

1977 GEOLOGICAL, GEOCHEMICAL and  
 GEOPHYSICAL REPORT  
 on the  
 STU CLAIM GROUP  
 HOOCHKOO CREEK AREA

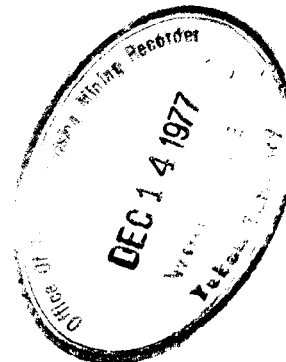
WHITEHORSE MINING DISTRICT

by

K. W. Watson

and

R. J. Joy,  
 United Keno Hill Mines Limited,  
 405 Main Street,  
 Whitehorse, Y.T.



Dated: November 21st, 1977

N.T.S. Sheet 115I-7  
 Latitude: 62° 25' N  
 Longitude: 136° 50' W  
 Dates: May 26th to Oct. 6/77

*Richard Joy*

090248

17,000.00

*[Signature]*

*[Signature]*

**MR. BAXTER**  
Supervising Mining Recorder  
Montana

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2. Property Map
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PHOTOS:

1. View from Zone 1, looking south west at part of Camp Creek valley
2. Medium-grained, biotite-hornblende granodiorite.
3. Malachite impregnated foliated granodiorite.
4. Quartzofeldspathic and quartz-feldspar-biotite gneiss.
5. Strongly foliated fine-grained granitic rock.

MAPS IN POCKET:

GENERAL GEOLOGY	Scale 1" = 400'
GEOCHEMISTRY, COPPER PLOT	1" = 400'
EXPOSURE PLAN with rock sample location	1" = 400'
MAGNETOMETER SURVEY	1" = 400'
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INTRODUCTION:-

The STU 1 - 120 Claims were staked in January, 1977 to cover an area from which several anomalous soil samples were collected during the 1976 reconnaissance sampling program. These samples contained up to 1620 ppm copper. Claims 121 and 122 were staked in August to cover a weakly mineralized foliated zone which extended off the property.

During the period May 26th to October 6th, 1977 a four to eight man crew conducted geological and geochemical surveys over the whole claim group. From August 11th to 18th, a two man geophysical crew conducted approximately 22 miles of magnetometer and EM-16 surveys.

These surveys outlined three foliated zones which contain weak copper mineralization.

LOCATION and ACCESS:-

The STU Claim Group lies about 131 miles north-northwest of Whitehorse (figure 1) and about 19 miles southeast of United Keno's DEF property. Approximate location is latitude 62° 25'N, longitude 136° 50' W on N.T.S. Sheet 115I-7. The property extends northwest of the northeast flowing Hoochekoo Creek.

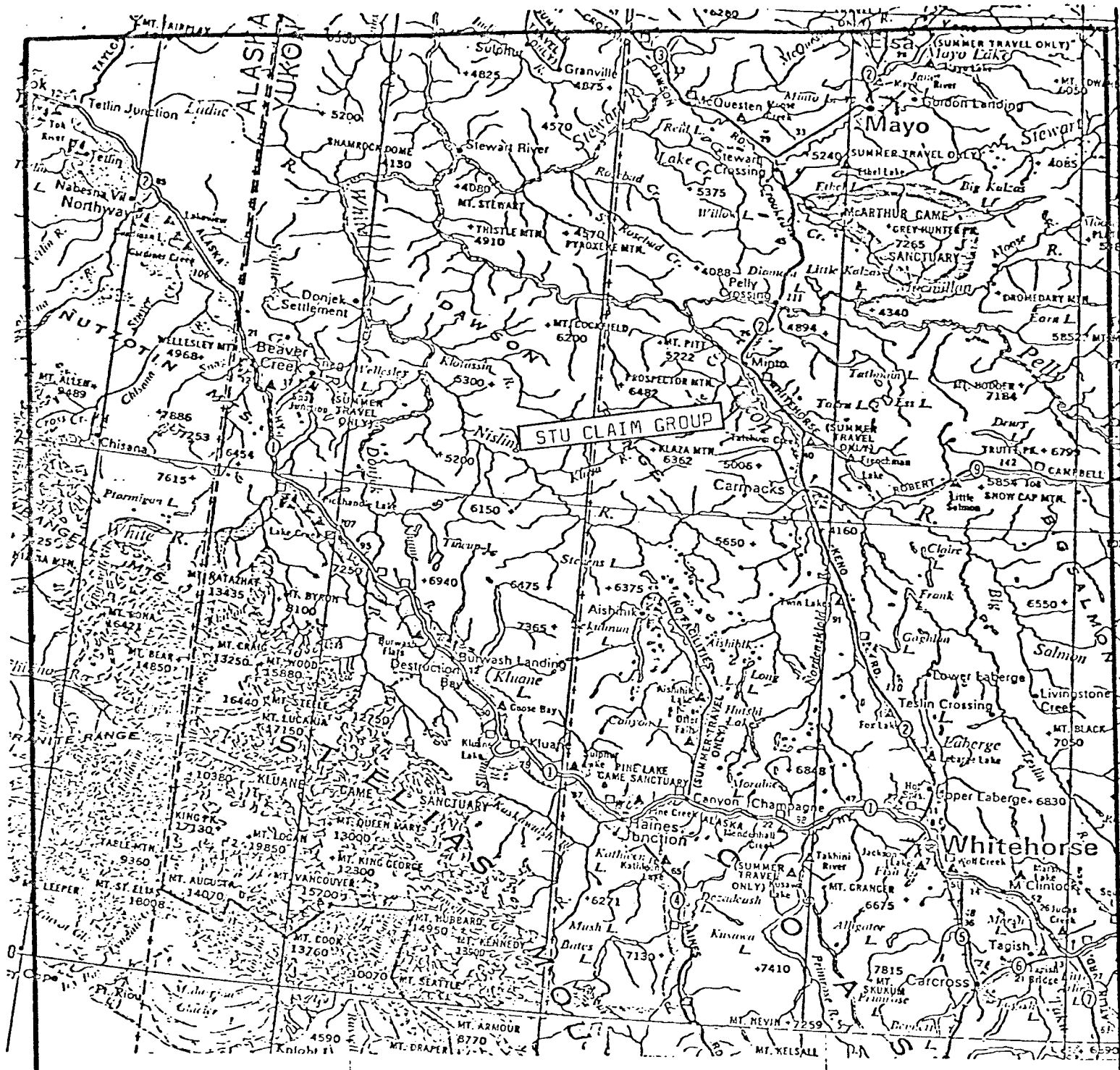
Access to the property was by a Bell 206B (Jet Ranger) helicopter based at Carmacks about 29 miles to the southeast. Whenever the volume of supplies made two or more trips necessary, a staging area about six miles east of the property was used.

PROPERTY:-

The STU Claim Group (figure 2) consists of 122 contiguous full claims. STU 1 - 120, Grant Number YA8616 to YA8735, expire on February 1st, 1978. STU 121 and 122, Grant Numbers YA19722 and YA19723, respectively, expire on September 12, 1978.

HISTORY:-

During the 1976 field season a two man crew conducted a reconnaissance soil sampling program between the Minto and Williams Creek deposits. Several of the anomalous samples collected during this program, including one containing 1620 ppm copper



**UNITED KENO HILL MINES LTD.**  
 EXPLORATION DEPARTMENT  
 WHITEHORSE — YUKON

Location Map  
 STU CLAIM GROUP

Mining District Whitehorse  
 N.T.S. Sheet No. 115 I 7  
 Scale 1 inch to 40 miles

Drawn by \_\_\_\_\_ Date 03/11/77

Figure 1

STU 119 YA 8734	STU 120 YA 8735	STU 95 YA 8710	STU 96 YA 8711	STU 71 YA 8686	STU 72 YA 8687	STU 47 YA 8662	STU 48 YA 8663	STU 23 YA 8638	STU 24 YA 8639
STU 117 YA 8732	STU 118 YA 8733	STU 93 YA 8708	STU 94 YA 8709	STU 69 YA 8684	STU 70 YA 8685	STU 45 YA 8660	STU 46 YA 8661	STU 21 YA 8636	STU 22 YA 8637
STU 115 YA 8730	STU 116 YA 8731	STU 91 YA 8706	STU 92 YA 8707	STU 67 YA 8682	STU 68 YA 8683	STU 43 YA 8658	STU 44 YA 8659	STU 19 YA 8634	STU 20 YA 8635
STU 113 YA 8728	STU 114 YA 8729	STU 89 YA 8704	STU 90 YA 8705	STU 65 YA 8680	STU 66 YA 8681	STU 41 YA 8656	STU 42 YA 8657	STU 17 YA 8632	STU 18 YA 8633
STU 111 YA 8726	STU 112 YA 8727	STU 87 YA 8702	STU 88 YA 8703	STU 63 YA 8678	STU 64 YA 8679	STU 39 YA 8654	STU 40 YA 8655	STU 15 YA 8630	STU 16 YA 8631
STU 109 YA 8724	STU 110 YA 8725	STU 85 YA 8700	STU 86 YA 8701	STU 61 YA 8676	STU 62 YA 8677	STU 37 YA 8652	STU 38 YA 8653	STU 13 YA 8628	STU 14 YA 8629
STU 107 YA 8722	STU 108 YA 8723	STU 83 YA 8698	STU 84 YA 8699	STU 59 YA 8674	STU 60 YA 8675	STU 35 YA 8650	STU 36 YA 8651	STU 11 YA 8626	STU 12 YA 8627
STU 105 YA 8720	STU 106 YA 8721	STU 81 YA 8696	STU 82 YA 8697	STU 57 YA 8672	STU 58 YA 8673	STU 33 YA 8648	STU 34 YA 8649	STU 9 YA 8624	STU 10 YA 8625
STU 103 YA 8718	STU 104 YA 8719	STU 79 YA 8694	STU 80 YA 8695	STU 55 YA 8670	STU 56 YA 8671	STU 31 YA 8646	STU 32 YA 8647	STU 7 YA 8622	STU 8 YA 8623
STU 101 YA 8716	STU 102 YA 8717	STU 77 YA 8692	STU 78 YA 8693	STU 53 YA 8668	STU 54 YA 8669	STU 29 YA 8644	STU 30 YA 8645	STU 5 YA 8620	STU 6 YA 8621
STU 99 YA 8714	STU 100 YA 8715	STU 75 YA 8690	STU 76 YA 8691	STU 51 YA 8666	STU 52 YA 8667	STU 27 YA 8642	STU 28 YA 8643	STU 3 YA 8618	STU 4 YA 8619
STU 97 YA 8712	STU 98 YA 8713	STU 73 YA 8688	STU 74 YA 8689	STU 49 YA 8664	STU 50 YA 8665	STU 25 YA 8640	STU 26 YA 8641	STU 1 YA 8616	STU 2 YA 8617
STU 122 YA 19723	STU 121 YA 19722								

UNITED KENO HILL MINES LTD.  
EXPLORATION DEPARTMENT  
WHITEHORSE — YUKON

## STU CLAIM GROUP

Mining District Whitehorse

N.T.S. Sheet No. 115-I-7

Scale 1 inch to 1/2 mile

Drawn by RJ

Date 31 Jan. 1977

were taken from an area adjacent to the BAY Claim Group. A field examination revealed a foliated zone with weak copper mineralization.

A 2 to 40 cm thick volcanic ash layer blankets this area. Since examination of several sample pits indicated that this layer had not been penetrated, it was believed that sampling by the previous owners may not have adequately represented the underlying bedrock. This was the case with the initial sampling at Williams Creek.

Thus, when this portion of the BAY was allowed to lapse, United Keno staked the favourable area.

#### PHYSIOGRAPHY:-

Maximum relief on the property is 1,200 feet with elevations ranging from a low of 2,200 feet in the eastern corner of the claim group to a high of 3,400 feet in the western section of the claim group.

North facing slopes are heavily timbered with black spruce. A thick moss cover is prevalent over most of these areas. Some north-facing slopes and most low-lying wet areas are covered with alder and willow. South-facing slopes and dry ridgetops are covered with poplar and/or pine.

A small stream (STU Creek) runs in a southeast direction along the northeast boundary of the claim group. This stream is a tributary of Hoochekoo Creek. Three small lakes are located at the headwaters of STU Creek in the north corner of the claim group.

A small stream (Camp Creek), running northeast, flows through the south central part of the claim group. This stream forms a major tributary of STU Creek. For most of its upper two-thirds, Camp Creek flows through a 2,000 to 3,500 foot wide swampy valley (Photo 1). The lower part of the creek valley has a steeper gradient and has steeper sides.

A small north flowing stream cuts across the west corner of the property.

The above mentioned streams are all permanent. Several intermittent streams and swampy areas occur over the property, but these are normally dry by mid-summer.

Outcrop exposure on the property is less than 1 percent, but float rock covers about 8 percent. Overburden is shallow to moderate in the showing areas (south-facing exposures) and on most ridgetops but may be 100 feet thick over other parts of the property, especially in the vicinity of the upper reaches of Camp Creek. The overburden consists primarily of alluvial or glacio-fluvial deposits with some residual soil.

REGIONAL GEOLOGY:-

The STU Claim Group lies on the northeast flank of the north west trending Dawson Range. The basement rocks of this physiographic region are metamorphic rocks of the Yukon group. Northwest structural trends predominate in these rocks. Yukon Group rocks are Mississippian or earlier in age and were intruded by plutonic rocks which range from Triassic to Tertiary in age. Tertiary and younger volcanic rocks overlie parts of the complex.

The northwest trending Teslin fault zone (axis of the Whitehorse trough) is coincident with the Yukon River valley about four miles east of the property.

STU Creek (local name) valley which marks the northeast boundary of the claim group reflects a postulated fault (Templeman-Kluit, 1974) which marks the western boundary of the Whitehorse trough massive green volcanics of uncertain age (possibly Upper Triassic). These abut intrusive rocks of the Klotassin suite to the west.

GEOLOGICAL SURVEY:-

GENERAL -

Most of the STU Claims are underlain by silica-rich and silica-poor intrusive rocks. The silica-rich rocks predominate and are medium to coarse grained, massive to moderately porphyritic, and generally granodioritic in composition. In places, the granodiorite is weakly to strongly foliated (map in pocket). A few small areas of fine and coarse grained silica-poor dioritic and gabbroic rocks were observed. Some areas of felsite, probably syenitic in composition, were noted.

A few lenses(?) or horizons of quartz-feldspar-biotite gneiss, similar to that contained in the DEF and Williams Creek deposits were observed. Foliations trend northwest and are steeply dipping.

Later aplitic and pegmatitic dykes cut the intrusive.

The intrusive complex is cut and in places, is overlain by volcanic rocks of the Carmacks group.

DETAILED -

Granodiorite - Unit qdm -

These rocks are dark grey to grey on weathered surfaces and greyish white to grey on fresh surfaces. They are generally medium grained (Photo 2) with a few fine grained and coarse grained occurrences. Most samples are porphyritic with 5 to 15 percent

Diorite and Gabbro - Units Di and Gb -

These rocks are dark coloured and fine to medium-grained.

The diorite contains up to 50 percent mafics with near equal amounts of biotite and hornblende. Where observed, contacts with the granodiorite were sharp. A reduction of the grain size toward the contact was noted in a few places. Also, near the contact, the diorite occasionally exhibits a weak foliation parallel to the contact.

The gabbro (hornblende-gabbro) contains up to 70 percent mafics generally with<sup>a</sup> hornblende to biotite proportion of 90:10. Where observed, contacts with the granodiorite were invariably sharp with no perceptible grain size change near the contacts. Small amounts of pyroxene were observed in some samples.

Felsite - Unit fel -

This unit is closely associated with Unit gdm. It is mafic poor, medium to fine-grained, and syenitic in composition.

These rocks are generally pinkish grey to grey on weathered surface and pink to white on fresh surface. Quartz generally constitutes less than 10 percent of the rock and mafics (mainly biotite) less than 4 percent.

Carmacks Group Volcanics - Unit eTCv -

A few localized areas of volcanic outcrop or debris were observed. These volcanics are greenish-brown to brown in colour and are basic to intermediate in composition. Both porphyritic and aphanitic varieties were noted. They occur as flows and tuff breccias.

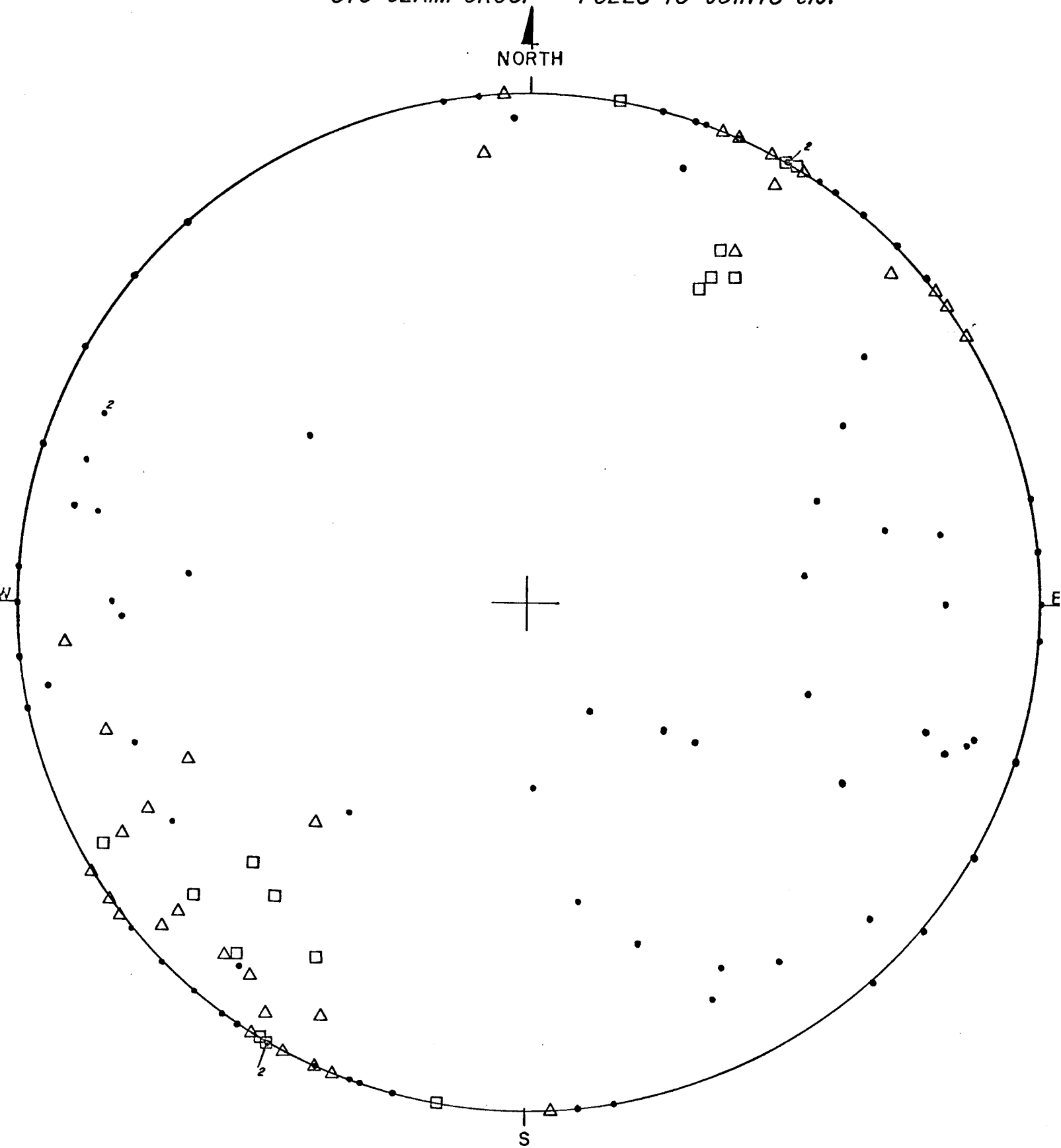
A few boulders of sub-volcanic, probably latite to dacite porphyry were found. These were rounded, transported boulders and do not appear to have originated on the property.

Aplite, Pegmatite, and Microgranite Dikes - Units ap,peg and mgr -

These dikes occur over most of the property within the foliated and non-foliated granodiorite.

The aplite dikes are white to pinkish white in colour, generally have a mafic content of one percent or less, and contain up to 80 percent feldspar. They are fine to medium-grained and generally exhibit a sucrose texture. Biotite is the only mafic constituent and occasionally shows a preferred orientation.

STU CLAIM GROUP — POLES TO JOINTS etc.



*Lower Hemisphere  
Equal Area Net Plot*

- Poles to Joints (62 points)
- △ Poles to Foliations (24 points)
- Poles to Gneissosities (13 points)

Figure 3

The microgranite is fine-grained, white to greyish white in colour, and has a mafic content of 2 to 8 percent. Biotite is the only mafic constituent and often exhibits a preferred orientation parallel to the contact with the granodiorite. Observed contacts between the microgranite and granodiorite were sharp. In a few locations a gradational contact was observed between the aplite and microgranite.

The pegmatite dikes are coarse-grained and are composed of feldspar, quartz and biotite. They are pinkish white or white in colour. Feldspar crystals are generally larger than the quartz and biotite crystals and comprise 70 to 80 percent of the rock.

#### Alluvium - Unit all -

This unit consists of rounded pebbles and cobbles of gdm, volcanics, quartz, etc. and was observed on steep hillsides. It also forms small ridges, and probably fills the main valleys.

#### STRUCTURE -

Two distinct attitudes of foliation were observed on the property. In the vicinity of showing No. 1, the foliation trends northwest and dips steeply southwest (figure 3). In the southwest half of the property, the foliation trends northwest and dips steeply northeast.

A northwest trending fault lies a few thousand feet beyond the northeast boundary of the claim group. Feldspar phenocrysts in some exposures of the porphyritic granodiorite in the northeast half of the property exhibit alignment parallel to this fault. In these same rocks, a few mafic rich, fine-grained schlieren, usually 10 to 20 centimeters long, were also aligned parallel to the fault.

Where observed, contacts between the gneiss and granodiorite also had northwest trends. The contacts between diorite and granodiorite appeared to have northeasterly trends.

Most of the aplite, microgranite and pegmatite dikes were striking northwest.

The granodiorite outcrops were moderately jointed and fractured. However, no strongly preferred orientation was apparent (figure 3).

A list of joint and foliation attitudes is given in Appendix A. Some of these may have to be modified to accommodate minor frost heaving of large rock slabs.

## ALTERATION -

Epidote is the most common alteration product and occurs along narrow fractures in some exposures of the granodiorite. It is probably a deuteric alteration product from hornblende.

Minor hematite was observed in a few small outcrops and float of granodiorite in the south corner of the property.

## MINERALIZATION -

Weak copper mineralization occurs as malachite in gneissic and strongly foliated rocks. The malachite is generally associated with the biotite or occurs along fracture surfaces. Three separate zones containing malachite were observed.

ZONE 1 is located on claims 32 and 34. Malachite occurs in two separate areas. In the northwest end of this gneissic unit malachite is present over an area 500 feet by 200 feet. Medium-grained quartz-feldspar-biotite gneiss including some mafic-rich (50 percent) zones is the predominant host for the malachite. A narrow quartzofeldspathic component with several percent magnetite and minor copper oxides is also present. In the southeast end of this same unit, a smaller showing (100 feet by 150 feet) of malachite in strongly foliated, fine-grained granitic rocks occurs just north of Camp Creek. Selected grab samples from these areas yielded assay values ranging from 0.01 to 0.58 percent copper.

ZONE 2 is situated in the south corner of the property on claims 98 and 121. Malachite occurs in medium-grained quartz-feldspar-biotite gneiss and strongly foliated fine grained granitic rocks. Minor copper mineralization was observed over a strike length of 125 feet. The zone appears to be 40 to 60 feet wide. Selected grab samples yielded copper assay values from 0.09 to 1.10 percent.

ZONE 3 is located on claims 84, 86, 88, and possibly 87. Outcrop and float are sparse but exposures of medium-grained quartz-feldspar-biotite gneiss with malachite have been observed intermittently along strike for 2,500 feet. The northwest boundary of the zone cannot be determined due to the absence of rock exposure. Generally, exposed widths vary from 10 to 20 feet. In the northwest end, the mineralized zone appears<sup>to</sup> widen to 300 feet. This showing probably represents a discontinuous, narrow, steeply dipping band or discontinuous lenses of quartz-feldspar-biotite gneiss.

A sample from a rounded transported boulder of latite or dacite porphyry containing a small section of fine grained sulphides returned 3.60 percent lead with 1.52 oz/ton silver (Assay No. 2523). Unfortunately, this rock type is foreign to the property and the source of the boulder is not known.

Twenty-two samples of the gneiss and one sample of latite to dacite were collected for assay. Results are as follows:-

<u>ZONE NO.</u>	<u>ASSAY NO.</u>	<u>Au</u>	<u>Ag</u>	<u>Pb%</u>	<u>Zn%</u>	<u>Cu(% unless otherwise stated)</u>
1	2501	-	-	-	-	495 ppm
1	2502	-	-	-	-	60 ppm
1	2503	-	-	-	-	3510 ppm
1	2504	-	-	-	-	2790 ppm
1	2505	.005	.24	.01	.02	.38
1	2506	-	-	-	-	.03
1	2507	Tr	.12	.01	.01	.32
1	2508	Tr	.01	.01	Tr	.02
1	2509	-	.01	.01	.01	.14
1	2510	-	Tr	-	-	.01
1	2511	-	.03	-	-	.58
1	2512	-	.44	-	-	.02
1	2513	Tr	.01	Tr	Tr	.02
1	2514	Tr	.02	.01	Tr	.01
2	2515	.005	.32	.01	.02	1.10
2	2516	Tr	.16	.01	.01	.13
2	2517	Tr	.06	.01	.02	.09
3	2518	.005	.22	.03	.07	.83
3	2519	.005	.24	-	-	.17
3	2520	.005	.20	-	-	.55
3	2521	Tr	.08	-	-	.28
3	2522	.005	.10	-	-	.34
Latite-Dacite 2523 Porphyry boulder		.005	1.52	3.60	.06	.06

## GEOCHEMICAL SURVEY:-

### GENERAL -

A claim reconnaissance type soil sample survey was conducted by a two man crew. During the first three weeks on the property an additional two man crew assisted with the sampling and during the last two weeks an additional four persons were employed.

Blazed claim location lines, running at 310°, were used as baselines. Samples were collected at 100 foot spacings along lines run orthogonal to these baselines at 300 foot intervals. The sample lines were run using topofil chain and compass. Mattocks were used to obtain samples due to dry soil conditions and permafrost. Augers were occasionally used to collect samples in some swampy areas.

All 122 claims were covered by the geochem survey and a total of 8,958 soil samples were collected and analysed for copper. An additional 362 active inorganic and channel side or bottom organic sediment samples were collected from Stu Creek, Camp Creek and Hoochekoo Creek. Samples were taken at 300 foot intervals along the creeks and analysed for copper. Stu Creek and Camp Creek were sampled along their entire lengths and Hoochekoo Creek was sampled from its merge with Stu Creek to a few hundred feet beyond where it crosses the southwest boundary of the claim group.

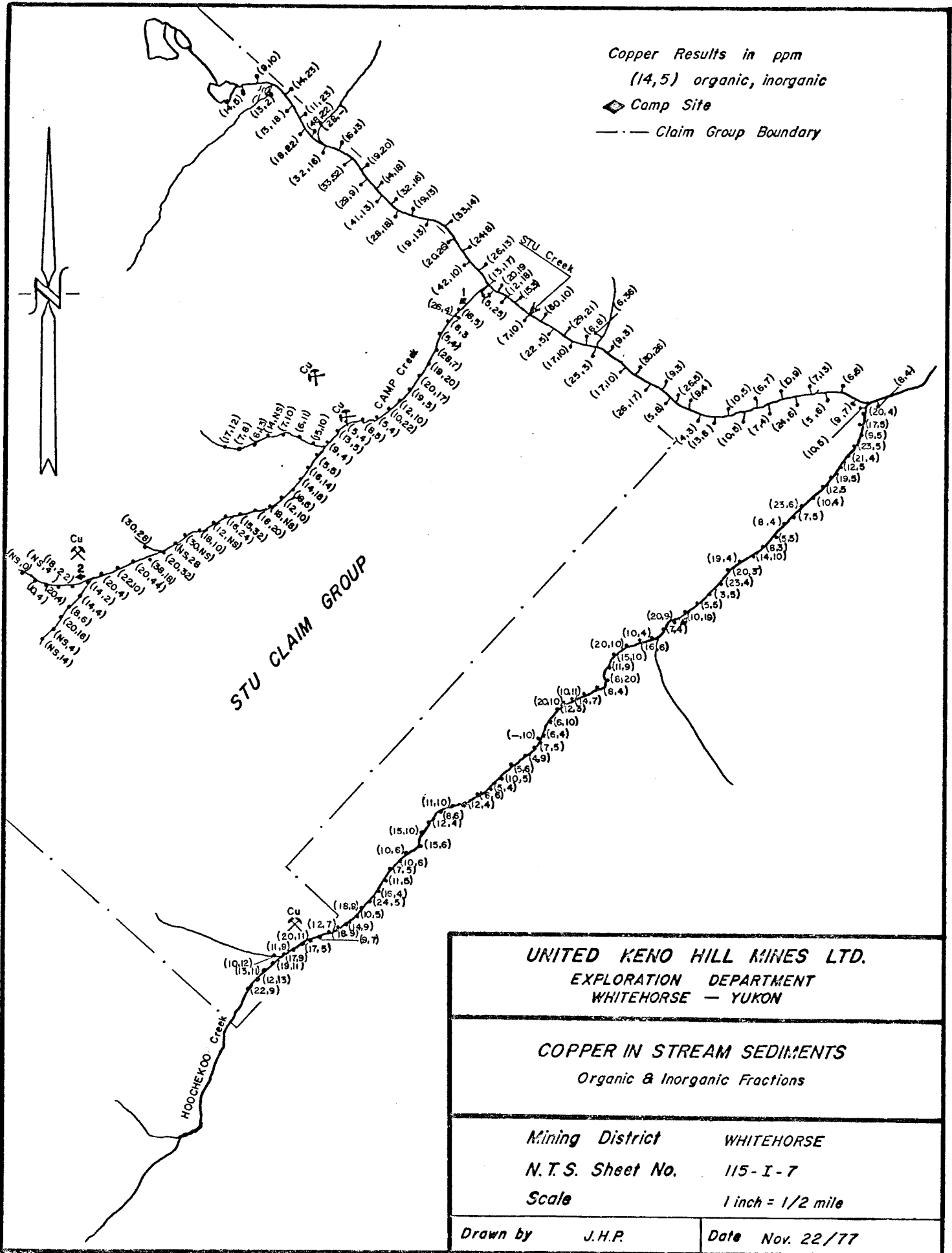
Fifty-six (56) rock samples were collected and analysed for copper and zinc.

All samples were analysed by Bondar-Clegg and Company Ltd. using standard analytical techniques.

### PEDOLOGY -

The ubiquitous volcanic ash varies in thickness with topographic expression. This ash layer varies in thickness from less than two(2) inches on some steep south facing slopes to fifteen(15) inches in topographic lows. A thin (1 to 2 inch) brown-black humus horizon commonly underlies the ash with a sandy-clayey, red-brown, B-horizon below that. This humus layer is generally absent on south facing slopes.

In areas of poor drainage and some north facing slopes, moss and other organic debris may reach twelve(12) inches in thickness and lies above the ash layer. Sometimes, permafrost conditions in these areas did not permit sampling of the B-horizon. Thus, an organic sample was collected if sufficient material was available. Occasionally, no samples could be collected. It was estimated that less than ten(10) percent of the samples are included in this category.



INTERPRETATION of RESULTS:-

SOIL SAMPLES -

From the histogram of copper values (figure 4) it is apparent that 95.5 percent of the samples contained less than 50 ppm copper. This value was taken as the local threshold and contour intervals were determined as a geometric progression. The highest value obtained was 1600 ppm.

Some of the weakly anomalous samples were collected immediately above or from the uppermost part of the permafrost layer and contained organic material. However, since no widespread concentration of copper values was observed in these areas, the anomalies probably reflect traces of copper in the underlying rock.

Two narrow, elongate, moderately anomalous areas are located in the south section of the claim group. North-northwest trends are indicated by these anomalies but the source of the copper is not known (map in pocket).

Several narrow elongate, weakly anomalous areas were also outlined in the east section of the property. Northwest trends are also indicated.

Geochemical soil anomalies are present over the three mineralized zones. Two separate anomalies reflect the two areas of weak copper mineralization in gneissic rocks of zone 1. The highest value was 240 ppm copper. However, a high of 1620 ppm was returned for a sample collected from this area during the 1976 reconnaissance soil sampling program.

Over Zone 2, two anomalous areas were defined. A northwest trending anomaly with a peak value of 495 ppm is located over the zone of weakly mineralized gneissic rock. This anomaly is quite a bit larger than the geological expression of the copper mineralization. A second anomaly, with a northerly trend, is located a few hundred feet to the northeast of this showing. This anomaly contains a peak copper value of 215 ppm and the source of the copper was not observed.

The main part of Zone 3 is reflected by a moderate to strong anomaly about 1800 feet long and about 400 feet wide. A few isolated low order anomalies indicate the weakly mineralized southeast continuation of this zone.

Numerous small isolated anomalies with values slightly above background are indicated. Some of these are elongate and probably reflect minor restricted copper mineralization.

The mobility of copper in the soil appears to be quite restricted.

Topography (i.e. downslope movement) appears to have had limited influence on the spread of values.

There are no apparent geochemical differences over the various unmineralized rock types.

The geochemical response over Zone 3 indicates a good potential for mineralization.

#### SEDIMENT SAMPLES -

The organic fraction has more variable copper concentrations between adjacent sample sites than does the inorganic fraction. Hoochekoo and Camp Creeks have similar background values of about 6 and 9 ppm for inorganic and organic fractions, respectively (figures 5,6 and 7). These creeks flow northeast across the granodiorite. The upper two thirds of Stu Creek, on the other hand, flows southeast along the contact of this granodiorite with copper rich volcanic rocks (soil threshold values of 80 ppm copper, DEL Report). Thus, background values are higher at about 7 and 12 ppm for inorganic and organic fractions, respectively.

Hoochekoo Creek - Two inorganic samples contained weakly anomalous copper concentrations. Although the organic samples did not return any anomalous values, they do show a tendency to increase downstream for a distance from the anomalous inorganic sample points. Neither fraction appears to indicate the presence of Zone 2 which lies several hundred feet up slope from the western part of the creek.

STU Creek - Three moderately anomalous organic samples were collected. Also, one highly anomalous and four weakly anomalous areas are indicated by the inorganic fraction. The highly variable copper content for both fractions probably reflect the nearness of the massive green volcanics that form the east wall of the STU Creek valley. Two samples taken from tributaries with headwaters in the volcanic terrane yielded 36 and 22 ppm, respectively for the inorganic fraction and 6 and 48 ppm, respectively for the organic fraction. The lower part of STU Creek, however, cuts through granodiorite with a much lower background. This is particularly evident in the inorganic fraction analyses (figure 6).

Camp Creek - Both fractions appear to reflect the presence of copper mineralization in ZONES 1 and 3. These are indicated by weakly anomalous samples almost immediately downstream (governing factors being distance from the creek and slope direction).

HISTOGRAM of COPPER RESULTS  
for 8958 SOIL SAMPLES  
STU CLAIM GROUP

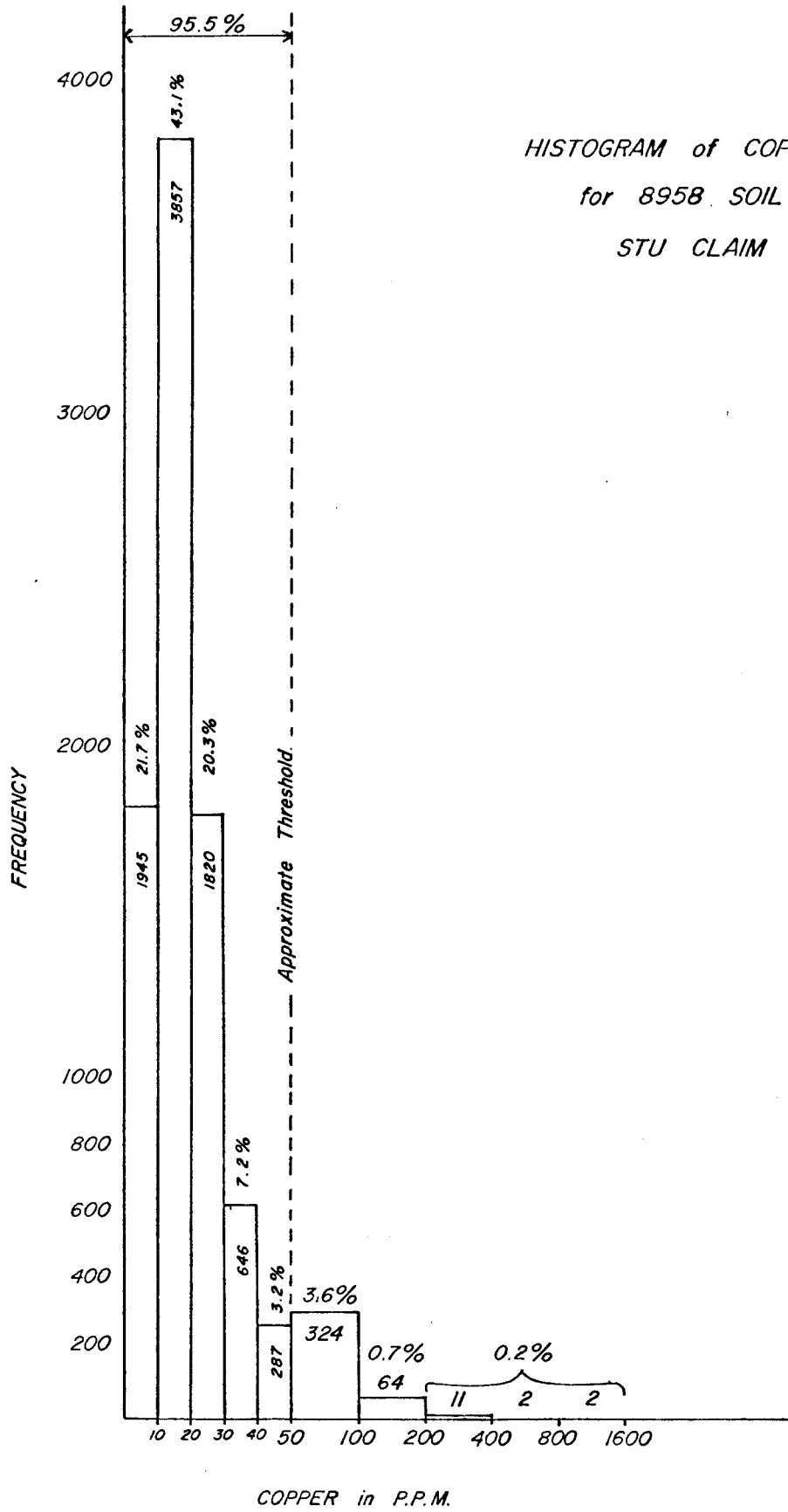


Figure 4

feldspar phenocrysts (about 1 cm long). Compositionally, these rocks vary from granodiorite to quartz monzonite.

Quartz generally constitutes from 10 to 20 percent of the rocks but may reach 30 percent. Mafic constituents are euhedral to subhedral hornblende and biotite in near equal amounts. The mafics constitute 5 to 35 percent of the rock with an average being 15 percent. The mafics are generally equally distributed throughout the rock. Magnetite occurs as a minor constituent in most samples and is normally associated with the hornblende.

#### Foliated Granodiorite - Unit fqdm -

This unit is very similar in composition to Unit gdm but generally contains a slightly greater proportion of mafic minerals (about 20 percent). The ratio of biotite to hornblende (in Unit gdm) generally increases with the degree of foliation.

These rocks are weak to strongly foliated. The foliation is defined by the alignment of biotite sheets and hornblende laths (Photo 3).

The contact between weakly foliated rocks and the unfoliated granodiorite is gradational and the division is arbitrary. Both gradational and sharp contacts were observed between strongly foliated rocks and gneiss.

#### Gneiss - Unit gn -

This unit is made up of quartz-feldspar-biotite gneiss and some minor quartzofeldspathic gneiss (Photo 4). These rocks are dark grey to light grey-brown on weathered surfaces and light grey-white on fresh surfaces. The rocks are fine to medium grained and exhibit moderate to strong foliation or banding. The foliation is defined by banding of light and dark components in the medium-grained gneisses and by a planar alignment of biotite sheets in the strongly foliated fine grained granitic rocks (Photo 5).

The mafic content exhibits extreme variations. The quartzofeldspathic gneiss contains as little as 1 to 2 percent biotite while some quartz-feldspar-biotite gneisses contain up to 50 percent biotite. The average biotite content for the quartz-feldspar-biotite gneiss is 15 to 20 percent. In the No. 1 showing area several percent magnetite occurs in the narrow quartzofeldspathic component.

These gneissic rocks are very important on the STU Claims because copper (as malachite) showings occur within them.



PHOTO 1. View from Zone 1, looking southwest at part of Camp Creek valley. The white colored soil in the foreground is the ubiquitous volcanic ash horizon. - K.W.

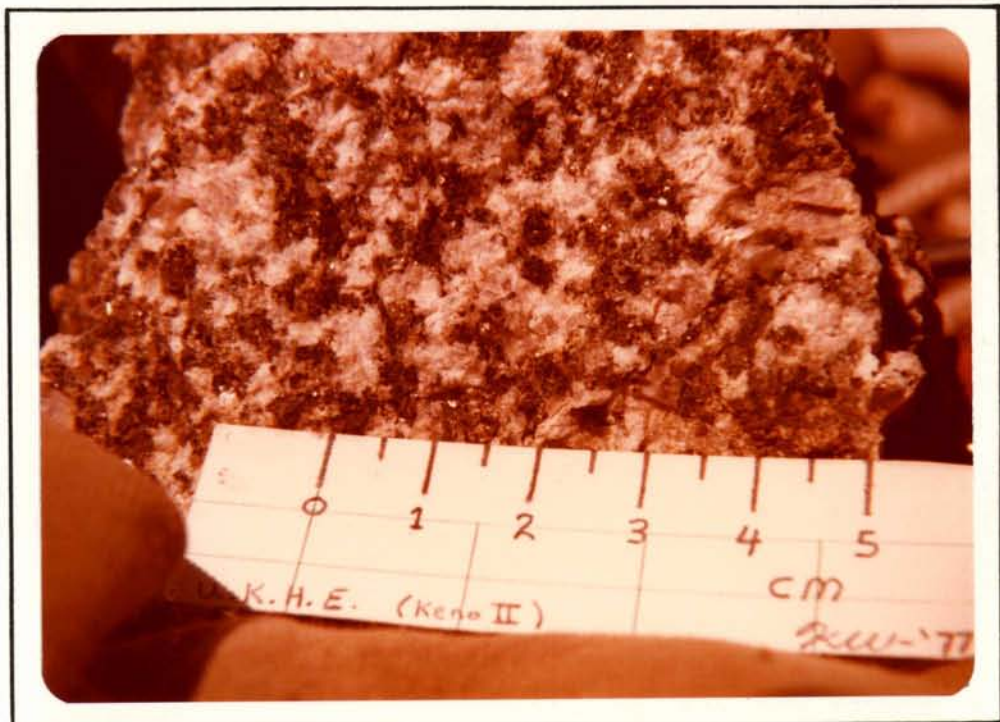


PHOTO 2. Medium-grained biotite-hornblende granodiorite. Note the high mafic of this specimen. - K.W.



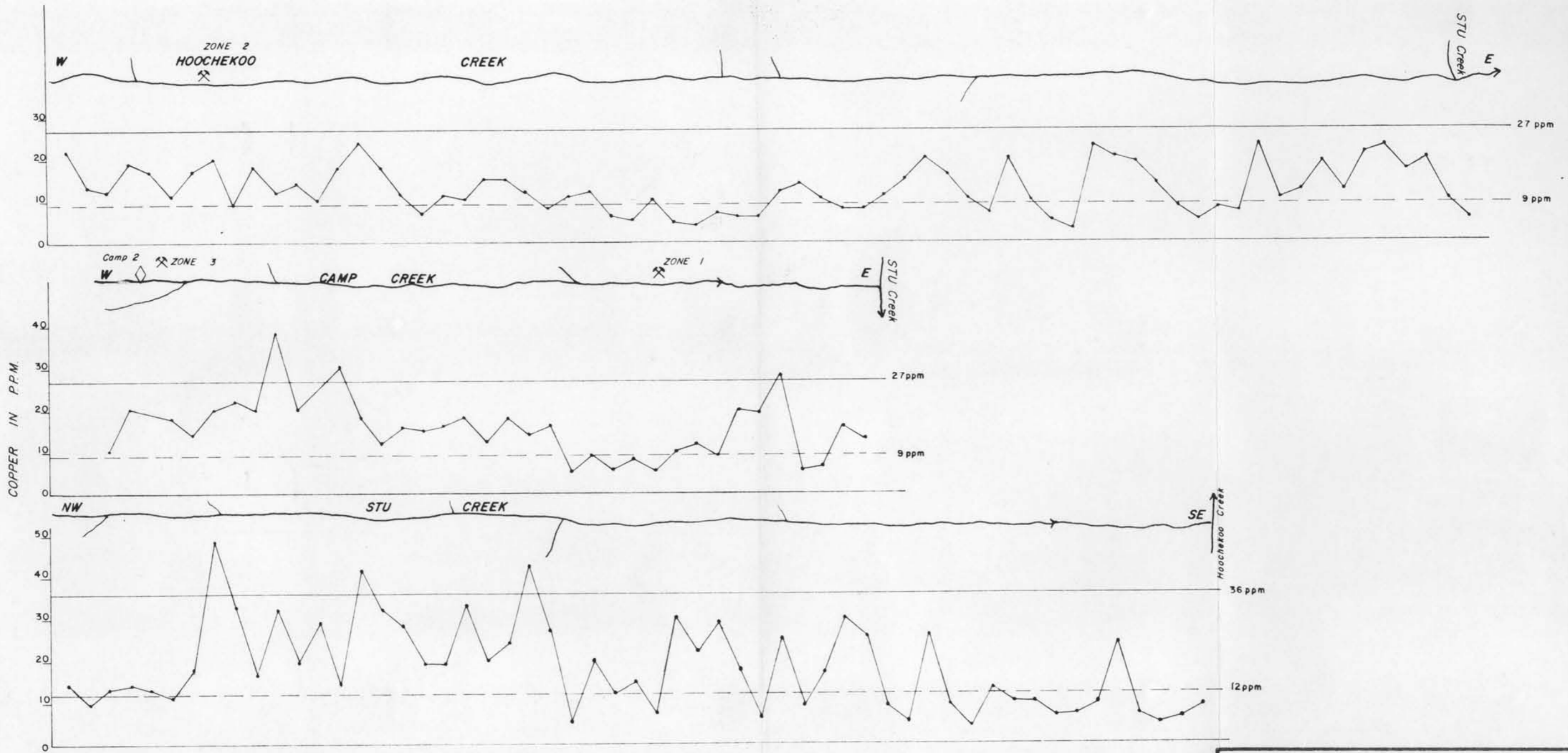
PHOTO 3. Malachite impregnated strongly foliated hornblende-biotite granodiorite from the central part of Zone 1.  
- K.W.



PHOTO 4. Fine-grained quartzofeldspathic and quartz-feldspar-biotite gneiss with malachite along fractures. Limonite specks may indicate weathered sulphides. Sample from northwest part of Zone 1. - K.W.



PHOTO 5. Fine-grained strongly foliated granitic rock from the southeast end of Zone 1. Limonite specks may indicate weathered sulphides or mafics. - K.W.



SAMPLE INTERVAL IS 300 feet

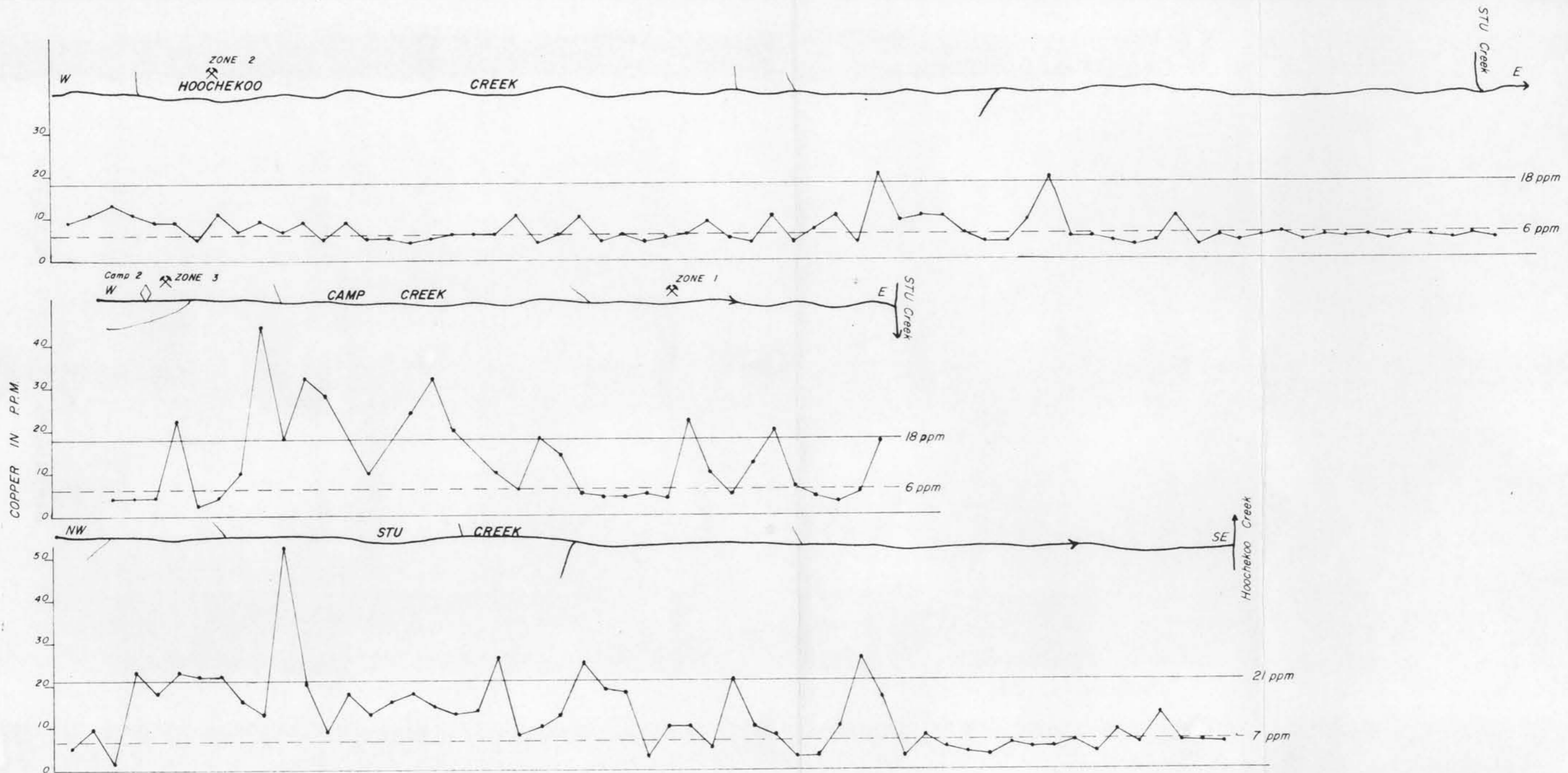
UNITED KENO HILL MINES LTD.  
EXPLORATION DEPARTMENT  
WHITEHORSE — YUKON

COPPER IN STREAM SEDIMENTS  
+ 80 mesh organic fraction

Mining District Whitehorse  
N.T.S. Sheet No. 115-1-7  
Scale approx. 1" = 1500'

Drawn by RJ

Date 15/11/77



SAMPLE INTERVAL IS 300 feet

UNITED KENO HILL MINES LTD. EXPLORATION DEPARTMENT WHITEHORSE — YUKON	
COPPER IN STREAM SEDIMENTS + 80 mesh inorganic fraction	
Mining District	Whitehorse
N.T.S Sheet No.	115-I-7
Scale	approx. 1" = 1500'
Drawn by	RJ
Date	15/11/77

Figure 6

A fairly strong anomaly is indicated for both fractions from 1500 to 3000 feet below Camp 2. Several hundred yards below this anomaly another moderate to strong anomaly at least six hundred feet long is apparent for the inorganic fraction only. The organic fraction plot shows a broad high over the area but doesn't appear to be anomalous. Possible causes of these anomalies are: copper enriched rocks suboutcropping beneath the alluvium; groundwater percolating from a mineralized zone at depth further upslope; mineralized debris in the alluvium; or, volcanic rocks which lie upslope from the anomalies. Several soil samples collected in the vicinity of the lower anomaly yielded values of 50 to 60 ppm copper.

#### ROCK SAMPLES -

Mean values of 2.5 and 28 ppm were obtained for copper and zinc, respectively. Quartz-feldspar-biotite gneiss samples with visible traces of malachite yielded peak values of 3300 and 650 ppm copper. No obvious dispersion halos away from mineralized zones are apparent for either copper or zinc.

## GEOPHYSICAL SURVEY:-

The slightly edited text of the complete survey report by Steve Presunka follows:

Between August 11th and 18th a geophysical survey was carried out on the STU Claim Group by Peter Presunka and Steve Presunka. The work consisted of magnetometer and E. M. Surveys over selected areas of the STU Claim Group. The instruments used were M-F-1 fluxgate magnetometer Ser. No. 905454 and Ronka EM-16 Ser. No. 2. The two V.L.F. stations used (EM-16) were 18.6 (Seattle) and 23.4 (Hawaii).

The magnetomer was adjusted to read 400 gammas for background. The readings were taken every 50 feet along the lines. Magnetic bases were established on the base lines for diurnal corrections. The final results are plotted and contoured every 100 gammas on a scale of one inch to 400 feet. The EM-16 readings were taken every 100 feet and in anomalous areas these were taken at 50 foot intervals. The results of both V.L.F. station (EM-16) are contoured. The cross-overs are marked in the field by big red cross flagging tied to the trees. Approximately 22 miles of survey were completed.

There are four plans submitted, two contoured EM-16 plans (inphase), one contoured magnetic and one composite geophysical plan (not reproducible). When views together, the two Em-16 plans have the conductors listed as to their signifiante or priority. In all there are 8 likely conductors shown (Plans in pocket).

The magnetic anomalies over 800 gammas likely indicates volcanic zones close to surface, as seen on baseline 0, from 78.5 to 83.5 and again from 36.5 to 28.5 and likely extending in northerly direction. The low magnetic anomalies represents lower ground (Map in pocket).

The No. 1 zone has magnetic N-S trend as seen on the north portion of the plan. This magnetic zone seems to be a series of N.W. striking magnetic bands. The conductor which follows this magnetic zone on the south side is of fair strength may be detecting a sulphide zone. This conductor is near vertical. Depth to the conductive zone is from 175 to 225 feet.

No. 2 conductor, located on south east portion of the plan parallels the north-south magnetic trend, crossing the baseline 42.5 at 57E. This is a two V.L.F. station conductor suggesting - likely mineralized contact. From the EM-16 results, the conductor should be dipping to the east. Depth to the conductive zone is some 200 feet. The geochem anomaly parallels this zone to the west, The 2-A very likely is the continuation of the No. 2 zone.

The 3, 3A and 3B which has a north-west strike, extends from L-60E to baseline 0 at 58S. This conductor is faulted off by No. 6 at L-24E. This conductive zone follows the magnetic trend to some extent. The EM-16 results indicated a good conductive zone from L-51E to 33E, particularly the secondary conductor indicated by broken red lines just west of No. 3. This, very likely is a north west dipping conductor. Average depth to the conductive zone is about 175 feet.

The No. 4 zone, which crosses base line 139 S at 72E follows a magnetic low trend to some extent. This zone requires more work to locate the extent of the conductive trend. Depth to conductor is approximately 175 feet.

The No. 5 conductor has a north-northwest trend and is about 2400 feet long and continues off the survey area. Depth to conductive zone is 175 to 250 feet.

The No. 6 conductor crosses base line 72 S at 25E, strikes in north east direction for some 3200 feet. This conductive zone very likely represents a fault. No. 7 which is similar to No. 6 is a likely fault as well.

No. 8 conductor which should have been mentioned earlier may well be detecting a sulphide zone. This conductor dips steeply to the north east. The strong geochem anomaly to the north west of No. 8 very likely is the top of the north east dipping conductive zone. Depth to the conductive zone is from 225 to 150 feet.

The numerous short conductors shown on the E.M.16 plans are very likely due to shears and local faults.

#### SUMMARY and CONCLUSIONS:-

The STU Claim Group consists of 122 full claims. These claims were staked in January and August, 1977 to cover an area from which anomalous reconnaissance soil samples were collected.

Geological, geochemical, and geophysical investigations were carried out by a crew which varied from two to eight men. The whole claim group was covered by the geological and geochemical surveys. The geochemical survey resulted in the collection of 8,958 soil and 362 active inorganic and organic stream sediment samples. These samples were analysed for copper. In addition, 56 rock samples were collected and analysed for copper and zinc. About 22 miles of magnetometer and E.M.-16 surveys were completed.

Three geochemically anomalous areas associated with weakly mineralized gneissic rocks were outlined. Peak values of 240, 495, and 1600 ppm copper were returned for Zones 1, 2, and 3, respectively.

Zone 3 is the most important and is outlined by an 1800 by 400 foot soil anomaly. A few isolated low order anomalies may indicate a weakly mineralized continuation of this zone. The available data suggest that this zone originated as part of a mineralized horizon which was later engulfed by intrusive rocks. This horizon was partly digested so that only discontinuous mineralized lenses remain.

Hoochekoo, Camp, and STU Creeks were sampled at 300 foot intervals. Both organic and inorganic samples were collected at these sites. The plus 80 mesh fraction was analysed for copper. Several anomalies were indicated. Two of these sediment anomalies probably reflect zones 1 and 3. One 1500 foot<sup>10<sup>2</sup>g</sup> anomaly on Camp Creek has not been explained.

No significant trends were indicated by the rock sample geochemistry.

The property is underlain by granodioritic rocks of the Klotassin batholith. Massive, porphyritic, and weak to strongly foliated varieties were observed. The granodiorite contains several zones or lenses of quartz-feldspar-biotite gneiss and quartzofeldspathic gneiss. Dioritic, gabbroic, aplitic, microgranitic, pegmatitic, and volcanic dykes cut the granodiorite. A few small outliers of Carmacks volcanic overlie the granodiorite.

Structural trends vary from northwest to northeast, but northwest trend predominate. Foliation attitudes are moderate to steeply dipping.

No primary copper minerals were identified. The secondary mineral, malachite, was observed in three separate zones. The malachite was generally restricted to gneiss and commonly occurred with biotite or along fractures in the gneiss. Magnetite was observed in the quartzofeldspathic component of the gneiss in Zone 1. It is a common accessory in the granodiorite.

Secondary alteration minerals comprise epidote and hematite. The epidote occurs as partial deuteric alteration of mafic minerals. The hematite occurs in a few granodiorite outcrops in the south corner of the property.

The magnetometer and E.M.-16 surveys outlined a number of shears, faults and contacts as well as some volcanic outliers.

RECOMMENDATIONS:-

It is recommended that five years assessment work be filed on the following 34 Claims: STU 31-34, 55-58, 73, 75, 77-90, 97-100, 102, 104, 106, 108, 121 and 122. The remainder should be allowed to lapse on their anniversary date.

Small grids should be established and I.P. surveys conducted over Zones 1, 2, and 3.

If sufficient encouragement is given by the survey results, the work should be filed for assessment credits.

The property could then be shelved for several years pending a better outlook for copper.

The anomalous areas on Camp Creek should be investigated to determine the source of the anomaly.

REFERENCES:-

Archer, Cathro and Associates - Mineral Inventory of Yukon and Northwest Territories.

Beavan, A. R., 1974 Geological and Geochemical Report on the DEL 1-84 Mineral Claims, Minto Area, N.T.S. Sheet 115I-7. U.K.H.M. Files.

Templeman-Kluit, D.J., 1973, Reconnaissance Geology of Aishihik Lake, Snag and part of Stewart River Map-Areas, west-Central Yukon, G.S.C. Open File 161.

— 1974, compilation Map of Carmacks, Yukon Territory, G.S.C. Open File 200.

APPENDIX A

<u>JOINTS</u>	<u>JOINTS</u>	<u>FOLIATIONS</u>	<u>GNEISSOSITIES</u>
360/70E	024/80E	320/69SW	280/90
062/70N	012/75E	284/78S	298/68SW
228/90	040/90	302/90	302/65SW
320/90	306/90	320/85SW	298/60SW
310/90	018/90	267/90	300/90
350/70W	340/50SW	313/50NE	299/63SW
012/80E	310/45NE	298/90	301/90
018/80E	072/60N	292/90	330/85NE
143/70SW	030/90	304/90	318/76NE
017/80W	308/80NE	302/85NE	310/65NE
109/80S	223/30NW	317/85SW	300/70NE
290/90	268/85SE	318/85NE	316/63NE
330/60SW	358/68E	296/80NE	294/?
289/90	005/56E	322/90	309/79NE
043/80NW	080/50N	324/90	
024/80E	294/90	328/90	
315/90	018/48W	330/80NE	
004/90	350/85E	318/80NE	
300/90	264/90	310/80NE	
030/60NW	040/35NW	335/62NE	
260/90	088/30N	355/80NE	
174/90	020/75W	331/73NE	
304/90	328/70NE	306/80NE	
038/45SE	018/70W	343/75NE	
018/79W	300/90		
318/85NE	348/90		
054/75N	150/60SW		
348/60W	060/20NW		
180/90	105/90		
245/75N	354/45W		
360/70W	340/70NE		

# ~~SEE~~ / SOIL SAMPLE STATISTICS

Project: No. 31, STU Claim Dates of Program: May 26  
to Oct. 6

Number of Samples Collected: 8958

Metals Analyzed: Cu

Samplers: D. MacDonald, D. Ouellette,

A. Ouellette, C. Austin, K.

Mardus, B. Baird, T. Mustapic,  
M. Smith

Man days: 231 (operating)

Samples collected / man - day: 38.8

Pb

Values in ppm    No. in Range    % of Total

Values in ppm    No. in Range    % of Total

0- 49	8555	95.5
50- 99	324	3.6
100-199	64	0.7
200-399	11	0.2
400+	4	

Cu

Zn

Values in ppm    No. in Range    % of Total

Values in ppm    No. in Range    % of Total

Mo

Values in ppm    No. in Range    % of Total

Values in ppm    No. in Range    % of Total

Ag





Contour Interval in ppm

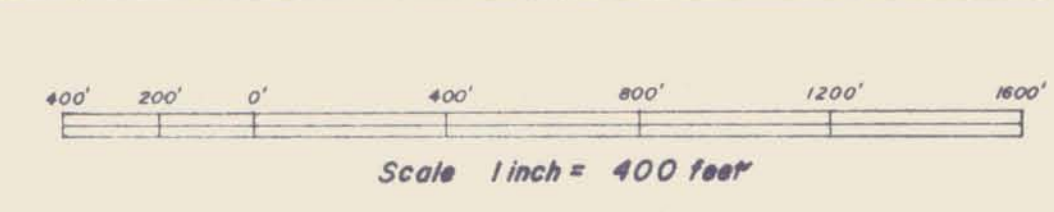
0 - 49
50 - 99
100 - 199
200 - 399
400+

- Creek with flow direction indicated
- Cut Line
- Claim boundary
- Claim posts
- Biased (Claim) Lines

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EXPLORATION DEPARTMENT WHITEHORSE, Y.T.

**STU CLAIM GROUP**  
N.T.S. SHEET 115-I-7

**COPPER PLOT**





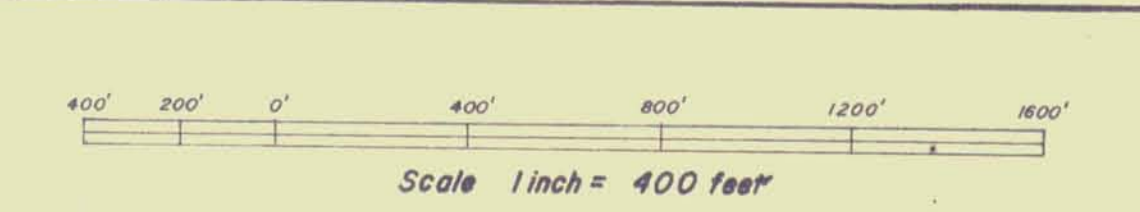
(H) Airport  
 (C) Campsite  
 (O) Outcrop  
 (F) Floor  
 (2509) Assay number  
 127-05 Information Area — Rock Sample Number  
 (underlined denotes Sample used for Rock Geochem)

→ Creek with flow direction indicated  
 — Cut Line  
 --- Claim boundary  
 - - - Claim posts  
 - - - Blazed (Claim) Lines  
 (shaded) Lakes, Ponds and Sloughs

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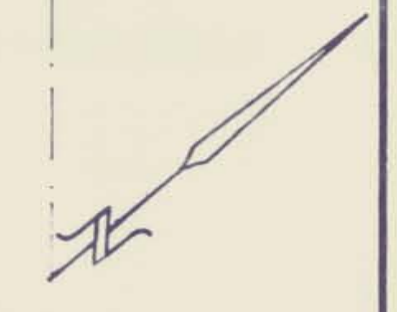
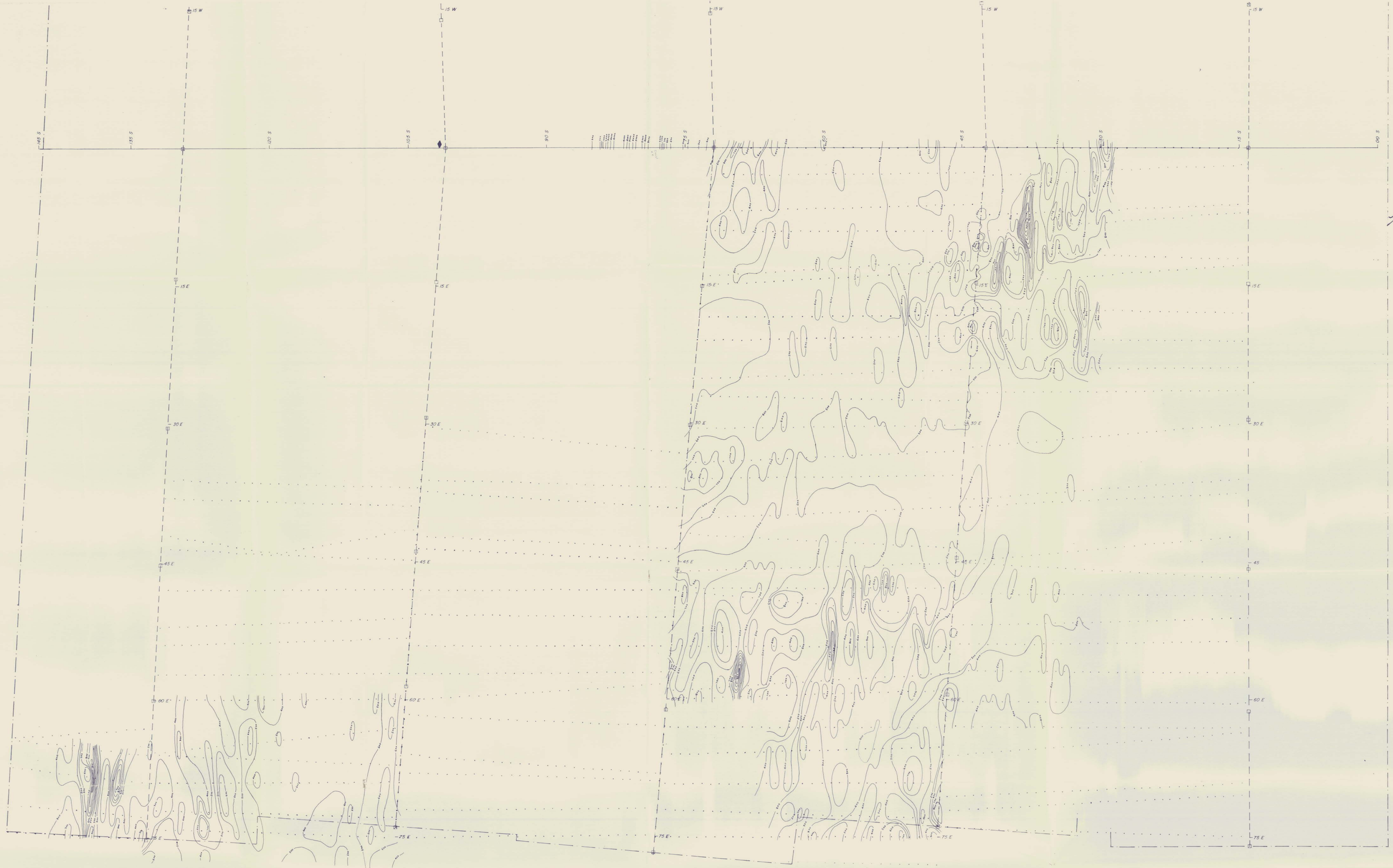
**STU CLAIM GROUP**  
 N.T.S. SHEET 115-I-7

**EXPOSURE PLAN**  
 with Rock Sample Locations



NO.	REVISION	DATE	BY	NO.	REVISION	DATE	BY
1	OR. 288-1877	1977	LRJ				
2	NO. 10-217	1977	LRJ				

Drawn by: RJ DWG.  
 Date: 15/06/77 NO.

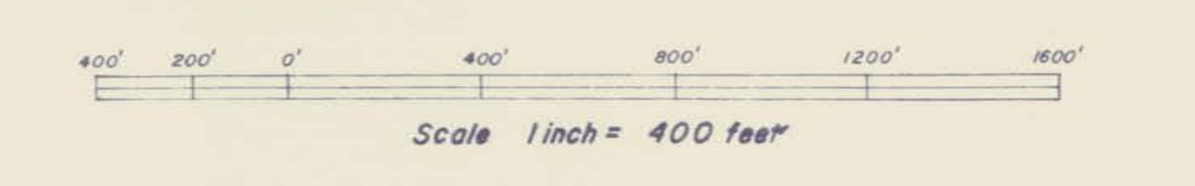


- Creek with flow direction indicated
- Cut Line
- Claim boundary
- Claim posts
- - - Blazed (Claim) Lines

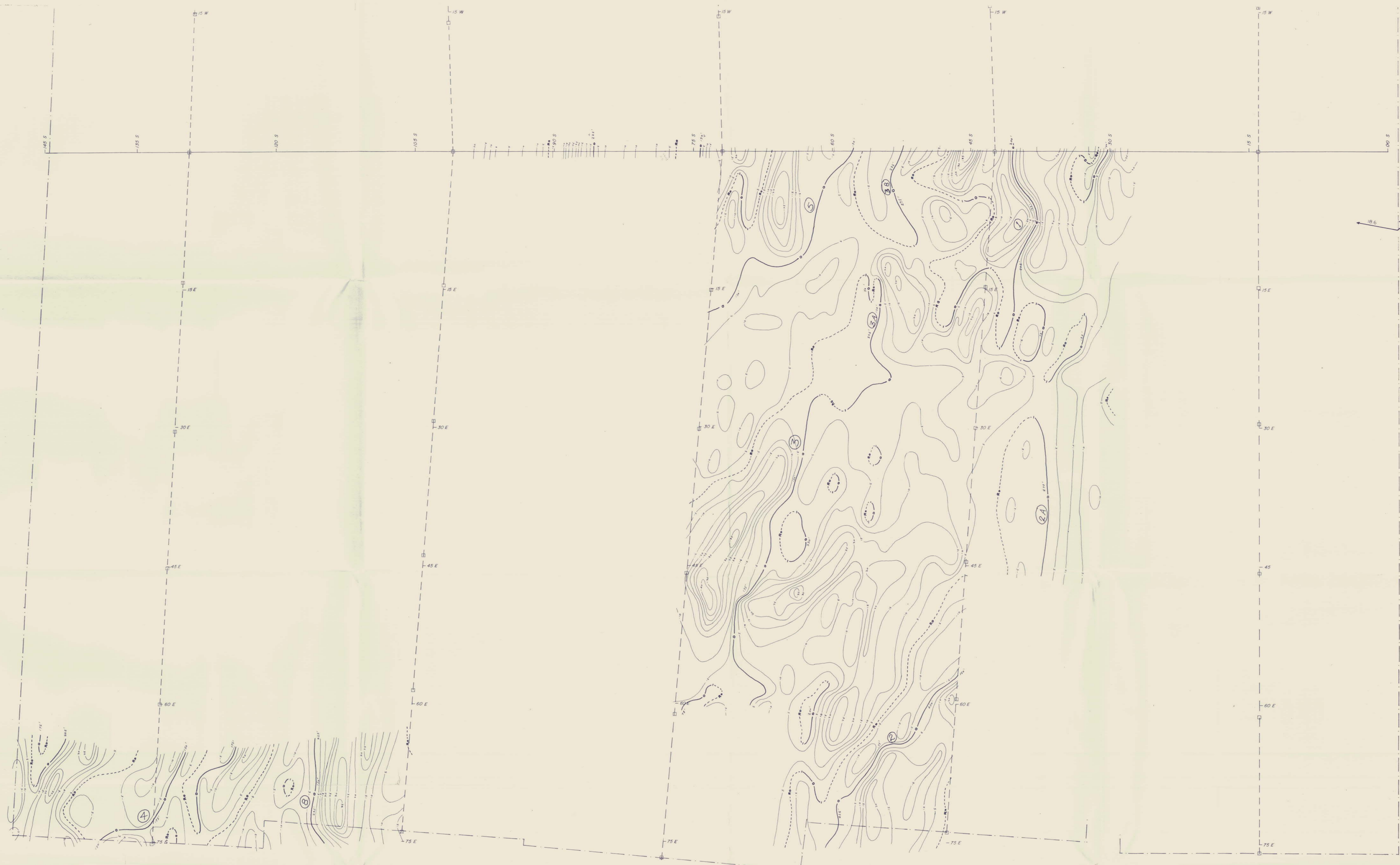
UNITED KENO HILL MINES LTD.  
 EXPLORATION DEPARTMENT WHITEHORSE, Y.T.

**STU CLAIM GROUP**  
 N.T.S. SHEET 115-I-7

MAGNETOMETER SURVEY  
 CONTOURS - CONTOUR INTERVAL 100 gammas  
 INST FLUXGATE MF-1 SER NO 905454



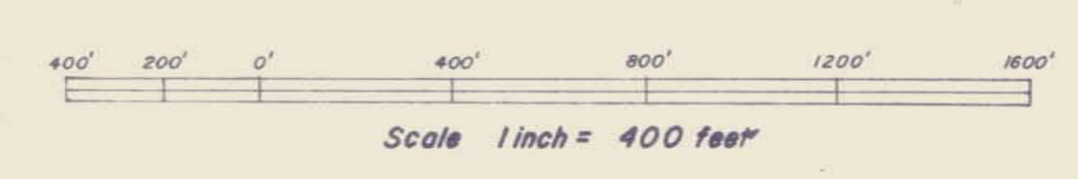
NO	Revision	Date	By	NO	Revision	Date	By	Drawn by	DWG
								RJ	
								Date: 15/06/77	NO.



UNITED KENO HILL MINES LTD.  
EXPLORATION DEPARTMENT WHITEHORSE, Y. T.

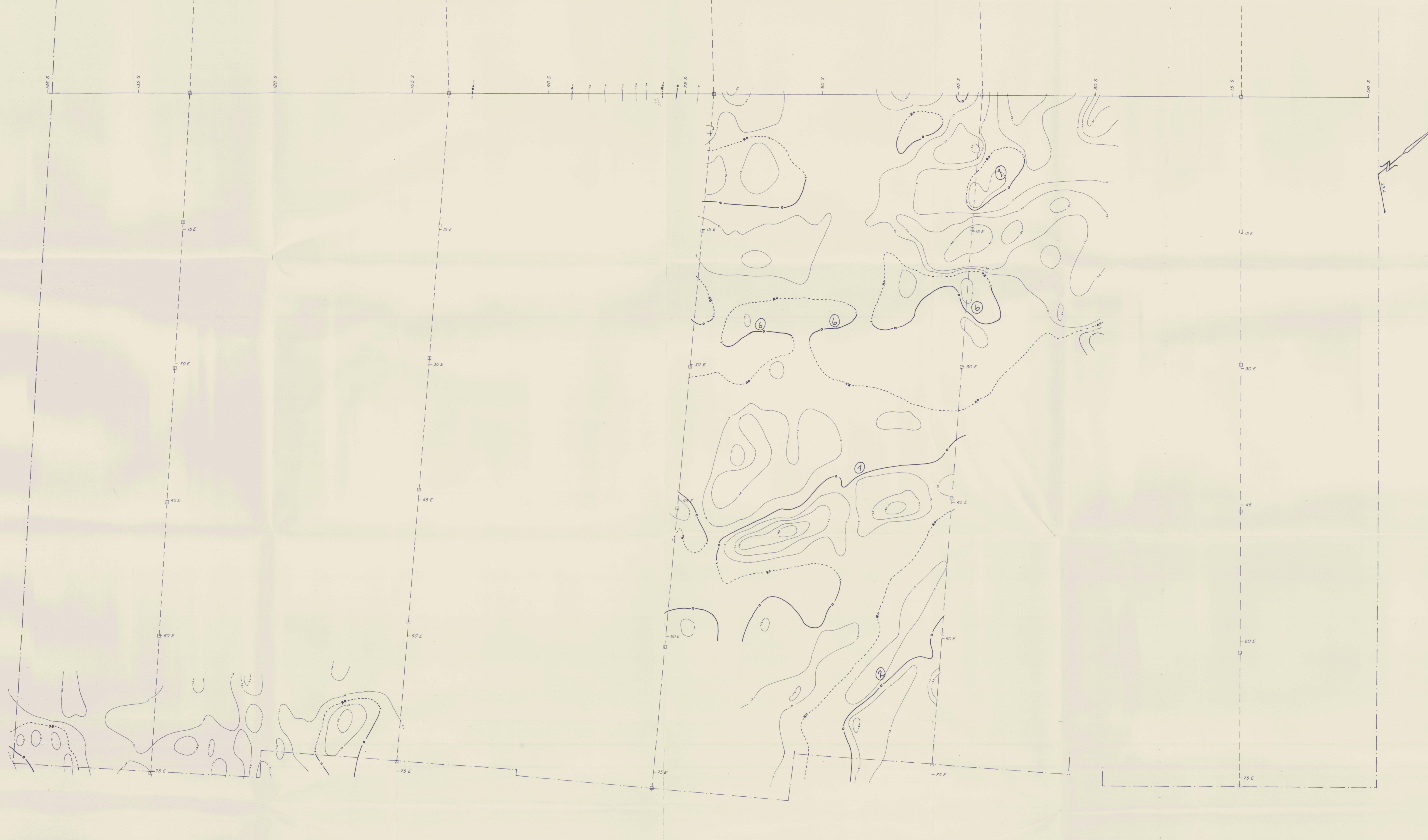
**STU CLAIM GROUP**  
N.T.S. SHEET 115-I-7

ELECTROMAGNETIC SURVEY  
CONTOURS - CONTOUR INTERVAL 5'  
INST. RONKA E.M.-16 SER. NO. 2 VLF ST. 18.6



- Creek with flow direction indicated
- Cut Line
- Claim boundary
- Claim posts
- Blazed (Claim) Lines
- Crossover (conductor)
- Reverse Crossover

NO.	Revision	Date	By	NO.	Revision	Date	By	
							Drawn by: RJ	DWG.
							Date: 15/06/77	NO.

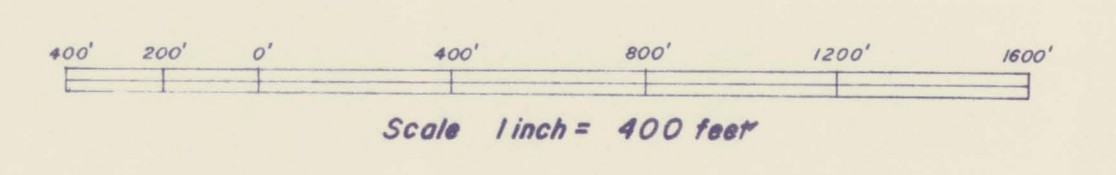


- Creek with flow direction indicated
- Cut Line
- Claim boundary
- Claim posts
- Blazed (Claim) Lines
- Crossover (conductor)
- Reverse Crossover

UNITED KENO HILL MINES LTD.  
EXPLORATION DEPARTMENT WHITEHORSE, Y.T.

**STU CLAIM GROUP**  
N.T.S. SHEET 115-I-7

ELECTROMAGNETIC SURVEY  
CONTOURS - CONTOUR INTERVAL 10%  
INST RONKA EM-16 SER NO 2 VLF ST 23.4



NO	Revision	Date	By	NO	Revision	Date	By

Drawn by: RJ  
Date: 15/06/77

DWG. NO.