PR · MT. Reesor 81(1)A

Crows Nest Resources LIMITED
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December 30, 1981

Ministry of Energy, Mines and Petroleum Resources
British Columbia

Enclosed please find our report on the Mount Reesor Project

Mr. Dennis E. Bell planned and supervised the 1981 geological field program on Mount Reesor 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 preperation 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.

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

Yours very truly,

R.D. Gilchrist, P. Geol.
Senior Geologist

BG/nmd

MOUNT REESOR

COAL EXPLORATION

- 1981 -

Coal Licences 4472 and 4473 Licences dropped

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

Crows Nest Resources Limited

Peace River Land District, Northeast British Columbia

National Topographic Series 93P/3W Bullmoose Creek

Latitude and Longitude 55 Degrees 04 Minutes North

121 Degrees 26 1/4 Minutes West

Consultant and Author Dennis E. Bell, P. Geol. (Alberta)

Max Air Exploration Limited

P.O. Box 878

Jasper, AB T0E 1E0

Field Work July and August, 1981

Submission Date December 31, 1981

4/CFa.1

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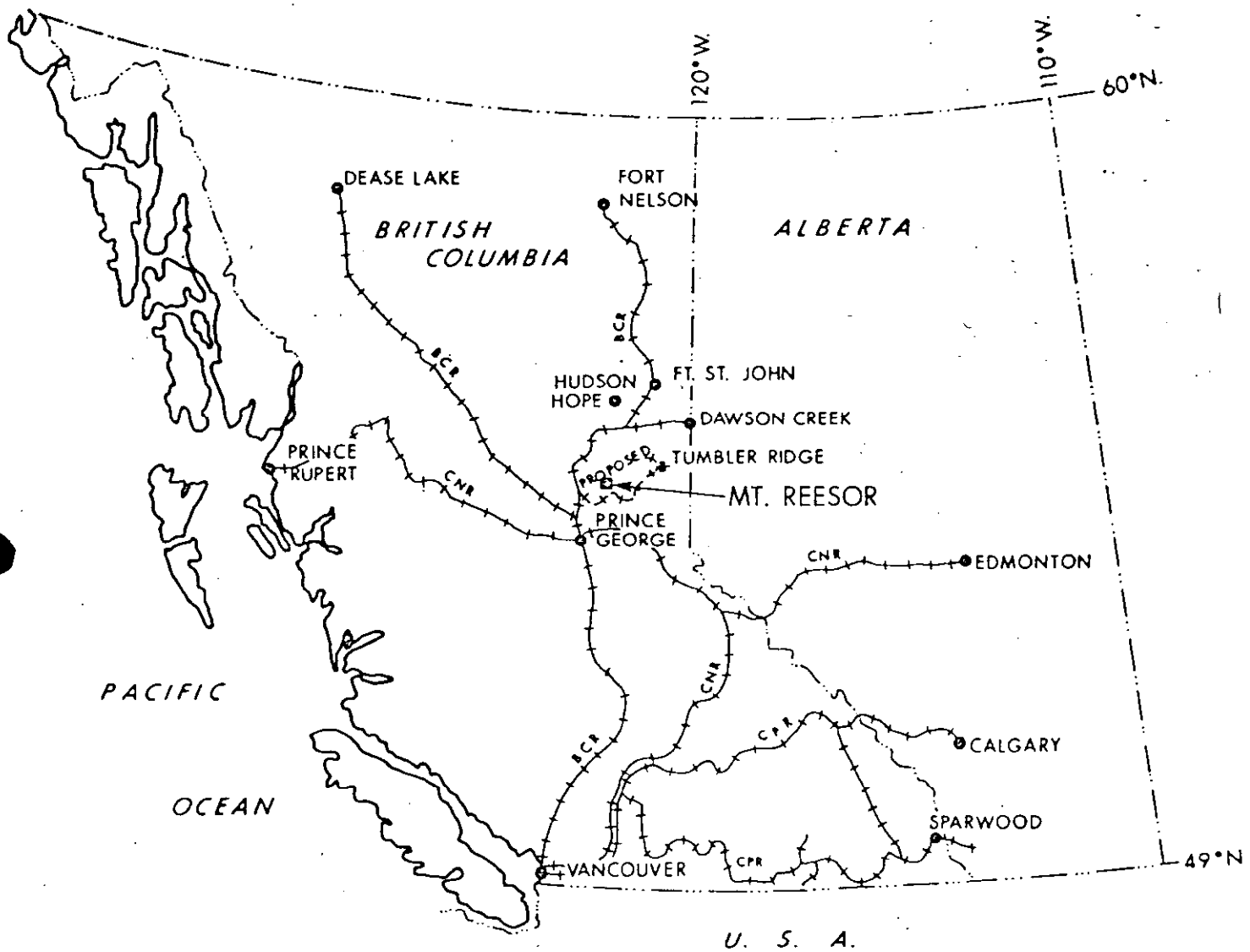


Crows Nest Resources Limited

EXPLORATION

MT. REESOR

NE BC

LOCATION MAP

FIGURE 1

AUTHOR: D. BELL	SCALE: N.T.S.	ENCLOSURE No:
DATE: 81-11-24	REVISED:	DRAWING No: AA-760
To Accompany		

1.0 SUMMARY

During the field season of 1981, Crows Nest Resources Limited conducted a surface geologic mapping program on the two coal licences composing Mount Reesor, northeastern British Columbia. The area is named after Mount Reesor, 2043 m (6,703 feet), which has its peak within the licences. Expenditures on the project, totally helicopter-supported, was $14,022.

Helicopter inspection shows that much of the area of interest is above treeline, erosion has outlined a relatively flat-bottomed syncline approximately 1 km in width and 1 1/2 km in length, left behind as an erosional remnant to form Mt. Reesor. The whole of the prospective Gething Formation is contained within the syncline, but significant thickness of the coal-bearing part of the Gates Member of the Commotion Formation above the Gething is missing.

Mount Reesor is located between Bullmoose Creek and the Wolverine River, 5 km north of the proposed Wolverine rail line which will service proposed coal mining in the area.

As the region has not yet been mapped on a 1:50,000 scale by the Geological Survey of Canada, the general purpose of the mapping was to map the existence and extent of the formations within the licences. Particular objectives were to establish a site for a first drill hole,

based upon measured thicknesses of the formations, and to establish lithologic and structural frameworks for the property.

There is no road or trail access to Mt. Reesor. Future work will have to be totally helicopter-supported, from the road and rail access presently being constructed along the Wolverine. The new town of Tumbler Ridge will be 25 km east by air.

The mapping was done at a scale of 1:25,000, on a blown-up 1:50,000 topographic base. Stereographic analysis of the bedding attitudes has established the structural orientation and parameters of the main syncline. A grid on the base map has been created, and a structural cross section at a scale of 1:25,000 on this grid has been prepared.

Mt. Reesor is now ready for drilling and trenching of the 200 m of Gething Formation contained within the area. The mapping located a partially-exposed coal seam slightly greater than 1 m in thickness near the top of the formation. Beyond the main syncline the licences contain complexly-folded undifferentiated Minnes Group sediments, which themselves may be prospective for coal.

2.0 INTRODUCTION

2.1 Coal Land Tenure

Two licences, 4472 and 4473, 594 ha total, compose Mt. Reesor. The project is named after Mount Reesor, which has its peak within licence 4472.

The following table entitled "B.C. Coal Licences Tenure Standing, Mt. Reesor" gives details of tenure.

TABLE 1

CROWS NEST RESOURCES LIMITED (Exploration)

B.C. COAL LICENCES — BLOCK: MOUNT REESOR — PROJECT: — YEAR: 1981

TENURE STANDING — GROUP: NOT GROUPED — MOUNT REESOR — DATE: DECEMBER 1981

LICENCE			ACQ/ADM		RENTALS		REQUIREMENT WORK						BUDGET		EXP	POTL	REMARKS
NO.	LEGAL DESCRIPTION	AREA TOTAL AC/HA.	FEES YEAR	FEES $	ANNUAL $	TOTAL TO NEXT ANN. $ 10^3	EXPIRED CURRENT YEAR $ 10^3	LIC. YEAR	$	PRE-FULFILMENT YEAR	$	ANNIVERSARY DATE	CURRENT YEAR AFE	$ 10^3	TOTAL $ 10^3	SHELL CLASS.	
2 LIC		594	78	40	2,970.	8.9	19.3	4	14,850		6,597	DECEMBER 29	-	-	34.7	Y	THE LICENCES ARE
	NTS 93-P-3-D																IN GOOD STANDING
4472	65,66,75,76	297															ON DECEMBER 29,
4473	85,86,95,96	297															1981. THE EXCESS
																	CREDIT IS $11.11
																	FOR THE NEXT TERM
				WORK DONE	1979	1980	1981										
				$	8,639	-	14,022										
			*	CASH IN LIEU	-	3,241.	-										

BA - 312

2.2 Location, Geography, and Physiography

Mt. Reesor is composed of two contiguous coal licences covering a north-south rectangular area of 3.2 km by 1.6 km.

Some location descriptions are:

1) covering the peak and western slopes of Mt. Reesor, 2,043 m, an inner foothill of the Rocky Mountain' Foothills Belt in northeastern British Columbia.
2) Centered about latitude 55 degrees, 04 minutes north and longitude 121 degrees, 26 1/4 minutes west.
3) 160 km west from Grande Prairie, Alberta.
4) 105 km southwest from Dawson Creek, British Columbia.
5) 70 km south-southeast from Chetwynd, British Columbia.
6) 150 km northeast from Prince George, British Columbia.
7) 25 km west from the new town of Tumbler Ridge, British Columbia.

Relief varies from 1325 m (4350 ft.) on the northwestern edge of licence 4473 to Mount Reesor's peak at 2043 m (6703 ft.) in the northeastern corner of licence 4472, a total of 718 m (2356 ft.). The drop to Bullmoose Creek on the northwest is only 45 m to 1280 m (4200 ft.). On the south the drop to the future rail line along the Wolverine is approximately 945 m (3100 ft.) from mid-Gething

Formation at 1829 m (6,000 ft.) to the Wolverine at 884 m (2,900 ft.). For a haul route on the east side of the unnamed creek running in this direction the distance is approximately seven to eight kilometres, meaning a grade of approximately 100-125 m per km, or 10 to 12 1/2%.

The two Mt. Reesor licenses lie across a major northeast-southwest ridge line, the high point of which is the peak. Most of the Crows Nest-controlled Gething Formation within the two licenses lies under the northwest-facing slope of this ridge, the opposite side to the rail line to the south. Denison Mines has the remainder of the Gething on the southeast-facing slope of the ridge.

2.3 Access

The 1981 mapping program on Mt. Reesor was serviced totally by a Hughes 500D helicopter, based at the Petro-Canada Monkman coal camp 53 km to the southeast, where the crew boarded for the season. There is no road or trail access to the licences at present.

Future road access to the license could come up Bullmoose Creek from the north. The present rail construction in the Wolverine River Valley to the south, however, means that good gravel access up this river from the outer foothills is at hand. In addition, the town of Tumbler Ridge, now being constructed, is only 30 km downstream to the east from the closest rail point to the licences.

Distance by air to Chetwynd is only 70 km, and so future helicopter-supported work could be serviced from this base, along with other Crows Nest work occurring in the Pine Pass-Sukunka region.

2.4 Environment

Mt. Reesor has the harsh climate through much of the year characteristic of the Rockies of northeastern British Columbia. Snow can be expected over much of the ground until May.

The two Mt. Reesor licences cover ground mostly above treeline, and classified by the province as sensitive alpine. As the licences cover ground which is situated athwart a high ridge, any future mining operations would encounter relatively high winds and changeable weather conditions.

The closest rail point on the new line along the Wolverine to the south is at a relatively low 884 m (2,900 ft.). Average atmospheric temperature gradient means an average annual temperature difference of 6 degrees Celsius (10 1/2 degrees F) between the mining and rail levels.

Overall, the general climate on the Mt. Reesor licences would be similar to that expected at Denison's proposed Quintette operations.

3.0 WORK DONE

3.1 Summary of Previous Work

Previous work on the Mt. Reesor licences by Crows Nest Resources consists of a small amount of geological mapping by Georgia Hoffman. This was done in August, 1979, on a 1:50,000 scale, and described in her report, "1979 Geological Report, Mt. Reesor Coal Property," dated March 27, 1980.

This 1979 mapping described basic stratigraphy and structure, and established the presence of the prospective Gething Formation. Several thinner coal seams in differing locations were identified.

The 1979 mapping was qualitative, however, done as reconnaissance. No strikes, dips, or other geologic measurements were reported, and unit thicknesses are approximate only.

3.2 Scope and Objectlive of 1981 Exploration

The 1981 mapping program on Mt. Reesor was designed to duplicate the 1979 mapping by Georgia Hoffman, at a slower pace and in more detail, by chaining traverses and recording strikes, dips, and other detail of a quantitative nature in order to flesh out the 1979 work.

Further mapping by chain and compass was intended to expand the geologic base, and to qualify the structural setting. Hand-trenching was planned.

Finally, an objective of an "immediate" sense was to establish a first or several drill sites, determining in the process their targets, positions, and depths.

3.3 Work Done in 1981

The summer of 1981 has been the driest, warmest summer since the keeping of records in northeastern British Columbia. Forest travel bans due to the fire hazard prevented mapping on the ground except during the morning period of each day.

The mapping was abbreviated, therefore, and only a partial conclusion of the objectives was reached.

The 1979 mapping was partially duplicated, this time on a 1:25,000 base and including strikes, dips, and measured sections. Mapping was not, however, expanded from the main ridge line over the peak. Sufficient data was gathered to quantify the position and partially the nature of the major structural features. Two drill sites were established for the Gething Formation.

A geologic map at a scale of 1:25,000 has been prepared. Bedding attitudes were analyzed stereographically and a geologic grid established on paper, designed to provide the best cross section orientation and structural analysis. Major formations, units, and structures have been outlined partially by chain and compass and partially by helicopter. This provides quantitative control for drill and trench planning, and structure location. An up-date 1:50,000 geologic compilation has been prepared. A 1:25,000 cross section which incorporates the proposed drill sites has been prepared.

3.4 Costs of Work Done in 1981

Detailed costs of the 1981 Mt. Reesor geologic program are contained in the Application to Extend Term of Licence on the following pages.

Total cost of the 1981 program was $14,022.

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). 4472 & 4473

TWO LICENCES, 594 HECTARES

for a further period of one year.

2. Property name MT. REESOR, 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 29th, 19 81, work to the value of at least $ 14,022.00 on the location of coal licence(s) as follows:

CATEGORY OF WORK	Licence(s) No(s).	Apportioned Cost
Geological mapping	4472, 4473	13,682.00
Surveys: Geophysical	-	-
Geochemical	-	-
Other	-	-
Road construction	-	-
Surface work	-	-
Underground work	-	-
Drilling	-	-
Logging, sampling, and testing	-	-
Reclamation	-	-
Other work (specify)	-	-
Off-property costs	GEOLOGICAL REPORT	340.00

5. I wish to apply $ 14,022.00 of this value of work on Coal Licence(s) No(s). 4472, 4473

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 THE GEOLOGICAL REPORT WILL BE SUBMITTED IN 90 DAYS

DECEMBER 21, 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	350	1:25,000	25 MAN DAYS
	Underground			
*Other (specify)				
			Total Cost	$ 13,682.00

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				
	Wireline				
Rotary:	Conventional				
	Reverse circulation				
*Other (specify)					

Contractor
Where is the core stored?

Total Cost $

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)						

OTHER WORK (specify details)

	Cost
GEOLOGICAL REPORT	340.00

Total Cost $ 340.00
On-property costs 13,682.00
Off-property costs 340.00
Total Expenditures $14,022.00

Dec 22nd 81
(Date)

(Signature)

MANAGER ACCOUNTING - CNRL
(Position)

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

4.0 GEOLOGY

4.1 Regional Geology

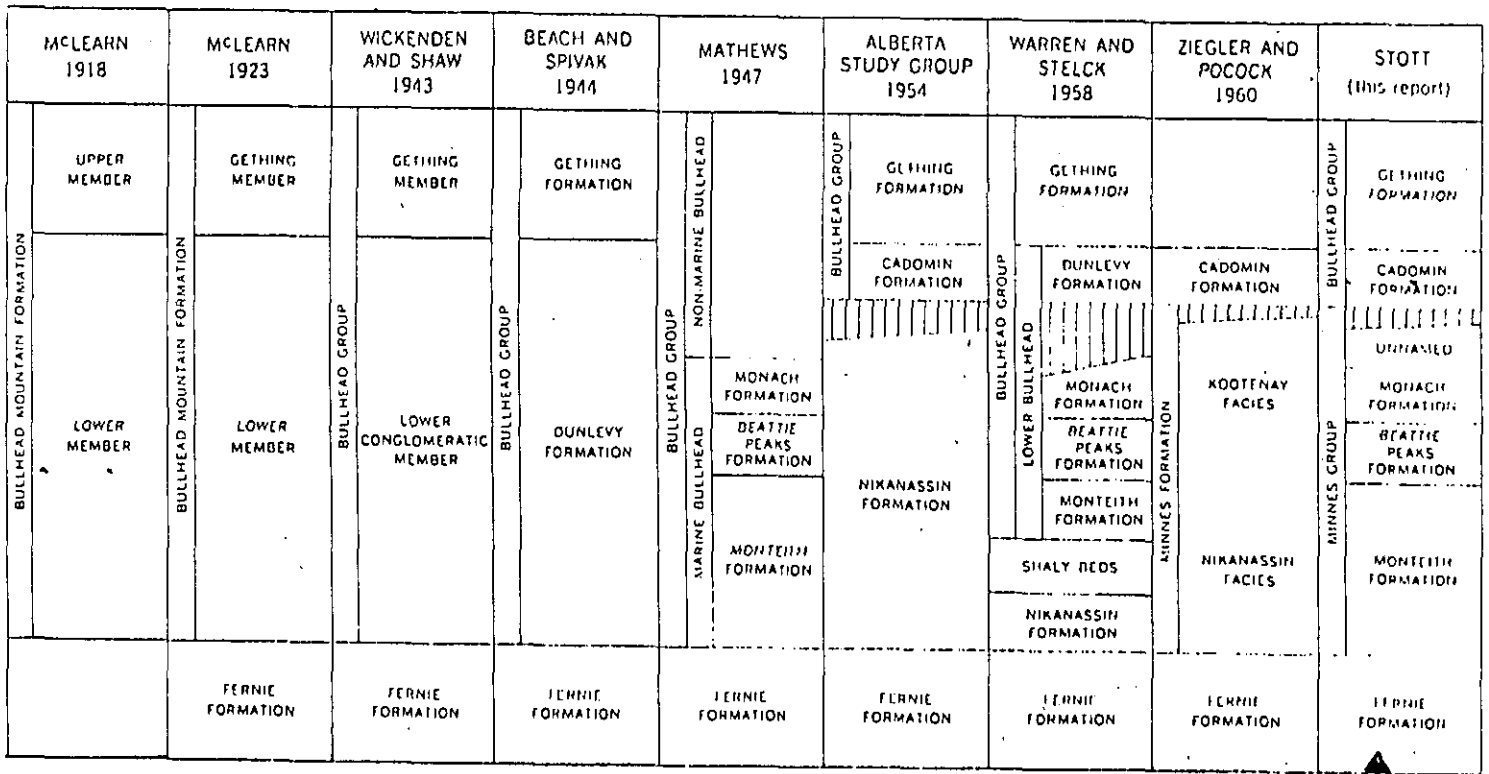
The nomenclature used in this report is the same as that used by the author in 1980 reports on Five Cabin Creek, Onion Lake, and Secus Mountain licences to the southeast along the coal belt. The formational diagrams of the next two pages outline this nomenclature. Its author is Stott (Geological Survey of Canada Bulletin 152).

As the Mt. Reesor mapping consisted of only a week's mapping with the days shortened by fire bans, and as the geology can be matched to the nomenclature commonly in use in that part of the coal belt, no attempt is made here to outline regional geology in further detail.

The two accepted most prospective formations, the Commotion of the Ft. St. John Group and the Gething of the Bullhead Group, are present within the licenses, although the small extent and thickness of the Commotion precludes it from further exploration. In addition, there is a structurally-confused thickness of pre-Gething section which is presently being explored by other companies elsewhere in the region and which contains known thin coal seams.

FORMATIONAL DIAGRAM
LOWER CRETACEOUS SERIES
BULLHEAD & MINNES GROUP

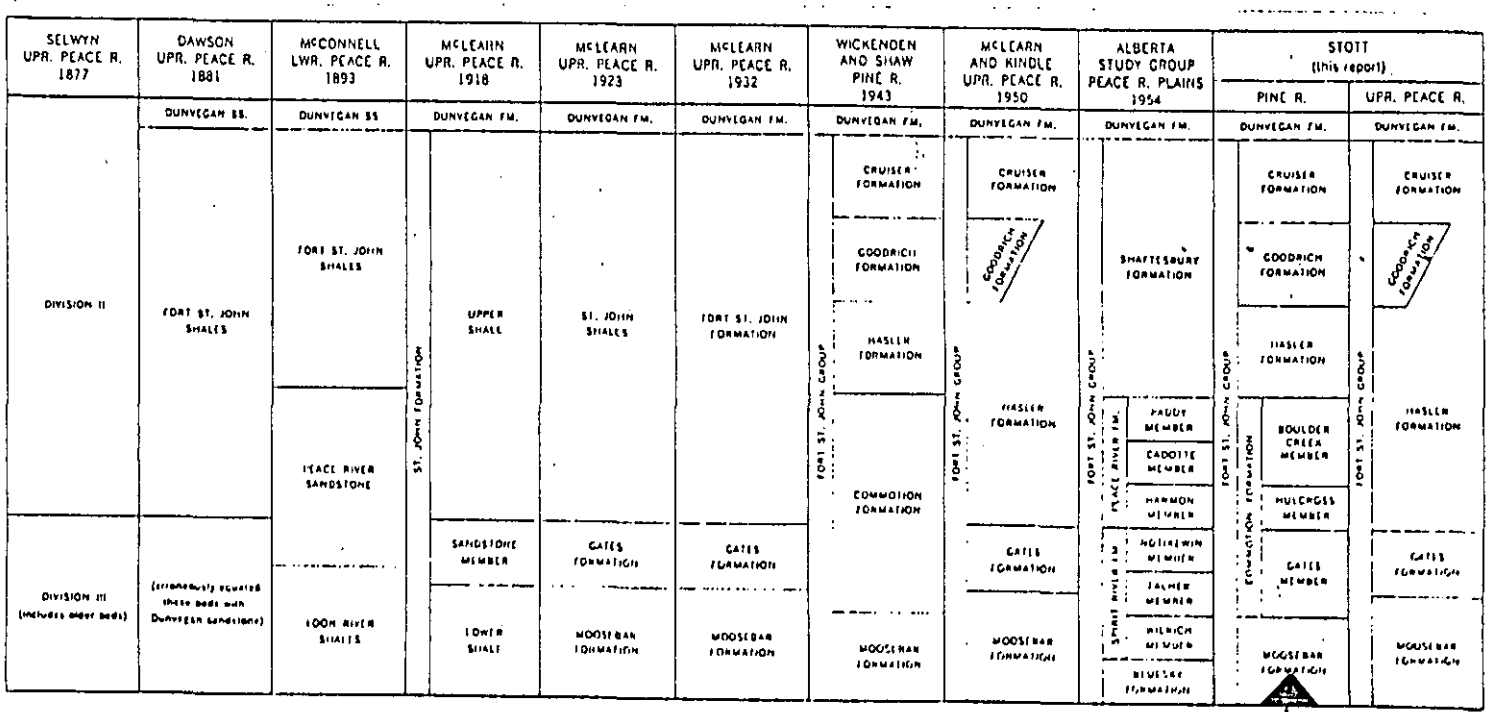
FIG. NO. 2



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. NO. 3



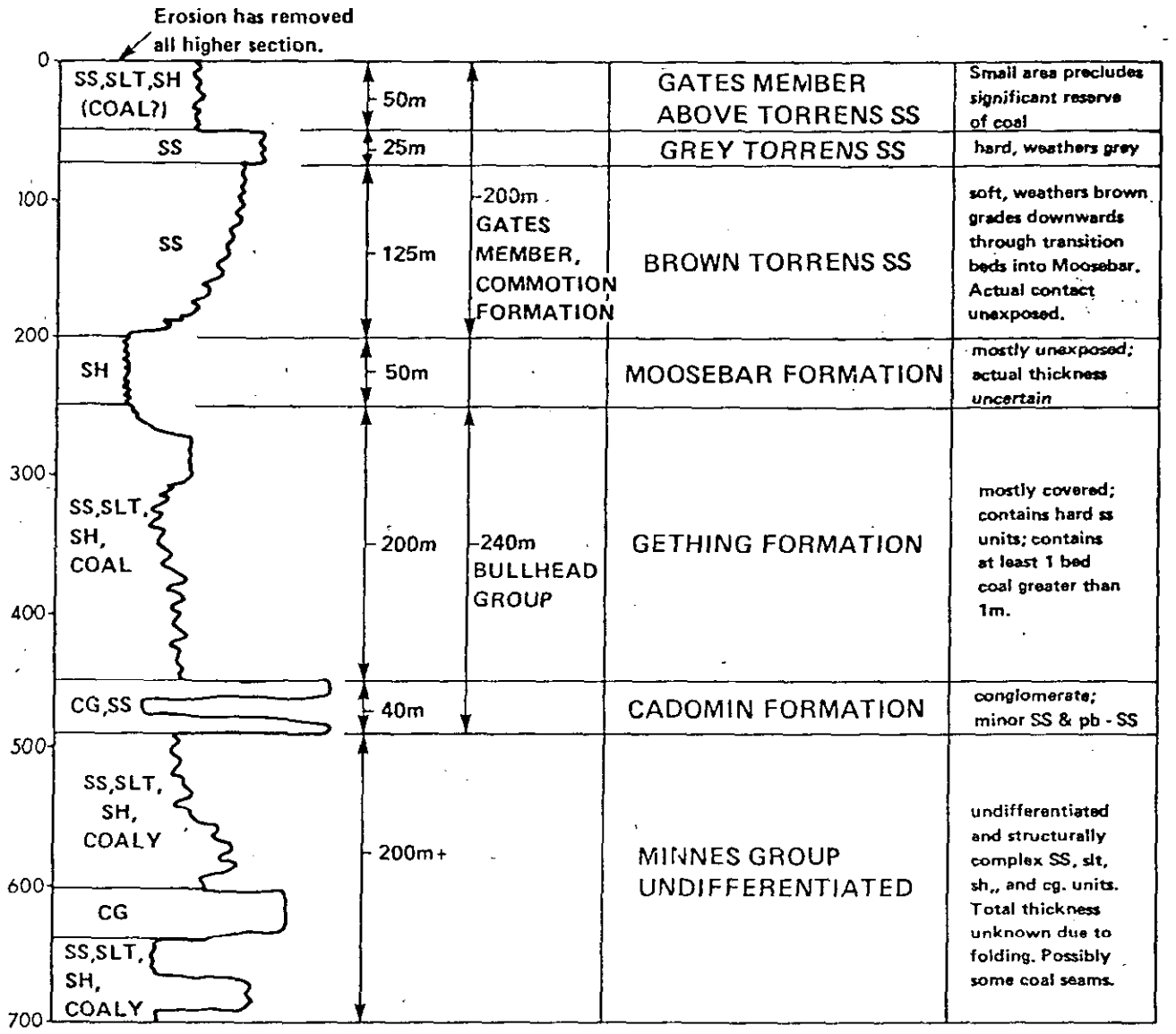
This Pine River nomenclature (Stott, Geological Survey of Canada Bulletin 152) is used in this report and on all maps and sections but with the modifacation as shown in Fig. No. 4

4.2 Stratigraphic Geology

As the mapping on Mt. Reesor coal licences consisted of only a week of days shortened by fire bans, and the property consists of two licences only, no detailed descriptions of the stratigraphy are included in this report. The author has followed the stratigraphy outlined in the following page.

One of the objectives in 1981 mapping was to measure the true thickness of the various formations and units. This is presented in the stratigraphic diagram on the next page. The thicknesses were derived from measurements using a hand-held plane table and a 50 m chain, and trignometric calculations resulting therefrom. They should be considerably more accurate than pogo measurements for thickness.

The lowermost unit of the stratigraphic diagram is termed the Minnes Group undifferentiated. Due to repetition by folding (and possibly disruption by faulting) its thickness within the licence boundaries is uncertain, although it is definitely thicker than that shown on the diagram.



SYMBOLS:

CG	CONGLOMERATE
SS	SANDSTONE
SLT	SILTSTONE
SH	SHALE
PB	PEBBLE

FIG. 4

Crowe Nest Resources Limited
EXPLORATION

MOUNT REESOR
N.E. B.C.

1981
STRATIGRAPHIC SECTION

AUTHOR: D. BELL | SCALE: 1:5000 | ENCLOSURE No.:
DATE: 81-11-27 | REVISED: | DRAWING No. AA-752
To Accompany

4.3 1981 Mapping Geology

During a slow flight around the Mt. Reesor licences, the major syncline which supports the peak and which contains the centre prospective Gething Formation is spectacularly visible. On either side of this syncline, along the high ridge of which the peak at the axis is the high point, the section on either side of the fold may be seen to be folded into smaller, sharper folds, in an echelon pattern.

The Gething is recognizable not so much by its appearance in outcrop, but by its position between the Cadomin and the Moosebar topographic recession above.

Above the Torrens sandstone cliffs above the Moosebar and almost to the peak, from the west, is a small section of Gates Member of the Commotion Formation, which appears to be so limited by erosion that it cannot be a significant extent of possible coal.

Beneath the Gething, in beds that are Cadomin or older, there is no outcrop or topographic indication of significantly thick coal seams (although thin beds, in the order of 1 m, do occur).

In 1979, G. Hoffman sketched this basic outline on air photographs and a map of 1:50,000 scale. To continue from this point, the

1981 mapping commenced with a 1:25,000 scale and mapped the same outline, this time with chain and compass to measure the section, and to more accurately locate the positions of the structures. These measurements are plotted on the geologic map and in the cross section, and they enabled a basic level of stereographic analysis of the structures.

The intent has been to provide a stratigraphic section accurate to within 25 to 50 m, depending upon the basic thickness of the unit involved, upon which to base drill and trench footages. In addition, the stereographic study provides orientation for drafting and drill hole projections.

4.3.1 Geologic Base Map 1:25,000

1:25,000 topographic base for the mapping is a 1:50,000 blow up. Contour interval is 100 ft. (30.5 m). Starting from the peak, 50 m chain lines were run in either direction along the main ridge line. Contacts are therefore as accurate on the ridge line as drawing them on a 1:25,000 scale allows. Trignometric corrections to chain lengths for vertical variation were made, based on held-held inclinometer.

Forest fire travel bans were imposed shortly before mapping on Mt. Reesor began. The intent had been to foot traverse most of the licences, following in particular major ridge-forming units to measure their attitudes and outline the structures.

A shortened plan of measuring the thickness and orientation of the main units and structures along the main ridge only was adopted. This has allowed the width of the major syncline containing the Gething to be more accurately stated, along with the actual thickness of the Gething within it. Sufficient bedding attitudes were gathered to allow stereographic determination of the syncline's orientation and to allow the best-oriented grid to be established to provide a framework for future work.

In addition, the number and position of the folds or dip reversals on either side of the syncline, stretching to the licence boundaries, were plotted and bedding attitudes recorded. A problem with a scale as large as 1:25,000 is that little detail can be drafted on the base, given the scale of the units of geology. The field notes contain further description of stratigraphy, lithology, and structural setting that cannot be reproduced on this base, but will be retained as part of the working file.

The following pages lists that part of the Abbreviations Legend too large to include on the map and section.

4/CFa.25

TABLE 2

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
5.	Bedding	bd, bds	bed, -s
		intbd	interbedded
		x-bd	cross-bedded
6.	Colours	blk	black
		brn	brown
		grn	green
		gry	gray
		rsty	rusty
		lt	light
		drk	dark
7.	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

At the peak the section is brown Torrens sandstone, dipping steeply southwest. In less than one 50 m chain in this direction, a fault is crossed, and the section is now dipping northeasterly. The axis of the syncline is, in other words, not directly locatable on the ground; it is represented at this altitude within the syncline by the fault. The section now dipping northeasterly is lowermost Gates Member, a coal-bearing zone in other places along the coal belt, and it is here composed of siltstone, shale, sandstone, all with coaly stringers.

This Commotion section, however, is such a small erosional slice that it cannot be a significant coal reserve. Underlying is 12-13 m of grey Torrens, dipping 27 degrees northeasterly. Next is a long cliff section of brown Torrens sandstone, typically cross-bedded and coloured, down into covered Moosebar. Ground cover is lichens and alpine grasses.

All of the above is easily observable from a helicopter, and the fault at the axis is easily discerned. Moosebar may be seem to be outcropping elsewhere around the peak, but it was not visited at this time.

Next, the upper half of the Gething is covered under sheep and goat grasses, although the contact is easily placeable by topography. The lower central portion of the Gething consists of a ridge-forming sandstone unit, containing an upper, thin coarse grey-weathering prominent sandstone underlain by softer brown sandstone with weather-etched cross-bedding similar to that of the brown Torrens sandstone. The cycle is very similar to the Torrens cycle.

The remainder of the Gething is covered, along to the dip-slope massive ledges of the Cadomin conglomerate underlying, the more recessive Gething sandstone.

Next, there are three massive pebble-conglomerate and conglomeratic sandstone units forming a topographic rise. The first, directly underlying the Gething, is 40 m in thickness. Next is an exposed section of interbedded siltstone and sandstone, quite recessive. Then comes the second conglomerate unit, a 5 m ledge. After another thick recessive interbedded siltstone and sandstone comes the third conglomerate, a massive 24 m cliff-ledge.

Further southwest along the ridge it is 1.1 km to the south boundary of the licences, through a structurally complex section of ridge-forming conglomerates and sandstones, with

interbedded mostly-covered more recessive units containing often-exposed softer and finer sandstones. This section does contain some thin coal beds at least.

The author has chosen to call of this latter section Minnes Group, undifferentiated, even though the two conglomerte units which occur in this direction apprear to be identical to the already-named Cadomin. By implication the intervening more recessive units containing much softer sandstones are not called Bullhead, but are kept also in the Minnes.

There are also five dip reversals in this 1.1 km along the ridge; two of them are almost surely folds, as the closing of the units may be seen; the others could involve faulting. The scale of the folds on the ridge means that none of them could contain a reserve of coal comparable to the reserve possibly available in the major syncline surrounding the peak. As the first structure to be drilled would logically be this syncline, this division into Minnes from Bullhead is practically feasible, as its sets apart the lower priority of this section of the ridge line. In addition, the scale, type, and appearance of the folding (fairly apparent in the view from the air) leads the author to judge the section of this ridge to closely resemble the

section beneath the Cadomin southeast along the coal belt, in which seams thicker than 1 m are rare and local only, and which is regarded as Minnes.

In the other direction from the peak, northeast along the ridge, the section is exposed brown Torrens sandstone, of thickness and character similar to that of the west limb, down into covered Moosebar.

The base of the topographic recession of the Moosebar is marked by a 32 m ridge-forming sandstone, the first strong upper Gething unit. The remainder of the distance to the Cadomin is covered under grasses.

Three conglomerate units occur, the upper 12 m thick, the middle 9 m, and the lower 8 m. Intervening are 14 and 8 m thick recessive exposed sandstone, siltstone, and mudstone units, some of the mudstone being coaly. This section has been named Cadomin, corresponding to the similar section on the west limb. Further northeast along the ridge line the topography becomes a broad upland. As far as chained along the best route for outcrop, there are three more dip reversals, the last at a prominent conglomerate that could also be called Cadomin. As on the west line of the ridge, this is called Minnes, as is the other section to this point, by inference and structure. It is possible that some thicker coal seams could occur.

4.3.2 Structural Cross Section 1:25,000

Drafting of the 1:25,000 structural cross section is difficult because of the large scale. A grid based on stereographic analysis was chosen, with the peak as the origin point. This cross section is 000 North/South on this grid; the grid is overlain on the 1:25,000 geologic base map. Further sections have not been drawn, as mapping did not proceed to this point.

The major syncline at the peak is outlined; the dip of the limbs and the axial plane as shown by stereograph is drawn. The altitude at which to draw the Cadomin at the axis is moot. The altitude drawn is at the high end of the possible range; it may be considerably lower.

The stereographic study shows that the syncline is plunging southeast at 04 degrees. This plunge direction, however, is at odds with the view from the air; at the southeast end of the syncline the top of the Cadomin has been spotted from the air at 1460 m, 1.2 km from the plane of the section. A plunge of 04 degrees over this distance means a vertical variation from this 1460 m of 84 m. At this stage, until further mapping is done on a detailed basis, it is not possible to state the altitude of the top of the Cadomin

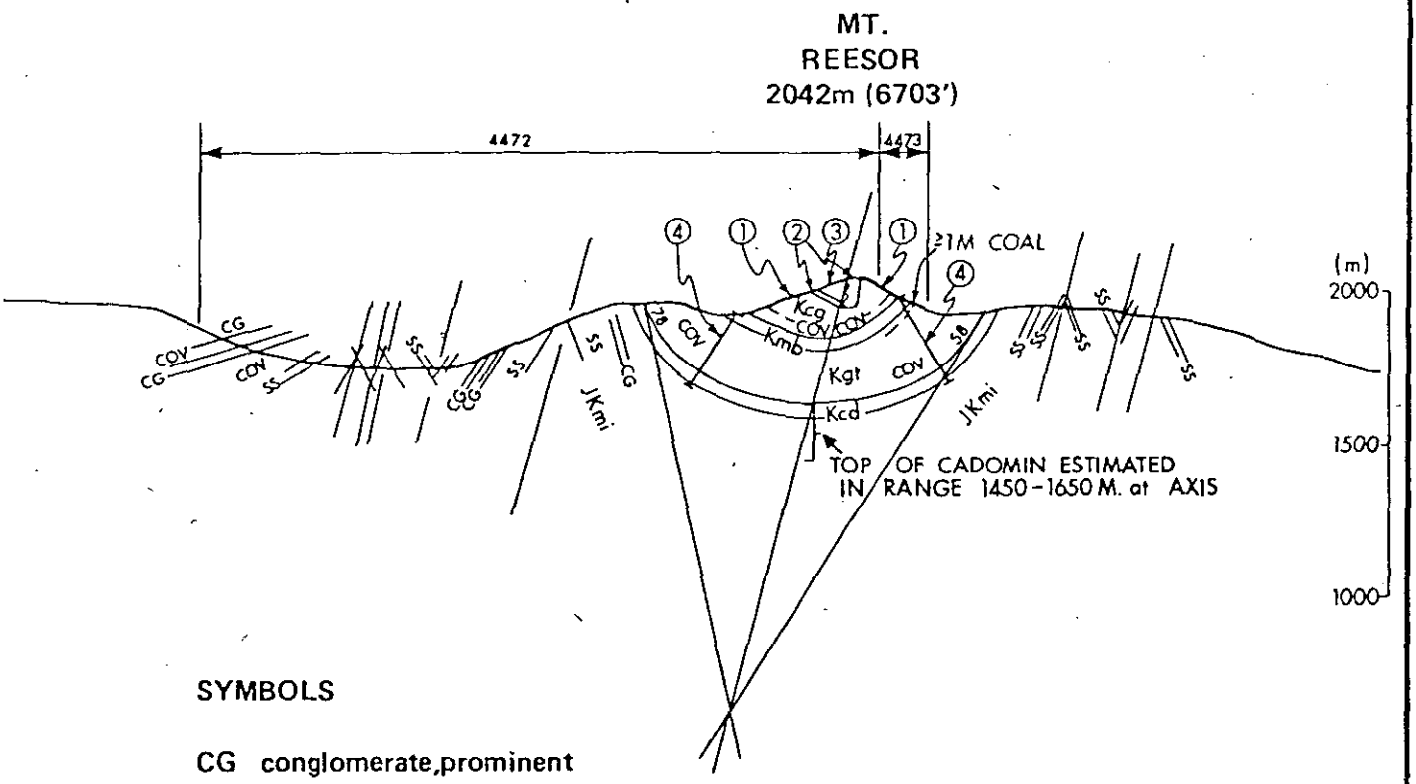
more closely than to use a range of 1380 m on upwards to 1540 m and higher. On the cross section the syncline has been drawn as shallow, although it may be considerably deeper, within the projected limbs as shown.

The width of the syncline, Cadomin to Cadomin, is accurate to 50 m as shown. The stereographic study shows that the axial plane dips steeply west, although it may be steeper than that drawn.

The positions of the dip reversals and the prominent topographic units at the appropriate dips east and west along the ridge from the major syncline are shown on the section. Axial planes as drawn are representational only.

4/CFa.32

NOTES: 1. This unit is Brown Torrens Sandstone, in massive cliffs.
2. This unit is Grey Torrens Sandstone, which overlies the Brown Torrens.
3. This is a small section of Gates Member above the top of the Torrens, faulted against the grey Torrens of the east limb.
4. Proposed 300m drill holes to test entire Gething Formation, Dip 60 . Holes spudded in Moosebar shales.



SYMBOLS

CG conglomerate,prominent
SS sandstone,prominent
fault
cov covered interval

LEGEND

Kcg Gates Member, Commotion Formation

Kmb Moosebar Formation

Kgt Gething Formation

Kcd Cadomin Formation

JKmi Minnes Group, Undifferentiated

FIG. 5
PR-Mt Reesor 8162 *A *1

Crows Nest Resources Limited
EXPLORATION

MOUNT REESOR
N.E. B.C.
1981
STRUCTURAL CROSS SECTION
000 N/S

AUTHOR: D. BELL	SCALE: 1:25000	ENCLOSURE No.:
DATE: 81-11-27	REVISED:	DRAWING No.: AA-753

4.4 Structural Geology

One of the objectives of the 1981 mapping was to enumerate the number of folds on the licences, outline their size, and determine as well as possible their orientation.

The folds (or, at least, dip reversals) are placed on the 1:25,000 base map and cross section; their position along the main ridge line should be accurate to 50 m as presented.

The cross section is oriented on a grid established using the stereographic analysis. Only the one section has been prepared; future mapping may be expected to fill in others. The grid is overlain on the 1:25,000 geologic base map.

4.4.1 Stereographic Analysis

The following pages contains copies of scatter diagrams and contour plots of the bedding attitudes recorded during the mapping. A concerted attempt was made to collect evenly-spaced, representative attitudes.

The attitudes were run in two sets using Golder and Associates' computer facilities and program "STEREO" to produce the stereographs. The first set, MRSYN81, "Mt.

Reesor Syncline 1981", is composed of attitudes from the Mt. Reesor Syncline, Cadomin to Cadomin, by itself. Using the attitudes for the Cadomin on both limbs, the fold may be seen on the contour plot to have a plunge of 04 degrees to the southeast, 123 degrees true. This is drafted on the plot. Using the attitudes for the brown Torrens and higher section, however, the plunge is essentially nil. The fold, in other words, is changing shape within itself, and the change is altitude-linked.

4/CFa.35

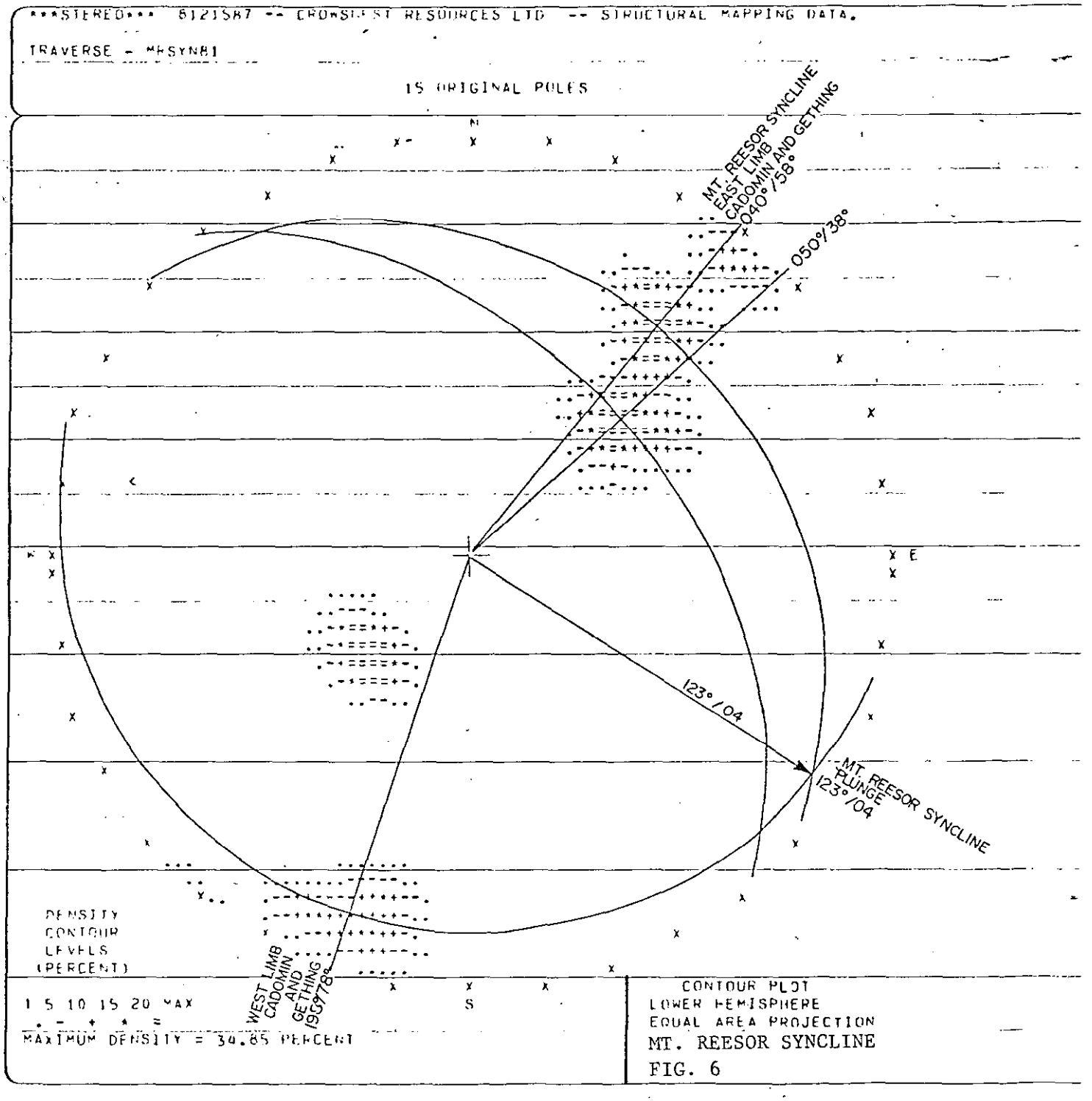
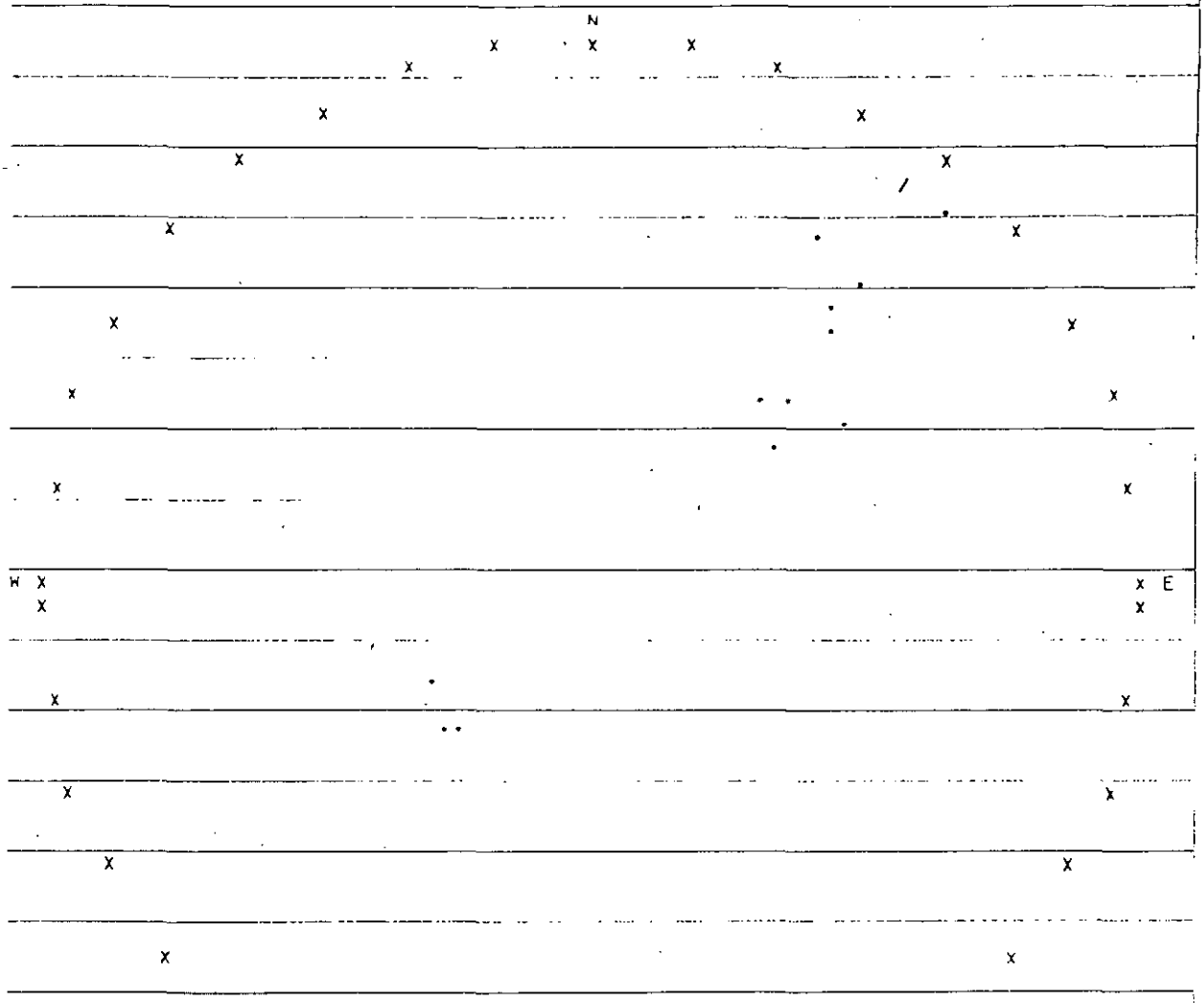

STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.
TRAVERSE - MRSYNBI
15 ORIGINAL POLES
MT. REESOR SYNCLINE EAST LIMB AND CADOMIN AND GETHING 040°/58°
050°/38°
123°/04
MT. REESOR SYNCLINE PLUNGE 123°/04
WEST LIMB CADOMIN AND GETHING 199/78°
DENSITY CONTOUR LEVELS (PERCENT)
1 5 10 15 20 MAX
MAXIMUM DENSITY = 30.85 PERCENT
CONTOUR PLOT
LOWER HEMISPHERE
EQUAL AREA PROJECTION
MT. REESOR SYNCLINE

FIG. 6

STEREO 8:21587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.

TRAVERSE - MRSYN81

15 ORIGINAL POLES



LEGEND

.	1 POLE	
-	2	
+	3	
*	4	
5-9	5,6,7,8,9	
A-Z	10,11,...	
/	MEAN VECTOR = 81.23/ 216.88	

SCATTER DIAGRAM
LOWER HEMISPHERE
EQUAL AREA PROJECTION

MT. REESOR SYNCLINE

FIG. 7

The fold is also somewhat assymmetric, with the east limb at 58 degrees dip and the west at 78 degrees dip. It is difficult to state the exact dip of the axial plane, due to the low plunge, but, in the case of Cadomin to Cadomin, it is demonstrably steeply dipping southwest. Within the brown Torrens it has changed to being more vertical.

The second set of attitudes is composed of the first set plus all attitudes, from the other smaller structures, to the east and west of the Mt. Reesor Syncline: MRALL81, Mt. Reesor ALL Attitudes 1981.

The contour plot shows folded structures with an average plunge of 07 degrees to the southeast, 126 degrees true, but there is a considerable degree of range about this, up to 20 degrees in either direction in strike. The average westerly attitude in the folding is strike of 315, dip 45 southwest, and the average easterly attitude is strike 295 degrees, dip 56 degrees northeast. It is normal in a thrusted environment that northeasterly dips are steeper than southwesterly dips.

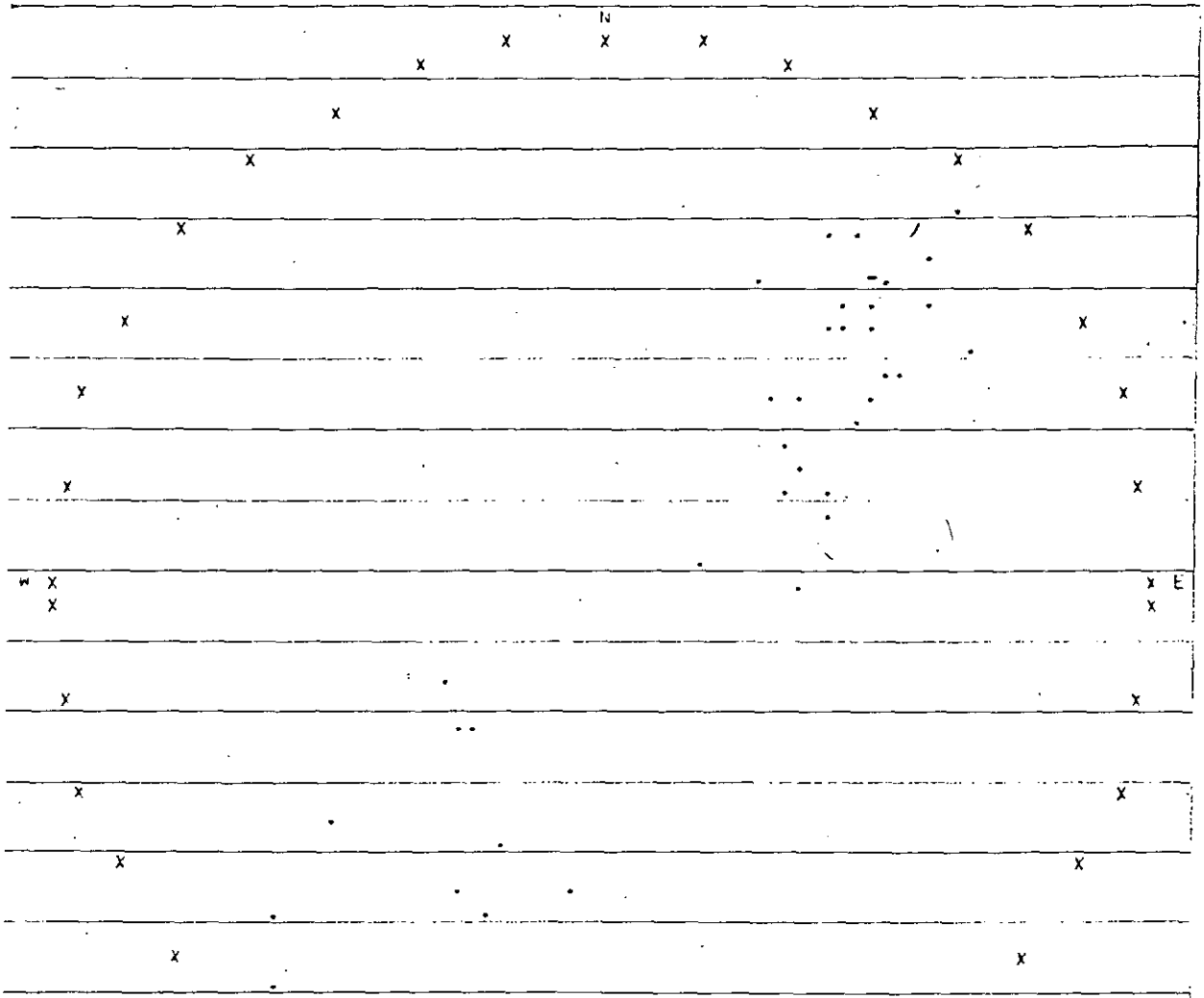
In choosing a baseline for a grid, the plunge direction of 123 degrees of the Mt. Reesor Syncline was used, rather than the overall 126 degrees average. This was done as the syncline is logically to be explored first, and the difference of three degrees is negligible in apparentness.

Future mapping may be particularly oriented to filling in several evenly-spaced sections to the northwest of the one drawn, using mapped-in altitudes of the units, as the overall view from the air and on photograph indicated the Mt. Reesor Syncline is plunging northwest, whereas the sterographic data from the main ridge line mapping in 1981 indicated the plunge is southeast. It is likely that the plunge is varying evenly and continually within the fold, in an echelon style, and only careful mapping of outcrop altitudes to within 25 m will describe the final shape.

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

TRAVERSES - MRALL81 AND MRSYN81

43 ORIGINAL POLES

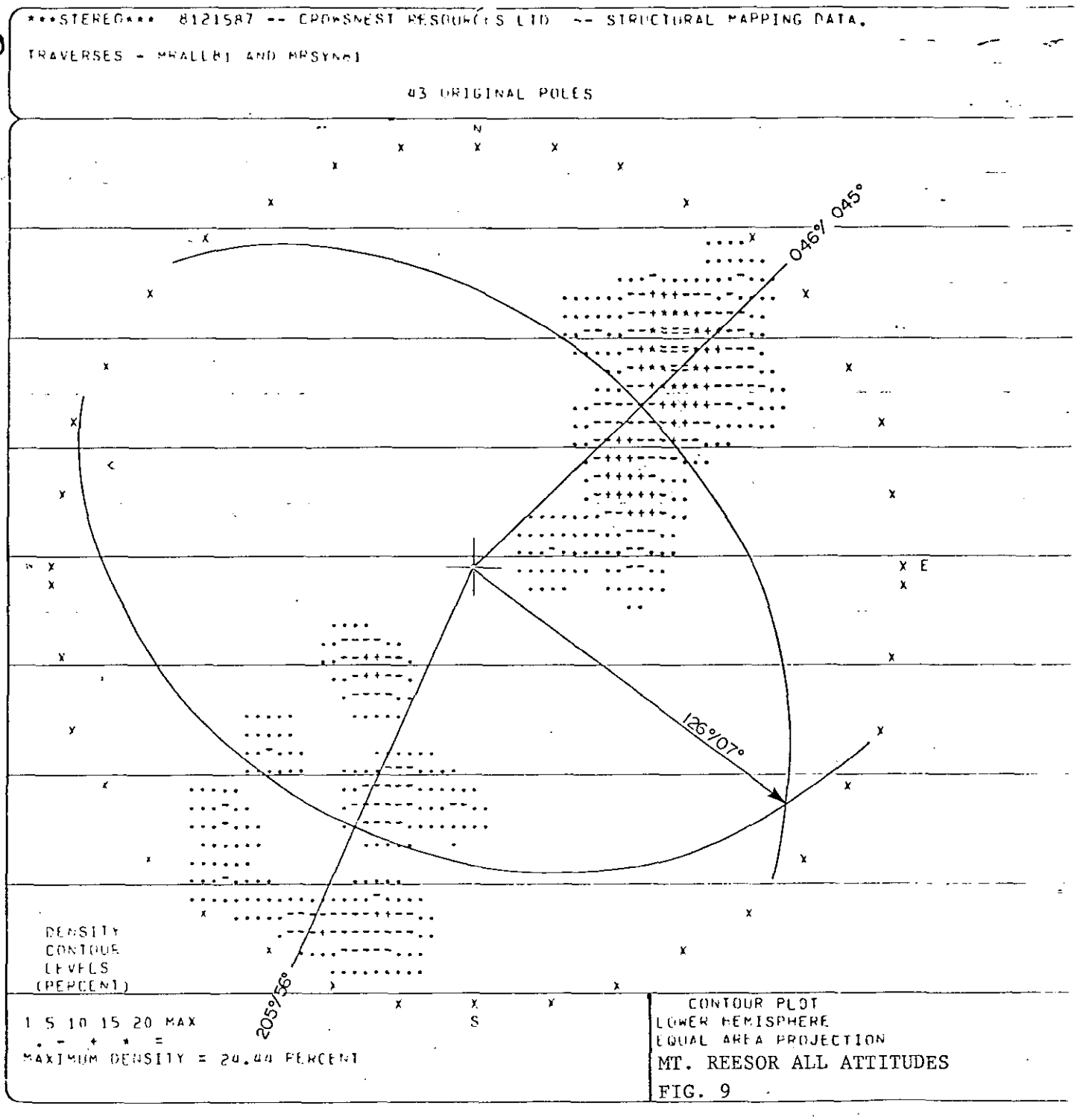


LEGEND

.	1 POLE	
-	2	
+	3	
*	4	
5-9	5,6,7,8,9	
A-Z	10,11,...	
/	MEAN VECTOR = 74.75/ 220.07	

SCATTER DIAGRAM
LOWER HEMISPHERE
EQUAL AREA PROJECTION

MT. REESOR ALL ATTITUDE. FIG. 8


STEREO 8121587 -- CROWSNEST RESOURCES LTD -- STRUCTURAL MAPPING DATA.
TRAVERSES - MHALLBI AND MRSYNAI
43 ORIGINAL POLES
N
E
S
046°/045°
126°/07°
205°/56°
DENSITY
CONTOUR
LEVELS
(PERCENT)
1 5 10 15 20 MAX
. - + * =
MAXIMUM DENSITY = 20.44 PERCENT
CONTOUR PLOT
LOWER HEMISPHERE
EQUAL AREA PROJECTION
MT. REESOR ALL ATTITUDES
FIG. 9

5.0 RECOMMENDATIONS

There is considerable work that may be done at Mt. Reesor; mapping may be continued, on a smaller scale, and there is much section that could be trenched by hand or machine along the main ridge line.

The Gething is measured to be 200 m thick, with an accuracy of possibly 25 m, but probably within 50 m. Single drill holes 275 and 300 m deep should therefore penetrate the whole of the section on either limb of the Mt. Reesor Syncline. It is quite possible to set the holes on the flat platform of the recessive Moosebar as natural sites, although the distance to water, and the vertical raise, will be excessive. There is, at the present, little reason to pick one limb over the other for a first hole, and distance to water could decide the question.

An alternative to drilling would be to trench the entire ridge line across the Gething on both limbs. Should thicker coal beds not be discovered, the priority of drilling could be reduced. This method would require, however, a small tracked backhoe and a means of getting it to the licences.

As Mt. Ressor is only 70 km by air from Chetwynd, trenching or drilling could be serviced from this base along with other Crows Nest properties in the region. The new town of Tumbler Ridge will provide an even closer base, 25 km, and lower altitude in route of travel.

SELECTED BIBLIOGRAPHY

Hoffman, Georgia (1980): Geological Report, Mount Reesor Coal Property; internal Crows Nest, Resources Limited filed with B.C. Ministry of Energy, Mines and Resources

G.S.C. (1960): Cretaceous Rocks of Smoky and Pine Rivers Area Rocky Mountain Foothills, Alberta and British Columbia; Map 21-1960

G.S.C. (1966): Monkman Pass, British Columbia; Open File Report No. 630

Karst, R.H. (1981): Correlation of the Lower Cretaceous Stratigraphy of Northeastern British Columbia from the Foothills to the Plains; in B.C. Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork 1980, Paper 1981-1

McLearn, F.H. and Kindle, E.D. (1950): Geology of Northeastern British Columbia; Geological Survey of Canada, Memoir 259

Stott, D.F. (1961): Dawson Creek Map - Area, British Columbia; Geological Survey of Canada, Paper 61-10

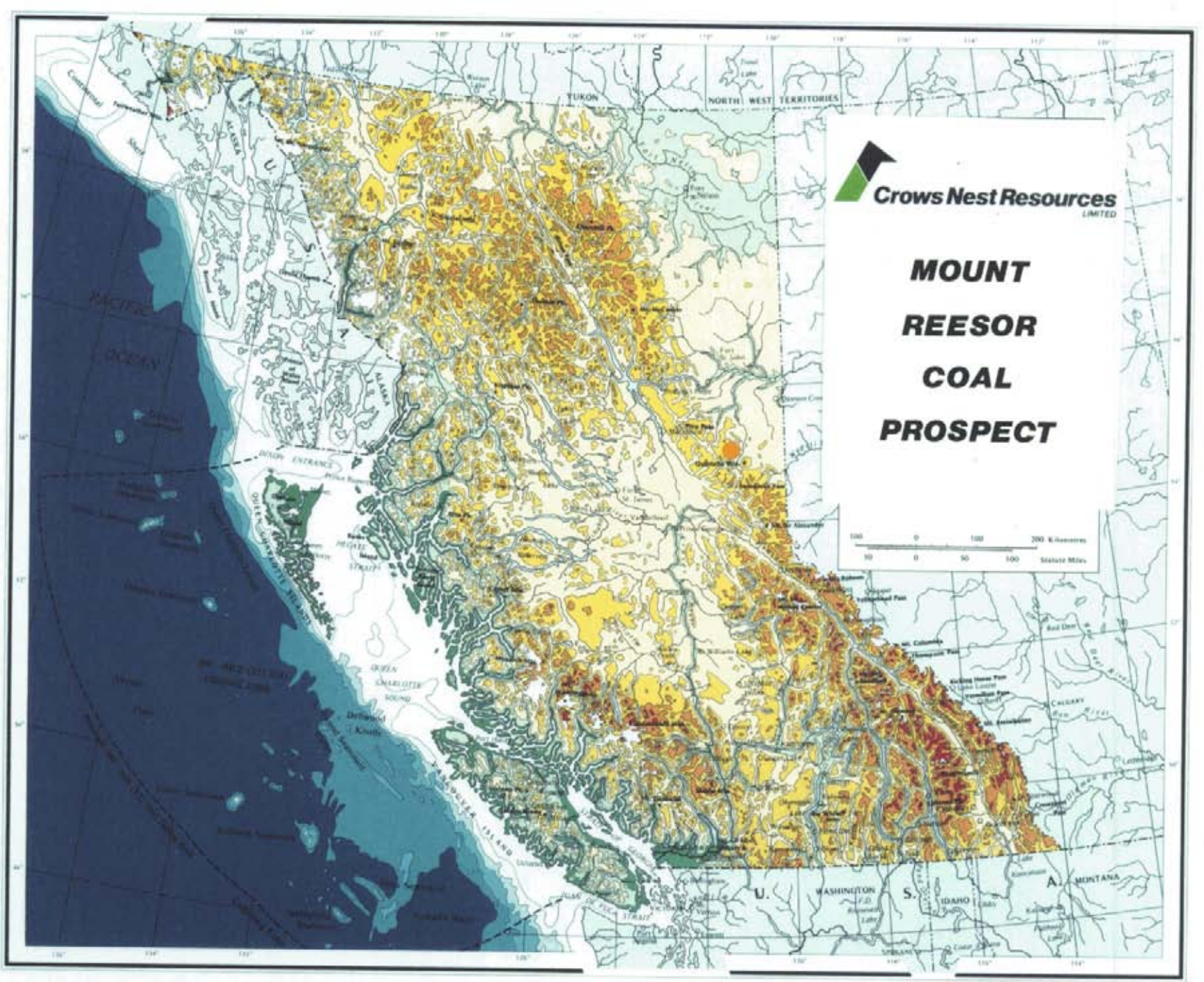
Stott, D.F. (1961): Type Sections of Some Formations of the Lower Cretaceous Fort St. John Group Near Pine River, British Columbia; Geological Survey of Canada, Paper 61-11

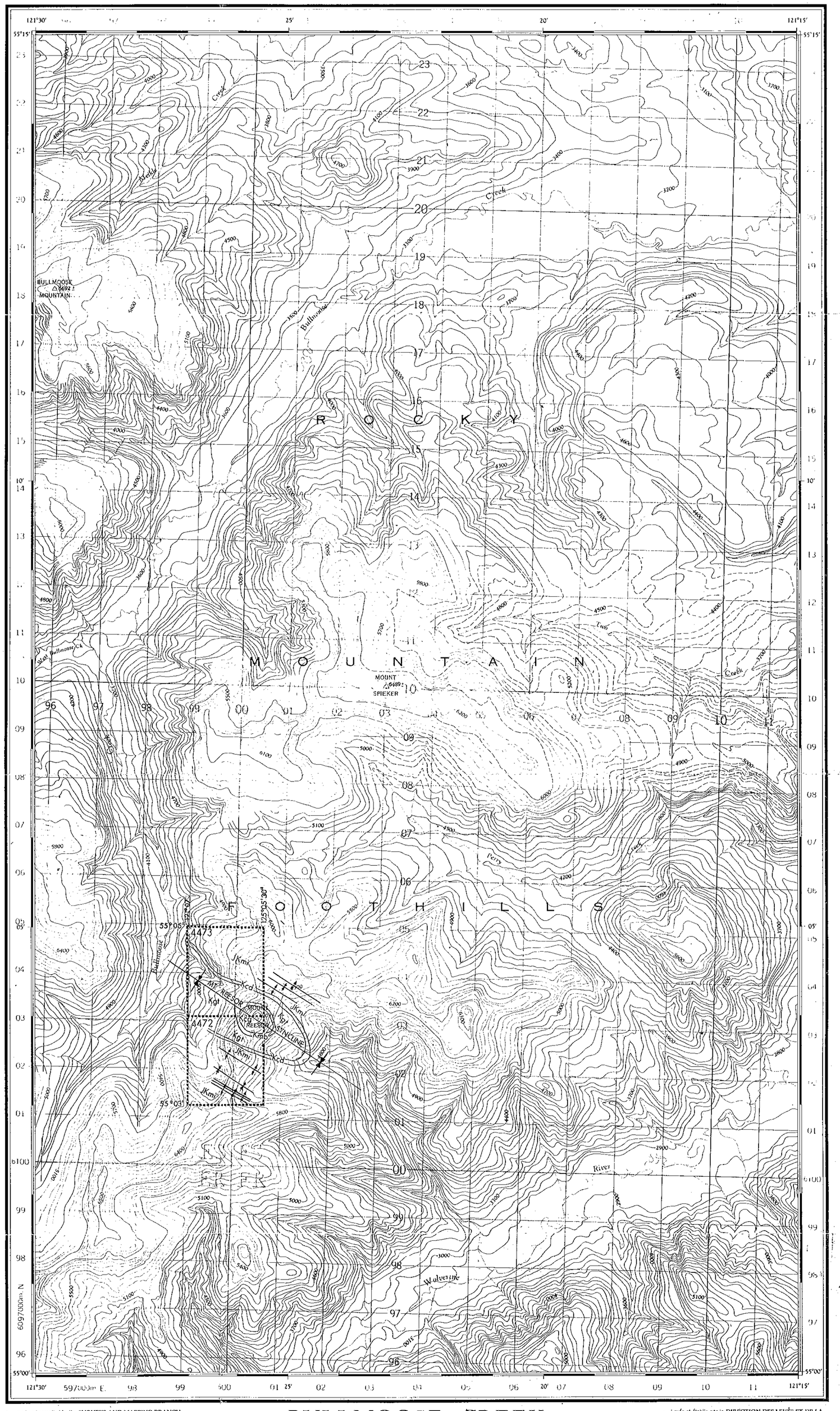
Stott, D.F. (1963): Stratigraphy of the Lower Cretaceous Fort St. John Group and Gething and Cadomin Formations, Foothills of Northern Alberta and British Columbia; Geological Survey of Canada, Paper 62-39

Stott, D.F. (1973): Lower Cretaceous Bullhead Group between Bullmoose Mountain and Tetsa River, Rocky Mountain Foothills, Northeastern British Columbia; Geological Survey of Canada, Bulletin 219

Stott, D.F. (1974): Lower Cretaceous Coal Measures of the Foothills of West-Central Alberta and Northeastern British Columbia; in CIM Bulletin Vol. 67, No. 749, Pages 87-100

Stott, D.F. (1979): Lower Cretaceous Bullhead and Fort St. John Groups, Between Smoky and Peace Rivers, Rocky Mountain Foothills, Alberta and British Columbia; Geological Survey of Canada, Bulletin 152





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BULLMOOSE CREEK

PEACE RIVER DISTRICT

BRITISH COLUMBIA

SCALE 1:50,000 ÉCHELLE

Miles 1: 0 1 2 3 Milles
Metres 1000 500 0 1000 2000 3000 4000 Mètres
Yards 1000 500 0 1000 2000 3000 4000 Verges

Roads:	Routes:		
hard surface, all weather	pavée, toute saison	more than 2 lanes plus de 2 voies	2 lanes voies
hard surface, all weather	pavée, toute saison	less than 2 lanes moins de 2 voies	
loose surface, all weather	de gravier, toute saison	2 lanes or more 2 voies ou plus	less than 2 lanes moins de 2 voies
loose surface, dry weather	de gravier, période sèche		
cart track	de terre		
trail or portage	sentier ou portage		
Railway, normal gauge, single track	Chemin de fer, voie unique (écartement normal)	siding voies d'évitement	station gare
Horizontal control point, with elevation	Point géodésique, avec cote		494△
Bench mark, with elevation	Repère de nivellement, avec cote		594 → 127
Spot elevation; precise, approximate	Point coté; précis, approximatif		450 ·450±

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level

Transverse Mercator Projection
North American Datum 1927

MAGNETIC DECLINATION 26°15' EAST
AT CENTRE OF MAP 1965
Annual change decreasing 4.1'

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer

Projection transverse de Mercator
Réseau géodésique nord-américain unifié 1927

DÉCLINAISON MAGNÉTIQUE AU CENTRE DE LA FEUILLE EN 1965 : 26°15' EST
Variation annuelle décroissante 4.1'

Building	Bâtiment	Church	Église
School	École	Post Office	Bureau de poste
Cemetery	Cimetière		
Mine or Open cut	Mine ou fosse à ciel ouvert		
Lighthouse	Phare		
Power transmission line	Ligne de transport d'énergie		
River with bridge	Rivière avec pont		
Stream, intermittent or dry	Cours d'eau intermittent, ou à sec		
Lake intermittent, indefinite	Lac intermittent, rive imprécise		
Marsh or Swamp	Marais ou marécage		
Depression contours	Courbes de cuvette		

TN
GN

U.T.M. ZONE 10

GEOLOGICAL LEGEND

Kcg	COMMOTION FORMATION GATES MEMBER	FORT ST. JOHN GROUP
Kmb	MOOSEBAR FORMATION	
Kgt	GETHING FORMATION	BULLHEAD GROUP
Kcd	CADOMIN FORMATION	
JKmi	MINNIES GROUP, UNDIFFERENTIATED	

GEOLOGICAL SYMBOLS

SYNCLINE

ANTICLINE

INDEX MAP

121°45' 121°00' 55°30' 55°45'

93P/5E	93P/6W	93P/6E
93P/4E	93P/5W	93P/3E
93I/13E	93I/14W	93I/14E

Crows Nest Resources Limited
EXPLORATION

MT. REESOR
N.E. B.C.

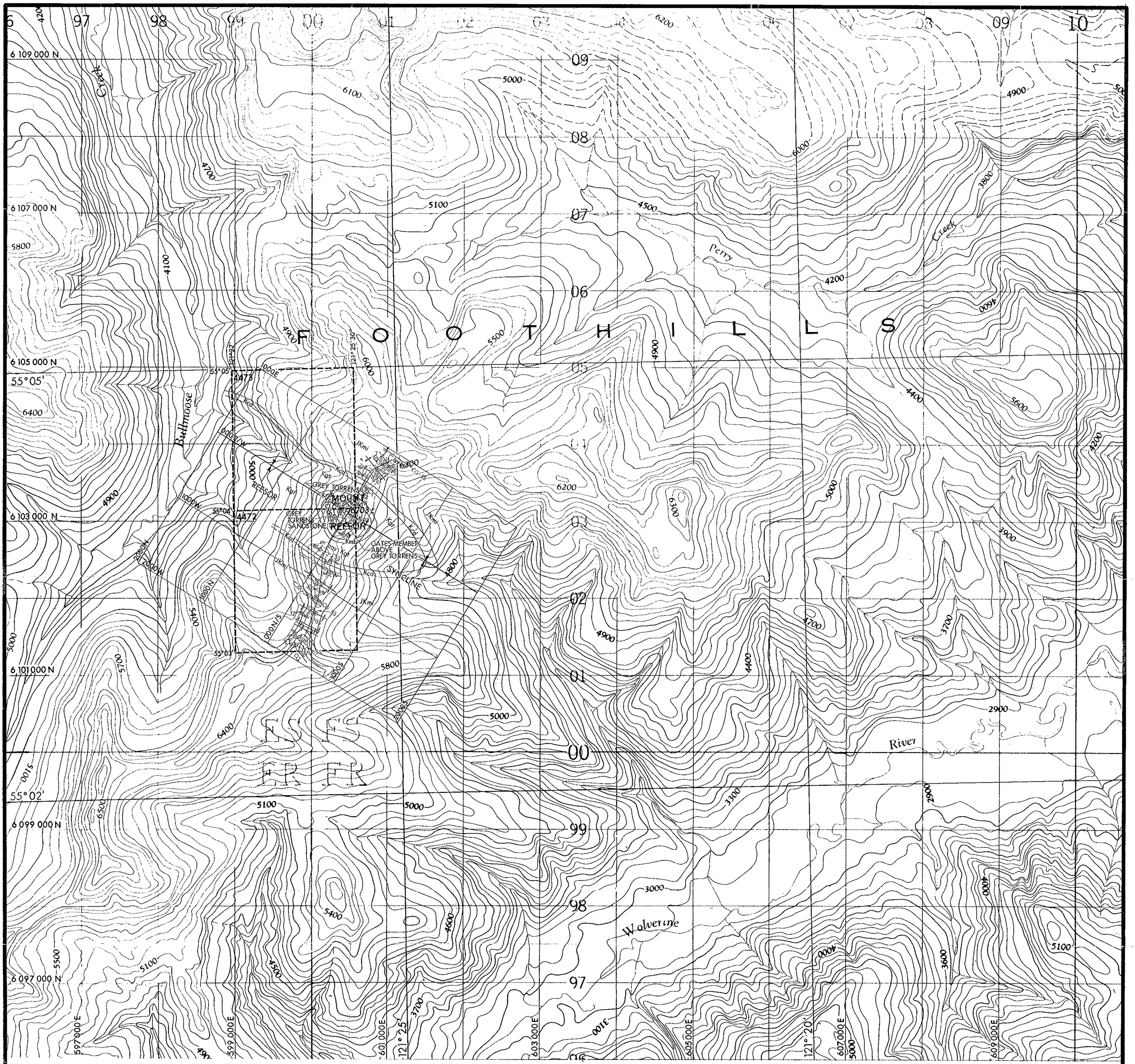
INDEX, COAL LAND DISPOSITION, AND GEOLOGIC COMPILATION MAP

N.T.S. - 93P/3W

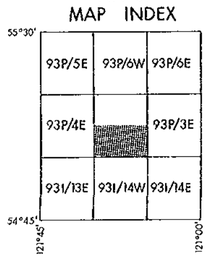
AUTHOR: D. BELL	SCALE: 1:50 000	ENCLOSURE No: Appendix A
DATE: 81-12-02	REVISED:	DRAWING No: HC-92
To Accompany		

PR-Mt. Reesor 81(27)A *1)

551



N.T.S. MAP INDEX



-------EXISTING COAL LICENSE BOUNDARY

CONTOUR INTERVAL : 100 FEET

T.N. G.N.

U.T.M. ZONE 10

2000 1000 0 500 1000 1500 2000 METRES

1:25000

GEOLOGIC SYMBOLS

- FAULT
- cov COVERED INTERVAL
- SYNCLINE
- ANTICLINE
- CG CONGLOMERATE UNIT, PROMINENT
- SS SANDSTONE UNIT, PROMINENT
- CHAINED TRAVERSE LINE

GEOLOGIC LEGEND

- Kcg GATES MEMBER COMMOTION FORMATION
  - ABOVE TORRENS SANDSTONE
  - GREY TORRENS SANDSTONE
  - BROWN TORRENS SANDSTONE
- Kmb MOOSEBAR FORMATION
- Kgt GETHING FORMATION
- Kcd CADOMIN FORMATION
- JKmi MINNES GROUP, UNDIFFERENTIATED

551

Crows Nest Resources Limited
EXPLORATION

MT. REESOR
N.E. B.C.

1981 GEOLOGIC MAP

N.T.S. - 93P/3W

AUTHOR: D. BELL	SCALE: 1:25000	ENCLOSURE No: Appendix B
DATE: 81 · 12 · 02	REVISED:	DRAWING No: HG-92
To Accompany		

RR- Mt. Reesor 84(2.)A *1