

GEOLOGICAL REPORT 920/3E

ON

LORN AND JIM CLAIM GROUPS

LORNA LAKE BRITISH COLUMBIA

CLINTON AND LILLOOET MINING DIVISIONS

2 OCTOBER 1972

920/3E

3850

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

GEOLOGICAL REPORT

ON

LORN AND JIM CLAIM GROUPS

LORNA LAKE BRITISH COLUMBIA

CLINTON AND LILLOOET MINING DIVISIONS

* * * * *

DATE: 2 OCTOBER 1972

REPORT BY: A.C. FREEZE JR.

SUPERVISED BY: J.M. ALLEN, P. Eng.

WORK PERFORMED DURING

THE PERIOD

JULY 16 - SEPT. 7, 1972

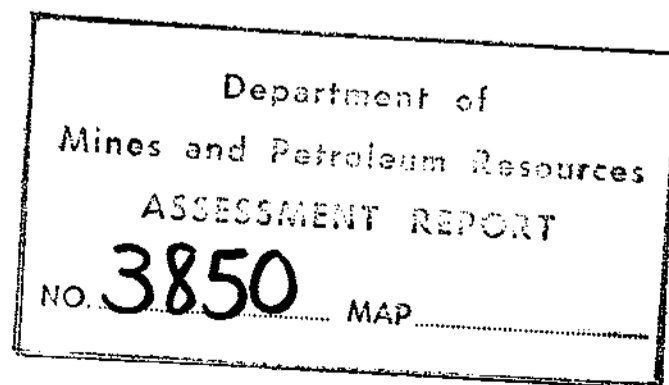


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MAPS

- | | | |
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| #1 | Geology - Lorn & Jim Groups (North Sheet) | 1" = 500' |
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C O M I N C O L T D.

EXPLORATION

WESTERN DISTRICT

GEOLOGICAL REPORT ON LORN AND JIM CLAIM GROUPS

GENERAL STATEMENT

This report describes the results of geological mapping on the Lorn and Jim Groups of claims in the Bralorne area. Field work was performed during the period from July 16, 1972 to September 7, 1972. The remainder of the month of September was spent in drafting a geological map and report preparation.

It is requested that \$13,217.00 or 132 claim years be applied to the Lorn and Jim claim groups. Affidavits on application for Certificate of Work were filed with the Mining Recorder at Vancouver on September 12, 1972 with assurance that a final report and map would follow in three to four weeks.

INTRODUCTION

1. GENERAL:

The geological mapping described in this report was undertaken as part of a continuing program to evaluate the economic mineral potential of the Lorn and Jim claim groups which combined comprise the Lorna Lake property.

2. HISTORY:

The property was first staked in 1963 by Phelps Dodge but no assessment work was claimed. Subsequent to this, the property was staked in 1968 by an individual and dropped. In 1969 Burlington Mines located 42 mineral claims in the area and trenched a chalcopyrite magnetite showing on the southwestern portion of the property at the intrusive volcanic contact. They also let the claims lapse, and in the fall of 1971 Cominco Ltd. acquired the property by staking.

Geological mapping was performed between July 16 and September 7, by A.C. Freeze Jr., Assistant Geologist and J.H.H. Heal, Exploration Assistant. The report was written by A.C. Freeze Jr., with technical assistance in the preparation of the maps provided by T. Bjorgan, Exploration Technician.

The entire program was supervised by Dr. J.M. Allen, Senior Exploration Geologist, Cominco Ltd., and registered B.C. Professional Engineer.

3. LOCATION AND ACCESS

The Lorn and Jim Groups are located 150 miles due north of Vancouver, approximately nineteen miles east south east of the south end of Lower Taseko Lake.

The claims cover the Lorna Lake stock, an Upper Cretaceous intrusion located near the southeastern margin of the Interior Tectonic Belt.

The property can be reached by float equipped fixed wing aircraft or helicopter as there is no access road to the property.

A campsite is located at the southwestern end of Lorna Lake providing the best possible access to the claim groups as a whole.

4. TOPOGRAPHY

The property is situated in rugged mountainous terrain almost completely above treeline with the exception of a moraine running between Sluice Creek and Lorna Lake. The majority of the property is underlain by loose talus grading with increasing altitude into steep bluffs of outcrop. There

are three permanent snow fields within the property, one being an extensive glacier extending from the peak of Mount Warner to a point approximately 2 3/4 miles due south of camp. Another tongue of the same glacier extends north to the western side of the ridge above camp and provides most of the run-off water for Sluice Creek. The other two snow fields cover the north faces of the first two cirques to the southwest of camp.

Above 7500 feet, outcrop exposure is excellent, affording a good cross section of the contact outcrops.

GEOLOGY:

1. SUMMARY

The Lorna Lake stock and the affiliated Taseko Batholith are located within the Interior Tectonic Belt near the southwestern margin of the system. The major northwest trending Yalakom and Taseko faults are located short distances to the north and south respectively. The plutons were emplaced in Upper Cretaceous or Paleocene time along the axis of a degenerating eugeosynclinal trough during a time of widespread volcanism to the southwest.

The Lorna Lake stock cuts lower and upper cretaceous volcanics and sediments. The exposed portion of the stock is boomerang shaped, and cross-sectional studies indicate that is most probably a cupola. Big and Sluice Creek Valleys appear as major north and northeast trending linears respectively. The lineaments most probably owe their existence to extensive alpine glaciation, as the author found no evidence to indicate that the area is underlain by major fault systems.

The Big and Sluice Creek valleys provide an excellent cross-section of the intrusive grading through the contact to the overlying volcanic and sedimentary rocks.

A widespread gossan marks the boundary between the intrusive and country rock. It results from oxidation of mafics and pyrite on joint planes and on intergranular crystal contacts.

2. DETAILED GEOLOGY

a) Sedimentary Rocks

The oldest rocks in the Lorna Lake area are Upper Jurassic to Lower Cretaceous bedded argillites greywackes. These rock types outcrop only on the northeastern corner of the property, extending a considerable distance in this direction. They were not examined in detail in this survey. Argillites at the contact are very fine grained and thinly laminated with alternating light brown to white bands. Trace amounts of pyrite mineralization are associated with some bedding planes.

A few random dykes of andesitic composition intrude the sediments. These areas are easily detected as a widespread gossan surrounds the periphery of the dykes in the sediments. Some copper bearing amphibole veinlets intrude the argillite at the contact, but are not extensive.

b) Andesitic Volcanics

The volcanic rocks, typically of andesitic composition, are younger than the sediments and are possibly equivalent to the Spences Bridge Group. They are mainly fine grained and rich in hornblende. Texturally they are similar with few minor variations such as flow banding, zones with porphyritic amphibole and some hornfels. There are also minor colour variations but the unaltered andesite is mainly dark green.

Only the contact volcanics were examined so subtle variations in the rock with proximity to the contact are not well understood. Outcrops in the immediate vicinity of the contact are generally highly fractured and gossaned.

Sulphide minerals occurring within the volcanic rocks are pyrite with lesser amounts of pyrrhotite and chalcopyrite. Pyrite is ubiquitous throughout. The highly fractured andesite to the north of Sluice Creek has a pyrite content of up to several percent extending in an east-west direction over several thousand feet and imparting a bright red gossan over the area. Not all the andesite is gossaned, as less fractured units away from the contact contain only trace sulfides. Sulfur staining is occasionally present.

Epidote, varying from micro-fracture fillings to massive aggregations a few hundred feet thick is present mainly throughout the contact area on the south of the property. Associated spatially with the epidote are lesser amounts of quartz, calcite, chlorite amphibole veinlets containing trace copper, lead and zinc mineralization.

c) Quartz Monzonite, Quartz Diorite, Diorite

The Lorna Lake stock consists mainly of quartz monzonite with scattered areas of more basic quartz diorite. Owing to the difficulty of distinguishing between plagioclase and potassium feldspar, all samples were etched in hydrofluoric acid and stained with sodium cobaltinitrite solution. On this basis, the areas of quartz monzonite and quartz diorite were differentiated.

The intrusive units are characteristically hypidiomorphic granular to porphyritic. Mineralogically they contain:

<u>QUARTZ MONZONITE</u>		
<u>Mineral</u>	<u>Percentage Spread</u>	<u>Average</u>
Plagioclase Feldspar	50-65% Total Feldspar	55%
Potassium Feldspar	35-50% Total Feldspar	45%
Quartz	10-40%	20%
Biotite	1-10%	5%
Hornblende	0-5 %	1%
Sulfides	< 1 %	<1%

<u>QUARTZ DIORITE (DIORITE)</u>		
Plagioclase Feldspar	80-100% Total Feldspar	85%
Potassium Feldspar	0-20% Total Feldspar	15%
Quartz	5-15%	10%
Biotite	< 1%	<1%
Hornblende	10-15%	12%
Sulfides	<1-1%	< 1%

The quartz monzonite is leucocratic varying between light grey and slightly pink. It grades from fine to coarse grained, but no spatial relationship

between grain size and proximity to the contact can be established. Several areas of the contact intrusive show good porphyritic texture with quartz and feldspar, phenocrysts grading up to one-half inch in length. Other areas along the contact are very fine grained, bleached and contain essentially no mafics. Small irregular inclusions observed in outcrops are fine grained and mafic rich.

Fracturing generally increases with proximity to the contact. Outcrops at the valley bottom are very fresh and poorly jointed while those at the contact are shattered and higher altered. Many joint attitudes were taken in the quartz monzonite and quartz diorite, but no statistical orientation studies were attempted to define dominant directional characteristics. Jointing in general seems to be random with dips approaching vertical. Most joint planes are fresh with minor iron stain, but those at the contact are often healed by quartz and chlorite.

The distribution of the quartz diorite, as can be seen by areas outlined on the map, is erratic. This is reflected by small more basic areas of the intrusive and dykes, with a larger zone outlined on the northeastern most portion of the stock at the headwaters of Sluice Creek.

The quartz diorite is more mafic rich and contains considerably less free quartz than the quartz monzonite. In fact several small areas are better classed as diorite. This distinction was not made as areas of diorite are not sufficiently extensive to classify as a separate unit.

The quartz diorite is anomalously rich in hornblende pyrite, and magnetite compared with the quartz monzonite.

Deuteric alteration is ubiquitous along most of the contact in the form of kaolinization of the feldspars, silicification, sericitization, and limonitization of the ferromagnesian minerals and sulfides.

d) Limonite Conglomerate

This unit is a recent formation and consists essentially of rounded to sub-angular fragments of andesite and intrusive cemented together by limonite. It is found in the northern part of the property downslope from the highly gossaned pyrite rich volcanics. It overlies the intrusives and volcanics. Sections at the headwaters of Sluice Creek grade up to 10 feet in thickness.

e. STRUCTURE

The most significant structural phenomena on the property is the high degree of secondary fracturing in the intrusive and volcanic rocks. The quartz monzonite is highly shattered over most of the south and southwestern portion of the contact. The shattering as previously mentioned is apparently un-systematic and occurs most pervasively in the porcellanous mafic free quartz monzonite at the contact.

Minor shearing is present throughout all major rock types on the property, but it is local, limited in extent and bears no relation to mineralization nor is persistent enough to indicate a relation to any major fracture systems.

f. MINERALIZATION

Copper mineralization in the form of chalcopyrite, locally accompanied by lesser amounts of molybdenite is genetically related to late hydrothermal stages of the quartz monzonite intrusive event. Sulphide mineralization in trace amounts is present throughout the majority of the claim groups, the best concentrations of potentially economic minerals being found at the intrusive volcanic contact.

Secondary copper minerals such as malachite, azurite, chrysocolla and trace nature copper also occur, and are most abundant in the volcanics.

Chalcopyrite is associated with a massive magnetite seam at the contact in the second cirque to the southwest of Lorna Lake. In the area of the extensive glacier to the south of Lorna Lake, copper mineralization is spatially related to intrusive dykes cross-cutting highly silicified andesite.

Molybdenite and secondary ferrimolybdenite, in general, are not associated with the chalcopyrite. Molybdenite is mainly associated with quartz sericite veins in highly altered intrusives. It is also found in the volcanics on the ridge between cirques 2 and 3 south of camp on fracture planes associated with quartz amphibole veins.

In addition to copper and molybdenite, trace amounts of galena and sphalerite have also been observed in association with chalcopyrite, mineralization in the southern part of the property.

g) Alteration

Hydrothermal alteration of the intrusive is directly associated with sulphide mineralization and occurs in the form of quartz sericite veins, chloritization of mafics kaolinization of feldspars, and partial to total leaching of mafics.

Corresponding volcanics show less alteration effects but are, in mineralized areas crosscut by quartz-calcite-epidote veinlets which are occasionally mineralized. Biotite, pyrite and pyrrhotite associated with quartz veinlets are common in the volcanics to the south of the property. Massive epidote is also found in the volcanics in this area.

CONCLUSIONS:

Geological mapping of the Lorn and Jim claim groups has shown that sulfide mineralization exists along the volcanic intrusive contact of the Lorna Lake stock. Further work may outline areas of significant economic potential.

Report by: *A. C. Freeze Jr.*
A. C. Freeze Jr.,

Endorsed by: *J. M. Allen*
J. M. Allen, Senior Geologist
Western District Exploration

Endorsed for release by: *W. T. Irvine*
W. T. Irvine, Manager,
Western District Exploration

Dist.: Director, Exploration
Mining Recorder (2)
Western District

ACF:pm
2 October 1972

A T T A C H M E N T S

- (1) STATUTORY DECLARATION RELATING TO EXPENDITURES
- (2) STATEMENT OF EXPENDITURES
- (3) PLATE (1) GEOLOGICAL MAP NORTH SHEET 1" = 500'
- (4) PLATE (2) GEOLOGICAL MAP SOUTH SHEET 1" = 500'

EXHIBIT "A"

C O M I N C O L T D.

STATEMENT OF EXPENDITURES

LORN AND JIM CLAIM GROUPS

CLINTON AND LILLOOET MINING DIVISIONS

GEOLOGY - SALARIES - FIELD AND OFFICE

A.C. Freeze, Jr. (Assistant Geologist)		
97 Days at \$45 per Day		\$ 4365.00
58 Days at \$39 per Day		2262.00
J.M. Allen (Senior Geologist)		
5 Days at \$100 per Day		<u>500.00</u>
	TOTAL:	<u>\$ 7127.00</u>

TRANSPORTATION

Fixed Wing Aircraft Charters		\$ 2700.00
Helicopter Charters		<u>1150.00</u>
	TOTAL:	<u>\$ 3850.00</u>

CAMP SERVICES AND SUPPLIES \$ 2240.00

<u>TOTAL EXPENDITURES</u> - GEOLOGY		\$ 7127.00
- TRANSPORTATION		\$ 3850.00
- CAMP SERVICES AND SUPPLIES		<u>\$ 2240.00</u>
	TOTAL COST:	<u><u>\$13217.00</u></u>

SIGNED:

J. M. ALLEN, P. Eng.

THIS IS EXHIBIT "A" TO THE STATUTORY DECLARATION
OF J. M. ALLEN DECLARED BEFORE ME THIS 4th
DAY OF October 1972.

Geoffrey H. Mott
A COMMISSIONER FOR TAKING AFFIDAVITS FOR
BRITISH COLUMBIA GEOFFREY H. MOTT
Barrister & Solicitor

C O M I N C O L T D.

EXPLORATION

WESTERN DISTRICT

STATEMENT OF QUALIFICATIONS

A. C. FREEZE Jr., WAS RESPONSIBLE FOR CONDUCTING THE GEOLOGICAL SURVEY DESCRIBED HEREIN. MR. FREEZE Jr., HAS RECEIVED HIS B.Sc. FROM THE UNIVERSITY OF NEW BRUNSWICK AND EXPECTS TO RECEIVE HIS M.Sc FROM THE UNIVERSITY OF MANITOBA IN 1973 AND I CONSIDER HIM A COMPETENT GEOLOGIST.

SIGNED:



J. M. ALLEN P. Eng.

DOMINION OF CANADA:
PROVINCE OF BRITISH COLUMBIA.
To Wit:

In the Matter of

I, JAMES M. ALLEN

of THE CITY OF VANCOUVER

in the Province of British Columbia, do solemnly declare that

1. I DID PERSONALLY SUPERVISE A.C. FREEZE Jr., WHO PREPARED THE ACCOMPANYING REPORT AS A RESULT OF A GEOLOGICAL SURVEY CARRIED OUT ON THE LORN AND JIM CLAIM GROUPS SITUATED IN THE CLINTON AND LILLOET MINING DIVISIONS OF BRITISH COLUMBIA.
2. TWO COPIES OF THE SAID REPORT ARE BEING FILED WITH THE MINING RECORDER IN CLINTON.
3. ATTACHED HERETO AND MARKED WITH THE LETTER "A" UPON WHICH I HAVE SIGNED MY NAME AT THE TIME OF DECLARING HEREOF, IS A STATEMENT OF EXPENDITURES INCURRED IN CONNECTION WITH THE GEOLOGICAL SURVEY OF THE SAID CLAIMS.

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the CITY
of VANCOUVER, in the
Province of British Columbia, this 4th
day of October, 1972, A.D.

A Commissioner for taking Affidavits within British Columbia or
A Notary Public in and for the Province of British Columbia.
GEOFFREY H. MOTT
Barrister & Solicitor

In the Matter of

.....

.....

.....

.....

Statutory Declaration
(CANADA EVIDENCE ACT)

GLACIER

GLACIER

GLACIER

MT. WARNER



LEGEND

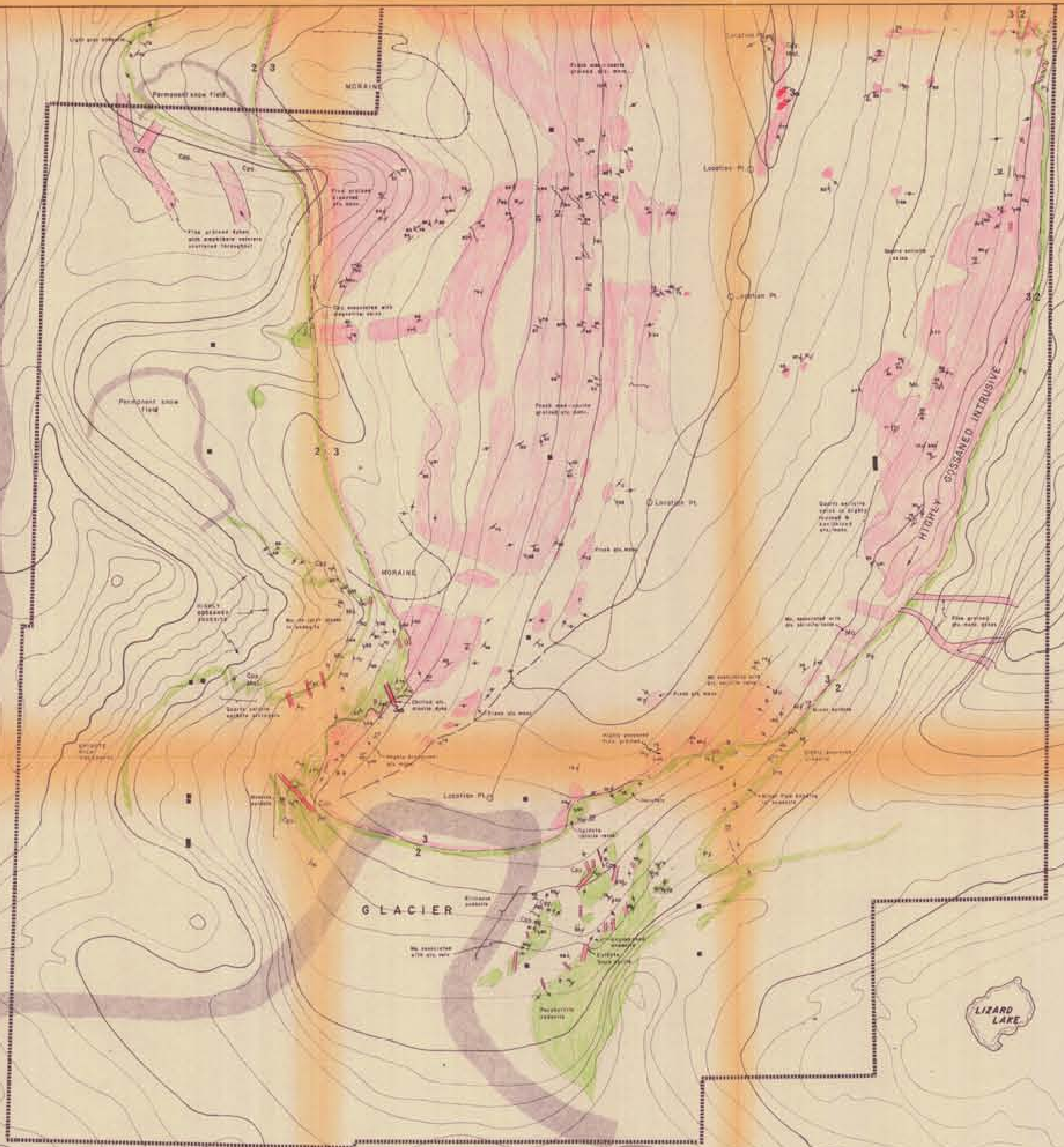
- RECENT ?**
- 4 Lignite conglomerate
- CRETACEOUS**
- UPPER CRETACEOUS OR PALEOCENE**
- 3/3a Fine to coarse grained quartz monzonite
 - 3b Fine to coarse grained quartz diorite
- LOWER & UPPER CRETACEOUS**
- 2 Mainly fine grained andesite, intercalated with massive or porphyritic flows, local basaltic
- JURASSIC & CRETACEOUS**
- UPPER JURASSIC & LOWER CRETACEOUS**
- 1 Argillaceous and pellicular beds, greenstones and shales

SYMBOLS

- General boundary
- Contact - observed, inferred
- Moraine
- Surface of glacier & proglacial lake
- Strike and dip of joint set - 100° 100°
- Fault
- Shear
- Strike boundary
- Claim post
- Fence
- Chained lines
- Location, point

MINERALIZATION

- Cz - Chalcopyrite
- Mo - Molybdenum
- Ms - Magnetite
- Py - Pyrite
- M - Magnetite



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3850 MAP #2

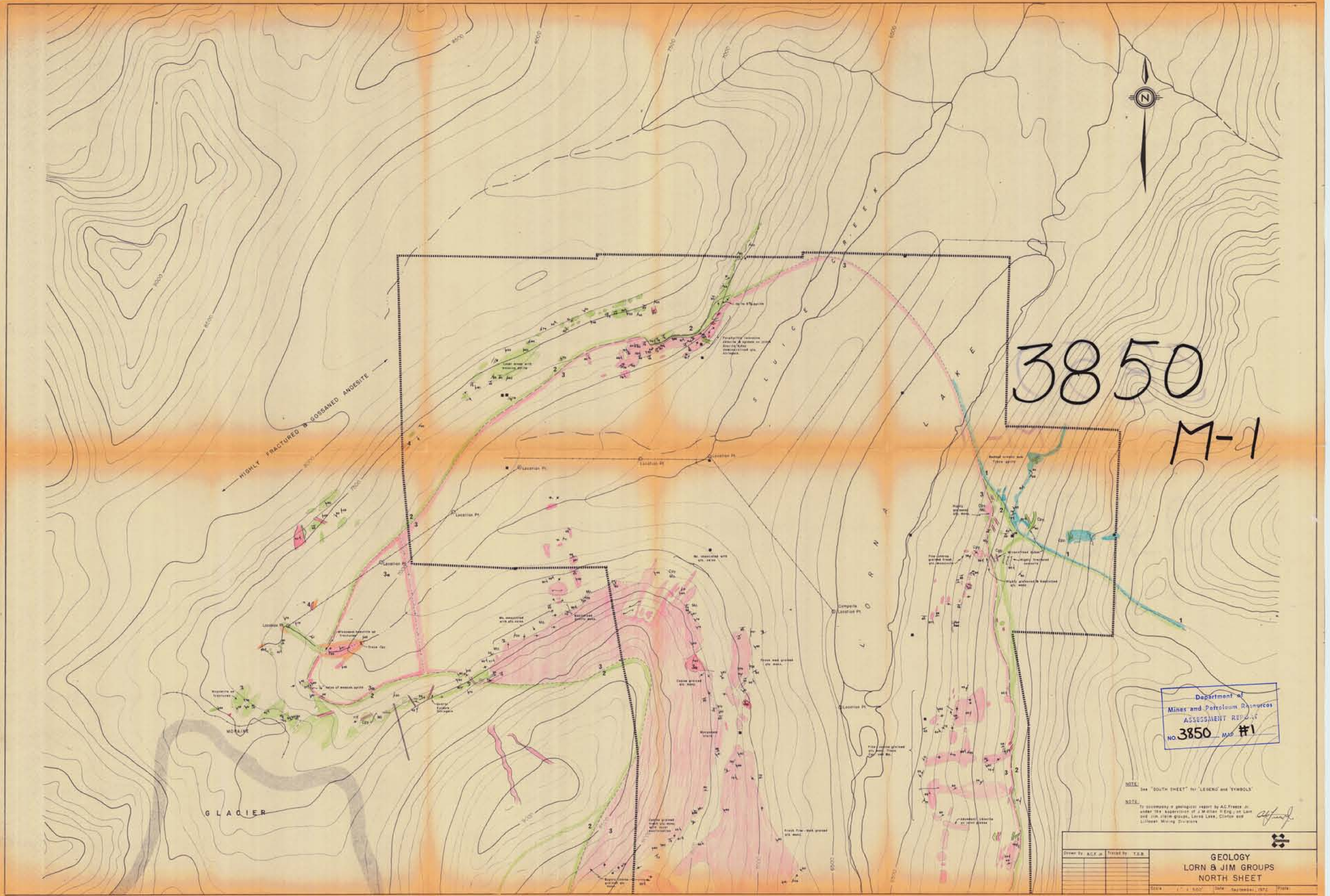
NOTE: To accompany a geological report by R.C. Frost, Jr. under the supervision of J.M. Allen P.Eng., on Lorn and Jim claim groups, Lizard Lake, Clinton and Lillian Mining Divisions.

DATE: 1967

GEOLOGY
LORN & JIM GROUPS
SOUTH SHEET



3850
M-1



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO 3850 MAP #1

NOTE: See "SOUTH SHEET" for LEGEND and SYMBOLS

NOTE: To accompany a geological report by AC. Fraser in
under the supervision of J. Muller, B. Eng., on Lands
and Jim Lorne, George, Lorne Lake, Clinton and
Lillooet Mining Divisions

AC Fraser

Drawn by: <i>ACJ</i>	Traced by: <i>Y.S.</i>
GEOLOGY	
LORN & JIM GROUPS	
NORTH SHEET	
Scale: 1" = 500'	Date: September, 1972