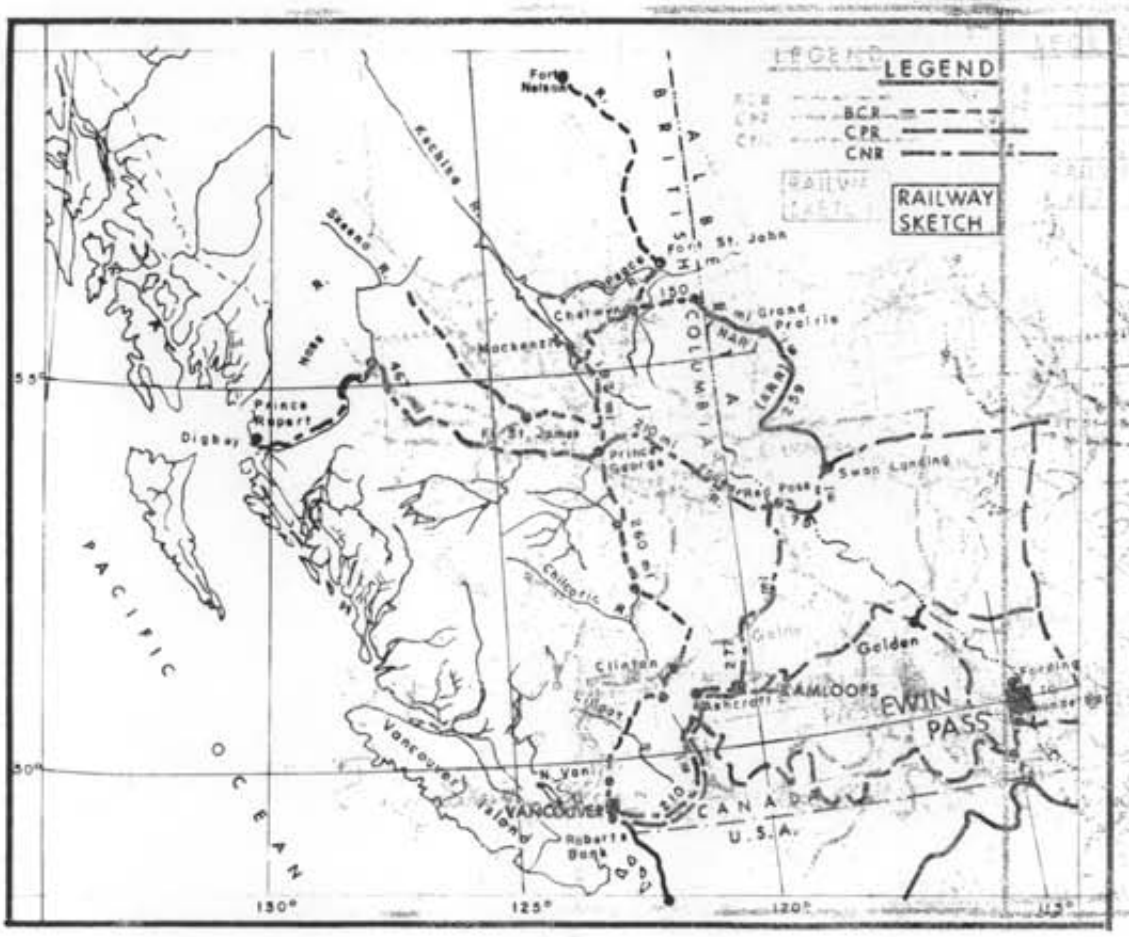
K-SHELL - EWIN PASS 79(1)A

"EWIN PASS COAL PROPERTY"

C.L.NOS 282, 283, 286-289,
291, 292, 1300-1302

C. R. BEUAN

EWIN PASS
COAL PROPERTY



Report on Coal Licences 282, 283, 286-289, 291, 292, 1300-1302 Group 264
Kootenay Land District, British Columbia on work done
August - October, 1979

Held by: SHELL CANADA RESOURCES LIMITED
Operated by: CROWS NEST RESOURCES LIMITED

Lat. 49°57' to 50°03', Long 114°42' - 114°44' N.T.S. 82 G/15

April 30, 1980

Author
Catharine R. Beavan
Geologist
Crows Nest Resources Ltd

CONFIDENTIAL

OPEN FILE

AA-447

TABLE OF CONTENTS

LIST OF ENCLOSURES — : K-EWIN PASS 79(2)A

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 General Introduction

The Ewin Pass property lies within the Front Ranges of the Rocky Mountains in southeastern British Columbia. It is thirty-one kilometres north of Sparwood and twenty-two kilometres south-east of Elkford. The property is located in the middle part of Shell - CNRL's Central Block of licences. There are two other major projects in this block: Horseshoe Ridge to the southeast and the Line Creek open pit mine development immediately west of the latter. The CNRL proposed coal preparation plant is sixteen kilometres from the property.

Geographically the Ewin Pass property extends between:

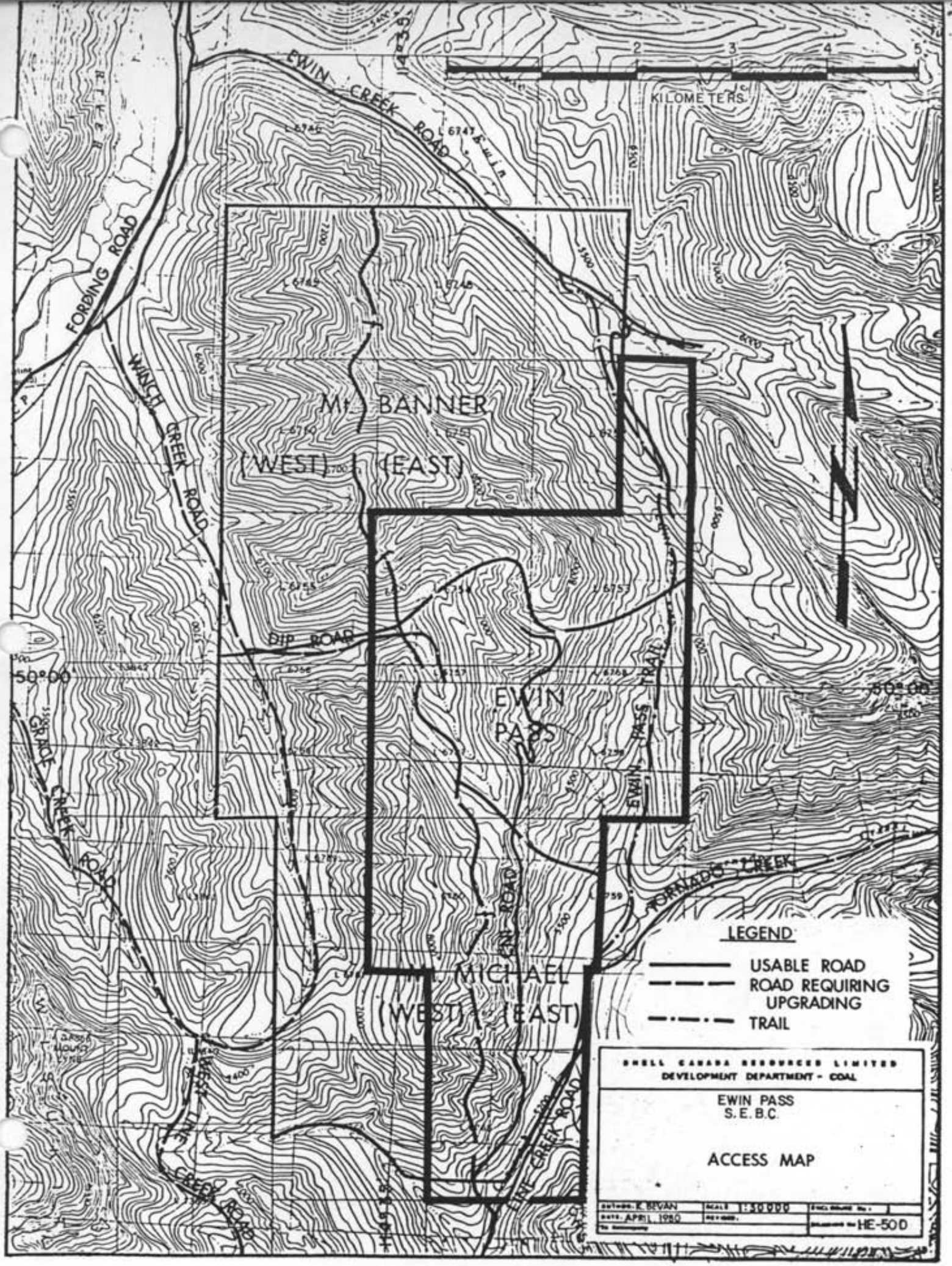
114° 42' and 114° 44' of Western Latitude and

49° 57' and 50° 03' of Northern Latitude

and is found on NTS map sheets 82 G/15 and 82 J/2.

Main access to the property is from Highway 3 at Sparwood; it is fourteen kilometres along a main all-weather gravel road used by Crows Nest Industries logging operations in the area, plus fourteen kilometres along a gravel road through Line Creek Canyon and three kilometres along a dirt road which goes up Ewin Pass Ridge. In addition, there is access to the north part of the property via Ewin Creek Road and to the west via Wrench Road and Dip Road (see Enclosure 1)

Within the property is a network of old exploration roads throughout the area which is underlain by coal measures of the Kootenay Formation.


EWIN CREEK ROAD
FORDING ROAD
WINSH CREEK ROAD
Mt. BANNER
(WEST)
(EAST)
DIP ROAD
EWIN PASS
EWIN PASS TRAIL
GRADE CREEK ROAD
TORNADO CREEK
MICHAEL
(WEST)
(EAST)
LINE CREEK ROAD
50°00'
KILOMETERS
0 2 3 4 5
N
LEGEND
USABLE ROAD
ROAD REQUIRING UPGRADING
TRAIL
SHELL CANADA RESOURCES LIMITED
DEVELOPMENT DEPARTMENT - COAL
EWIN PASS
S.E.B.C.
ACCESS MAP
author: K. BRYAN
date: APRIL 1980
scale: 1:50000
HE-500

1.2 Summary

The Ewin Pass Coal Property consists of eleven B.C. Coal Licences Nos. 282, 283, 286-289, 291, 292 and 1300-1302, Group No. 264, covering approximatley 1949 hectares of Crown coal land (see Enclosures 2 and 3). The property is held by Shell Canada Resources Limited and operated by Crows Nest Resources Limited, a wholly owned subsidiary of the former. Licences were transferred to Shell Canada Resources in 1979 upon its acquisition of the previous Licencee The Crows Nest Pass Oil and Gas Company Limited in 1978.

In August, September and October, 1979 an exploration program was conducted on the Ewin Pass property that consisted of:

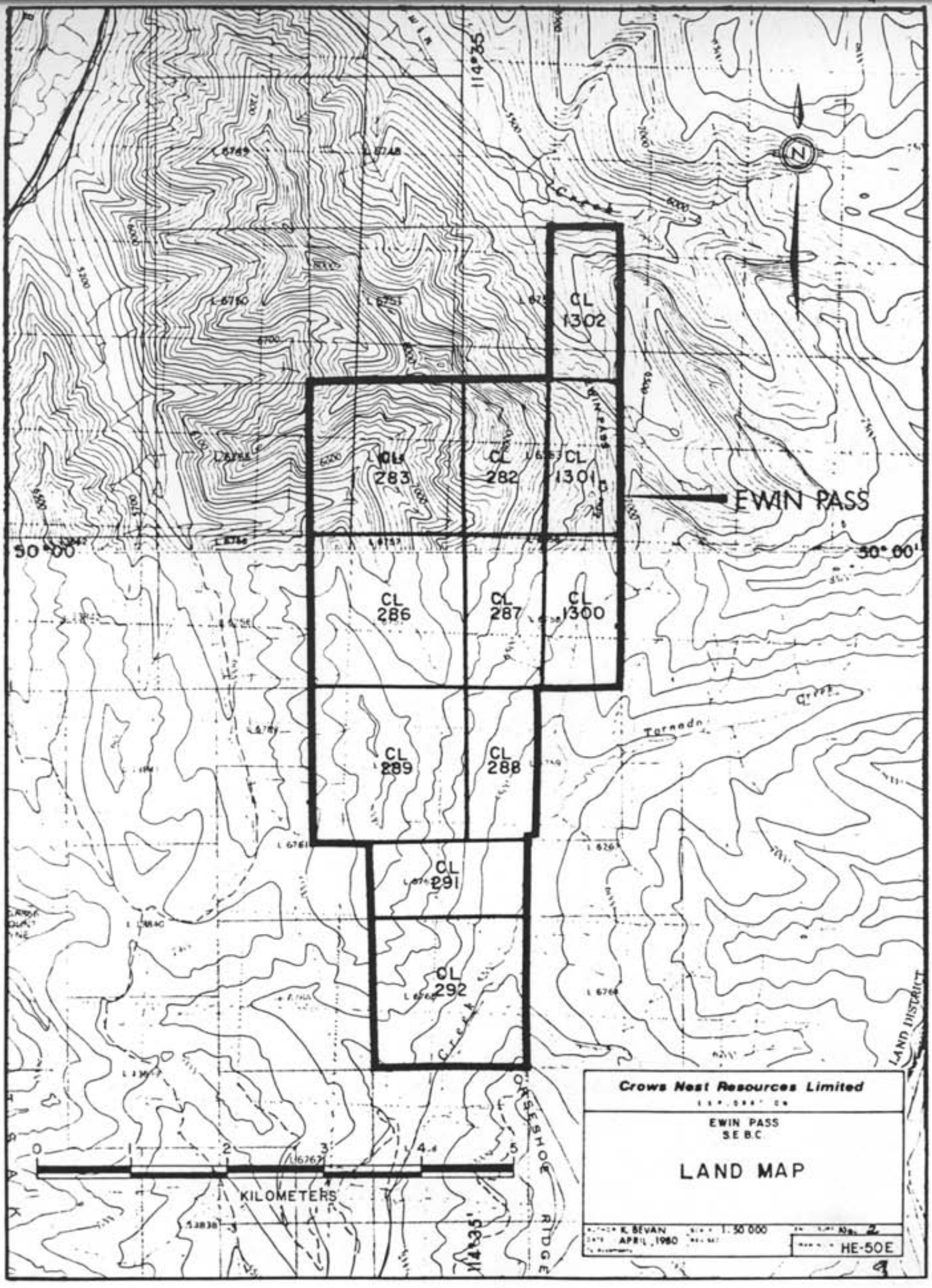
1 detailed geological mapping of Ewin Pass Ridge

2 driving three adits

3 geodetic surveying

The Coal-Bearing Member of the Kootenay Formation on Ewin Pass Ridge has for some time been thought to contain large volumes of excellent quality coking coal amenable to open pit mining. Two tonne bulk samples were taken from each of the three thickest seams on the ridge, Seam 4, Seam 8 and Seam 9, to ascertain quality and coking characteristics of these coals.

Structurally Ewin Pass Ridge is a dip-slope comparable to Line Creek Ridge with an average westward dip of 35°. The structure is complicated to some extent by faulting. The property holds good potential for open pit mining.


CL 1302
CL 283
CL 282
CL 1301
EWIN PASS
CL 286
CL 287
CL 1300
CL 289
CL 288
CL 291
CL 292
Tornado
114°35'
50°00'
30°00'
KILOMETERS
0
1
2
3
4
5
Crows Nest Resources Limited
EWIN PASS
S.E. B.C.
LAND MAP
K. BEVAN
1:50 000
APRIL, 1980
HE-50E
LAND DISTRICT
RIDGE

CROWS NEST RESOURCES LIMITED
EXPLORATION

B. C. COAL LICENCES
TENURE STANDING

BLOCK: CENTRAL BLOCK
GROUP: # 264

PROJECT: EWIN PASS
KOOTENAY LAND DISTRICT

YEAR: 1979-80
DATE: JAN. 31'80

Project Name	Project Lics.	Project Area Total Hectares	Block Name	Block Lic. Total No.	Block Area Total Hectares	Group No.	Group Lics. Total No.	Group Area Hectares	Year	Licence No.	Legal Description	Area	Acquisition Year	Acquisition $10³	Rentals Annual $	Rentals Total $10³	Requirement Work Expired $10³	Current Year	Credit $	Anniversary Date	Budget Current Year	Exp	Potl	Commitments, J.V.	Remarks
EWIN PASS	11	1,949	CENTRAL BLOCK	36	7,554	264	11	1,949	80				74 75	64732	9745	31.2	38.3 / 153.5	5862 4040 10	216,340 / 92,450	JAN 31	4951R (79) 4951E (80) 215	70503	Y		TWO LAND MAP SHEETS WORK REQMT FULFILLED TO JAN 31/83 UNDER COAL ACT '74 & TO JAN 31/90 UNDER COAL ACT '78
										282	W1/2 6753	130	75				211.8	5	313,813						
										283	LOT 6754	259	75					5							
										286	LOT 6757	259	75					5							
										287	W1/2 6758	130	75					5							
										288	W1/2 6759	130	75					5							
										289	LOT 6760	259	75					5							
										291	LOT 6762	133	75					5							
										292	LOT 6765	259	75					5							
										1300	E1/2 6758	130	74					6							
										1301	E1/2 6753	130	74					6							
										1302	E1/2 6752	130	74					6							
						264										WORK DONE $	PRIOR TO '78: 1290	1978: 90653	1979: 150321						

GENERAL REMARKS: FILL NECESSARY LINES AND COLUMNS ONLY. SHELL'S DEVELOPMENT POTENTIAL CLASSIFICATION IS "Y" (PRIME) UNLESS OTHERWISE STATED. SHELL CANADA RESOURCES LIMITED IS THE HOLDER. CROWS NEST RESOURCES LIMITED IS THE OPERATOR OF ALL LICENCES UNLESS OTHERWISE STATED. THIS TABULATION SHOWS CROWN COAL LICENCES ONLY. FREEHOLD LANDS ARE TABULATED SEPARATELY. IF SUMMARY OF EXPENDITURES SINCE THE LAST ANNIVERSARY IS AVAILABLE, IT IS ENTERED IN BRACKETS ( ) UNDER REQUIREMENT WORK-CURRENT YEAR AND IS INCLUDED IN THE TOTAL EXPENDITURES. OTHERWISE THE WORK REQUIREMENT IS SHOWN IN THIS COLUMN, WHICH IS NOT INCLUDED IN THE TOTAL EXPENDITURES. SHELL-CNPL EXPENDITURES ARE ENTERED ACCORDING TO ACCOUNTING AND TIME SHEETS (#125 PER MAN-DAY). THE ACQUISITION COST OF CNI'S COAL HOLDINGS IS ENTERED ACCORDING TO SHELL'S COAL PREMIUM ALLOCATION. CNI'S #800,000 INITIAL ACQUISITION COST OF CROWN MTN., CENTRAL BLOCK (EXCEPT CL.1299-1302 INC.) AND NORTH BLOCK LICENCES IS DISTRIBUTED ON AREA BASIS: #62.51 PER HECTARE. OTHER CNRCO/CNI EXPENDITURES PRIOR TO FEBRUARY 21,1978 (AFTER APPROVAL OF CNI'S TAKEOVER BY SHELL) ARE INCLUDED AS REPORTED TO THE B.C. GOVERNMENT. IF LICENCES WERE RE-ISSUED THE ORIGINAL ACQUISITION YEAR IS SHOWN IN BRACKETS ( )

Enclosure 3

5

CC019R

1.3 Summary of Work Done

1.3.1 Pre-1979 Exploration

Between 1968 and 1970 Crows Nest Industries Ltd. mapped the Ewin Pass property at a scale of 1:12,000 and drilled eight reverse-circulation rotary holes (EP 74-EP 77, EP 79-EP 81, EP 83). All holes were drilled on coal licences 286 and 289 (see Enclosure 4 for locations of the drill holes). They were all vertical and all geophysically logged. In total 2132.6 metres were drilled.

In October 1970 John T. Boyd Company of Pittsburg, Pennsylvania summarized the Ewin Pass exploration and presented a proposed mine area and reserve calculations for the property.

In 1978 the property was mapped by Shell Canada Resources Limited on scales of 1:24,000 and 1:12,000. Some coal seams were trenched and described. In addition, the following newly flown air photogrpahs of the area were obtained from North West Survey Corp. (Yukon) Ltd:

High level photographs	1:40 000	NW 55678 Line 6-S	092-095
Low level photographs	1:20 000	NW 61778 Line 4-S	003-005

The following topographic maps were constructed from these photographs:

1:5000	82 G 15	Northwest	Zone J
	82 G 15	Northeast	Zone K
	82 J 2	Southwest	Zone B
	82 J 2	Southeast	Zone C
1:2000	82 G 15	Zone J	Units 69, 70, 79, 80
	82 G 15	Zone J	Units 89, 90, 99, 100
	82 G 15	Zone K	Units 61, 62, 71, 72
	82 G 15	Zone K	Units 81, 82, 91, 92
	82 J 2	Zone B	Units 9, 10, 19, 20
	82 J 2	Zone C	Units 1, 2, 11, 12

1.3.2 1979 Exploration Program - Objectives and Work Summary

Objectives of the 1979 exploration program were:

1 to gain as much structural and stratigraphic information as possible from detailed geological mapping, and

2 to determine some quality information for the three thickest seams on the property.

From this structural information a 1980 drill hole program could be planned which would enable the 1970 Boyd pit design and reserve calcuations to be updated.

Objectvies of the 1979 program were achieved by the following work:

1 detailed geological mapping at a scale of 1:2000 on licences 286-289 inclusive;

2 150 metres of trenching on licences 288 and 289;

3 driving 3 adits, one each on licences 286, 288, and 289;

4 reclamation work on 286, 288, and 289.

1.3.2.1 Geological Mapping (Enclosure 4)

Detailed geological mapping was undertaken with a view to:

1 better define surface traces of coal seams and resistant sandstone units, and

2 gain as much structural information as possible.

Mapping was concentrated on Ewin Pass Ridge specifically in and around the 1970 John T. Boyd proposed pit area, which is essentially the area within the cross section grid on the geological map (see Enclosure 4).

Mapping was done by:

1 chaining along roads;

2 chain and compass traverses along sandstone outcrops, and

3 surveying marker horizons.

Geology was plotted directly onto 1:2000 topographic maps.

1.3.2.2 Geodetic Survey

Geodetic survey of control points and adits were carried out by Shell Canada Resources Limited and its subcontractor Tronnes Survey (1979) Limited.

Conventional surveying methods were used to determine locations, elevations and UTM coordinates of 1970 drill locations, 1979 adits and geological marker horizons. In all, 58 points were surveyed. Appendix A shows a plot of these points. Conventional methods were also used for the underground surveys in the three adits. Enclosure 5 shows the surveyed plan views and profiles of the adits.

For a report on the location survey see Appendix A.

1.3.2.3 Adits

Three adits were driven in September and October, 1979; one into each of the three thickest seams on the Ewin Pass property.

Target Tunnelling Ltd. was contracted to do the drivage and to take bulk samples. Adits were driven with an attempt to follow the strike of the seam close to the footwall. Channel samples were taken at 3 metre intervals and were sent to the Crows Nest Resources Lab in Fernie for FSI testing. The FSI's were performed on an air dried basis with coal

washed to a specific gravity of 1.5. Cross-cuts were driven where FSI values were consistently high over a 9 metre interval (6 metre interval in adit 3). The cross-cuts were driven from footwall to hanging wall and a full-width channel sample was sent to Fernie to confirm FSI of the rib channel sample. A 2-tonne representative bulk sample which included 0.3 metres from both the footwall and hanging wall was then taken and placed in 45 gallon drums. Bulk samples were then sent first to Birtley Coal and Minerals Testing in Calgary for washing and subsequently to Canmet, Department of Energy, Mines and Resources, in Ottawa for carbonization and other tests.

See Enclosure 6 on the following page for a summary of adit data, Enclosure 4 for locations of the adits and Enclosure 5 for plan views, profiles and seam descriptions of the adits.

1.3.2.4 Reclamation

The Ewin Pass reclamation program was carried out in October, 1979. The following mechanical work was done:

1 adit sites were graded;

2 coal dump roads were surfaced with soil;

3 roads connecting adits were ditched and cross-trenched;

4 the main access road was blocked off from Line Creek Road, culverts were removed and the road ditched and cross-trenched.

The revegetation program was contracted to Interior Reforestation Company Limited of Cranbrook, B.C. who seeded and fertilized the adit sites and their connecting roads, two old drill sites and all coal spoil.

Enclosure 6

ADIT SUMMARY

Adit Number	1	2	3
Seam Number	8	4	9
Coal Licence	289	286	288
Portal UTM Cordinates			
Northing	*5,539,290.84	5,540,132.03	5,539,318.21
Easting	* 661,107.29	661,098.59	681,371.55
Portal Elevation	* 2,110.32	2,252.58	2,049.17
Azimuth of Entry	002°	358°	360°
Drivage	33.4 m	61.0 m	91.2 m
Drivage to cross-cut	22.9 m	61.0 m	86.9 m
Length of cross cut	17.6 m	10.2 m	10.9 m
Seam width at cross-cut	13.55 m	7.75 m	8.30 m
FSI in cross-cut channel sample (washed at 1.5 S.G.)	8	8	5.5
Bulk sample weight	2 tonnes	2 tonnes	2 tonnes

* Portal of Adit No. 1 was not actually surveyed. Co-ordinates listed above were derived graphically from surveyed point "Z".

A report on Ewin Pass reclamation is included in Crows Nest Resources Limited Annual Reclamtion Report for Coal Exploration to December 31, 1979 - B.C. Reclamation Permit #C 54. This report was sent to J.D. McDonald, P.Eng., Senior Reclamation Inspector, in Victoria, B.C., in February, 1980.

1.4 List of Licences on Which Work Was Performed

The following list shows what work was carried out on which particular coal licences:

Type of Work	Coal Licence No(s).
Geological Mapping	286-289 incl.
Geodetic and Adit Surveys	286 - 289 incl.
Road Construction	286, 288, 289, 291, 292
Surface Work	286, 288, 289
Adits	286, 288, 289
Sampling	286, 288, 289
Reclamation	286, 288, 289

2.0 GEOLOGY

2.1 General Statement

Bedrock on the Ewin Pass property ranges from Jurassic Fernie Formation to the Lower Cretaceous-Jurassic Kootenay Formation. Nomenclature used in this report follows Gibson, 1977. See Enclosure 7 for the Table of Formations and their descriptions and Enclosure 8 for a Typical Stratigraphic Section from Ewin Pass Ridge.

2.2 Stratigraphy

2.2.1 Fernie Formation

The Fernie is the oldest formation within the property. It makes up the bottom one half to two-thirds of the east side of Ewin Pass Ridge. It is a marine sequence of rocks dominated by dark-grey to black shales. In approximately 100 metres of the top, there is a transition to the "Passage Beds", a sequence of siltstones, shales and fine-grained sandstones interpreted to be a prograding beach complex.

2.2.2 Kootenay Formation

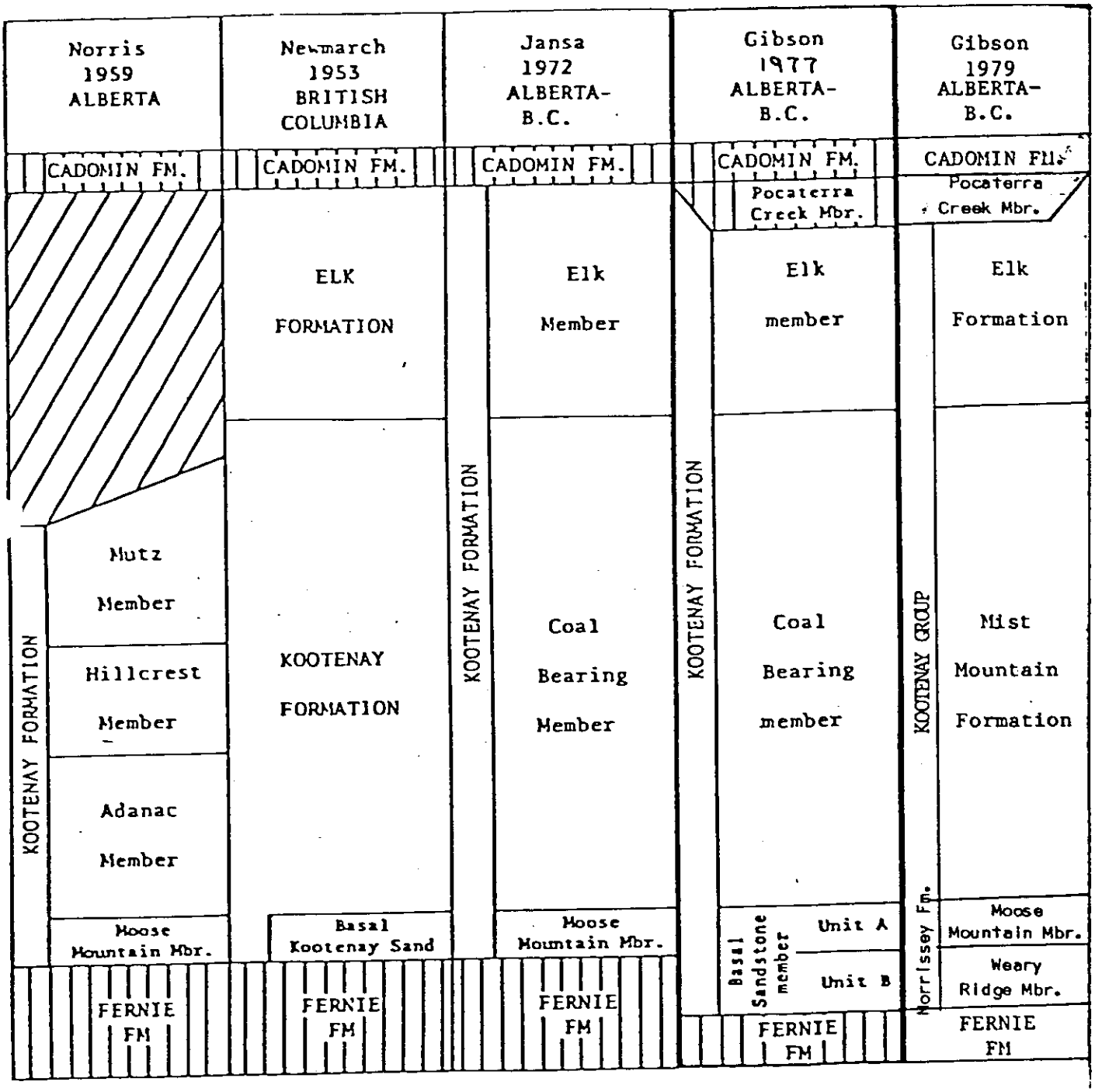
In southeastern British Columbia and southwestern Alberta the Kootenay Formation is part of an eastward thinning wedge of Jura-Cretaceous rocks. The Formation is divided into three stratigraphic units: the Basal Sandstone Member, the Coal-Bearing Member and the Elk Member.

2.2.2.1 Basal Sandstone Member

A massive, cliff-forming sandstone marks the conformable transition from Fernie into the Kootenay Formation. This unit is a distinctive marker horizon in southeastern British Columbia and southwestern Alberta. It has been interpreted as both a delta-front sheet sand and a beach deposit.

Enclosure 7

TABLE OF FORMATIONS



At Ewin Pass, the Basal Sandstone can be distinctly seen approximately half way up the east side of the ridge at the south end angling its way up the ridge northerly. The Member is 65 metres thick and is comformably overlain by the Coal-Bearing Member.

2.2.2.2 Coal-Bearing Member

Interbedded dark grey, carbonaceous and argillaceous siltstone, silty shale, mudstone, fine-grained sandstone and thin to thick seams of coal characterize the Coal-Bearing Member. This member has been interpreted as representing either a deltaic or an interdeltaic coastal plain marsh environment.

The Coal-Bearing makes up the top one half to one-third of the east side of Ewin Pass Ridge and the entire west side. Approximately 350 metres of the lower two-thirds of Coal-Bearing Member is present on Ewin Pass Ridge, the top one third having been eroded away.

2.2.2.3 Elk Member

Comformably overlying the Coal-Bearing Member in the Fernie-Sparwood area is the Elk Member. Thick, cliff-forming sequences of sandstone, coarsening upwards to conglomerate are interbedded with siltstone, mudstone, shale and sporadic, thin seams of coal. This Member has been interpreted as forming in an alluvial plain environment.

The Elk Member is not present on Ewin Pass Ridge but may underlie part of the valley in the west part of the property.

2.3 Structure

The Kootenay Formation in southeastern Britsh Columbia is located in the Front Ranges of the Rocky Mountains within three separate, elongate areas, collectively called the East Kootenay Coalfields. The Ewin Pass property is located in the Elk Valley Coalfield which is the most northerly of the Kootenay Coalfields.

The Elk Valley Coalfield is 100 kilometres long and extends in a NNW direction from Crowsnest Pass to the Alberta-British Columbia boundary near Kananeskis Lakes. The Kootenay Formation is preserved in structural lows within the coalfield, namely the Fording River Syncline and the down-dropped block of the Erickson Normal Fault. The Ewin Pass property is towards the southern part of the Fording River Syncline on its eastern flank. The syncline is further complicated on this eastern limb by thrust faulting (Fording Thrust). Enclosure 9 shows the general geological setting of the Ewin Pass property.

Bedding on Ewin Pass Ridge strikes almost uniformly (within 15°) due north-south. Dips on the ridge are to the west varying between 20° and 45°, averaging 35°. The cross-sections in Enclosures 10-18 show that the west side of the ridge approaches a dip-slope.

The structure on Ewin Pass Ridge is relatively simple although faulting is present as follows:

(1) A major thrust fault repeats Seam 9 in outcrop and the estimated throw on this fault is 500 metres.

(2) The 1970 geophysical logs show a thickened seam 8 in holes E.P. 79 and E.P. 76 and this thickening has been interpreted as a minor thrust. Overturned bedding at one place in the

north part of the ridge is on strike with where this fault should surface.

(3) Two parallel normal faults in the vicinity of Adit 1 can be seen both on air photographs and in the abnormal strike of the bedding.

(4) The normal fault in the northwest quadrant of the ridge was again interpreted from geophysical logs.

The cross-sections in Enclosures 10 - 18 show how the Kootenay Formation has been affected by faulting.

2.4 Coal Geology

Enclosure 8 shows the coal seams present on Ewin Pass Ridge. The coal seams are correlatable to the seams on Line Creek Ridge; thus seam numbers correspond to the seam numbering system at Line Creek. Seams 4 through 10A are present on Ewin Pass Ridge with the exception of Seam 7 which is either not present or very thin and discontinuous. The main mineable seams are Seams 4, 8 and 9.

The thickness of Seam 4 in Adit 2 is 7.75 metres. Both in outcrop and in the adit cross-cut this is a very clean seam with no rock partings. Drill hole E.P. 79 shows a 1.5 metre coal horizon 2 metres above the seam and an 2 metre coal horizon 1 metre below it. The footwall and hanging wall in Adit 2 are dark, hard, carbonaceous shales.

The thickness of Seam 8 in Adit 1 is 13.55 metres. It is also a clean seam. In Adit 2 there is one 0.04 metre thick shale parting while at the face where the adit was driven there were two 0.05 metre thick partings towards the base of the seam. The footwall and hanging wall are dark, hard, silty, carbonaceous shales.

Seam 9 is 8.30 metres thick in the cross-cut in Adit 3. Of that thickness, 0.30 metres are shaly partings. The hanging wall and footwall of Seam 9 are grey, carbonaceous shales.

For descriptions of Seams 4, 8 and 9 in the adit cross-cuts see Enclosure 5.

Seam 5 in drill holes and in outcrop averages 2.2 metres thick. Seam 6 averages 0.6 metres thick, but to date does not appear to be consistently present. Seams 10A and 10B each average 1.7 metres thick, have several rock partings and concretions and are broken up in outcrop.

3.0 COAL QUALITY

One of the prime aims of the 1979 exploration program on Ewin Pass Ridge was to obtain bulk samples of unoxidized coal from Seams 4, 8 and 9 for coal & coke testing. Two tonne bulk samples were taken from each seam and sent first to Birtley Coal and Minerals Testing in Calgary for washing and then to Canmet in Ottawa for carbonization testing. At the time of writing of this report, results from Canmet had not been received. Clean coal analyses (proximate, sulphur and FSI) from Birtley are summarized in Enclosure 19. (Note that the sample from Seam 4 was of sufficiently low ash content such that it was not washed). In addition to the bulk samples, the following samples were taken in each adit:

1 Channel samples every 3 metres consisting of coal from the rib plus 2 metre auger samples into the roof and floor (where possible).

2 a channel sample from each cross-cut.

These samples were sent to the CNRL lab in Fernie for testing. There, FSI tests were done on the adit channel samples which had been washed to a 1.5 specific gravity while proximate analyses and FSI's were determined for raw coal and coal washed to 1.4 and 1.5 specific gravities on channel samples from cross-cuts. The cross-cut results are tabulated on Enclosure 19 while the FSI's from the adit channel samples are shown pictorially on the adit profiles in Enclosure 5.

Enclosure 19

COAL QUALITY TABLE

1. Cross-cut Channel Samples - CNRL Fernie Lab

	% Air Dry Loss	% Moisture	% Ash	% V.M.	% F.C.	FSI	Calculated Basis
Adit 1							
Raw	2.49	0.62	7.87	27.23	64.28	7.5	ADB
Adit 2							
Raw		0.60	6.47	27.16	65.77	7.5	ADB
Adit 3							
Raw		0.86	28.80	18.29	52.05	1.0	ADB

2. Bulk Sample - Birtley Coal and Minerals Testing

Adit #	Washed	% ADM	% R.M.	% Ash	% V.M.	% F.C.	% S	FSI	Calculated Basis
1	yes	4.8	0.4	6.3	27.0	66.3	0.51	8.5	ADB
2	no	2.3	0.5	7.5	27.5	64.5	0.40	8.5	ADB
3	yes	4.5	0.4	8.5	21.6	69.5	0.56	5.0	ADB

4.0 MINEABILITY

Previous exploration on the Ewin Pass property exploration area has indicated that there is open pit potential for a 1.2 kilometre by 0.7 kilometre area on Ewin Pass Ridge. A dip-slope situation exists in this area, with dips ranging from 20° - 45° comparable to the Line Creek Ridge mine area. There are 350 metres of the Coal-Bearing Member of the Kootenay Formation preserved on the ridge within which there is an aggregate thickness of 33.3 metres of coal in 5 seams.

In 1970, John T. Boyd Co., on the basis of eight drill holes and geological mapping, calculated the following reserves for Ewin Pass:

	Proven	Partially Proven	Total
Metallurgical Coal Tons (Millions)	17.2	11.1	28.3
Oxidized Coal Tons (Millions)	3.0	2.0	5.0
Total Tons (Millions)	20.2	13.1	33.3
Stripping Ratio	8.53	9.85	9.05

The 1979 exploration program concentrated on: (1) increasing surfical geological information through mapping and, (2) gaining quality information from the 3 thickest seams on the property, numbers 4, 8 and 9. Thus at this stage no attempt was made to recalculate reserves for the property.

5.0 COST STATEMENT

Costs for the 1979 exploration program on the Ewin Pass property are tabulated in Enclosure 20, the Application to Extend Term of Licence.

ENCLOSURE 20

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, BOLTON AGNEW (Name) agent for CROWS NEST RESOURCES LIMITED (Name)

P.O. BOX 2699 Stn. "M" (Address)

CALGARY ALBERTA T2P 2M7 (Address)

Valid FMC No. 187621

hereby apply to the Minister to extend the term of Coal Licences No(s). 282, 283, 286 to 289, 291, 292, 1300, 1301, 1302 for a further period of one year.

2. I have performed, or caused to be performed, during the period February 1, 1979 to January 31, 19 80, work to the value of at least $ 250,921 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	286-289 incl.	9,473
Surveys: Geophysical		
Geochemical		
Other	286-289 incl.	10,175
Road construction	286, 288, 289, 291, 292	24,598
Surface work	286, 288, 289	30,620
Underground work	286, 288, 289	165,749
Drilling		
Logging, sampling, and testing	286, 288, 289	4,905
Reclamation	286, 288, 289	1,200
Other work (specify)	286 - 289 Incl.	6,625

3. I wish to apply $ 250,921 of this value of work on Coal Licence(s)* 282, 283, 286-289, 291, 292, 1300, 1301, 1302

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

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

6. The work performed on the location(s) is detailed in the attached report entitled Ewin Pass Project
- Annual Reclamtion Report, 1979
- Geological Report on Work Done in 1979 - will be submitted in ninety days

January 28, 1980 (Date)

(Signature and position)

Coal Supervisor

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

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

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

Value of work approved $ _____ Value of credit remaining $ _____

Work performed. Yes [X] No [ ]

The program of operations detailed hereunder was carried out during the period from Aug. 5, 1979 to Oct. 31, 19 79. Total costs are $ 250,921, an average of $ 128.74 per acre.

GEOLOGICAL MAPPING Yes [X] No [ ] Cost $ 9,473

	Area (Acres)	Scale	Time
Reconnaissance			
Detail: Surface		1:2000	50 days
Underground		1:200	2 days
Other (specify)			

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

Method Line miles

OTHER SURVEYS Yes [X] No [ ] Cost $ 13,000

Grid Topographic location Other

ROAD CONSTRUCTION Yes [X] No [ ] Cost $ 22,598

Length: On Licences 10.6 km Access (off licences)

SURFACE WORK Yes [X] No [ ] Cost $ 26,530

	Length	Licence Number(s)
Trenching	150 m	288, 289
Seam tracing		
Crosscutting		
Other	Disposal of coal from adits	286, 288, 289

UNDERGROUND WORK Yes [X] No [ ] Cost $ 169,058

Test adits: Number 3 Average length 62.3 m Total footage 186.9 m

Other workings: Area Total footage

DRILLING Yes [ ] No [X] Cost $

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

Contractor Where core stored

LOGGING, SAMPLING, AND TESTING (check) Yes [X] No [ ] Cost $ 4,405

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

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

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

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

OTHER WORK (specify details) Cost $

REPORTS:

Reclamation work (Permit No. C-54) Detail of work* erosion bars, recontouring, seeding, fertilizing $1,200

Geological Report Cost $ 6,625

OPERATIONS: Work was supervised by Cathy Beavan Frank Martonhegyi Position Geologist Sr. Staff Geologist

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

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

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

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

ON-PROPERTY COSTS: For period from Aug. 5 to Oct. 31, 19 79

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

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	1	125	67	8,375
Machine operators and support				
Miners				
Other				

Total operator's costs $ 8,375

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
Target Tunnelling	Adit driving	102,476
Drain Brothers	Road building, trenching	47,174
SCRL Surveying dept. and its	Surveying	
subcontractors Tronnes		10,175
Geological Consultants (Pathfinder, BNR, Tronnes, Jamieson)	Supervising machinery work	8,044

Total contractor and consultant costs $ 167,869

3. EQUIPMENT AND INSTRUMENTS USED: Owned _____ Rented _____

Type	Rented From	Amount

Total equipment and instrument rentals $ _____

4. FIELD CAMP COSTS:

		Amount
Food		
Accommodation	Black Nugget Motor Inn Contractors only	15,719
Fuel	Helicopter fuel, fuel and lubricants	6,875
Other	Communications	900

Total field camp costs $ 23,494

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount
samples taken and sent for analysis and tests to		
be completed in the subsequent term		
	to date:	

Totals, samplings, analysis, and testing $ 3,500

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	
Office and technical supplies	
Other supplies and materials	1,418

Total, supplies and materials $ 1,418

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
Ford Bronco	Rent Rite, Calgary	$1000/month	2,500
	Trucking companies		1,150

Air support details:

Aircraft Type	Owner	Charter
Bell 206	Kenting	31,219

Total transportation costs $ 34,869

8. RECLAMATION WORK:

Interior Reforestation Ltd. $ 1,200

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

Number of Personnel	Number of Trips	Amount
1		1,041

incl. food & accommodation for CNRL staff (1 to 2)

Total travel expenditures $ 1,041

Total costs $ 241,766

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

OFF-PROPERTY COSTS: Period from Nov. 1/79 to Jan. 31, 19 80

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	615
(c) Preparation of reports 53 days (to Feb. 29' 80 this item only)	6,625
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	
(f) Travelling expenses (Itemize)	1,915

Total $ 9,155

Supporting Cost Statements Attached

Total supporting costs $

SUMMARY

On-property costs	$ 241,766
Off-property costs	$ 9,155
Total costs	$ 250,921

Statement of costs verified by W.S Kowalski

Jan 29/80 (Date)

W.S Kowalski (Signature and position)
Chief Accountant

2M-675-8196

6.0 BIBLIOGRAPHY

John T. Boyd Co. - Coal Reserve Development as of October 1970, Upper Elk River Coal Field, B.C. - 1970

J. Fisher & G. Sloan - Geological Report on Work Done May 29, 1978 to August 23, 1978 for North Central Block Project, B.C. Coal Licences Nos. 277-293 Inclusive, 304 & 1299, 1300, 1301, 1302 - 1979

D.W. Gibson - Sedimentary Facies in the Jura - Cretaceous Kootenay Formation, Crows Nest Pass Area, Southwestern Alberta and Southeastern British Columbia - Bull. C.S.P.G. Vol. 25, No. 4, pp. 767 - 791.

A.P. Hamblin & R.G. Walker - Storm-dominated Shallow Marine Deposits: the Fernie - Kootenay (Jurrassic) Transition, Southern Rocky Mountains - Can. J. Earth Sci. Vol. 16, No. 9, pp. 1673 - 1690.

PROFESSIONAL VERIFICATION OF REPORT

Entitled: Ewin Pass Coal Property
Report on Coal Licences
282, 283, 286-289, 291, 292,
1300-1302, Group 264

Catharine Beavan planned and carried out the 1979 geological field program on Ewin Pass B.C. Coal Licences held by Shell Canada Resources Ltd. She also prepared this report. Mr. Frank Martonhegyi supervised the activity of this program under the general direction of the undersigned.

Catharine Beavan, B.Sc., graduated in Geology from McGill University, in 1970. She completed all course work towards a M.Sc. degree in Geology in 1979. Her experience with Western Canada coal exploration since 1977 includes positions with:

- B.P. Coal, Calgary, Alberta
- Crows Nest Industries Ltd., Calgary, Alberta
- Crows Nest Resources Ltd., Calgary, Alberta

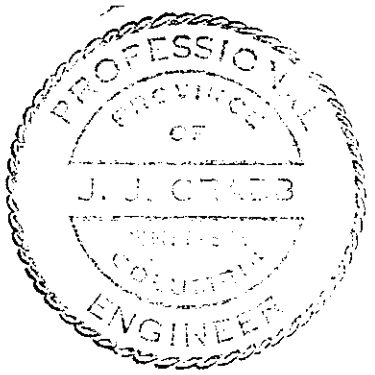
Frank Martonhegyi, M.E., graduated in Mining Geological Engineering from the University of the Heavy Industry, Hungary, in 1962; and received post-graduate training at the University of Saskatchewan, Saskatoon, in 1969-1971. His experience in Western Canadian coal exploration since 1971 includes positions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

- CanPac Minerals Ltd., Calgary, Alberta
- Shell Canada Resources Ltd., Calgary, Alberta
- Crows Nest Resources Ltd., 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 Ltd. 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, 1980 has been competently prepared and justly represents the information obtained from this project.



J.J.Crabb, P. Eng.

April 30, 1980

INTER-OFFICE CORRESPONDENCE

Date DECEMBER 18, 1979

To CROWSNEST RESOURCES LIMITED (C.N.R.L.)

From D.C. POULSOM
SHELTECH CANADA

Subject LOCATION SURVEY
EWIN PASS - SPARWOOD AREA
S.E. BRITISH COLUMBIA 4951R

Three control stations (301, 302, 303) were established in this area for survey control. Control stations 103 and 104 on Horseshoe Ridge were used to originate this control and the survey was tied into Temp #1 which was established on a traverse between goedetic control stations Northwest and Tornado.

Three adits as well as numerous outcrops were surveyed in this area.

Conventional survey methods using a 1" and 6" theodolite and electronic distance measuring equipment were used to obtain coordinates and elevations of survey points. Calculations were done in the U.T.M. system, with distances and bearings converted to plane (reference meridian was 117°W) and results were reported to C.N.R.L. in both Tabular and plan form

The survey cost attributed to the Ewin Pass was approximately $10,175

D.C. Poulsom Sr. Surveyor

Dave Poulsom

Enclosure

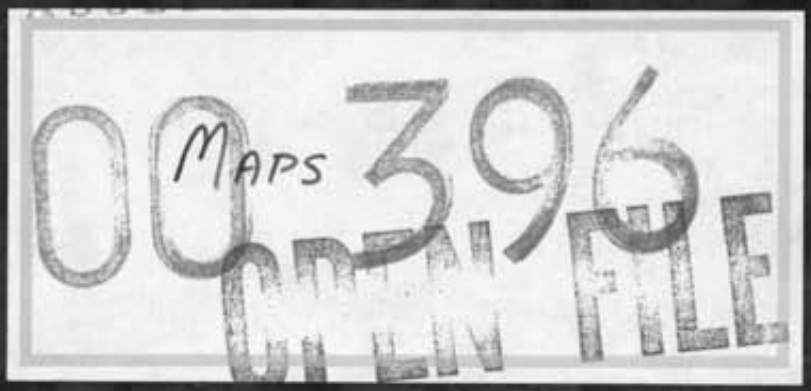
DPcw

Adits (Cont'd)	N	E	Elev.
3	5539318.2	661371.6	2049.17
3 (face)	5539412.4	661366.9	2041.29

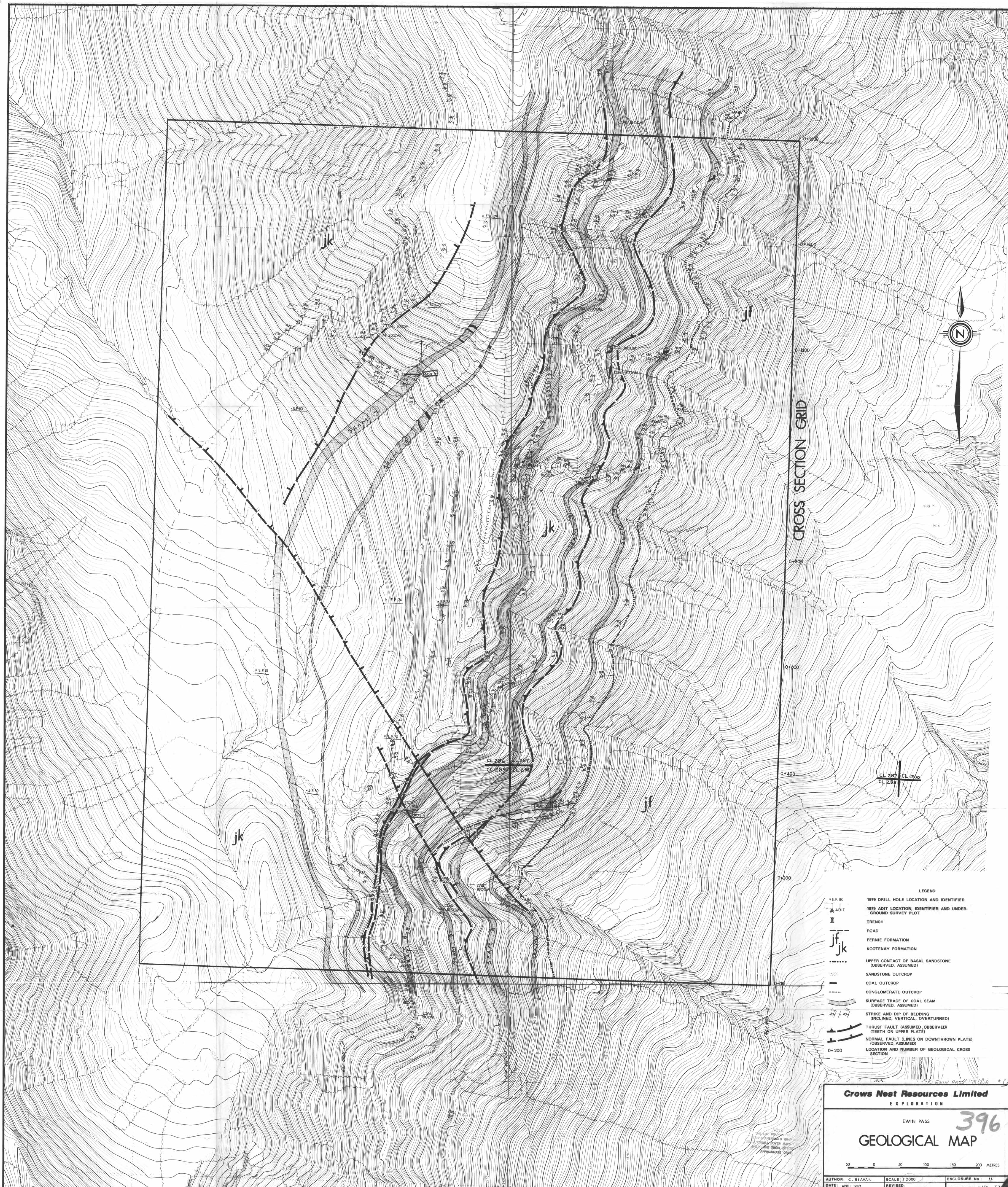
Ewin Pass

Control	N	E	Elev.
301	5538450.13	660460.22	2479.32
302	5539015.20	660326.08	2464.55
303	5539816.78	659962.64	2403.53
Adits			
1	5539289.8	661107.3	2110.12
1 (face)	5539332.0	661108.7	2111.93
2	5540132.0	661098.6	2252.58
2 (face)	5540196.6	661097.5	2256.72

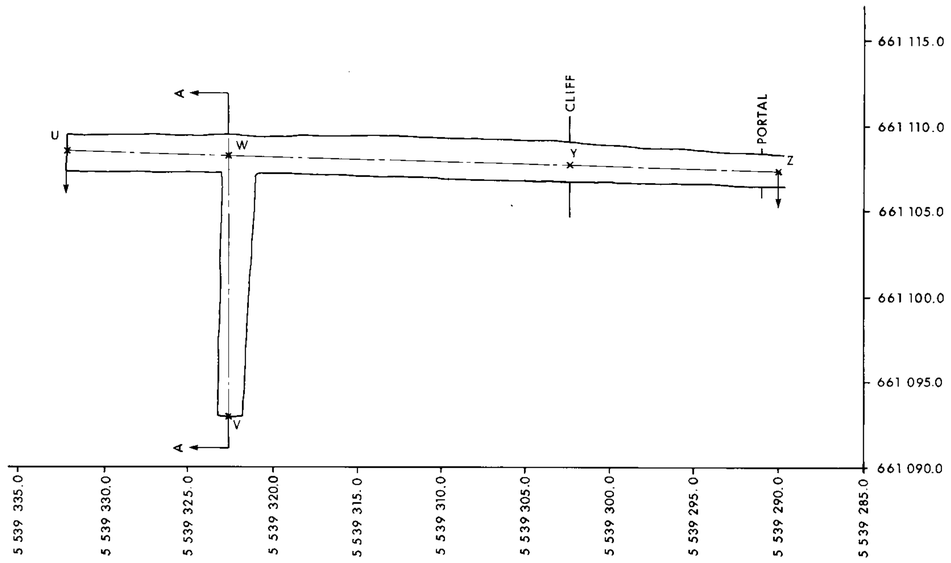
K-SHELL-EWIN PASS 79(2)A



396


jk
jf
SEAM
COAL BLOOM
ADIT
× E.P. 79
× E.P. 83
× E.P. 74
× E.P. 81
× E.P. 80
× E.P. 75
CROSS SECTION GRID
0+1600
0+1400
0+1200
0+800
0+600
0+400
0+200
0+00
CL 286
CL 287
CL 289
CL 288
CL 1300
5 540 800 mN
5 540 000 mN
5 539 000 mN
N
LEGEND
×E.P. 80 1979 DRILL HOLE LOCATION AND IDENTIFIER
ADIT 1979 ADIT LOCATION, IDENTIFIER AND UNDERGROUND SURVEY PLOT
TRENCH
ROAD
jf FERNIE FORMATION
jk KOOTENAY FORMATION
UPPER CONTACT OF BASAL SANDSTONE (OBSERVED, ASSUMED)
SANDSTONE OUTCROP
COAL OUTCROP
CONGLOMERATE OUTCROP
SURFACE TRACE OF COAL SEAM (OBSERVED, ASSUMED)
STRIKE AND DIP OF BEDDING (INCLINED, VERTICAL, OVERTURNED)
THRUST FAULT (ASSUMED, OBSERVED) (TEETH ON UPPER PLATE)
NORMAL FAULT (LINES ON DOWNTHROWN PLATE) (OBSERVED, ASSUMED)
0+200 LOCATION AND NUMBER OF GEOLOGICAL CROSS SECTION
NOTE
THE LOT BOUNDARIES HAVE BEEN TRANSFERRED GRAPHICALLY FROM FOREST COVER MAPS AND THEREFORE THEIR POSITION IS APPROXIMATE ONLY.
R-EWIN PASS 79(2)A
Crows Nest Resources Limited
EXPLORATION
EWIN PASS
396
GEOLOGICAL MAP
50 0 50 100 150 200 METRES
AUTHOR: C. BEAVAN
SCALE: 1:2000
ENCLOSURE No: 4
DATE: APRIL, 1980
REVISED:
DRAWING No: HD-51
To Accompany

ENCLOSURE #4



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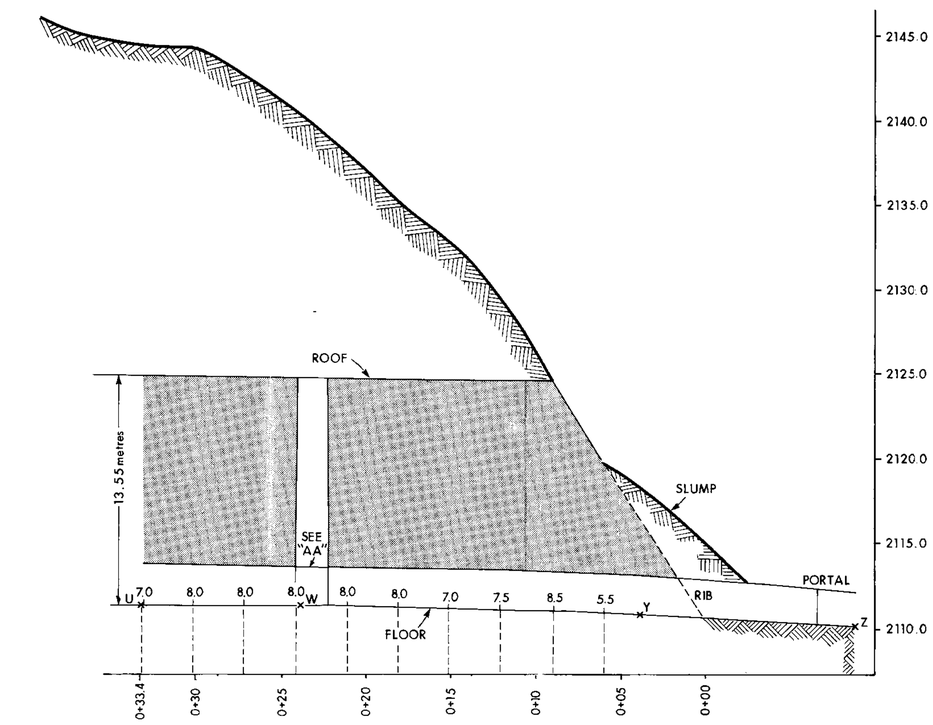
SCALE 1:200



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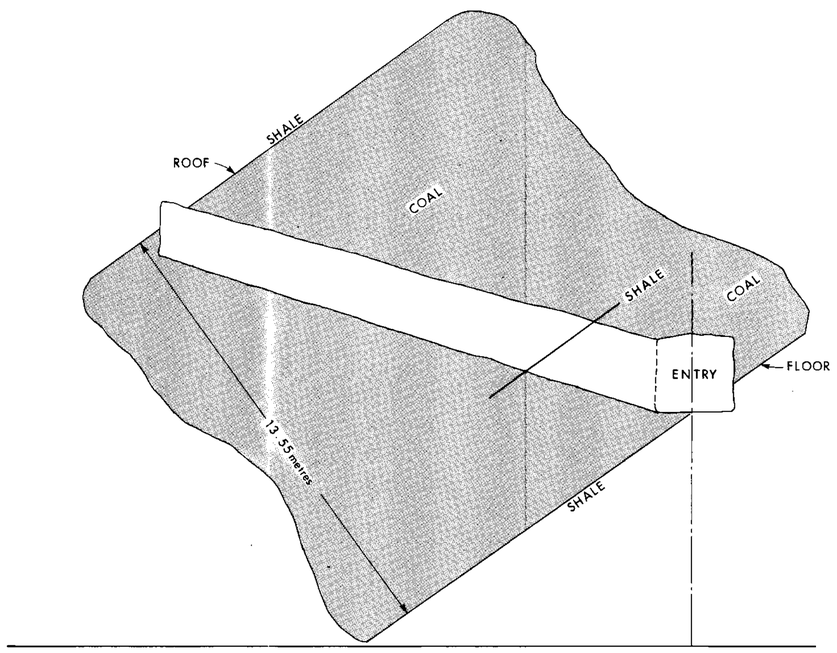
SCALE 1:200



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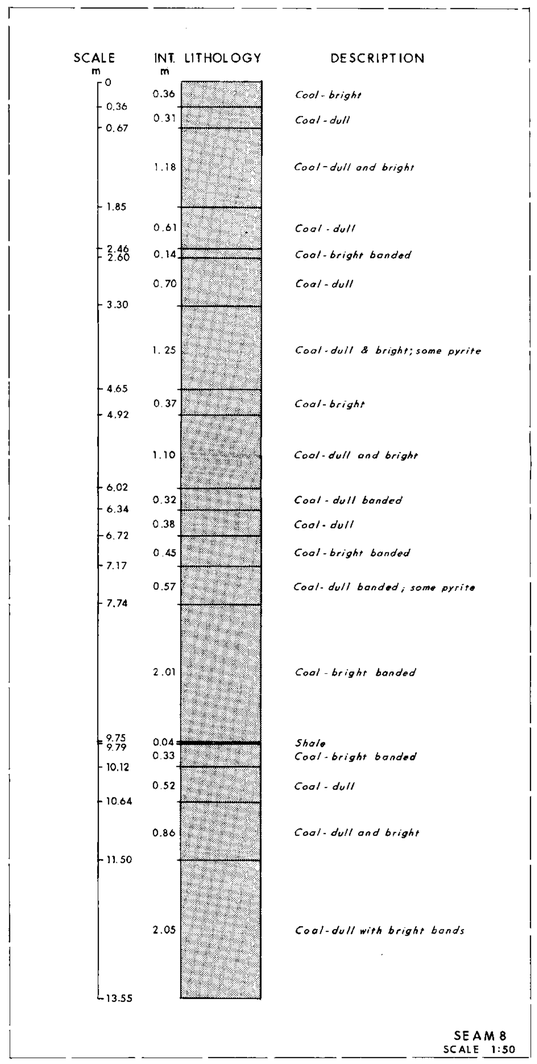
SCALE 1:100



SEAM 8
SCALE 1:50

STATION	NORTHINGS	EASTINGS	ELEVATION
Z	5 539 289.84	661 107.29	2110.12
W	5 539 302.49	661 107.71	2110.90
Y	5 539 322.48	661 108.36	2111.43
V	5 539 322 .60	661 092.85	2116.18
U	5 539 332.04	661 108.68	2111.93

LEGEND

8.0 FSI WASHED TO S.G. 1.5

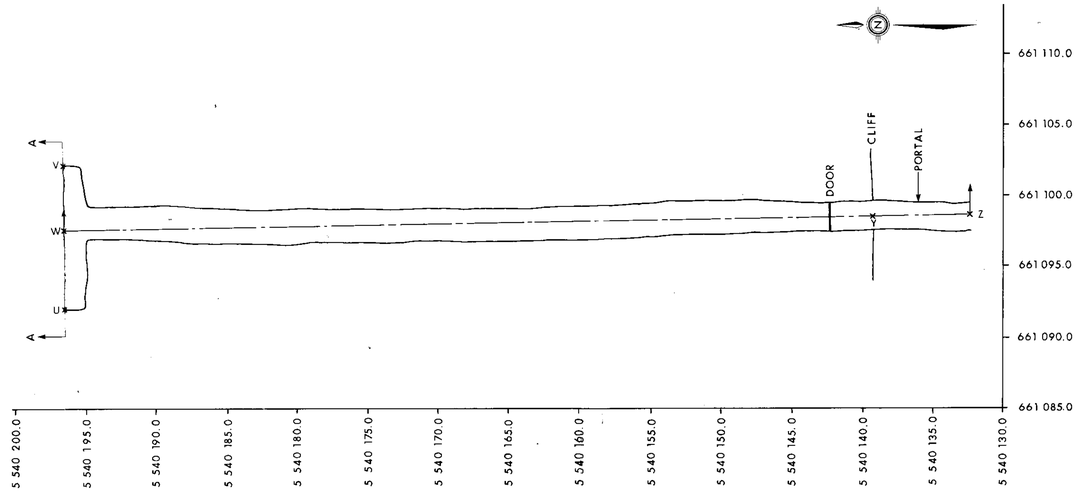
K-EWIN PASS 79(2)A *(1)

Crows Nest Resources Limited
EXPLORATION
EWIN PASS AREA
S.E. BRITISH COLUMBIA

ADIT 1
SEAM 8

396

AUTHOR: C. BEAVAN	SCALE: AS NOTED	ENCLOSURE No: 5a
DATE: 80 04 08	REVISED:	DRAWING No: HE-50
To Accompany		



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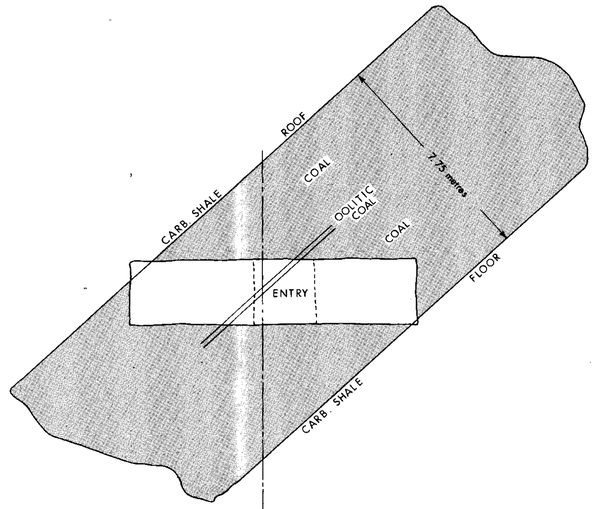

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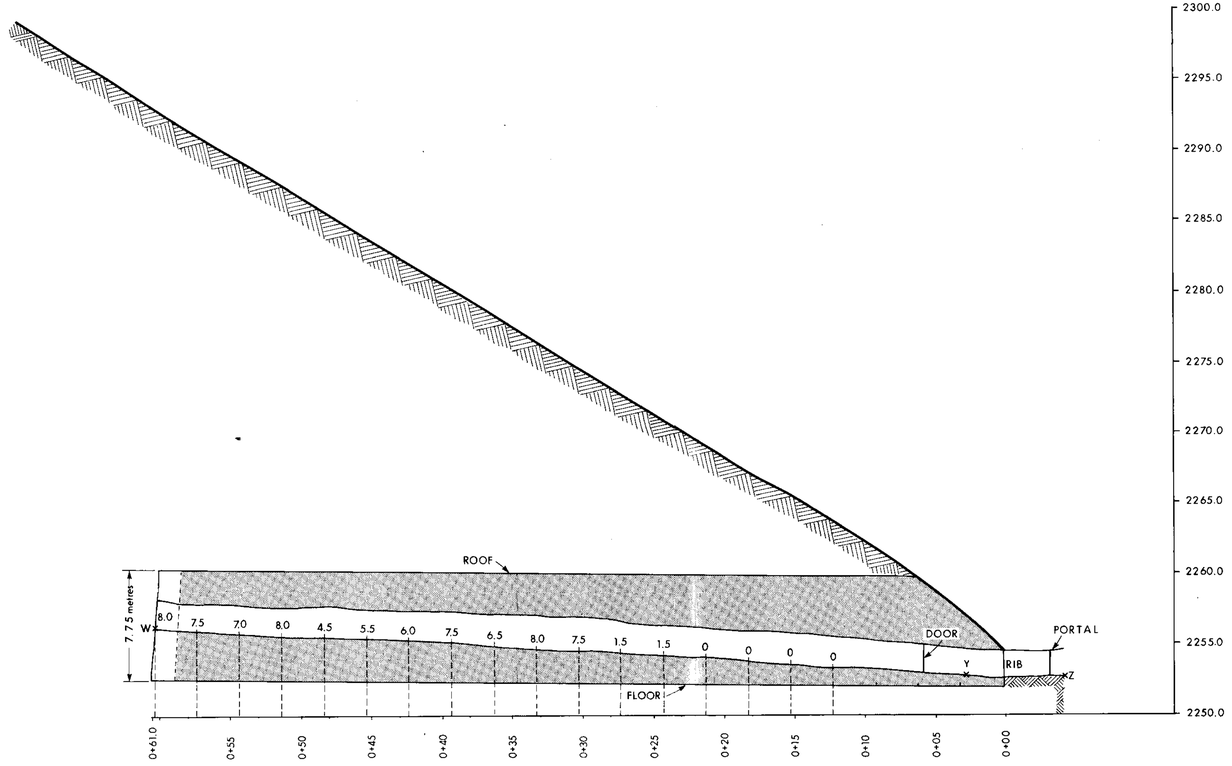

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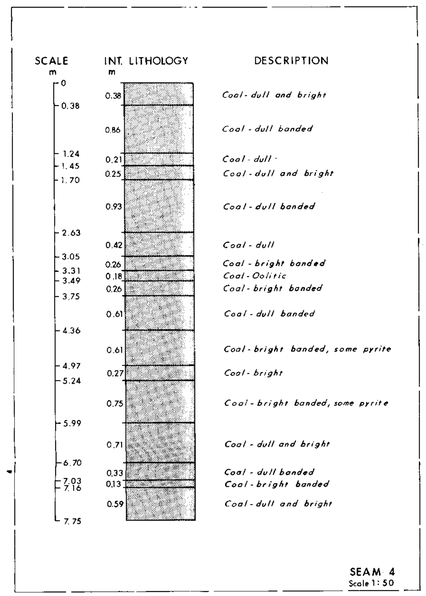


SEAM 4
Scale 1:50

STATION	NORTHINGS	EASTINGS	ELEVATION
Z	5 540 132.03	661 098.59	2252.58
W	5 540 138.93	661 098.48	2252.71
Y	5 540 198.58	661 097.52	2256.72
V	5 540 196.48	661 091.92	2256.72
U	5 540 196.66	661 102.12	2256.73

LEGEND

4.5 FSI WASHED TO S.G. 1.5

K-EWIN PASS 79(2⁴)A *(1)

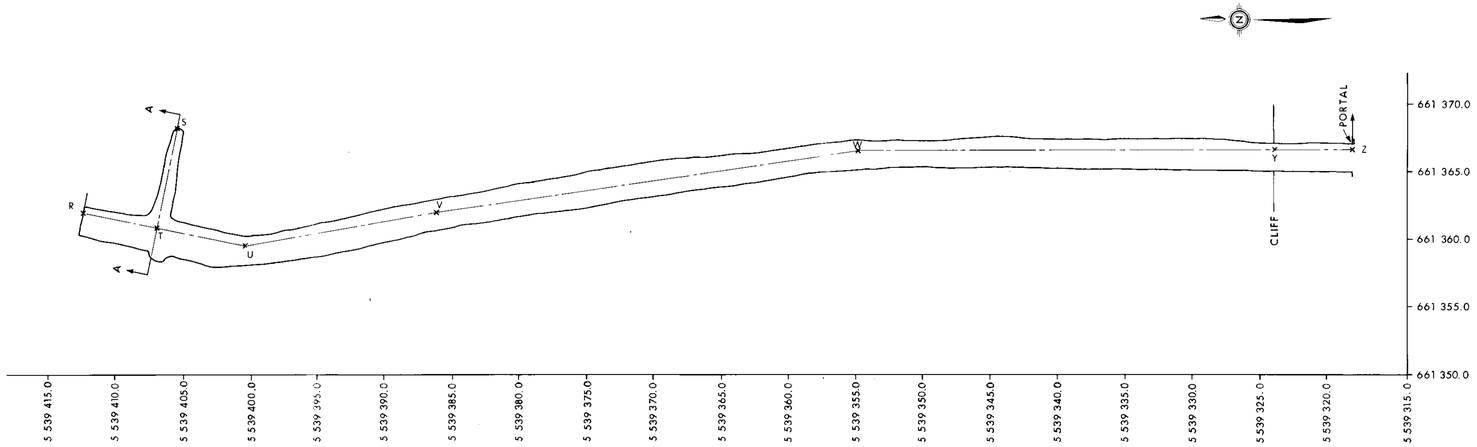
Crows Nest Resources Limited
EXPLORATION

EWIN PASS AREA
S.E. BRITISH COLUMBIA

ADIT 2
SEAM 4

396

AUTHOR: C. BEAVAN	SCALE: AS NOTED	ENCLOSURE No: 5 b
DATE: 80 04 09	REVISED:	DRAWING No: HE-50A
To Accompany		



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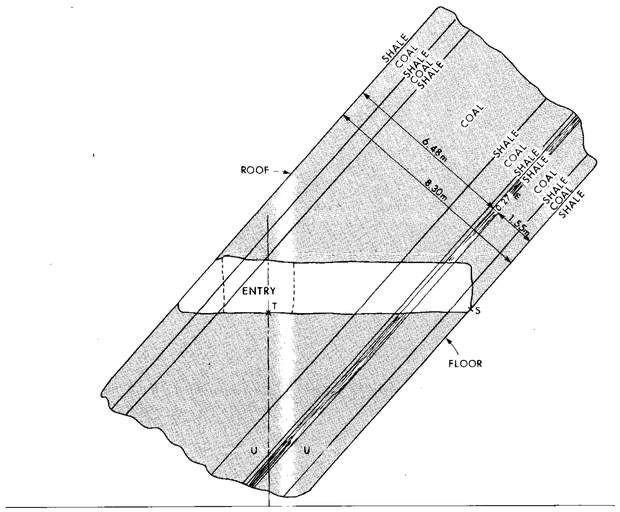

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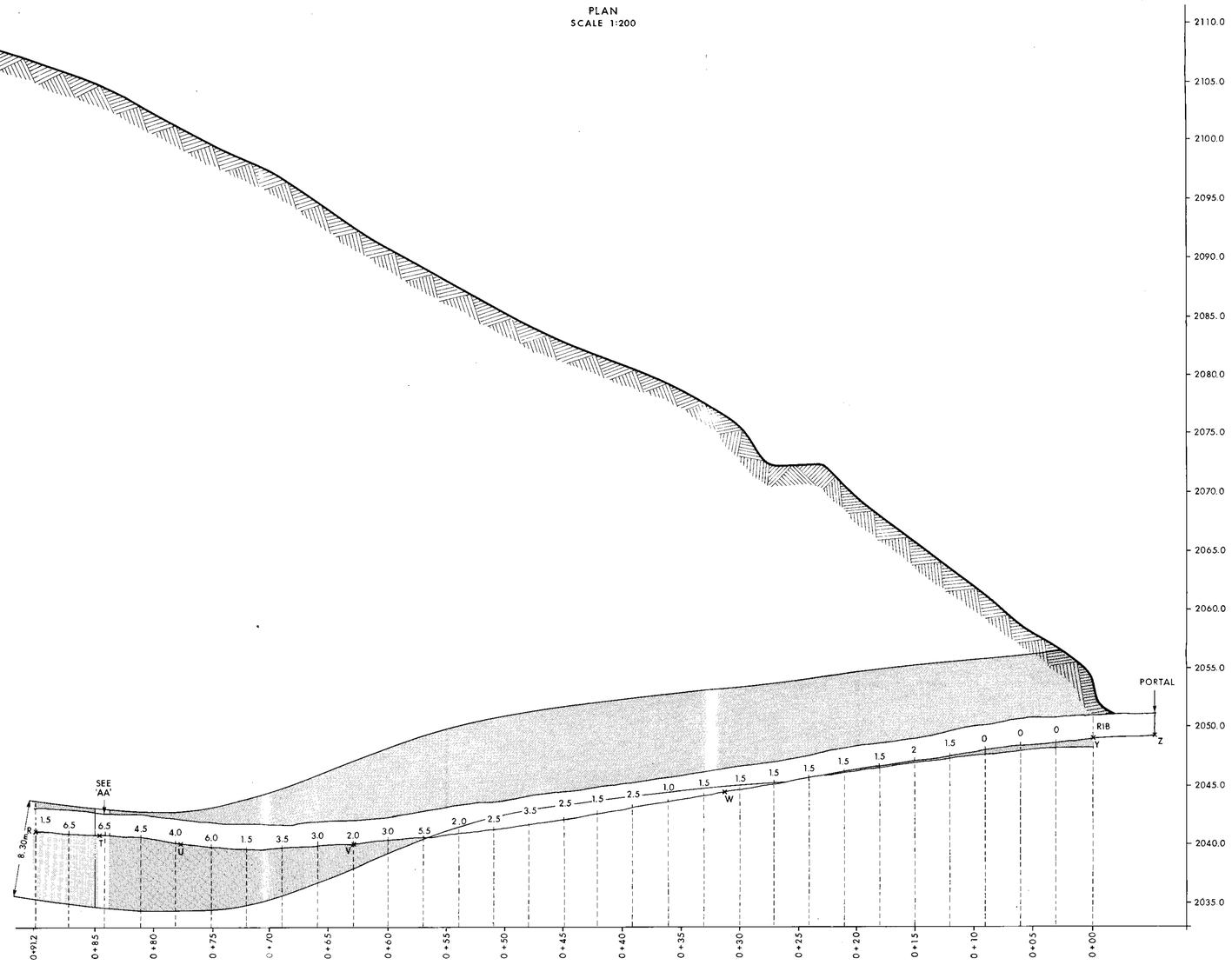
SCALE 1:100



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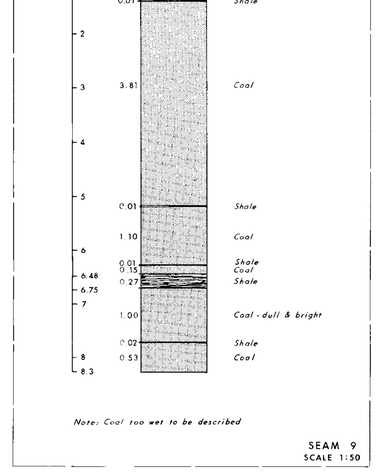


SEAM 9
SCALE 1:50

STATION	NORTHINGS	EASTINGS	ELEVATION
Z	5 539 318.2	661 371.55	2049.17
W	5 539 323.88	661 371.58	2048.98
Y	5 539 354.80	661 371.75	2044.47
V	5 539 386.19	661 367.03	2040.37
U	5 539 400.42	661 364.52	2040.13
T	5 639 407.10	661 365.91	2040.08
S	5 539 405.41	661 373.12	2041.00
R	5 539 412.40	661 366.89	2041.29

LEGEND
3.5 FSI WASHED TO S.G. 1.5

K-EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited
EXPLORATION
EWIN PASS AREA
S.E. BRITISH COLUMBIA

ADIT 3
SEAM 9

396

AUTHOR: C. BRAVAN	SCALE: AS NOTED	ENCLOSURE No.: 5c
DATE: 80 04 14	REVISED:	DRAWING No: HE-50B
To Accompany		

396

ENCLOSURE 8 K-EWIN PASS 79 (2)* A *(1)

STRATIGRAPHIC SECTION

DESIGNATION:

PART ____ OF ____

PROJECT:

AUTHOR: C. BEAVAN

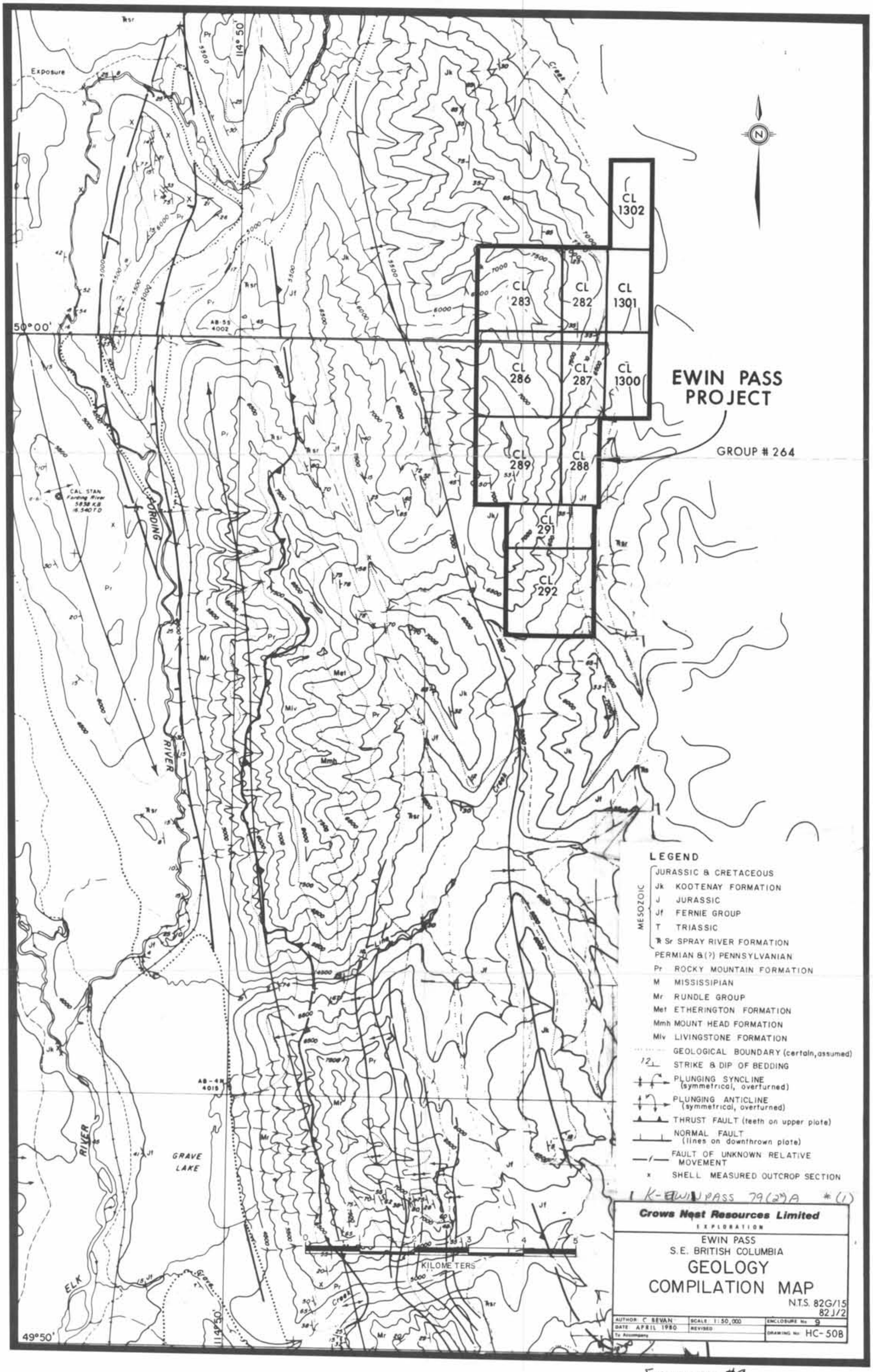
DATE: 1980

AREA: EWIN PASS

SOURCE OF DATA:

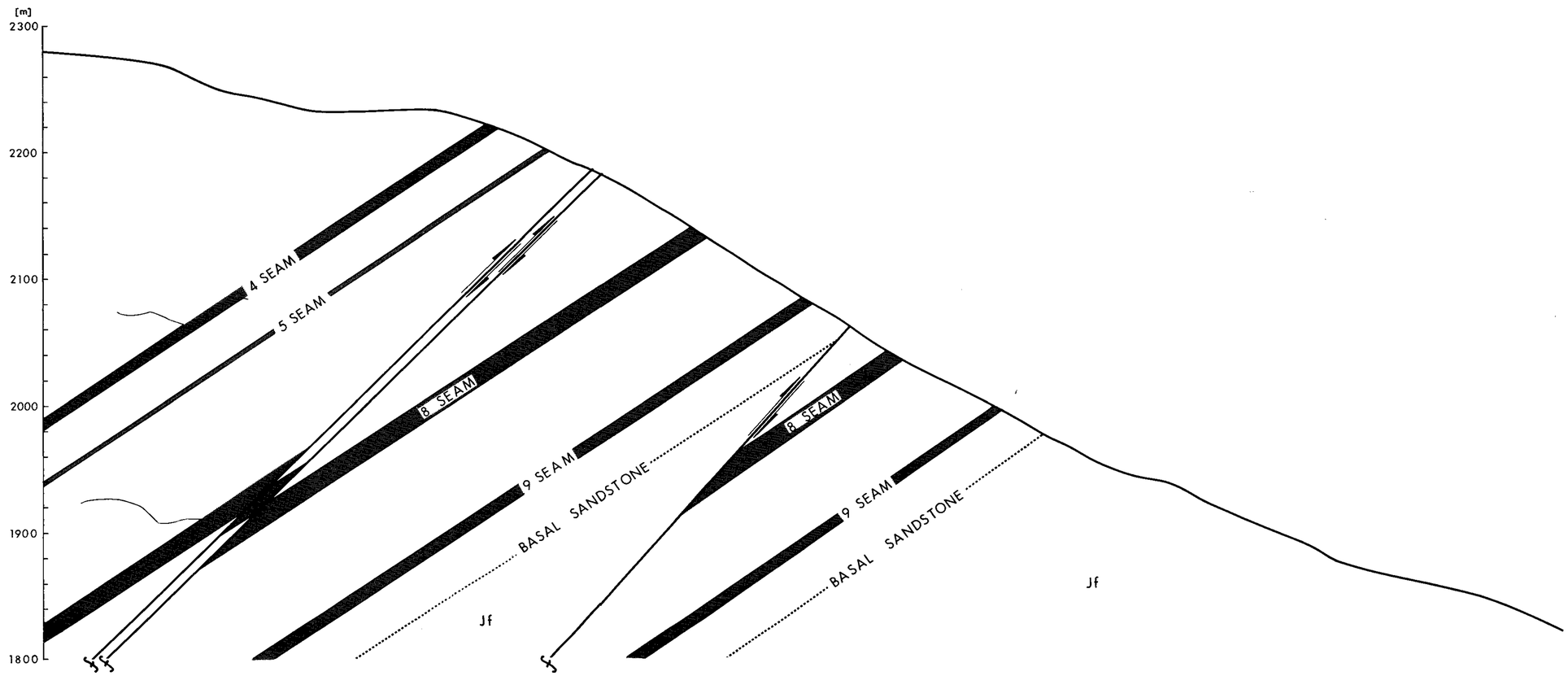
LOCATION: TYPICAL STRATIGRAPHIC SECTION

SCALE	CONTROL POINT	INTERVAL	LITHOLOGY	STRIKE & DIP	SEAM NO.	GROSS COAL SECTION	NET COAL	DESCRIPTION MAIN	DESCRIPTION AMPLIFIED	SAMPLE
									Interbedded Sandstone, Siltstone, & Shale	
350									*Sandstone*	
									Interbedded Siltstone & Shale	
					4	7.8	7.8		*Coal*	
									Interbedded Sandstone, Siltstone, & Shale	
300					5	2.2	2.0		*Coal*	
									Interbedded Sandstone, Siltstone, & Shale	
					6	0.8	0.5		*Coal*	
									Interbedded Sandstone & Siltstone	
250									*Sandstone*	
									Interbedded Sandstone & Siltstone	
									Sandstone	
									Siltstone	
200		KOOTENAY FORMATION			8	13.5	13.5		*Coal*	
									Interbedded Sandstone, Siltstone, & Shale	
150									*Interbedded Siltstone & Shale*	
									Interbedded Siltstone & Shale	
									Sandstone	
100								COAL-BEARING MEMBER	*Siltstone*	
					9	8.3	8.0		*Coal*	
									Interbedded Siltstone & Shale	
					10B	1.7	1.0		*Coal*	
									Interbedded Siltstone & Shale	
					10A	1.7	1.0		*Coal*	
									Interbedded Siltstone & Shale	
50								BASAL SANDSTONE UNIT	*Sandstone*	
0								PASSAGE BEDS	*Interbedded Siltstone, Sandstone, & Shale*	
		FERNIE FORMATION								
50								FERNIE SHALE	*Shale*	
100										



ENCLOSURE #9

396



396

K-EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited

EXPLORATION

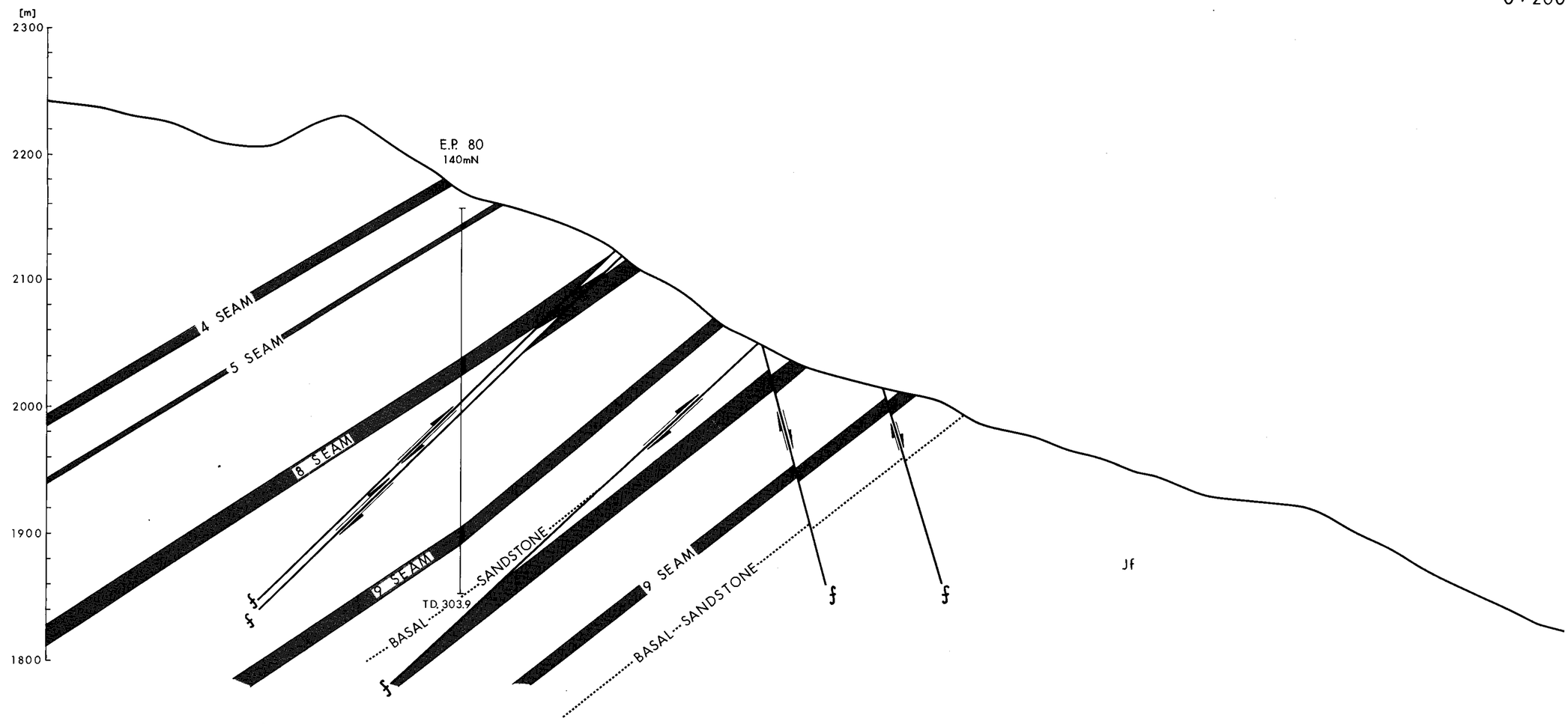
EWIN PASS PROJECT

CROSS SECTION
0 + 00

AUTHOR C. BEAVAN	SCALE 1:2000	ENCLOSURE No. 10
DATE 80 04 17	REVISED	DRAWING No. HB-51
To Accompany		

0 + 200 WEST

0 + 200 EAST



396

IC-EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited

EXPLORATION

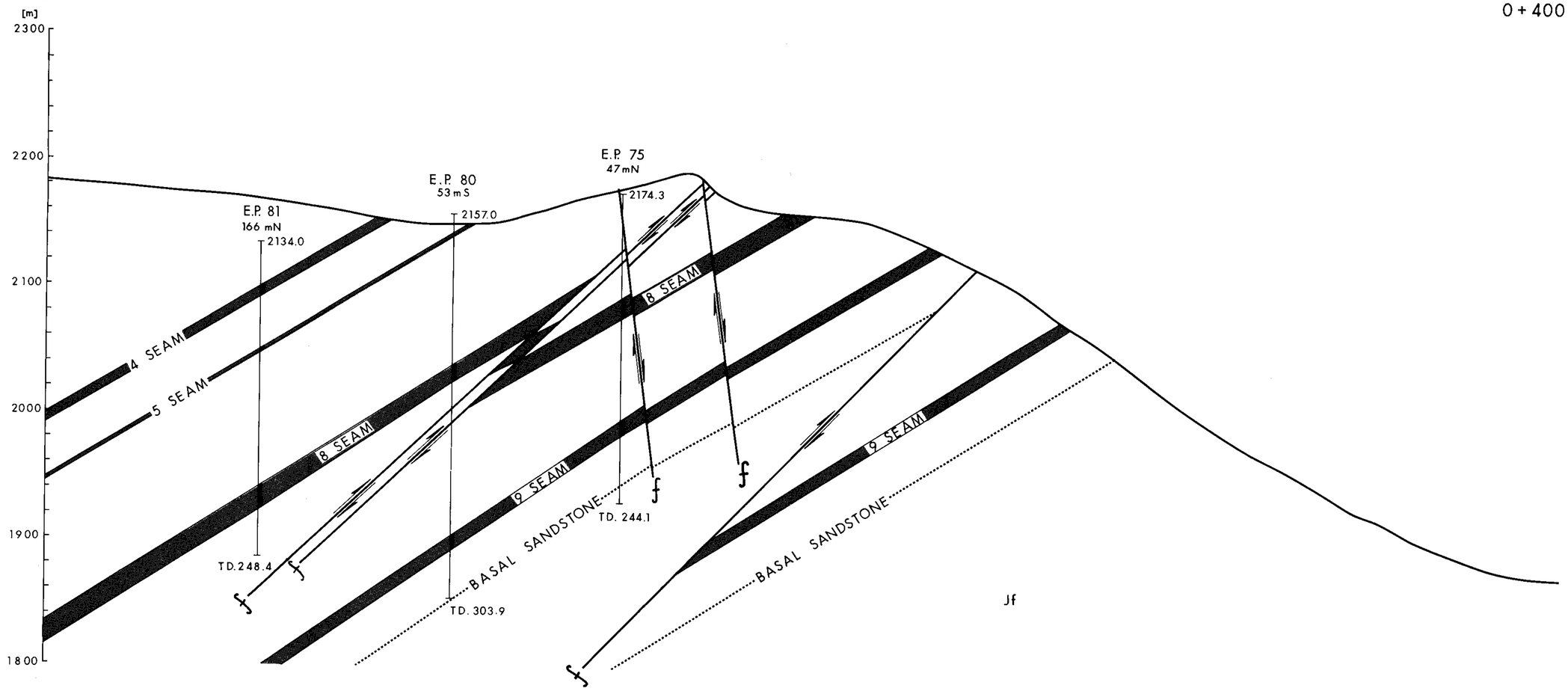
EWIN PASS PROJECT

CROSS SECTION
0 + 200

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: II
DATE: 80 04 17	REVISED:	DRAWING No: HB-51A
To Accompany		

0 + 400 WEST

0 + 400 EAST



396

K-EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited
EXPLORATION

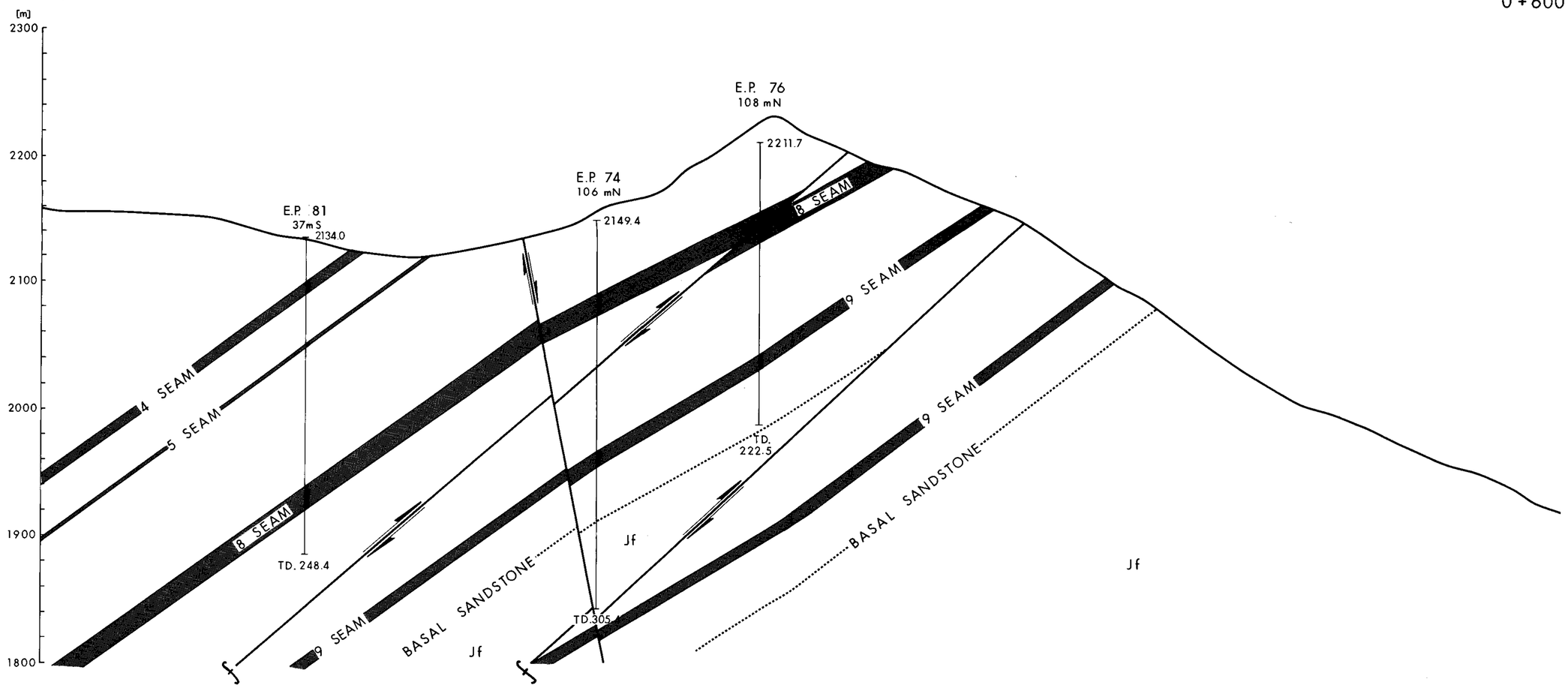
EWIN PASS PROJECT

CROSS SECTION
0 + 400

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: 12
DATE: 80 04 17	REVISED:	DRAWING No: HB-51B
To Accompany		

0 + 600 WEST

0 + 600 EAST



396

K-EWIN PASS 79(2*) A *(1)

Crows Nest Resources Limited

EXPLORATION

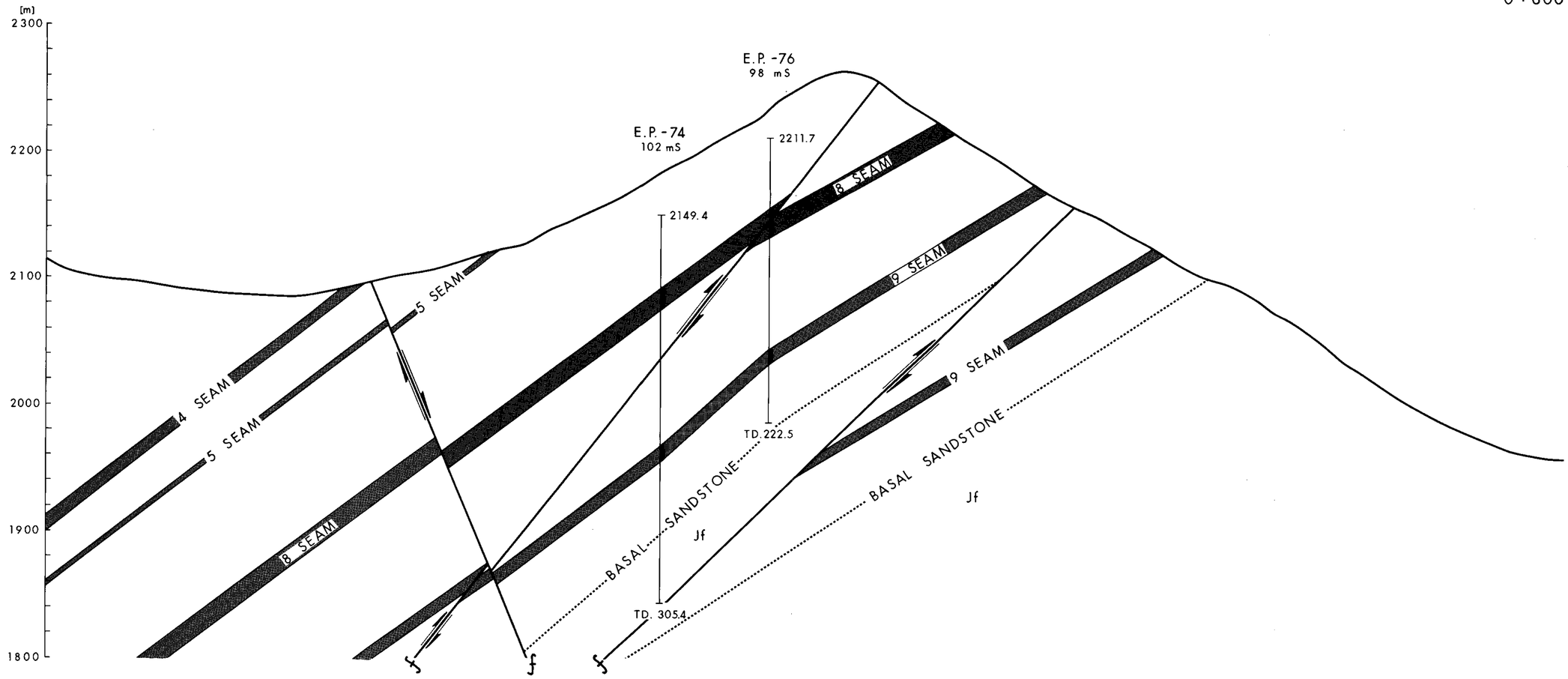
EWIN PASS PROJECT

CROSS SECTION
0 + 600

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: 13
DATE: 80 04 17	REVISED:	DRAWING No: HB-51C
To Accompany		

0 + 800 WEST

0 + 800 EAST



396

K - EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited
EXPLORATION

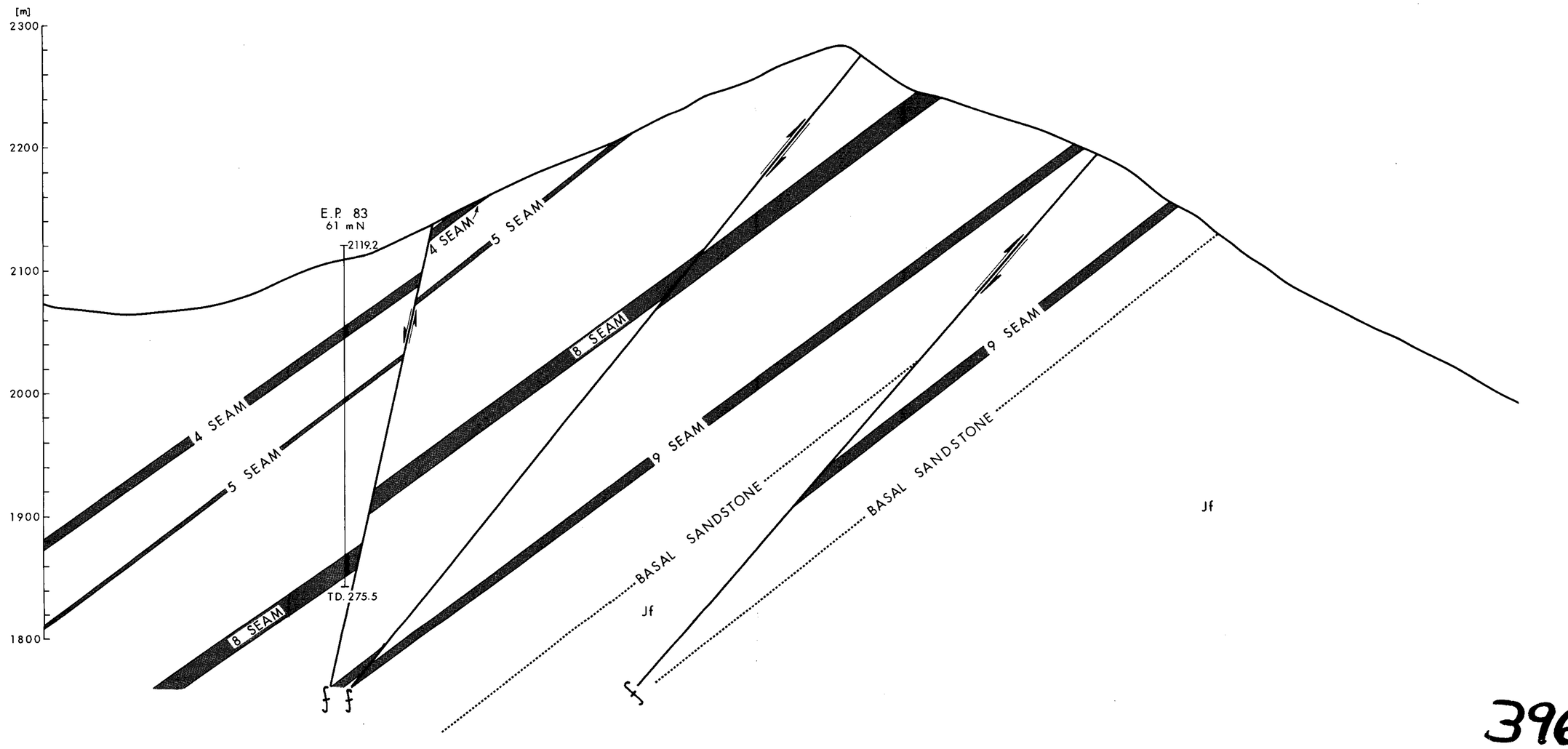
EWIN PASS PROJECT

CROSS SECTION
0 + 800

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: 4
DATE: 80 04 17	REVISED:	DRAWING No: HB-51D
To Accompany		

0 +1000 WEST

0 +1000 EAST



396

K-EWIN PASS 79(2*)A *(1)

Crows Nest Resources Limited

EXPLORATION

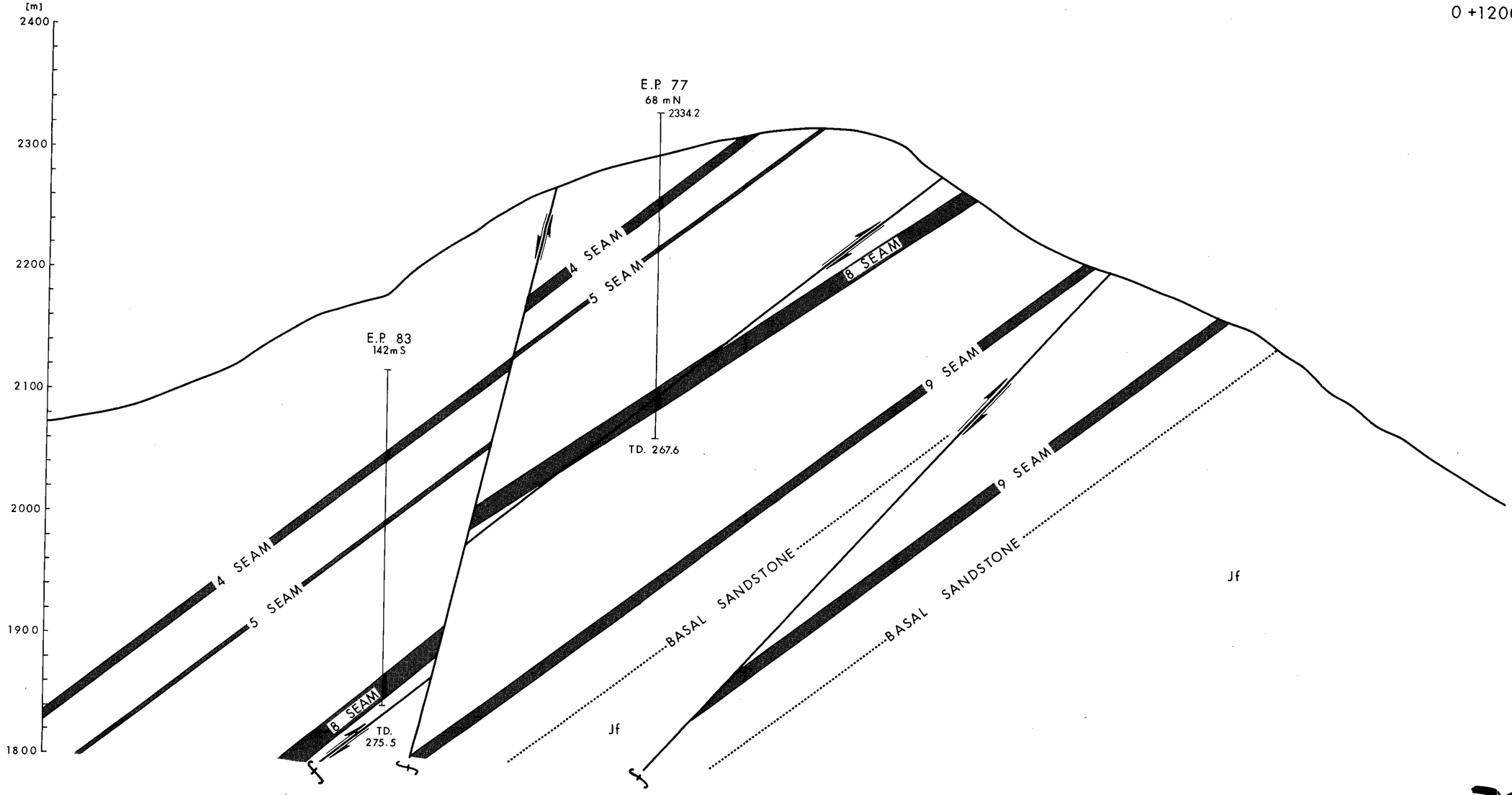
EWIN PASS PROJECT

CROSS SECTION
0 +1000

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No. 15
DATE: 80 04 17	REVISED:	DRAWING No HB-51E
To Accompany		

0 +1200 WEST

0 +1200 EAST



396

K-EWIN PASS 79 (2*)A ¥(1)

Crows Nest Resources Limited

EXPLORATION

EWIN PASS PROJECT

CROSS SECTION
0 +1200

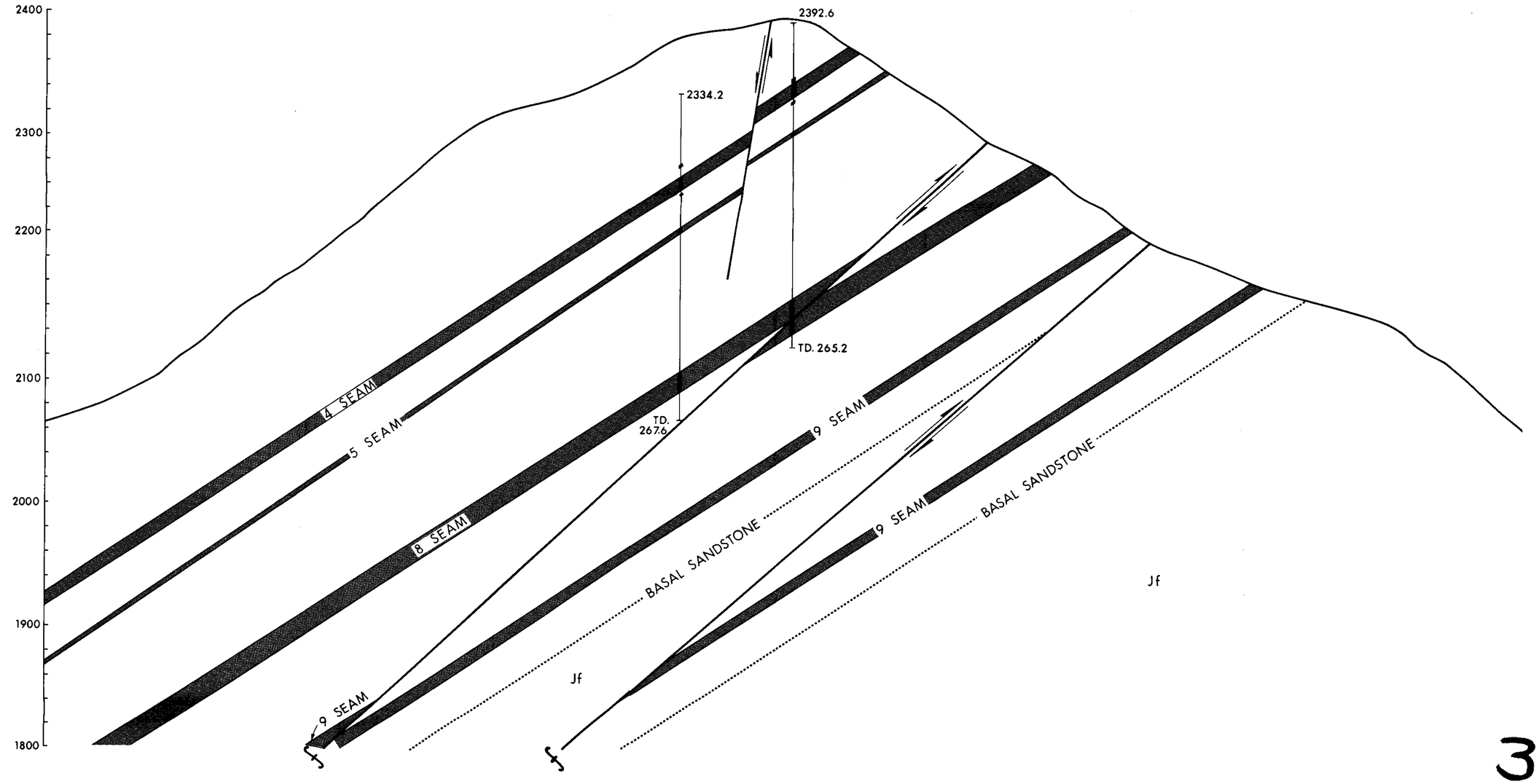
AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: 16
DATE: 80 04 17	REVISED:	DRAWING No: HB-51F
To Accompany		

0 +1400 WEST

E.P. 77
131 mS

E.P. 79
38 mN

0 +1400 EAST



396

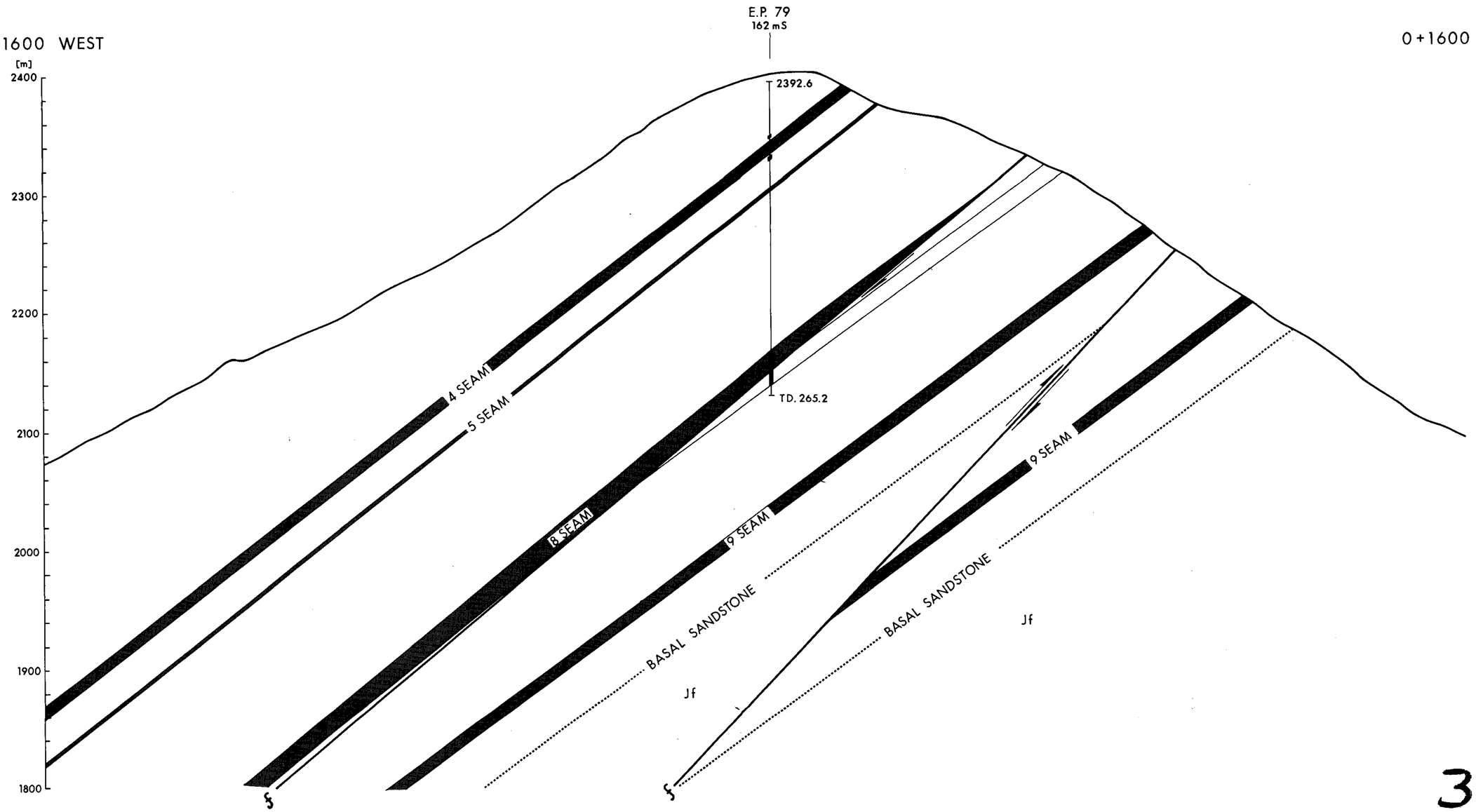
K-EWIN PASS 79(2)A *(1)

Crows Nest Resources Limited
EXPLORATION

EWIN PASS PROJECT

CROSS SECTION
0 +1400

AUTHOR: C. BEAVAN	SCALE: 1:2000	ENCLOSURE No: 17
DATE: 80 04 17	REVISED:	DRAWING No: HB-51G
To Accompany		



396

K-EWIN PASS 79(2)* A *(1)

Crows Nest Resources Limited
EXPLORATION

EWIN PASS PROJECT

CROSS SECTION
0 +1600

AUTHOR: C. BEAVAN	SCALE: 1: 2000	ENCLOSURE No: 18
DATE: 80 04 17	REVISED:	DRAWING No: HB-51H
To Accompany		

CONFIDENTIAL

Enclosure 19

COAL QUALITY TABLE

1. Cross-cut Channel Samples - CNRL Fernie Lab

	% Air Dry Loss	% Moisture	% Ash	% V.M.	% F.C.	FSI	Calculated Basis
Adit 1							
Raw	2.49	0.62	7.87	27.23	64.28	7.5	ADB
1.5 Float		0.67	5.52	27.52	66.51	8.0	ADB
1.4 Float		0.73	4.43	28.49	66.31	8.33	ADB
Adit 2							
Raw		0.60	6.47	27.16	65.77	7.5	ADB
1.5 Float		0.62	3.96	28.24	67.18	8.0	ADB
1.4 Float		0.62	3.16	28.41	67.81	8.0	ADB
Adit 3							
Raw		0.86	28.80	18.29	52.05	1.0	ADB
1.5 Float		0.63	9.02	21.73	68.62	5.5	ADB
1.4 Float		0.84	5.79	22.62	70.75	7.0	ADB

2. Bulk Sample - Birtley Coal and Minerals Testing

Adit #	Washed	% ADM	% R.M.	% Ash	% V.M.	% F.C.	% S	FSI	Calculated Basis
1	yes	4.8	0.4	6.3	27.0	66.3	0.51	8.5	ADB
2	no	2.3	0.5	7.5	27.5	64.5	0.40	8.5	ADB
3	yes	4.5	0.4	8.5	21.6	69.5	0.56	5.0	ADB