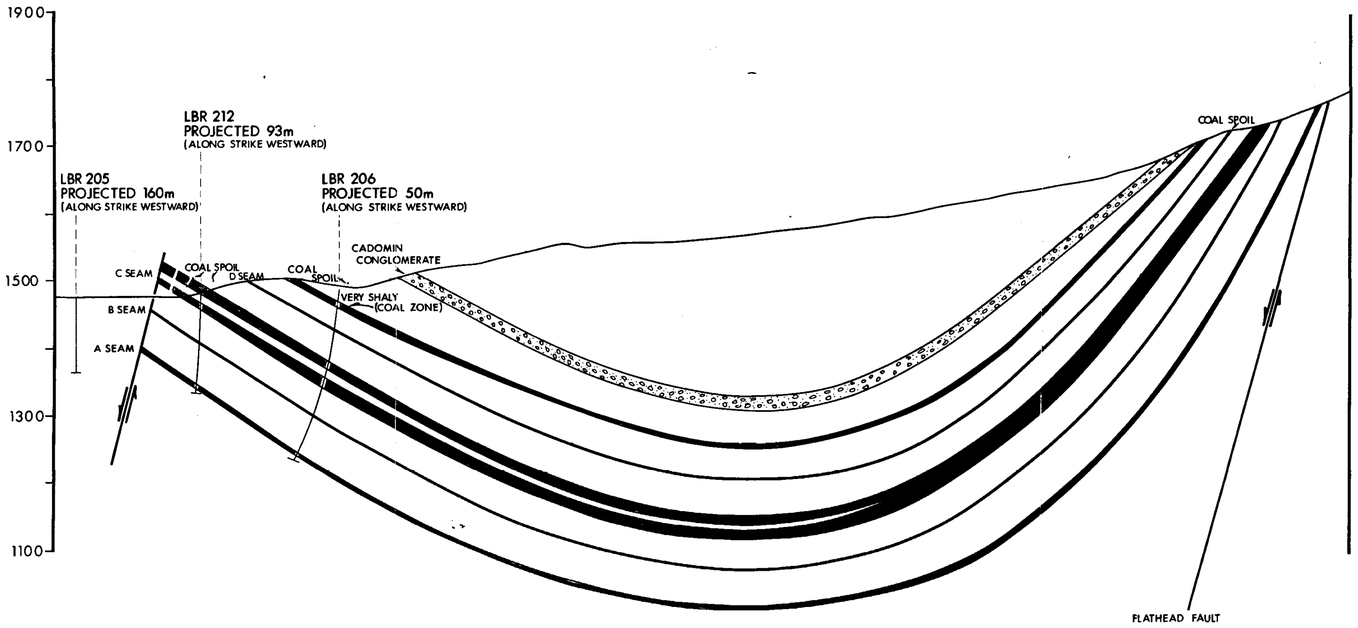
CROSS SECTION 3500

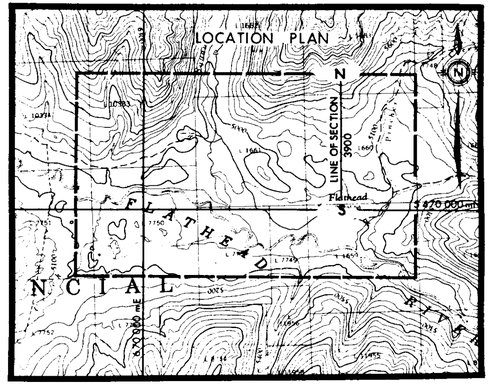
(8)

AUTHOR: B. McKINSTRY	SCALE: 1:5000	ENCLOSURE No.
DATE: 81 2 25	REVISED	DRAWING No. HK-59G
To Accompany		

SOUTH

NORTH





DOC. NO 80117

0 1000 2000 3000 4000 5000

BAR SCALE

Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B. C.

406 3/3

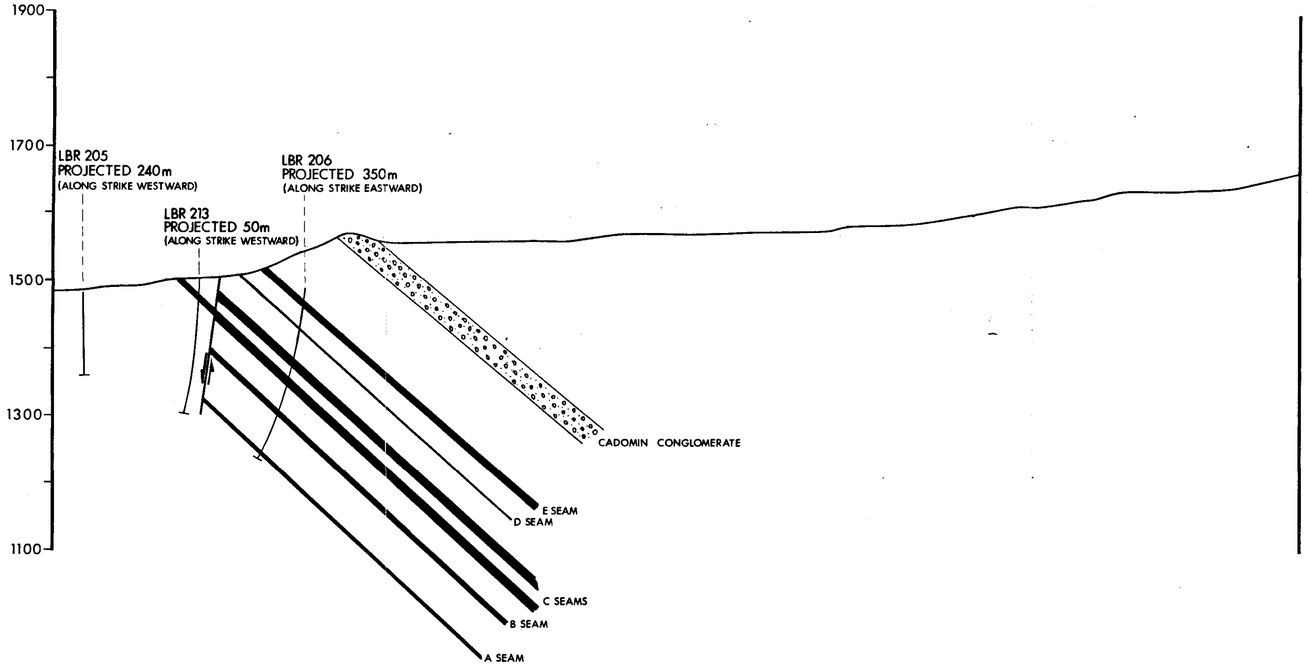
CROSS SECTION 3900

(9)

AUTHOR B McKINSTRY	SCALE 1:5000	ENCLOSURE No:
DATE 81-2-23	REVISED:	DRAWING No HK-591
To Accompany		

SOUTH

NORTH



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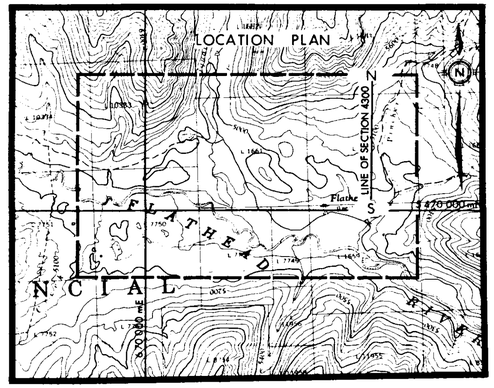
BAR SCALE



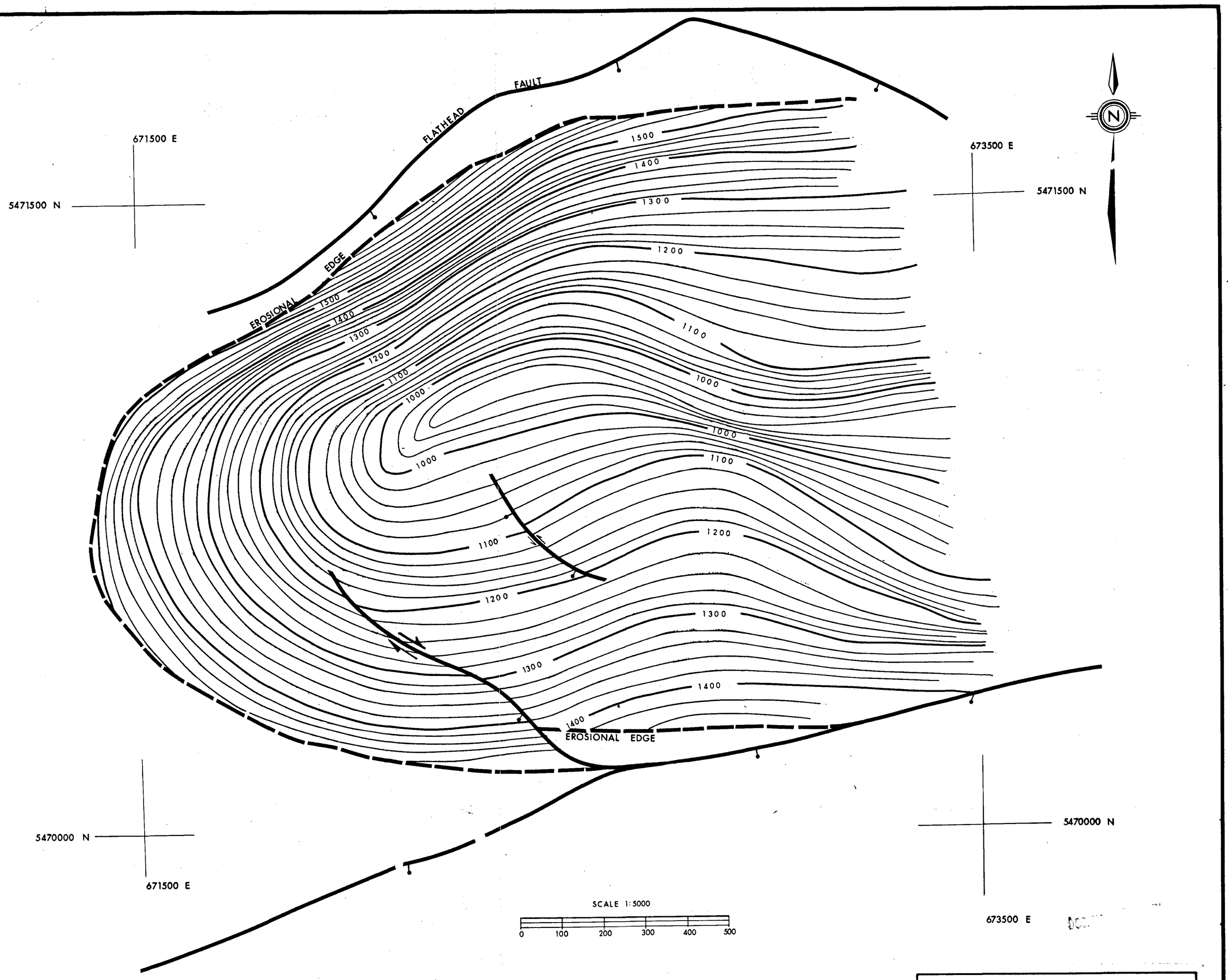
Crows Nest Resources Limited
EXPLORATION

LILLYBURT
B.C. 406 3/3

CROSS SECTION 4300

(10)

AUTHOR: B McKINSTRY	SCALE: 1:5000	ENCLOSURE No.:
DATE: 81-2-23	REVISED:	DRAWING No: HK-59K
To Accompany		



Crows Nest Resources Limited

EXPLORATION

LILLYBURT
S.E. B.C.

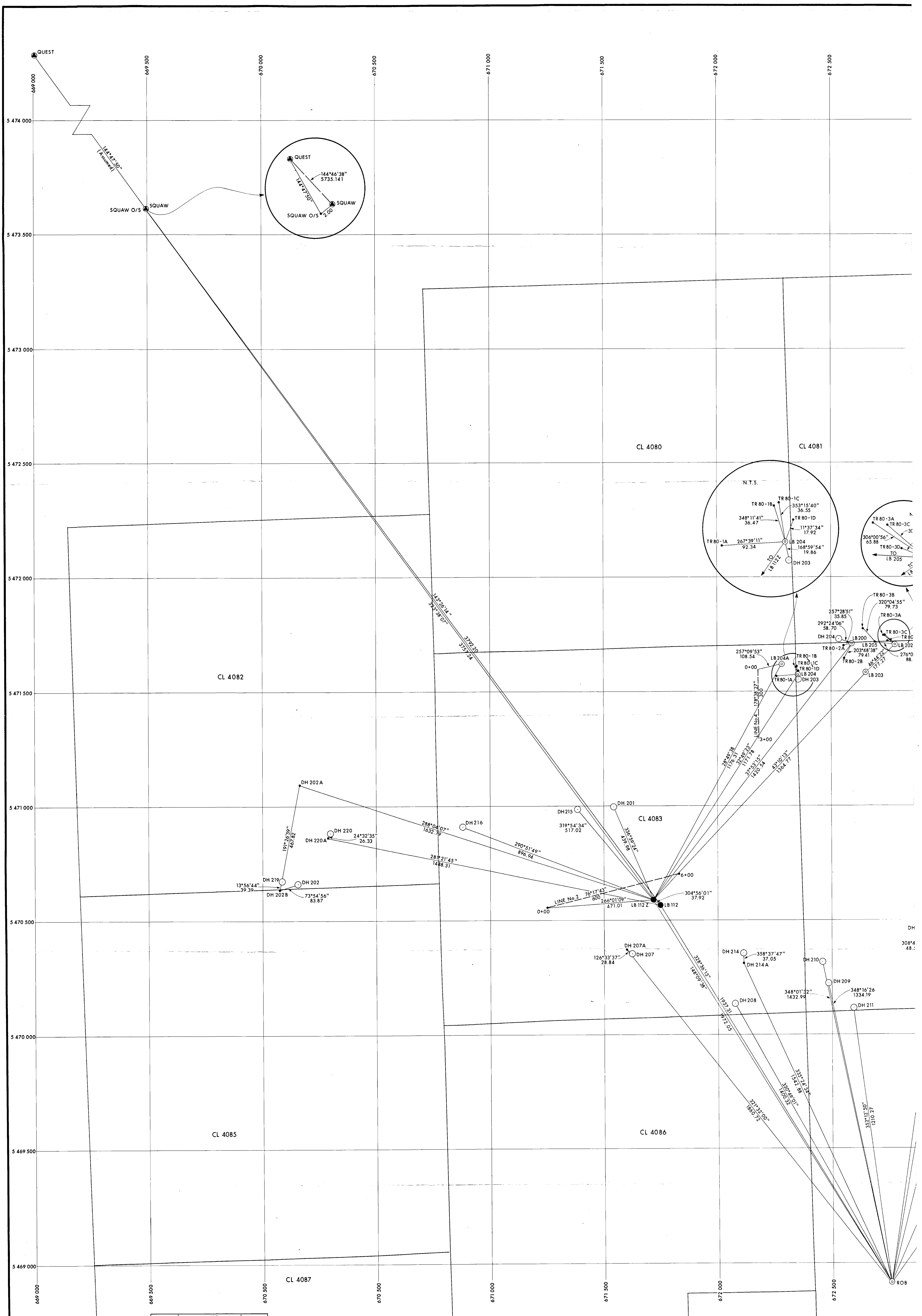
406 3/3

STRUCTURE CONTOUR MAP

(11)

BASE OF SEAM C

AUTHOR B. MC KINSTRY	SCALE: 1:5000	ENCLOSURE No:
DATE MARCH 16, 1981	REVISED:	DRAWING No: HC-70C
To Accompany		



STATION	CONTROL NORTHING	EASTING	ELEVATION
QUEST	5 478 299.78	666 184.06	2441.74
SQUAW	5 473 613.92	669 492.35	2364.26
SQUAW O/S	5 473 612.77	669 490.72	2363.26
LB 112	5 470 566.86	671 749.74	1566.82
LB 112 Z	5 470 588.57	671 718.65	1565.19
ROB	5 468 913.26	672 758.98	1627.81
	TRAVERSE POINTS		
LB 200	5 471 709.69	672 591.02	1708.99
LB 201	-	-	-
LB 202	5 471 705.42	672 781.48	1683.41
LB 203	5 471 583.93	672 652.39	1673.36
LB 204	5 471 573.27	672 353.81	1662.81
LB 204A	5 471 619.11	672 285.83	-
LB 205	5 471 714.70	672 693.21	1700.72
DH 202A	5 471 094.99	670 116.38	1590.86
DH 202B	5 470 636.48	670 073.51	1530.73
DH 206A	5 470 421.09	672 975.57	1493.75
DH 207A	5 470 370.15	671 601.50	1490.31
DH 214A	5 470 316.20	672 116.94	1535.25
DH 220A	5 470 860.04	670 290.61	1535.72
	RESITIVITY SURVEY		
0+00	5 470 556	671 249	LINE No.2
6+00	5 470 698	671 832	LINE No.2
0+00	5 471 595	672 180	LINE No.4
3+00	5 471 295	672 187	LINE No.4
	TRENCHES		
80-1A	5 471 569.5	672 261.6	1658.2
80-1B	5 471 609.0	672 346.4	1660.9
80-1C	5 471 609.6	672 349.5	1661.3
80-1D	5 471 590.8	672 357.4	1662.6
80-2A	5 471 701.9	672 556.0	1701.2
80-2B	5 471 637.0	672 559.0	1684.9
80-3A	5 471 744.2	672 728.2	1700.5
80-3B	5 471 775.9	672 642.1	1722.1
80-3C	5 471 743.3	672 734.4	1698.7
80-3D	5 471 722.6	672 751.6	1688.8
	DRILL HOLES		
200	5 470 325.71	673 768.79	1502.90
215	5 470 984.11	671 385.69	1521.14
216	5 470 908.01	670 880.52	1506.93
201	5 470 993.54	671 546.67	1520.07
202	5 470 659.72	670 154.09	1520.53
203	5 471 553.78	672 357.60	1662.25
204	5 471 732.06	672 536.76	1706.54
205	5 470 066.72	673 045.35	1478.80
206	5 470 451.43	672 937.72	1494.19
207	5 470 352.97	671 624.67	1489.87
208	5 470 135.83	672 076.18	1483.17
209	5 470 219.61	672 487.83	1488.56
210	5 470 315.06	672 461.67	1508.22
211	5 470 112.37	672 595.02	1474.42
212	5 470 247.89	672 984.49	1486.09
213	5 470 252.01	673 339.72	1506.39
214	5 470 353.24	672 116.06	1527.64
219	5 470 674.71	670 083.00	1530.20
220	5 470 883.99	670 301.54	1529.76

LEGEND

- FOUND GEODETIC STATION
- FOUND 12" SPIKE
- PLANTED 12" SPIKE
- PLANTED 6" NAIL
- DRILL HOLE
- RESITIVITY SURVEY

NOTE: CO-ORDINATES OF QUEST & SQUAW WERE TAKEN FROM 1979 DOPPLER OBSERVATIONS AND USED AS THE DATUM IN THIS AREA.

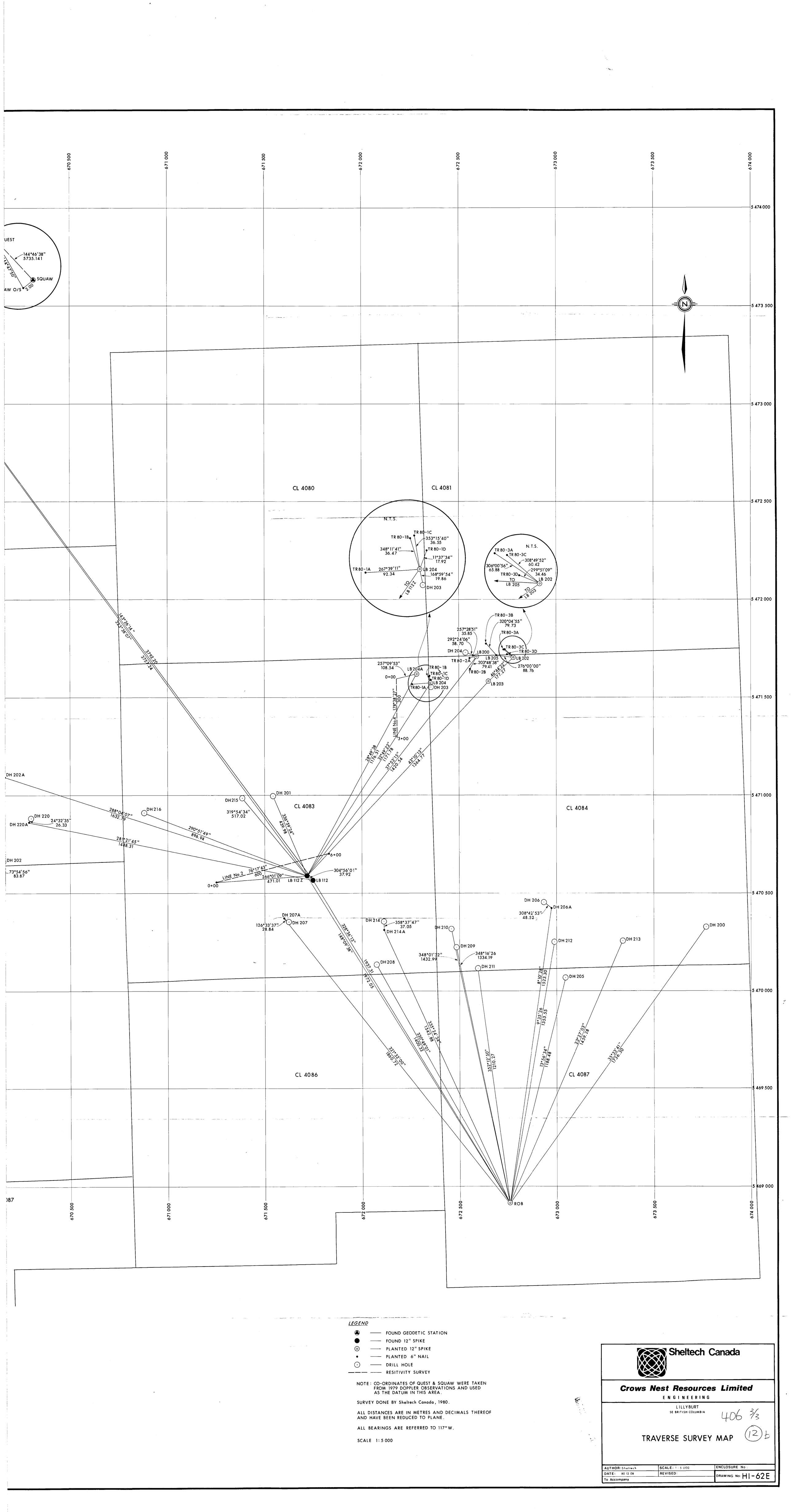
SURVEY DONE BY Sheltech Canada, 1980.

ALL DISTANCES ARE IN METRES AND DECIMALS THEREOF AND HAVE BEEN REDUCED TO PLANE.

ALL BEARINGS ARE REFERRED TO 117°W.

SCALE 1:5 000

406 3/3
(12)a



LEGEND

- (A) —— FOUND GEODETIC STATION
- ● —— FOUND 12" SPIKE
- ⊙ —— PLANTED 12" SPIKE
- • —— PLANTED 6" NAIL
- ⊙ —— DRILL HOLE
- ——— —— RESITIVITY SURVEY

NOTE : CO-ORDINATES OF QUEST & SQUAW WERE TAKEN FROM 1979 DOPPLER OBSERVATIONS AND USED AS THE DATUM IN THIS AREA.

SURVEY DONE BY Sheltech Canada, 1980.

ALL DISTANCES ARE IN METRES AND DECIMALS THEREOF AND HAVE BEEN REDUCED TO PLANE.

ALL BEARINGS ARE REFERRED TO 117°W.

SCALE 1:5 000

Sheltech Canada

Crows Nest Resources Limited

ENGINEERING

LILLYBURT
SE BRITISH COLUMBIA

406 3/3

(12)b

TRAVERSE SURVEY MAP

AUTHOR: Sheltech	SCALE: 1 : 5 000	ENCLOSURE No :
DATE: 80 12 08	REVISED:	DRAWING No: H1-62E
To Accompany		

CROWS NEST RESOURCES LIMITED
EXPLORATION

B. C. COAL LICENCES
TENURE STANDING

BLOCK: LILLYBURT PROJECT: YEAR: 1981

GROUP: NO. 245 LILLYBURT DATE: MARCH 18, 1981

KOOTENAY LAND DISTRICT

PROJECT NAME	PROJECT LICS TOTAL NO.	PROJECT AREA TOTAL AC/HA	BLOCK NAME	BLOCK LIC. TOTAL NO.	BLOCK AREA TOTAL AC/HA	GROUP NO.	GROUP LICS TOTAL NO.	GROUP AREA TOTAL AC/HA	GROUP YEAR	LICENCE NO.	LICENCE LEGAL DESCRIPTION	LICENCE AREA TOTAL AC/HA	ACQ/ADM FEES YEAR	ACQ/ADM FEES $	RENTALS ANNUAL $	RENTALS TOTAL $ TO NEXT ANN. $	REQUIREMENT WORK EXPIRED $	REQUIREMENT WORK CURRENT YEAR LIC. YEAR	REQUIREMENT WORK CURRENT YEAR $	REQUIREMENT WORK PRE-EXISTING YEAR	REQUIREMENT WORK PRE-EXISTING $	REQUIREMENT WORK ANNIVERSARY DATE	BUDGET CURRENT YEAR $	BUDGET YEAR $	EXP TOTAL $	POTL SHELL CLASS	COMMITMENTS, J. V. OTHER THAN B.C. DEV'T DESCRIPTION	REMARKS
LILLYBURT	10	2479	LILLYBURT	10	2479	245	10	2479	1				78	300	12,395	30	48	3	30,988	4-3/4	343,501	DEC. 31	4151	500	445	Y		ONE LAND REPAYMENT
										4080	L 1662	259																WORK DONE SINCE LAST ANNIVERSARY IS NOT INCLUDED
										4081	L 1663	259																
										4082	L 10333	259																
										4083	L 1661	259																
										4084	L 1660	259																
										4085	L 7750	259																
										4086	L 7749 & L 7754	220																
										4087	L 1659	259																
										4088	L 7752	259																
										4089	L 7753	187																
																									518,893			1980
																									74,372			1978-1979

GENERAL REMARKS: FILL NECESSARY LINES AND COLUMNS ONLY. COAL DEVELOPMENT POTENTIAL IS "Y" (PRIME) UNLESS OTHERWISE STATED. LICENCES HELD BY SHELL CANADA RESOURCES LTD.- CNR. IS THE OPERATOR.

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