PR - Secus Mtn. 81(1)A

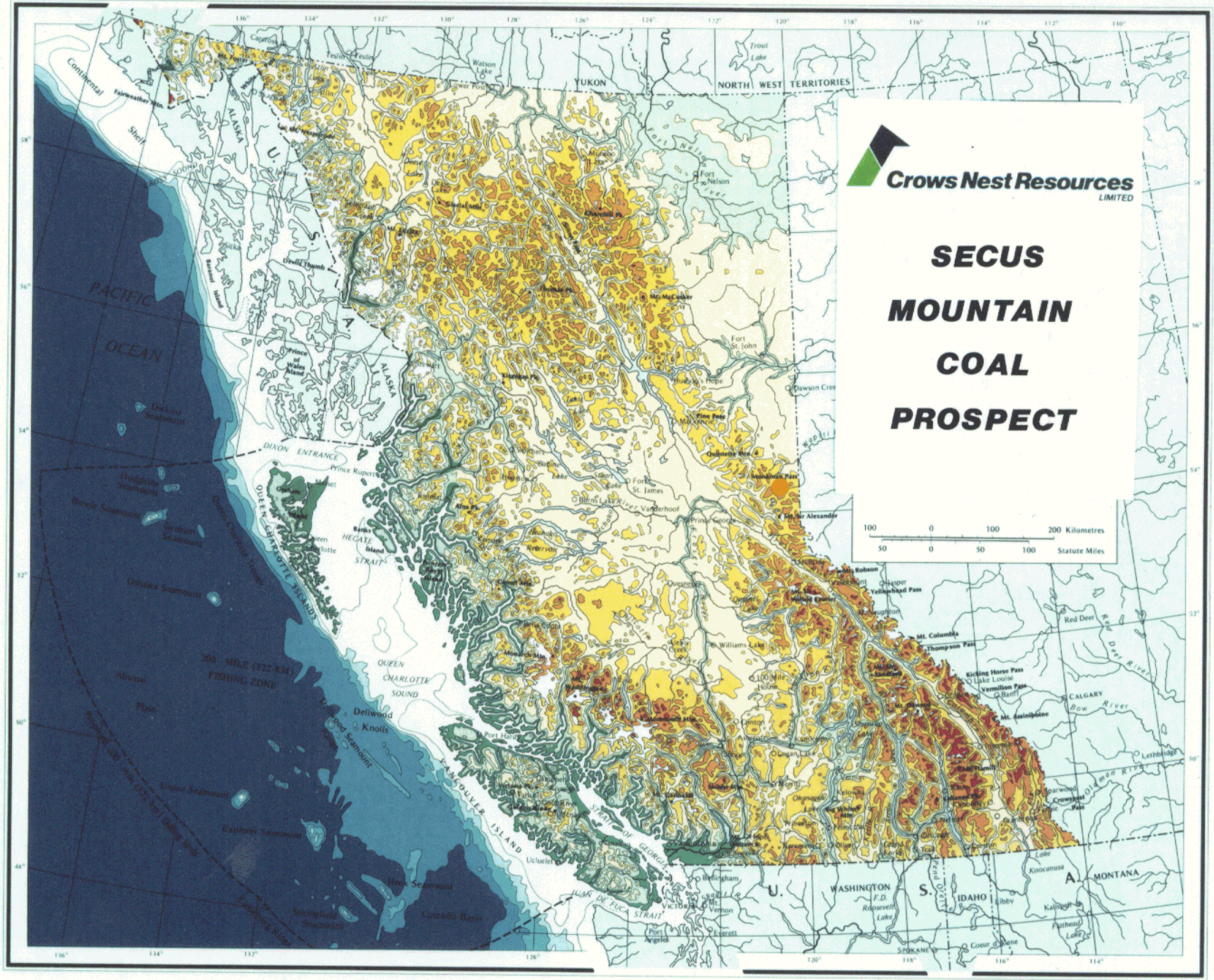
93I/7E,8W

SECUS MOUNTAIN COAL
EXPLORATION (98)
Shell Canada Resources Ltd.

CL#4204-4206, 4208, 4209,
4211, 4212, 4218, 4219,
4243-4745, 7019

D. Bell
Dec 31/81

632



Crows Nest Resources LIMITED
Eau Claire Place, 525 - 3rd Avenue S.W., Calgary, Alberta (403) 232-4355
P.O. Box 2699, Station M, Calgary, Alberta T2P 2M7 Telex 03-822505

December 30, 1981

Ministry of Energy, Mines and Petroleum Resources
British Columbia

Enclosed please find our report on the Secus Mountain Project

Mr. Dennis E. Bell planned and supervised the 1981 geological field program on Secus Mountain B.C. Coal Licences held by Shell Canada Resources Limited and operated by Crows Nest Resources Limited. Gary Cox assisted with the field work, and the preparation of this report.

Mr. Dennis E. Bell, B.Sc., graduated in Geology from Dalhousie University in 1965. Since 1968 he has specialized in mapping, structural interpretation, and exploration supervision in the coking coal belt of British Columbia and Alberta. He has worked on projects similar to this property for this company and a number of other major coal companies. Mr. Bell is registered as a Professional Geologist in the Association of Professional Engineers, Geologists, and Geophysicists of Alberta.

Gary Cox, B.Sc., graduated in Geology from the University of Alberta in 1981.

Their work was carried out under the supervision of our District Manager, British Columbia, Mr. Frank Martonhegyi.

Yours very truly,

R. D. Gilchrist, P. Geologist
Senior Geologist

PR-Secus Mtn 81(1) A

SECUS MOUNTAIN
COAL EXPLORATION
-1981-

Coal Licences South Secus Block, Group 296, (6 total) Belcourt Creek Block, Group 298 (2 total) Dumbgoat Block, Group 297 (5 total), Peace River Land District, Northeast British Columiba

C.L.# 4204-4206, 4208, 4209, 4211, 4212, 4218, 4219, 4743-45 7019

B.C. Coal Licences held by Shell Canada Resources Limited and Operated by Crows Nest Resources Limited.

National Topographic Series 93/I/8 W (Narraway River),
93/I/7 E (Wapiti Pass)

Latitude and Longitude: 54 degrees, 22 minutes north
120 degrees, 23 minutes west

Consultant and Author: Dennis E. Bell, P. Geol. (Alberta)
Max Air Exploration Limited
P.O. Box 878
Jasper, Alberta, T0E 1E0

Field Work: July and August, 1981

Submission Date: December 31, 1981

2/CEa.1

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81(2)A

See PR-Secs 14th 81(3)A

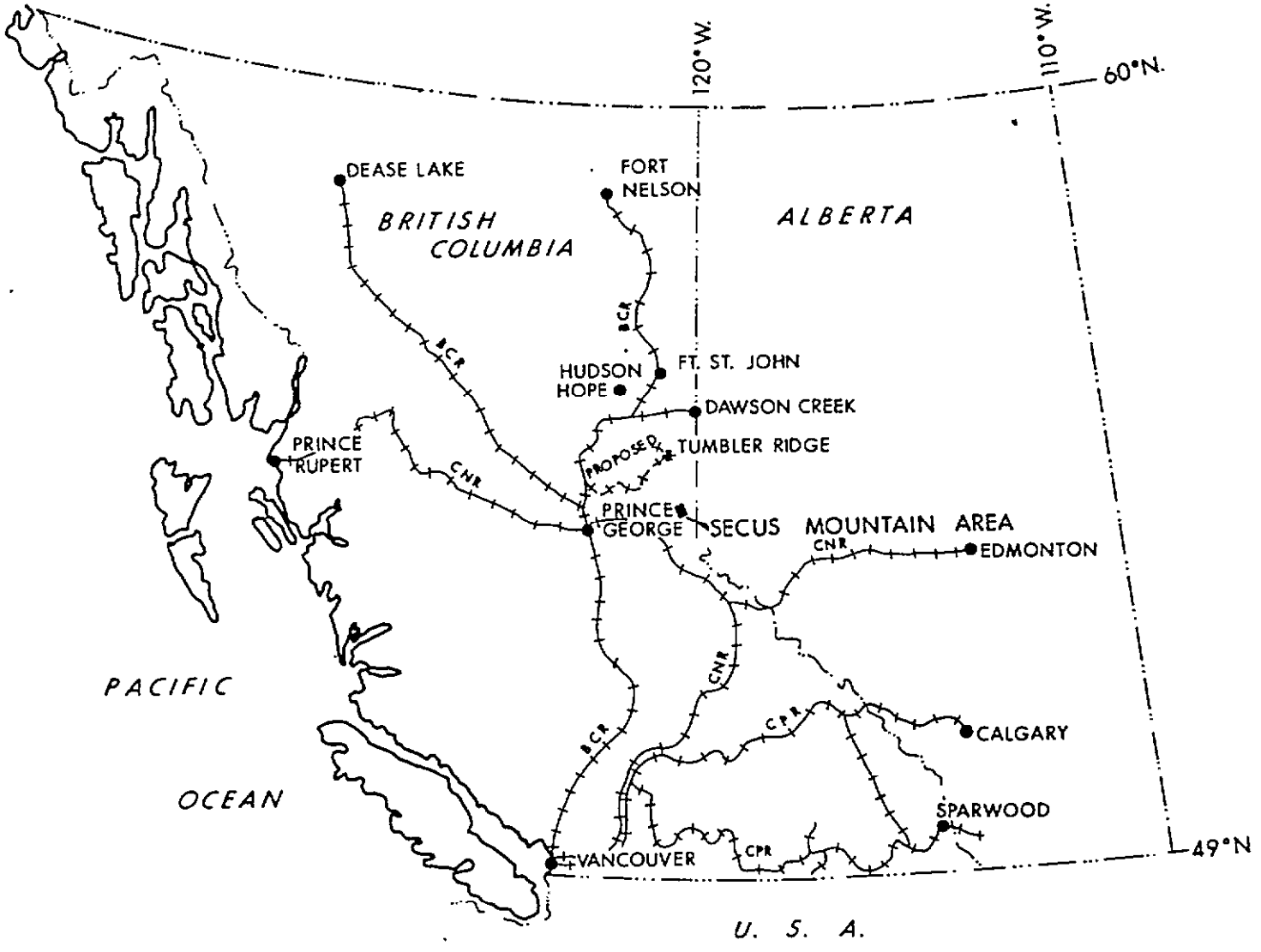
1.0 SUMMARY

During the 1981 field season Crows Nest Resources Limited conducted a geologic exploration program consisting of two helicopter-supported diamond drill holes and a limited amount of detail 1:5,000 mapping on its twelve Secus Mountain, northeast British Columbia, coal licences. Total cost to November, 1981 was $209,780.

This 1981 work was complementary to and planned on the 1980 1:5,000 detail mapping which costs approximately $72,000. 1981 mapping was of a fill-in nature, and was shortened in planned length due to forest travel bans on account of fire danger. The two diamond drill holes, totally helicopter serviced, successfully tested the lower half of the coal-bearing Gates Member of the Commotion Formation above the Torrens Sandstone. This target was chosen as being the most-prospective part of the Gething and Commotion coal-bearing section available. Future drilling may be placed to expand on these two holes.

SC 81-1 4208
DG 81-1 4219

As the drilling encountered the expected section to a small tolerance (6.5 and 13 m), no new set of 32 cross sections has been prepared from the 1980 sections, and only those sections involving the drilling and the fill-in mapping have been included in this report.



Crows Nest Resources Limited

EXPLORATION

SECUS MOUNTAIN

N.E. B.C.

LOCATION MAP

FIGURE 1

AUTHOR A. WHITE	SCALE	ENCLOSURE No
DATE 81 03 05	REVISED	DRAWING No AA-539
To Accompany		

Similarly, a revised set of 19 maps for 1981 has not been prepared from the 1980 set; only those sheets which involved drilling or mapping are included in this 1981 report.

Core recovery was generally very good. The drillers, Mid-West, performed without equipment down-time. Unflyable weather caused only a three-shift loss total for both holes. The holes held up well. Water was not a problem. Geophysical logs collected were gamma-neutron, gamma-density-caliper, focused beam, and directional survey.

The crew boarded in the Petro-Canada Monkman coal camp on Honeymoon Creek, approximately 40 km north. Petro-Canada crews cleared and slashed the sites. In October the sites were reclaimed by burning in a separate operation and approved by provincial forestry personnel. No site work remains to be done.

This report subdivides the Secus Mountain block of licences into three new names, as the thirteen licences are divided into three widely-distant non-contiguous properties, each with differing geology and structure. They are:

(1) (Secus Mountain north) DUMB GOAT: 4745, 4744, 4743, 4218 and 4219 (5 total)

(2) (Secus Mountain central) BELCOURT CREEK: 4211, 4212 (2 total)

(3) (Secus Mountain south) SOUTH SECUS: 4204, 4205, 4206, 4208,4209 and 7019 (6 total)

This terminology is followed through the remainder of this report.

Crows Nest Resources drilled three drill holes for Petro-Canada on Petro-Canada licences. Two of these holes were in the Nekik area, south of South Secus block, and Crows Nest has retained results of these holes under an agreement which shared the results of these two holes with Crows Nest Resources' two holes. These Petro-Canada holes have not been included in this report.

As the drilling has confirmed the 1980 stratigraphy and structure, future work at Secus Mountain may continue to use the same maps and sections. Next drill target would logically be the upper half of the coal-bearing Gates Member, so that the total number and thickness of Commotion seams within the licences may be counted and analyzed.

The coal zone immediately above the Torrens sandstone proved to have several coal seams to 4 m thickness in both holes. One of the two holes (Dumb Goat) was situated high enough in the section to penetrate the 5 m seam hand-trenched in 1980, finding the seam to be 6.5 m true thickness. It would appear that Dumb Goat in particular thus contains a sizeable reserve of at least one thick seam.

Future fill-in mapping can continue on all three blocks. Hand-trenching of at least several days duration by one crew may be done on the seams outlined by the Dumb Goat drill hole. Hand-trenching is not, as yet, planned on Belcourt Creek or South Secus blocks, as the topography is not complementary.

2.0 INTRODUCTION

2.1 Coal Land Tenure

Thirteen B.C. Licences held by Shell Canada Resources Ltd. in three non-contiguous blocks compose the 1981 Secus Mountain project area.

Thirteen licences were dropped from the 1980 project area of 25 licences, which were contiguous, and one was added (7019).

New groupings and names are:

(1) Group 297, Dumb Goat Block, 4745, 4744, 4743, 4219, 4218 (5 total)

(2) Group 298, Belcourt Creek Block, 4211, 4212 (2 total)

(3) Group 296, South Secus Block, 4204, 4205, 4206, 4208, 4209 and 7019 (6 total)

The project is named after Secus Mountain, a large inner foothill of the Rocky Mountains. Two of the three new blocks, South Secus and Belcourt Creek, are located on the southwest and west slopes of Secus Mountain itself. Dumb Goat is one of two similarly large inner foothills in the region (the other is Mt. Belcourt).

The following table entitled "B.C. Coal Licences Tenure Standing, Secus Mountain 1981" contains details of tenure.

TABLE 1

CROWS NEST RESOURCES LIMITED (Exploration)

B.C. COAL LICENCES — BLOCK: SECUS MOUNTAIN — PROJECT: — YEAR: 1981

TENURE STANDING — GROUP: #296, #297, #298 — SECUS MOUNTAIN — DATE: DECEMBER 81

LICENCE			ACQ/ADM		RENTALS		REQUIREMENT WORK						BUDGET		EXP	POTL	REMARKS
			FEES				EXPIRED CURRENT YEAR			PRE-FULFILMENT			CURRENT YEAR				
NO.	LEGAL DESCRIPTION	AREA TOTAL AC/HA.	YEAR	$	ANNUAL $	TOTAL TO NEXT ANN. $ 10^3	$ 10^3	LIC. YEAR	$	YEAR	$	ANNIVERSARY DATE	AFE	$ 10^3	TOTAL $ 10^3	SHELL CLASS.	
13 LIC		3,246		250	16,230.	84.2	89.4		68,900.		229,596	DECEMBER 31	-	-	403.1	Y	
	GROUP #296																THE LICENCES ARE
6 LIC	NTS 93-I-8-C	1,661			8,305		46.4		37,750.		100,980.	DECEMBER 31				Y	IN GOOD STANDING
4204	62,64,73,74	302	78				9,815	4	7,550.	2+	19,204						UNTIL DEC.31st 83
4205	65,66,75,76	302	78				9,815	4	7,550.	2+	19,204						THE EXCESS CREDIT
4206	67,68,77,78	302	78				9,815	4	7,550.	2+	19,204						IS $13.59 FOR THE
4208	88,98	151	78				4,907	4	3,775	2+	9,602						'78 LIC. & $23.22
4209	89,90,99,100	302	78				9,815	4	7,550.	2+	19,204						FOR THE 81 LIC.
7019	69,70,79,80	302	81				2,265	2	1,775.	2+	14,562						
	GROUP #297																
5 LIC	NTS 93-I-8-L	1,131			5,655		28.2		19,800.		124,944	DECEMBER 31					THE LICENCES ARE
4218	29,30,39,40	302	78				9,815	4	7,550	3+	34,431					Y	IN GOOD STANDING
4219	49,50	151	78				4,907	4	3,775	3+	17,215						UNITL DEC.31st 84
4743	NTS 93-I-7-I 41,42,51,52	301	79				6,020	3	3,762.5	3+	32,541						THE EXCESS CREDIT
4744	61,62,71,72	301	79				6,020	3	3,762.5	3+	32,541						IS $14.01 FOR THE
4745	82	76	79				1,520	3	950.	3+	8,216						'78 LIC. & $45.61
	GROUP #298																FOR THE '79 LIC.
2 LIC	NTS 93-I-8-E	454	78		2,270		14,755	4	11,350.	½	3,672.	DECEMBER 31					
4211	41,42,52	227														Y	THE EXCESS CREDIT
4212	62,71,72	227															1982 IS $8.09/HA

GROUP	WORK DONE	1978 - 79	1980	1981
296	$	73,095	33,233	92,550
297	$		26,657	117,230
298	$		11,102	-

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2.2 Location, Geography, and Physiography

Secus Mountain is a long, rectangular area measuring approximately 31 km by 5 km and oriented southeast-northwest.

Some location descritions are:

1) Situated along the joining line of the Inner Foothills belt with the Front-Range Rockies belt between the Narraway River on the south and Red Deer Creek on the north in northeastern British Columbia.
2) Centered about latitude 54 degrees, 22 minutes north, longitude 120 degrees, 23 minutes west.
3) 132 km southwest from Grande Prairie, Alberta.
4) 150 km east-northeast from Prince George, British Columbia.
5) 90 km southeast from the proposed townsite of Tumbler Ridge.
6) From the south end of the area on the Narraway River it is 25 km along the coal belt to the Alberta border, and a further 55 km to McIntyre Mines' Smoky River mine.

Relief varies from 1190 m (3,907 ft.) on the Narraway at the southeast corner of the area, and rises to 2249 m (7378 ft.) at the peak of Mt. Belcourt.

2.2 (continued)

Physiographically, the area can be divided into four blocks, based on the drainages separating three relatively enormous inner foothills (from the north: Dumb Goat Peak, Mount Belcourt, and Secus Mountain) and one medium-size foothill (the last on the south), Mount Nekik. The coal formations underlie, generally, the west slopes of these foothills, and also some of the lower northeast-facing slopes of the opposing front-range Rockies (of which Meosin and Muinok Mountains are two).

In addition to often soaring, spectacular scenery, there is a variety of forest cover, from the low alluvial flats of the Narraway to the barren alpine zone on the uper slopes of each of the foothills (except for Nekik). Topography is typically Rocky Mountain-rugged.

2.3 ACCESS

The two pairs of the mapping crew stayed as guests in the Petro-Canada Monkman Pass coal camp, 35 km north of the north end of the area. Round trip time by Jet Ranger to Mt. Nekik at the south end of the area is 40 minutes.

Two older seismic lines cross the length of the property, one in the Nekik block, and the other on the south slope of Mt. Belcourt in the block of the same name.

At present there is no road access in the area within several miles of any part of the property. The area is perhaps Crows Net Resources' most-wilderness project area. Flying weather is frequently marginal at best.

The Petro-Canada area camp is 158 km southwest up the Redwillow River valley from Grande Prairie, Alberta, the natural service center. The turn-off is at Beaverlodge, Alberta, 37 km west from Grande Prairie on the highway to Dawson Creek, B.C. The drive is 2-1/2 hours in dry weather, the last 6 km on 40 kmh single lane gravel road.

2.4 Environment

Secus Mountain has the harsh climate characteristic of the western Rockies of Northeastern British Columbia. Snow can be expected on the ground to late May. Mapping in 1980 stopped on August 24th, when the winter's snowline descended to 1450 meters. High winds, sometimes preventing landings, and -4 degrees Celsius were a common morning condition. There were only two days during the summer the crew was not wearing jackets and gloves.

The year-round mining climate and situation would be similar to that presently experienced at McIntyre Mines' Smoky River operation to the southeast, and the proposed Quintette-Sukunka mining areas to the northwest.

1981 work at Secus Mountain was conceived at the time of planning of the 1980 work: to carry out drilling based on the 1980 mapping. After the 1980 program was successfully concluded, Crows Nest dropped 13 of the 25 licences and added one, retaining 13 licences in three non-contiguous blocks. Two holes were drilled, one in each of two of the three blocks. In addition, fill-in mapping on the 1:5,000 scale was carried out, concentrating on these blocks.

3.0 WORK DONE

3.1 Summary of Previous Work

Previous work consists of a small amount of mapping by Crows Nest Resources in 1979 (G. Hoffman) and the 1980 detail mapping by the author. In addition, Crows Nest Resources acquired Petro-Canada mapping from 1978 on scale of 1:5,000 and which covered much of the licences. The author had previously worked for Petro-Canada, and was the author of some of the 1978 mapping.

In addition, Crows Nest Resources acquired core logs and geophysical logs for six 1976 and 1978 diamond drill holes done by Petro-Canada on neighbouring licences. Furthermore, as Crows Nest drilled two holes for Petro-Canada in the Secus Mountain region, and the results of these have been pooled under mutual agreement with the 1981 Secus Crows Nest holes, Crows Nest has results of eight other holes drilled in Bullhead and Commotion units in the area.

As 1981 work is complementary to the 1980 work, and written by the same author, the reader is referred to the 1980 report for details of previous work at Secus Mountain.

3.2 Scope and Objectives of 1981 Exploration

In 1980 Crows Nest Resources mapped in detail the 25 licences forming Secus Mountain, covering nineteen contiguous 1:5,000 map sheets. In addition, thirty-two kilometer-spaced 1:5,000 structural cross sections were created, based on the mapping. These maps and section fulfilled the scope and objectives of the 1980 work, as outlined on Page 12 of the 1980 report.

Part of the reason for such complete detail mapping was that Secus Mountain has not been mapped on a 1:50,000 scale by the Geological Survey, and there were stratigraphic and structural problems in the area. Another part lay in drill planning: Crows Nest Resources had planned two drill holes for 1981, completely helicopter-supported as the area is still wilderness with no road access, of necessarily shallow capacity, and the most suitable sites needed to be planned. The third and remaining part of the reason lay in the need to measure the positions of the formations as they passed through the licences, in order to establish the relative merit of each licence with respect to the Petro-Canada majority position along the structure.

3.3 Work Done in 1981

The two Secus Mountain 1981 drillholes were drilled as part of a seven-hole series; two others were drilled by Crows Nest at Onion Lake and Five Cabin Creek. The other three were drilled for Petro-Canada, two of which were in the licences immediately south of the South Secus block. The results of these two Nekik Petro-Canada holes have been pooled with Crows Nest's Secus holes by mutual agreement, and thus Crows Nest has acquired information from four holes in 1981 in the Secus Mountain area.

As the results of all four holes matched closely the planning, based on the 1980 mapping and sections, no new maps or sections have been issued for 1981. The two Crows Nest holes are plotted on the appropriate sections and maps, and included in the appendices of this report. In addition, the fill-in mapping has been plotted on the maps and sections, and these too are included.

In summary, 1981 closes a two-year mapping and drilling program on the Secus Mountain licences. The basic stratigraphy and structure of a 40 km part of the coking coal belt has been created on a 1:5,000 scale, with tolerances on major structures and stratigraphic units to usually plus or minus 200 m horizontally on the ground and 50 m vertically. The two diamond drill holes have penetrated the lower half of the coal-bearing upper part of the Gates Member, Commotion Formation, counting the seams and their thicknesses, and providing core samples for analysis. The next several drill holes in the future would logically explore the remainder of the Commotion in the two blocks already drilled, and test the Commotion of the third, as yet un-drilled, block.

4.0 GEOLOGY

The 1981 drilling and fill-in 1:5,000 detail mapping has confirmed the overall stratigraphy and structure of Secus Mountain coal licences as presented in the 1980 report.

Therefore no basic change is made to the 1980 maps and sections, and they are considered valid for 1981 also. 1981 mapping and drill holes have been placed on the 1980 maps and sections and only those affected are included in this report. In addition, the details of the mapping and drilling are reported in the following pages.

As 1981 geologic work at Secus Mountain was an extension of the 1980 work, the 1980 report, sections 4.1, 4.2, and 4.3 for regional geology, stratigraphy, and structural setting have been reproduced for this report.

Formational diagrams and the stratigraphic diagram and accompanying table from the 1980 are also reproduced on the following pages. The stratigraphic section was used in 1980 to cover Onion Lake and Five Cabin Creek as well as Secus Mountain, and this practice is continued.

3.4 Costs of Work Done in 1981

Detailed costs of the 1981 Secus Mountain geologic program are contained in the Applications to extend Term of licence on the following pages. The overall figure has been apportioned amongst the two blocks of licences (Secus South, and Dumb Goat).

Total cost of the 1981 program is $209,780.

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

APPLICATION TO EXTEND TERM OF LICENCE

I, LESLIE GRAMANTIK (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)

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

ALBERTA T2P 2H5

Valid FMC No. 207568

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 4204, 4205, 4206, 4208, 4209, 7019, SIX LICENCES, GROUP #296, 1661 HECTARES

for a further period of one year.

2. Property name SECUS MOUNTAIN, PEACE RIVER LAND DISTRICT

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

4. I have performed, or caused to be performed, during the period JANUARY 1981 to DECEMBER 31, 1981, work to the value of at least $ 92,550.00 on the location of coal licence(s) as follows:

CATEGORY OF WORK	Licence(s) No(s).	Apportioned Cost
Geological mapping	7019, 4208, 4205,	5,491.00
Surveys: Geophysical	-	-
Geochemical	-	-
Other	-	-
Road construction	-	-
Surface work	-	-
Underground work	-	-
Drilling	4208	75,117.00
Logging, sampling, and testing	4208	6,072.00
Reclamation	4208	4,000.00
Other work (specify)	-	-
Off-property costs	GEOLOGICAL REPORT	1,870.00

5. I wish to apply $ 92,550.00 of this value of work on Coal Licence(s) No(s). 4204, 4205, 4206, 4208, 4209, 7019

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 SECUS MOUNTAIN COAL EXPLORATION, 1981

DECEMBER 22, 1981 (Date)

Gramantik (Signature)

ASSISTANT LANDMAN (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

CATEGORY OF WORK

GEOLOGICAL MAPPING Yes ☒ No ☐

		Area (Hectares)	Scale	Duration
Reconnaissance				
Detail:	Surface	555	1:5,000	19 MAN DAYS
	Underground			
*Other (specify)				

Total Cost $ 5,491.

GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes ☐ No ☒

Method
Grid
Topographic
*Other (specify)

Total Cost $

ROAD CONSTRUCTION Yes ☐ No ☒

Length Width
On Licence(s) No(s).
Access to

Total Cost $

SURFACE WORK Yes ☐ No ☒

	Length	Width	Depth	Cost
Trenching				
Seam Tracing				
Crosscutting				
*Other (specify)				

Total Cost $

UNDERGROUND WORK Yes ☐ No ☒

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits					
*Other workings					

Total Cost $

DRILLING Yes ☐ No ☐

		Hole Size	No. of Holes	Total Metres	Cost
Core:	Diamond	NQ	1	194	75,117
	Wireline				
Rotary:	Conventional				
	Reverse circulation				
*Other (specify)					

Contractor MID-WEST DRILLING
Where is the core stored? CHARLIE LAKE CORE STORAGE FACILITY

Total Cost $ 75,117.

LOGGING, SAMPLING AND TESTING Yes ☒ No ☐

Lithology:	Drill samples	☐	Core samples	☒	Bulk samples	☐	
Logs:	Gamma-neutron	☒	Density	☒			
*Other (specify)							
Testing:	Proximate analysis	☒	FSI	☐	Washability	☐	
	Carbonization	☐	Petrographic	☐	Plasticity	☐	
*Other (specify)							

OTHER WORK (specify details)

	Cost
RECLAMATION ON DRILL SITES	4,000.
GEOLOGICAL REPORT	1,870.

Total Cost $ 5,870.

TOTAL COST $ 6,072.

On-property costs 90,680.
Off-property costs 1,870.
Total Expenditures $ 92,550.

Dec 22/87 (Date)

(Signature)

MANAGER ACCOUNTING - C.N.R.L. (Position)

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

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

APPLICATION TO EXTEND TERM OF LICENCE

I, LESLIE GRAMANTIK (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
P.O. BOX 100 (Address) CALGARY (Address)
ALBERTA T2P 2H5
Valid FMC No. 207568

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 4218, 4219, 4743, 4744, 4745, FIVE LICENCES, GROUP #297, 1132 HECTARES

for a further period of one year.

2. Property name SECUS MOUNTAIN, PEACE RIVER LAND DISTRICT

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

4. I have performed, or caused to be performed, during the period JANUARY 1981 to DECEMBER 31ST, 19 81, work to the value of at least $ 117,230.00 on the location of coal licence(s) as follows:

CATEGORY OF WORK	Licence(s) No(s).	Apportioned Cost
Geological mapping	4219, 4743, 4744,	7,751.
Surveys: Geophysical	-	-
Geochemical	-	-
Other	-	-
Road construction	-	-
Surface work	-	-
Underground work	-	-
Drilling	4219	97,537
Logging, sampling, and testing	4219	6,072
Reclamation	4219	4,000
Other work (specify)		
Off-property costs	GEOLOGICAL REPORT	1,870

5. I wish to apply $ 117,230.00 of this value of work on Coal Licence(s) No(s). 4218, 4219, 4743, 4744, 4745

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 SECUS MOUNTAIN COAL EXPLORATION, 1981

DECEMBER 22, 1981 (Date)

(Signature)

ASSISTANT LANDMAN (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

CATEGORY OF WORK

GEOLOGICAL MAPPING Yes ☒ No ☐

		Area (Hectares)	Scale	Duration
Reconnaissance				
Detail:	Surface	1020	1:5000	30. MAN. DAYS.
	Underground			
*Other (specify)				
			Total Cost	$ 7,751.00

GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes ☐ No ☒

Method
Grid
Topographic
*Other (specify)
Total Cost $

ROAD CONSTRUCTION Yes ☐ No ☒

Length Width
On Licence(s) No(s).
Access to
Total Cost $

SURFACE WORK Yes ☐ No ☒

	Length	Width	Depth	Cost
Trenching				
Seam Tracing				
Crosscutting				
*Other (specify)				
			Total Cost	$

UNDERGROUND WORK Yes ☐ No ☒

	No. of Adits	Maximum Length	No. of Holes	Total Metres	Cost
Test Adits					
*Other workings					
				Total Cost	$

DRILLING Yes ☒ No ☐

		Hole Size	No. of Holes	Total Metres	Cost
Core:	Diamond	NQ	1	257	97,537.00
	Wireline				
Rotary:	Conventional				
	Reverse circulation				
*Other (specify)					

Contractor MID-WEST DRILLING
Where is the core stored? CHARLIE LAKE CORE STORAGE FACILITY
Total Cost $97,537.00

LOGGING, SAMPLING AND TESTING Yes ☒ No ☐

Lithology:	Drill samples	☐	Core samples	☒	Bulk samples	☐
Logs:	Gamma-neutron	☒	Density	☒		
*Other (specify)						
Testing:	Proximity analysis	☒	FSI	☐	Washability	☐
	Carbonization	☐	Petrographic	☐	Plasticity	☐
*Other (specify)						

TOTAL COST $ 6,072.00

OTHER WORK (specify details)

	Cost
RECLAMATION	4,000.00
GEOLOGICAL REPORT	1,870.00
Total Cost	$ 5,870.00
On-property costs	115,360.00
Off-property costs	1,870.00
Total Expenditures	$117,230.00

Dec. 22/81 (Date)

(Signature)

MANAGER ACCOUNTING - C.N.R.L. (Position)

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

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

APPLICATION TO EXTEND TERM OF LICENCE

I, LESLIE GRAMANTIK (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)

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

ALBERTA T2P 2H5

Valid FMC No. 207568

hereby apply to the Minister to extend the term of Coal Licence(s) No(s). 4211 AND 4212
TWO LICENCES, GROUP #298, 454 HECTARES

for a further period of one year.

2. Property name SECUS MOUNTAIN, PEACE RIVER LAND DISTRICT

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

~~4. I have performed, or caused to be performed, during the period ..... to .....~~
~~....., 19 ....., work to the value of at least $ .....~~
~~on the location of coal licence(s) as follows:~~

~~CATEGORY OF WORK~~

	~~Licence(s) No(s).~~	~~Apportioned Cost~~
~~Geological mapping~~	~~.....~~	~~.....~~
~~Surveys: Geophysical~~	~~.....~~	~~.....~~
~~Geochemical~~	~~.....~~	~~.....~~
~~Other~~	~~.....~~	~~.....~~
~~Road construction~~	~~.....~~	~~.....~~
~~Surface work~~	~~.....~~	~~.....~~
~~Underground work~~	~~.....~~	~~.....~~
~~Drilling~~	~~.....~~	~~.....~~
~~Logging, sampling, and testing~~	~~.....~~	~~.....~~
~~Reclamation~~	~~.....~~	~~.....~~
~~Other work (specify)~~	~~.....~~	~~.....~~
~~Off-property costs~~		~~.....~~

5. I wish to apply $ ..... of this value of work on Coal Licence(s) No(s). .....

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

7. The work performed on the location(s) is detailed in the attached report entitled PLEASE APPLY EXCESS CREDIT ON THESE LICENCES

DECEMBER 22, 1981 (Date)

(Signature)

ASSISTANT LANDMAN (Position)

(FORMS AND REPORT TO BE SUBMITTED IN DUPLICATE)

4.1 Regional Geology

A problem encountered in planning exploration on the Secus Mountain, Onion Lake, and Five Cabin Creek properties was that there existed no Geological Survey of Canada detail 1:50,000 geologic maps covering that portion of the coking coal belt in northeastern British Columbia. The G.S.C. has done detail work to the northwest up the belt, as have other coal exploration companies, but distance and facies changes have confused identification of mappable units in this region.

The generally accepted nomenclature is that of the Survey's Stott (Bulletin 152, 1968) dividing the section of interest into the Bullhead and Minnes Groups, with further subidivisions into formations and members. This is as reproduced on the two following pages in formational diagrams of both groups.

The Petro-Canada staff has fit its intensive Duke Mountain drilling into this nomenclature and also used it for its six drill holes of previous years in the Secus Mountain area.

4.1 (continued)

The 1980 Crows Nest mapping crew decided to continue this nomenclature, to fit in with the work of G.S.C. and Petro-Canada as Crows Nest and Petro-Canada may continued to exchange some parts of their information in the future. The Secus Mountain area in particular is one logical mining area, but it is divided into intertwined fashion between the two companies.

The 1980 mapping crew divided the total section yet further into units mappable through all three Crows Nest properties and throughout the Petro-Canada licences (including the Duke Mountain Block). Should Petro-Canada institute a detailed mapping program on any of its properties in this region of northeast British Columbia (it has not done so in the past, including within the Duke Mountain block), continuity between the companies exploring and developing in the same belt can be maintained.

The Onion Lake and Secus Mountain 1:50,000 compilation maps (enclosures) and 1:25,000 compilation maps were constructed by overlaying the 1:5,000 grids on the topography, and placing the formations and members as measured on these grids from the 1:5,000 maps and sections.

Stratigraphy

Minnes, Bullhead, and lower Fort St. John Group strata in the region stretching from Secus Mountain through Onion Lake and Five Cabin Creek contain an unusually high proportion of conglomerate. Identification and mappability of the two target units, the Gething Formation in the Bullhead Group and the Gates Member of the Commotion Formation of the Fort St. John Group, has been hindered by the vastly increased footages of conglomerate they contain, compared to the remainder of the better-studied part of the coal belt to the northwest (which also contains the type section for the nomenclature).

In fact, not only the Gates and Gething contain many thick conglomerates, but the Minnes, Cadomin, and Boulder Creek also contain unusually thick units of conglomerate. This character is unique to this part of the coal belt, and Stott treats it with some attention in his 1968 bulletin.

The most noticeable conglomerate thicknesses have been centered around Mt. Belcourt, one of the four foothills in the Secus area. To the northwest, at Onion Lake and Five Cabin Creek, the total mass of conglomerate is less and it has less effect on the mappability of the standard nomenclature, but the number of conglomerate occurrences remains high.

(continued)

Secus Mountain itself, situated right next to Mt. Belcourt, has a long, striking west slope composed of dip-slope units of conglomerates, deeply incised by small canyons and gorges, all of it basically exposed and barren. The general concept and question of how to divide and follow the conglomerates has thus become known in the local mapping trade as "the Secus Mountain conglomerates."

The effect of the conglomerates has been to defeat identification of the standard formations and members, to the point that over the years various crews making quick geological examinations with the idea of locating drill sites to prospect the Gething and Gates ended up often by drilling a completely wrong formation.

The problem is mostly centered along the part of the belt containing Five Cabin Creek, Onion Lake, and Secus Mountain, which are all located along the innermost line of inner foothills. Those properties situated along the outer side of the inner foothills (i.e. the Duke Mountain Block of Petro-Canada, as well as the Belcourt and Saxon properties of Denison Mines) on the east flank of the Wapiti Anticline have less conglomerate.

(continued)

The Geological Survey maintains an active interest in "the Secus Mountain Conglomerates", and the crew was visited for one day by one of their geologists (D. Gibson), who wished to see the division of the units by the crew.

Since the mapping was completed and the 1:5,000 maps and structural cross-sections finished in November of 1980, the logs (drill core and geophysical) of the six Petro-Canadian holes at Secus Mountain have been acquired by Crows Nest. The positions and altitudes of the holes have never been surveyed (this will be done in 1981), but the author can see that they fit the sections closely, and therefore the basic interpretation and conception of the stratigraphy are valid.

The Stratigraphic Section

As it appeared that an academic style of mapping by the Geological Survey and reconnaissance-level mapping by coal company geologists had not in the past produced a workable division of units in the stratigraphic section, Crows Nest Resources' 1980 crew decided instead, as it was the first crew on the west side of the Wapiti Anticline to do detail mapping, to use a different approach.

The concept was to concentrate instead on building up a structural framework containing the whole of the sequence from Minnes up through Boulder Creek, and while so doing to attempt to divide the total section into smaller and smaller units, eventually sandwiching possible coal horizons into smaller and smaller spaces.

This entailed leaving aside most notions of academic interest, (such as paleoenvironments and unconformities), and also leaving aside the notion that particular coal beds should be followed. As coal beds are usually recessive and unexposed, the problem came to be to find identifiable units close by in the section.

(continued)

The mapping was thus carried out from the point of view of the most basic principle: if enough exposures are looked at, and each exposure is compared to all others on the most fundamental geological points such as grain size, bedding characteristics, and so on, then eventually it would be possible to follow certain (and also probably prominent) units close to the coal horizons and so locate drill sites no matter what the discussions on the formal nomenclature would have to say concerning the identify and origin of the units. In other words, the whole problem could be by-passed.

Being able to separate and follow the prominent units in the total stratigraphic section became, then, essentially the study of "the Secus Mountain Conglomerates". The stratigraphic descriptions following the next couple of pages of the stratigraphic section are oriented to this question.

The two pages of stratigraphic section are meant to be used by the reader for six different locations: four within the Secus Mountain area, and one each at Onion and Five Cabin Creek. The nomenclature remains the same, but the reader must substitute the appropriate thickness for each location from the table. The sketch presented is for the 7,000 South structural cross-section on the west slope of Secus Mountain itself.

Stratigraphic Descriptions

Minnes Group

The Minnes Group is the term used for any section stratigraphically beneath the Cadomin Formation, the base of the overlying Bullhead Group. Minnes strata throughout this portion of northeastern Britisn Columbia have not been mapped in detail, and the group is undivided.

The Minnes Group is composed of a sequence of both marine and non-marine sediments; often coal or coaly beds occur, but they are rarely thicker than one or two meters, and seem to have little extent laterally.

The nature of the Minnes section immediately beneath the Cadomin at any particular location is often different from the last. At Onion Lake there are massive, thick conglomerates beneath the Cadomin; along the 30 km of Secus it varies from conglomerates to interbedded sandstones, siltstones, and shales, with coal often showing up.

Cadomin Formation

The 1980 Crows Nest Resources crew used a definition of the Cadomin somewhat different than that used by both past coal company workers and the Geological Survey. It was found that by restricting the name to a particular conglomerate within the overall succession, it was possible to divide the question of "the Secus Mountain Conglomerates" into Minnes conglomerates, Cadomin conglomerates, and Gething conglomerates.

The problem has been that if the geologist includes all thick massive conglomerates in the Cadomin, he will have almost no Gething before the Moosebar is encountered. Georgia Hoffman, in her 1979 "Onion Lake Coal Property", states that "the Cadomin is ... unusually thick ... in the Onion Lake area". Also, in regard to the Cadomin-Gething part of the problem, she states "mapping problems ... indicate that a more consistent unit for this area is the Bullhead Group as a whole". The trouble is that if all conglomerates are called Cadomin, then there is very little left to call Gething, and the Gething is what is supposed to be drilled as it contains coal.

(continued)

Crows Nest Resources' crew restricts the name Cadomin to a unit mostly conglomeratic which stands apart in a set of fundamental mapping characteristics from all other conglomerates within the Minnes-Bullhead-Fort St. John succession. The conglomerate must be light-gray weathering, ring hard to the pick, be so tough that the rock breaks off through the pebbles, cobbles, and boulders, rather than around them, and must always form the basic backbone for the whole succession (Minnes to Boulder Creek) in the topography and structure.

In addition, it must contain particular shades of rosey pink, a jade-like green, and a particular smooth, light gray in the constituents. Cadomin sandstones contain these particular colours, within the sand grain sizes. This character of the Cadomin is the same, in the author's view, as he has seen in the Cadomin from the Alberta town of Cadomin north through the coking coal belt as far as the Peace River. It is very like the Cadomin anywhere through the Luscar and McIntyre Mines properties.

(continued)

All section below this unit, including conglomerates, is called Minnes. The conglomerates tend to be less tough, browner in overall aspect, slightly less topographically prominent, and they do not ever contain the pink and green constituents.

The top of the Cadomin is taken at that centimeter where the tough, light-gray, massive conglomerate or sandstone gives way to something softer and browner; it may be a conglomerate or a sandstone, but it will be much browner, pebbles and cobbles can be more easily extracted, and the pick hits with a thud.

Gething Formation

In addition to colour and hardness, Gething conglomerates bear another relation to the Cadomin beds beneath: whatever the average largest constituent size in the Cadomin, the Gething will have similarly large sizes, but always slightly smaller. For example, if the Gething has boulders to 20 cm in length, expect 25 cm in the Cadomin beneath.

Up to half of the Gething at any point along the length of the region can be expected to be conglomerate, occuring in one or more massive, prominent units. Gething cliffs can often be followed for several kilometers at a time.

It would appear that in the stretch covering Five Cabin Creek all the way southeast through Secus, there may be expected to be only two coal zones - an upper and a lower - within the Gething. The crew did not find any place where it seemed there could be room for more than that, and each of these zones probably contains no more than a meter or two each. (The lately-acquired Petro-Canada drill logs from Secus are now known to bear this out.)

The Gething is thus judged to be less prospective at this point, and therefore the first drilling on these properties by Crows Nest Resources will be aimed at the Gates Member of the Commotion, lying some distance above.

Moosebar Formation

The Moosebar Formation is notable mostly because of its very characteristic recessive effect on the topography. It is thicker in the Sukunka area to the northwest, is thinning southwards towards Onion Lake, where it is 30 m, and is thinnest in the Secus area. At Secus the crew used 23 m for the Moosebar in constructing the cross-sections, as the actual marine beds in two complete exposures (complete exposures of the Moosebar are almost unheard of, and warrant special examination anytime) were that thickness. The exposure measured at Onion Lake (in The Gorge) is the only other complete exposure known in the region.

Coal crews through the years have followed "the Moosebar recession" in the topography, and through Crows Nest Resources licences the effect remains.

Commotion Formation

The Commotion Formation is divisible into a coal-bearing Gates Member, a marine Hulcross Member overlying the Gates, and then the Boulder Creek Member, an often-coaly sandstone unit.

(continued)

The Hulcross was found to be almost non-identifiable in the Secus area (it was found near the peak of Mt. Belcourt). A section this high has not been identified in the Onion Lake area, but it is thick at Five Cabin Creek and thickens northwestward.

Mapping was generally stopped in the base of the Boulder Creek, as there is no prospective coal known above the Gates.

Gates Member, Commotion Formation

The Gates Member is perhaps the most consistent in thickness of all the units between Secus Mountain area and Onion Lake; the range appears to be 362 to 435 m. It is composed of alternating sequences of conglomerates, sandstones, siltstones, mudstones, and coal beds. As a general rule the coal seams, while remaining numerous, get uninterestingly thinner towards the top of the member. Individual conglomerate units, while massive and often prominent, are thinner and more well-bedded than Gething and Cadomin conglomerates. The constituents remain the same, but at smaller diameters. The crew found that it could not distinguish between Gates conglomerates individually, but it could generally differentiate them from Gething conglomerates.

Torrens Submember, Gates Member, Commotion Formation

The Torrens Submember consists of an extremely distinctive sandstone occurring at the bottom of the Gates. It is the most prominent unit in the succession besides the Cadomin. Typically, the top five or ten meters of Torrens may be folowed for kilometers at a stretch. The upper unit within the Torrens is a hard gray sandstone, which overlies and is always thinner than the underlying softer brown main part of the unit. The brown sandstones have an extremely distinctive weathering which etches out a particular cross-bedding. The sequence from Moosebar through the Torrens and into the coal above is very reminiscent of the Weary Ridge - Moose Mountain - coal member sequence in southeast British Columbia.

The combination of distinctive topography, distinctive outcrop and distinctive colouring make the Torrens an ideal marker.

Transition Beds, Gates Member, Commotion Formation

The Transition Beds are both part real outcrop and part a notion of conception. The name is applied by the crew to those beds which are "transitional" or "passage" from the marine Moosebar into the terrestial cross-bedded Torrens sandstones above.

They are composed of very evenly-bedded siltstones and very fine sandstones, which grade upwards into the Torrens. The cross-bedding and increased grain sizes appear imperceptibly. Nothing else in the sequence is as evenly bedded.

This unit is quite recessive, and always forms the gentler ground where the Moosebar is rising up to the Torrens prominence above. It is not included in the Moosebar as that name is reserved for the striking moosebar topographic recession.

Gates Coal Zone No. 1, Gates Member, Commotion Formation

Mapping (and the logs of the Petro-Canada holes) shows that the thickest coal in the Gates may be found in the 20 to 30 meters above the Torrens Sandstone. In places the coal lies directly on top of it. Sometimes there is one thick bed (estimated at 14 m at one ridge on Mt. Belcourt); more often there are two or more thinner beds.

No further seam or zone designations have been made above this lowermost No. 1 Zone, as in the 1980 season the crew did not conduct more than a few traverses to describe the Gates to that level of detail. This can be done as drilling and future work progresses. Any drilling will be placed to end in the Torrens, and so the seams above the No. 1 Zone can be catalogued at the same time.

First Gates Conglomerate, Gates Member, Commotion Formation

Very often there is a somewhat prominent Gates conglomerate forming a massive unit above the Coal Zone No. 1. It is often mappable through a kilometer at a time, and forms a convenient top to the recessive coal zone. It has been mapped where appropriate.

Boulder Creek Member, Commotion Formation

The Boulder Creek is a prominent sandstone unit above the Gates. The contact (where the Hulcross is not present) is drawn at the beginning of hard, generally gray-weathering, massive, often pebbly sandstone.

The Boulder Creek can often also be followed through many kilometers, and forms the cap on the mapping. Only once was its top mapped, although often it can be seen from the air to be giving away to Shaftesbury shales.

Geological Structure

The Crows Nest Resources-operated areas in the Five Cabin Creek-Onion Lake-Secus Mountain region of northeastern British Columbia were licenced because of their possibility of containing considerable mileage of the two known prospective formations, the Gething and the Commotion.

The region is approximately 90 km in length. To cover this distance in 64 days of field season, counting all time lost to mobilization and demobilization, weather in a northern Rocky Mountain climate, and incidental losses, the two mapping pairs decided to take a structural approach to the mapping, treating the belt as a whole. This meant acquring actual, measured thickness on the formations and their parts individually. In this manner, drilling with reasonable expectations of being at about the right sites could be planned for the future with no extra effort - the proper positions would become revealed.

Efforts were concentrated in the beginning at traverses across the formations, from Minnes up to Boulder Creek. As the units became clearer, they were extended longitudinally. In this fashion, by chain-measuring selected good exposures across the sequence, and then rapidly following their longitudinal extensions in the topography, the thicknesses for the formations and their parts as expressed in the cross-sections became apparent.

(continued)

There is a natural rhythm apparent in the thickening and thinning of the formations along the belt.

In the latter part of the season, efforts were directed at refining the sections in the lower part of the Gates, so that the excellent Torrens marker can be used as a guide for the Gates Coal Zone No. 1 immediately above it.

Structural Setting

It may appear while examining the 32 structural cross-sections that the geology through the 31 km of Secus Mountain has been over-simplified and drawn as too layer-cake; this is not so. The Wapiti Anticline's west flank is amazingly regular, almost unbelievably so considering that it is part of the inner foothills.

The only major disruption is the Saxon Thrust, but exposure is so good that it does not present a problem.

Along the long southwest side of the property, the Rockies' front-range thrust limits the extent of Cretaceous rock. The crew did not pay quite so much attention to the position of this thrust through all of the 31 km, as through much of it the Boulder Creek forms the cap to the sequence.

Along the long northeastern side of the belt, the Torrens easily defines the most-prospective section of the Gates, and the Moosebar and Cadomin box in the Gething. The Gething can be penetrated in entirety by single holes no deeper than 200 m along its entire length, from Five Cabin Creek through Secus Mountain. The Moosebar recession forms an excellent drill platform.

(continued)

Much of the valley bottom land lining and separating the four major foothills of the Secus area (from the north: Dumb Goat Peak, Mt. Belcourt, Secus Mountain, and Nekik Mountain) hides the sequence, and study of the sections will show considerable space for which there is room for undiscovered structure and variation.

For 1981 Crows Nest Resources has decided to concentrate on three smaller areas in the region. This will allow for examination of these problems in detail. There is certainly much more detail mapping to be done.

On many of the sections, there may be seen no need for further mapping - the space available is filled by known units. On others, however, there is room which must be filled by more section, repeated section, or changing structure.

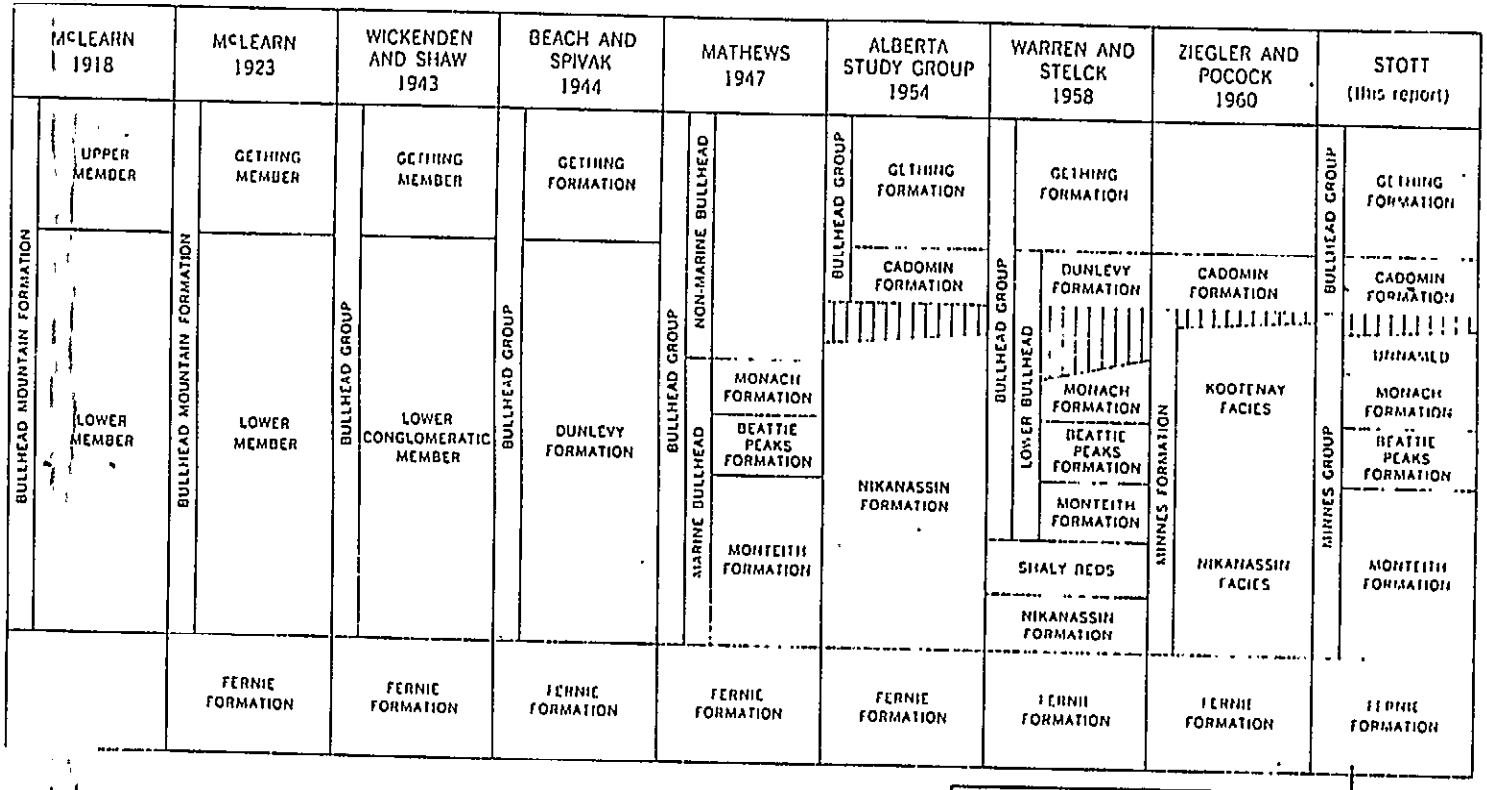
(continued)

Most of the unexplained space the author feels will be found to be taken up by firstly a distorted zone extending about 1 km northeast from the front-range thrust, and secondly by the subtle changes caused by the overall en echelon nature of the entire belt, as shown by the advances and recessions of the front-range thrust nearby.

The Petro-Canada 1:25,000 maps account for the extra space by drawing in single thrusts where necessary. The interpretation presented by the Crows Nest Resources crew accounts for most of it by stating that it is mostly illusory, and the illusion lies in the subtle-by-the-kilometer changes in strike and dip inherent in very large en echelon folds such as the Wapiti Anticline, which runs for over 100 km. This interpretation would account for the flattening and curving seen in the Cadomin on the Narraway River at the south end of Nekik Mountain, and the same feature in the Boulder Creek on the north bank of Belcourt Creek in the 11,000 South - 13,000 South area opposite the south end of Secus Mountain.

FIG. 2

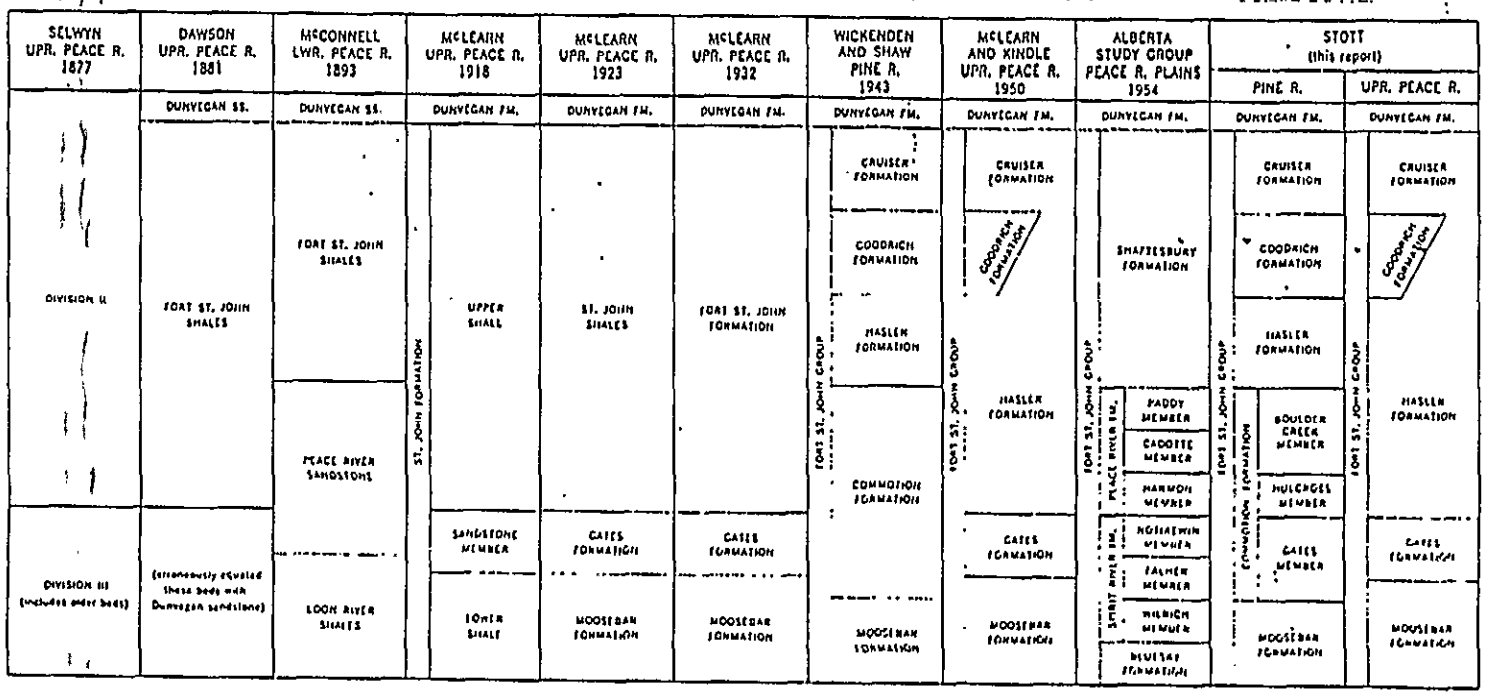
FORMATIONAL DIAGRAM
LOWER CRETACEOUS SERIES
BULLHEAD & MINNES GROUP



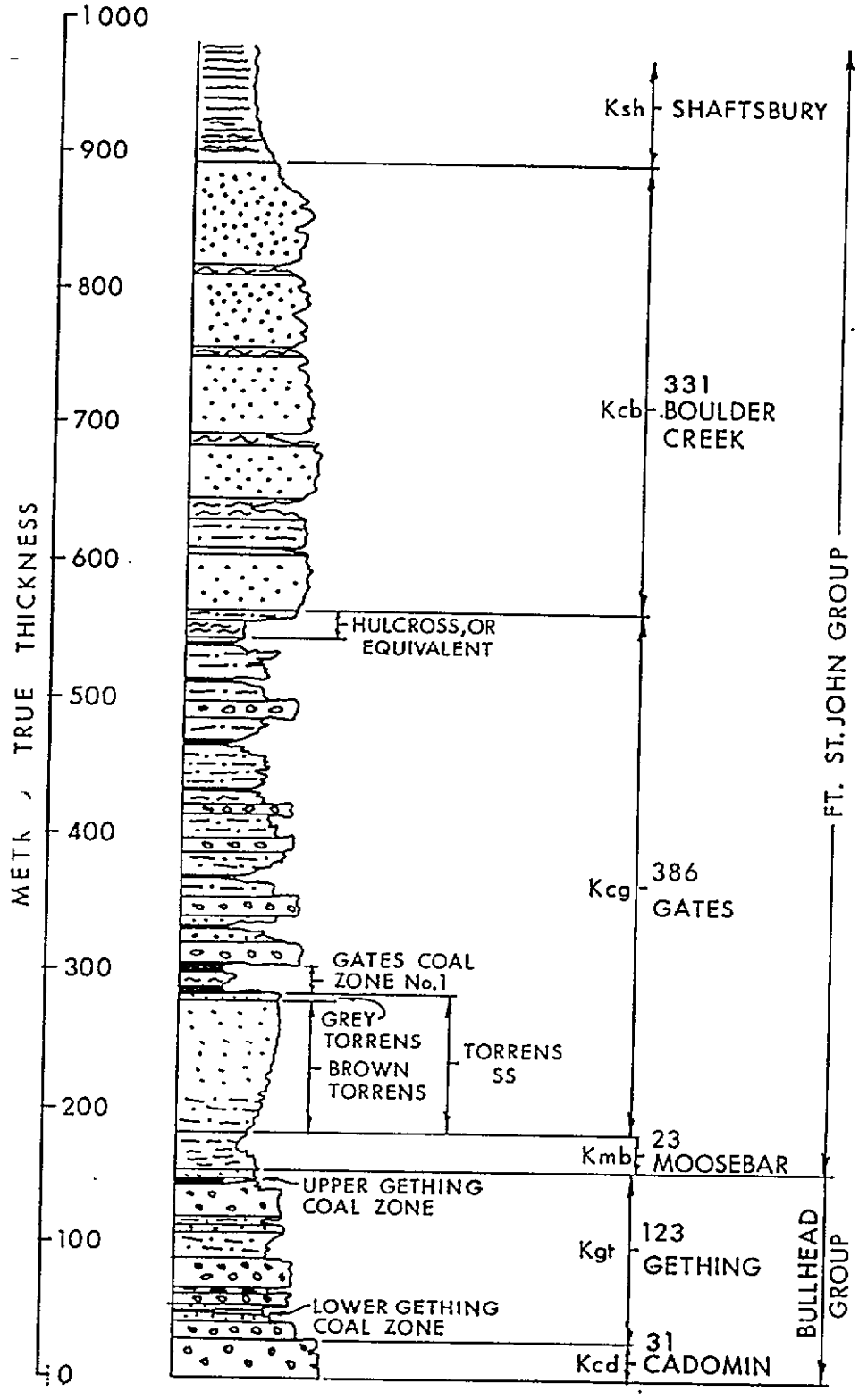
This nomenclature (Stott, Geological Survey of Canada Bulletin 152) is used in this report and on all maps and sections.

FORMATIONAL DIAGRAM
UPPER/LOWER CRETACEOUS SERIES
FORT ST. JOHN GROUP

FIG. 3



This Pine River nomenclature (Stott, Geological Survey of Canada Bulliten 152) is used in this report and on all maps and sections but with the modifications as shown in Fig. 4



Marine : shales, siltstones, some minor sandstone and pebbles ; recessive.

Non-marine : sandstones, minor conglomerates, siltstones, mudstones, sometimes coaly, relatively prominent

Marine shale

Sandstones, conglomerates, siltstones, mudstones, coal. Neither prominent nor recessive.

Sandstone ; particularly prominent and distinctive ; transitional marine to non-marine environment.

Grey marine shale ; very recessive

Non-marine sandstones and conglomerates, minor siltstones, mudstones, coal ; often prominent.

Non-marine massive conglomerates, minor coarse sandstones ; extremely prominent

— COAL

— SHALE

— SANDSTONE

— CONGLOMERATES

— SANDSTONE, SILTSTONE MUDSTONE INTERBEDDED

PR-Secus Mtn 81(2)A *1

Crows Nest Resources Limited
EXPLORATION
N.E. BRITISH COLUMBIA

STRATIGRAPHIC SECTION
FIG. 4

AUTHOR: D.E. BELL | SCALE: 1:5000 | ENCLOSURE No.:
DATE: 61 03 | REVISED: | DRAWING No.: AA-534

STRATIGRAPHIC THICKNESSES BY AREA

UNIT		Kcd	Kgt	Kmb	Kcg	Kbc	Torrens ss*	TOTALS
SECUS MOUNTAIN	7,000 S	31	123	23	386	331	50	894
	000 N/S	77	104	23	396	204	51	804
	4,000 N	SAXON THRUST PLATE: T = Top Plate (Dumb Goat); B = Bottom Plate (Whatley)						
		T 152 B 165	T 260 B 184	T 23 B 23	T 435 B -	T 77 B -	T 43 B 79	T 947 B -
	9,000 N	96	58	23	362	61	64	600
ONION LAKE		36	100	30	Top Missing	Missing	Gray 6.5 Brown 166	-
FIVE CABIN CREEK								

* NOTE: Torrens sandstone figures include Transition Beds

TABLE NO. 2

4.2 1981 Geologic Mapping

The 1981 1:5,000 mapping on Secus Mountain licences was intended to complement and fill in the 1980 mapping. In 1980 Secus Mountain composed 25 licences, and the mapping was spread through these, with much of the actual mapping outside the licences altogether. During 1981, the mapping was concentrated within the thirteen licences of the reduced area, divided into three separate properties.

Less than half of the planned mapping was carried out, as 1981 has been the driest, warmest summer on record in northeastern British Columbia, and forest closures prevented both traversing and helicopter operation. The mapping that was done, however, was intended to fill in the most critical areas. The closure started shortly after the start of mapping, and the crew was able to plan short traverses in advance for the month of August.

The following pages contain mapping up-dated from the 1980 report, separately for each block. On the following page is the Abbreviations Legend for the maps and sections, both 1980 and 1981; it was too large to include on the sheets.

TABLE 3

ABBREVIATIONS LEGEND
GEOLOGICAL BASE MAPS
SCALE 1:5 000

1.	Sizes	cm	centimeters true thickness
		m	meters true thickness
2.	Lithologic Types	cg, cgs	conglomerate, -s
		md	mudstone
		sh	shale
		slt	siltstone
		ss	sandstone
		qzt	quartzite, -itic
3.	Grain Sizes	bld, blds	boulder, -s
		cb, cbs	cobble, -s
		pb, pbs	pebble, -s
		cs	coarse-grained sandstone
		ms	medium-grained sandstone
		fs	fine-grained sandstone
		vfs	very fine-grained sandstone
4.	Bed Thickness	fiss	fissile
		flgy	flaggy
		msv	massive
		plty	platey
4.	Bedding	bd, bds	bed, -s
		intbd	interbedded
		x-bd	cross-bedded
5.	Colours	blk	black
		brn	brown
		grn	green
		gry	gray
		rsty	rusty
		lt	light
		drk	dark
6.	Miscellaneous	otc, otcs	outcrop, -s
		occ	occasional
		mnr	minor
		cov	covered
		rcv	recessive
		res	resistant
		hd	hard
		ovln	overlain
		unln	underlain
		wth,wthg	weathers, weathering

4.2.1 South Secus Block Geologic Mapping

The South Secus block is located on the southwest lower slopes of Secus Mountain, and spreads west across the valley floor past Belcourt Creek and a short way up the east slopes of the opposing front range Rocky Mountains. The topography is subdued and at very low elevation, compared to that around.

The north side of the block has its shape formed by the Petro-Canada licences and the same is partially true for the east and south sides. The remainder of the licence boundary depends upon the positions of the *Commotion and Gething Formations*, as established in the 1980 1:5,000 mapping.

1981 drillhole SC81-1 (Secus 1981-1) was drilled in this block, and encountered stratigraphy and structure as expected. 1980 Section 13,000 South, in the appendices of this report, has been up-dated for this 1981 report. The drill hole was projected onto the plane of the section using the sterographically-determined average strike of the 1980 Secus Stereographic Block, and its altitude is the final survey calculation. The directional survey has controlled the dip and direction of the hole as drawn.

Mapping was done in almost all of the six South Secus licences. The maps G-10 and H-10, up-dated for this work from the 1980 report, are included in this report. The mapping was intended to investigate several problems, minor to the overall scale of the licences, but directed to particular structural questions.

Firstly, the 1981 Crows Nest Geologist, Gary Cox, established the existence and position of the front-range thrust on the western side of licence 4209. It had been placed by aerial view on the map in 1980 by the author, and it had been located in 1980 in licences 4206 and what is now the new licence 7019. Its position for at least one point, with bedding attitudes, was desired to confirm the northwestern limit of prospective section, important in future planning, as the slopes become increasingly rugged up Muinok Mountain.

Second, traverses were carried out in the vicinity of the drill hole, and a last-minute adjustment made to its site before slashing. The position of the First Gates Conglomerate has been added to the 1980 work and the match between topography and stratigraphic unit, vague from 1980, was resolved for licence 4208.

Third, several Cadomin outcrops were located and measured in licences 4204 and 4205. Perhaps the most fundamental geologic structural feature of the South Secus block is the bend that the formations take to the east in these licences, as they move from Secus Mountain on the northeast side to Nekik Mountian beyond the southeast side. Accounting for this bend, and the impact it has on the mostly covered positon of the formations in the broad, swampy valley between the two mountains, has been a major problem to workers in the past. It was cause for some of the missed-formation drilling done in the past by Pacific Petroleums, and the missing of its target section by Petro-Canada in its two 1981 drill holes (Nekik Block, no.s MND-17 and 18). The results of these have been shared with Crows Nest, and they are complementary to the drilling and geology as established for South Secus.

The locating and mapping of these Cadomin outcrops show them to be within the 200 m tolerance of the 1980 mapping, and so they have been drawn on the 1980 map G-10 without re-drafting of the map and sections. They now form a reliable guide for drilling in licences 4204, 4205, and the northwest half of 4206.

Fourth, cross-country traverses were carried out in licences 4206, 4209 and 7019 in an attempt to find outcrop not visible in the heavy forest from the air. The intention was to find outcroping ledges of prominent units, in order to determine bedding attitudes and, if possible, identities, as there is increasing structural complication known to occur as the western, thrust-created boundary of the geology is approached. No considerable amount of outcrop was found, but that mapped shows general agreement with the maps and sections.

4.2.2 Belcourt Creek Block Geologic Mapping

The Belcourt Creek block is composed of two coal licences, covering ground along both banks of the low swampy Belcourt Creek at the northwest lower most slope of Secus Mountain. The licence boundaries are determined on their northwest and southeast by Petro-Canada boundaries of adjacent licences, and on their northeast and southwest by the line of the formations.

Belcourt Creek block was not picked for drilling in 1981, for several reasons. The geologic control was relatively the strongest of the three blocks. The block, at two licences, is smallest in size. Older 1976 and 1978 Pacific Petroleums drill holes in the region nearby confirm the stratigraphic and structural model of the 1980 maps and sections. The results of the two holes drilled on the other two blocks in 1981 are broadly applicable to the Commotion section available in the licences.

As 1981 mapping was shortened in duration and length by forest closure due to fire danger, no further mapping on the licences was done in 1981. It is felt that the stratigraphy and structure in the licences is

known to a degree more accurate than many parts of the other two blocks, even at the end of 1981. Mapping time was therefore directed to the other blocks.

Future work could include a drill hole into the Commotion without further mapping. Approximately one week of detail 1:5,000 mapping would be required to visit all outcrop in the licences not yet mapped.

4.2.3 Dumb Goat Block Geologic Mapping

The Dumb Goat Block is named after Dumb Goat Peak, the large inner foothill, similar in size to Secus Mountain and Mount Belcourt to the south, on which part of the licences are located.

Topographically and structurally it is necessary to sub-divide the block into two parts, as each part has a distinct setting. Whatley Creek is used as the dividing line between the two. Licence 4219 and the south half of 4743 are located on ground covering both upper and lower slopes of Dumb Goat Peak. Licences 4745, 4744, and 4743 west and north of Whatley Creek are located on the lowermost east-facing slopes of the unnamed front range Rocky Mountain opposed to the west. In a general sense, the character of the "dip-slope", the colloquial name for that part of the coal belt, has been lost, as the licences are situated on the west side of the valley.

In addition, the ground north and west of Whatley Creek enters new structure, based on proximity to the front-range thrust. This area was not mapped in 1980, as the topographic base was unavailable.

The ground south and east of Whatley Creek is termed Dumb Goat, and the ground north and west is termed Whatley.

Licence 4219, the major part of the Dumb Goat area, is placed to fill in a corner of the line of Petro-Canada licences on the north, east, and south. 1980 mapping showed that the licence covered an intrusion into the formations covering from Boulder Creek down through Commotion, Moosebar, Gething, and into Cadomin. 1980 hand-trenching close to the licence uncovered several seams of 4 to 5 m.

As the structure is very regular and the 1981 drillhole confirmed the stratigraphy of the 1980 maps and sections, no further mapping was carried out on the upper slopes of the Dumb Goat area. The appropriate 1981 1:5,000 map and section, J-14 and 4,000 North, have been up-dated for 1981, but no basic change is made to the sheets. The drill hole altitude is the final survey altitude. The hole was projected onto the plane of the section using the altitude and the average strike for the Dumb Goat sterographic study block, as outlined in the 1980 report. The dip and bearing of the hole are as reported in the down-hole geophysical directional survey.

The 1981 Crows Nest geologist, G. Cox, directed much of his traversing in the closure-shortened season within the Whatley area. As this area was unmapped in 1980, the general objective was to bring its mapping up to the level of the remainder of Secus Mountain. This was not fully accomplished in the time available, but a significant amount was done.

Firstly, the formations were extended across Whatley Creek, from south and east bank (Dumb Goat area) to the north and west bank. This was not done in 1980 due to the lack of the base and when it was known the base would be available in 1981. It was conceptually important to establish that the formations did enter the area, as the characteristic topographic forms are missing in the new northeast-facing location. Elsewhere along the dip-slope the topographic dips are to the west, and the various units acquire characteristic topographic forms.

Second, the position of the front range thrust was established on Whatley Creek in southwest licence 4743. This permits a westward extent to the prospective ground to be drawn northwards into northwest 4743 and 4744.

Third, several of the ridge-forming units crossing from Dumb Goat into Whatley were followed northwest across the creek and up into 4743, establishing a definite extent in this direction.

1980 maps K-14 and 15 are included in this report, up-dated for 1981 with the mapping of G. Cox. He has also drawn this new geology on the appropriate 1980 sections (the 1980 grid covered this ground, even though it was unmapped).

Spanning the distance across Whatley Creek, this mapping interprets a repetition of the prospective section, yielding two sections total, and the newly-named Whatley Thrust, separating section between the Saxon Thrust on the east and the Whatley Thrust from section between the Whatley Thrust and the Front-Range Thrust on the west.

To the north through 4743 and on into 4744 and 4745, the additions to the maps and sections are to be regarded as interpretational only. Scarcity of outcrop will continue to be a problem in this direction.

Approximately three weeks by one mapping pair would be required to bring the Whatley area up to the stratigraphic and structural standards now in the maps and sections for the rest of the Secus Mountain licences. The basic need is to outline more precisely the ground underlain by the Bullhead and Fort St. Groups so that drilling can be planned. This should be done in advance of drilling.

Further mapping and hand-trenching may be continued in the Dumb Goat area, but future drilling needs no more data to be planned to an accuracy of 25 m down-hole (the 1981 Dumb Goat drill hole DG81-1 was 12 m in error using the top of the Torrens Sandstone as a target).

4.3 1981 Stereographic Analysis

As the Whatley area of the Dumb Goat block was not mapped on scale of 1:5,000 in 1980, and as the area contains a structural setting differing from the remainder of the block, scatter diagrams and contour plots were run using Golder Associates' program "Stereo".

The bedding attitudes mapped by G. Cox in the Whatley area were run in three sets.

The first, WTWTTOP (Whatley Area Whatley Thrust Top Plate), consists of attitudes above the Whatley Thrust and below the front range thrust. Average strike is calculated by the program to be 325 degrees. All dips are southwesterly.

The second, WTSXTOP (Whatley Area Saxon Thrust Top Plate), consists of attitudes below the Whatley Thrust and above the Saxon Thrust, which forms the eastern edge to the prospective section. Average strike is 331, 06 degrees more northerly than in the Whatley plate above. Again all dips are southwesterly.

The third set, WTSXTOP AND WTWTTOP, is a combination of the other two. Average strike is 327, average dip is 49 degrees southwesterly.

The grid baseline for Secus Mountain is 326 degrees, and so the Whatley area average of 327 degrees is very close. Average dip for the 1980 stereographic Dumb Goat area was 41 degrees and strike was 313 degrees. Therefore it is possible to state that, as the majority of the attitudes were collected along Whatley Creek, the mostly-hidden structural setting is steepening slightly (from 41 to 48 degrees) and changing direction slightly to the north (from 313 to 327 degrees).

Whether or not the Whatley Thrust exists will remain moot until future mapping; it needs to be established somewhere north of its presently singly-known location on the creek itself.

The six scatter diagrams and contour plots are reproduced on following pages. The averages ("mean vector") are printed in the lower left of the scatter diagrams.

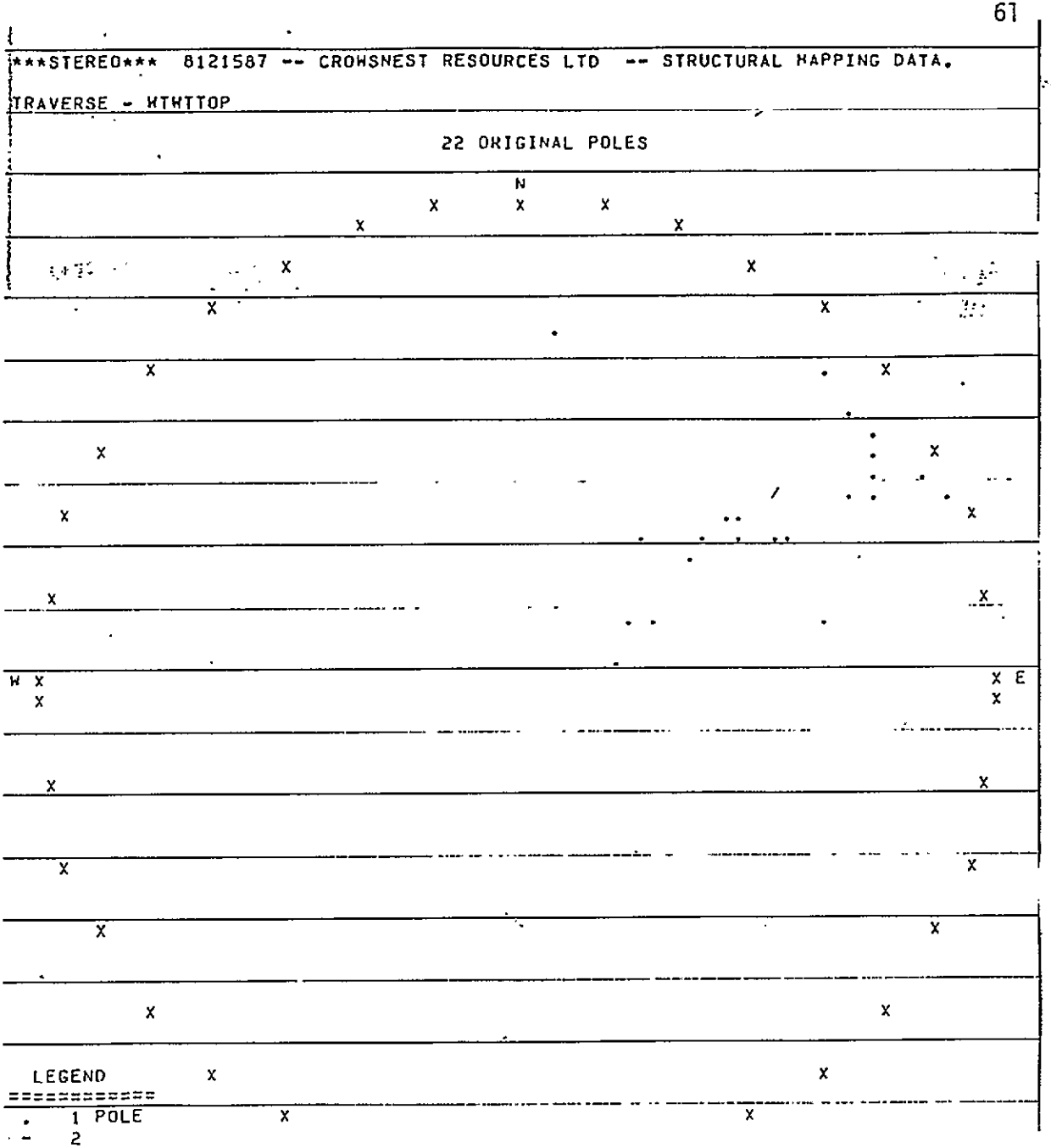
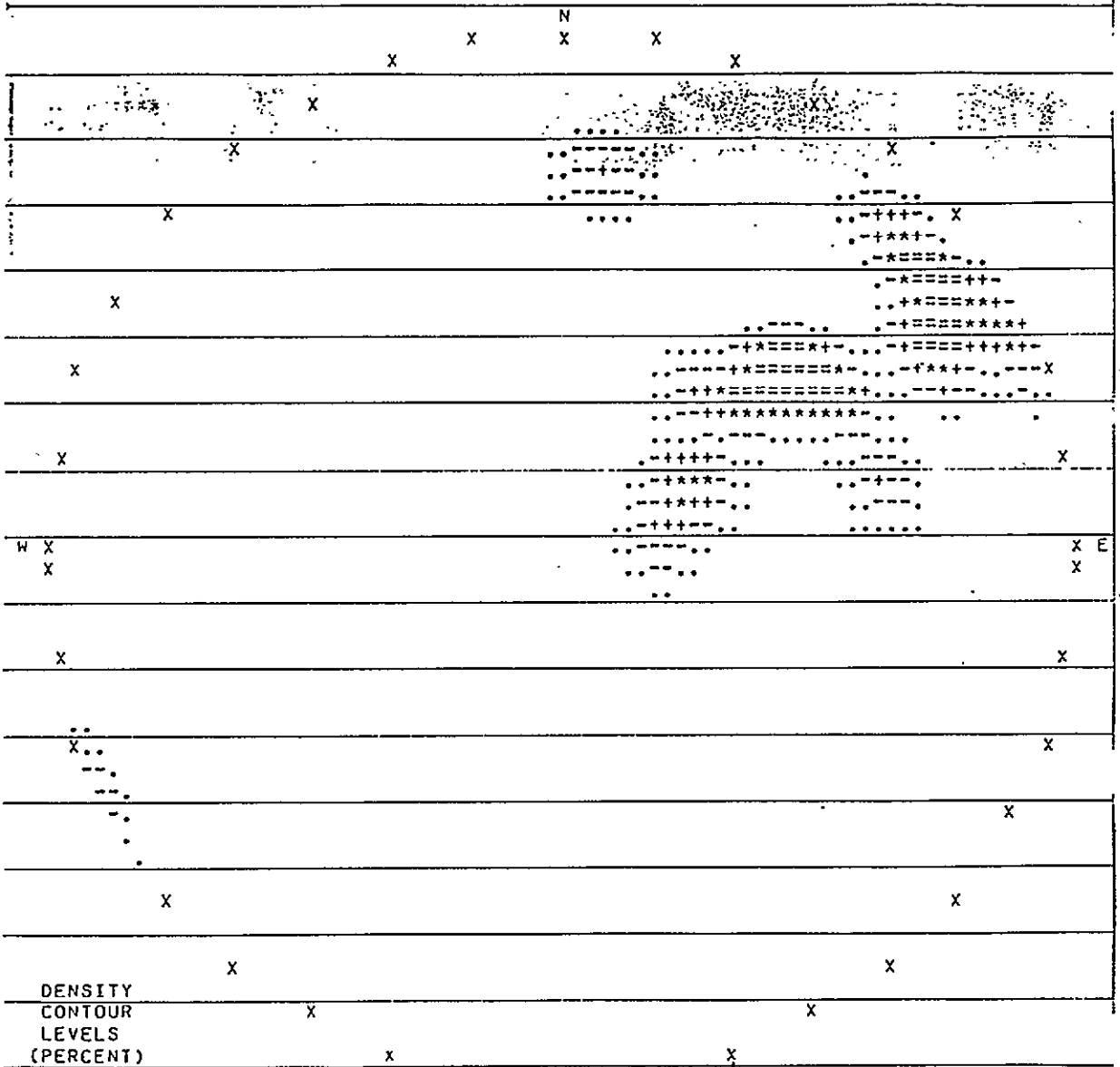

STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.
TRAVERSE - WTHTTOP
22 ORIGINAL POLES
N
W
E
LEGEND
1 POLE
2
3
4
5,6,7,8,9
10,11,...
MEAN VECTOR = 55.88/ 234.46
SCATTER DIAGRAM
LOWER HEMISPHERE
EQUAL AREA PROJECTION
WHATLEY THRUST, TOP PLATE

FIG. 5

STEREO, 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.

TRAVERSE - WTWTTOP

22 ORIGINAL POLES



DENSITY CONTOUR LEVELS (PERCENT)

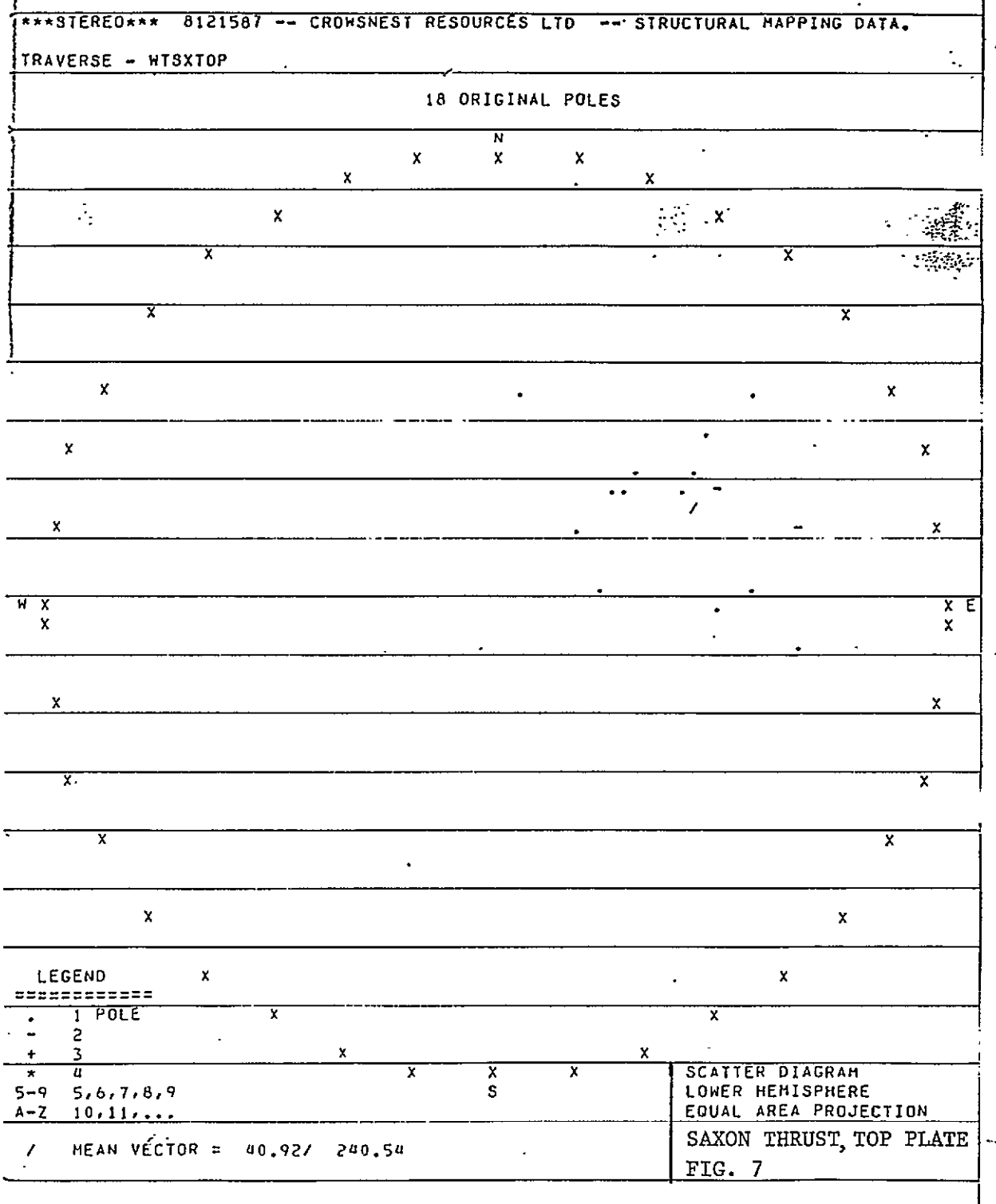
1 5 10 15 20 MAX
. - + * =

MAXIMUM DENSITY = 33.63 PERCENT

CONTOUR PLOT
LOWER HEMISPHERE
EQUAL AREA PROJECTION

WHATLEYTHRUST, TOP PLATE

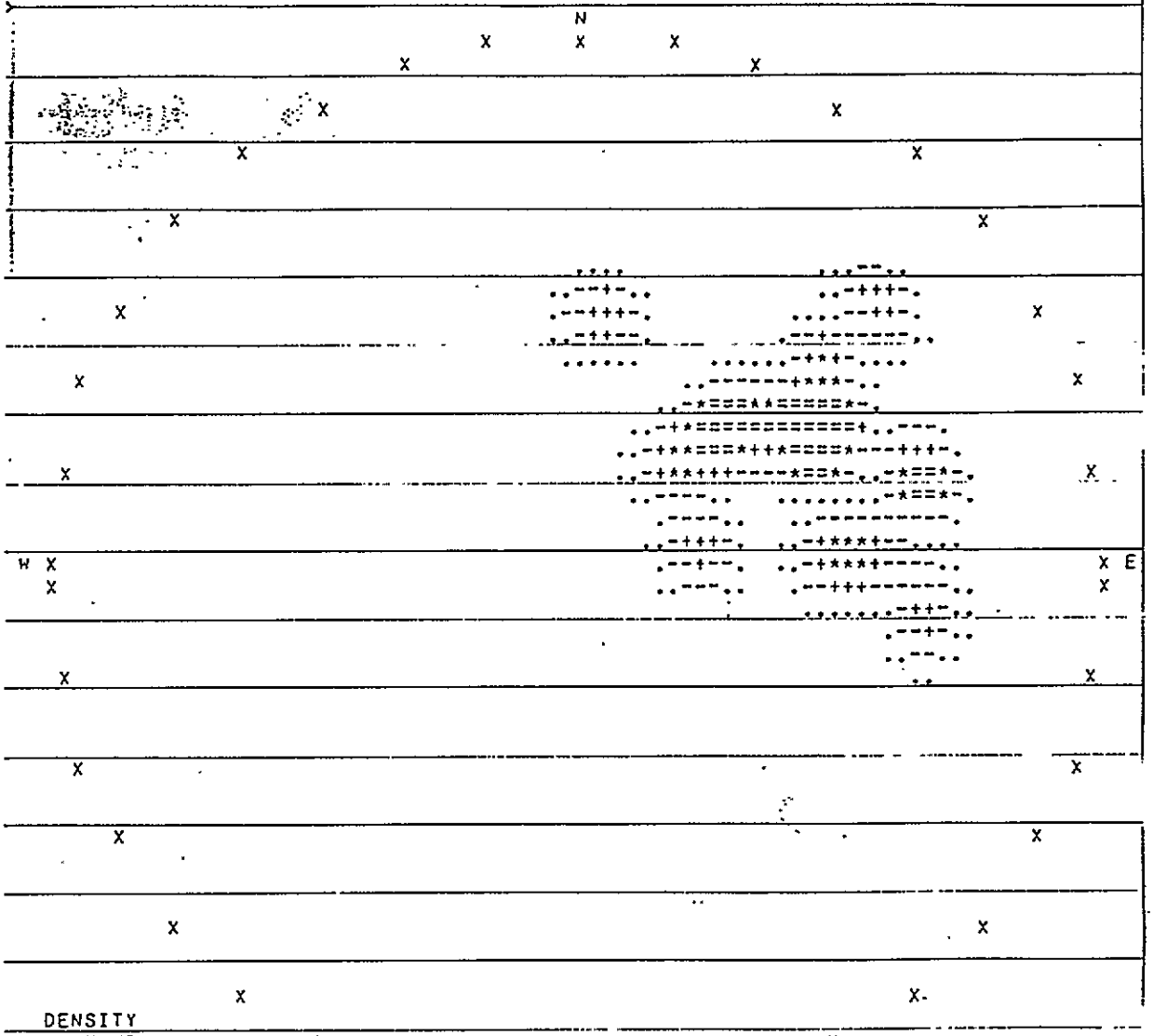
FIG. 6


STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.
TRAVERSE - WTSXTOP
18 ORIGINAL POLES
N
W
E
LEGEND
1 POLE
2
3
4
5-9 5,6,7,8,9
A-Z 10,11,...
/ MEAN VECTOR = 40.92/ 240.54
SCATTER DIAGRAM
LOWER HEMISPHERE
EQUAL AREA PROJECTION
SAXON THRUST, TOP PLATE
FIG. 7

STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.

TRAVERSE - HTSXTOP

18 ORIGINAL POLES



DENSITY CONTOUR LEVELS (PERCENT)

1 5 10 15 20 MAX

. - + * =

MAXIMUM DENSITY = 49.29 PERCENT

CONTOUR PLOT
LOWER HEMISPHERE
EQUAL AREA PROJECTION

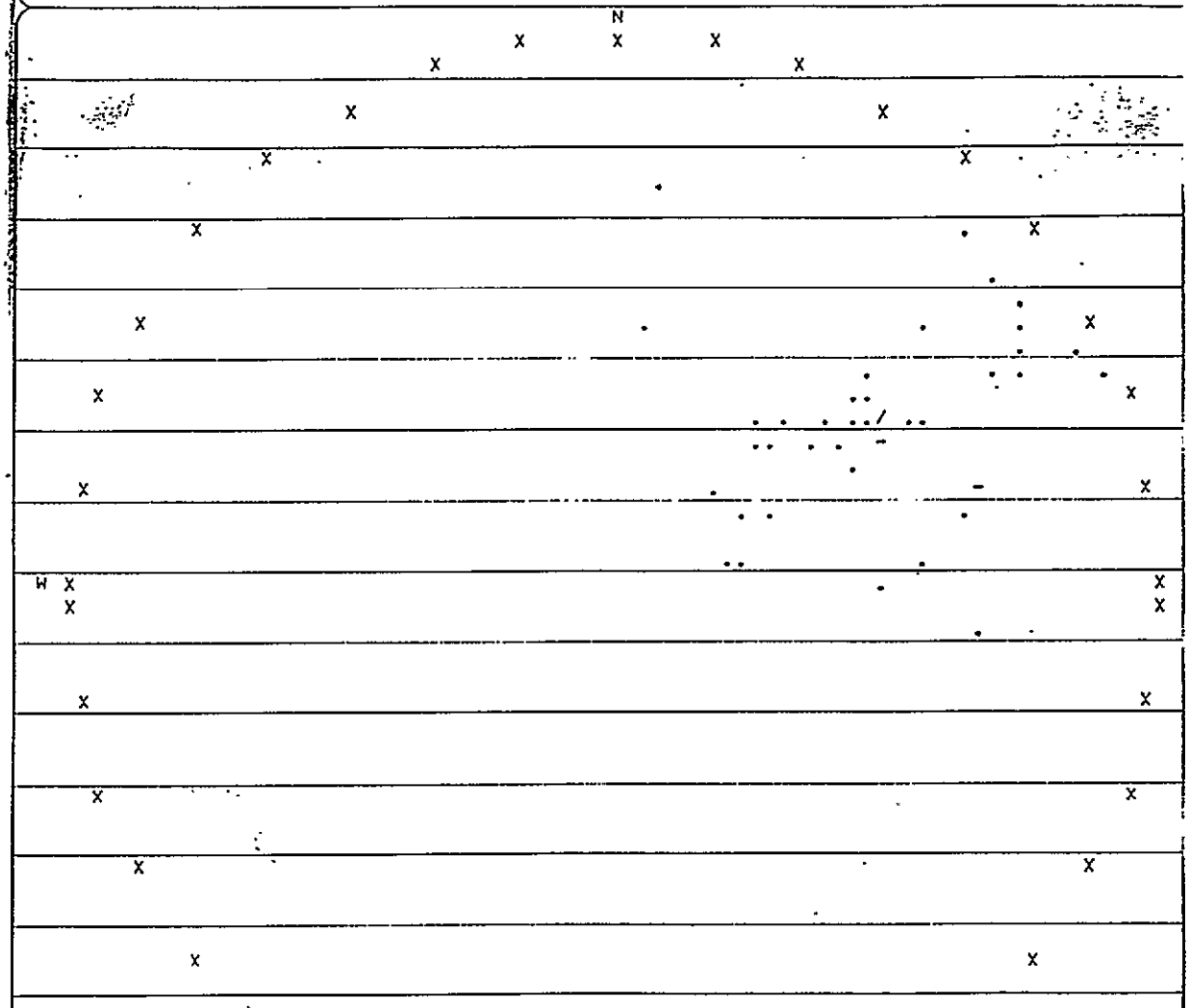
SAXON THRUST, TOP PLATE

FIG. 8

STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.

TRAVERSES - WTSXTOP AND WTWTTOP

40 ORIGINAL POLES



LEGEND

.	1	POLE
-	2	
+	3	
*	4	
5-9	5,6,7,8,9	
A-Z	10,11,...	
/	MEAN VECTOR = 48.97/ 236.90	

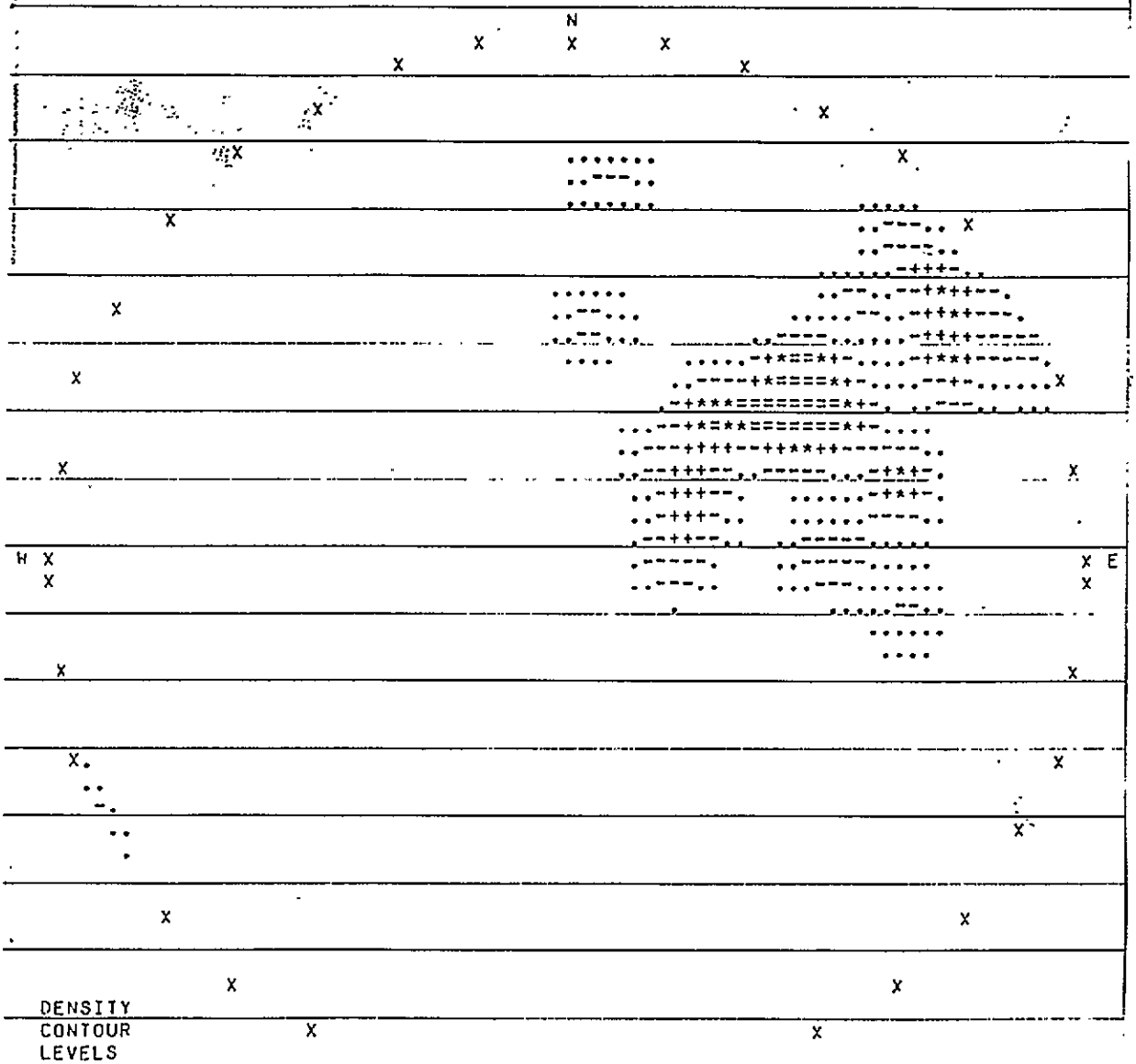
SCATTER DIAGRAM
LOWER HEMISPHERE
EQUAL AREA PROJECTION

WHATLEY BLOCK, ALL ATTITUDES. FIG. 9

STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.

TRAVERSES -- HTSXTOP AND HTWTTOP

40 ORIGINAL POLES



DENSITY CONTOUR LEVELS (PERCENT)

1 5 10 15 20 MAX

. - + * =

MAXIMUM DENSITY = 33.15 PERCENT

CONTOUR PLOT
LOWER HEMISPHERE
EQUAL AREA PROJECTION

WHATLEY BLOCK, ALL ATTITUDES. FIG. 10

5.0 1981 DRILL PROGRAM

Crows Nest Resources drilled two NQ diamond drill holes on the Secus Mountain property in 1981 as part of a four-hole series. The other two holes were drilled at Onion Lake and Five Cabin Creek. General hole data are tabulated for the series ("General Drill Hole Data 1981") Table No. 4.

One Secus Mountain hole (SC81-1) was drilled in the South Secus block at the southwest corner of Secus Mountain itself. This hole was situated to penetrate the Gates Member of the Commotion Formation in the section above the Torrens Sandstone. The Torrens was found at 145.5 m, 6.5 m higher than anticipated.

The other hole (DG81-1) was drilled in the Dumb Goat block on the west slope of Dumb Goat Peak. This hole was situated to penetrate the same section of Gates Member above the Torrens Sandstone as in SC81-1. The Torrens was found at 213.0 m, 13.0 m deeper than anticipated.

TABLE NO. 4

GENERAL DRILLHOLE DATA 1981

Secus Mountain, Onion Lake and Five Cabin Creek

Note: All four holes drilled by Mid-West Drilling using two Boyles Brothers lightweight helicopter-transportable NQ-3 diamond drill rigs.

	Drill Hole and Area			
	South Secus	Dumb Goat	Onion Lake	Five Cabin Creek
Total depth (m)	194	257	236	241
Bearing (true degrees)	059	051	049	227
Dip (degrees from horizontal)	69	64	57	57
Casing depth (m)	6.1	7.9	6.1	3.0
Altitude (m)	1,323.66	1,689.69	1,580.29	1,752.81
	Depth to top of Torrrens Sandstone			
Projection (m)	152.0	200.0	210.0	210.0
Actual (m)	145.5	213.0	183.6	209.9
Error (m)	-6.5	+13.0	-26.4	-0.1

Water for the South Secus hole was pumped from a year-round stream 150 m distant and presented no problem. Water for the Dumb Goat hole was pumped up from the intermittent small stream on the north side of the ridge, a distance of 300 m. A route was cut to the smaller stream on the south side of the ridge, in case the flow on the first route proved inadequate, but it was not needed.

The South Secus site was located in thick timber on a gentle south slope. The Dumb Goat hole was also located in thick timber, on sharp minor ridge running down the west slope of the mountain. This made for relatively easy approach and departure by helicopter.

There is no road or trail access to either block. Both holes were totally helicopter-supported, using a Hughes 500D, a Bell 212 and a Bell 205.

Both holes were abandoned by cementing from their bottoms to the surface. Cutting, slashing, and burning have been completed to the satisfaction of local forestry personnel. No site work remains to be done.

5.1 Geophysical Logging

Roke Oil Enterprises Ltd. of Calgary used a helicopter-transportable geophysical logging unit for the two 1981 Secus Mountain drill holes. The total load was approximately 550 kg and was slung in two trips by the Hughes 500D helicopter used for the drilling.

The log suite for both Secus Mountain holes consisted of gamma-neutron, gamma-sidewall densilog (L.S.D.)-caliper, 20 cm focused beam, and directional survey.

All logs were completed to hole; there was no appreciable wash-in of the sidewall rock. There were no delays or undue problems in the logging operation.

5.1.1 Gamma-Neutron

These logs were run with the drill crew maintaining the fluid level at surface and rods in the holes to their bottoms, to avoid the possibility of the holes collapsing or partially in-filling upon string withdrawal. It makes little difference in the gamma-neutron if the log is run through the rods. By running the gamma-neutron first before withdrawal of the string, and subsequently running the other logs open hole, it is assured that at least a gamma and a neutron will be obtained for the complete hole. For consistent interpretation, gamma-neutron must be run in fluid and not air, and so the water level was maintained with pumps at surface.

On the logs coal beds have been drafted down the left side of the depth tracks, based on interpretation of the gamma-neuton alone. As a following step, the same coal bed interpretations were drafted from the density logs down the right side of the same depth track, traced on a light table. The general effect is that coal thicknesses are slightly reduced on density logs, a normal occurrence as density provides better detail. At this beginning level of exploration, however, no attempt was made to resolve interpretations smaller than approximately 20 cm. Thin coal beds are shown by a dashed line running across the depth track; they also have been traced through from the density logs.

5.1.2 Gamma-Sidewall Densilog (L.S.D.)-Caliper

These three logs were run on the same depth tracks. Detail sections of thicker coal beds were logged on an expanded scale of 20:1. These logs follow the density logs on the same sheets. The Dumb Goat caliper log shows one wash-in of coal and partings from 43 m to 45 m; otherwise, the holes were clean and held up well.

5.1.3 *Focused Beam*

The Focused Beam runs logged all coal beds. The water level in the South Secus hole was at 6.5 m and in the Dumb Goat hole was 32.5 m. In both cases the first (highest) coal beds occur beneath these depths. Detail sections of the thicker coal beds on an expanded scale of 20:1 were logged in separate runs presented on the same sheets as the logs.

5.1.4 Directional Survey

The South Secus hole commenced at a dip of 69 degrees from the horizontal and steepened to 71 degrees. Its bearing commenced at 061 degrees true and decreased to 059 degrees. A bearing of 061 had been planned, as that is the average up-dip direction for the 1980 mapping block of Secus as determined in the 1980 stereographic analysis. The decrease of two degrees at the hole's bottom means a correction for the strike component of apparentness in thickness of the beds of less than one-tenth of one per cent and so may be disregarded.

The Dumb Goat hole commenced at a dip of 71 degrees from the horizontal, and flattened to 68 degrees. Its bearing started at 054 degrees true and lessened to 048 degrees. A bearing of 052 had been planned, as that is the average up-direction for the 1980 mapping block of Belcourt as determined in the 1980 stereographic analysis. As with the South Secus hole, there is therefore no significant correction for apparent thickness of the strike component to be made.

5.2 Diamond Drill Core Logging

Core from the two 1981 Secus Mountain drill holes was examined briefly on the drill sites, then stacked while geophysical logging and cementing was completed. As short (75 cm) core boxes were being used at the direction of the B.C. Ministry of Energy, Mines, and Petroleum Resources, they were brought back to base camp by the small service helicopter eight to ten at a time for detail examination using Petro-Canada's facilities. This avoided the possibility of losing core being slung and thus having to log the core on site. Also, several further thousands of dollars of increased helicopter time transporting the core logging geologist back and forth were avoided.

The core logs show that recoveries were generally very satisfactory. There has been no problem in correlating among the geophysical logs, surface outcrop, and core logs.

Coal core samples were sent to the Crows Nest Resources' Fernie laboratory for analysis.

Remaining core was sent to the provincial core storage facility in Charlie Lake, B.C., as the province decided to include it in its collection of core from relatively unknown areas.

5.3 Strip Logs

Geologist's strip logs of the two 1981 Secus Mountain drill holes have been prepared at a vertical scale of 200:1 (appendices) from the core logs. Bedding-to-core angles are printed down the right side of the depth track. Angles measured in the core agree in essence with those used in planning. There is no evidence of important structural complication in either hole, based upon examination of both angles and lithologies.

Small differences in depths to beds between strip and geophysical logs are due to interpretation and the fact that core, from which the strip logs were made, inevitably involves drilling loss, as recorded in the core logs.

5.3.1 SC81-1

Thicknesses of the beds in this hole are calculated to be apparent by 12 degrees; therefore each thickness must be multiplied by a factor of 0.98 for true thickness.

5.4 Drill Hole Surveying

The 1981 Secus Mountain drill holes were surveyed by a Petro-Canada crew contracted from Grande Prairie, Alberta. Hole locations are shown on Maps G-10 and J-14.

5.3.2 DG81-1

Satisfactory mapping control and stereographic study in 1980 showed that the average dip of the beds in this hole could be expected to be 41 degrees. This meant that a drill angle of 49 degrees from horizontal would have eliminated apparentness in thickness. The drillers, however, experienced difficulties earlier in the season drilling with an angle less than 70 degrees.

The geophysical directional survey shows that the hole commenced at a dip of 71 degrees and lessened to 68 degrees at its bottom. If 70 degrees is used as average, the apparent angle becomes 21 degrees, which results in a factor of 0.93 to be used in determining true thickness.

6.0 1980 Hand Trench Sample Analyses

Several field days in 1980 were devoted to hand-trenching outcropping Commotion coal seams on Mt. Belcourt and Dumb Goat Peak. These seams, or their lateral equivalents, are typical of those expected within Crows Nest licences. In addition, an analysis is included of three seams sampled in 1979 by G.Hoffman in Minnes section within a 1980 Crows Nest licence since dropped.

No hand-trenching was done in 1981. The analyses of the following pages compose complete hand trench data to date.

6.1 Dumb Goat Peak Analyses

Three seams were trenched on an exposed ridge on Dumb Goat Peak. They extend down directly north into Crows Nest ground. Their locations were measured by 50-m chain in order to place them as accurately as possible on the 1:5,000 scale. The map sheet, J-14, is included in this report in the appendices.

6.1.1 Hand Trench DG-1

This seam was marked as "less than 4 m" on the 1980 map. It consists of 3.55 m true thickness coal with no parting except one of 2 cm in the upper half metre. Hanging wall and footwall are mudstone.

6.1.2 Hand Trench DG-2

The seam is located directly upon top of the grey Torrens Sandstone, which is the footwall. It is a 4.50 m seam with no obvious partings. The outcrop is dull, oxidized, and featureless. It is the thickest seam of the First Gates coal zone in this area.

6.1.3 Hand Trench DG-3

This seam correlates directly to the 6.5 m true thickness seam drilled near the top of 1981 drill hole DG81-1 situated to the north of the trench in Crows Nest ground. In outcrop the seam is dull, oxidized, chippy, and featureless coal with two major partings.

5.76

Coal, 2.70 m

3.06

Sh, 0.36 m

2.70

Coal, 0.53 m

2.17

Sh, 0.35 m

1.82

Coal, 1.82 m

0.00

Coal totals 5.05 m. Parting is 0.71 m. Hanging wall is mudstone. Footwall is interbedded soft sandstone, siltstone, and mudstone.

6.2 Mt. Belcourt Analyses

Two seams were hand-trenched on the northeast ridge of Mt. Belcourt, approximately midway between Dumb Goat and Belcourt Creek blocks. They are located on the 1:5,000 map I-13 included in the appendices of this report.

6.2.1 Hand Trench BEL-1

The seam was trenched and logged by the 1980 Crows Nest Geologist, A. White, who also trenched the other two Mt. Belcourt trenches. Located in the First Gates coal zone, it uncovered a single seam of 14.66 m true thickness above the grey Torrens, its immediate footwall. There were no partings. This seam correlates to the 4.50 m seam trenched on top of the Torrens in Dumb Goat trench no. 2, previously described. In the Dumb Goat 1981 drill hole this seam is absent and it is 20 cm in the South Secus hole.

6.2.2 Hand Trench BEL-2

This trench is located higher in the section, exposing a seam 6.26 m in thickness, containing a 50 cm parting from 5.29 to 5.79 above the base, leaving a total coal thickness of 5.76 m.

6.2.3 Hand Trench BEL-3

This trench was located on the southeast ridge of Mt. Belcourt, where the topography is not as suitable for trenching as on the northeast ridge.

The top 2.70 m of a seam was uncovered, under 5 to 10 m of brown sandstone underlying the base of the first Gates conglomerate. The continuation towards the base of the seam became too deep to follow in the time available. This is the third trench in the first Gates coal zone, the other two being BEL-1 and DG-2.

6.3 1979 South Secus Analyses

During the 1979 geologic program of preliminary mapping, G. Hoffman, trenched three Minnes coal seams on a northwest subsidiary ridge of Secus Mountain. The section containing these seams on 1980 Crows Nest ground has been dropped for 1981. 1980 1:5,000 map sheet H-12 is included in the appendices of this report, with location of the trenching plotted. – not on this report but H-12 on 1980 report.

The location of the trenches is listed in feet measured beneath the Cadomin; this should be the same Cadomin base used for the 1980 1:5,000 maps and sections in the vicinity.

7.0 1981 CORE SAMPLES

The coal core samples taken during the core logging of the two 1981 Secus Mountain holes SC81-1 and DG81-1 have been submitted to the Crows Nest Resources' Fernie, B.C. laboratory for analysis. Results are not available at this time of report, but they will be reported in the next Secus Mountain report, as the 1980 results have been reported in this 1981 report.

In general, core recovery was satisfactory and the drillers encountered no undue problems.

8.0 RECOMMENDATIONS

December, 1981 marks the end of a two year exploration program on previously un-mapped and wilderness Secus Mountain coal licences. Stratigraphy and structure have been established, and two drillholes have been completed into the most prospective section, yielding coal seams to 6.5 m.

Future work may be divided into three blocks which now compose the project. There is yet the uppper half of the Gates Member coal-bearing zone to drill from sites which may be situated directly down-dip and west from the 1981 sites. In addition, drilling may extend the same units along strike within both blocks.

The Belcourt Creek block is at yet undrilled. A complete Gates Member section exists in the licences, but it is of small extent.

Gething Formation is also available for drilling on all three blocks, but it remains relatively less prospective due to no known coal thicker than 1 to 2 m.

Considerably more 1:5,000 fill-in mapping may be done. The large topographic area of Secus Mountain project through 1980 and 1981 has meant that mapping has been planned to define broad dimensions with only minor emphasis on detailed section. Whatley area within Dumb Goat block needs in particular considerably more mapping.

Hand-trenching would be of value only in the Dumb Goat Block, within Dumb Goat area itself, to trench the thicker seams found in the 1981 Dumb Goat drill hole and the 1980 Dumb Goat hand trenches.

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