

87-299-16083



2/88

RECONNAISSANCE GEOLOGICAL MAPPING

ROCK AND SILT SAMPLING
AFT, RODEO CLAIMS

Alberni Mining Division, B.C.
NTS 92F/2E 49°~~01'~~^{00.7'} N Lat., 124°~~38.1'~~^{38.9'} W Long.

Owner: Ladysmith Minerals Ltd.
Operator: CREW MINERALS INC.

April 30, 1987

H. KANG, B.Sc. & J.S. GETSINGER, Ph.D.

SUB-RECORDER
RECEIVED
MAY 26 1987
M.R. # \$.....
VANCOUVER, B.C.

FILMED

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

16,083



MINERAL ACT

STATEMENT OF EXPLORATION AND DEVELOPMENT

I. <u>J.S. Getsinger</u> <small>(Name)</small>		Agent for <u>Ladysmith Minerals Ltd.</u> <small>Name</small>	
<u>#301-409 Granville St.</u> <small>(Address)</small>		<u>1020-475 Howe St.</u> <small>(Address)</small>	
<u>Vancouver, B.C.</u>		<u>Vancouver, B.C.</u>	
<u>V6C 1T2</u> <small>(Postal Code)</small>	<u>687-7938</u> <small>(Telephone Number)</small>	<u>V6C 2B3</u> <small>(Postal Code)</small>	<u>681-9565</u> <small>(Telephone Number)</small>
Valid subsisting F.M.C. No. <u>296 277</u>		Valid subsisting F.M.C. No. <u>296 473 LADMIL</u>	

STATE THAT

1. I have done, or caused to be done, work on the RODEO Claim(s)
Record No(s) 1385(2)
Situate at Corrigan Creek in the Alberni Mining Division,
to the value of at least 4,000.00 dollars. Work was done from the 23rd day
of January 19 87, to the 24th day of February 19 87

2. The following work was done in the 12 months in which such work is required to be done:

[COMPLETE APPROPRIATE SECTION(S) A, B, C, D, FOLLOWING]

A. PHYSICAL (Trenches, open cuts, adits, pits, shafts, reclamation, and construction of roads and trails.)

(Give details as required by section 13 of regulations.)

	COST
	SUB-RECORDER RECEIVED
	FEB 25 1987
	M.R. # \$
	VANCOUVER, B.C.
TOTAL PHYSICAL	

I wish to apply \$ of physical work to the claims listed below.

(State number of years to be applied to each claim, its month of record, and identify each claim by name and record number.)

B. PROSPECTING (Details in report submitted as per section 9 of regulations.)
(The itemized cost statement must be part of the report.)

COST

I wish to apply \$ of this prospecting work to the claims listed below.

(State number of years to be applied to each claim, its month of record, and identify each claim by name and record number.)

C. DRILLING	(Details in report submitted as per section 8 of regulations.) (The itemized cost statement must be part of the report.)	COST
D. GEOLOGICAL, GEOPHYSICAL, GEOCHEMICAL	(Details in report submitted as per section 5, 6, or 7 of regulations.) (The itemized cost statement must be part of the report.) (State type of work in space below.)	
	Geological, geochemical	4,000.00
TOTAL OF C AND D		4,000.00

Where the above statement requires a technical report as per section C of the Mineral Act Regulations, the author of the report shall complete both copies of the ASSESSMENT REPORT TITLE PAGE AND SUMMARY form and include the completed forms in the assessment reports.

Who was the operator (provided the financing)?

Name Crew Minerals Inc.
Address #615 - 800 West Pender St.
Vancouver, B.C. V6C 2V6

Portable Assessment Credits (PAC) Withdrawal Request		AMOUNT
Amount to be withdrawn from owner(s) or operator(s) account(s):		
Name of Owner/Operator		
[May be no more than 30 per cent of value of the approved work submitted as assessment work in C and (or) D.]	1.	
	2.	
	3.	
TOTAL WITHDRAWAL		
TOTAL OF C AND (OR) D PLUS PAC WITHDRAWAL		

I wish to apply \$ 4,000.00 of this work to the claims listed below.

(State number of years to be applied to each claim, its month of record, and identify each claim by name and record number.)

RODEO 1385(2) 20 units(1982) 1 year @ \$200 = \$4,000.00

Value of work to be credited to portable assessment credit (PAC) account(s).
[May only be credited from the approved value of C and (or) D) not applied to claims.]

Name	AMOUNT
Name of owner/operator 1.	
2.	
3.	

I, the undersigned Free Miner, hereby acknowledge and understand that it is an offence to knowingly make a false statement or provide false information under the *Mineral Act*. I further acknowledge and understand that if the statements made, or information given, in this Statement of Exploration and Development are found to be false and the exploration and development has not been performed, as alleged in this Statement of Exploration and Development, then the work reported on this statement will be cancelled and the subject mineral claim(s) may, as a result, forfeit to and vest back to the Province.

J. A. Hestington
Signature of Applicant

C. DRILLING (Details in report submitted as per section 8 of regulations.)
(The itemized cost statement must be part of the report.)

		COST
D. GEOLOGICAL, GEOPHYSICAL, GEOCHEMICAL (Details in report submitted as per section 5, 6, or 7 of regulations.) (The itemized cost statement must be part of the report.) (State type of work in space below.)		
Geological, geochemical		1,600.00
TOTAL OF C AND D		1,600.00

Where the above statement requires a technical report as per section C of the Mineral Act Regulations, the author of the report shall complete both copies of the ASSESSMENT REPORT TITLE PAGE AND SUMMARY form and include the completed forms in the assessment reports.

Who was the operator (provided the financing)? Name Crew Minerals Inc.
Address #615 - 800 W. Pender St.
Vancouver, B.C.

Portable Assessment Credits (PAC) Withdrawal Request		AMOUNT
Amount to be withdrawn from owner(s) or operator(s) account(s):		
Name of Owner/Operator		
[May be no more than 30 per cent of value of the approved work submitted as assessment work in C and (or) D.]	1.	
	2.	
	3.	
TOTAL WITHDRAWAL		
TOTAL OF C AND (OR) D PLUS PAC WITHDRAWAL		

I wish to apply \$ 1,600.00 of this work to the claims listed below.

(State number of years to be applied to each claim, its month of record, and identify each claim by name and record number.)

AFT 1389(2) 8 units (1982) 1 year @ \$200 = \$1,600.00

Value of work to be credited to portable assessment credit (PAC) account(s).
[May only be credited from the approved value of C and (or) D) not applied to claims.]

Name	AMOUNT
Name of owner/operator 1.	
2.	
3.	

I, the undersigned Free Miner, hereby acknowledge and understand that it is an offence to knowingly make a false statement or provide false information under the *Mineral Act*. I further acknowledge and understand that if the statements made, or information given, in this Statement of Exploration and Development are found to be false and the exploration and development has not been performed, as alleged in this Statement of Exploration and Development, then the work reported on this statement will be cancelled and the subject mineral claim(s) may, as a result, forfeit to and vest back to the Province.

J. A. Getzinger
Signature of Applicant



(i)

SUMMARY

The Aft and Rodeo claims are underlain predominantly by Jurassic Island Intrusions diorite to quartz diorite. Jurassic Bonanza Group and Triassic Karmutsen Formation basalts also occur on the Rodeo claim.

On the Rodeo claim, several anomalous values were obtained from grab samples of Island Intrusions diorite/quartz diorite and Bonanza Group volcanic rocks. Values up to 120 ppb Au, 18.9 ppm Ag, 10,006 ppm Cu, 71 ppm Mo, and 482 ppm Zn were returned. In addition, silt samples returned Cu and Mo values up to 686 ppm and 15 ppm respectively. On the Aft claim, a gold value of 10 ppb was returned from a silt sample.

The claims occur in an area which has been prospected since at least 1899, when auriferous quartz veins were reported on the present day Rodeo claim. Since then, minor amounts of placer gold have been produced from Corrigan Creek; Noranda Ltd. explored a porphyry Cu-Mo occurrence on the present day Rodeo claim from 1964 to 1970 and still hold one 2-post claim within the Rodeo claim; and the 3-W Mine, adjacent on the west to the Aft claims, has produced at least 105 tonnes (116 tons) of ore grading 131 g/t (4.0 oz/ton) Au, 147 g/t (4.3 oz/ton) Ag, 0.23% Cu, and 1.1% Pb.

Additional exploration of both claims is recommended. On the Rodeo claim, Phase I geological mapping, rock and soil sampling, and a VLF-EM survey is recommended at an estimated cost of \$30,000. Phase II detailed geological mapping and sampling, trenching, and IP surveys are recommended, contingent upon



(ii)

favourable Phase I results, to be followed by Phase III diamond drilling, if warranted by Phase II results.

On the Aft claim, Phase I geological mapping, rock and silt sampling is recommended at an estimated cost of \$4,500. Phase II detailed geological mapping and sampling, trenching, soil sampling, and a VLF-EM survey; and Phase III IP surveying and diamond drilling are recommended, each contingent upon favourable results from the previous phase.



TABLE OF CONTENTS

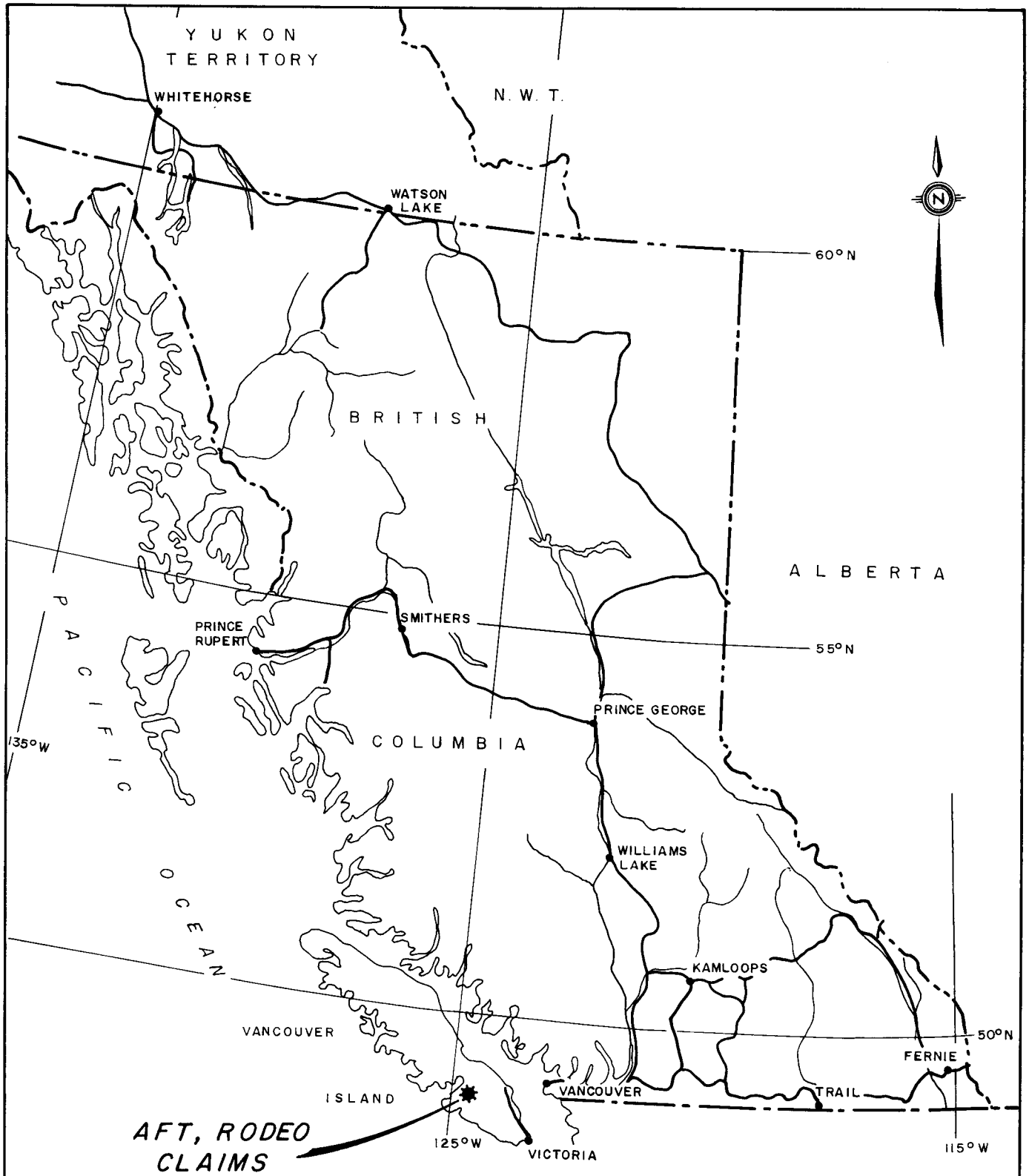
	Page
SUMMARY	(i)
1.0 INTRODUCTION	2
2.0 LOCATION, ACCESS, TITLE	3
3.0 PREVIOUS WORK	6
4.0 REGIONAL GEOLOGY	8
4.1 Sicker Group	8
4.2 Vancouver Group	12
4.3 Bonanza Group	13
4.4 Nanaimo Group	13
4.5 Intrusive Rocks	14
4.6 Structure	15
4.7 Economic Setting	16
5.0 1987 ASSESSMENT WORK	22
5.1 Geology	22
5.1.1 Aft Claim	22
5.1.2 Rodeo Claim	23
5.2 Mineralization and Rock Sampling	24
5.2.1 Aft Claim	24
5.2.2 Rodeo Claim	24
5.3 Silt Sampling	25
5.3.1 Aft Claim	25
5.3.2 Rodeo Claim	26
6.0 RECOMMENDED WORK PROGRAM	27
6.1 Plan	27
6.2 Budget	29
6.2.1 Rodeo Claim	29
6.2.2 Aft Claim	30
6.3 Schedule	31
7.0 CONCLUSIONS	32
8.0 RECOMMENDATIONS	33
CERTIFICATES - H. Kang, B.Sc.	35
- J.S. Getsinger, Ph.D.	36
REFERENCES	37




- Appendix I - List of Personnel and Statement of Expenditures
- Appendix II - Rock Sample Descriptions and Lithogeochemistry Results
- Appendix III - Certificates of Analysis/Assay
- Appendix IV - Conversion Factors for Metric Units

List of Illustrations

- | | | |
|----------|--|-----------|
| Figure 1 | - Location Map | 1 |
| Figure 2 | - Claim Map | 5 |
| Figure 3 | - Regional Geology Map | 9 |
| Figure 4 | - Mineral Occurrences Location Map | 21 |
| Figure 5 | - Property Plan, Geology and Rock Sampling - Aft, Rodeo Claims | In Pocket |



AFT, RODEO CLAIMS

CREW MINERALS INC.	
GENERAL LOCATION MAP	
AFT, RODEO CLAIMS	
ALBERNI MINING DIVISION	
Project No: V 196	By: T. N.
Scale: 1 : 8 000 000	Drawn: J. S.
Drawing No: 1	Date: APRIL 1987.
 MPH Consulting Limited	



1.0 INTRODUCTION

At the request of Crew Minerals Inc., this report was prepared as a preliminary study to aid in the assessment of the Aft and Rodeo claims in the Alberni Mining Division, B.C.

This report is based on a three-day field examination of the claims by H. Kang and B. Fletcher of MPH Consulting Limited, from January 23 to 26, 1987. Work carried out to fulfill assessment work requirements included reconnaissance geological mapping at a scale of 1:10,000, covering 7 km², and rock and silt sampling for geochemical analysis (24 rock and 9 silt samples). Snow cover up to 30 cm limited outcrop exposure and made access difficult during work on both claims.



2.0 LOCATION, ACCESS, TITLE

The Crew Minerals Inc. Aft and Rodeo claims are located 24 and 27 km south-southeast, respectively, of Port Alberni. The Aft claim is located in the Corrigan Creek valley and on the northwest slopes of Mount Olsen, centred at approximately $49^{\circ}02.1'N$ latitude, $124^{\circ}39.7'W$ longitude. The Rodeo claim is located at the headwaters of Corrigan Creek between Mount Olsen and Logan Peak, centred at approximately $49^{\circ}0.8'N$ latitude, $124^{\circ}38.6'W$ longitude. Both claims are located in the Alberni Mining Division of British Columbia and are both located on NTS mapsheet 92F/2 (Figures 1 and 2).

Access to the claims is provided by the all-weather gravel Bamfield Road from Port Alberni to the MacMillan Bloedel Corrigan Main road which follows Corrigan Creek and runs through portions of both claims. An overgrown, abandoned railway grade provides foot access to the central part of the Aft claim. Approximately 1 km before the Rodeo claim boundary is reached, the Corrigan Main road is gated by the owners of the 3W Mine, Angloquest Exploration Ltd. The slope of Mount Olsen and Logan Peak are very steep to precipitous, making a helicopter necessary for access to higher parts of the Rodeo claim.

Claim information is summarized below:

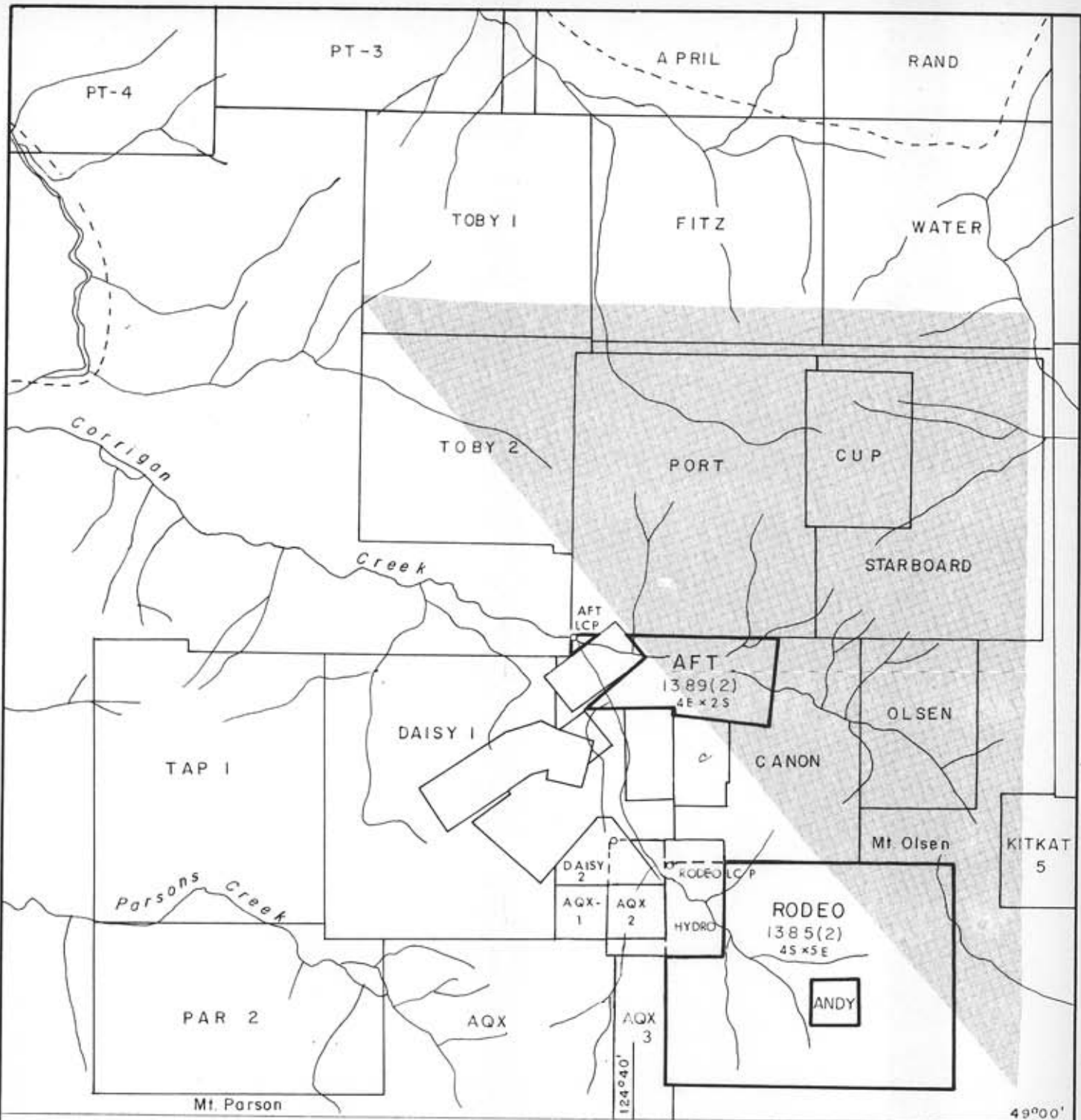
Claim	Record No.	Units	Anniversary Date	Year Registered
Rodeo	1385(2)	20	Feb. 25, 1988	1982
Aft	1389(2)	8	Feb. 25, 1988	1982
	Total	28		




4.

Both claims are owned by Ladysmith Minerals Ltd. Crew Minerals Inc. is the operator of the claims by virtue of an option agreement.

The northeast corner of the Rodeo claim and the eastern half of the Aft claim lie in an area to which Imperial Metals Corp. owns the base metal rights under an option from Fording Coal Ltd. The Andy 22 claim, which lies within the Rodeo claim, is owned by Noranda Ltd. (Figure 2).



LEGEND

 Base metal rights held by Imperial Metals Corp.



Claim boundaries approximate only.
N.T.S. 92 F/2E

CREW MINERALS INC.

**CLAIM MAP
AFT, RODEO CLAIMS**

ALBERNI MINING DIVISION

Project No. V 196	By T N
Scale 1 : 50 000	Drawn J S
Drawing No. 2	Date: APRIL 1987



MPH Consulting Limited



3.0 PREVIOUS WORK

Recent government geological work in the area includes mapping by J.E. Muller and D.J.T. Carson (1969), and J.E. Muller (1977 and 1980).

During the years 1963 to 1966, Gunnex Ltd. carried out a regional mapping program over a large portion of the E&N Land Grant, with limited prospecting and silt sampling. They compiled a list of all known mineral occurrences in the area and visited many of them.

No other previous work has been recorded on the Aft claim. On the Rodeo claim a Cu-Mo stockwork showing in Island Intrusions granodiorite (Andy claims or Arland's Showing) was explored by Noranda Exploration Co. Ltd. from 1964-70. Noranda carried out silt sampling, soil sampling; EM, magnetometer, and IP surveys; and drilled 19 diamond drill holes totalling 2235 m. Results of the work are unavailable. In 1970, the property was made up of 66 claims. It occurs within the boundaries of the Rodeo claim (Figure 2).

The Golden Slipper and Golden Rule claims were operated in 1899 and 1900 on the present Rodeo claim. A limited amount of work was done on quartz(?) vein(s) carrying values of \$17.50 to \$40.00 in gold, silver, and copper (1900 values). There is no record of any work since 1900 on the Au-quartz veins or since 1970 on the Cu-Mo stockwork.

A brief program of geological mapping, rock sampling and silt sampling was carried out on the Aft and Rodeo claims by MPH



7.

Consulting Limited for Ladysmith Minerals Ltd. in February 1985 (Hawkins and Neale, 1985). A zone of anomalous Cu in Bonanza(?) volcanics was located on the Rodeo claims. Silt samples collected from below this zone are more anomalous downstream from the zone, indicating that the sampled zone may be the fringe of a more heavily mineralized zone.

A similar assessment program (geological mapping, rock and silt sampling) was carried out by MPH Consulting Limited in February 1986. More accessible areas of the claims were mapped and grab samples from abundant quartz veins cutting Island Intrusions and Bonanza Group rocks on the Rodeo claim returned anomalous values up to 3.02 g/t (0.088 oz/ton) Au, 119.3 g/t (3.48 oz/ton) Ag, 4.10% Cu and 866 ppm Mo.

Refer to the Mineral Occurrence section in report by Neale and Hawkins (1986) for further information on the Andy, Golden Slipper, and Golden Rule occurrences.



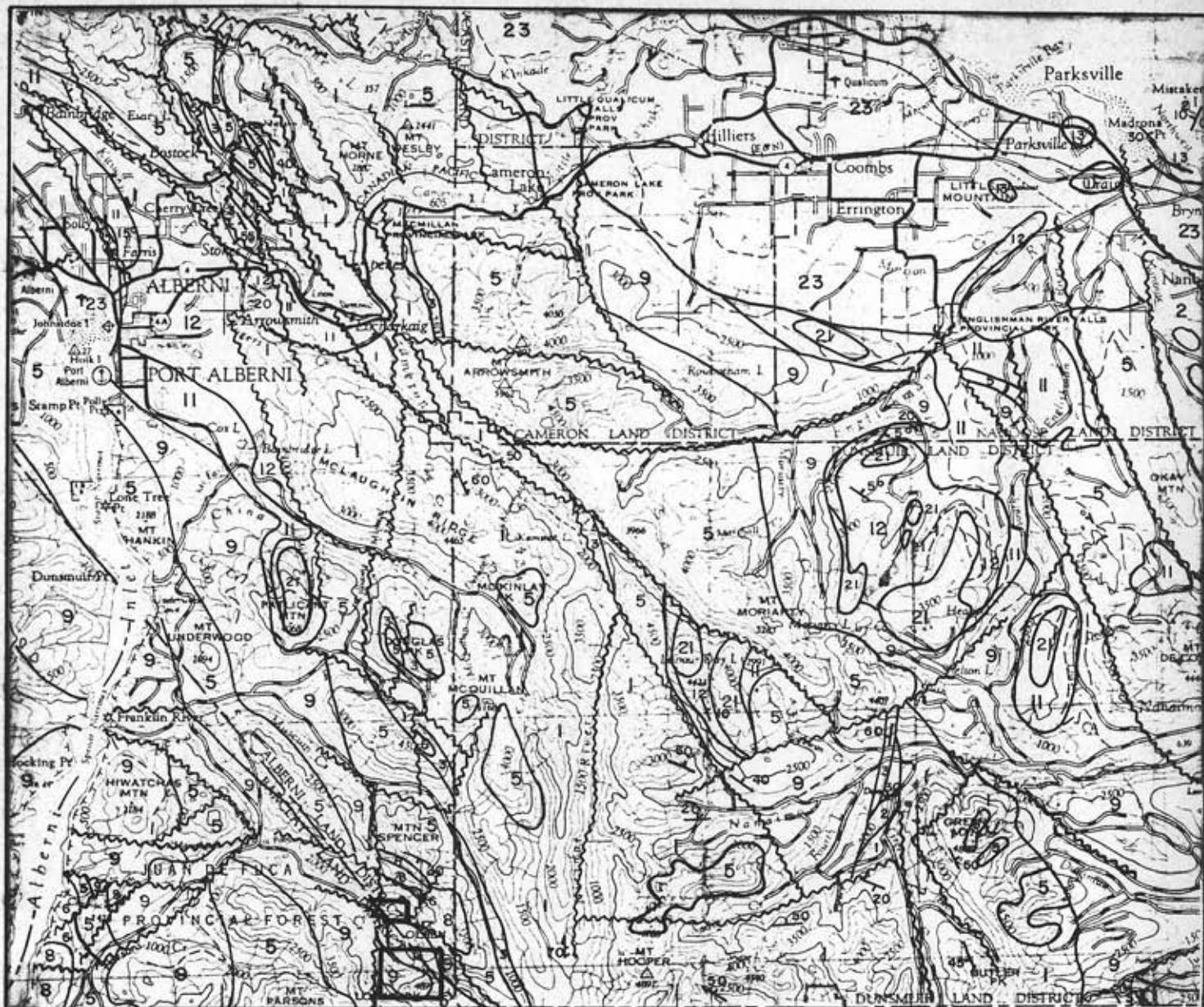
4.0 REGIONAL GEOLOGY

The predominant rock units in the Port Alberni-Nitinat River area are the Upper Paleozoic Sicker Group rocks and the Lower Mesozoic Vancouver Group rocks. Both are eugeosynclinal sequences of volcanic and sedimentary rocks. Jurassic Bonanza Group volcanics are present in moderate amounts in the southern part of the area. Lesser amounts of the Upper Cretaceous Nanaimo Group and of intrusive rocks of various ages also occur (Figure 3).

4.1 Sicker Group

The oldest rocks in the area are those of the Sicker Group. Muller (1980) proposed the following subdivisions of the Group from oldest to youngest: Nitinat Formation, Myra Formation, Sediment-Sill Unit, and Buttle Lake Formation.

The **Nitinat Formation** (Unit 1) consists predominantly of mafic volcanic rocks, most commonly flow-breccias or agglomerates, including some massive flows, and rare pillow basalts. Locally, medium grained, generally massive basaltic tuff is interbedded with the flows. The thickness of the Nitinat Formation is estimated at 2000 m (Muller 1980). The flow-breccia is composed of fragments of basalt up to 30 cm in length containing phenocrysts of uralitized pyroxene, as well as amygdules, both from 1 mm to more than 1 cm in size, in a matrix of finer grained, similar basalt(?). Thin sections indicate pale green amphibole (uralite) replaces clinopyroxene. Uralitized gabbroic rocks underlie and intrude the volcanics and are believed to represent feeder dykes, sills, and magma chambers to the



LEGEND

QUATERNARY

23 Glacial and alluvial deposits

TERTIARY

21 Hornblende quartz diorite, leucoquartz monzonite, porphyritic dacite, breccia.

UPPER CRETACEOUS NANAIMO GROUP

13 EXTENSION-PROTECTION FM.: sandstone, conglomerate, shale, coal.

12 HASLAM FM.: shale, siltstone, fine sandstone.

11 COMOX FM.: sandstone, conglomerate, shale, coal.

MIDDLE TO UPPER JURASSIC

9 ISLAND INTRUSIONS: biotite - hornblende granodiorite, quartz diorite.

LOWER JURASSIC

8 BONANZA GROUP: andesitic to latitic breccia, tuff, and lava; minor greywacke, argillite, and siltstone.

UPPER TRIASSIC

VANCOUVER GROUP

6 QUATSINO FM.: massive to thick bedded limestone, minor thin bedded limestone.

5 KARMUTSEN FM.: pillow-basalt and pillow breccia, massive basalt flows; minor tuff, volcanic breccia; Jasperoid tuff, breccia and conglomerate at base.

TRIASSIC OR PERMIAN

4 Gabbro, periodite, diabase.

LOWER PERMIAN TO PENNSYLVANIAN SICKER GROUP

3 BUTTLE LAKE FM.: limestone, chert.

2 MYRA FM.: lower unit; argillite, greywacke, conglomerate, tuff, minor limestone. Upper unit; rhyodacite to rhyolite tuff, lapilli tuff, breccia lesser siliceous siltstone, argillite, quartz porphyry and mafic flows.

1 NITINAT FM.: basaltic uralite porphyry, agglomerate, pillow lava; greenschist.

0 5 10 km



CREW MINERALS INC.

**REGIONAL GEOLOGY MAP
AFT, RODEO CLAIMS**

ALBERNI MINING DIVISION

Project No. V 196	By: T. N.
Scale: 1 : 250,000	Drawn: J. S.
Drawing No. 3	Date: APRIL 1987

MPH MPH Consulting Limited

volcanics. The Nitinat Formation may be distinguished from the similar Karmutsen Formation by the abundance of uralite phenocrysts, the usual lack of pillow basalts, lack of dallasite alteration between pillows (characteristic of the Karmutsen Formation), the locally pervasive foliation, and lower greenschist or higher metamorphic grade.

The **Myra Formation** (Unit 2) unconformably overlies the Nitinat Formation. In the Nitinat-Cameron River area, the Myra Formation is made up of a lower massive to widely banded basaltic tuff and breccia unit, a middle thinly banded pelitic albite-trachyte tuff and argillite unit, and an upper thick bedded, medium grained albite-trachyte tuff and breccia unit. In the lower unit, crudely layered mottled maroon and green volcanoclastic greywacke, grit, and breccia are succeeded by beds of massive, medium grained dark tuff up to 20 m thick interlayered with thin bands of alternating light and dark, fine grained tuff with local fine to coarse breccias containing fragments of Nitinat Formation volcanics. The middle unit comprises a sequence of thinly interbedded, light feldspathic tuff (albite trachyte or keratophyre composition) and dark marine argillite which has the appearance of a graded greywacke-argillite turbidite sequence. In the upper part of the middle unit, sections of thickly bedded to massive black argillite occur. The upper unit contains fine and coarse crystal tuffs in layers up to 10 m thick with local rip-up clasts and slabs of argillite up to 1 m in length as well as synsedimentary breccias of light coloured volcanic and chert fragments in a matrix of black argillite.

The type locality of the Myra Formation is Myra Creek, at the south end of Buttle Lake, about 88 km northwest of the Aft and



Rodeo claims. There, volcanoclastic rocks consisting dominantly of rhyodacitic or rhyolitic tuff, lapilli tuff, breccia, and some quartz porphyry and minor mafic flows and argillite (Upper Myra Formation) are host to Westmin Resources' Myra, Lynx, Price, and H-W massive sulphide (Cu-Zn-Pb-Au-Ag-Cd) deposits. The Myra Formation is approximately 750 to 1000 m thick and both the Nitinat and Myra Formations are dated as Devonian and/or older, Muller (1980).

The **Sediment-Sill** Unit contains thinly bedded to massive argillite, siltstone, and chert with interlayered sills of diabase. It is transitional between the Myra and Buttle Lake Formations. It has not been mapped within the area of this report.

The **Buttle Lake Formation** (Unit 3) consists of a basal green and maroon tuff and/or breccia, overlain by coarse grained crinoidal and calcarenitic limestone, fine-grained limestone with chert nodules, and some dolomitic limestone. Lesser amounts of argillite, siltstone, greywacke, or chert may also be present.

The Buttle Lake Formation is up to 470 m thick. Based on fossil evidence, the Buttle Lake Formation has been dated at Middle Pennsylvanian but is possibly as young as Early Permian (Muller, 1980). Confirmation of this age through recent work done by Brandon and others (1986) includes isotopic and conodont ages indicating that rocks of the Buttle Lake Formation are early Middle Pennsylvanian (Atokan) through Early Permian (probably Sakmarian).



4.2 Vancouver Group

The **Karmutsen Formation** volcanic rocks (Unit 5) unconformably to paraconformably overlie the **Buttle Lake Formation** limestone, forming the base of the Vancouver Group. This is the thickest and most widely distributed sequence of rocks on Vancouver Island. The formation, which is well exposed southeast of Port Alberni, consists mainly of dark grey to black pillowed basalt, massive basalt and pillow breccia. Flows are commonly aphanitic and amygdaloidal. Pillow lavas occur locally, generally near the base of the section.

Volcanic conglomerate containing clasts of Sicker Group rocks and jasperoid tuff form basal sections in the Nitinat-Horne Lake area.

Karmutsen Formation rocks are generally undeformed relative to Sicker Group rocks, and are Upper Triassic and older in age.

Massive to thick bedded limestone of the **Quatsino Formation** (Unit 6) occurs south of Mount Spencer. The limestone is black to dark grey and fine grained to microcrystalline. Coarse-grained marble occurs in the vicinity of intrusive rocks. Thin bedded limestone also occurs within the formation. Fossils indicate an age of Upper Triassic (Muller and Carson, 1969).

Quatsino Formation limestone hosts the majority of known economic skarn deposits on Vancouver Island.

4.3 Bonanza Group

The **Bonanza Group** (Unit 8) stratigraphy varies considerably as it represents parts of several different eruptive centres of a volcanic arc. Basaltic, rhyolitic, and lesser andesitic and dacitic lava, tuff, and breccia with intercalated beds and sequences of marine argillite and greywacke make up the Bonanza Group. In the area south of Mount Spencer and south of Corrigan Creek, it consists of light coloured andesite to latite breccia, tuff, and flows with minor greywacke, argillite, and siltstone. The Bonanza volcanics are considered to be extrusive equivalents of the Island Intrusions and to be of Early Jurassic age.

4.4 Nanaimo Group

Upper Cretaceous Nanaimo Group sedimentary rocks are scattered throughout the area. Extensive exposures occur near Port Alberni, Patlicant Mountain and south and northwest of Mount Moriarty. The formations present comprise the basal portions of the Nanaimo Group.

The **Comox Formation** (Unit 11) consists mainly of quartzofeldspathic, cross-bedded beach facies sandstone and lesser conglomerate. Numerous intercalations of carbonaceous and fossiliferous shale and coal are characteristic.

The **Haslam Formation** (Unit 12) is a near shore littoral depositional facies unit characterized by thickly bedded fossiliferous sandy shale, siltstone and shaly sandstone.



Interbedded coarse clastic conglomerate, pebbly sandstone and arkosic sandstone of the **Extension-Protection Formation** (Unit 13) are beach and deltaic sands. Minor shale and coal are reported.

4.5 Intrusive Rocks

Gabbro, Peridotite, Diabase (Unit 4). Mafic and ultramafic rocks of Triassic or Permian age are scattered throughout the area. A large band is exposed approximately 8 km north of Port Alberni.

Although mapped as intrusive, some of these rocks may be basal flow units of the Karmutsen Formation.

Island Intrusions (Unit 9). Exposures consisting mainly of quartz diorite and lesser biotite-hornblende granodiorite occur throughout the area and are assigned an age of Middle to Upper Jurassic. Intrusive contacts with Sicker and Bonanza Group volcanic rocks are characterized by transitional zones of gneissic and migmatitic rocks, whereas contacts with Karmutsen Formation volcanic rocks are sharp and well defined. Skarn zones are reported at the contacts of Island Intrusions with Quatsino Formation limestone, and less commonly with Buttle Lake Formation limestone.

Tertiary (Catface or Sooke) Intrusions (Unit 21). Sills and stocks of mainly hornblende-quartz diorite and dacitic hornblende-feldspar porphyry plus lesser leucocratic quartz monzonite intrude Nanaimo Group sedimentary rocks and Sicker Group rocks in the area.

4.6 Structure

The Buttle Lake Arch, Cowichan-Horne Lake Arch and Nanoose Uplift are north-northwesterly trending axial uplifts and are believed to be the oldest structural elements of south central Vancouver Island. Folding and uplift occurred before the Late Cretaceous, and possibly before the Mesozoic (Muller and Carson, 1969) and additional tilting, folding and uplift occurred after the Late Cretaceous. Sicker Group volcanic and sedimentary rocks occur at the core of these uplifts.

Asymmetric southwest verging, northwest trending, antiformal structures, characterized by subvertical southwest limbs and moderately dipping northeast limbs, are reported at Buttle Lake and in the Cameron-Nitinat River area. Intense shearing and metamorphism to chlorite-actinolite and chlorite-sericite schist occurs in steep and overturned limbs of folds. Folding, as evidenced by K-Ar dating, occurred during the Jurassic. The overlying Buttle Lake Formation limestones are relatively undeformed locally, but are known to be highly deformed in other areas (Brandon and others, 1986).

Vancouver Group units are not as intensely folded; gentle monoclinal and domal structures have been mapped. However, Karmutsen Formation volcanic rocks locally conform to the attitude of underlying Myra and Buttle Lake Formations (Muller, 1980).

Some early Mesozoic faulting occurred in the area prior to emplacement of Island Intrusions. Middle to Upper Jurassic intrusive activity (Island Intrusions) occurred along northwesterly trends.

Extensive west-northwest trending faulting occurred during the Tertiary and is best illustrated by large displacements of Nanaimo Group sediments. The north-trending Alberni Valley fault is traced over 70 km and displaces a section of Karmutsen Formation approximately 1500 m (Muller and Carson, 1969).

4.7 Economic Setting

The Sicker Group, and to a lesser extent, the Vancouver Group of volcanics rocks, have been explored intermittently since the 1890's for gold and base metal mineralization.

Until recently, deposits of copper and gold-silver in quartz veins and shear zones hosted by mafic to intermediate volcanic rocks and base metal plus gold-silver skarn deposits were the most widely recognized economic and subeconomic metal concentrations in the Port Alberni area. Placer mining for gold was carried out during the 1940's in various localities, especially in the China, Mineral and Corrigan Creeks areas.

At Buttle Lake, approximately 70 km northwest of Port Alberni, the Myra Formation hosts Westmin Resources' volcanogenic massive sulphide deposits. Initially discovered in 1917, it was not recognized as being a volcanogenic deposit until the late 1960's. Ore minerals including sphalerite, chalcopyrite, galena, tetrahedrite-tennantite, minor bornite and covellite are hosted by pyritic, rhyolitic to rhyodacitic volcanic and pyroclastic rocks of the Myra Formation.



Proven reserves of the Lynx (open pit), Price and Myra deposits are 926,600 t grading 1% Cu, 0.9% Pb, 7.4% Zn, 2.06 g/t Au (0.06 oz/ton, 89.1 g/t Ag (2.6 oz/ton) (1983). Published reserves of the H-W zone are 13,901,000 t averaging 2.2% Cu, 5.3% Zn, 0.3% Pb, 2.40 g/t Au (0.07 oz/ton) and 37.7 g/t Ag (1.1 oz/ton) (Walker, 1983). In the 3 years 1980 to 1982, there were 811,987 t of ore milled producing 7,306,880 kg Cu, 43,706,118 kg Zn, 6,455,040 kg Pb, 1,740,000 g Au (56,000 oz), 78,630,000 g Ag (2,528,000 oz) and 58,500 kg Cd.

Another volcanogenic massive sulphide deposit in the Sicker Group is the Twin J Mine near Duncan on Mount Sicker, about 68 km southeast of the Rodeo claim. Two parallel orebodies, 46 m apart, each containing pyrite, chalcopyrite, sphalerite and minor galena in a barite quartz-calcite gangue and chalcopyrite in quartz, occur in schists believed to have been derived from acidic volcanics (Myra Formation).

Total production from 1898 to 1964 was 277,400 tonnes producing 1,383,803 g Au (44,491 oz), 29,066,440 g Ag (934,522 oz), 9,549,590 kg Cu and 20,803,750 kg Zn with at least 164,590 kg Pb and 4.5 kg Cd.

A significant recent development in the Sicker Group is the delineation of a large volcanogenic massive sulphide zone on the Lara property, 60 km southeast of the Aft and Rodeo claims. On the Lara property, Aberford Resources Ltd. (now Abermin Corp.) has completed at least 69 diamond drill holes on geochemical and geophysical anomalies. In January 1985, an intersection of 8.0 m (true thickness) of mineralization grading 3.4 g/t Au (0.1 oz/ton), 67.5 g/t Ag (1.97 oz/ton), 3.01% Zn, 0.68% Cu and 0.45%



Pb was announced. This was the discovery hole of the Coronation Zone. By January 1986, the Coronation Zone had been outlined by drilling for a length of 500 m and to depths ranging from 75 to 250 m. The width averages 6.15 m. The western 400 m of the zone averages 1.75 g/t Au (0.051 oz/ton), 38.4 g/t Ag (1.12 oz/ton), 1.98% Zn, 0.44% Cu, and 0.36% Pb; while the eastern, high-grade 120 m section averages 2.98 g/t Au (0.087 oz/ton), 69.9 g/t Ag (2.04 oz/ton), 3.8% Zn, 0.67% Cu, and 0.79% Pb. The Coronation Extension is located about 275 m southeast of the Coronation Zone. It has been explored over a strike length of 80 m and to depths of 150 m and averages about 3 m in width. Several rich intersections have been drilled, including 3.7 m of 7.3 g/t Au (0.213 oz/ton), 2.6 g/t Ag (8.6 oz/ton), 9.22% Zn, 1.16% Cu, and 2.53% Pb. Both zones are open at depth and the Coronation Zone is open along strike. A feasibility study on the establishment of a 300- 500 tonne per day milling operation was planned for early 1987.

The mineralized zones are stratiform and are hosted by porphyritic rhyolites of the Sicker Group. Metal ratios of the Coronation zone are similar to those of the Buttle Lake mines (Westmin Resources Ltd.) The Twin J Mine is located 9 km southeast of the Lara property (i.e. on strike) and is geologically similar.

Five past producing mines occur in the Port Alberni area. The Thistle Mine produced 85,844 g Au (2,760 oz), 65,938 g Ag (2,120 oz) and 309,090 kg Cu from 6,280 tonnes (6,920 tons) of ore. It was originally considered to be a skarn deposit (Stevenson, 1945; Carson, 1968). Disseminated and massive sulphide mineralization occurs as lenses and bands within pyritic quartz-sericite schist



and at the contact of quartz-sericite schist with chloritized mafic volcanic rocks (Sicker Group). Disseminated sulphide mineralization occurs throughout the host rocks. The deposit is now believed to be of syngenetic-volcanogenic origin. Recent work by Westmin Resources Ltd. (1983, 1984) has located 16 significant Cu and/or Au occurrences over a strike length of 4.6 km grading up to 16.8 g/t Au (0.49 oz/ton) over 2.1 m. Nine diamond drill holes (1984) intersected numerous anomalous concentrations of Au, although no ore grade Au-Cu was intersected over mining widths. The Thistle Mine is located 9 km northwest of the Aft and Rodeo claims.

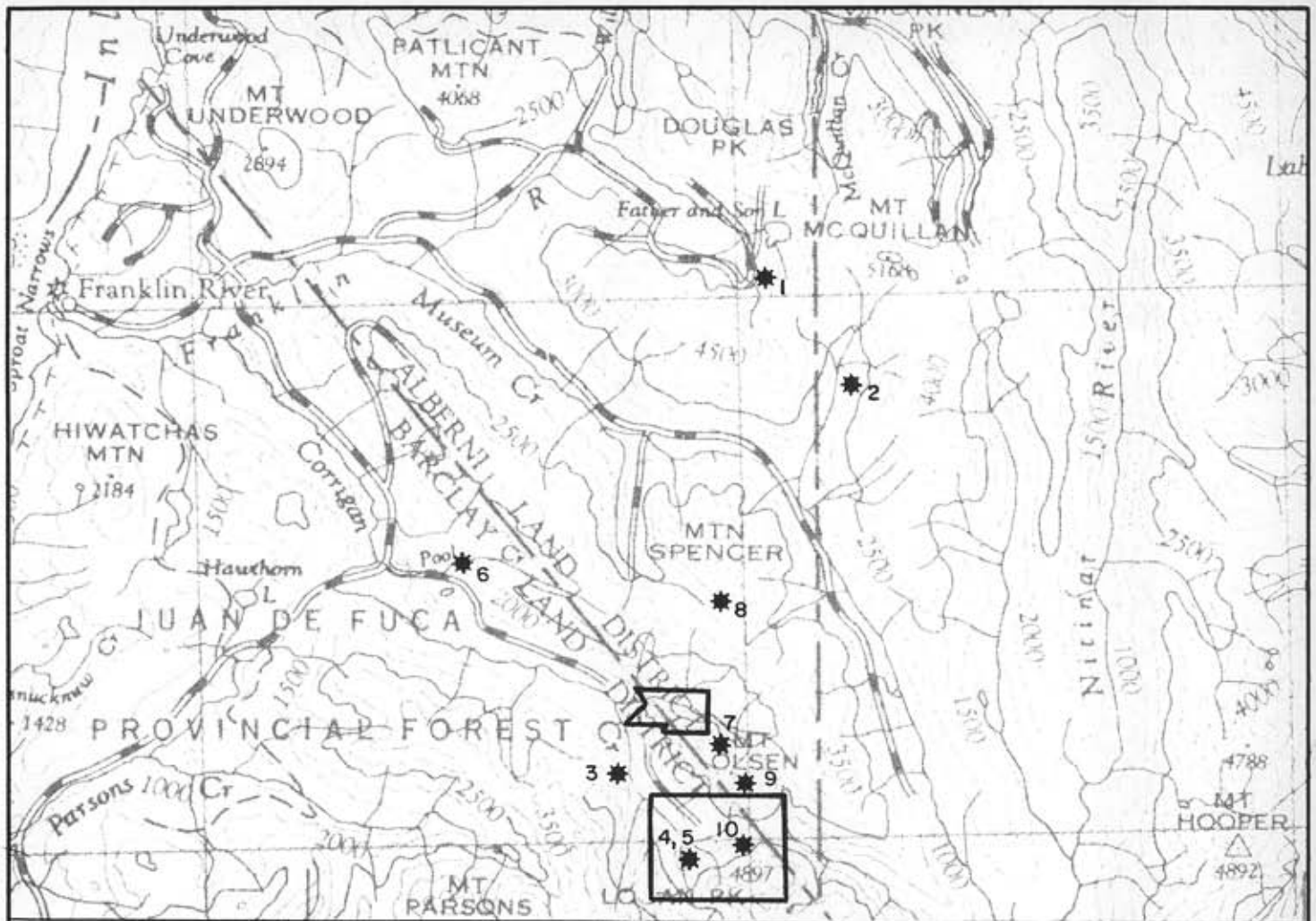
The Havilah Mine (950 t produced 8,056 g Au (259 oz), 43,670 g Ag (1,404 oz)) and the Vancouver Island Gold Mine (438 t produced 11,944 g Au (384 oz), 1,617 g Ag (52 oz)) are quartz vein deposits hosted by andesite and andesite tuff of the Sicker Group and are located 11 km and 18 km, respectively north of the Aft and Rodeo claims.

The Black Panther Mine is a quartz vein deposit hosted by a shear zone in Sicker Group andesite and Island Intrusions diorite located 9 km north of the Rodeo claim. Production of 1,715 t yielded 15,830 g Au (509 oz), 29,640 g Ag (953 oz), 5,587 kg Pb and at least 2,030 kg Zn and 226 kg Cu.

The other past producer in the area is the 3-W Mine which consists of gold-bearing quartz veins in Island Intrusions diorite and granodiorite. Production amounts to 105 t of ore grading 137 g/t Au (4.0 oz/ton), 147.4 g/t Ag (4.3 oz/ton), 0.23% Cu, 1.1% Pb. The 3-W Mine is located 2 km northwest of the Rodeo claim adjacent to the Aft claim.



Significant mineral occurrence locations in the Port Alberni and Aft and Rodeo claim area are shown on Figure 4. A summarized description of each of these occurrences may be referred to in the mineral occurrences section in the report by Neale and Hawkins (1986).



GOLD OCCURRENCES

- 1. Thistle
- 2. Black Panther
- 3. 3-W
- 4. Golden Slipper
- 5. Golden Pule
- 6. Starlight
- 7. Canon

OTHER OCCURRENCES

- 8. Cup
- 9. Mt. Olsen
- 10. Andy



Mineral occurrences described in
Neale and Hawkins (1986).

CREW MINERALS INC.

MINERAL OCCURRENCE
LOCATION MAP
AFT, RODEO CLAIMS

Project No.	V 196	By	T. N.
Scale	1:125 000	Drawn	J. S.
Drawing No.	4	Date	APRIL 1987



MPH Consulting Limited



5.0 1987 ASSESSMENT WORK

One day (January 26, 1987) was spent mapping, prospecting and rock sampling on the Aft claim. Eight rock samples and one silt sample were collected and subsequently analyzed by AA for Au and by 30-element ICP.

A total of two days (January 23, 25, 1987) was spent mapping, prospecting and rock sampling over the Rodeo claim. Sixteen rock samples and eight silt samples were collected and subsequently analyzed by the same methods described above. Snow cover up to 30 cm significantly reduced outcrop exposure for mapping.

5.1 Geology

5.1.1. Aft Claim

The Aft claim is predominantly underlain by various intrusive rocks of Jurassic Island Intrusions ranging from quartz diorite to more mafic diorite, medium- to coarse-grained and grey to green in colour. Large blocks of mafic volcanic, probably of Karmutsen Formation basalt, are found downslope from the southern claim boundary, and in the valley bottom on either side of the creek. The intrusive/volcanic contact is assumed to lie approximately 300-400 m south of the creek, on the north face of Mt. Olsen. Blocky inclusions of dark green, slightly purple to lavender, aphanitic volcanic rocks (basalt?) are found within the steep, bluff-forming, granodioritic to dioritic outcrops. These volcanic inclusions may indicate proximity to the geologic contact, which could be established by more detailed mapping.



Also occurring within the Aft claim are grey feldspar porphyritic xenoliths(?) of varying size with subhedral crystals, 1-3 mm in a siliceous aphanitic groundmass.

Structurally, the property hosts a major east-west oriented fault (as mapped by Muller, 1980), surficially expressed by the creek. There is no evidence of fault displacement, but the creek is a fairly strong delineation, cutting the property into north and south portions.

Mineralization on the Aft claim is not particularly encouraging from an economic point of view. Trace amounts of disseminated pyrite grains occur locally.

5.1.2 Rodeo Claim

The property is predominantly underlain by various intrusive rocks assigned to the Island Intrusions and the overlying, hornfelsed basalt/andesite of the Bonanza Group. The contact is approximately east-west and flat-lying in orientation, and roughly parallels the old, abandoned logging road which crosses the property. The dominant intrusive body is grey to dark grey, rusty weathering, fine- to medium-grained quartz diorite/diorite. These rocks locally show signs of deformation in the form of blurred crystal boundaries and stretched and elongated mafic components forming crude layers, producing an overall foliated texture. The typical volcanic rocks are dark grey to black, rusty weathering, fine-grained andesite/basalt with subhedral feldspar phenocrysts up to 2 mm in size. Euhedral hornblende crystals (2-3 mm) are especially prominent on weathered surfaces.



An east-west fault with sinistral movement exposed in Corrigan Creek was observed by Neale and Hawkins (1986). A related mylonitic zone was seen near the headwaters of the creek. Two north-south trending faults with dextral movements in the south half of the Rodeo claim are displaced by the east-west fault. Continuations of the dextral faults were not observed north of Corrigan Creek (Neale and Hawkins, 1986). Evidence of faulting was not observed during this year's assessment work.

5.2 Mineralization and Rock Sampling

5.2.1 Aft Claim

Rocks on the Aft claim were not found to be well-mineralized. Trace amounts (less than 1%) of disseminated pyrite locally occur in dioritic rocks. One sample, 15567, returned 235 ppm Cr. Sample 15567 is a fine-grained andesite(?) with poorly defined feldspar phenocrysts about 1 mm in size.

5.2.2 Rodeo Claim

On the Rodeo claim, both the intrusive and the volcanic units are commonly mineralized with disseminated blebs and discontinuous stringers of pyrite. Best mineralized rocks contain up to 12-15% pyrite. Lesser amounts of chalcopyrite, pyrrhotite, and trace molybdenite, bornite, covellite are found in dioritic rocks. The best mineralized part of the property, according to observations made during this year's assessment work, is the south-central portion of the Rodeo claim near the western boundary of the Andy claim of Noranda Exploration Ltd. One sample, 15564, returned



10,006 ppm Cu, 482 ppm Zn, 18.9 ppm Ag, and 120 ppb Au. Three other intrusive rock samples from this area returned anomalous values of Mo and Cu. Sample 15563 returned 12 ppm Mo and 1042 ppm Cu, while sample 15565 returned 71 ppm Mo and 2238 ppm Cu. Sample 15566, taken from the bluff-forming outcrop 140 m above the old logging road, returned 47 ppm Mo, 2219 ppm Cu. Other anomalous values were returned from samples taken near the southwest corner of the claim in the vicinity of the north-south trending creek, which may be the surface expression of a fault. Sample 15557, granodiorite from 150 m above the old logging road, returned 450 ppm Cu. Two other samples from this area, 15558 and 15559, returned Cu values of 260 ppm and 334 ppm respectively. Sample 15558 is diorite, while sample 15559 was taken from a quartz vein hosted by the diorite.

5.3 SILT SAMPLING

5.3.1 Aft Claim

One silt sample was collected on the Aft claim, from a south flowing creek near the northern claim boundary. This sample returned 10 ppb Au, 0.4 ppm Ag, and did not return any anomalous concentrations for base metals.

Silt sampling on the Aft claim was a difficult task due to fast moving stream currents that did not permit silt deposition. Most of the creek beds consist of gravel, and coarser cobbles and boulders.



5.3.2 Rodeo Claim

Five of the eight silt samples were collected from the southern portion of the property. The other three samples, 87-RS-6, 87-RS-7, and 87-RS-8, were taken from the northwestern corner portion of the claim. These samples returned Mo values of 9 ppm, 5 ppm, and 15 ppm, respectively. Sample 87-R-3, collected from a north trending creek near the western boundary of the Andy claim, returned 15 ppm Mo and 686 ppm Cu. Two other samples, 87-RS-1 and 87-RS-2, were collected approximately 200 m apart from a roadside ditch that extends westward from the sample location of 87-RS-3. Sample 87-RS-1 returned 11 ppm Mo and 298 ppm Cu, while 87-RS-2 yielded 3 ppm Mo and 225 ppm Cu. The mineralized dioritic rocks immediately to the south of the old logging road seem to be the source of the anomalies.



6.0 RECOMMENDED WORK PROGRAM

6.1 Plan

Phase I exploration including geological mapping, rock sampling, soil sampling, and a VLF-EM survey is recommended for the Rodeo claim and geological mapping, rock and silt sampling is recommended for the Aft claim.

On the Rodeo claim, geological mapping and rock sampling will be conducted over all accessible parts of the property, to follow up anomalous areas. A flagged grid with north-south trending lines spaced 100 m apart will be established over the southern portion of the claim. Results indicate that this area is anomalous in Au, Cu, Ag, Zn and Mo and is considerably flatter than the north half. Soil samples are to be collected at 50 m intervals along grid lines and VLF-EM readings will be taken at 12.5 m intervals on all grid lines. The VLF-EM survey should aid in locating mineralized quartz veins.

On the Aft claim, geological mapping and rock sampling should be conducted in the areas not covered by previous assessment work particularly in the higher areas. Silt sampling should be at 50 m intervals along the main creek, in conjunction with geological mapping and rock sampling.

If warranted by the results of Phase I exploration, the Phase II program for the Rodeo claim is to consist of detailed geological mapping, trenching, and rock sampling of anomalous grid areas with IP surveying to define drill targets. Phase III work, if warranted by Phase II results, will consist of diamond drilling of the highest priority target(s).



On the Aft claim, Phase II exploration will include detailed geological mapping, rock sampling, grid soil sampling, a VLF-EM survey, and trenching, contingent upon favourable Phase I results. If warranted by Phase II results, Phase III on the Aft claim will consist of IP surveying followed by diamond drilling of the highest priority target(s).

The following detailed cost estimates are for Phase I exploration of the Rodeo and Aft claims. Phases II and III are contingent upon results of Phase I exploration.



6.2 Budget

6.2.1 Rodeo Claim

Phase I

Personnel:

- Geologist	10 days @ \$350	\$3,500	
- Soil Samplers/ Geophysical Technicians (3)	10 days @ 175	<u>5,250</u>	\$ 8,750

Support Costs:

- Food and Accommodation	40 mandays @ 40	\$1,600	
- 4WD Truck	12 days @ 110	1,100	
- Miscellaneous Supplies		<u>200</u>	2,900

VLF-EM Receiver	10 days @ 25		300
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Analyses:

- 100 rocks @ \$12.75 (Au, ICP)		\$1,275	
- 5 rocks @ \$32.00 (whole rock)		160	
- 400 soils @ \$10.60 (Au, ICP)		<u>4,240</u>	5,675

17,625

Administration @ 15% (on \$8,875)

1,331

18,956

Contingency @ 15%

2,844

Field Work Subtotal

21,800

Consulting/Supervision:

- 2 days @ \$500		\$1,000	
- Expenses		<u>200</u>	1,200

Report:

- Geologist	6 days @ \$350	\$2,100	
- Geophysicist	1 day @ 450	450	
- Drafting	30 hours @ 18	540	
- Materials, Typing, Copying		<u>1,000</u>	4,090

5,290

Administration @ 15% (on \$1,740)

261

5,551

Contingency @ 15%

832

Office/Consulting subtotal

6,383

Phase I Total, say

\$30,000

**6.2.1 Aft Claim****Phase I****Personnel:**

- Geologist	2 days @ \$350	\$ 700	
- Prospector	2 days @ 250	<u>500</u>	\$ 1,200

Support Costs:

- Food and Accommodation	4 mandays @ 40	\$ 160	
- 4WD Truck	2 days @ 110	220	
- Miscellaneous Supplies		<u>100</u>	480

Analyses:

- 25 rocks @ \$12.75 (Au, ICP)		\$ 319	
- 10 silts @ \$12.00 (Au, ICP)		<u>120</u>	439

2,119

Administration @ 15% (on \$919)

138

2,257

Contingency @ 15%

339

Field Work Subtotal

2,596

Consulting/Supervision:

- 0.5 day @ \$500		\$ 250	
- Expenses		<u>75</u>	325

Report:

- Geologist	2 days @ \$350	\$ 700	
- Drafting	8 hours @ 20	160	
- Materials, Typing, Copying		<u>400</u>	1,260

1,585

Administration @ 15% (on \$635)

95

1,680

Contingency @ 15%

252

Office/Consulting subtotal

1,932

Phase I Total, say

\$ 4,500



6.3 Schedule

Two separate budgets have been proposed for the first work phase for the Rodeo and Aft claims, as outlined above. The estimated time requirement for work on the Rodeo claim is approximately three weeks and on the Aft claim is less than one week at estimated costs of \$30,000 and \$4,500 respectively.



7.0 CONCLUSIONS

1. The Rodeo claim is underlain by Island Intrusions granodiorite to diorite and Bonanza Group and Karmutsen Formation basalts/andesites.
2. Several anomalous values were returned from grab samples of Island Intrusions diorites/granodiorites and Bonanza Group rocks on the Rodeo claim. Values up to 120 ppb Au, 18.9 ppm Ag, 10,006 ppm Cu, 71 ppm Mo, and 482 ppm Zn were returned. The intrusive rocks near the western boundary of the Andy 22 claim, within the central Rodeo claim, are the best mineralized part of the property.
3. Silt samples from the Rodeo claim returned Cu and Mo values up to 686 ppm and 15 ppm respectively.
4. Gold bearing quartz veins located on the present Rodeo claim were prospected in 1899-1900 and were reported to have averaged up to \$40/ton in Au+Ag+Cu (1900 values).
5. Additional exploration of the Rodeo claim to follow up the results of 1987 assessment work is warranted.
6. The Aft claim is underlain by Island Intrusions diorite, commonly containing mafic volcanic (Karmutsen Formation?) inclusions of variable sizes.
7. A value of 10 ppb Au was returned from the silt sample taken from the Aft claim, which is adjacent to the 3-W Mine property (Au in quartz veins).
8. Additional work is required to determine whether or not the Aft claim has economic potential.



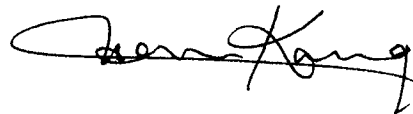
8.0 RECOMMENDATIONS

1. It is recommended that the boundaries of complexly overlapping claims in the area be established precisely so that no work is done off the property.
2. It is recommended that results from Noranda's 1964-1970 exploration of the Rodeo claim area be obtained, if possible, and considered in planning future exploration of the Rodeo claim.
3. Phase I exploration of the Rodeo claim consisting of geological mapping and sampling, soil sampling and a VLF-EM survey is recommended at an estimated cost of \$30,000.
4. It is recommended that particular attention be paid to the area of the Rodeo claim south of Corrigan Creek where pyrite mineralization up to 15% and visible molybdenite were observed. A soil sampling and VLF-EM grid is recommended to cover this area.
5. Phase I exploration of the Aft claim consisting of geological mapping, rock sampling, and silt sampling is recommended at an estimated cost of \$4,500.
6. It is strongly recommended that future work on either or both of the claims be done during spring or summer so that snow and ice do not cause access and safety problems.
7. Contingent upon favourable Phase I results, Phase II exploration consisting of detailed geological mapping and

sampling, trenching, linecutting, and IP surveying on the Rodeo claim and detailed geological mapping and sampling, soil sampling, VLF-EM surveying, and trenching on the Aft claim are recommended.

8. Contingent upon favourable Phase II results, Phase III work including diamond drilling on the Rodeo claim and IP surveying and diamond drilling on the Aft claim are recommended.

Respectfully submitted
MPH Consulting Limited

A handwritten signature in cursive script, appearing to read 'H. Kang'.

H. Kang, B.Sc.

A handwritten signature in cursive script, appearing to read 'J.S. Getsinger'.

J.S. Getsinger, Ph.D.

April 30, 1987



CERTIFICATE

I, H. Kang, do hereby certify:

1. That I am a graduate in geology of The University of British Columbia (B.Sc. 1986).
2. That I have practised as a geologist in mineral exploration for one full year and two summers.
3. That the opinions, conclusions, and recommendations contained herein are based on field work carried out on the property in February 1987 by me and other MPH personnel and on library research work.
4. That I own no direct, indirect, or contingent interest in the subject property, or shares or securities of Crew Minerals Inc. or associated companies.

A handwritten signature in black ink, appearing to read "H. Kang", is positioned above the printed name.

H. Kang, B.Sc.

April 30, 1987

**CERTIFICATE**

I, J.S. Getsinger, do hereby certify:

1. That I have studied geology at Harvard University (B.A., 1974), and have graduate degrees in geology from the University of Washington, Seattle (M.S. 1978), and from the University of British Columbia, Vancouver (Ph.D. 1985).
2. That I have practised within the geological profession for the past twelve years.
3. That the opinions, conclusions and recommendations contained herein are based on geological research and fieldwork carried out by MPH Consulting Limited.
4. That I own no direct, indirect, or contingent interest in the subject property or shares or securities of Crew Minerals Inc. or associated companies.

A handwritten signature in cursive script that reads 'J.S. Getsinger'.

J.S. Getsinger, Ph.D.

Vancouver, B.C.

April 30, 1987

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Appendix I

LIST OF PERSONNEL

and

STATEMENT OF EXPENDITURES



**LIST OF PERSONNEL and
STATEMENT OF EXPENDITURES**

The following expenses have been incurred on the Aft and Rodeo claims for the purpose of mineral exploration during the period of January 23 to 26, 1987. The distribution of expenditures between the claims is 28.57% to the Aft claim, and 7.43% to the Rodeo claim.

FIELD COSTS

Personnel

H. Kang, B.Sc., Geologist		
4 days @ \$250	\$1000.00	
B. Fletcher, B.Sc., Geologist		
2 days @ \$250	<u>500.00</u>	\$1500.00

Equipment Rental

4WD Truck - 4 days @ \$110	\$ <u>440.00</u>	440.00
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Disbursements

Laboratory Analyses		
Rocks (Au ICP) 24 @ \$12.75	\$ 306.00	
Silts (Au ICP) 9 @ 11.75	<u>105.75</u>	411.75
Accommodation & Food - 6 mandays @ \$45	\$ 270.00	
Field Supplies	8.00	
Communications	3.74	
Shipping	<u>8.75</u>	<u>290.49</u>
Total Field Costs		<u>2642.24</u>



Report Costs

H. Kang, B.Sc. 7 days @ \$250	\$1750.00	
J.S. Getsinger, Ph.D. 1-1/4 days @ \$350	437.50	
T.G. Hawkins, P.Geol. 1-1/2 day @ \$500	250.00	
B.Y. Thomae, B.Sc. 1-1/4 days @ \$250	<u>312.50</u>	2750.00
Typing	\$ 300.00	
Drafting	200.00	
Maps & Report Copying	<u>250.00</u>	<u>750.00</u>
Report Costs		3500.00 -----
Administration @ 15% (on \$1452.24)		<u>217.84</u>
TOTAL COSTS		\$6360.08 =====



Appendix II

ROCK SAMPLE DESCRIPTIONS

and

LITHOGEOCHEMISTRY RESULTS

**ROCK SAMPLE DESCRIPTIONS
MPH PROJECT V196 - "AFT/RODEO"**

ROCK SAMPLE DESCRIPTIONS - RODEO CLAIM

Samples 15551 to 15554, and 15560 to 15566 were collected by Han Kang on January 23 and 25, 1987; samples 15555 to 15559 were collected by Betsy Fletcher on January 25, 1987; all from the Rodeo claim.

Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm	
15551	Location: Rodeo Claim - on logging road, 623 m from west claim boundary Rock type: Quartz vein Grab from float. Rusty weathering, milky white fresh colour with 3 to 10 mm sized crystals. Disseminated pyrite blebs up to 2 cm across, occur as vug replacements and also in fine grains along fracture surfaces. Pyrite approximately 1%.	5	1.6	17	1	1	136	Cr
15552	Location: Rodeo Claim - on logging road, 1986 sample site TN - B.C. Rock type: Andesite Grab from outcrop. Rusty weathering, dark grey to black, fine-grained groundmass with white, subhedral plagioclase(?) phenocrysts up to 2 mm in size. Prominent hornblende phenocrysts stand out on weathered surfaces. Disseminated pyrite blebs and fine grains and oxidized pyritic smearings on fracture surfaces. Pyrite less than 2%.	5	0.1	28	1	71	556	Ba



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15553	Location: Rodeo Claim - on logging road, 1986 sample site TN-B.C. Rock type: Granodiorite Grab from outcrop. Rusty weathering, light grey to green, medium-grained. Trace amounts of pyrite occurring as discontinuous, fracture-replaced stringers or disseminated, fine grains.	5	0.1	99	10	39	
15554	Location: Rodeo Claim - 170 m above logging road at the sharp turn Rock type: Andesite Grab from outcrop. Rusty weathering, dark green to black, fine-grained groundmass with white, subhedral feldspar (plagioclase?) phenocrysts up to 2 mm in size. Slight chloritization along fracture margins. Disseminated, and discontinuous stringers of pyrite as fracture replacements. Pyrite less than 2%.	5	0.1	286	9	221	
15555	Location: Rodeo Claim - 90 m above logging road, heading 210° upslope parallel to creek Rock type: Andesite Grab from outcrop. Feldspar (plagioclase?) phenocrysts up to 2 mm in size within aphanitic, mafic groundmass. Slight epidote alteration on feldspar and chloritization of mafics. Trace pyrite along fractures.	5	0.1	11	2	35	
15556	Location: Rodeo Claim - 150 m above logging road, 50 m north of creek Rock type: Aplite(?) Grab from outcrop. Sugary texture, intergranular, fine-grained (much less than 1 mm in grain size) with chloritized fracture veins and mafic crystals. Trace amounts of disseminated and stringer pyrite.	5	0.1	86	2	54	14 Th



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15557	Location: Rodeo Claim - 150 m above logging road, 100 m north of creek Rock type: Granite Grab from outcrop. Rusty weathering, fine to medium-grained (2-3 mm), equigranular. Chloritization of mafic components. Trace amounts of disseminated pyrite blebs and malachite.	5	0.7	450	1	114	
15558	Location: Rodeo Claim - 150 m above logging road, 180 m northwest of creek Rock type: Diorite Grab from outcrop. Rusty weathering, green. Pale green, epidote altered plagioclase grains with fine-grained mafic components (amphibole or pyroxene?) in interstices. Disseminated blebs and discontinuous stringers of pyrite, less than 2%.	5	0.5	260	4	153	10 W
15559	Location: Rodeo Claim - 150 m above logging road, 180 m northwest of creek Rock type: Quartz vein Grab from outcrop. Milky, white quartz vein (up to 30 cm wide), hosted in diorite with amphibolized vein to host margins. Minor pyrite associated with amphibole, partial pyritic replacement.	5	1.9	334	1	397	134 Cr 36 W



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15560	Location: Rodeo Claim - 150 m east of sharp bend on the logging road Rock type: Diorite Grab from outcrop. Rusty weathering, dark grey fine to medium-grained. Disseminated pyrite blebs and fine grains, and rusty pyrite smearing on fracture surfaces. Pyrite less than 3%.	5	0.1	40	1	50	
15561	Location: Rodeo Claim - 220 m east of sharp bend on the logging road Rock type: Granodiorite Grab from outcrop. Rusty weathering, grey to dark grey, medium-grained. Chloritization of mafics and blurred crystal boundaries indicate slight metamorphism. Disseminated pyrite less than 2%.	5	0.1	82	1	30	
15562	Location: Rodeo Claim - 380 m east of sharp bend on the logging road Rock type: Basalt Grab from outcrop. Slight rusty weathering. Dark grey to black, mafic, aphanitic groundmass with rare feldspar(?) phenocrysts. Pyrite less than 5% occurring as disseminated blebs and fracture fillings.	5	0.1	501	8	58	133 V
15563	Location: Rodeo Claim - 390 m east of sharp bend on the logging road Rock type: Diorite Grab from outcrop. Rusty weathering, grey to green-grey. Slight chloritization of mafic components and blurred crystal boundaries, especially near the basalt/diorite contact within the bluff-forming outcrop. Disseminated blebs and fracture replacement of pyrite in a semi-parallel fashion. Pyrite less than 7%.	5	0.2	1042	12	30	



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15564	Location: Rodeo Claim - 700 m east of sharp bend on the logging road Rock type: Granodiorite Grab from outcrop. Light grey to grey. Showing alteration in the form of blurred crystal boundaries and mafic component forming crude layers and bands; the overall texture approaches that of mylonite(?). Pyrite and chalcopyrite stringers and disseminated blebs. Pyrite 4-6%, chalcopyrite 1-2%, trace bornite. Gossanous patches indicate previous partial leaching.	120	18.9	10,006	9	482	6.0 Cd
15565	Location: Rodeo Claim - 700 m east of sharp bend on the logging road Rock type: Quartz diorite Grab from outcrop. Rusty weathering, dark grey to grey, fine to medium grained. Crosscutting quartz veins (3 mm to several centimetres thick), and silica smearing on fracture surfaces. Disseminated blebs and fracture-filled pyrite (10-15%), chalcopyrite (8-12%), trace pyrrhotite and molybdenite.	5	1.1	2238	71	73	6.80% Fe
15566	Location: Rodeo Claim - 700 m east of sharp bend, 140 m above the road Rock type: Granodiorite Grab from outcrop. Rusty weathering, grey coloured, fine to medium grained. Crosscutting quartz veins (2 mm to several cm thick). Disseminated pyrite (10-12%), chalcopyrite (8-9%), trace pyrrhotite.	5	1.3	2219	47	77	



ROCK SAMPLE DESCRIPTIONS - AFT CLAIM

Samples 15567 to 15574 were collected by Han Kang and Betsy Fletcher on January 26, 1987, on the Aft claim.

Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15567	Location: Aft Claim - 450 m east of Corrigan Main road, on the abandoned railway Rock type: Andesite Grab from float. Slight rusty weathering, dark green to black and slightly lavender, basaltic tuff(?). Chloritized fracture veinlets. No visible sulphides.	5	0.1	79	1	81	29 Co 235 Cr 4.76% Mg
15568	Location: Aft Claim - 1033 m east of Corrigan Main road, on the abandoned railway Rock type: Basalt Grab from float. Slight rusty weathering, dark green to black and slightly lavender, basaltic tuff(?). Chloritized fracture veinlets. No visible sulphides.	5	0.1	41	1	56	
15569	Location: Aft Claim - 1150 m east of Corrigan Main road, on the abandoned railway Rock type: Diorite Grab from outcrop. Pale green to green, partially epidotized, subhedral to subrounded feldspar crystals (about 45% of rock), and subhedral to euhedral pyroxene crystals. Medium to coarse grained (2-4 mm grain size). Moderate to extensive chloritization of mafic crystals. Trace pyrite.	5	0.1	22	2	46	4 Bi



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15570	<p>Location: Aft Claim - 320 m up slope (south) of the large, unnamed creek</p> <p>Rock type: Diorite</p> <p>Grab from outcrop. Subrounded to lath-shaped feldspar phenocrysts (grain size less than 3 mm; 10% of the rock) within green, aphanitic groundmass. Accessory (3-5%) mafic phenocrysts (less than 1 mm in grain size). Trace amount of pyrite cubes (less than 1 mm in size).</p>	5	0.1	49	1	100	1108 Mn
15571	<p>Location: Aft Claim - 300 m up slope (south) from the creek and 100 m west</p> <p>Rock type: Quartz diorite</p> <p>Grab from outcrop. Fine to medium-grained, equigranular. Partially chloritized mafic components - small and poor crystal forms make identification of original mineralogy impossible. Rusty weathered fracture surfaces.</p>	5	0.1	9	1	42	
15572	<p>Location: Aft Claim - 300 m up slope (south) from the creek and 220 m west</p> <p>Rock type: Feldspar porphyry</p> <p>Grab from outcrop. Grey, subhedral, slightly altered feldspar phenocrysts (1-3 mm in grain size) within siliceous, aphanitic groundmass. Greenish, subhedral to euhedral mafic crystals (1-3 mm in grain size) occupy 5% of the rock. No visible sulphides, but disseminated, leached boxwork (about 1 mm) present.</p>	5	0.1	15	1	18	



Sample Number	Description	Au ppb	Ag ppm	Cu ppm	Mo ppm	Zn ppm	Other ppm
15573	Location: Aft Claim - 300 m up slope (south) from the creek and 220 m west Rock type: Andesite/Diorite Grab from outcrop. 10-20% subhedral feldspar phenocrysts (less than 2 mm in size) within dark grey to black, aphanitic groundmass. Rusty weathering on fractures. Pyrite blebs and discontinuous stringers, about 1% of rock.	5	0.1	214	2	3	60 Ni
15574	Location: Aft Claim - 300 m up slope (south) from the creek and 400 m west Rock type: Basalt Grab from float. Dark green, slightly lavender/pink weathering, aphanitic, basaltic flow. Rare dark green to black, anhedral phenocrysts (much less than 1 mm). No visible sulphides.	5	0.1	36	1	89	



Appendix III

CERTIFICATES OF ANALYSIS/ASSAY

ROSSBACHER LABORATORY LTD.

2225 S. SPRINGER AVENUE
 BURNABY, B.C. V5B 3N1
 TEL : (604) 299 - 6910

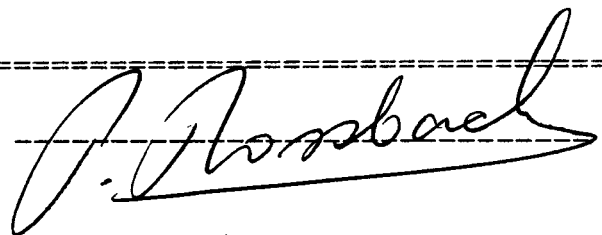
CERTIFICATE OF ANALYSIS

TO : MPH CONSULTING LTD.
 301-409 GRANVILLE STREET
 VANCOUVER B.C.
 PROJECT: V 196
 TYPE OF ANALYSIS: GEOCHEMICAL

CERTIFICATE#: 87038
 INVOICE#: 7441
 DATE ENTERED: 87-02-06
 FILE NAME: MPH87038
 PAGE # : 1

RE FIX	SAMPLE NAME	PPB Au
A	15551	5
A	15552	5
A	15553	5
A	15554	5
A	15555	5
A	15556	5
A	15557	5
A	15558	5
A	15559	5
A	15560	5
A	15561	5
A	15562	5
A	15563	5
A	15564	120
A	15565	5
A	15566	5
A	15567	5
A	15568	5
A	15569	5
A	15570	5
A	15571	5
A	15572	5
A	15573	5
A	15574	5
LP	87-RS-1	10
LP	87-RS-1	5
LP	87-RS-2	5
LP	87-RS-3	5
LP	87-RS-4	5
LP	87-RS-5	5
LP	87-RS-6	5
LP	87-RS-7	5
LP	87-RS-8	5

CERTIFIED BY :



RECEIVED FEB 13 1987

GEOCHEMICAL ICP ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN.FE.CA.P.CR.MG.BA.TI.B.AL.NA.K.W.SI.ZR.CE.SN.Y.NB AND TA. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: SOLUTION

DATE RECEIVED: FEB 9 1987 DATE REPORT MAILED: Feb 11/87 ASSAYER: D. C. DEAN TOYE. CERTIFIED B.C. ASSAYER.

ROSSBACHER LABORATORY PROJECT - CERT # 87038 FILE # 87-0278

PAGE 1

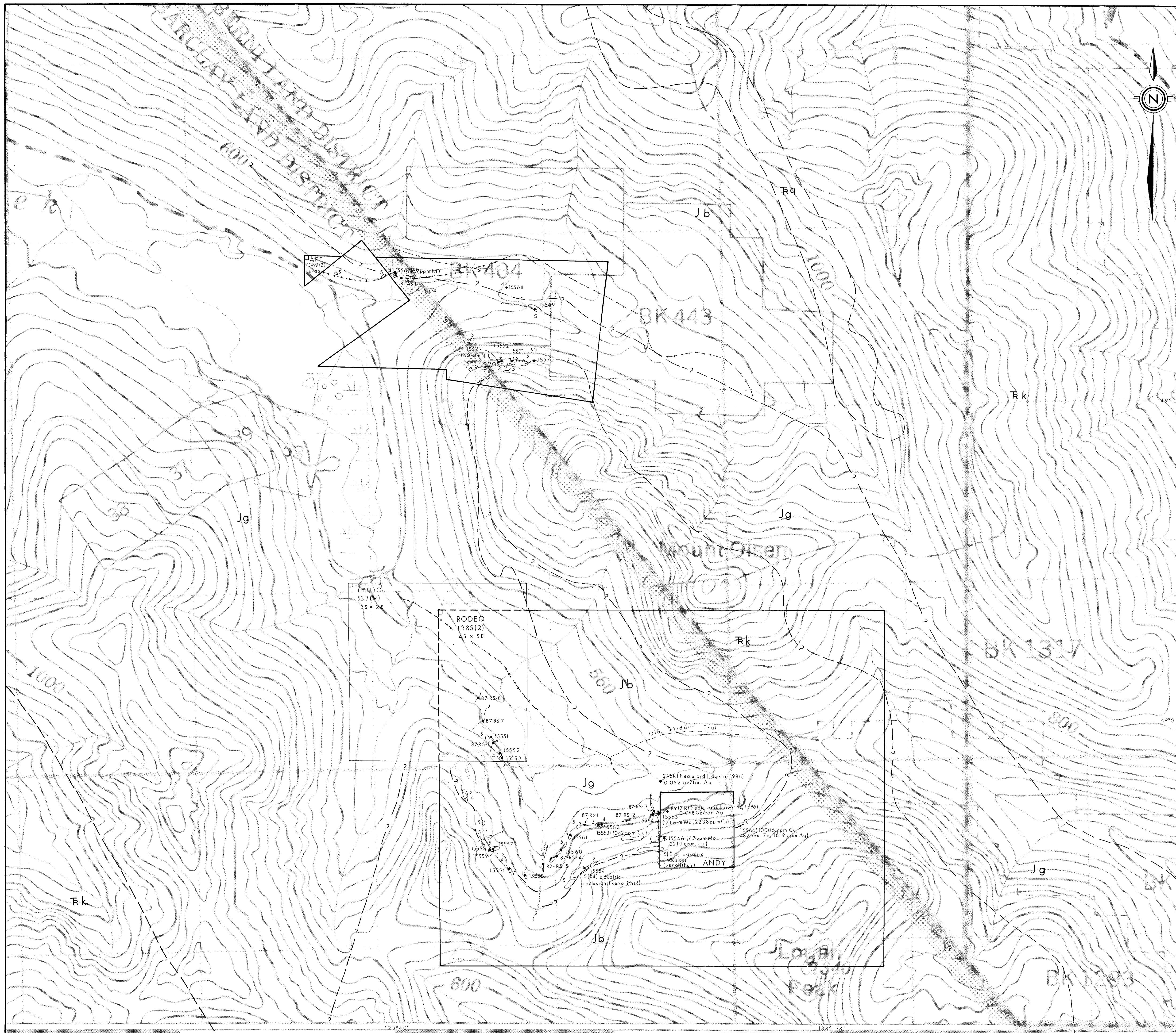
SAMPLE#	Mo PPM	Cu PPM	Pb PPM	Zn PPM	Ag PPM	Ni PPM	Co PPM	Mn PPM	Fe %	As PPM	U PPM	Au PPM	Th PPM	Sr PPM	Cd PPM	Sb PPM	Bi PPM	V PPM	Ca %	P %	La PPM	Cr PPM	Hg %	Ba PPM	Ti %	B PPM	Al %	Na %	K %	W PPM
15551	1	17	11	1	1.6	3	4	41	.57	5	5	ND	1	1	1	2	2	1	.04	.001	2	136	.02	2	.01	6	.03	.01	.01	1
15552	1	28	6	71	.1	5	10	489	4.38	3	5	ND	1	60	1	2	2	95	.91	.110	3	31	1.17	556	.18	2	2.20	.26	.90	1
15553	10	99	5	39	.1	8	4	287	2.43	2	5	ND	4	20	1	2	2	23	.27	.042	3	88	.49	170	.10	4	1.01	.11	.34	1
15554	9	286	4	221	.1	11	8	608	5.90	2	5	ND	1	17	2	2	7	128	.51	.112	2	33	1.97	53	.19	2	2.83	.18	.90	3
15555	2	11	2	35	.1	2	3	343	2.03	2	5	ND	2	34	1	2	2	11	.52	.060	6	56	.46	100	.09	4	1.23	.17	.37	1
15556	2	86	2	54	.1	2	10	134	.93	4	5	ND	14	11	1	2	2	7	.12	.003	5	101	.12	16	.01	6	.49	.09	.01	1
15557	1	450	4	114	.7	2	3	348	1.70	2	5	ND	6	7	1	2	2	9	.17	.038	4	67	.47	37	.01	5	.81	.06	.11	1
15558	4	260	6	153	.5	4	14	803	6.63	3	5	ND	1	24	1	2	4	125	.55	.053	2	41	1.65	56	.14	2	2.61	.17	.57	10
15559	1	334	2	397	1.9	7	7	251	1.85	2	5	ND	1	41	3	2	2	22	.19	.028	2	134	.47	17	.02	5	.62	.04	.03	36
15560	1	40	2	50	.1	2	4	288	2.27	2	5	ND	3	17	1	2	3	42	.19	.029	5	77	.63	155	.12	5	.91	.10	.31	1
15561	1	82	2	30	.1	2	3	164	1.90	3	5	ND	5	26	1	2	2	27	.36	.030	3	83	.42	118	.05	4	1.08	.14	.21	1
15562	8	501	7	58	.1	6	14	262	5.68	7	5	ND	1	53	1	2	2	133	1.68	.090	2	49	1.71	40	.19	2	3.81	.56	1.29	1
15563	12	1042	5	30	.2	3	27	163	5.64	2	5	ND	3	21	1	2	3	54	.55	.032	2	72	.79	17	.11	2	1.91	.25	.47	1
15564	9	10006	4	482	10.9	2	18	528	5.43	5	5	ND	3	30	6	2	2	51	.56	.033	3	68	1.32	24	.03	2	2.15	.21	.08	1
15565	71	2238	6	73	1.1	4	26	249	6.80	2	5	ND	2	14	1	2	2	58	.36	.044	3	76	.88	16	.14	2	1.54	.15	.67	1
15566	47	2219	3	77	1.3	3	11	243	3.83	2	5	ND	4	13	1	2	2	69	.37	.050	3	75	.93	77	.16	3	1.57	.15	.70	1
15567	1	79	7	81	.1	59	29	832	6.05	4	5	ND	1	6	1	4	4	131	.55	.058	2	235	4.76	16	.11	2	3.70	.10	.01	1
15568	1	41	4	56	.1	7	10	548	4.10	3	5	ND	1	23	1	2	2	21	.24	.013	2	21	1.01	32	.09	3	1.54	.08	.09	1
15569	2	22	7	46	.1	7	14	794	3.99	6	5	ND	1	53	1	2	4	123	1.56	.048	2	26	1.67	36	.09	3	2.56	.21	.08	1
15570	1	49	10	100	.1	17	18	1108	5.32	6	5	ND	1	49	1	2	2	116	1.35	.070	4	29	2.46	19	.24	2	3.36	.21	.05	1
15571	1	9	3	42	.1	2	4	521	1.80	2	5	ND	7	14	1	2	2	17	.67	.056	5	47	.57	52	.07	6	.84	.09	.07	1
15572	1	15	2	18	.1	2	4	192	1.26	4	5	ND	6	12	1	2	2	13	.20	.019	5	47	.31	36	.07	6	.59	.07	.05	1
15573	2	214	3	41	.1	60	26	503	3.23	7	5	ND	1	41	1	2	2	57	1.71	.059	2	39	1.19	58	.19	4	2.55	.27	.03	1
15574	1	36	3	89	.1	7	17	924	3.57	2	5	ND	1	17	1	2	2	29	.38	.047	2	26	1.39	46	.25	4	1.82	.09	.12	1
87-AS-1	3	81	16	93	.4	36	16	509	5.40	16	5	ND	2	27	1	2	3	119	.38	.052	5	90	1.43	77	.11	2	3.43	.07	.04	1
87-RS-1	11	298	10	39	.1	8	6	203	5.12	10	5	ND	3	10	1	2	2	115	.17	.060	5	52	.76	54	.24	2	3.51	.06	.11	2
87-RS-2	3	225	10	38	.1	8	5	177	4.09	15	5	ND	2	6	1	2	3	85	.10	.064	4	49	.46	35	.22	3	5.35	.05	.05	1
87-RS-3	15	686	19	57	.1	9	7	267	5.95	6	5	ND	3	8	1	3	3	90	.13	.094	5	47	.64	73	.16	3	4.69	.05	.13	2
87-RS-4	4	68	8	29	.2	10	4	134	4.27	3	5	ND	2	4	1	2	7	91	.05	.037	3	88	.27	23	.24	2	2.61	.04	.03	7
87-RS-5	7	102	11	152	.2	13	12	580	4.40	9	5	ND	2	29	1	2	3	95	.33	.058	4	136	.81	101	.16	3	2.57	.10	.17	10
87-RS-6	9	149	21	63	.2	6	4	170	3.33	6	5	ND	3	8	1	2	2	61	.11	.055	4	57	.40	40	.15	4	4.93	.04	.06	5
87-RS-7	5	84	8	70	.2	8	7	264	3.95	6	5	ND	3	9	1	2	2	81	.13	.063	4	59	.59	57	.17	3	5.16	.06	.09	2
87-RS-8	15	55	18	69	.2	11	11	628	3.49	11	5	ND	2	14	1	2	2	60	.21	.060	5	104	.45	55	.13	4	4.19	.05	.04	4
STD C	20	59	41	136	6.8	69	28	1016	3.96	39	19	7	34	48	18	16	20	64	.45	.102	36	57	.84	181	.08	35	1.71	.11	.12	14

Appendix IV

CONVERSION FACTORS FOR METRIC UNITS

Conversion Factors for Metric Units

1 inch	= 25.4 millimetres	(mm)
	or 2.54 centimetres	(cm)
1 cm	= 0.394 inch	
1 foot	= 0.3048 metre	(m)
1 m	= 3.281 feet	
1 mile	= 1.609 kilometres	(km)
1 km	= 0.621 mile	
1 acre	= 0.4047 hectares	(ha)
1 ha	= 2.471 acres	
1 ha	= 100 m x 100 m = 10,000 m ²	
1 km ²	= 100 ha	
1 troy ounce	= 31.103 grams	(g)
1 g	= 0.032 troy oz	
1 pound (lb)	= 0.454 kilogram	(kg)
1 kg	= 2.20 lb	
1 ton (2000 lb)	= 0.907 tonne	(t)
1 tonne	= 1.102 ton = 2205 lb	
1 troy ounce/ton	= 34.286 g/t	
1 g/tonne	= 0.0292 troy oz/ton	
1 g/t	= 1 part per million	(ppm)
1 ppm	= 1000 parts per billion	(ppb)
10,000 g/t	= 1%	



LEGEND

- GEOLOGY** (modified from GSC Open File 463 and MPH Consulting Limited, unpublished reports.)
- LOWER TO MIDDLE JURASSIC
 - Jg Island Intrusions: granodiorite, quartz diorite, intermediate dykes; - may contain volcanic inclusions. (5)
 - LOWER JURASSIC
 - Jb Bonanza Group: basaltic to rhyolitic tuff, breccia, flows, sills, and dykes; minor argillite, greywacke. (4)
 - MIDDLE ? AND UPPER TRIASSIC
 - Rq Quatsino Formation: limestone
 - Rk Karmutsen Formation: pillow basalt, breccia, tuff; minor flows.
 - Sicker Group
 - PENNSYLVANIAN AND PERMIAN
 - Ps1 Buttle Lake Formation: limestone, chert, greywacke, argillite.

SYMBOLS

- Claim boundaries with LCP (not located)
- Abandoned railway line
- Geological contact approximate
- Fault, approximate, assumed
- Approximate area of outcrop
- 15551 Rock sample
- x Float / boulder
- 87-RS-1 Silt sample

GEOLOGICAL BRANCH ASSESSMENT REPORT

16,083

NTS 92 F/2

J. S. Stetinger

CREW MINERALS INC.

PROPERTY PLAN, GEOLOGY, AND ROCK SAMPLING
AFT, RODEO CLAIMS
ALBERNI MINING DIVISION, B.C.

Project No:	V 196	By:	H. K.
Scale:	1:10,000	Drawn:	J. S.
Drawing No:	5	Date:	APRIL 1987

MPH Consulting Limited