

K-Shell-Line Creek 80(1)A

82-G-15

Mar 31, 81

"Line Creek Coal
Project"

SHELL CANADA RESOURCES LTD.

C.L.# 293, 294, 297, 298,

301

T. Hannah

422

K-Shell-Line Creek 80(1)A



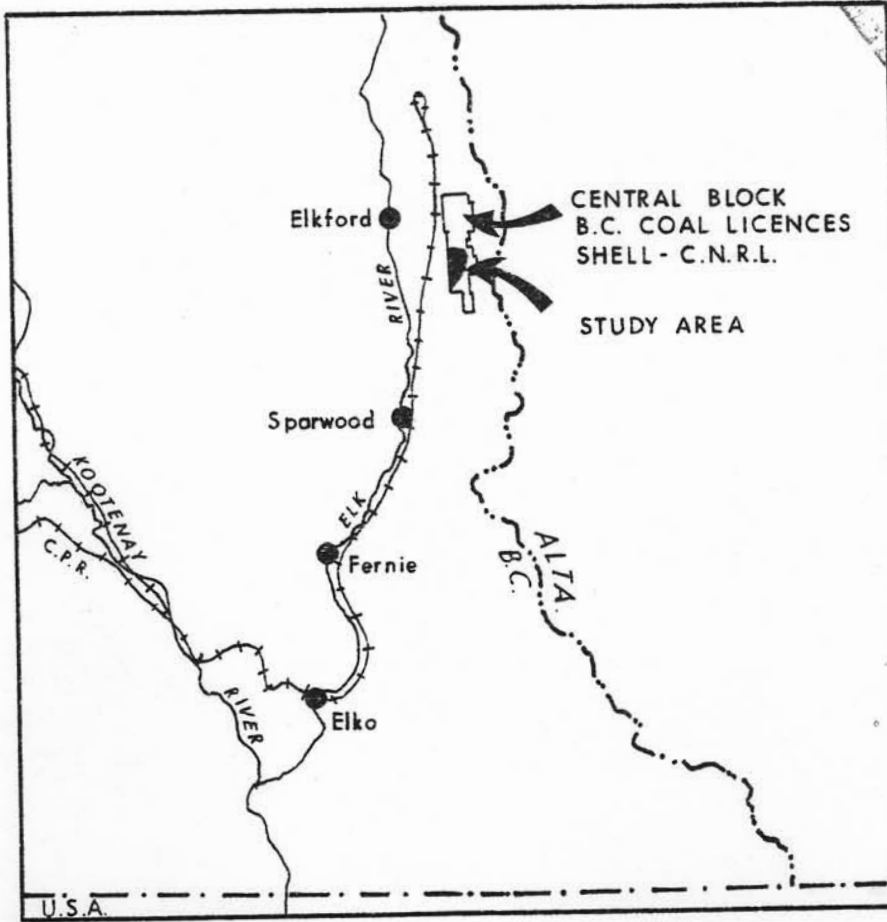
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CROWS NEST RESOURCES LIMITED

Calgary, Alberta, Canada

LINE CREEK COAL PROJECT

CONFIDENTIAL



C.L. # 293, 294, 297, 298, 301

Report on Coal Licences ~~277 to 281 incl., 284, 285, 290, 293, 294, 297, 298, 301, 304, 1299~~, Kootenay Land District, British Columbia, For Work Done in Period February, 1980 to November, 1980 Inclusive.

for C.L. 277, 280, 281

Held By: Shell Canada Resources Limited
Operated By: Crows Nest Resources Limited
Lat. 49° 56' N, Long 114° 46' W
NTS 82 G 15

GEOLOGICAL BRANCH ASSESSMENT REPORT

Banner East

March 31, 1981

Author: T. Hannah

OPEN FILE 422

LINE CREEK EXTENSION, 1980

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*refer K-Shell-Line
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Other than bulk-sampling of four existing adits in the pit our exploration in 1980 concentrated on Line Creek Extension. It consisted of drilling 2,117 metres, backhoe trenching 5,625 metres supplemented by detailed geological mapping. The main purposes of this work were to identify feasible mining potential, to define preliminarily the stratigraphy and geological structure and to obtain coal quality information. Large volumes of coal are indicated at relatively low overburden ratio. This coal would also be a very desirable supplement to Line Creek due to its higher volatile water composition.

Actual volumes of coal which can be considered as reserves vary dimensionally according to the mine design and other parameters. Such studies, as well as further exploration, are already underway to integrate Line Creek Extension into the current mine development. Due to these circumstances, reserve estimates are not included in this report.

Exploration data indicates that the Kootenay Coal-Bearing Member in the Line Creek Extension area is 500 metres thick and contains sixteen coal zones or seams with a gross aggregate thickness of 91.7 metres. Fourteen seams have coal thicknesses greater than 2.0 metres.

The north-plunging Fording Syncline is the main structural element in the vicinity of Line Creek Ridge. The Ridge is largely underlain by the Syncline's west limb, the dip and curvature of which is disturbed by thrust faults and small magnitude folds. At lower elevations, the eastern slope of Line Creek Ridge overlies the Syncline axis, the west-dipping east limb and Fording Thrust Zone. Drag-folding along this major thrust zone has resulted in local thickening of coal seams and inter-seam strata. Dips flatten out towards the synclinal axis both on the

south and north end of the Line Creek Ridge. Bedding dips on the Syncline limbs range from low on the east limb (8° - 25° W) to high in the west and northwestern portions of the west limb (60° E to slightly overturned W). Overburden and thick forests permit only sparse outcrop exposure in the eastern and northeastern portion of the project area; a network of exploration roads in the western and northwestern portions of the project area permit sufficient outcrop exposure to allow detailed geological mappings.

2.2 Tenure

Group #266 includes 15 B.C. Coal Licences (nos. 277, 278, 279, 280, 281, 284, 285, 290, 293, 294, 297, 298, 301, 304, and 1299) which cover 3,402 hectares (Figure 1, Enclosure 1). These licences are held by Shell Canada Resources Limited and operated by Crows Nest Resources Limited. These licences were transferred in 1979 from Crows Nest Pass Oil and Gas upon its acquisition by Shell Canada Resources Limited in 1978.

A summary of work done in these licences prior to 1980 by Crows Nest Resources Industries Ltd. and Shell Canada Resources was filed with the B.C. Ministry of Energy, Mines and Petroleum Resources on April 30, 1979, and April 30, 1980.

2.3 Summary of Work Done in 1980

The 1980 exploration program included: (Figure 2)

- two diamond core holes with 444 m of total drilling and thirteen reverse-circulation rotary drill holes with 2,673 m of total drilling. A suite of geophysical logs including gamma-ray, neutron-neutron, focused density and caliper was produced for each hole; except where holes had to be logged through the drill stem, in which case the caliper was eliminated. For the latter holes, attempts were made to clean out the hole with a smaller rotary rig in order to get open-hole geophysical logs. These attempts were usually futile. This work was all on Line Creek Extension.
- twelve backhoe trenches with a total length of 5,625 m.^{← have fun filling them!}? The main purpose of these trenches was to supplement natural outcrop data for structural and stratigraphic mapping. This work was mainly on Line Creek Extension.
- detailed geological mapping on 1:2000 scale maps, primarily on Line Creek Extension. Limited natural and trench exposure of bedrock in the central and eastern portion of the area restricted the thoroughness of the mapping.
- four bulk samples from four existing adits. This work involved sampling of existing cross-cuts to obtain metallurgical coal samples for testing. This work was in the pit area. involved sampling of existing cross-cuts to obtain metallurgical coal samples for testing. This work was in the pit area.

2.4 List of Licence on Which Work Was Done

Group #266	293, 294
Geological Mapping	293, 294
Surveys; Geodetic	293, 294
Road Construction	293, 294
BackHoe Trenching	293, 294
Underground Work	294, 297
Drilling	293, 294
Logging, Sampling and Testing	293, 294, 297
Reclamation	293, 294, 297
Other Work Geol. Report	293, 294, 297

SUMMARY

The Line Creek coal property is located in the Crows Nest Pass Area of the Rocky Mountains in southeastern British Columbia. It is at Latitude 45° 76'N and Longitude 114° 46'W, 1150 kilometres east of the Vancouver area coal ports on railway and 25 kilometres northeast of the town of Sparwood on road.

The central block of B.C. Coal licences, held by Shell Canada Resources and operated by its wholly owned subsidiary Crows Nest Resources, includes the property. CNRL has been concentrating its exploration on the southern half of this block. In addition to the Line Creek Mine currently under construction, there are several other projects in this area scheduled for early development, such as Ewin Pass, Mount Michel, Horseshoe Ridge, and Teepee Mountain. A preparation plant is also under construction 9.5 kilometres from the Line Creek Mine at the nearest railway (CPR) point. This plant, with the necessary extensions, is planned to handle all the coal from this area.

The Line Creek property includes (Figure 2):

Line Creek Mine (as presently designed) on the south, and
Line Creek Extension on the north on which report concentrates.

Pre-development exploration has been completed and construction is underway in the Line Creek Mine (open pit) area. Line Creek Extension is an approximately two square kilometres area, little explored previously, north of the highwall of the pit as of the present design.

2.0 INTRODUCTION

2.1 Location

The Line Creek Ridge Project area is centered at latitude $49^{\circ} 56'N$ and longitude $114^{\circ} 46'W$, 25 km northeast of Sparwood, British Columbia in the Upper Elk Coal Field. It is within 9.5 km of the Canadian Pacific Railroad line in the Elk Valley (Figure 1). The project lies about midway between two major operating metallurgical coal properties, Kaiser's Harmer Ridge to the south and Fording Coal's open pit operations to the north.

Vehicular access into the area is via an all-weather, gravel base road which intersects the Elkford highway approximately 18.5 km north of Sparwood, B.C.

The Central Block Area consists of several explored units, principal ones being Line Creek Ridge, Horseshoe Ridge, and Ewin Pass. This report covers primarily the southwestern portion, Line Creek Ridge, in which the major exploration effort has been concentrated.

Topographically, Line Creek Ridge is of rugged relief, with elevation differentials of up to 780 m from the narrow ridge crest to the valley floor. Average surface gradients range from 40% on the eastern side to 60% on the west flank of the ridge. One major drainage, Line Creek, drains the bulk of the reserve area from the east flank and is a tributary to the Fording River some 9.5 km west.

3.0 GEOLOGY

3.1 Regional Stratigraphy

The Kootenay Formation of Upper Jurassic - Lower Cretaceous age is the coal-bearing sequence of southeastern B.C. It is a thick sequence of clastic sediments representing delta progradation over marine shales, siltstones and sandstones of the Jurassic Fernie Formation.

Deposition was initiated by an epeirogenic uplift of the source area in early phases of the Columbian Orogeny in Late Jurassic time. The Kootenay section thickens from east to west ranging from m up to 1,100 m within the Upper Elk Coalfield.

The Kootenay Fm. can be subdivided into three main units. A basal, cliff-forming "Moose Mountain Member" is composed predominantly of sandstone with minor siltstones and shales. It is a prograding sequence of delta front sheet sands, barrier bars and tidal channel deposits.

The middle, "Coal-Bearing Member" is generally in sharp contact with the underlying Moose Mountain (sandstone-coal, or sandstone-bioturbated silty shale). It consists of alternating beds of sandstones, shale, siltstone, and coal representing prograding delta plain environments. The Coal-Bearing Member is 245 m - 860 m thick, including 6 m to 61 m of coal in the south contained within 2 to 8 seams, and up to 90 m of coal in 23 seams on the north.

The upper portion of the Kootenay Fm., the "Elk Member", consists of alternating sandstone, siltstone, shale and conglomerates with minor lenticular coal beds. It represents progradation of the alluvial plain over the delta plain coal-forming environments.

The upper contact of the Kootenay is an erosional surface. It is overlain by the Cretaceous Blairmore Group, beginning with rejuvenated piedmont-plain deposits of the Cadomin Formation (Cadomin Conglomerate).

3.2 Regional Structure

The coal-bearing Kootenay Formation occurrences in the front ranges of southeastern B.C. are preserved in north-south trending synclines referred to as the Crowsnest Coalfields. High structural relief of Paleozoic rocks surrounding the coalfields fades out in relatively incompetent rocks of the Fernie and Kootenay Formations. The structure within the synclines is complicated to varying degrees by thrust faults, their associated folds, and normal faults. This structural complexity increases towards the thinner, east side of the coal fields where they have been thrust against underlying Paleozoics.

The Crowsnest Coalfields can be subdivided into three coal-bearing areas. From south to north they are the Flathead Coalfield, the Fernie Coalfield and the Upper Elk Coalfield. Since they are all part of the same depositional complex, the subdivision is based on erosional and structural boundaries.

3.2.1 Upper Elk Coalfield

The Upper Elk Coalfield is an elongate basin composed of two major synclines (Greenhills and Fording) separated by an anticline and the northern extension of the Erickson normal fault. The eastern, Fording

Syncline, can be traced northward from Alexander Creek to the Kananaskis Lakes. On its south end, (Enclosure 3), it is symmetric with moderate to steep dips on both limbs. To the north it becomes more asymmetric with west dipping axial plane, vertical strata on the west limb and moderately dipping strata on the west limb.

On the west side of the Erickson Fault, the Greenhills Syncline has been downthrown approximately 900 m. It can be traced northerly up the Elk River valley from Fording Mountain to where it is cut off by the Elk River Thrust. The Greenhills Syncline is slightly asymmetric with a west dipping axial plane.

Only erosional remnants of the Kootenay Formation are preserved in the southern portion of the Fording Syncline. A 10° north plunge on the syncline preserves an increasing thickness of Kootenay section to the north. Faulting and folding has caused some repetitions of the section and thickening of the coal seams.

3.3 Stratigraphy - Line Creek Ridge

- The 1980 drilling and adit data did not change the stratigraphy for the open pit area as reported in the 1978 Line Creek Geology Report.
- The 1980 mapping and drilling data from Line Creek Extension resulted in recorrelation of the upper half of the Kootenay section.
(Figure 4,5)
- The Kootenay Formation on Line Creek Ridge is up to 500 metres thick. The Kootenay Coal-Bearing Member is approximately 440 metres thick and contains sixteen coal zones, numbered from top to bottom E, D, C, B,

A, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10B, and 10A. These zones have a net aggregate thickness of 67.4 metres in 91.7 metres of gross aggregate coal section. Seam details are as follows:

- E-Seam - Two variable thin coal seams separated by a shale parting. Upper seam may be mineable in some areas. Average thickness is 2.0 m / 6.0 m.
- D-Seam - Variable thin multiple seams separated by shale partings. Average thickness is 2.4 m / 2.7 m.
- C-Seam - At the south end of Line Creek Extension it consists of two thin seams separated by a shale parting. To the north it changes to a thicker coal seam with thin shale splits. Average thickness is 2.3 m / 3.4 m.
- B-Seam - At the south end it consists of two seams separated by a shale parting. To the north it changes to three thin seams with shale partings between. Average thickness is 2.7 m / 3.7 m.
- A-Seam - At the south end it consists of two seams separated by a shale parting. To the north it changes to a single thick seam with thin shale splits. Average thickness is 3.0 m / 4.0 m.
- 1-Seam - Varies from two thin seams separated by a shale parting, to a carbonaceous shale zone. Average thickness is 1.5 m / 2.0 m.
- 2-Seam - Varies from a single thin seam to a coal zone containing two or three seams separated by shale partings. Average thickness is 2.5 m / 3.0 m.

- 3 Upper Seam - It is the most consistent of the upper seams, often exhibiting a "bell-shaped" curve on gamma logs. The lower 50-75% of this zone consists of a single coal seam with thin variable shale splits. The upper portion of the zone consists of multiple thin coal seams with shale partings. Average thickness is 4.0 m / 6.0 m.
- 3 Lower Seam - Varies from single or multiple thin seams to a single thicker seam. To the northwest it appears to disappear completely. Average thickness is 3.3 m / 3.8 m.
- 4-Seam - This seam exhibits the most dramatic facies change of all the upper seams. At the south end of the area it consists of two seams separated by a variable shale parting. Average thickness for this facies is 5.0 m / 12.5 m. To the north this zone changes to a single very thick seam in which shale splits develop to the northeast. Average thickness of this facies is 11.6 m / 12.0 m.
- 5-Seam - One thin coal seam that appears to pinch out towards the north. Average thickness 1.6 m / 1.6 m.
- 6-Seam - Two coal seams separated by a split. Lower seam has a thin shale split as a typifying signature. The seam thickens towards the southwest (structurally thickened?) and thins towards the north and northeast. Average thickness is 5.0 m / 12.0 m.
- 7-Seam - Maintains a regular thickness of 5.2 m / 6.3 m. Structural thinning occurs in the northeast.

- 8-Seam - This is the thickest seam, averaging 11.6 m / 12.8 m. Its stratigraphic and geophysical character remains consistent throughout the area. Variations in thickness are probably due to structural disturbance.
- 9-Seam - Two coal seams separated by shale split, the lower seam thins towards the north. On the west side of the property structural disturbance appears to have reduced seam outcrop thickness to less than 1 metre. Overall average thickness is 5.4 m / 6.4 m.
- 10B-Seam - Outcrops of this seam show that it thins towards the north, especially on the west side of the property. This may be a result of structural disturbance that is quite pronounced on the west side. Average thickness is 4.5 m / 4.5 m.
- 10A-Seam - Maintains a regular thickness throughout Line Creek. Its basal contact is a coaly sandstone directly on top of the Moore Mountain Member. Average thickness is 2.8 m / 2.8 m.

3.4 Structure - Line Creek Ridge

The 1980 exploration program did not change previous interpretations of the pit area structural geology as presented in the 1978 and 1979 Geology Reports.

The 1980 exploration program on Line Creek Extension indicates that geological structure in this area is only slightly more complex than in the main pit area (Figures 6, 7 a-f, 8 a-g). The main structural feature is the Fording Syncline which trends north-south, plunges approximately 10° north and has a near-vertical axial plane.

- west limb: the west limb is entirely present on Line Creek Ridge, however, the east limb is truncated by the Fording Thrust Zone and by erosion of topography down to its present level. On the west side of Line Creek Ridge the lower Kootenay ~~section~~ has been folded into near-vertical and overturned attitudes due to thrusting from the west. To date there is insufficient sub-surface data to determine how far down - dip this structural situation persists.

: on the east side of Line Creek Ridge, bedding attitudes range from 65° at the ridge crest, to near-horizontal at the syncline axis. Drill hole correlation shows repetitions of coal and rock sections due to shallow east-dipping thrust faults. The bulk of drill holes intersect stratigraphy above seam 5; however, several deeper holes at the south end of Line Creek Extension indicate the frequency of these thrust zones appears to increase higher in the stratigraphic section. Although thrust zones are difficult to trace between drill hole control points, the number of faults also appears to increase towards the syncline axis. Limited outcrop data gives only vague indications of similar structural patterns at the surface.

- east limb: outcrop data on the east limb of the Fording Syncline is poor. Limited drill hole data show a normal fault just east of the syncline axis. Its west side is downthrown approximately 80 metres. This fault may be the northern extension of a normal fault seen in the northeast corner of the main pit area.

: drill hole data shows coal and rock repetitions which are probably due to west-dipping thrust faults. Thrust zones and coal "dykes" were seen in several outcrops, but could not be definitely correlated to any sub-surface thrusts.

3.5 Quality - Line Creek Extension

The following pages summarize the coal quality data for each coal zone on Line Creek Extension.

All values given are indicative, rounded and are averages of several holes on an "air dry" basis. Coal cleaned at S.G. 1.5.

Raw ash values derived from chip samples are not reliable, however are useful when compared with clean coal ash to indicate ease of beneficiation.

Notwithstanding the above considerations, the reserve in seam #3 appears considerable and it is planned to conduct carbonization tests for this seam.

In the upper seams sulfur values are somewhat higher and calorific values lower.

PROFESSIONAL VERIFICATION OF REPORT

Entitled: Line Creek Coal Project
Geological Report
for Work Done
During 1980

Ted Hannah planned and carried out the 1980 geological field program on Line Creek B.C. Coal Licences held by Shell Canada Resources Limited. He also prepared this report. Mr. Frank Martonhegyi supervised the activity of this program under the general direction of the undersigned.

Ted Hannah, B. Sc., graduated in Geology from University of New Brunswick 1973. His experience with Western Canada coal exploration since 1974 includes positions with:

- Shell Canada Resources, Calgary, Alberta
- Crows Nest Resources Limited, Calgary, Alberta

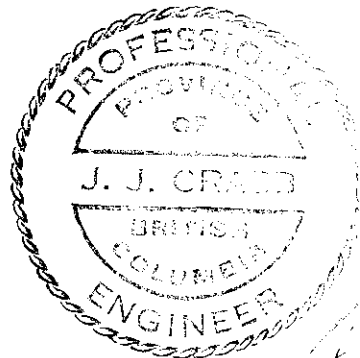
Frank Martonhegyi, M.E., graduated in Mining Geological Engineering from the University of the Heavy Industry, Hungary, in 1962; and received post-graduate training at the University of Saskatchewan, Saskatoon, in 1969-1971. His experience in Western Canadian coal exploration since 1971 includes positions with:

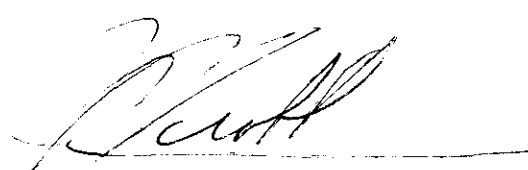
- CanPac Minerals Ltd., Calgary, Alberta
- Shell Canada Resources Ltd., Calgary, Alberta
- Crows Nest Resources Limited, Calgary, Alberta

His prior experience includes underground coal mining geology, geotechnical engineering and geochemistry in Hungary, Austria and Canada.

He currently holds the position of Senior Staff Geologist for Crows Nest Resources Limited supervising coal exploration in British Columbia.

I consider both the aforementioned geologists to be well qualified to undertake responsibilities they were assigned for this project. I am satisfied that the attached report dated April 30, 1981 has been competently prepared and justly represents the information obtained from this project.




J.J. Crabb, P. Eng.

April 30, 1981

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SEAM E (UPPER & LOWER)

Hole 311 - chip samples

Raw ash - chips - 40.0% +

	<u>%</u>
IM	6.0
ASH	16.0
VOL.	28.0
FSI	0

- I. I.M. is high
- II. Will be difficult to segregate 1/4" X 0 with ash low enough to meet specifications.
- III. Note that clean coal ash at S.G. 1.5 is high at 16.0%.
- IV. Log observations:
 - E Upper - numerous rock bands
 - selective mining NOT possible
 - E Lower - only about 0.4 m thick
 - if this reflects entire seam it should be spoiled.

SEAM D

Hole 311 - chip samples

Raw ash - chips - 14.0% in #311, 50.0% in #312.

	<u>%</u>
IM	3.0
ASH	7.0
VOL.	30.0
FSI	0

- I. I.M. is high
- II. Raw ash is low in #311 - may be possible to blend lower ash portions of this seam with high ash "E" seam to meet specifications.
- III. Log observations:
 - a) Hole #311 - shows upper portion (2.5m)
 - has rock bands (42.0% ash)
 - lower portion (1.5m) looks clean (14.0% ash)
 - upper portion may spoiled and only lower taken.
 - b) Hole #312 - high ash - should be spoiled.

SEAM C

Hole 312 - chip samples

Raw ash - 24.0%

	<u>&</u>
IM	1.0
ASH	5.0
VOL.	28.0 - 30.0
FSI	8
S	0.4
C.V.	7800

- I. Should be easily beneficiated for thermal use. Can be considered as a blend with higher ash coals.
- II. Log observations:
 - a) Upper 2.5 m of seam NOT sampled (consists of 1.5 m of good coal over a 1.0 m split).
 - b) Lower 4.5 m has a few thin partings.

SEAM B

Holes 304, 310, 311, 312 - chip samples

Raw ash - 40.0% +

	<u>%</u>
IM	2.0
ASH	9.0
VOL.	28.0 - 30.0
FSI	8 1/2

I. Log observations:

Numerous thin coal seams separated by thick rock bands.

Does NOT appear mineable.

SEAM A

Hole 302 - core samples

Holes 303, 304, 306, 310, 311, 313 - chip samples

Raw ash - core - 10.1%

- chips - 28.0%

	<u>%</u>
IM	1.5
ASH	8.0
VOL.	28.0 - 29.0
FSI	8.0
S	0.6
C.V.	7700

I. Significant difference between core and chip raw ash.

Appears it can be beneficiated for thermal.

II. Log observations:

a) Zone varies from one to several good coal seams separated by mineable rock bands.

b) Holes 302, 306 are similar - single seam

c) Holes 303, 304, 310, 311, 313 are similar - multiple coal bands.

SEAM #1

Hole 302 - core samples

Holes 303, 306 - chip samples

Raw ash - core hole - 17.2%

- chips - 30.0% +

	<u>%</u>
IM	1.5
ASH	7.5
VOL.	27.0 - 29.0
FSI	9

- I. Core hole ash indicates coal easily beneficiated for thermal.
- II. Log observations:

Holes 302, 303, 306 are similar with two coal bands separated by a 0.5 m rock band.

SEAM #2

Hole 302 - core samples

Holes 303, 304, 306, 307, 308, 310, 311, 312, 313 - chip samples

Raw coal - ash core - 18.0%

ash chips - 35.0%

	<u>%</u>
IM	1.0
ASH	7.5
VOL.	28.0 - 29.0
FSI	7.0
S	0.5
C.V.	7800

- I. a) Core ash indicates no big difficulty in beneficiation for thermal use.
- b) Clean coal ash in chips suggests same conclusion as (a).
- II. Log observations:

Stratigraphy in all holes is similar, with only minor variations, and is characterized by two or more coal bands (1.0 m) separated by variable bands.

SEAM 3 U

Hole 207² - core samples

Hole 303 - 313 (incl) - chip samples

Raw ash - core - 20.0%

- chips - 40.0%

	<u>%</u>
IM	1.0
ASH	7.0
VOL.	26.0 - 28.0
FSI	8 1/2
S	0.5
C.V.	7700

- I. This coal is designated thermal but will be tested for carbonization because of extensive reserve potential. It can be marketed as required for Met use.
- II. Log observation:

Stratigraphy in all holes is similar and is characterized by:

 - a) Upper 50.0% - 75.0% contains thin coal seams separated by variable rock bands.
 - b) Lower portion of seam consists of single coal zone with thin rock splits.

SEAM 3 LOWER

Hole 302 - core samples

Holes 303, 305, 306, 307, 308, 309, 314 - chip samples

Raw ash - core - 23.0%

- chips - 30.0%

	<u>%</u>
IM	1.0
ASH	8.0
VOL.	25.5 - 27.5
FSI	8 1/2
S	0.9
C.V.	7500

- I.
 - a) Vol appears about 1.0% below #3 upper.
 - b) This seam is designated thermal, but will be tested for carbonization of extensive reserve potential and can be marketed for Met if required.
 - c) There may be problems in obtaining low enough raw ash on 1/4" X 0.
- II. Log observations:
 - a) Stratigraphy in all holes is similar and is characterized by two good coal bands (1.0 - 2.0 m) with several thinner coal bands above and below.
 - b) Rock splits between thin seams are variable.

SEAM #4

Hole 302 - core samples

Hole 304 - 306 (incl) 308 - 314 (incl) - chip samples

Raw ash - core - 40.0% +

- chips - 35.0%

	<u>%</u>
IM	1.0
ASH	7.0
VOL.	25.5 - 30.0
FSI	7 1/2
S	0.6
C.V.	7400 - 7900

- I.
 - a) Extreme range for vols. indicates a correlation across a normal fault.
 - b) This seam has been designated thermal, but will be tested for carbonization because of extensive reserve potential and can be marketed for met as required.
- II. Log observations:
 - a) Seam #4 is subject to facies changes.

Holes 302 (near current pit) and 311 are characterized by two or more thin seams (approx. 1.0 m) with variable rock splits.

Holes 304, 305, 306, 308, 309, 310, 312, 313, 314 are characterized by a thick coal zone (min. 10.0 m) comprised of variable thick and thin coal bands throughout.

SEAM #5

Hole 302 - core samples

Hole 310, 311, 312, 314 - chip samples

Raw ash - core - 39.0%

- chips - 40.0%

%

IM	1.0
ASH	7.0
VOL.	26.0 - 28.0
FSI	8 1/2
S	0.5
C.V.	7900

- I.
 - a) It may be difficult to segregate 1/4" X 0 with low enough ash to meet specifications.
 - b) Vols. are somewhat higher than expected, possibly because of normal faulting.

II. Log observations:

Stratigraphy in all holes is similar and is characterized by two coal bands (1.0 m) separated by a major rock band.

SEAM #6

Holes 309, 311, 313, 314 - chip samples

Raw Ash - 35.0%

	<u>%</u>
IM	1.0
ASH	8.0
VOL.	26.0 - 28.0
FSI	8.0

No C.V. or S. values

- I. a) Vols. are about 1.5% higher than in current pit.
b) Questionable if any of this should be diverted to met.
- II. Log observations:
Seam consists of two or more coal bands with mineable rock bands between and not-mineable within.

SEAM #7

Hole 301 - core samples

Hole 315, 309 - chip samples

Raw coal - ash core - 33.0%

ash chips - 32.0%

	<u>%</u>
IM	1.0
ASH	7.0
VOL.	22.0 - 24.0
FSI	8.0
S	0.4
C.V.	7900

- I. This can be considered as met coal.
- II. Log observations:
 - a) Upper part of seam is typical of current pit and contains various thin rock bands. One of which may be mineable.
 - b) Below are three coal bands containing thin rock partings separated by thick mineable rock bands.
 - c) These holes are in an area of structural disturbance and therefore the seam may be modified by the faulting.

SEAM #8

Hole 301 - core samples

Hole 315 - ship samples

Raw ash - core - 16.0%

chips - 24.0%

%

IM	1.0
ASH	7.5
VOL.	19.5 - 20.5
FSI	2 1/2
S	0.3
C.V.	7800

I. This coal will have to be blended with a higher vol. and marketed as thermal.

II. Log observations:

Stratigraphy in both holes is similar and is characterized by a single thick coal seam with two rock partings which may be mineable in some areas.

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- M. Dorsay

PROFESSIONAL VERIFICATION OF REPORT

Entitled: Line Creek Coal Project
Geological Report
for Work Done
During 1980

Ted Hannah planned and carried out the 1980 geological field program on Line Creek B.C. Coal Licences held by Shell Canada Resources Limited. He also prepared this report. Mr. Frank Martonhegyi supervised the activity of this program under the general direction of the undersigned.

Ted Hannah, B. Sc., graduated in Geology from University of New Brunswick 1973. His experience with Western Canada coal exploration since 1974 includes positions with:

- Shell Canada Resources, Calgary, Alberta
- Crows Nest Resources Limited, Calgary, Alberta

Frank Martonhegyi, M.E., graduated in Mining Geological Engineering from the University of the Heavy Industry, Hungary, in 1962; and received post-graduate training at the University of Saskatchewan, Saskatoon, in 1969-1971. His experience in Western Canadian coal exploration since 1971 includes positions with:

- CanPac Minerals Ltd., Calgary, Alberta
- Shell Canada Resources Ltd., Calgary, Alberta
- Crows Nest Resources Limited, Calgary, Alberta

His prior experience includes underground coal mining geology, geotechnical engineering and geochemistry in Hungary, Austria and Canada.

He currently holds the position of Senior Staff Geologist for Crows Nest Resources Limited supervising coal exploration in British Columbia.

I consider both the aforementioned geologists to be well qualified to undertake responsibilities they were assigned for this project. I am satisfied that the attached report dated April 30, 1981 has been competently prepared and justly represents the information obtained from this project.

J.J. Crabb, P. Eng.

April 30, 1981

DRILL HOLE SUMMARY

HOLE NO: LC-301
 TYPE: Diamond Core
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535065.16 N 659005.16 E
 ELEVATION: 2194.2 m
 HOLE DIRECTION: 250° / 71°
 LOGS RUN: Gamma, Neutron, Density

SEAM No.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
7	31.6	32.0	0.4			
	90.5	93.5	3.0			
	93.7	94.9	1.2			
	95.2	95.6	0.4			
	96.0	102.4	6.4			
	102.6	103.7	1.1			
	106.2	108.6	2.4			
	108.8	111.8	3.0			
	113.8	115.2	1.4			
	122.0	124.0	2.0			
8	165.1	186.8	21.7			

DRILL HOLE SUMMARY

HOLE NO: LC-302
 TYPE: Diamond Core
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5534854.70 N 659825.69 E
 ELEVATION: 1921.0 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
A	10.0	11.9	1.9			
1	43.5	43.6	0.1			
	44.2	45.0	0.8			
	46.1	46.9	0.8			
	47.1	47.5	0.4			
2	52.3	53.3	1.0			
	53.8	54.0	0.2			
	54.2	55.3	1.1			
3 u	95.1	95.6	0.5			
	96.0	96.8	0.8			
	97.2	98.1	0.9			
	98.1	98.8	0.7			
	99.0	101.0	2.0			
	101.4	102.3	0.9			
3 u?	114.5	116.0	1.5			
	116.5	120.2	3.7			
3 L?	131.4	132.1	0.7			
	132.3	133.2	0.9			
	133.4	134.6	1.2			
	134.6	135.8	1.2			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-302

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 L	143.6	145.0	1.4			
	145.4	147.0	1.6			
4 u?	187.5	188.5	1.0			
4 u?	198.0	199.5	1.5			
4 L	208.5	209.0	0.5			
	209.7	210.5	0.8			
	211.0	211.5	0.5			
5	225.4	227.0	1.6			
	228.0	228.3	0.3			
6 u?	240.2	241.7	1.5			

DRILL HOLE SUMMARY

HOLE NO: LC-303
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535408.7 N 659724.84 E
 ELEVATION: 1860.9 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
E u	2.5	3.5	1.0			
	3.5	4.25	.75			
E L	7.6	8.8	1.2			
D u	15.2	16.4	1.2			
D L	16.4	18.2	1.8			
	23.5	24.1	.6			
	29.4	31.0	1.6			
	32.7	33.0	.3			
C	36.5	38.0	1.5			
	40.0	40.5	.5			
B	44.9	47.8	2.9			
	50	50.9	.9			
A u	61.7	64.1	2.4			
A L	65.1	66.2	1.1			
	75.1	75.5	.4			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-303

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
B	77.2	79.8	2.6			
A u	95.7	97.1	1.4			
	97.1	97.5	.4			
A L	99.5	100.7	1.2			
	101.4	101.8	.4			
	108.0	108.3	.3			
	111.4	111.7	.3			
E u	118.8	118.9	.1			
	128.7	129.2	.5			
	129.2	130.9	1.7			
2	141.6	142.9	1.3			
	142.9	143.3	0.4			
	143.7	144.1	0.4			
	144.2	145.8	1.6			
	161.3	161.6	.3			
	161.7	162.4	.7			
3 u	187.5	188.0	.5			
	188.4	192.7	4.3			
	192.8	194.6	1.8			
	194.9	196.6	1.7			
	196.8	197.7	0.9			
	197.7	199.9	2.2			
3 L	218.2	219.5	1.3			
	219.9	222.0	0.1			

DRILL HOLE SUMMARY

HOLE NO: LC-304
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535523.01 N 659566.34 E
 ELEVATION: 1861.8 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	16.2	17.2	1.0			
	21.2	22.0	1.2			
	26.5	27.5	1.0			
A	33.6	36.4	2.8			
	36.8	38.2	1.4			
	40.8	42.2	1.4			
	42.2	46.2	4.0			
2	61.9	63.0	1.1			
	63.5	64.1	.6			
	69.7	70.4	.7			
3 u	109.3	109.9	.6			
	110.5	114.7	4.2			
	114.7	117.8	3.1			
4	199.1	201.3	2.2			
	201.9	210.8	8.9			
	211.5	216.0	4.5			
	216.3	219.9	3.6			
	220.3	221.3	1.0			

DRILL HOLE SUMMARY

HOLE NO: LC-305
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535203.64 N 659485.96 E
 ELEVATION: 1937.8 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 u	39.3	40.7	1.4			
	40.9	41.3	.4			
	41.5	42.4	.9			
	42.6	49.0	6.4			
	67.4	68.7	1.3			
	69.2	69.8	.6			
3 L	74.0	75.9	1.9			
4	86.9	90.2	3.3			
	90.4	94.5	4.1			
	95.2	96.0	.8			
	100.7	101.1	.4			
	101.9	102.4	.5			
5	120.7	121.3	.6			

DRILL HOLE SUMMARY

HOLE NO: LC-306
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535092.38 N 659917.23 E
 ELEVATION: 1844.53 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	23.1	25.1	2.0			
	32.5	33.2	.7			
1	43.8	45.8	2.0			
2	50.5	51.5	1.0			
	51.5	52.1	.6			
	52.4	54.0	1.6			
1	78.2	78.6	.4			
	79.2	80.1	.9			
2	85.1	86.1	1.0			
	86.4	88.2	1.8			
3 u	126.3	126.8	.5			
	127.5	128.0	.5			
	129.3	130.1	.8			
	130.1	130.5	.4			
	131.1	133.1	2.0			
	133.1	133.9	.8			
	134.4	135.2	.8			
	136.0	136.4	.4			
	136.4	138.0	1.6			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-306

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 L	148.0	148.4	.4			
	148.4	149.4	1.0			
	150.0	150.3	.3			
	150.3	151.8	1.5			
4	154.2	156.8	2.6			
	157.3	159.8	2.5			
	160.0	162.4	2.4			
	163.9	165.3	1.4			
	165.96	167.0	1.4			
	168.3	168.6	.3			

DRILL HOLE SUMMARY

HOLE NO: LC-307
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5534696.81 N 659617.88 E
 ELEVATION: 2022.91 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
2	17.5	18.9	1.4			
3 u	54.0	54.7	.7			
	55.7	56.4	.7			
	56.7	60.0	3.3			
	60.0	65.1	5.1			
	65.5	66.0	.5			
3 L	86.4	87.1	.7			
	88.3	89.8	1.5			
	90.0	91.0	1.0			

DRILL HOLE SUMMARY

HOLE NO: LC-308
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5534859.97 N 659680.34 E
 ELEVATION: 1978.53 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
1	23.5	24.9	1.4			
	25.5	26.3	.8			
2	31.2	32.5	1.3			
	32.7	33.4	.7			
	33.4	35.0	1.6			
	36.5	37.5	1.0			
	37.5	38.0	.5			
	80.6	81.3	.7			
	81.8	83.0	1.2			
	83.4	84.9	1.5			
	86.0	86.4	.4			
	3 u	90.1	90.9	.8		
91.8		93.1	1.3			
94.0		95.0	1.0			
95.3		102.2	6.9			
3 L	113.7	114.4	.7			
	115.1	116.9	1.8			
	133.6	133.9	.3			
	136.9	137.2	.3			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-308

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
4	143.0	143.7	.7			
	143.9	146.4	2.5			
	146.4	147.1	.7			
	147.6	148.9	1.3			
	149.3	149.6	.3			
	149.6	152.0	2.4			
	152.3	154.0	1.7			
	154.9	156.8	1.9			
	157.2	159.0	1.8			
	159.7	160.8	1.1			
	161.2	162.1	.9			
	169.9	170.5	.6			
	170.5	171.1	.6			
	180.7	182.0	.3			

DRILL HOLE SUMMARY

HOLE NO: LC-309
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535461.15 N 659329.86 E
 ELEVATION: 1969.17 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 u	17.5	18.3	.8			
	31.5	32.2	.7			
	77.4	78.2	.8			
	80.0	80.6	.6			
	81.0	85.5	4.5			
	85.5	86.2	.7			
	86.6	87.1	.5			
3 L	87.1	87.8	.7			
	95.4	96.1	.7			
	96.1	97.2	1.1			
	98.2	100.4	2.2			
	100.7	101.8	1.1			
4	101.8	103.7	1.9			
	111.5	112.4	.9			
	112.6	113.2	.6			
	113.8	117.8	4.0			
	118.0	122.7	4.7			
	123.2	124.0	.8			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-309

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
5	136.5	136.8	.3			
	137.5	138.6	1.1			
	141.2	141.4	.2			
	145.7	146.7	1.0			
	160.3	162.2	1.9			
	174.9	175.8	.9			
6 ?	189.0	190.0	1.0			
	190.3	192.0	1.7			
	192.5	196.0	3.5			
	196.6	197.9	1.3			
	197.9	200.0	2.1			
	200.0	201.8	1.8			
7 ?	207.0	207.6	.6			
	208.0	208.7	.7			
	221.8	222.6	.8			
	222.6	223.0	.4			
	223.0	223.8	.8			
	223.8	224.0	.2			
	224.1	225.1	1.0			
	225.1	227.5	2.4			
	228.8	229.7	.9			
	234.2	234.7	.5			

DRILL HOLE SUMMARY

HOLE NO: LC-310
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535635.38 N 659627.11 E
 ELEVATION: 1827.18 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	18.6	20.0	1.4			
B	26.9	28.0	1.1			
	28.0	28.3	0.3			
	30.0	31.1	1.1			
	32.4	33.1	0.7			
	33.1	33.4	0.3			
A	41.3	46.0	4.7			
	46.7	49.3	2.6			
	49.8	53.1	3.3			
2	72.5	73.5	1.0			
	74.3	74.8	.5			
	75.2	76.3	1.1			
	77.1	78.1	1.0			
	134.1	134.6	.5			
	135.9	137.3	1.4			
	137.5	138.1	.6			
	139.2	139.5	.3			
	139.7	140.2	.5			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC310

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 u	152.2	152.5	.3			
	152.5	155.3	2.8			
	156.3	158.5	2.2			
	159.8	161.0	1.2			
	162.7	168.2	5.5			
	168.7	170.1	1.4			
	171.4	173.0	1.6			
	173.0	175.3	2.3			
	175.3	176.5	1.2			
	176.5	179.1	2.6			
4	195.5	196.3	0.8			
	196.3	197.4	1.1			
	198.2	203.1	4.9			
	203.1	206.0	2.9			
	206.0	206.7	.7			
	209.2	210.5	1.3			
5	217.2	218.2	1.0			
	227.0	228.0	1.0			

DRILL HOLE SUMMARY

HOLE NO: LC-311
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535517.12 N 659785.15 E
 ELEVATION: 1826.52 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
E	5.4	6.6	1.2			
	6.8	7.6	.8			
	10.3	10.7	.4			
D	16.8	17.7	.9			
	18.2	19.0	.8			
	19.2	21.2	2.0			
B	40.6	41.4	.8			
	41.4	42.0	.6			
	45.6	46.3	.7			
	47.1	47.7	.6			
A	58.5	60.6	2.1			
	61.5	62.5	1.0			
	65.1	66.1	1.0			
	67.3	67.8	.5			
	67.8	68.3	.5			
	68.7	69.8	1.1			
2	84.7	86.0	1.3			
	86.3	87.3	1.0			
	87.3	88.3	1.0			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-311

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	94.2	94.4	.2			
	94.4	95.0	.6			
	95.8	96.0	.2			
	97.6	97.9	.3			
A	102.5	103.2	.7			
	103.4	104.7	1.3			
	104.8	105.5	.7			
2	125.9	126.9	1.0			
	127.2	127.7	.5			
	127.8	129.0	1.2			
3 u	195.4	196.4	1.0			
	196.6	196.8	.2			
	196.8	198.0	1.2			
	200.0	200.3	.3			
	201.7	204.1	2.4			
	204.1	204.6	.5			
	205.4	206.0	.6			
4	208.3	210.0	1.7			
	210.6	211.2	.6			
	212.3	212.8	.5			
	214.0	214.5	.5			
5	224.0	224.5	.5			
	224.5	224.8	.3			
	226.3	226.8	.5			
	229.2	229.4	.2			
	229.8	230.9	1.1			
	230.9	233.0	2.1			
6 ?	246.0	247.3	1.3			
	247.6	249.0	1.4			
	249.0	249.9	.9			
	252.2	252.4	.2			
	252.4	253.7	1.3			
	254.5	255.2	.7			
	255.2	256.5	1.3			

DRILL HOLE SUMMARY

HOLE NO: LC-312
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5536058.27 N 659640.45 E
 ELEVATION: 1754.16 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	34.7	35.4	.7			
	52.5	53.2	.7			
	53.2	54.2	1.0			
	54.7	55.4	.7			
C u	55.4	56.3	.9			
C L	56.7	59.8	3.1			
	68.0	68.7	.7			
	69.9	70.3	.4			
	73.0	76.6	3.6			
	121.7	122.5	.8			
2 u	133.5	133.7	.2			
	133.9	135.4	1.5			
	135.4	135.9	.5			
	135.9	136.8	.9			
	149.5	150.3	.8			
	150.3	150.6	.3			
	152.8	153.2	.4			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-312

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 u	188.8	189.4	.6			
	189.7	190.5	.8			
	190.5	191.5	1.0			
	191.5	193.7	2.2			
	193.7	194.2	.5			
4	232.5	233.4	.9			
	233.9	241.0	7.1			
	291.0	241.4	.4			
	242.5	243.6	1.1			
	245.0	248.9	3.9			
	249.4	249.9	.5			
	254.2	255.1	.9			
5	262.6	263.0	.4			
	270.4	271.1	.7			
	281.9	282.1	.2			

DRILL HOLE SUMMARY

HOLE NO: LC-313
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535807.39 N 659390.09 E
 ELEVATION: 1849.94 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
A	8.7	10.0	1.3			
	10.0	12.1	2.1			
	12.9	15.0	2.1			
2	34.1	34.6	.5			
	34.6	35.3	.7			
	35.7	36.1	.4			
	36.1	36.6	.5			
	40.1	41.5	1.4			
	41.8	43.1	1.3			
	44.0	44.6	.6			
	45.2	45.7	.5			
3 u	93.7	94.4	.7			
	95.0	96.3	1.3			
	96.3	100.0	3.7			
	100.0	101.2	1.2			
	101.2	102.0	.8			
	102.0	102.4	.4			
	102.4	102.8	.4			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-313

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
4	118.7	119.0	.3			
	120.1	120.4	.3			
	120.8	124.5	3.7			
	125.0	128.7	3.7			
	128.7	130.3	1.6			
	130.3	130.7	.4			
5	139.9	140.6	.7			
6 ?	160.0	160.3	.3			
	160.9	161.8	.9			
	163.6	166.0	2.1			
	167.5	168.2	.7			
	168.2	168.9	.7			

DRILL HOLE SUMMARY

HOLE NO: LC-314
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535400.95 N 659957.09 E
 ELEVATION: 1783.79 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
3 L	11.5	12.8	1.3			
	13.2	13.4	.2			
	18.5	18.9	.4			
	20.5	20.9	.4			
4	29.6	33.4	3.8			
	33.4	34.0	.6			
	34.0	34.3	.3			
	35.0	35.3	.3			
	35.3	37.3	2.0			
	37.6	41.4	3.8			
	42.3	43.2	.9			
5	44.5	45.7	1.2			
	59.8	61.3	1.5			
	61.3	61.8	.5			
	62.4	64.3	1.9			
	64.9	67.3	2.4			
6 ?	67.8	68.0	.2			
	78.1	79.1	1.0			
	79.5	80.8	1.3			
	81.0	82.6	1.6			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-314

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	119.5	121.1	1.6			
	121.7	123.4	1.7			
	123.4	124.3	.9			
	130.3	130.9	.6			
	130.9	131.3	.4			
	131.7	132.6	.9			
	132.6	133.7	1.1			
	133.7	134.4	.7			

DRILL HOLE SUMMARY

HOLE NO: LC-315
 TYPE: CSR Rotary
 DATUM:
 CASING:
 WATER LEVEL:
 LOCATION: 5535297.41 N 658982.04 E
 ELEVATION: 2149.05 m
 HOLE DIRECTION: Vert.
 LOGS RUN: Gamma, Neutron, Density

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
7	32.5	35.4	2.9			
	36.2	43.2	7.0			
	43.2	44.3	1.1			
	45.0	46.1	1.1			
	46.1	46.9	.8			
	46.9	48.7	1.8			
	48.7	54.0	5.3			
	54.0	55.0	1.0			
	55.8	57.1	1.3			
	57.1	60.6	3.5			
	60.6	61.5	.9			
	62.5	63.4	.9			
	65.2	67.0	1.8			
	67.0	68.0	1.0			
	68.2	68.8	.6			
69.1	69.8	.7				
69.8	71.7	1.9				
72.0	73.2	1.2				
8	121.0	125.5	4.5			
	126.0	130.1	4.1			
	130.7	130.9	.2			
	130.9	133.3	2.4			
	133.3	133.8	.5			

DRILL HOLE SUMMARY (con't)

HOLE NO: LC-315

SEAM NO.	FINAL		THICKNESS	REC. %	SAMPLE NO.	BEDDING ANGLE TO CORE AXIS
	TOP	BOTTOM				
	186.7	187.7	1.0			
	196.0	196.4	.4			
	196.4	196.9	.5			
	197.3	200.1	2.8			
	200.1	200.7	.6			
	209.8	210.4	.6			
	210.8	211.0	.2			
	212.0	212.3	.3			
	217.6	217.9	.3			
	217.9	218.4	.5			
	218.4	219.7	1.3			



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

APPLICATION TO EXTEND TERM OF LICENCE

I, Bolton Agnew agent for Shell Canada Resources Limited
(Name) (Name)

P.O. Box 100
(Address) (Address)
Calgary, Alberta, T2P 2H5

Valid FMC No. 207568

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 277 - 281 Incl., 284, 285, 290, 293, 294, 297, 298, 301, 304, 1299; 15 Licences, 3402 Hectares
for a further period of one year.

2. Property name Line Creek North & Mt. Banner East; Group #266, Kootenay Land District

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

4. I have performed, or caused to be performed, during the period January 30, 1980 to January 31, 1981, work to the value of at least \$ 822,728.20

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

CATEGORY OF WORK

	Licence(s) No(s).	Apportioned Cost
Geological mapping	277,280,281,293,294,1299	\$120,635.50
Surveys: Geophysical		
Geochemical		
Other (Location)	277,280,281,293,294,1299	33,636.93
Road construction	277,280,281,293,294,1299	104,583.78
Surface work (Trenching)	277,281,293,294	31,843.52
Underground work (Adits)	293,294,297	42,742.58
Drilling	293,294,297	353,728.28
Logging, sampling, and testing	277,293,294,297	49,968.13
Reclamation	277,280,281,293,294,1299	49,338.13
Other work (specify)		
Off-property costs		36,251.35

5. I wish to apply \$ 822,728.20 of this value of work on Coal Licence(s) No(s). 277 - 281 Incl., 284, 285, 290, 293, 294, 297, 298, 301, 304, 1299

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

7. The work performed on the location(s) is detailed in the attached report entitled Line Creek North Geological Report '80, Mount Banner East Geological Report '80, will be submitted in ninety days

1981.01.28
(Date)


(Signature)

Land Supervisor
(Position)

CATEGORY OF WORK

GEOLOGICAL MAPPING

Yes No

	Area (hectares)	Scale	Duration
Reconnaissance	778	1:5,000	211 Man-Days
Detail Surface	500	1:2,000	90 Man-Days
Underground			
*Other (specify)			
			Total Cost \$ 120,635.50

GEOPHYSICAL/GEOCHEMICAL SURVEYS

Yes No

Method	
Grid	
Topographic Location Surveys	
*Other (specify)	
Total Cost \$ 33,636.93	

ROAD CONSTRUCTION

Yes No

Length	Width	On Licence(s) No(s)	Access to	Total Cost
4,760 m	5 m	293, 294, 277, 280, 281, 1299, 1302		\$ 104,583.78

SURFACE WORK

Yes No

	Length	Width	Depth	Cost
Trenching	5,852	1 m	1 m	
Seam Tracing				
Crosscutting				
*Other (specify)				
				Total Cost \$ 31,843.52

UNDERGROUND WORK

Yes No

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits					
*Other workings					
					Total Cost \$ 42,742.58

DRILLING

Yes No

	Hole Size	No. of Holes	Total Metres	Cost
Core: Diamond Wireline	HQ-96 mm	3	761.82 m	
Rotary: Conventional Reverse circulation	124 mm	13	2,658 m	
*Other (specify)				
Contractor Acadia, Tant (Diamond), SDS (Rotary), Drilling Companies.				
Where is the core stored? CNRL Lab, Fernie, and on Mt. Banner East Prop. (UTM 5,544,250 m N; 661,870 m E)				Total Cost \$ 353,728.28

LOGGING, SAMPLING AND TESTING

Yes No

Lithology: Drill samples	<input checked="" type="checkbox"/>	Core samples	<input checked="" type="checkbox"/>	Bulk samples	<input checked="" type="checkbox"/>
Logs: Gamma-neutron	<input checked="" type="checkbox"/>	Density	<input checked="" type="checkbox"/>		
*Other (specify) .Caliper					
Testing: Proximity analysis	<input checked="" type="checkbox"/>	FSI	<input checked="" type="checkbox"/>	Washability	<input checked="" type="checkbox"/>
Carbonization	<input checked="" type="checkbox"/>	Petrographic	<input checked="" type="checkbox"/>	Plasticity	<input checked="" type="checkbox"/>
*Other (specify)					
					To Date Total Cost \$ 49,968.13

OTHER WORK (specify details)

Reclamation (harrowing, seeding, fertilizing), roads, adit and drill sites, re-contouring parts of Mt. Banner East road as requested by the Advisory Committee on Coal	Total Cost	\$ 49,338.13
Exploration, BC Ministry of Energy, Mines and Petroleum Resources	On-property costs	786,476.85
	Off-property costs	36,251.35
	Total Expenditures	\$ 822,728.20

1981.01.28

(Date)

W. P. Karubshi
(Signature)

Manager - Accounting, CNRL
(Position)

Application to extend term of licence for the entire group was submitted January 28th, 1981

CATEGORY OF WORK

GEOLOGICAL MAPPING

Yes No

	Area (Hectares)	Scale	Duration
Reconnaissance	500	1:2000	90 man-days
Detail: Surface			
Underground			
*Other (specify)			
Total Cost			\$ 56,148.50

GEOPHYSICAL/GEOCHEMICAL SURVEYS

Yes No

Method		
Grid		
Topographic	Location Surveys	
*Other (specify)		
Total Cost		\$ 18,424.00

ROAD CONSTRUCTION

Yes No

Length	1160 m	Width	5 m
On Licence(s) No(s)	293, 294		
Access to	Drill sites		
Total Cost			\$ 35,757.00

SURFACE WORK

Yes No

	Length	Width	Depth	Cost
Trenching	5625	1 m	1 m	
Seam Tracing				
Crosscutting				
*Other (specify)				
Total Cost				\$ 20,058.86

UNDERGROUND WORK

Yes No

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits	4 existing	6 m		25	
*Other workings	* bulk samples	6 m each in existing	X cuts		
Total Cost					\$ 42,742.58

DRILLING

Yes No

	Hole Size	No. of Holes	Total Metres	Cost
Core: Diamond				
Wireline	HQ 96 mm	2	443	
Rotary: Conventional				
Reverse circulation	124 mm	13	2658	
*Other (specify)				
Contractor	Acadia - \$05			
Where is the core stored?				
Total Cost				\$ 294,713.03

LOGGING, SAMPLING AND TESTING

Yes No

Lithology: Drill samples	<input checked="" type="checkbox"/>	Core samples	<input checked="" type="checkbox"/>	Bulk samples	<input checked="" type="checkbox"/>
Logs: Gamma-neutron	<input checked="" type="checkbox"/>	Density	<input checked="" type="checkbox"/>		
*Other (specify)	Caliper				
Testing: Proximate analysis	<input checked="" type="checkbox"/>	FSI	<input checked="" type="checkbox"/>	Washability	<input checked="" type="checkbox"/>
Carbonization	<input checked="" type="checkbox"/>	Petrographic	<input checked="" type="checkbox"/>	Plasticity	<input checked="" type="checkbox"/>
*Other (specify)	BTU, Sulphur				
Total Cost					\$ 47,403.13

OTHER WORK (specify details)

Reclamation		
Total Cost		\$ 33,268.13
On-property costs		548,515.23
Off-property costs		27,162.37
Total Expenditures		\$ 547,677.60

Original dated 1981.01.28
(Date)

ORIGINAL SIGNED BY
W. S. KOWALSKI
(Signature)

Manager - Accounting CNRL
(Position)

K-Shell-Line Creek 80(2)A

82-07-13

OPEN FILE

MAPS

C.L.#. 293, 294, 297,
298, 301

422

INTER-OFFICE CORRESPONDENCE

11

DATE: December 3, 1980
TO: CROWSNEST RESOURCES LIMITED (CNRL)
FROM: Sheltech Canada
SUBJECT: LOCATION SURVEY
NORTH LINE CREEK 4051 B
S.E. British Columbia

All the work done in North Line Creek was surveyed from the Crowsnest Control Network using coordinates established in July 14, 1980. Stations 103, Peak, Crown, Timber, Hump, Knob, Pass, and 17 were all used with the survey method of "resectioning" done whenever possible. All the traverse runs were closed with the exception of two because of lack of control in that area and reasonable closures were obtained.

A total of 73 traverse stations were established from which 15 drill holes and 14 trenches were surveyed. While surveying the trenches, a total of 195 geological points were picked up.

Conventional survey methods using both a 1" and a 20" theodolite and an electronic distance measuring instrument were used to obtain an x,y,z value for all the above mentioned points. Calculations were done in the UTM system with distances and bearing reduced to grid with a reference meridian of 117° W and the results were given to CNRL in both tabular and plan form.

The survey cost attributed to the North Line Creek project was \$19,600.

Dave Poulson

Dave Poulson

DP/eh

By Kan

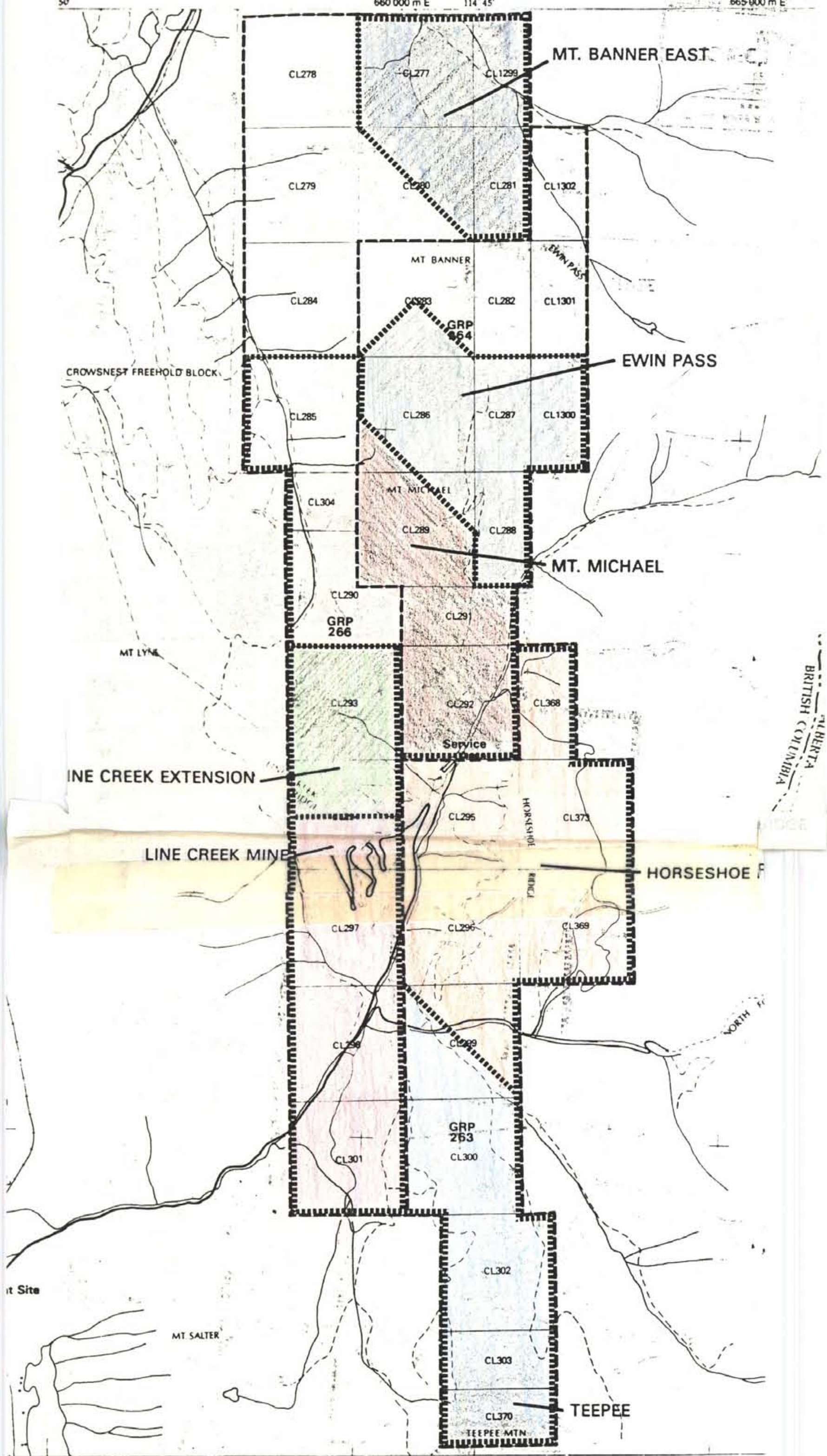
422

50

660 000 m E

114 45'

665 000 m E

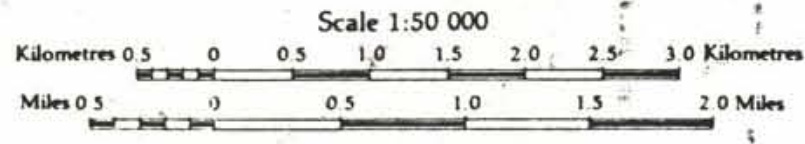


ALBERTA
BRITISH COLUMBIA

114 50

114 45'

By the Survey and Mapping
Energy Mines and Resources
1979 Province of British Col
ing and 1980 Crown and
drawing (C-1000012)



ECT PROSPECT
IDARY
IP BOUNDARY



Transverse Mercator Projection
Universal Transverse Mercator Grid Zone II.

Crows Nest Resource
EXPLORATIVE

CENTRAL BLO
SE BC

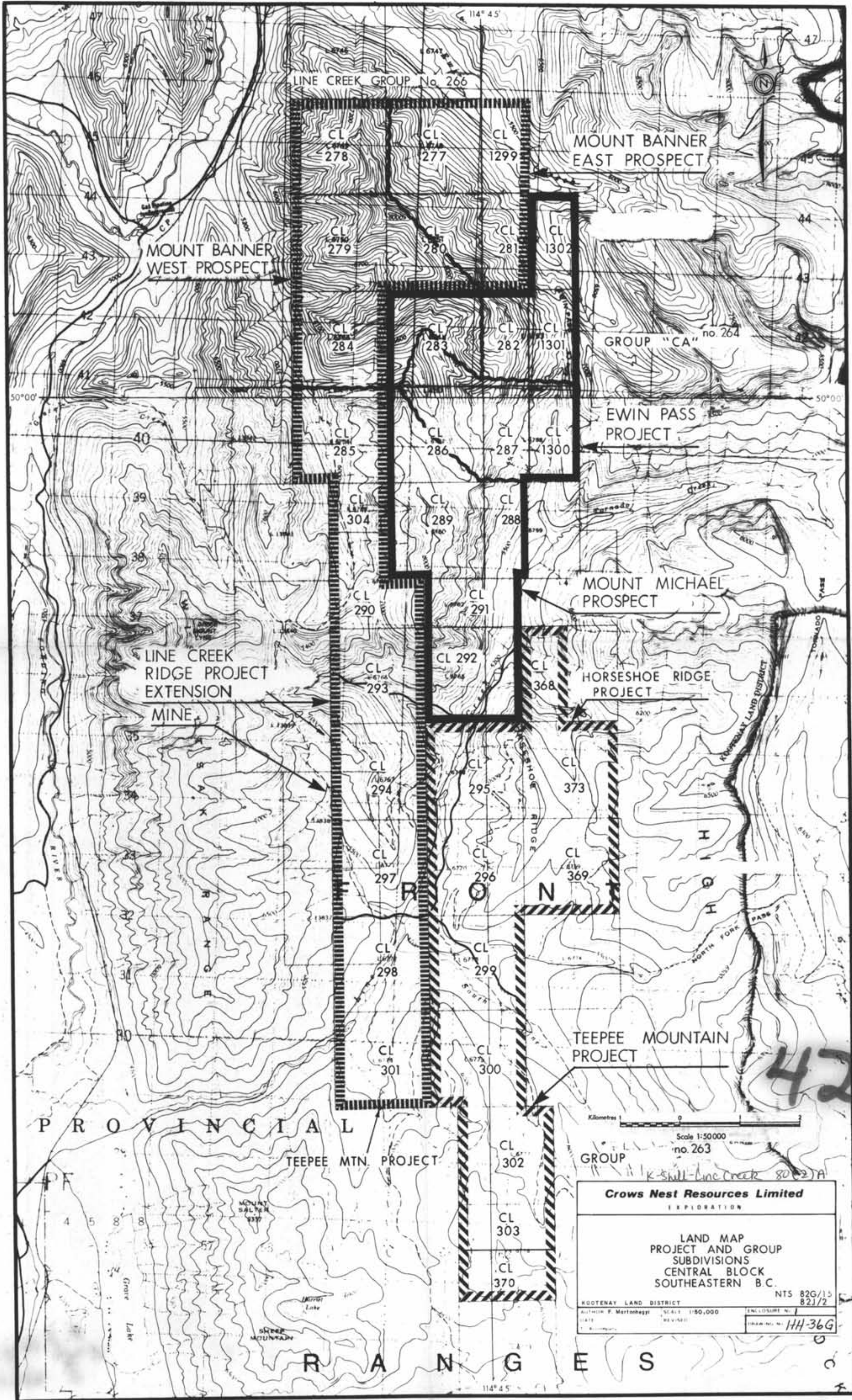
PROJECT LC
MAP

Author: R. BARRY Date: 81/07/30 Scale: 1:50,000

422

Diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION 1275
Annual change in declination 5.4

ENC 1



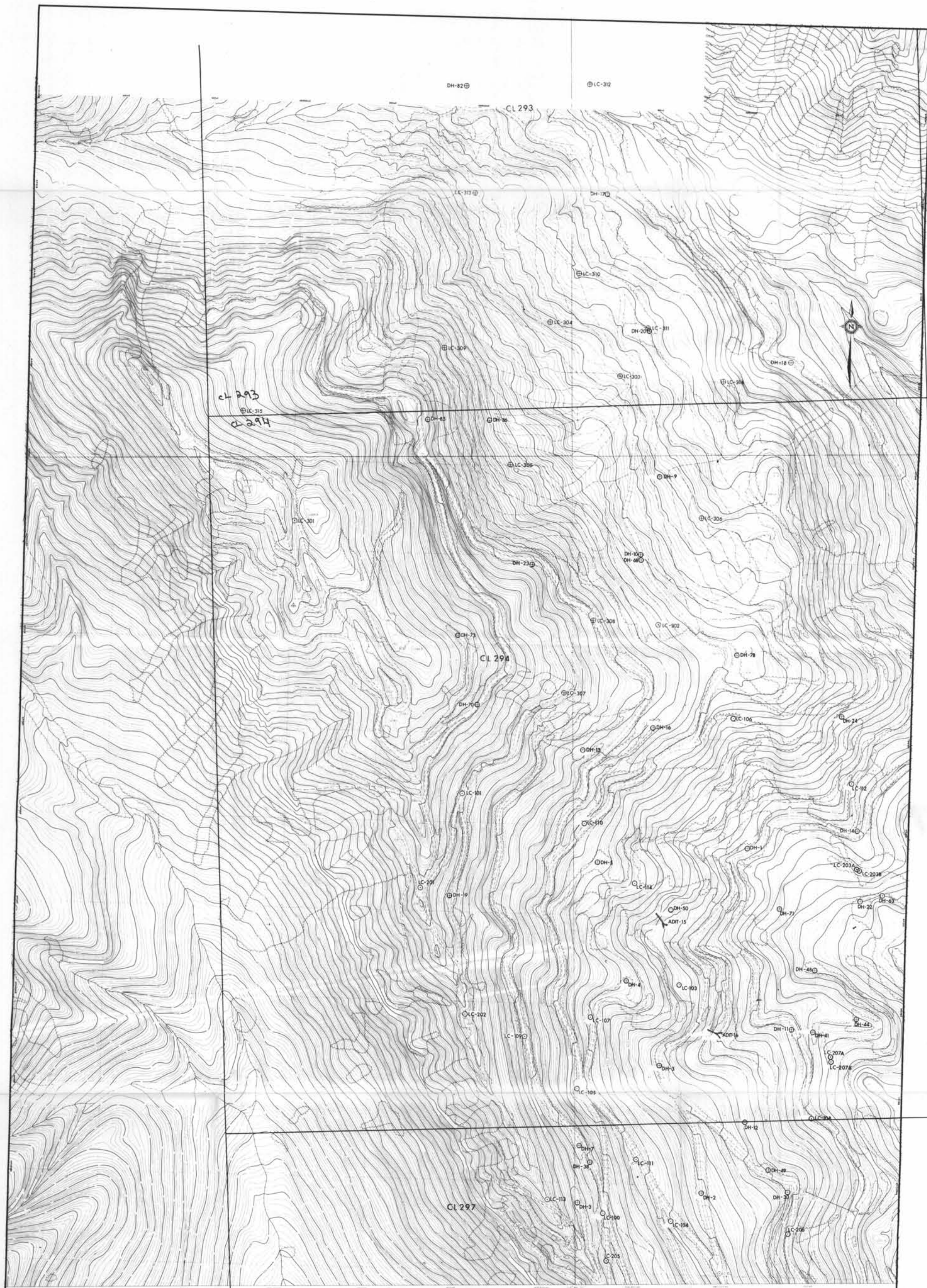
Kootenay Land District
 AUTHORITY: F. Martineggi
 SCALE: 1:50,000
 DATE: REVISED:
 ENCLOSURE NO.:
 DRAWING NO.: HH-36G

GROUP no. 263
 K-Shill-Line Creek 80(2)A

Scale 1:50,000
 KILOMETRES 0 1 2

Crows Nest Resources Limited
 EXPLORATION
 LAND MAP
 PROJECT AND GROUP
 SUBDIVISIONS
 CENTRAL BLOCK
 SOUTHEASTERN B.C.
 NTS 82G/15
 82J/2

422



CL 293
CL 294

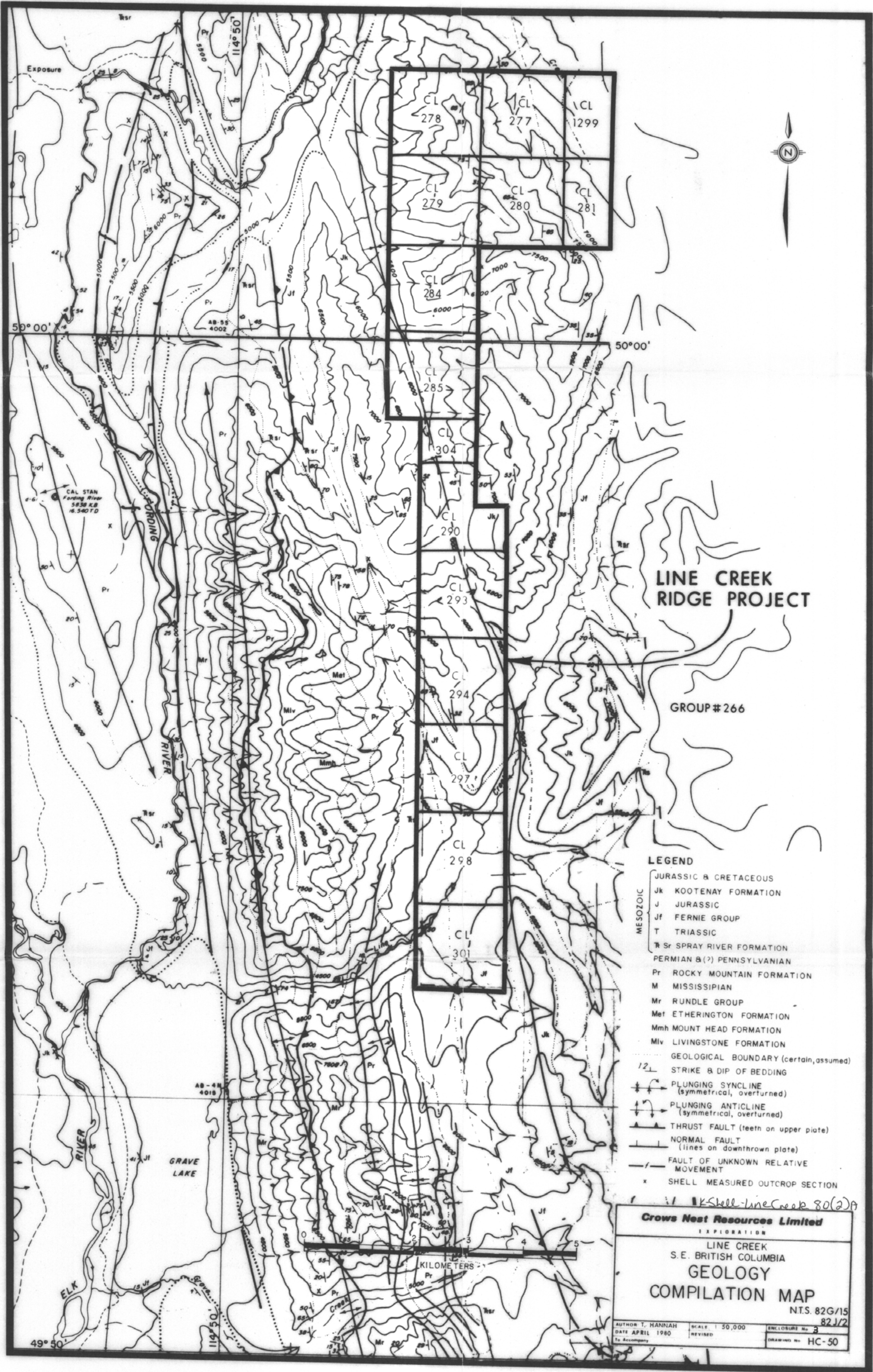
CL 292

CL 295

SOUTH EAST BRITISH COLUMBIA
SCALE 1:5 000
CONTOUR INTERVAL: 2 METRES
DATE OF PHOTOGRAPHY: JUNE/JULY 1979

K Shell Line Creek 80(2)A
Crows Nest Resources Limited
S.E. BRITISH COLUMBIA
LINE CREEK EXTENSION
DATA BASE MAP
DATE: 01-15-80
SCALE: 1:5000
PROJECT: 80-2A
SHEET: 422

422



**LINE CREEK
RIDGE PROJECT**

GROUP #266

LEGEND

- MESOZOIC
- JURASSIC & CRETACEOUS
- Jk KOOTENAY FORMATION
- J JURASSIC
- Jf FERNIE GROUP
- T TRIASSIC
- Rsr SPRAY RIVER FORMATION
- PERMIAN B(?) PENNSYLVANIAN
- Pr ROCKY MOUNTAIN FORMATION
- M MISSISSIPPIAN
- Mr RUNDLE GROUP
- Met ETHERINGTON FORMATION
- Mmh MOUNT HEAD FORMATION
- Mlv LIVINGSTONE FORMATION
- GEOLOGICAL BOUNDARY (certain, assumed)
- 1/2 STRIKE & DIP OF BEDDING
- PLUNGING SYNCLINE (symmetrical, overturned)
- PLUNGING ANTICLINE (symmetrical, overturned)
- THRUST FAULT (teeth on upper plate)
- NORMAL FAULT (lines on downthrown plate)
- FAULT OF UNKNOWN RELATIVE MOVEMENT
- x SHELL MEASURED OUTCROP SECTION

Crows Nest Resources Limited
EXPLORATION

LINE CREEK
S.E. BRITISH COLUMBIA
**GEOLOGY
COMPILATION MAP**
N.T.S. 82G/15
82J/2

AUTHOR T. HANNAH SCALE 1:50,000 ENCLOSURE No. 3
DATE APRIL 1980 REVISED DRAWING No. HC-50

PIC 422

422 4

STRATIGRAPHIC SECTION

DESIGNATION:

PART _____ OF _____

PROJECT: LINE CREEK RIDGE

AUTHOR: T.W.H.

DATE: 1979 / JAN

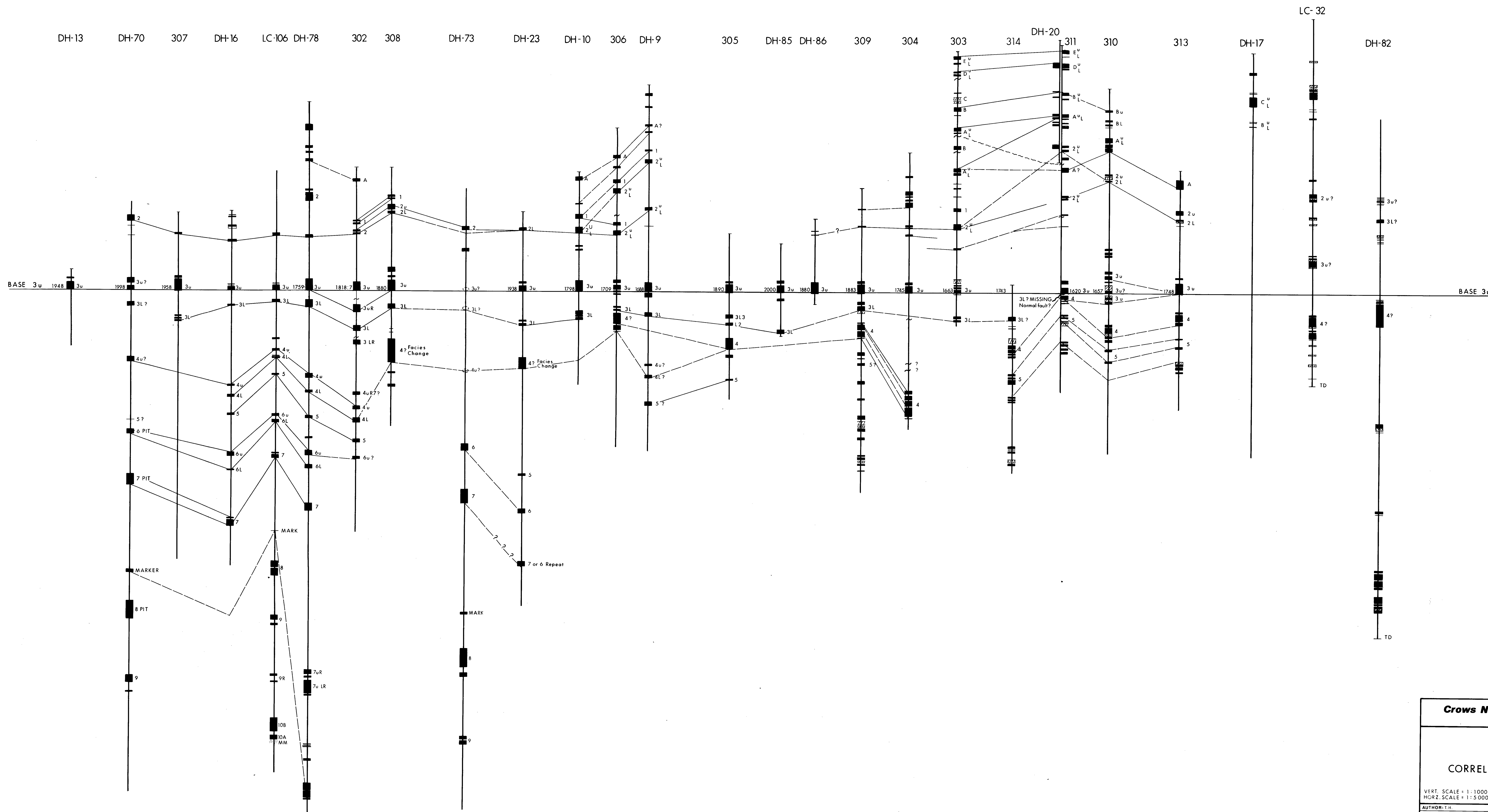
AREA: SOUTHEASTERN B.C.

SOURCE OF DATA:

LOCATION: TYPICAL STRATIGRAPHIC SECTION

SCALE	CONTROL POINT	INTERVAL	LITHOLOGY	STRIKE & DIP	DESCRIPTION		SAMPLE
					MAIN	AMPLIFIED	
(m)							
560							
540							
520							
500							
480					E SEAM	20/60m	
					D SEAM	2.4/27m	
460					C SEAM	2.3/3.4m	
					B SEAM	2.0/2.0m 0.7/0.7m	
440					A SEAM	30/40m	
420					No.1 SEAM	1.5/2.0m	
400					No.2 SEAM	2.5/3.0m	
380							
360					No. 3u SEAM	1.5→3.0 3.3	
					No. 3l SEAM	3.5/3.8	
340							
320					No. 4 SEAM	5.0/12.5 → 11.6 /12.0	
300					No. 5 SEAM	1.6 /1.6m	
280							
260					No. 6 SEAM	5.0/12.0m	
240					No. 7 SEAM	5.2 /6.3m	
220							
200							
180							
160					MARKER SEAM		
140					No. 8 SEAM	11.6/12.8m	
120							
100					No. 9 SEAM	5.4 /6.8 m	
80					No. 10B SEAM	4.5 /4.5 m	
60					No. 10A SEAM	2.8 /2.8 m	
40					COALY BEDS		
20							
0							
20							
40							
60							
80							
100							

COAL-BEARING MB.
 KOOTENAY FM.
 MOOSE MTN MB.
 PASSAGE BEDS
 FERNE SHALE
 FERNE FM.



422

K-3411 Line Creek 80(2)A

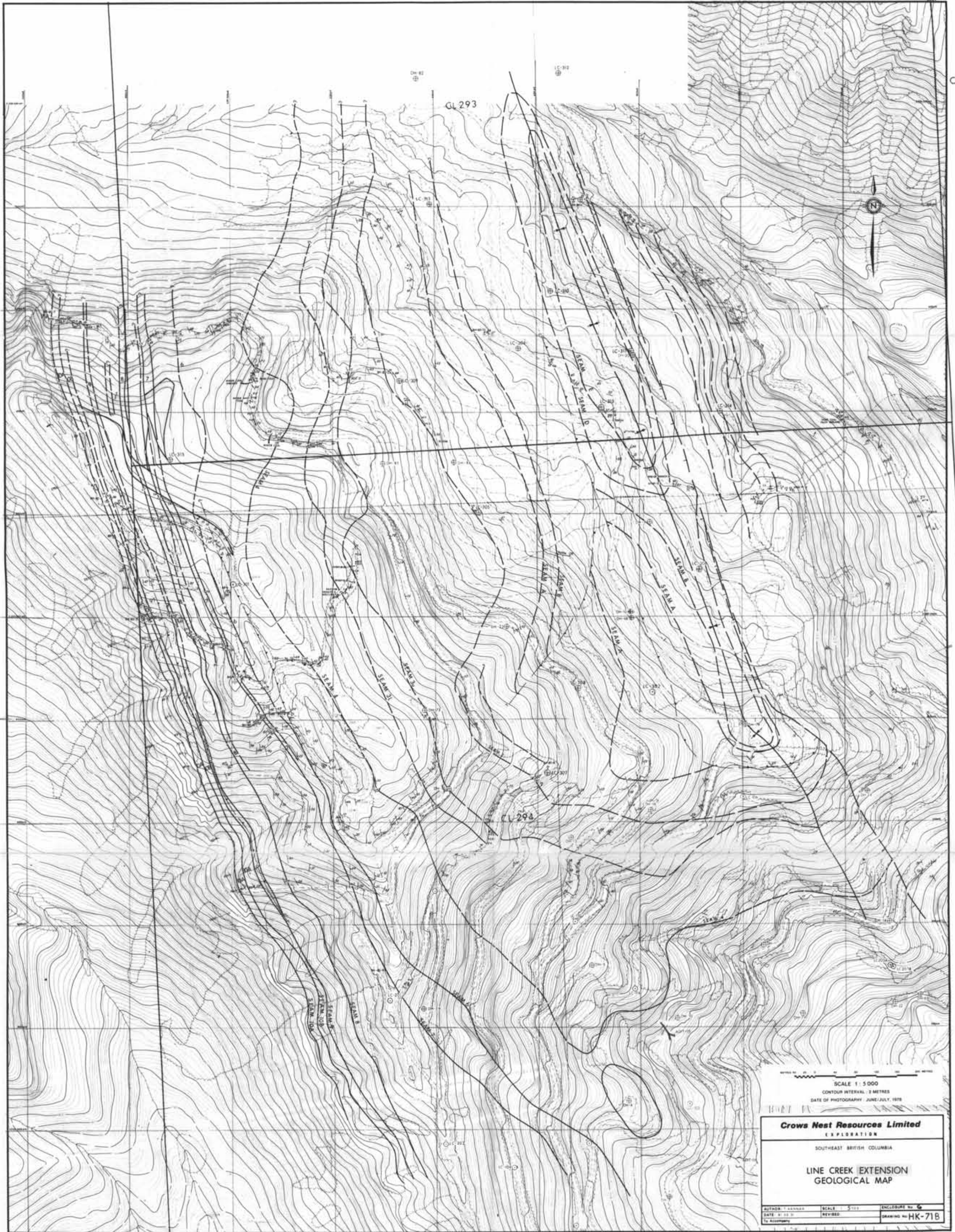
Crows Nest Resources Limited
EXPLORATION

LINE CREEK EXTENSION
SOUTHEAST BRITISH COLUMBIA

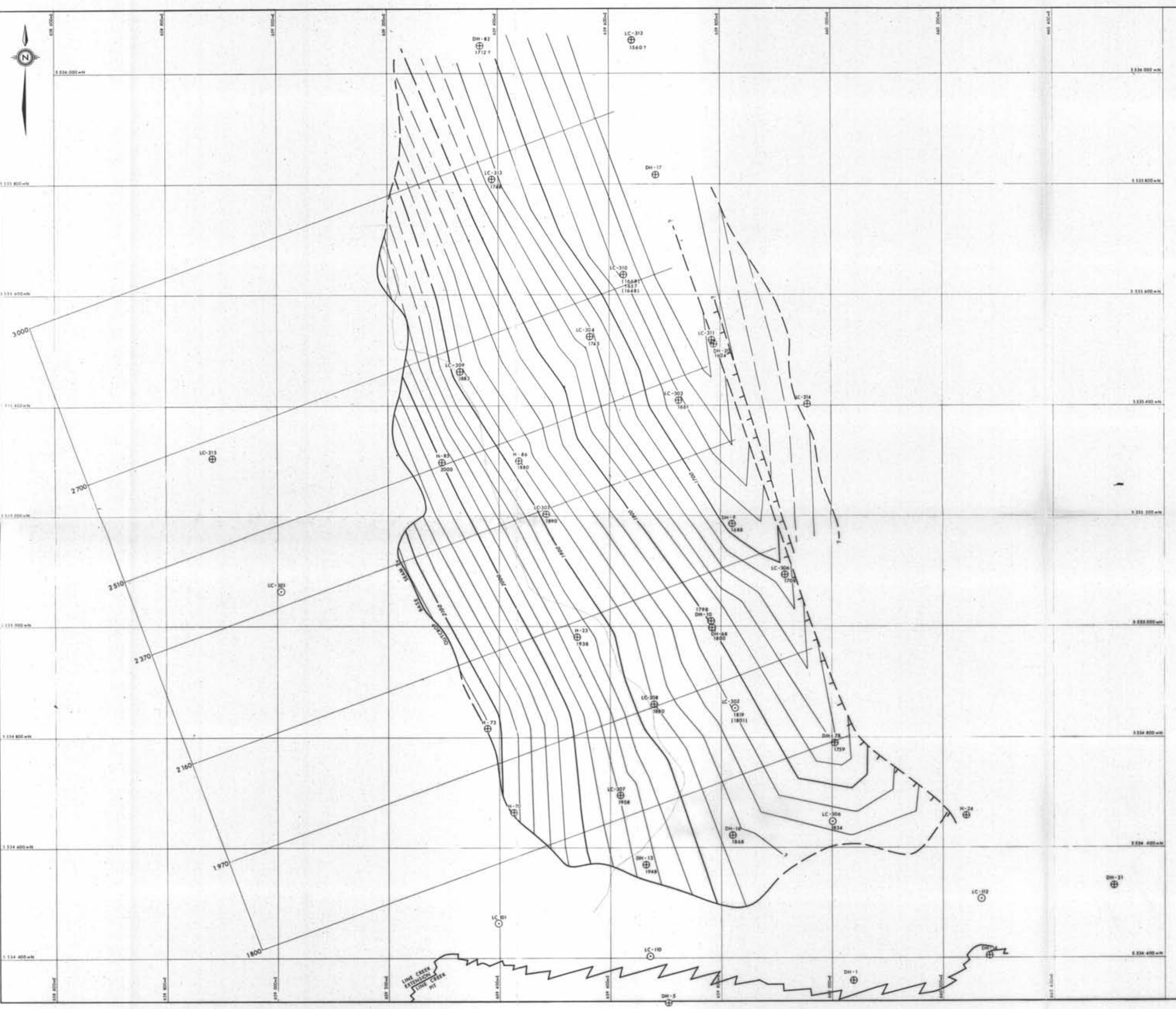
CORRELATION SECTION

VERT. SCALE = 1:1000
HORZ. SCALE = 1:5000

AUTHOR: T.H.	SCALE:	ENCLOSURE No: 5
DATE: 81 01	REVISED:	DRAWING No: HI-70
To Accompany		



PIC 422



- LEGEND**
- - - NORMAL FAULT
 - - - THRUST FAULT
 - ⊕ DH-78 1853 ROTARY HOLE W. SEAM ELEV.
 - ⊕ LC-106 1831 DIAMOND CORE HOLE W. SEAM ELEV.
 - (1847) - PROJECTED SEAM ELEV.

753

422

K-Shell-Line Creek 80(2)A

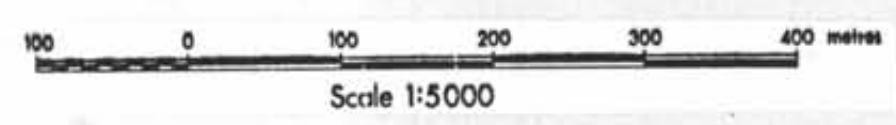
Crows Nest Resources Limited
EXPLORATION

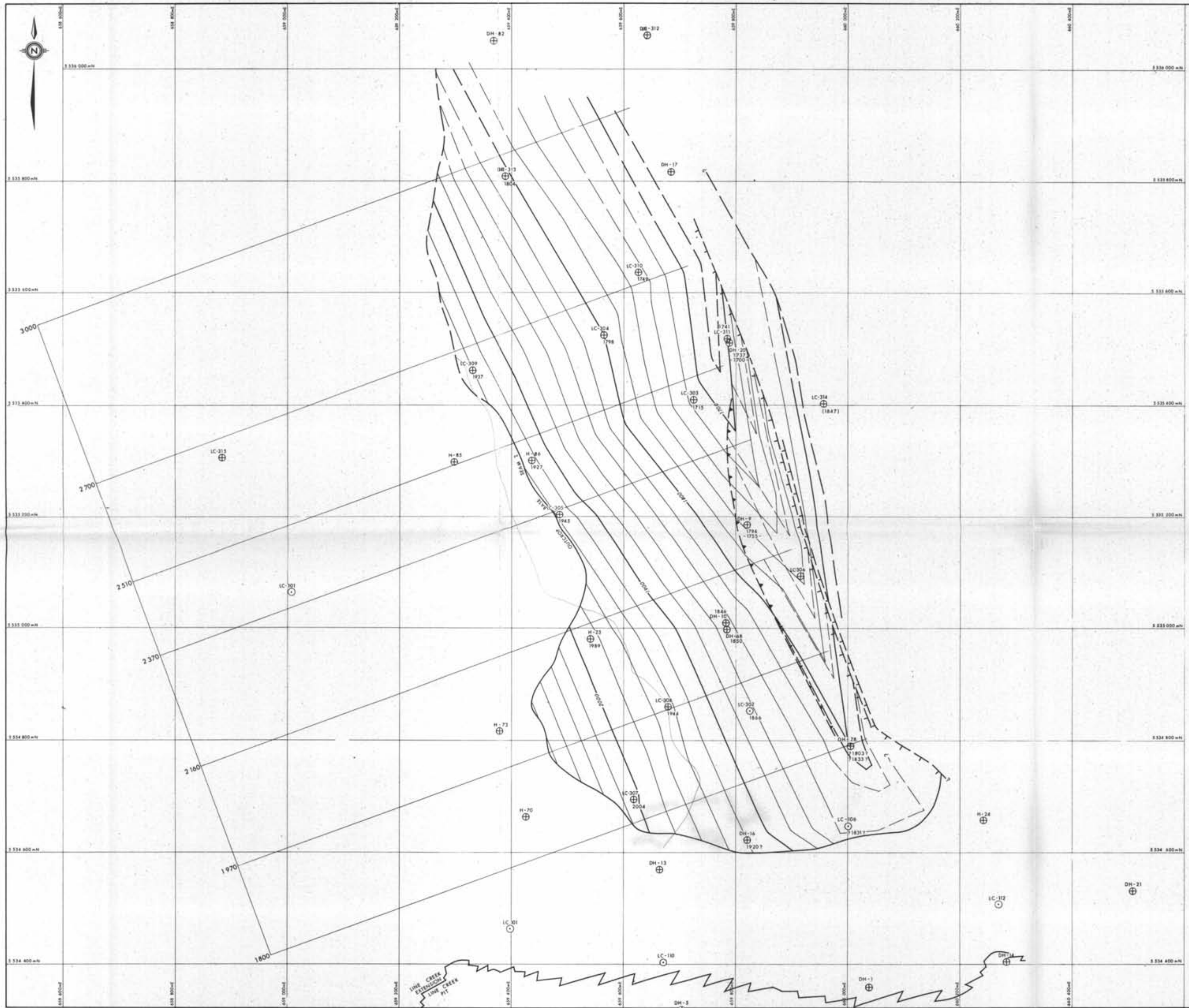
LINE CREEK NORTH
1:2 AC

STRUCTURE CONTOURS
BASE SEAM No.3U

CONTOUR INTERVAL = 20 m

APPROX. 1:2 A.L.	SCALE 1:5000	ENCLOSURE NO. 7
DATE: 01/01	REVISED:	DRAWING NO. HB-69 K
By: Accompany		





422

- LEGEND**
- - - - - NORMAL FAULT
 - - - - - THRUST FAULT
 - ⊕ - DH-78 - ROTARY HOLE
 - 1863 - W. SEAM ELEV.
 - ⊙ - LC-106 - DIAMOND CORE HOLE
 - 1831 - W. SEAM ELEV.
 - 1847 - PROJECTED SEAM ELEV.

422

K-Shill Line (Creek Rd 2) A

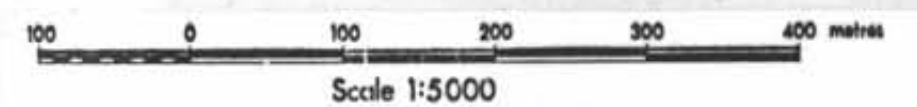
Crows Nest Resources Limited
EXPLORATION

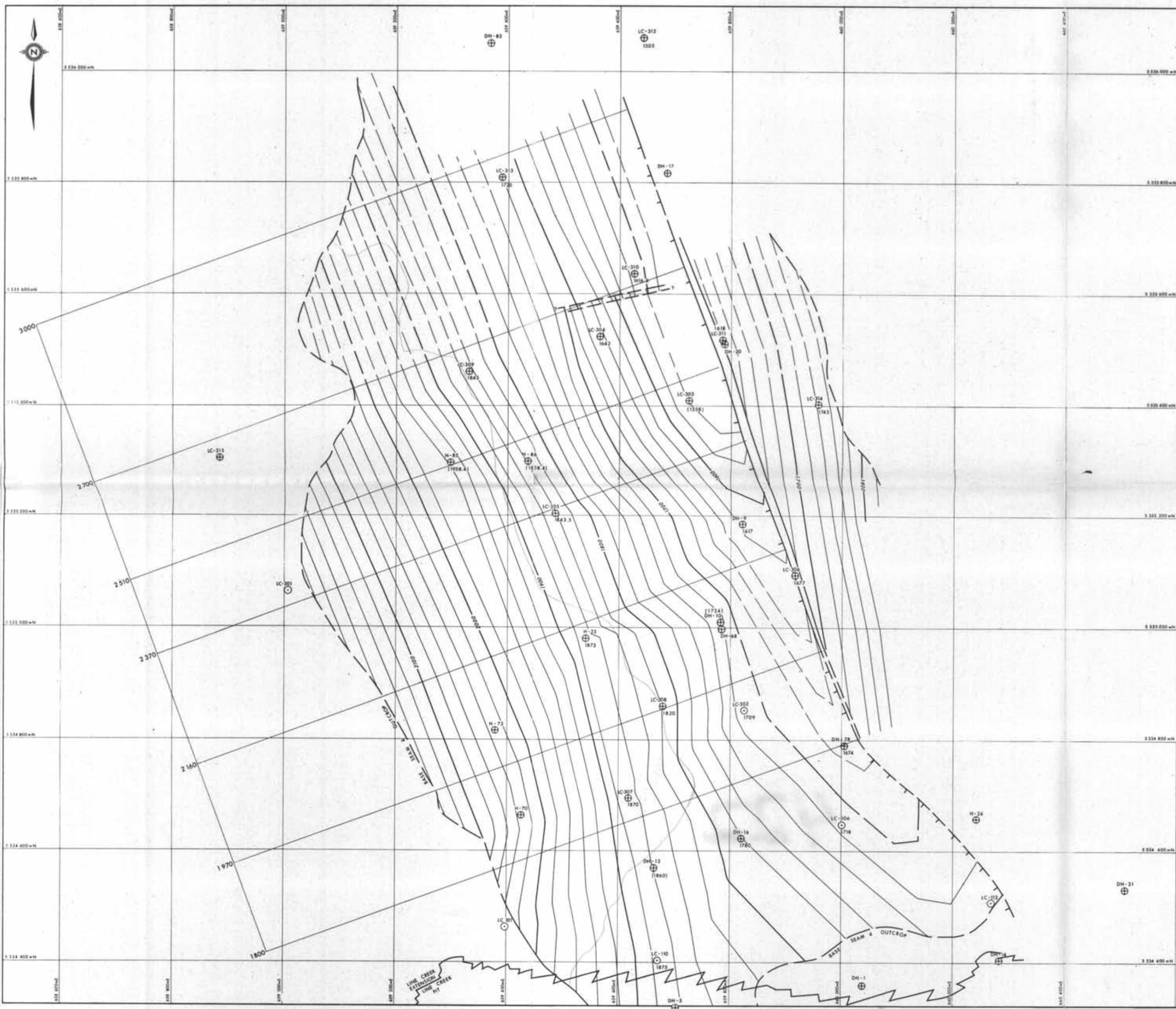
LINE CREEK NORTH
S.S. BC

STRUCTURE CONTOURS
BASE SEAM No. 2
6

CONTOUR INTERVAL = 20m

AUTHOR: T.D. J.S.	SCALE: 1:5000	ENCLOSURE No. 7
DATE: 8/01	REVISED:	DRAWING No. HB-69L
To Accompany:		





- LEGEND**
- NORMAL FAULT
 - THRUST FAULT
 - ⊕ DH-78
1803 - ROTARY HOLE
W. SEAM ELEV.
 - ⊙ LC-106
1831 - DIAMOND CORE HOLE
W. SEAM ELEV.
 - (1847) - PROJECTED SEAM ELEV.

422

K-Shell-Line Creek 80(2)A

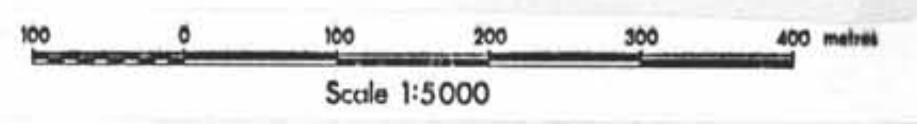
Crows Nest Resources Limited
EXPLORATION

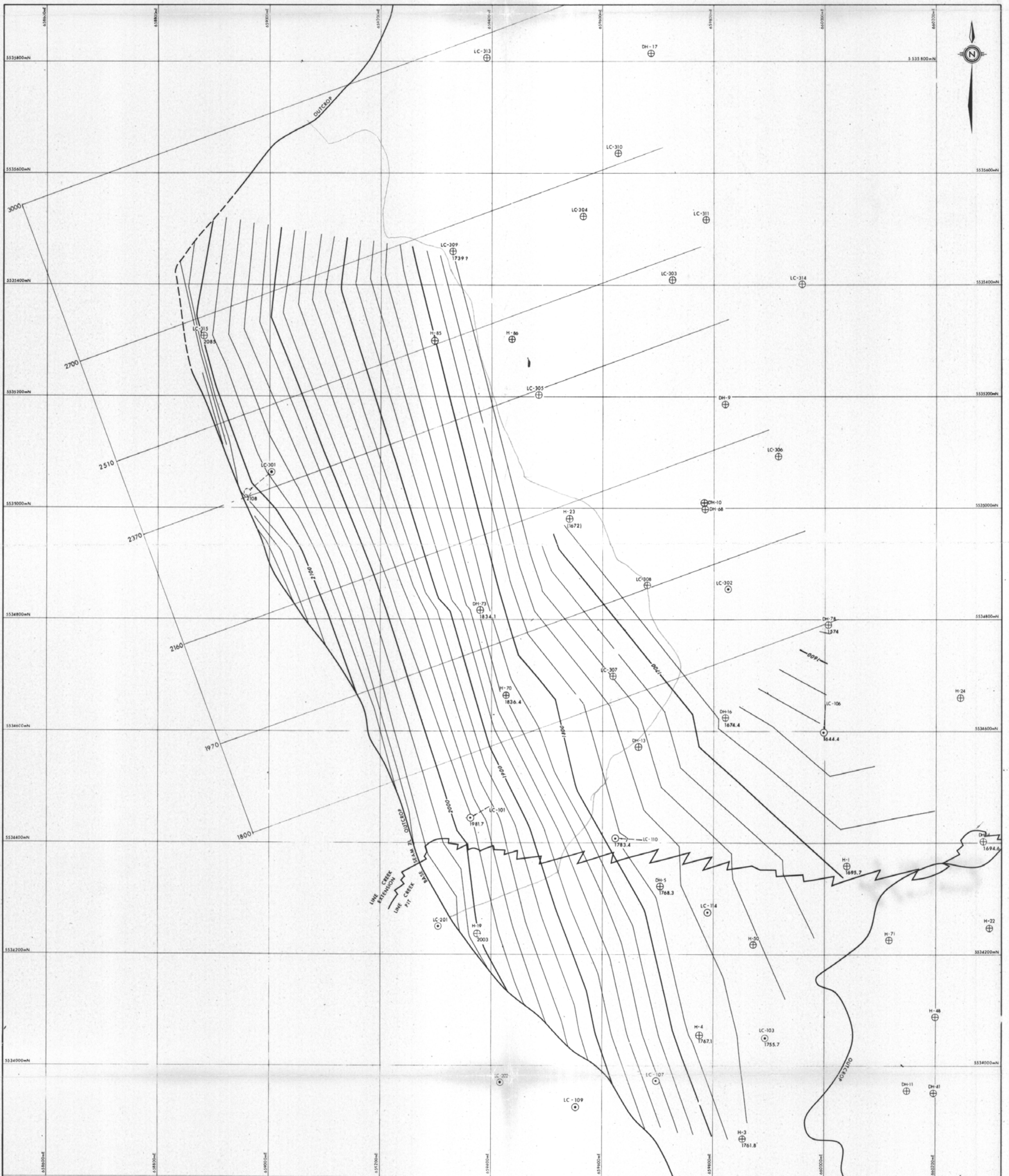
LINE CREEK NORTH
S.S. 22

STRUCTURE CONTOURS
BASE SEAM No. 4
C

CONTOUR INTERVAL = 20m

AUTHOR: J.L.	SCALE: 1:5000	ENCLOSURE No. 7
DATE: 8/01	REVISED:	DRAWING No. HB-69M
By: [Signature]		





LEGEND

- NORMAL FAULT
- THRUST FAULT
- ROTARY HOLE
- DIAMOND CORE HOLE
- PROJECTED SEAM ELEV.

422

K-Skill-Line (week 80(2)A)

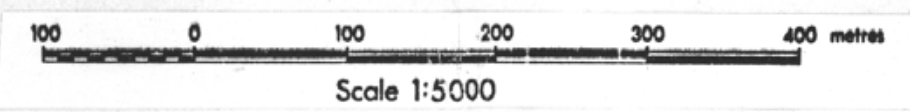
Crows Nest Resources Limited
EXPLORATION

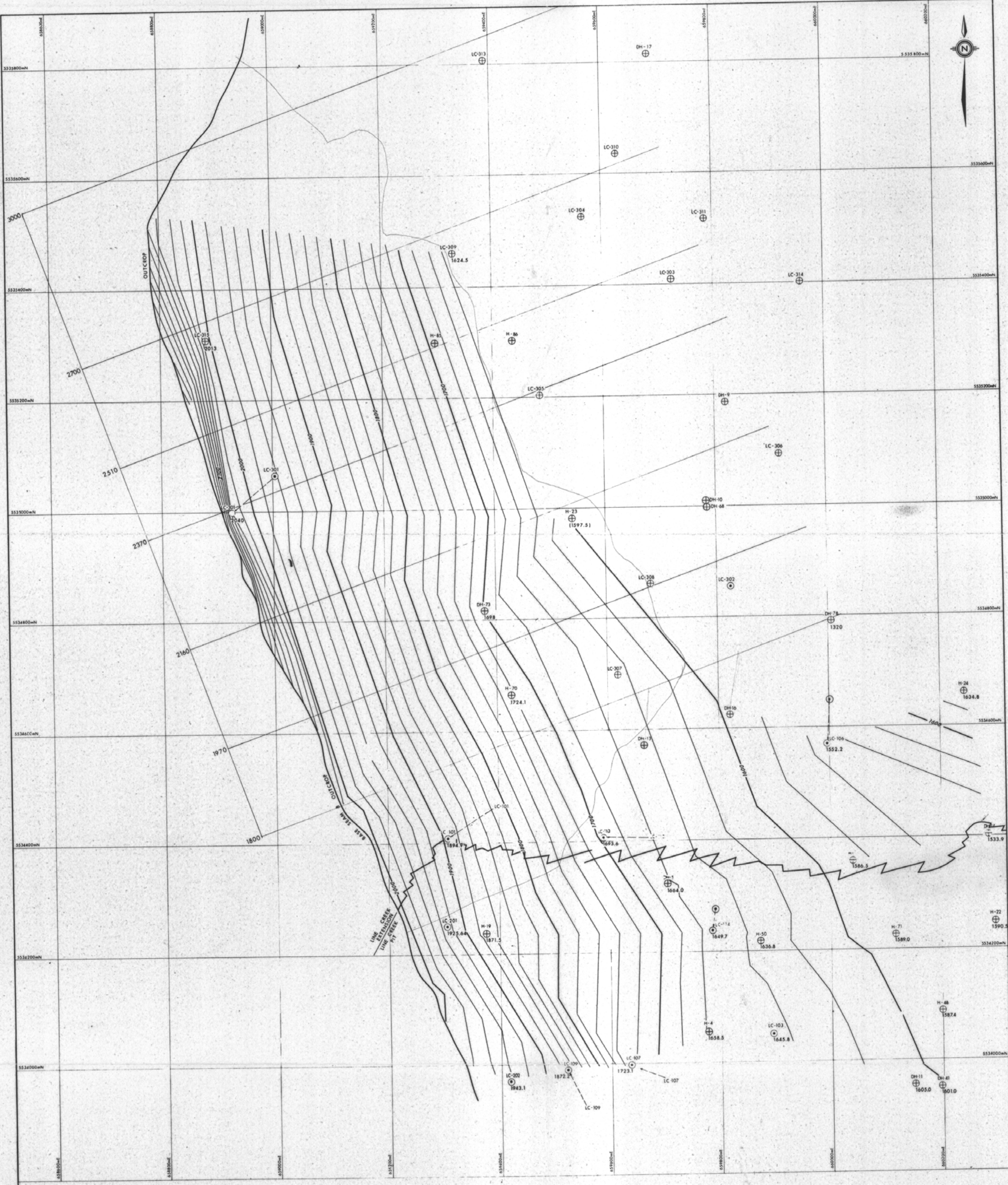
LINE CREEK NORTH
S.E. P.C.

STRUCTURE CONTOURS
BASE SEAM No. 7

2

CONTOUR INTERVAL = 20 m.		
AUTHOR: H. J. S.	SCALE: 1 : 5000	ENCLOSURE NO. 2
DATE: 8/11	REVISED:	DRAWING NO. HB-69 J
To Accompany		





LEGEND

- - - NORMAL FAULT
- - - THRUST FAULT
- ⊕ DH-78 1803 ROTARY HOLE W. SEAM ELEV.
- ⊕ LC-106 1831 DIAMOND CORE HOLE W. SEAM ELEV.
- (1847) - - - PROJECTED SEAM ELEV.

422

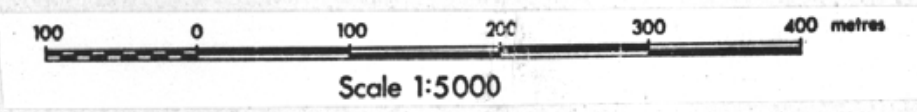
K-Shell-Line (Creek 80(2)A)

Crows Nest Resources Limited
EXPLORATION

LINE CREEK NORTH
1:4

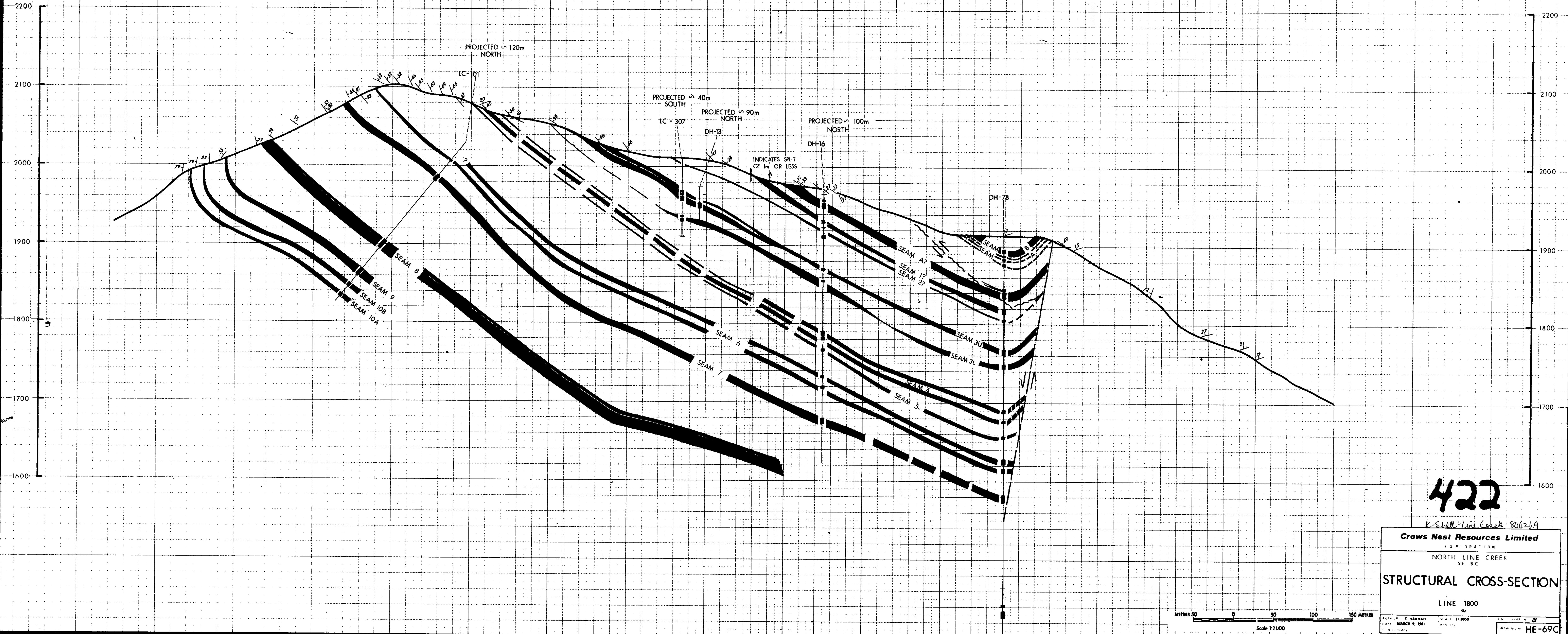
STRUCTURE CONTOURS
BASE SEAM No. 8
4

CONTOUR INTERVAL = 20 m		ENCLOSURE No. 7
AUTHOR: SL	SCALE: 1:5000	DATE: 11/01
DATE: 11/01	REVISED:	DRAWING BY: HB-69H
TO: ACCOUNTS		



AZIMUTH 070°

SCALE 1:2000



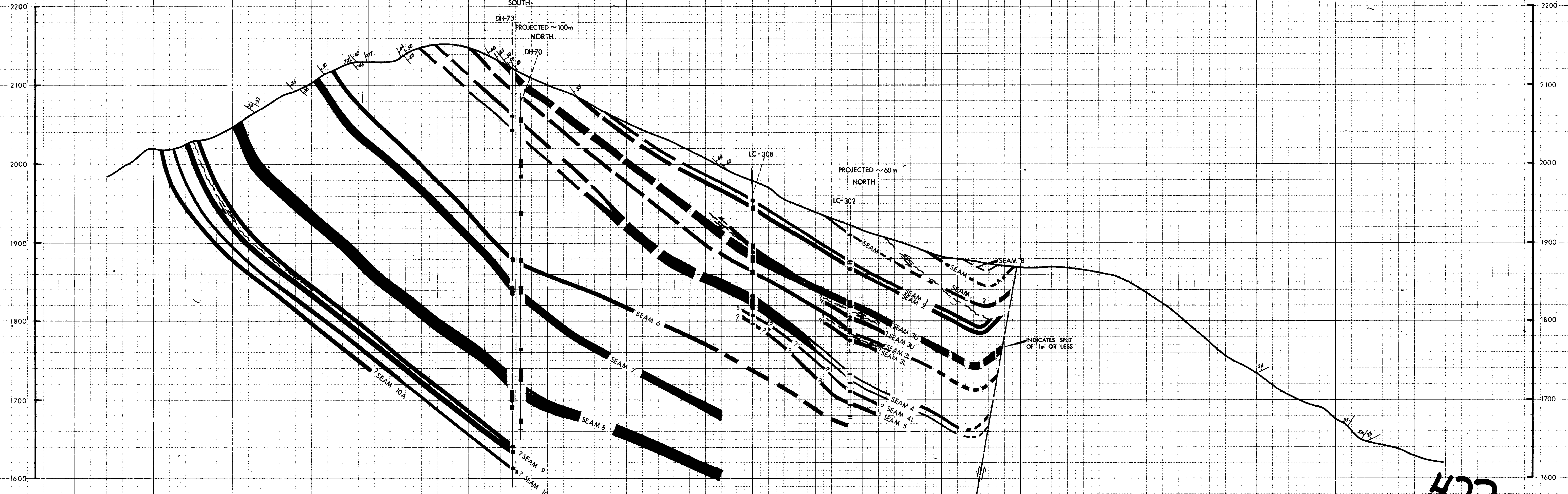
422

K-Swell/Lin (Cont): 80(2)A

Crows Nest Resources Limited
 EXPLORATION
 NORTH LINE CREEK
 SE B C
STRUCTURAL CROSS-SECTION
 LINE 1800
 METRES 50 0 50 100 150 METRES
 Scale 1:2000
 AUTH: T. HANNAH DATE: MARCH 9, 1981
 DRAWN BY: HE-69C

AZIMUTH 070°

SCALE 1:2000



422

K-Shell-Like (Sheet 80(2)A)

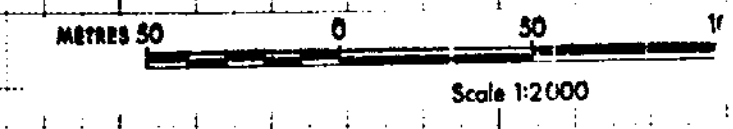
Crows Nest Resources Limited
EXPLORATION

NORTH LINE CREEK
S.E. B.C.

STRUCTURAL CROSS-SECTION

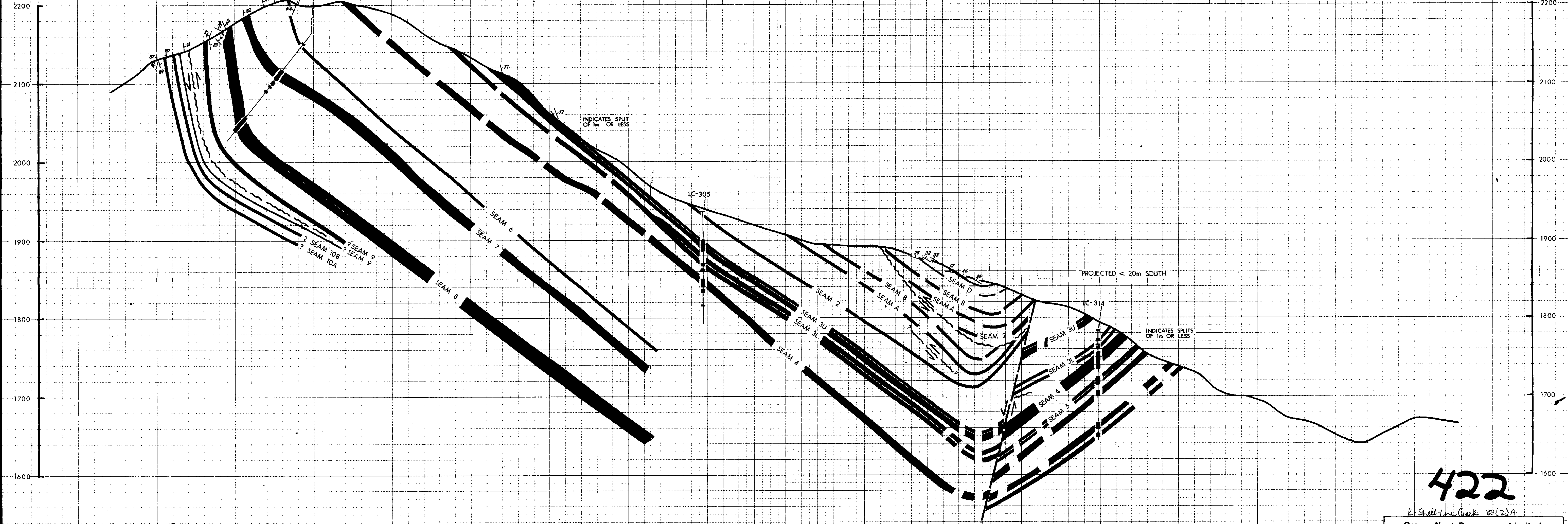
LINE 1970

AUTHOR: T. HARRAN DATE: MARCH 9, 1981
SCALE: 1:2000
DRAWING NO.: HE-69F



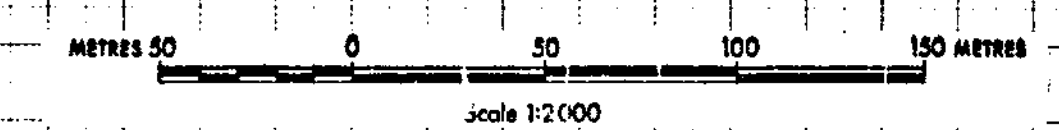
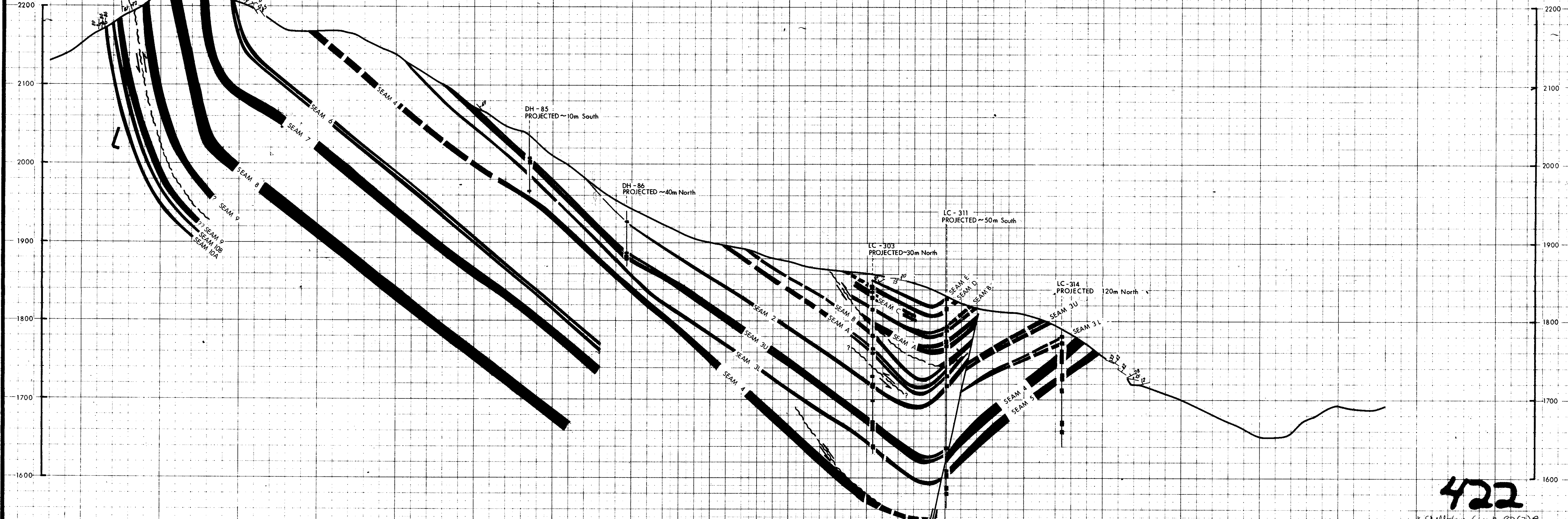
AZIMUTH 070°

SCALE 1:2000



AZIMUTH 070°

SCALE 1:2000



422

16 SKILL Line (near 80C7)A

Crows Nest Resources Limited
EXPLORATION

NORTH LINE CREEK
SE BC

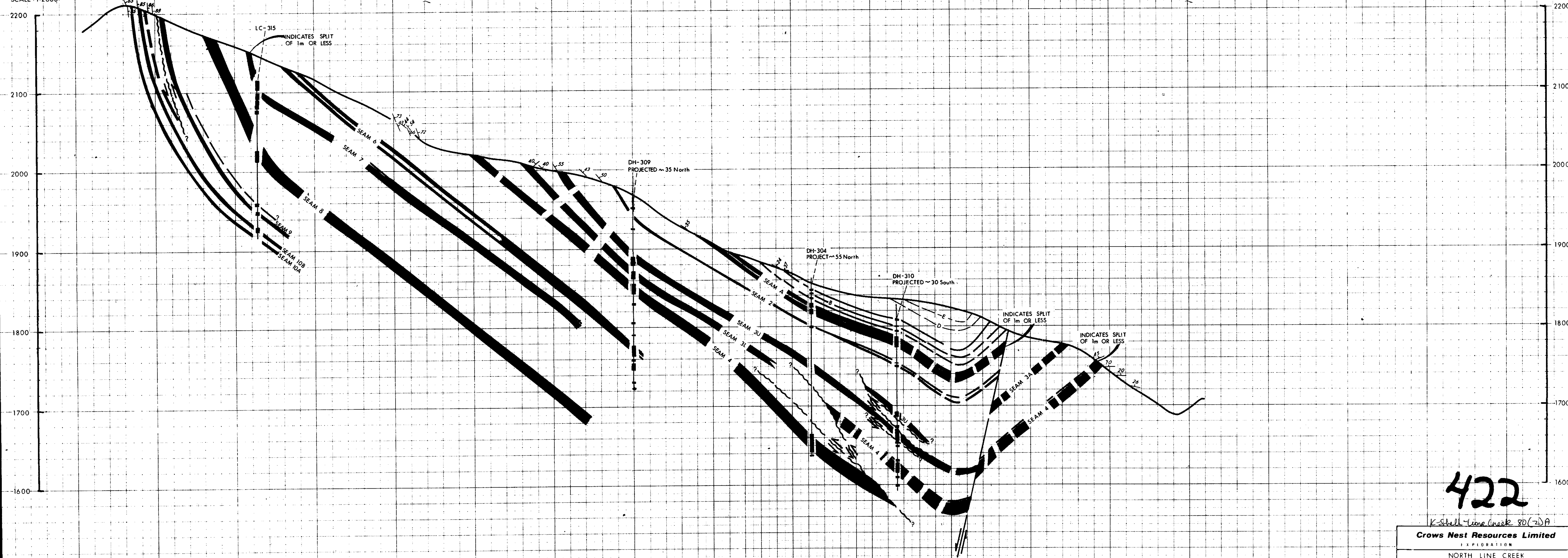
STRUCTURAL CROSS-SECTION

LINE 2510

AUTHOR: T. HENRAN SCALE: 1:2000 ENCLOSURE NO: 9
DATE: MARCH 12, 1981 REVISED: DRAWING NO: HE-69

AZIMUTH 070°

SCALE 1:2000



422

K-Shell Line Creek 80(2)A

Crows Nest Resources Limited
EXPLORATION

NORTH LINE CREEK
S.E. B.C.

STRUCTURAL CROSS-SECTION

LINE 2700
F

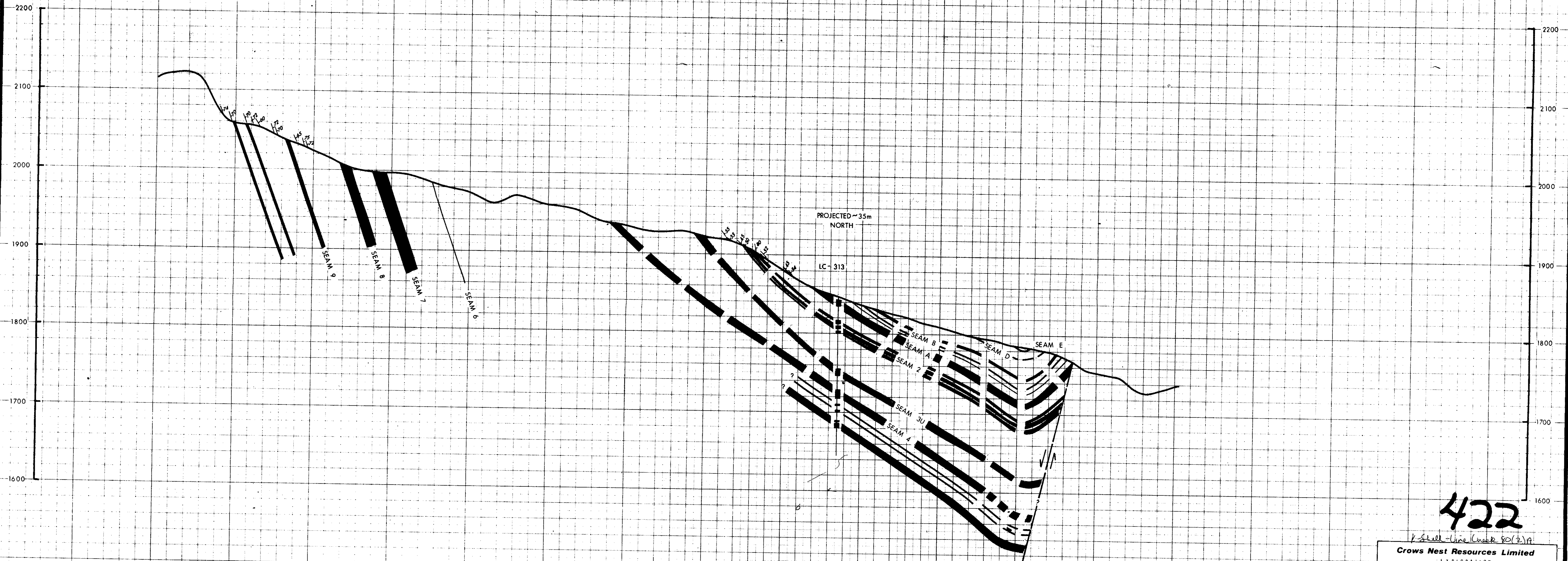
Scale 1:2000

DATE: MARCH 9, 1981

DRAWING NO.: HE-69A

AZIMUTH 070°

SCALE 1:2000



Shell Line (Line 3000) (2)A

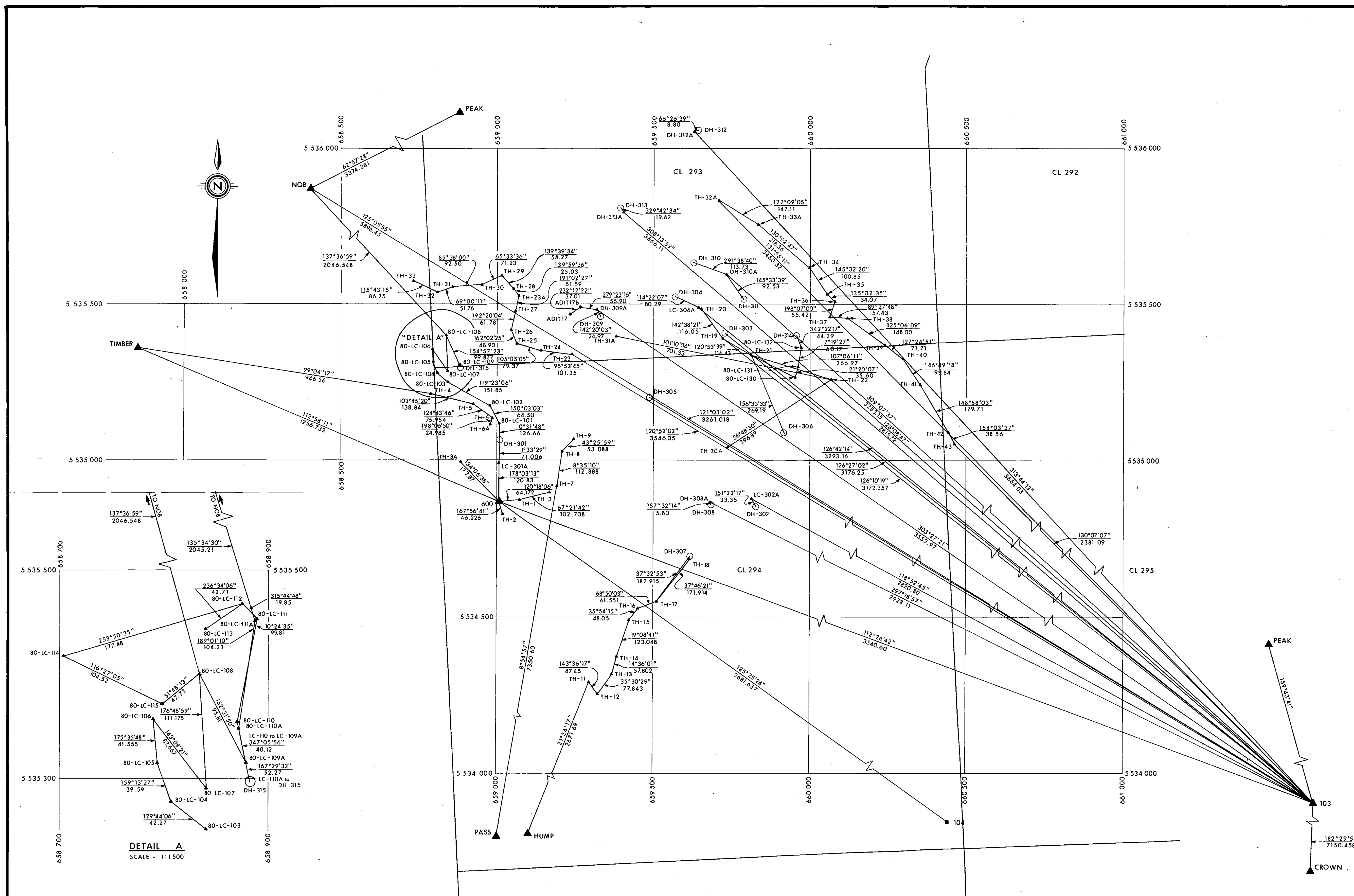
Crows Nest Resources Limited
EXPLORATION

NORTH LINE CREEK
SE & C

STRUCTURAL CROSS-SECTION

LINE 3000

AUTHOR: E. HARRIS DATE: MARCH 12, 1981 SCALE: 1:2000 ENCLOSURE NO: 8
 DRAWING NO: HE-69E



STATION	NORTHING (m)	EASTING (m)	ELEVATION (m)
CONTROL POINTS			
TIMBER	5535363.855	657860.238	2281.80
NOB	5536912.002	657455.459	2406.00
PEAK	5538446.104	660480.838	2481.10
103	5538321.631	662279.719	2156.10
104	5532740.96	662007.42	2020.63
CROWN	5526377.974	661967.934	2220.40
HUMP	5531814.496	658295.808	1970.20
PASS	5527658.242	658050.398	2215.50
600	5534873.419	659007.331	2181.00
DOPP 17	5529892.346	655045.795	2562.10

STATION	NORTHING (m)	EASTING (m)	ELEVATION (m)
DRILL HOLES			
DH-301	5535065.16	659005.16	2164.2
DH-302	5534854.70	65925.69	1921.0
DH-303	5535408.70	659724.84	1860.9
DH-304	553523.01	659666.34	1861.8
DH-305	5535203.84	659485.96	1937.8
DH-306	5535092.38	659917.23	1844.53
DH-307	5534896.81	659617.88	2022.91
DH-308	5534859.97	659680.34	1978.53
DH-309	5535461.15	659329.86	1965.17
DH-310	553535.38	659627.11	1827.18
DH-311	5535517.12	659785.15	1826.52
DH-312	5536068.27	659640.45	1754.16
DH-313	5535807.39	659390.09	1849.94
DH-314	5535400.95	65967.09	1783.79
DH-315	5535297.41	658882.04	2149.05

STATION	NORTHING (m)	EASTING (m)	ELEVATION (m)
TRAVERSE POINTS			
TH-1	5534861.21	659698.98	2172.98
TH-2	5534829.67	659016.93	2171.31
TH-3	5534900.74	659164.77	2165.51
TH-3A	5534997.226	658879.619	2149.854
TH-4	5535214.616	658794.962	2209.632
TH-5	5535181.603	658919.82	2203.529
TH-6	5535136.332	658982.24	2201.10
TH-6A	5535114.441	658974.435	2211.14
TH-7	5534920.023	659189.631	2163.267
TH-8	5535031.646	659206.485	2132.793
TH-9	5535070.197	659242.983	2120.102
TH-10	5534293.304	659252.523	2051.42
TH-11	5534556.109	659320.678	2053.332
TH-12	5534516.476	659360.891	2046.695
TH-13	5534374.411	659380.454	2138.8
TH-14	5534490.652	659420.82	2023.96
TH-15	5534529.57	659449.00	2027.62
TH-16	5534851.79	659606.40	2025.88
TH-17	5534887.89	659511.70	2022.80
TH-18	5535393.989	659718.636	1964.40
TH-19	5535488.231	659648.412	1861.309
TH-20	5535339.354	659810.146	1845.76
TH-21	5535050.840	659965.312	1821.35
TH-22	5535340.935	659935.958	2056.61
TH-23	5535351.346	659135.125	2057.19
TH-24	5535372.000	659068.495	2057.68
TH-25	5535418.516	659043.417	2060.47
TH-26	5535478.87	659056.80	2064.81
TH-27	5535629.50	659066.40	2067.23
TH-28	5535648.68	659060.40	2068.94
TH-29	5535693.09	659012.88	2061.67
TH-30	5535683.62	658947.83	2064.319
TH-31	5535656.60	658955.60	2068.64
TH-32	5535638.00	658907.30	2066.75
TH-33	5535676.46	658729.58	2058.05
TH-34	5535615.90	658995.20	1728.5
TH-35	5535632.80	660052.20	1717.71
TH-36	5535608.70	660076.3	1713.73
TH-37	5535456.0	660059.0	1708.98
TH-38	5535456.5	660116.5	1703.50
DH-308A	5534885.33	659678.12	1978.53
DH-308B	5534880.91	659314.80	1974.10
DH-310A	553503.43	659732.82	1829.93
DH-312A	5536054.75	659632.38	1754.16
DH-313A	5535790.45	659399.99	1850.64
TH-39	5535371.4	660237.6	1885.4
TH-40	5535327.8	660294.56	1876.8
TH-41	5535244.3	660349.2	1865.8
TH-42	5535090.3	660441.8	1845.9
TH-43	5535055.9	660468.9	1840.7
80-LC-101	5535120.83	659004.40	2195.33
80-LC-102	5535176.72	658972.20	2191.19
80-LC-103	5535251.23	658939.88	2187.1
80-LC-104	5535278.25	658907.38	2180.10
80-LC-105	5535315.27	658873.33	2177.8
80-LC-106	5535356.70	658839.14	2175.09
80-LC-107	5535399.76	658804.93	2168.06
80-LC-108	5535400.32	658770.2	2161.72
80-LC-109	5535309.85	658737.33	2148.48
80-LC-301A	5534994.18	659003.23	2196.18
80-LC-302A	5534883.98	658999.71	1920.0
80-LC-304A	5535489.98	659030.48	1963.1
TH-30A	5535043.50	659733.2	1899.0
TH-31A	5535396.60	65977.3	1956.9
TH-32A	5535833.40	659705.0	1771.7
TH-33A	5535755.10	659629.5	1752.5
80-LC-109A	5535315.31	658879.21	2148.33
80-LC-110	5535354.42	658870.26	2146.62
80-LC-110A	5535348.44	658870.72	2147.12
80-LC-111	5535452.59	658888.29	2139.18
80-LC-111A	5535451.38	658887.06	2139.18
80-LC-112	5535466.80	658874.44	2137.15
80-LC-113	5535443.27	658838.80	2133.49
80-LC-114	5535417.42	658703.97	2176.20
80-LC-115	5535370.86	658797.95	2174.76
80-LC-130	5535265.89	659049.86	1811.56
80-LC-131	5535299.05	659062.83	1805.87
80-LC-132	5535358.73	659070.50	1789.83

RE-SECTION			
DONE AT STATION	BACK SIGHT	TIMBER	PEAK
TH-4	HUMP	103	PASS
TH-7	103	CROWN	PASS
TH-11	PASS	HUMP	TIMBER
TH-18	103	CROWN	PASS
TH-6A	PEAK	103	CROWN
TH-23	NOB	103	DOPP 17
TH-19	NOB	103	DOPP 17
TH-21	NOB	103	DOPP 17

- LEGEND**
- ▲ PLANT 4" NAIL
 - PLANT 6" NAIL
 - X PLANT 12" SPIKE
 - FOUND 12" SPIKE
 - △ 1979 C.N.R.L. PHOTO. CONTROL
 - TRENCH
 - OUTCROP
 - ADIT
 - DRILL HOLE
 - ▲ CONTROL POINT OF CROWS NEST CONTROL NETWORK (CO-ORDINATES - JULY, 1980)
 - FOUND IRON POST

ALL DISTANCES HAVE BEEN REDUCED TO THE U.T.M. PLANE AND ARE IN METRES AND DECIMALS THEREOF.
 ALL BEARINGS ARE GRID AND REFERRED TO 117°W
 SURVEY PERFORMED BY Sheltech Canada, 1980

Sheltech Canada 422

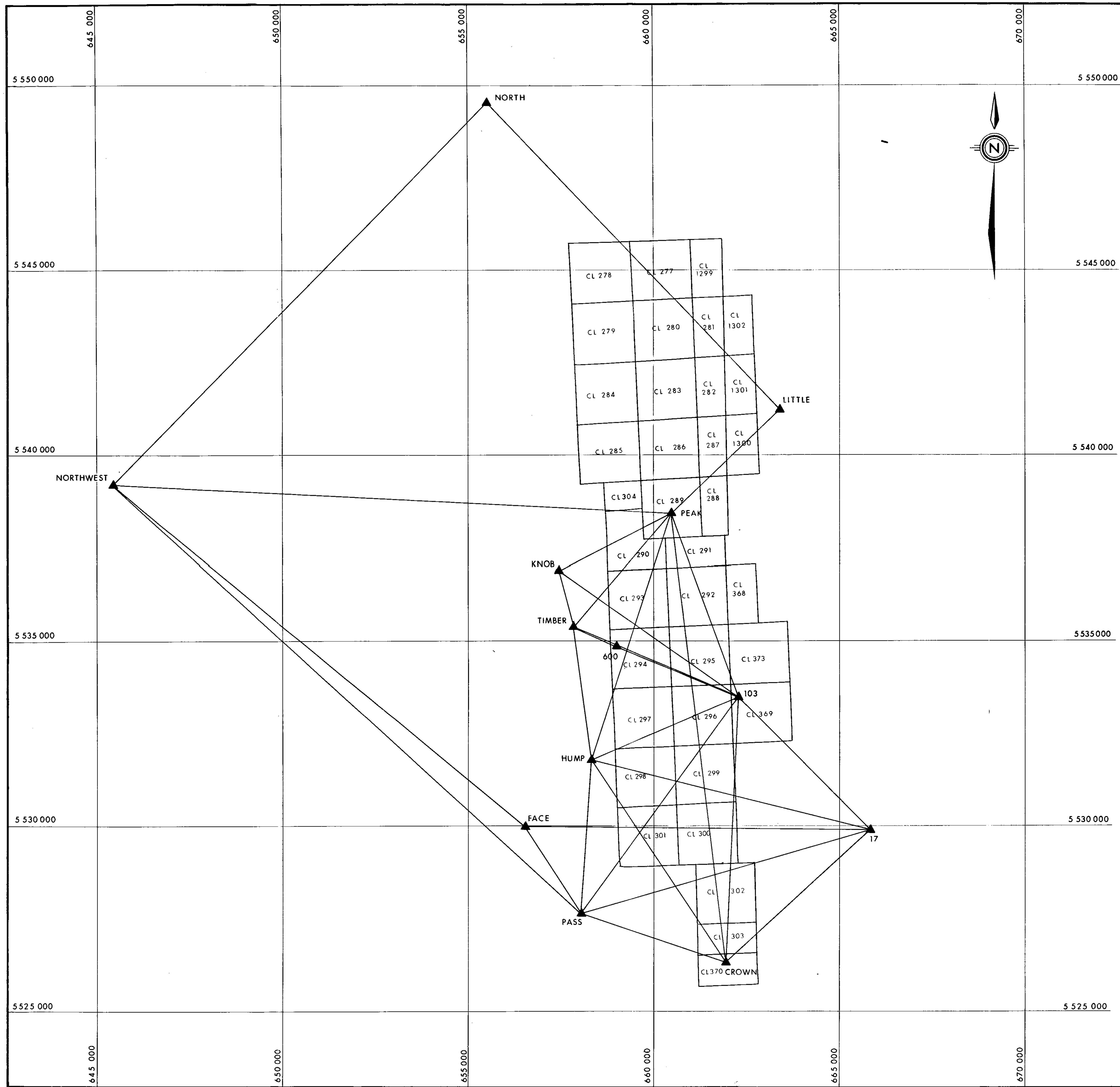
Crows Nest Resources Limited
ENGINEERING

NORTH LINE CREEK
S.E. B.C.

TRAVERSE SURVEY MAP

AUTHOR: Sheltech	SCALE: 1:5000	ENCLOSURE No:
DATE: 8/12/08	REVISED:	DRAWING No: HI-62A
To Accompany		

DETAIL A
SCALE: 1:1500



SPRING 1980 ADJUSTED COORDINATES

LINE CREEK CONTROL NETWORK

STATION	NORTHING	EASTING	ELEVATION
Northwest	5539195.153	645451.460	2416.2
Face	5529889.328	656541.076	2205.5
Pass	5527658.242	658050.398	2215.5
Crown	5526377.974	661967.934	2220.4
Hump	5531814.496	658296.808	1970.2
Timber	5535363.855	657850.238	2261.6
Knob	5536912.002	657455.459	2406.0
Peak	5538446.104	660480.838	2481.1
Little	5541250.853	663393.613	2274.3
North	5549565.373	655531.603	2135.7
17	5529892.346	665845.795	2562.1
103	5533521.631	662279.719	2158.1
600	5534873.419	659007.331	2181.0

FALL 1980 ADJUSTED COORDINATES

STATION	NORTHING	EASTING	ELEVATION
Northwest	5539195.153	645451.460	2416.2
Face	5529889.728	656540.597	2205.5
Pass	5527658.737	658049.859	2215.5
Crown	5526378.539	661967.214	2220.4
Hump	5531814.810	658295.232	1970.2
Timber	5535363.987	657849.702	2261.6
Knob	5536912.086	657454.945	2406.0
Peak	5538446.072	660480.198	2481.1
Little	5541250.645	663392.848	2274.3
North	5549564.859	655531.244	2135.7
17	5529892.758	665844.926	2562.1
103	5533521.868	662278.975	2158.1
600			

LEGEND

- — PLANT 4" NAIL
- — PLANT 6" NAIL
- x — PLANT 12" SPIKE
- — FOUND 12" SPIKE
- △ — 1979 C.N.R.L. PHOTO. CONTROL
- — TRENCH
- — OUTCROP
- — ADIT
- — DRILL HOLE
- ▲ — CONTROL POINT OF NETWORK
- — FOUND IRON POST

ALL DISTANCES HAVE BEEN REDUCED TO THE U.T.M. PLANE AND ARE IN METRES AND DECIMALS THEREOF.
 ALL BEARINGS ARE REFERRED TO 117° W LONGITUDE.
 SURVEY PERFORMED BY Sheltech Canada, 1980.

K-Shell-Line-Creek 80(2)A
422

Sheltech Canada
Crows Nest Resources Limited
ENGINEERING

LINE CREEK
S.E.B.C.
1982

TRAVERSE SURVEY MAP

AUTHOR: Sheltech	SCALE: 1: 50 000	ENCLOSURE No
DATE: 80 12 08	REVISED:	DRAWING No: HI-62C
To Accompany		