GEOLOGICAL, GEOCHEMICAL REPORT

on the

MUN 1 - 80 MINERAL CLAIMS

No's YA12387 - 12450; 12478 - 12493

MAP SHEET 105B/3W

Lat. 60°08'N; Long. 131°21'W

WATSON LAKE M.D. YUKON

by

D.B. REID

J.C. STEPHEN Expl Ltd

Work Dates

June 15 - Sept.9 1977

Feb. 10 - 12 1978

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $12,800.00

Resident Geologist or
Resident Mining Engineer

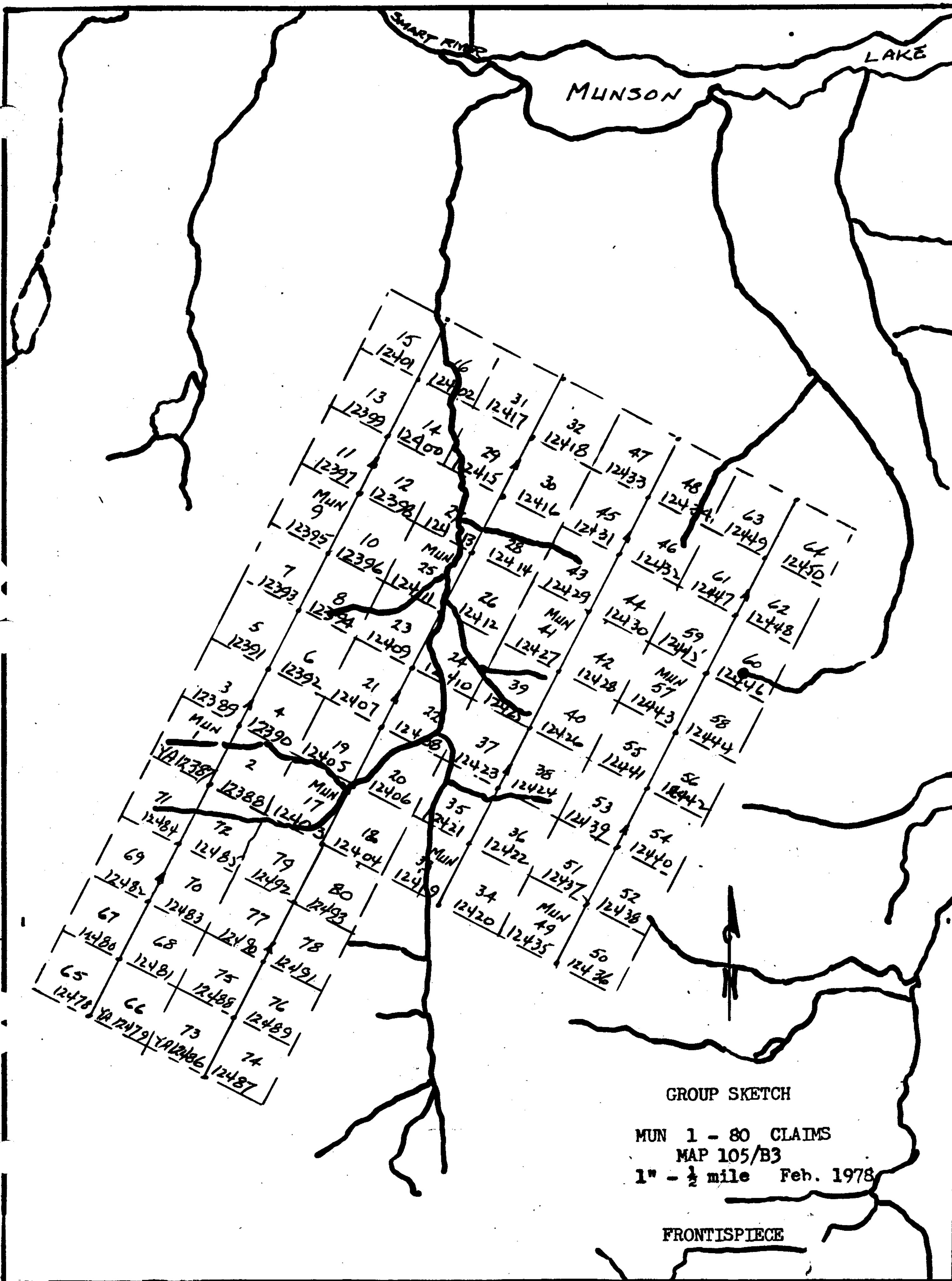
Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. R. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS



GROUP SKETCH

MUN 1 - 80 CLAIMS
MAP 105/B3
1" - ½ mile Feb. 1978

FRONTISPIECE

GEOLOGICAL, GEOCHEMICAL SURVEY

on the

MUN 1 - 80 CLAIM GROUP

MAP 105B/3W YUKON

ABSTRACT

The MUN claim group is located approximately ten miles north and four miles west of Swift River, Mile 733 Alska Highway, Yukon.

A sequence of siltstones, limestones, tuffaceous sediments and tuffs is intruded by a Cretaceous granitic intrusive, the Seagull Batholith. Small zones of limey sediments have been altered to calc-silicate skarns. Several of these skarns contain one or more of pyrrhotite, sphalerite, scheelite and occassionally malayaite.

The mineralized skarn outcrops found on the MUN property are too small for economic consideration. The geochemical results from soil and talus samples suggest that additional zones may exist on the property and a programme of additional exploration is recommended for the 1978 season.

LIST OF CLAIMS

This report is filed as assessment work on the following mineral claims.

CLAIM NUMBERS	RECORD NUMBERS	CLAIM HOLDER	CLAIMS HELD FOR
MUN 1 - 8	YA12387 - 12394	P. Thibaudeau	D.C. Syndicate
9 - 16	12395 - 12402	D.R. Leach	"
17 - 24	12403 - 12410	J.C. Stephen	"
25 - 32	12411 - 12418	R. Saugstad	"
33 - 40	12419 - 12426	J.P. Stevenson	"
41 - 48	12427 - 12434	M.T. Douglas	"
49 - 56	12435 - 12442	Corby Stanley	"
57 - 64	12443 - 12450	R.E. Brooke	"
65 - 72	12478 - 12485	C.A. Ager	"
73 - 80	12486 - 12493	Douglas MacQuarrie	"

INTRODUCTION

The MUN claim group consists of eighty claims. It is situated ten miles north and four miles west of Swift River at latitude $60^{\circ}08'$ and longitude $131^{\circ}21'$. This is about two miles south of Munson Lake. There is no road to the property and access is by helicopter.

The MUN claim group was staked in the early spring of 1977 on the basis of anomalous tungsten stream sediment geochemistry in samples taken in the summer of 1976. The purpose of the summer field work was to locate the source of the tungsten found in stream sediments and determine the economic potential of the area.

Field work was carried out on the property from June 15 to August 28, 1977. Methods used in prospecting for tungsten include silt and soil geochemistry, talus fines, rock geochemistry and the use of an ultraviolet lamp to assist in field recognition of scheelite, the main tungsten mineral.

The claim group lies within the rugged Cassiar Mountains. Steep cliff faces hindered examination of rock exposures; particularilyly where the tungsten mineralization was discovered. According to the G.S.C. Wolf Lake Map Sheet (W. H. Poole) a Pleistocene ice-sheet moved through the region in an easterly direction. Locally, ice-sheets reached an elevation of 6,200 feet, the height to which the ridge tops are rounded

Good outcrop is exposed on ridge tops and cliff faces. Most ridge flanks are covered with talus near the top and glacial-fluvial unconsolidated deposits near the bottom. The valley floor is entirely covered with glacial-fluvial deposits.

The authors are grateful to John Candy and Jim Chartier for their enthusiastic prospecting at the begining of the field season.

LOCATION AND TOPOGRAPHY

The MUN 1 - 80 claims are located about two miles south of Munson Lake in map sheet 105B/3W. Latitude 60°08' N., longitude 131°21' W. is approximately at the centre of the claim group.

Topography is relatively rugged with peaks reaching 6300 and 6400 foot elevations on north trending ridges above the valley floor at about 4200 foot elevation in the centre of the property.

Drainage is to the north to Munson Lake and thence westerly via Smart River. Snow occupies the valley walls and approximately half the valley floor until about mid June while snow cornices above the various cirque walls make work hazardous in places until early July.

GENERAL GEOLOGY

The sedimentary rock units of the MUN claim group have been dated as Lower and/or Middle Mississipean (W. H. Poole). Crinoids are the sole fossils observed by the authors.

Sediments include fine-grained quartzites, limestones plus dolomitic and siliceous limestones. The limestones have been skarned locally. Siltstones and sandy siltstones have been metamorphosed into argillite and hornfels by a granitic intrusive. Several facies changes occur over short distances, thinning and omitting members of sedimentary units.

On the northwest ridge ash is intimately intermixed with siltstones and calcareous siltstones forming tuffaceous sediments. It is impossible to distingush between tuffaceous sediments and argillite in hand speciman. Feldspar andesite lapilli tuffs grade into fine-grained andesite tuffs on the southern part of this ridge. A similar sequence of limestone, argillite and fine-grained tuff and lapilli tuff exists on the northeast ridge, but the tuff is much less abundant. The volcanics continue to thicken in the ridges west of this claim group.

The mountains located in the west central portion of the claim group are believed to be metamorphosed tuffaceous sediments containing limy laminations altered to calc-silicates.

A granite to quartz monzonite intrusive body obviously underlies most of the sediments in the area. The body is assumed to exist, but is not visible, beneath the northwest ridge and the extreme northern end of the northeast ridge. Alaskite dykes - a probable phase of the granitic intrusive - frequently cut the sedimentary rocks.

An ultrabasic intrusive of gabbro to diorite composition overlies the granitic intrusive in the southern part of the claim group. It is believed to be older than the granite and younger than the sediments.

TABLE OF FORMATIONS

AGE	MAP UNIT		LITHOLOGY
TERTIARY ?			
	10 a		Alaskite dykes
CRETACEOUS OR TERTIARY			
Seagull Batholith	10		Leuco Quartz Monzonite to Granite
JURASSIC and/or CRETACEOUS			
	9		Quartz Diorite
	8		Gabbro to Diorite
UPPER DEVONIAN AND LOWER MISSISSIPPIAN			
	7		Siltstone, Hornfels, Argillite, rusty
	6		Silicified Limestone, Limestone
	5		Siltstone, argillaceous, dark grey, rusty
	4		Meta Tuff, Meta Sediments
	3		Tuff, Lapilli Tuff, Siltstone
		3a	Tuffaceous Sediment, Tuff, Lapilli Tuff
		3b	Limestone, tuff interbeds
		3c	Limestone, Silicified Limestone
	2		Limestone, white, coarsely crystalline
		2a	Limestone, Siltstone, Quartzite, tuff interbeds
		2b	Quartzite, rusty
		2c	Silicified Limestone
		2d	Siltstone, argillaceous, dark grey
	1		Siltstone, argillaceous, thinly laminated, rusty
		1a	Quartzite, thinly laminated, rusty
		1b	Limestone, white, coarsely crystalline
		1c	Silicified Limestone, quartzite interbeds

STRATIGRAPHY

The most northern beds are thought to be the oldest of the sedimentary rocks in the area. Sections through N-S ridges illustrate stratigraphic relationships. Units 5, 6 and 7 at the south end of the claim group may correlate with the lower portion of unit 2; however there is insufficient data to make a definate correlation. In support of correlating unit 2 with units 5, 6 and 7 is a similar sequence of silicified limestones, limestones, skarns and rusty siltstones seen in these units. Other than the lower portion of unit 2, unit 6 is the only unit with known scheelite and malayaite mineralization. If unit 2 is correlated with units 5, 6 and 7 this would support the postulated fault cutting the Twin Lake cirque and would indicate an upward movement of unit 5, 6 and 7 with relation to unit 4.

Unit 1

Unit 1 is exposed on the ridges in the northeast and northwest corners of the map area. It is divided into four members with a total exposed thickness of 4,200 feet. The largest member of the group is a rusty, finely laminated, pyrrhotitic, dark grey argillaceous siltstone with occasional small scale chevron folding and plastic deformation.

The second largest member (1a) is a slightly rusty, fine-grained impure quartzite located on the northeast ridge. It contains pyrrhotite blebs and rare zones of augen gneiss.

There are two minor members in this unit, each about 100 feet thick. One is a limestone (1b) which is thin-to-medium bedded, white and coarsely crystalline. The other is an interbedded silicified limestone and quartzite.(1c) It consists of two to ten feet thick interbeds of white finely crystalline, silicified limestone and fine-grained, rusty quartzite.

A small, very rusty skarn zone is situated at the north corner of the northwest ridge. Pyrrhotite, pyrite and fluorite are accessories in a diopside garnet skarn with minor scheelite mineralization.

Unit 1 conformably underlies a thick limestone (unit 2) to the south. The northern contact if unit 1 is not exposed.

Unit 2

Unit 2 is exposed on the northwest ridge and central northeast ridge. It is divisible into five members with a total thickness of 3,200 feet.

The major member of unit 2 is a pure white, coarse crystalline limestone with occasional zones of large secondary calcite crystals. Several thin siltstone beds are contained within the limestone. These pinch out on the east ridge. East ridge limestone is highly contorted.

The second most prominent member of this unit (2a) consists of two sequences of interbedded limestone, quartzite, siltstone and possibly tuffaceous sediments. The individual beds are from ten to twenty feet thick. Both sequences are approximately 250 feet thick.

The third member (2b) of unit 2 is a rusty, impure, fine-grained quartzite. The fourth member is comprised of several silicified limestone zones. These zones are finely crystalline, white to pale green and pale pink. The colouration is believed to be the result of minor calc-silicate mineralization during the silicification process.

The last member of unit 2 (2d) is a rusty, pyrrhotitic, dark grey siltstone. It is contained locally within the silicified limestone but appears thick due to the dip-slope bedding relationship. It shows a high degree of small scale folding and is metamorphosed to hornfels and hard argillite.

Unit 2 is underlain conformably by unit 1 to the north and overlain conformably by unit 3 to the south.

Unit 3

Unit 3 is situated at the south end of the northwest ridge and on the mountain in the east central part of the claim group. This unit is subdivided into four members which have a total thickness of 4000 feet. The major member (3) is intimately intermixed siltstones, tuffaceous sediments, tuffs with occasional crystal and elongated lapilli tuffs. Usually this member is non-rusty. Rusty, thinly laminated beds are believed to be pure siltstones.

The second (3a) member is a non-rusty, dark grey tuffaceous sediment, tuff and lapilli tuff. The lapilli tuff accounts for up to 30% of the total member. It is a massive, thickly bedded sequence. The lapilli tuff ranges from square crystal lapilli (?) to highly elongated lapilli.

The third member (3b) is a narrow, interbedded sequence of limestone, tuffaceous sediments and lapilli tuff interbeds. The limestone beds vary from 10 to 30 feet thick, while the tuffaceous sediments and tuff are 5 to 10 feet thick.

The final member (3c) is a limestone and silicified limestone.

Limestone is dominant with light green and pink silicified zones near the contact. The limestone is white to light grey and fine-to medium crystalline. The silicified limestone is mainly finely crystalline with occasional coarsely crystalline calc-silicates zones.

Unit 3 is underlain by unit 2 and is in contact with unit 4 on a shear zone. On the east ridge it is underlain by the intrusive. (unit 10)

Unit 4

Unit 4 occurs in the two mountains located in the west central part of the claim group, north of the mineralized cirque, and is believed to be a sequence of meta-volcanics and meta-tuffaceous sediments. Map measurements indicate a thickness of more than 1,500 feet. Contacts with sedimentary rocks to the north and south of this sequence are shear zones.

The rocks in this unit are typically dark grey to black hornfels irregularly altered to light greenish-grey. These contain reddish-brown garnet laminations and stockwork-like fractures up to several inches thick. Also present are thin un-altered limestone beds plus limestone inclusions. The inclusions have garnet alteration rims and measure up to twelve inches in diameter. Crystal and elongated lapilli tuffs are frequently interbedded with tuffaceous sediments, particularly to the south. Evidently, this represents a sequence of andesitic ash which settled into a shallow water basin where normal sedimentation was taking place. The ash mixed with the silty and limy sediments to form tuffaceous sediments. Thin limestone beds formed between periods of ash fall.

The high porosity of tuffs enabled hydrothermal solutions to flow through and alter the limestones and limy tuffaceous sediments to calc-silicates. Chlorite and montmorillonite are the probable alteration products of the tuff and tuffaceous silty sediments. Up to thirty per cent of this rock type is comprised of calc-silicates, chiefly garnet.

The granitic intrusive body is the most likely source of the silica-rich hydrothermal solutions which altered the tuffaceous sediments into hornfels and hard argillite. No tungsten mineralization was discovered in any part of this unit. Stream sediment geochemistry draining this unit gave low tungsten values.

Unit 5

Unit 5 is situated on the south side of the Twin-Lake cirque in the west central portion of the claim group. A thickness of more than 1,000 feet is exposed on the cliff face on the south side of the cirque.

This unit is very rusty, thin-to-thick bedded, thinly laminated, dark grey, argillous siltstone. Finely disseminated pyrrhotite is believed to be the cause of the rusting. Bedding is highly contorted. Lenses of silicified limestone, limestone and skarns (unit 6) occasionally interfinger with the siltstone.

On the west side of the ridge a poorly defined rubble contact exists with unit 10. A highly fractured shear zone occurs at the head of the cirque dividing the rusty siltstone (unit 5) from the non-rusty, altered, tuffaceous sediments. (unit 4) A fault with unknown displacement probably caused this shear zone.

Unit 6

Unit 6 is located on the southwest ridge and on the south face of the Twin-Lake cirque in the west central part of the claim group. Poor exposure and a high degree of folding made accurate measurements difficult. The maximum thickness is estimated to be 600 feet, pinching out rapidly to the west.

This unit consists mainly of white to light pink and green silicified limestone. Non-continuous rusty siltstones with a maximum thickness of 30 feet are occasionally interbedded with silicified limestone. These siltstone beds usually pinch out over several hundred feet. Rusty zones up to ten feet thick within the silicified limestone give the appearance of siltstones.

Calc-silicate skarn zones occur as thin beds and clusters within the silicified limestone and limestone. These skarn zones occasionally contain scheelite.

The silicified limestone forms an anticlinal fold over a granitic intrusive bulge. This fold is the thickest exposure of unit 6. The silicified limestone pinches out into unit 5 to the west.

Lenses of limestone and silicified limestone occur in unit 5 and are believed to belong to unit 6.

Unit 6 is underlain by the granitic intrusive.(unit 10) The west contact is with unit 5 and the south contact is conformable with unit 7. To the north this unit has been eroded. It is thought that a fault separated unit 6 from unit 4. A fault has uplifted unit 10 relative to unit 6 forming a fault contact.

Unit 7

Unit 7 is situated on the corner of the southwest ridge in the claim group. Poor exposure on the west side of the ridge hampered measurements, but the unit is estimated to be greater than 300 feet thick.

This unit consists mainly of a very rusty, medium-to-dark grey, thinly laminated siltstone containing fine-grained disseminated pyrrhotite. Fine-grained, white to pure, rusty quartzite occurs in minor amounts near the northern contact. The rusty siltstone has been altered to hornfels and hard argillite by the underlying granitic intrusive. It also has white sericitic alteration in minor amounts due to the intrusive.

Unit 7 is underlain by a granitic intrusive body. On the south corner of the ridge the contact with ultramafic intrusives is poorly defined because of talus slopes. This unit is believed to overlie the ultramafic. (unit 8) The contact on the north side is with unit 6 which it conformably overlies. Extensive folding has occurred near this contact.

Unit 8

Unit 8 consists of ultramafic rock from gabbro to diorite. This unit occurs in the southern portion of the claim group overlying the granitic intrusive on the southeast ridge. On the southwest ridge unit 8 underlies the sediments of unit 7 and overlies unit 10.

At the head of the valley, beyond the south end of the claim group, the ultramafic is in contact with a limestone unit forming extensive skarn minerals. One outcrop shows the gabbro cut by an Alaskite dyke. (unit 10)

Unit 9

Unit 9 is a quartz diorite, believed to be a phase of the ultramafic intrusive. (unit 8) It is situated on the back of the east ridge and as a small cap on top of the southwest ridge. On the east ridge unit 9 underlies the sediment-volcanic sequence (unit 5) and overlies the granitic intrusive. (unit 10) On the southeast ridge it is approximately twenty feet thick overlying unit 5.

Unit 10

The Cretaceous Seagull Batholith (W. H. Poole) underlies the area. It is acid in composition ranging from granite to quartz monzonite with zero to ten per cent mafics. The mafics are typically less than five per cent. The rocks are generally medium-grained but are porphyritic in places and fine-grained near the margins.

Alaskite dykes form one phase of the intrusive. On the southeast ridge one of these dykes cuts across the ultrabasic; therefore the acid intrusion is the younger.

These rocks are strongly jointed and have three joint sets. The jointing is most prominent on the east ridge where folding has occurred.

Numerous irregular quartz-tourmaline concentrations characterize the rocks. They average 2 to 3 inches in diameter but range up to and greater than 12 inches. All the granitic intrusive rocks in the area have these concentrations.

The intrusive rocks underlying the mineralized cirque to the west of camp contain abundant quartz - tourmaline veins as well as the concentrations. These veins are several inches across and occur on nearly all fracture surfaces. They form rarely in the intrusive in the non-mineralized part of the claim group.

STRUCTURE

The regional structure is dominated by a major northwesterly trending syncline with the axis across the south central portions of the ridges in the claim group. The axis is rotated northerly directly to the south. Local recumbent folding occurs in the limestones and silicified limestones of unit 2 and 6. There is small scale deformation and chevron folding in most units, particularly on the east ridge. Unit 6 displays a small anticlinal fold over an intrusive bulge which apparently caused the fold.

Two faults with a displacement of approximately 100 feet cut through units 5 and 10 on the mountain to the east. Several other smaller faults are also evident on this ridge. A near vertical north trending fault uplifted an intrusive block to form a contact with unit 6 on the east limb of the anticlinal fold.

A large fault striking east-west is believed to exist between unit 4 and units 5, 6 and 10. A shear zone is prominent at the west end of the cirque where unit 3 forms an abrupt contact with unit 4. The granitic intrusive (unit 10) underlies all the sediments south of the proposed fault but is not visible north of the proposed fault. A distinct line exists between resistant ridges on the floor of the cirque with unit 4 on the north side and unit 10 on the south side.

There is a shear zone running east-west on the contact between unit 4 and unit 3 on the northwest ridge. As unit 4 is bordered by faults, this volcanic-sediment unit may be a downfaulted block.

HISTORY

During the Lower to Middle Mississipian a sedimentary basin deposited siltstones, quartzites and limestones. There are abrupt local facies changes and pinchouts from east to west. Volcanic activity contributed ash fall which became interbedded and intimately intermixed with the silty and limy sediments. This volcanic source appears to be to the west where the tuffaceous sediments are thicker. Occasional beds of crystal lapilli tuff were deposited with the sediments.

Regional folding created a synclinal structure trending northwesterly. The MUN claims occupy a portion of the northeast limb of this syncline.

During the Cretaceous an ultramafic body intruded the sediments to the south. Following this intrusion the Seagull Batholith intruded the area uplifting the sedimentary rocks. Several minor faults may have occurred at this time or later. Small Alaskite dykes from a later stage of batholith then cut the sediments and ultramafics.

The batholith intrusion caused metamorphism of the siltstones and tuffaceous sediments to hornfels and argillite. Hydrothermal solutions probably derived from the batholith, altered the calcareous sediments to calc-silicates and silicified limestone.

During the Pleistocene at least one major ice-sheet covered the area moving in an easterly direction. Subsequent valley glaciers formed the cirques.

ECONOMIC GEOLOGY

Tungsten, zinc and tin mineralization are associated with skarn zones in the silicified limestone and limestone units. The mineralized portion of the skarn zones occur as local concentrations with no apparent mineralogical difference from the slightly mineralized or non-mineralized parts. Some of the mineralized or non-mineralized skarns have pyrrhotite but not all of them. The mineralized zones are very limited in extent in most skarn zones, few being more than several feet in length. The skarn zones themselves are small and infrequent occurrences. The skarn zones are believed to be the result of silica solutions derived from the Cretaceous granitic intrusion.

Tungsten occurs as scheelite and is frequently associated with pyrrhotite or arsenopyrite in the skarn zones. The zinc occurs as sphalerite and is generally not associated with scheelite. A rare occurrence is tin in the form of malayaite. This is occasionally associated with scheelite and is also found by itself in skarns.

Three forms of geochemical sampling techniques were employed to locate mineralized zones. These were stream sediment samples taken from streams draining the property, a soil sample grid and talus rock fines sampled at intervals along talus slopes. The stream sediment samples indicate the primary source of tungsten is the Twin Lake cirque located in the west central part of the claim group. The soil sample grid on the east side of the main creek in the central part of the property showed no anomolous mineralization. The talus rock fines samples show anomalous tungsten and zinc in the known mineralized cirque and anomalous zinc and tungsten in the cirque on the east central part of the claim group and a zone on the southwest ridge. At the time of writing no visible mineralization has been found in these two areas. No geochemical testing was done for tin because it was discovered at the end of the summer. Samples taken will be retested for tin.

Chip sampling lines were taken across four mineralized outcrops for assaying. Selected mineralized samples have also been sent for assaying.

ZINC

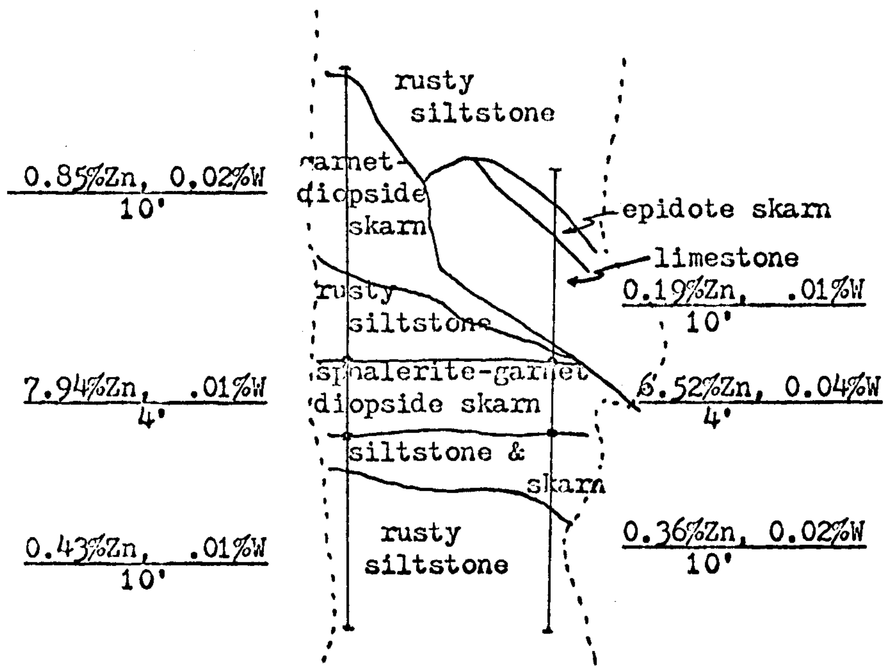
Mineralogy

Sphalerite generally occurs as large platy crystals which are dark brown to black contained in a dark green, medium-to-fine grained diopside skarn. Pyrrhotite is frequently associated as massive fine-grained lenses as well as disseminated throughout the skarn. Sphalerite is concentrated in some parts of the skarn with no apparent mineralogical difference. These skarn zones appear within limestones and silicified limestones, frequently near or on the contact with rusty siltstones. Skarns containing sphalerite weather a chocolate brown colour. Six small sphalerite bearing skarns were found on the MUN group. Two of these were sampled and three are described.

Showing 1

Showing 1 is located at the south end of the northwest ridge in unit 3 near the contact between units 3 and 4. The skarn is likely in a fracture zone between two siltstone beds. Diagram 1 shows the skarn cutting across bedding below a limestone and skarn bed. Samples taken across the mineralized zone average 7.3 per cent zinc. Trace scheelite was present in the assay although a blue fluorescent mineral thought to be scheelite occurs with the sphalerite.

Showing 1 is located on the top of a steep ridge with talus covering the east slope. To the west this zone extends for only a few feet and disappears in rubble.



MUN CLAIM GROUP

MINERALIZED SHOWING 1

Scale 1"- 10'

DIAGRAM I

Showing 2

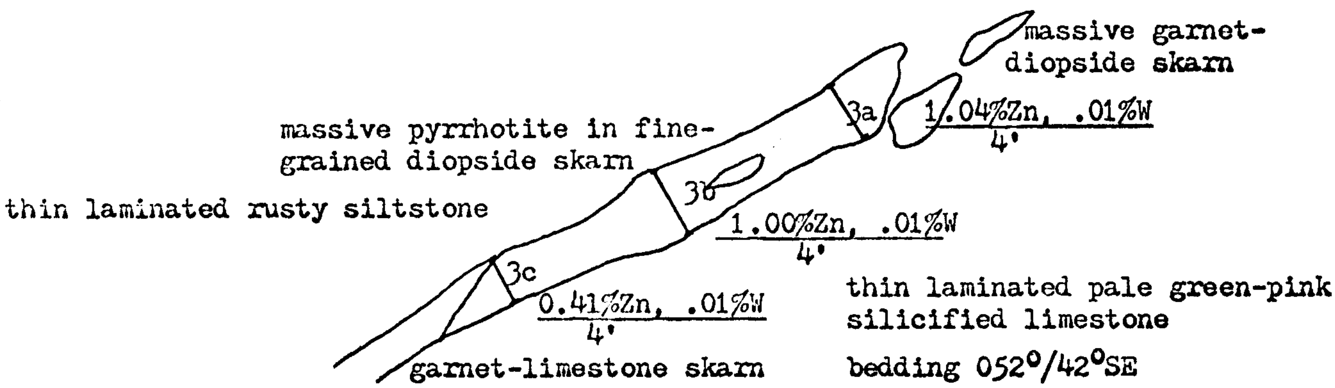
Showing 2 is located at the head of the Twin Lake cirque, directly under the peak on the south side. Sphalerite is contained in a dark green, fine-grained diopside skarn thirty to thirty-five feet in length by four feet in width. It pinches out at both ends. This skarn zone is found in a silicified limestone unit thirty feet thick and about ten feet above the lower contact. The silicified limestone is contained in a rusty argillite.

The skarn zone is estimated to average two to three per cent zinc. No samples were taken across the skarn due to its location on a cliff face.

Showing 3

Showing 3 is situated at the head of the Twin Lake cirque, just below the ridge.(diagram 2) It is a dark green, fine-grained diopside skarn on the contact between a silicified limestone unit forty feet thick (below) and a rusty argillite. (above) A fine-grained, massive pyrrhotite lens is located in the center of the skarn. The skarn zone pinches out at both ends. A coarser unmineralized garnet diopside skarn occurs at the west end in two patches, is absent for ten feet and then extends for another thirty feet.

Three chip samples were taken in lines across showing 3. The highest grade zinc is 1.04 per cent with no tungsten present.



Sketch looking south

slope steep

MUN CLAIM GROUP

MINERALIZED SHOWING 3

Scale 1"- 10'

DIAGRAM II

TUNGSTEN

Tungsten occurs as scheelite in skarn zones. Most skarn zones on the MUN property are small, rarely exceeding twenty feet wide by forty feet long. Skarns usually are found on or near the contact of limestones or silicified limestones and rusty siltstones as lenses. Numerous small skarn zones occur in the claim group but most contain no scheelite.

Mineralogy

The principal skarn minerals are diopside, reddish-brown garnet, tremolite-actinolite and calcite. Other minor calc-silicates are epidote and augite. Accessory minerals in order of frequency are pyrrhotite, quartz, arsenopyrite, sphalerite, tourmaline, magnetite, scheelite, fluorite and chalcopyrite. Occasionally a yellow flourescent mineral is present which was thought to be powellite, but is now considered to be the mineral malayaite.

Skarn zones on the property can be divided into five major types: garnet limestone, diopside, garnet-diopside, tremolite-actinolite and garnet-diopside-tremolite-actinolite. Scheelite has been found in all of these skarn types except the garnet limestone. Skarn texture ranges from aphanitic to course crystals of garnet, diopside, augite and radiating tremolite-actinolite. Scheelite occurs in all textures.

Scheelite frequently is found in skarns with abundant pyrrhotite or arsenopyrite. Often small lenses of massive fine-grained pyrrhotite in a dark green fine-grained matrix exist in skarns and in rusty argillites. These pyrrhotite lenses usually contain concentrated scheelite relative to the host rock.

Above the upper lake in the Twin Lake cirque high-grade scheelite was discovered in talus in a coarse magnetite hornfels. The source of this rock type was not found but is believed to be in an inaccessible part of the cliff face. The mineralization is only a minor part of the talus therefore the zone is probably small.

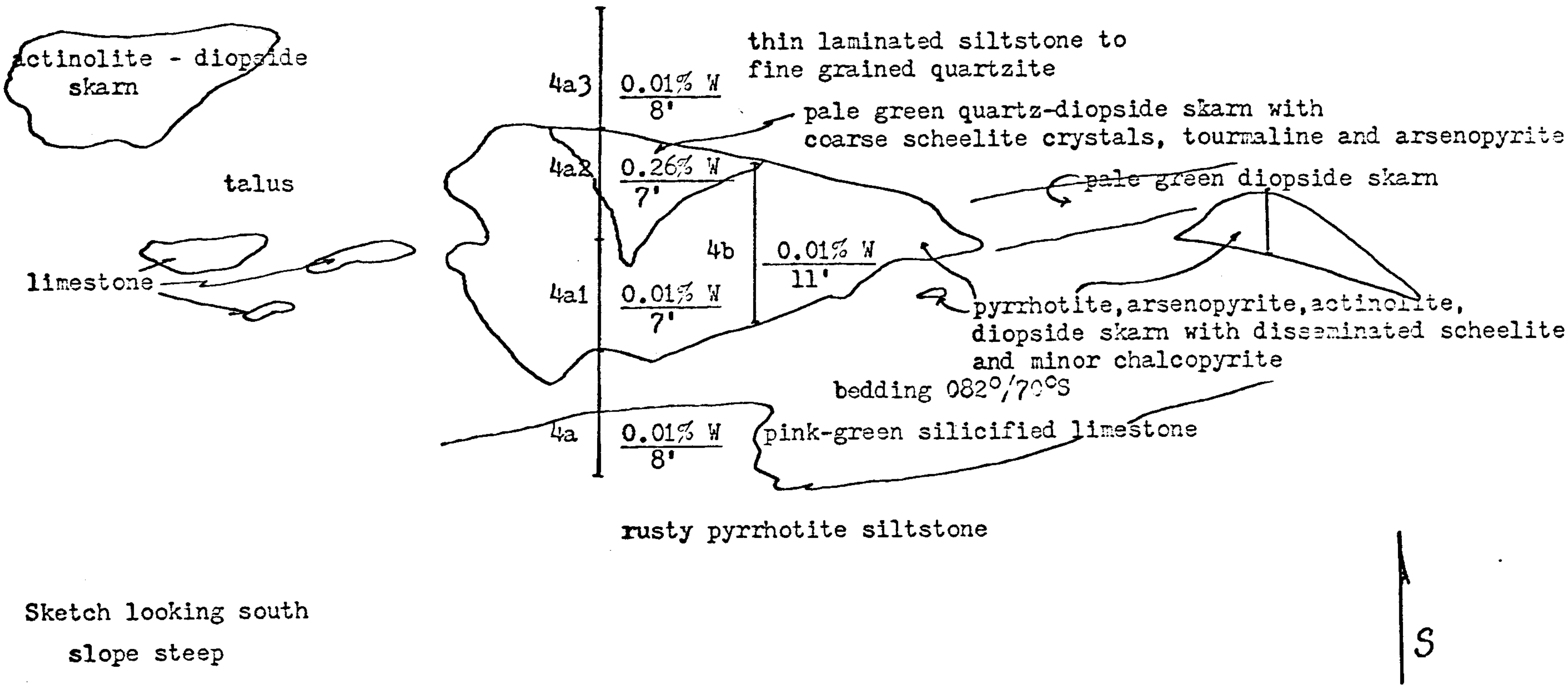
Above the intrusive bulge above the upper lake in the Twin Lake cirque is a quartz-tourmaline vein eighteen inches thick extending for about three hundred feet. This vein contains large tourmaline crystals and low grade scheelite in the form of coarse crystals. Yellow fluorescence also exists which is possibly malayaite.

Showing 4

Showing 4 is located at the head of the Twin Lake cirque on the south side near the ridge top. Diagram 3 illustrates showing 4 and shows its relationship with overlying and underlying beds. It is contained in a pale pink and green fine-grained silicified limestone between two rusty argillite units.

Scheelite mineralization occurs in two distinct zones within the skarn. The first zone is a rusty, pyrrhotite and arsenopyrite rich fine-grained actinolite-diopside skarn with minor chalcopyrite. Scheelite is finely disseminated throughout this zone with occasional heavy concentrations.

The second zone is a pale green diopside skarn with coarse



Sketch looking south
slope steep

MUN CLAIM GROUP
MINERALIZED SHOWING 4
Scale 1"- 10'

DIAGRAM III

quartz and scheelite crystals intergrown. Tourmaline occurs as clusters of fine radiating crystals. Arsenopyrite is present in a minor amount as medium sized crystals.

Three sample lines were taken across this mineralized zone. The results are plotted on diagram 3.

Showing 5

Showing 5 is at the head of the Twin Lake cirque, just above the moraine. It is a small outcrop in a shear zone. Diagram 4 illustrates this showing.

Scheelite is contained in a rusty, coarse-grained, augite-actinolite skarn with disseminated pyrrhotite. This skarn is overlain by rusty argillite. No outcrop occurs below the skarn zone.

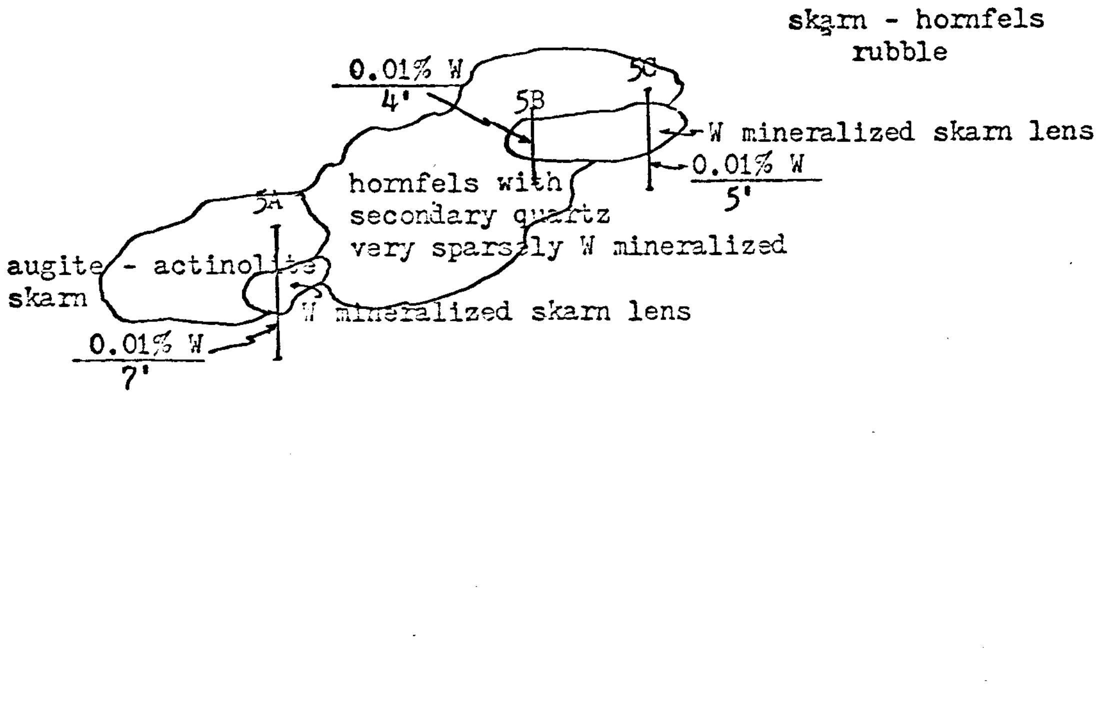
Large boulders of this mineralized skarn type were discovered near the toe of the moraine which are believed to have originated near showing 5.

Three chip sample lines were taken across showing 5 with the results shown on Diagram 4.

Tungsten Source

The Cretaceous granitic intrusion, underlying the sediments, is the most likely source of the tungsten found on the MUN property. In this theory, residual silica solutions from the intrusive body containing tungsten and iron, permeate the limestone replacing it with calc-silicates, scheelite and iron.

Support of an intrusive source for the tungsten is found in the



MUN CLAIM GROUP

MINERALIZED SHOWING 5

Scale 1"- 10'

DIAGRAM IV

scheelite bearing quartz-tourmaline vein. Tourmaline-quartz veins and clusters are abundant in the intrusive in this area; therefore the intrusive is the most probable source of the vein material.

The silty sedimentary rocks may also be the source of the tungsten. In this theory the tungsten originally was trapped in the siltstones and then remobilized by the metamorphic climate and hydrothermal solutions of the intrusive. The remobilized tungsten was later deposited as scheelite when it came in contact with limy sediments. Support of this theory is that mineralized skarns are frequently on the contact between siltstones and limy sediments. This suggests that tungsten-rich solutions originating in the siltstones precipitate scheelite and calc-silicates when in contact with limestones.

Small massive pyrrhotite lenses in the siltstone frequently contain scheelite. The tungsten and iron may be derived from the pyrrhotite-rich siltstones and redeposited in small limestone lenses.

A rock geochemical study is being carried out by Cominco Ltd. on the intrusive and sedimentary rocks from the claim group. This study should indicate whether the sediments or the intrusive contain anomalous tungsten, and decide which is the source.

TIN

Tin mineralization was encountered in talus float as malayaite ($CaSnOSiO_4$). This mineral exhibits a bright yellow flourescence and would otherwise have gone unnoticed. It is apparently isomorphous with sphene.

Malayaite infrequently occurs as an accessory mineral in scheelite skarns. It has been found in Unit 6 diopside skarn talus above the upper lake in the Twin Lake cirque. No outcrops were found. Malayaite was also found associated with sphalerite bearing talus in garnet-limestone skarn at the head of the cirque located in the east central part of the claim group. The source of this float was not found although several small outcrops of similar skarn occur.

Tin has been detected in several samples of talus fines on both sides of the north east ridge but the tin mineral concerned has not been identified.

A thin section of malayaite bearing rock contained:

Diopside	55%
Garnet (grossularite - andradite)	25
Flourite (colorless in thin section)	15
Malayaite	5-
Scheelite	1-
Apatite	1-
Carbonate	1-
Chlorite	tr.

CONCLUSIONS AND RECOMMENDATIONS

Small skarn zones occur within limy sediments on the MUN claim group. Scheelite, sphalerite and malayaite mineralization are found with some of the skarn zones but not all of them. The zones of mineralization are too small for economic consideration.

If unit 6, which holds most of the known mineralization is correlative with the lower part of unit 2, then the possibility of further and larger skarn zones exists beneath the Limestone mountain. At the time of writing the results from the talus samples around the base of this mountain are not known. If these samples indicate anomalous tungsten or tin over a large area then additional geochemical sampling and possibly a geophysical survey is recommended. If these samples show little or no tungsten or tin the authors recommend no further work be done on the claim group and the claims be allowed to lapse.

D.B. Reid
Party Chief,

S.J. Woywitka
Assistant,

REFERENCES

Blusson, S. L., Geology and Tungsten Deposits near the Headwaters of Flat River, Yukon Territory and Southwestern District of Mackenzie, Canada, Paper 67-22, Geological Survey of Canada, 1968

Gabrielse, H., Geology of Jennings River Map Area, British Columbia (104-O) Paper 68-55, Geological Survey of Canada, 1969.

Poole, W. H., Map 22-1957, Wolf Lake, Yukon Territory, Sheet 105B, Geological Survey of Canada, 1958.

DISCUSSION OF GEOLOGY

Photo 2 shows Peak D taken from the north east. A more general view, from Peak D to Peak B, is shown on Photo 3. These show the light colored limestone, Formation 2, as well as the rusty argillaceous siltstone mapped as Formation 2d by Reid.

The general appearance, description and location of Formation 2d suggests it is in reality part of Formation 1.

The limestone, Formation 2, is terminated by faulting and the granitic intrusive on the south slopes of Peak D.

The skarn, mapped near the top of Peak D thus would occur on the lower, rather than upper, contact of the limestone and its extension, or equivalent, should be sought near point K. north of Peak B.

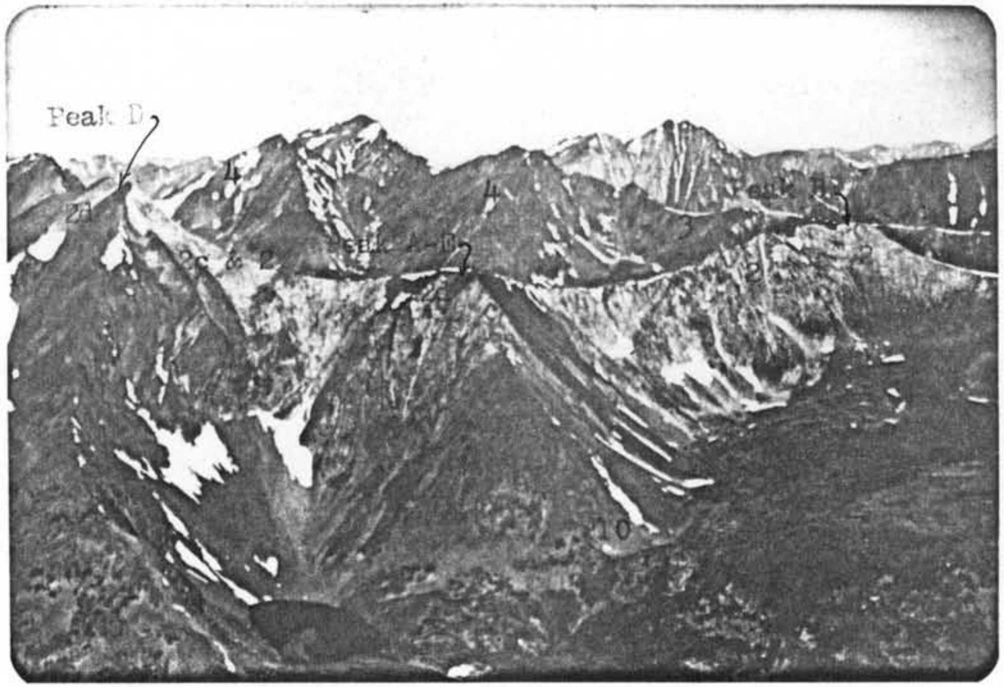
Specimens of skarn containing malayaite were found in talus within the cirque north west of Peak D. None was found in place. It is possible this material came from the skarn near the top of Peak D and that tin mineralization may be found along the lower contact of the limestone as indicated by the talus samples with anomalous tin content on either side of the ridge at point K.

Photos 4 - 7 inclusive depict the cirque north west of Peak D. Considerable time was spent in prospecting the walls of this cirque on the assumption that the source of some tungsten geochemistry might be along the contact of the granite, Unit 10, with the limestone, Unit 2. The portion of that contact south-west of Peak B is still considered as favourable and should be sampled as outlined on the modified sample grid proposed for 1978.

PHOTO 2

PEAK D LOOKING SOUTH WEST

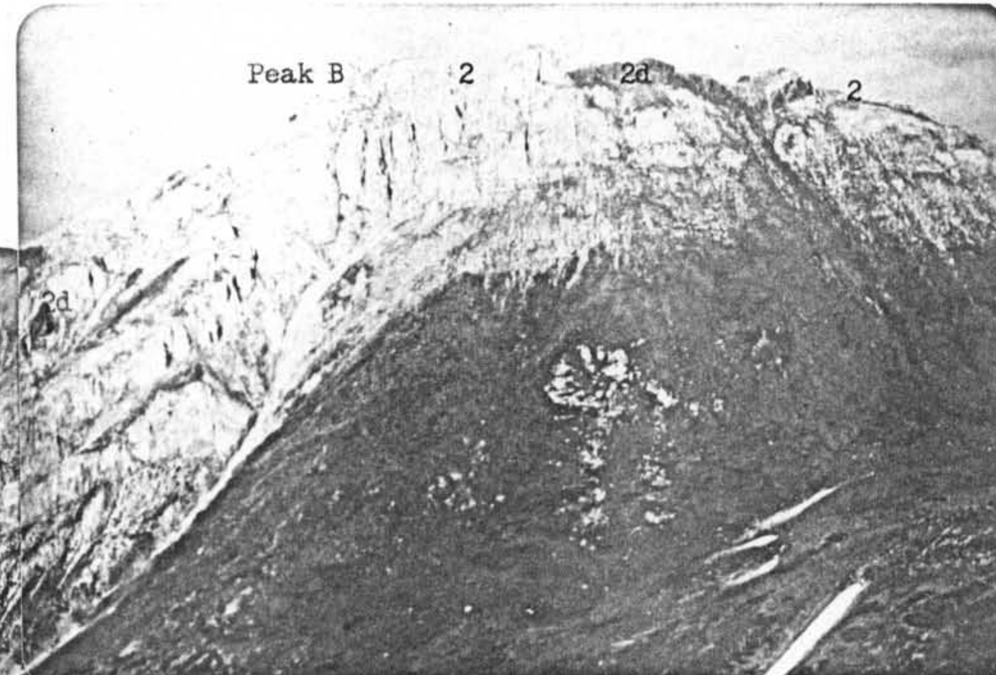
PHOTO 3



EAST SIDE OF MUN GROUP LOOKING WEST

PHOTO 4

PHOTO 5



LOOKING NORTH EAST TO NORTH EAST RIDGE

MUN CLAIMS

PHOTO 6

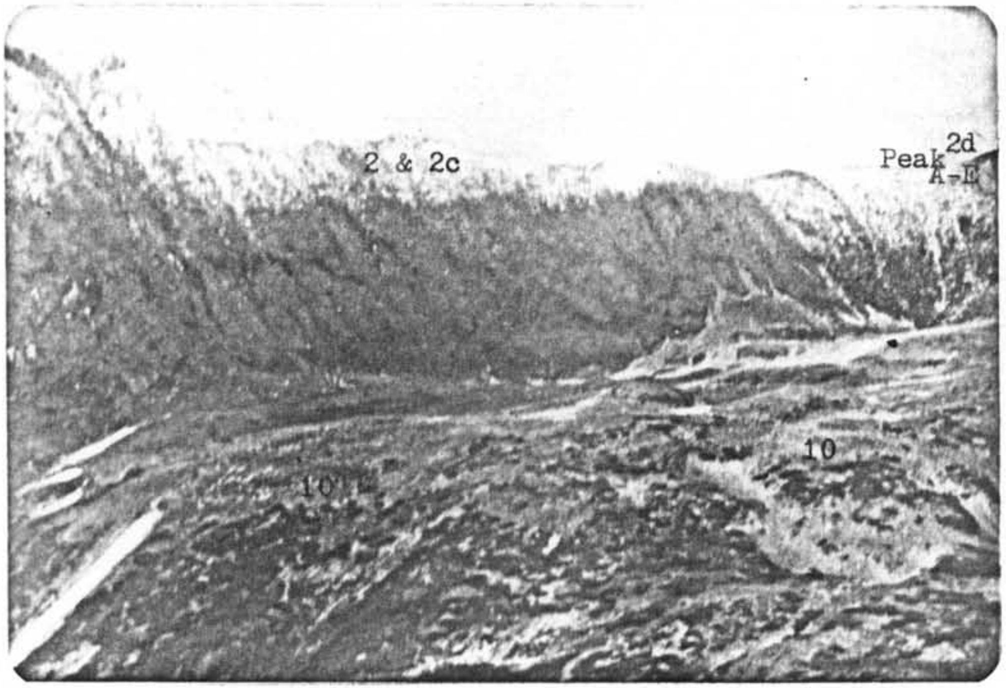
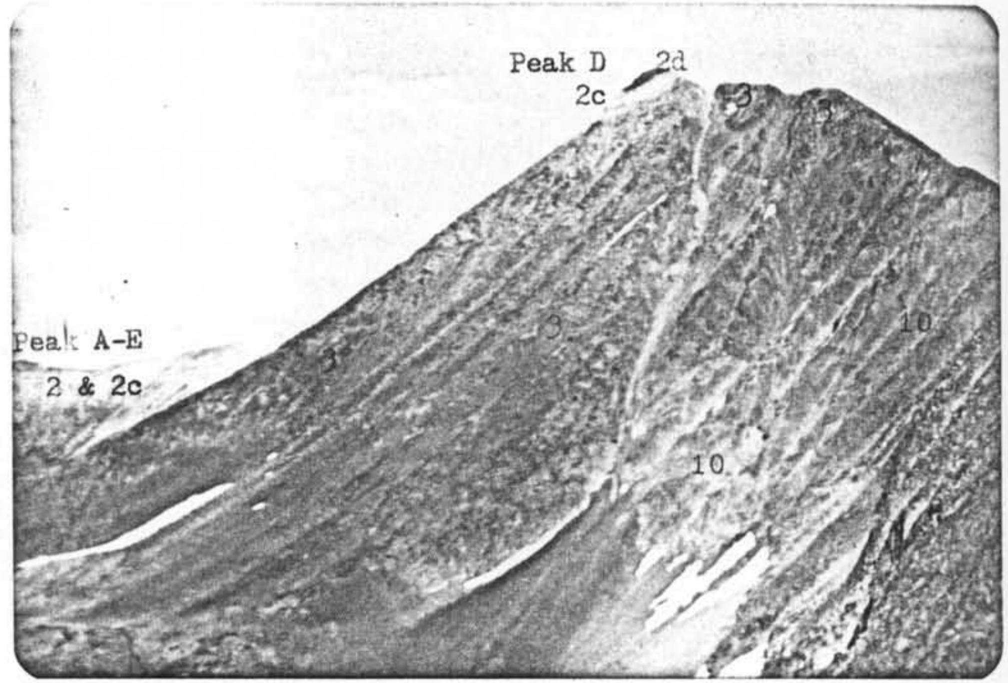


PHOTO 7



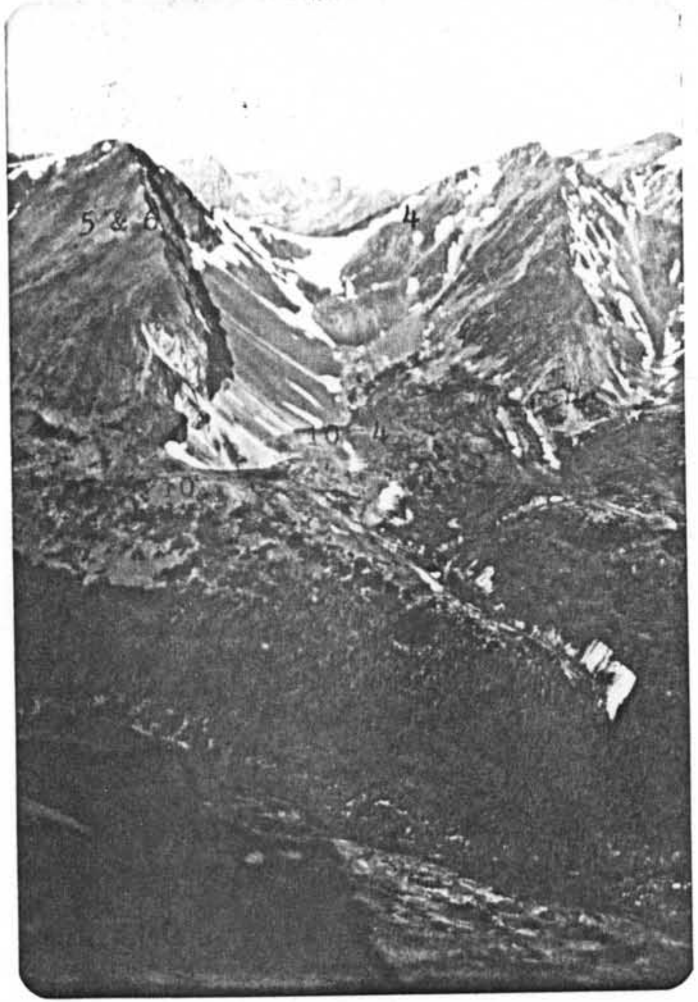
LOOKING EAST TO PEAKS A-E AND D

MUN CLAIMS

Photo 8 is a general view of Twin Lakes cirque where most of Reid's time was spent trying to define reasonable sized skarn zones. It is evident from his work that a number of small, low grade zones exist and it is possible this type of occurrence has given rise to the anomalous silt samples obtained. They are adequate to explain the values obtained in the local small creeks in the cirque but there is some doubt that they can account for the values distributed in the main creek all the way to Munson Lake. Potential in this cirque appears to be very limited and no further work is proposed.

Photo 9 is a view, looking south east, along the limestone horizon, Unit 2, from a point two miles north west of the MUN claims. The small limestone knob in the shadow, lower centre, of the photo is that shown in the upper left corner of Map II. Scheelite and malayaite were found in a small skarn on the south contact of this limestone. This occurrence of tin mineralization, together with minor occurrences on the MUN claims, suggest a strike length of four miles along which tin mineralization may be found.

PHOTO 8

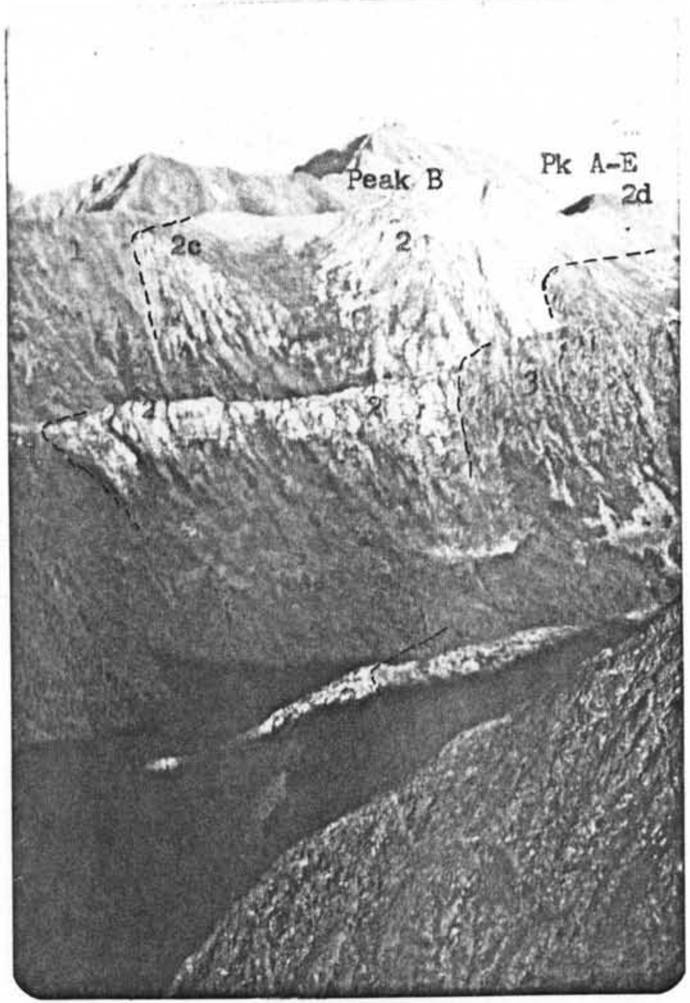


TWIN LAKES CIRQUE

LOOKING SOUTHWEST

MUN CLAIMS

PHOTO 9



MUN LIMESTONE

LOOKING SOUTH EAST

GEOCHEMISTRY

As mentioned under Economic Geology, page 20, three forms of geochemical sampling were undertaken:-

(a) stream sediment sampling,
(b) talus fines sampling,
(c) soil sampling.

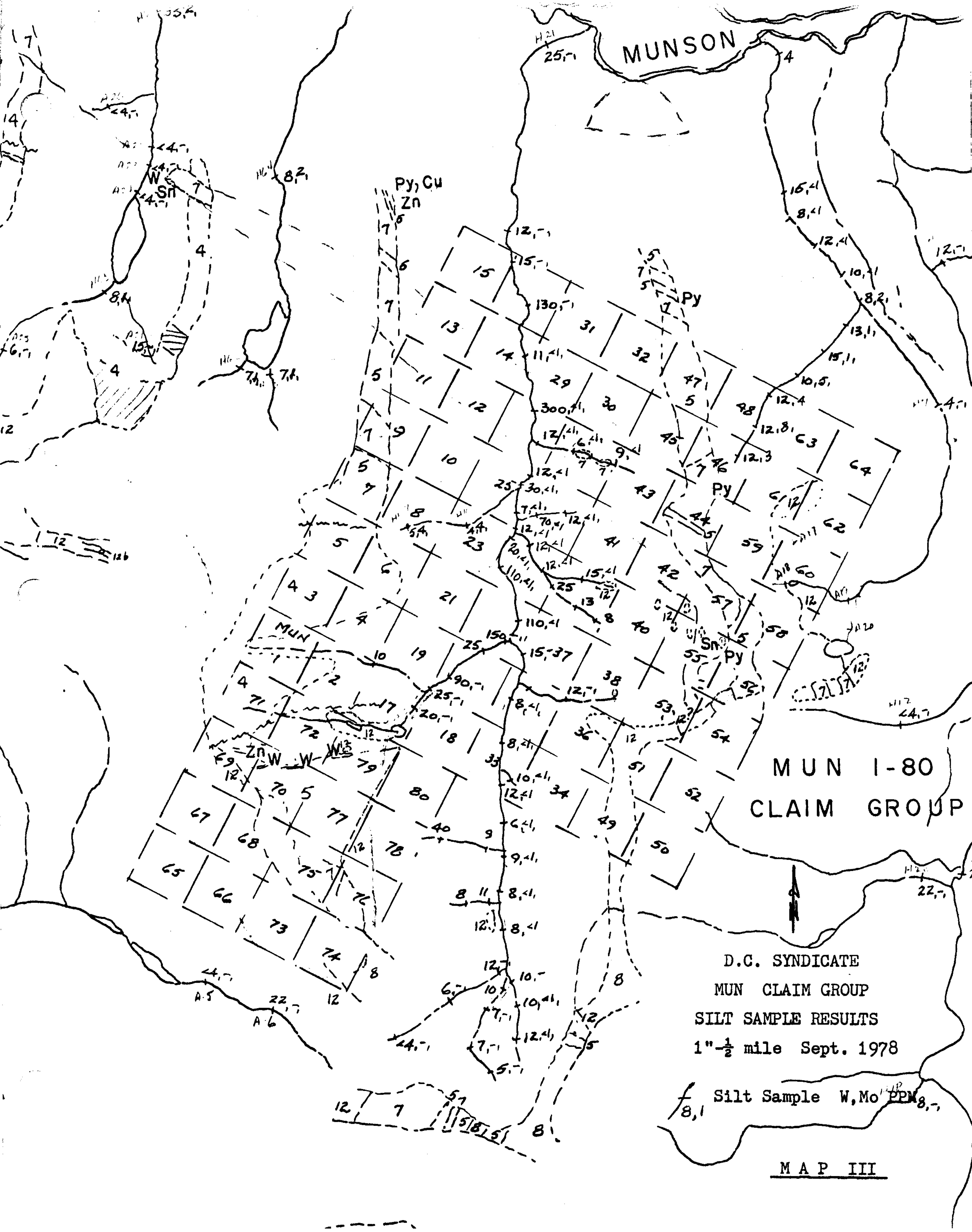
(a) Stream Sediment Samples

The original stream sampling was done in 1976 and led to staking of the MUN 1 - 80 claims. Costs for that work are not included in this report.

Map III shows the original silt sample results. These samples were of the ordinary stream sediments collected by hand into kraft sample bags. Samples were dried at the base camp and sifted to -40 mesh. Sifted samples were forwarded to Chemex Labs Ltd. in North Vancouver for analysis.

(b) Talus Fines Samples

Samples were collected near the tops of talus slopes in Twin Lakes cirque on the west side of the property, and on both sides of the ridge on the east side of the property. Sample intervals varied from 100' to 400' measured by hip chain, and consisted of the finest portion of the talus picked up by hand and collected in kraft paper sample bags.


MUNSON
MUN 1-80
CLAIM GROUP
D.C. SYNDICATE
MUN CLAIM GROUP
SILT SAMPLE RESULTS
1"-½ mile Sept. 1978
Silt Sample W,Mo PPM
MAP III

Some of the early samples were treated in the same manner as silt samples, being dried and sifted to -40 mesh at the base camp before being sent to Chemex Labs. Later samples were shipped as collected and were separated into +50 and -50 mesh fractions by Chemex. Results of analysis are compared below.

(c) Soil Samples

Soil development is poor. The lower slopes and valley bottom are covered by glacial debris. Samples were collected at 500 foot intervals on three lines east of the main creek, and at 100 foot intervals on two lines west of the creek.

Samples were from 6" to 18" depths in sparsely to heavily wooded areas and consisted of stoney glacial transported material. Of the 30 samples on the east side of the creek 10 are described as being from the 'B' horizon and the remainder from the 'A2' horizon. There is no apparent direct correlation between soil description and geochemical results, nor a direct correlation between zinc znd tungsten results.

TALUS SAMPLES

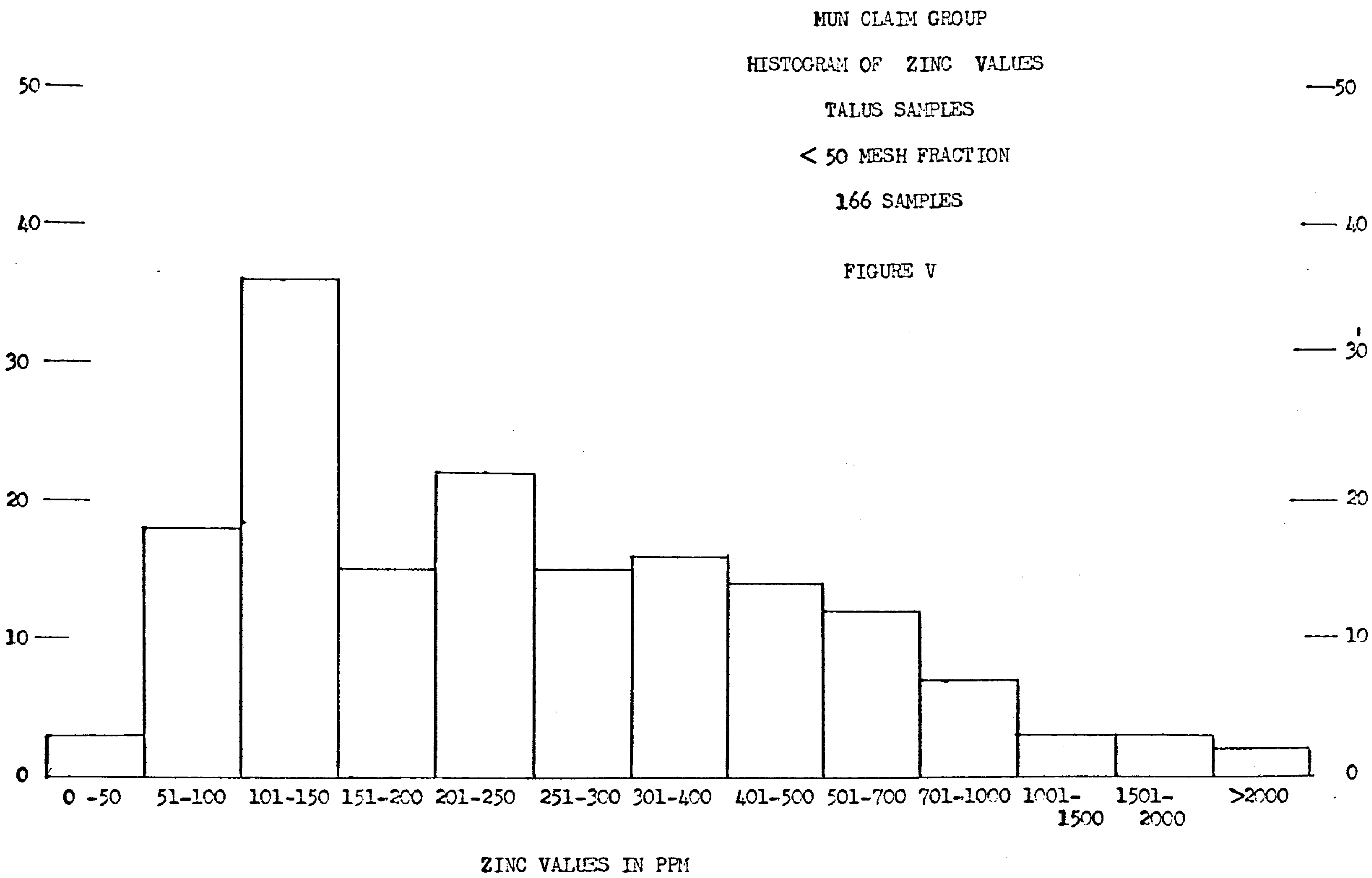
A series of samples were taken from talus slopes in cirques where indications of tungsten mineralization were located. These samples are plotted on Maps Iand II MUN Claim Group, and show results for zinc, tungsten, and in places, tin in ppm.

Figures V,VI,VII are histograms of zinc, tungsten and tin values respectively, for samples taken on the MUN claims.

ZINC
Figure V, Map II

No distinct division between anomalous and non-anomalous zinc values is apparent from the histogram. There are probably two or more populations present. The histogram suggests values over 200 ppm are anomalous but experience in the area suggests only values over 500 ppm should be considered anomalous.

Almost all the high zinc values come from the north west slopes of Peak D and from the Twin Lakes cirque. Showings mapped and sampled by Reid occur mainly in Twin Lakes cirque and it is possible more mineralization is present north west of Peak D than has so far been located.


MUN CLAIM GROUP
HISTOGRAM OF ZINC VALUES
TALUS SAMPLES
< 50 MESH FRACTION
166 SAMPLES
FIGURE V
50
40
30
20
10
0
0 -50
51-100
101-150
151-200
201-250
251-300
301-400
401-500
501-700
701-1000
1001-1500
1501-2000
>2000
ZINC VALUES IN PPM

TUNGSTEN
Figure VI, Maps I and II

The histogram for tungsten values shows that a large proportion (47%) of the samples contain no appreciable tungsten. Forty-four samples (26.5%) contain more than 10 ppm. The diagram suggests values over 5 ppm are anomalous but in practice it is likely that values over 20 ppm would be necessary to indicate an anomaly of interest. This depends on the character and exposure of the mineralization. On the Logjam Creek property (Logtung) where minor scheelite mineralization occurs disseminated over a very large area there is a very large soil anomaly of greater than 150 ppm tungsten and a substantial area of greater than 400 ppm.

The majority of anomalous tungsten values on the MUN claims, generally of moderate intensity, are derived from Twin Lakes cirque while a few, rather scattered and erratic, come from the east cirque. There is some doubt that these sources alone are responsible for the extensive silt anomaly in the main creek.

Figure VIII of results obtained from greater than 50 mesh and less than 50 mesh fractions of talus samples indicates considerable variation in the values obtained.

Samples of the less than 50 mesh fractions gave values of 4 ppm or greater in 13 cases (29.5%). Samples of greater than 50 mesh material, crushed to 3/16" and then pulverized to less than 100 mesh gave values of 4 ppm or greater in 22 cases (50%).

The talus samples were made up of the finest material that could be picked up by hand near the top of the talus slopes.

MUN CLAIM GROUP

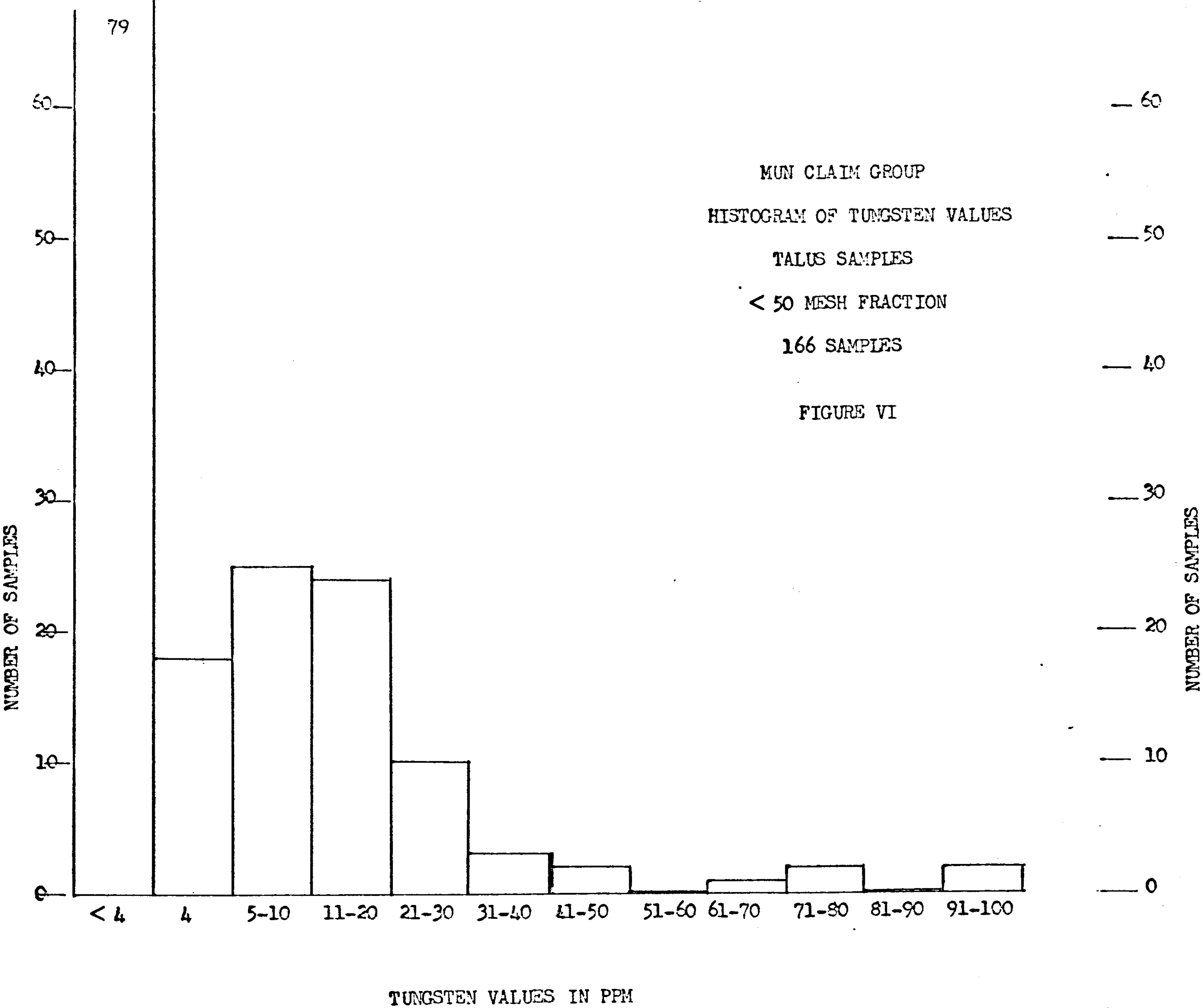
HISTOGRAM OF TUNGSTEN VALUES

TALUS SAMPLES

< 50 MESH FRACTION

166 SAMPLES

FIGURE VI



TIN
Figure VII, Maps I and II

Only 44 samples were analysed for tin and the histogram is probably not representative since a large percentage of these samples are from an anomalous area. An apparently anomalous zone occurs on both the east and west sides of the east ridge at point K (Map I).

Figure IX shows results of analysis of < 50 and > 50 mesh fractions from talus samples. It is immediately apparent that a much larger proportion of samples are anomalous for tin than were anomalous for tungsten (Fig. VIII). There is again, a substantial variation in the numerical results obtained from the different sized fractions.

Twenty-seven samples (61.4%) of the < 50 mesh fraction gave values of 10 ppm or greater, whereas only eighteen samples (40.9%) of > 50 mesh fraction samples gave values of 10 ppm or greater.

MUN CLAIM GROUP

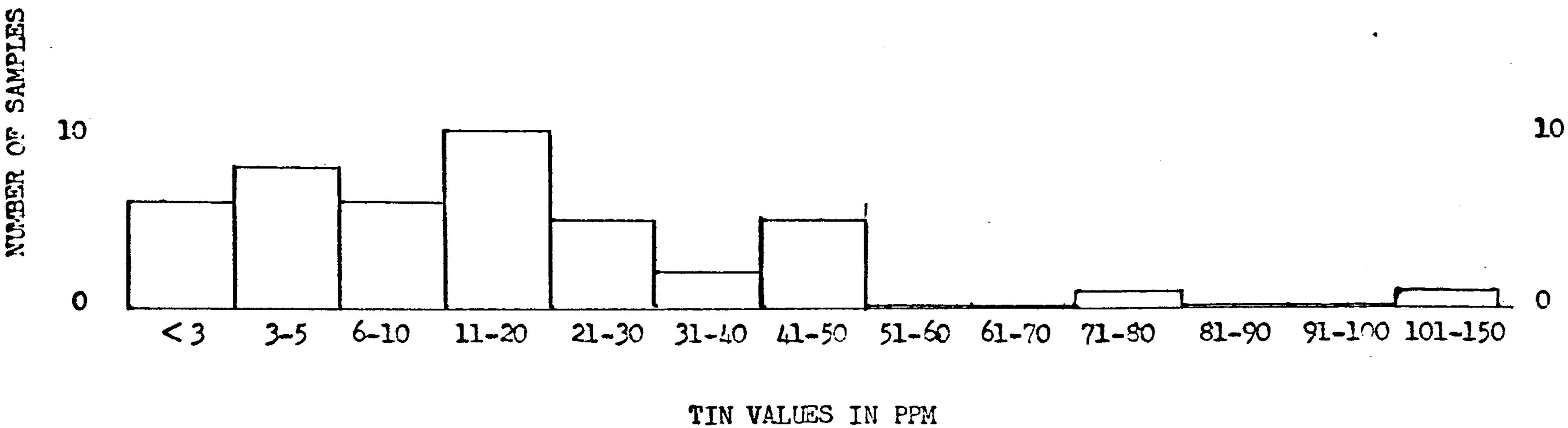
HISTOGRAM OF TIN VALUES

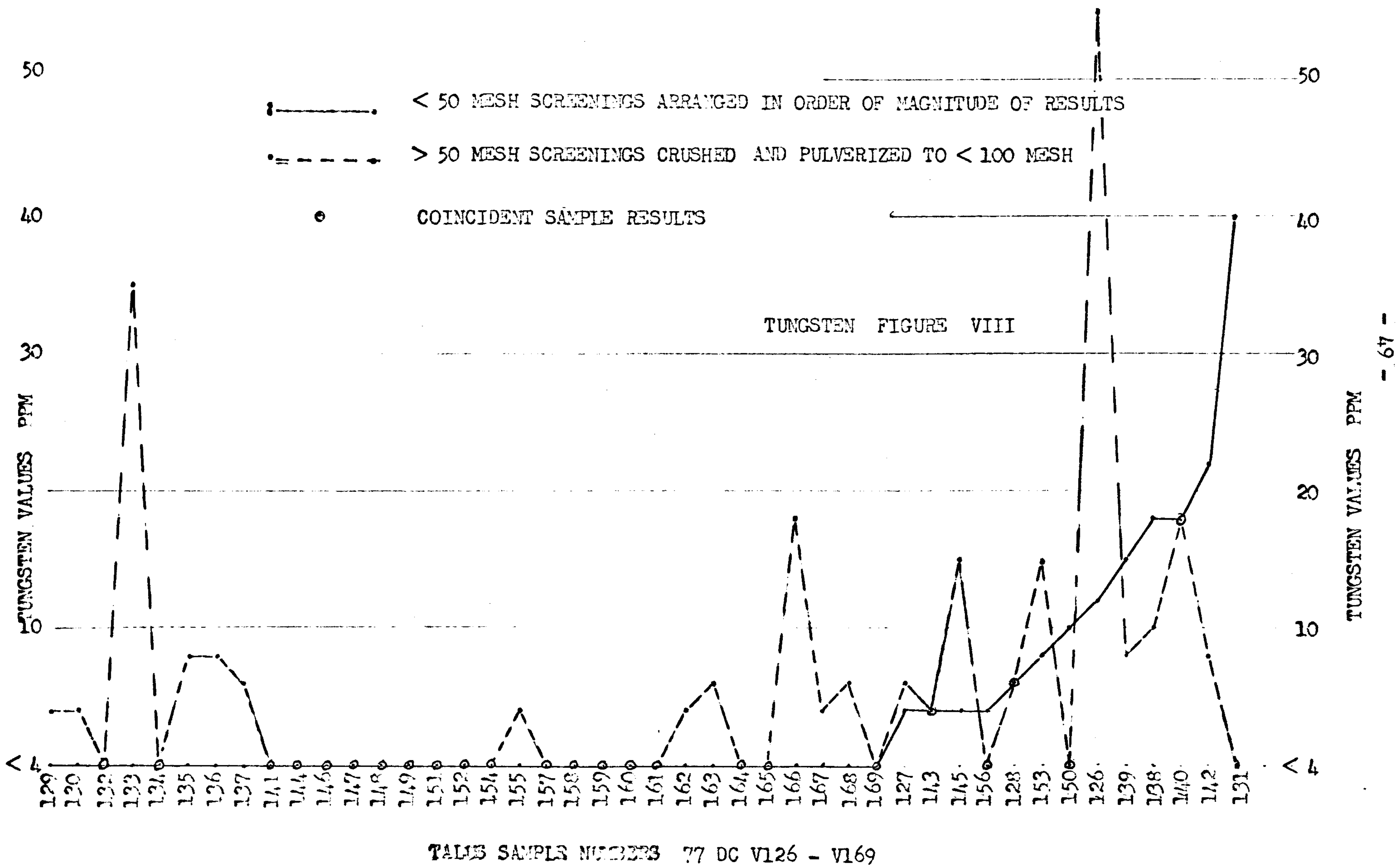
TALUS SAMPLES

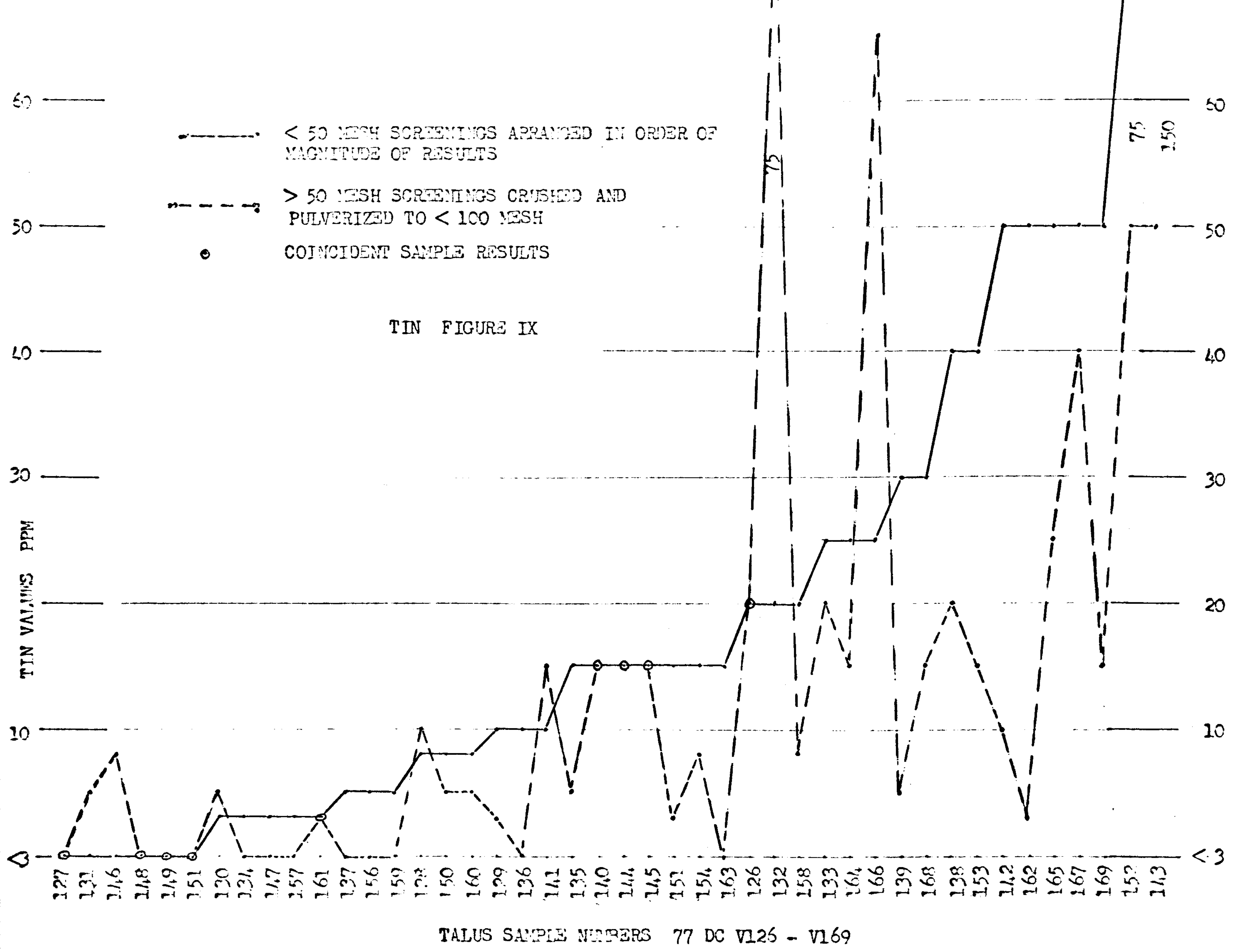
< 50 MESH FRACTION

44 SAMPLES

FIGURE VII




< 50 MESH SCREENINGS ARRANGED IN ORDER OF MAGNITUDE OF RESULTS
> 50 MESH SCREENINGS CRUSHED AND PULVERIZED TO < 100 MESH
COINCIDENT SAMPLE RESULTS
TUNGSTEN FIGURE VIII
TUNGSTEN VALUES PPM
50
40
30
10
< 4
TALUS SAMPLE NUMBERS 77 DC V126 - V169



TIN FIGURE IX

PROPOSED PROGRAMME 1978

Although exploration on this claim group to date has been disappointing, indications of tungsten mineralization have been located and tin mineralization is indicated both by float samples containing malayaite and by anomalous talus samples.

An extensive "soil" sampling programme is proposed on the grid indicated on Maps I and II. In the east cirque this sample programme would test the assumed contact area above the granite outcrops and below the talus samples so far taken. These 1977 samples may in fact be too high up slope to test the favourable contact area.

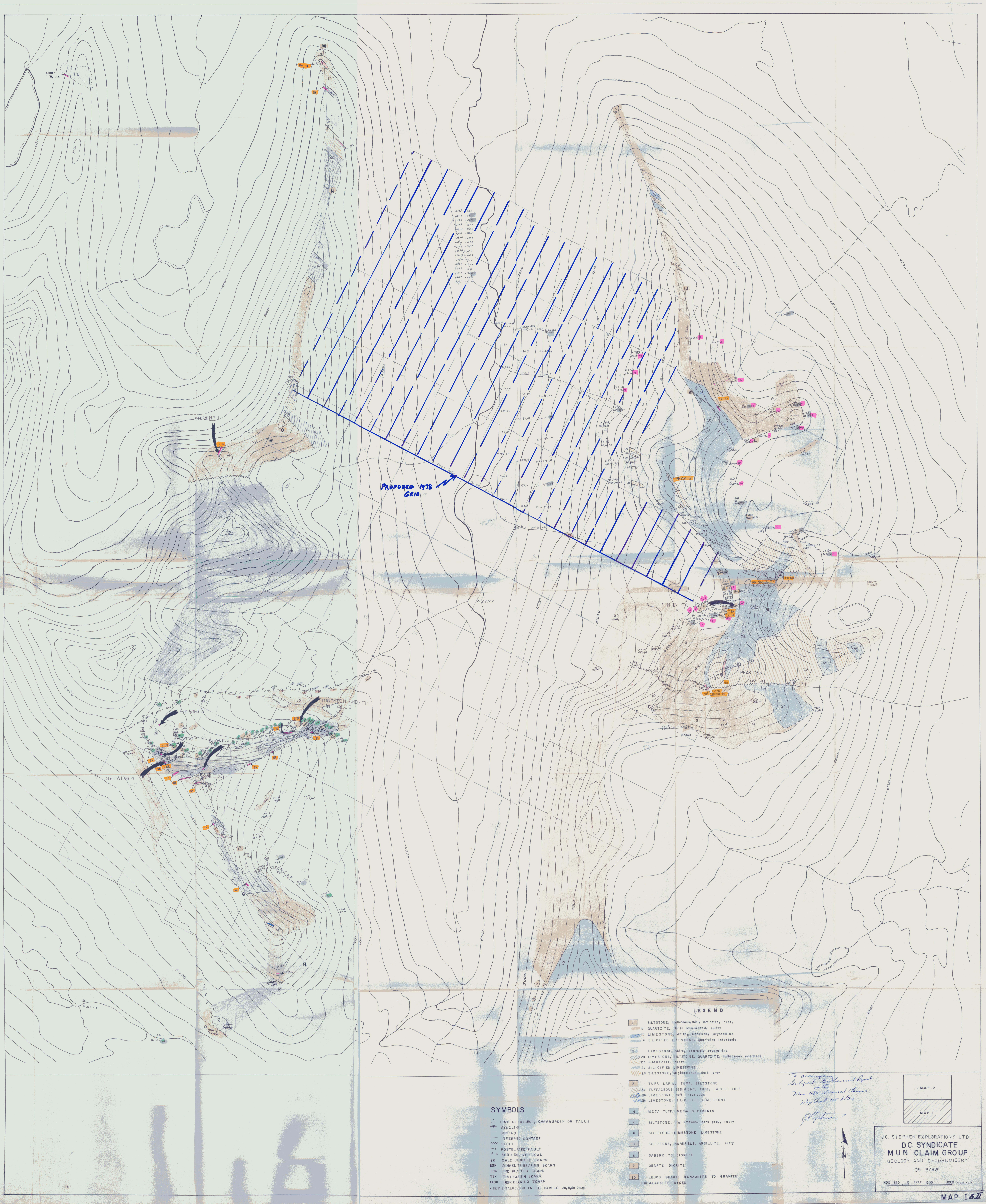
The grid lines should be extended to the north boundary of the claims to test the lower, or northern, contact between Units 1 and 2 where tin is indicated by present sampling.

The grid should extend to the north west to check this same contact zone on the west ridge. Some of this work may be outside the boundaries of the claim group. Some portions of the valley bottom are covered by glacial debris and these sections may not be sampled.

Rock chip sampling of some skarns on the east ridge, as well as portions of Unit 1 and lower contact of Unit 2 should be done.

Respectfully submitted,
J.C. Stephen Explorations Ltd.,

J.C. Stephen



SHOWING 1
PROPOSED 1978 GRID
CAMP
TIN IN TALUS
PEAK B
PEAK D&A
TUNGSTEN AND TIN IN TALUS
SHOWING 4
LEGEND
1 SILTSTONE, argillaceous, thinly laminated, rusty
1a QUARTZITE, thinly laminated, rusty
1b LIMESTONE, white, coarsely crystalline
1c SILICIFIED LIMESTONE, quartzite interbeds
2 LIMESTONE, white, coarsely crystalline
2a LIMESTONE, SILTSTONE, QUARTZITE, tuffaceous interbeds
2b QUARTZITE, rusty
2c SILICIFIED LIMESTONE
2d SILTSTONE, argillaceous, dark grey
3 TUFF, LAPILLI TUFF, SILTSTONE
3a TUFFACEOUS SEDIMENT, TUFF, LAPILLI TUFF
3b LIMESTONE, tuff interbeds
3c LIMESTONE, SILICIFIED LIMESTONE
4 META TUFF, META SEDIMENTS
5 SILTSTONE, argillaceous, dark grey, rusty
6 SILICIFIED LIMESTONE, LIMESTONE
7 SILTSTONE, HORNFELS, ARGILLITE, rusty
8 GABBRO TO DIORITE
9 QUARTZ DIORITE
10 LEUCO QUARTZ MONZONITE TO GRANITE
10a ALASKITE DYKES
SYMBOLS
LIMIT OF OUTCROP, OVERBURDEN OR TALUS
SYNCLINE
CONTACT
INFERRED CONTACT
FAULT
POSTULATED FAULT
BEDDING, VERTICAL
SK CALC SILICATE SKARN
SSK SCHEELITE BEARING SKARN
ZSK ZINC BEARING SKARN
TSK TIN BEARING SKARN
FESK IRON BEARING SKARN
x 112,7,12 TALUS, SOIL OR SILT SAMPLE Zn,W,Sn p.p.m.
To accompany Geological, Geochemical Report on the Mun 1-80 Mineral Claims Map Sheet 105 B/3W
MAP 2
MAP 1
N
J.C. STEPHEN EXPLORATIONS LTD.
D.C. SYNDICATE
MUN CLAIM GROUP
GEOLOGY AND GEOCHEMISTRY
105 B/3W
500 250 0 feet 500 1000 Sept/77
MAP I & II


VERTICAL SECTION EAST RIDGE FACING EAST
NORTH
SOUTH
6000'
5500'
5000'
4500'
J
K
D
PEAK D
PEAK B
RIDGE 700' WEST OF SECTION
PEAK A-E
RIDGE 500' EAST OF SECTION
Skarn
Down dip projection of skarn located 300' west of section
GEOCHEM AREA zinc and tin
Granite contact 800' - 1800' west of section
Base of limestone outcrop 1600' west of section
Granite contact 1600' - 3000' east of section
Tin geochem west of section
Limestone 1600' - 3400' west of section
Granite 3300' west of section
VERTICAL SECTION WEST RIDGE FACING EAST
NORTH
SOUTH
M
N
O
F
G
H
Skarn
FOR LEGEND SEE MAP 2
To accompany Geological, Geochemical Report on the Mun 1-80 Mineral Claims Map Sheet 105B/3W
J.C. STEPHEN EXPLORATIONS LTD
D.C. SYNDICATE
MUN CLAIM GROUP
NORTH - SOUTH SECTIONS FACING EAST
SCALE: HORIZONTAL 1" - 500'
VERTICAL 1" - 250'
OCT. 1977
SECTION I