G E O L O G I C A L

A N D

G E O C H E M I C A L R E P O R T

on the

H Mineral Claims

by

Terry Heard

April 26, 1966

Staking Sheet No. : 105 M 13

Latitude . . . . . : 63° 52'

Longitude . . . . : 135° 50'

Date Work Performed : Aug. 8 - Aug. 27, 1965

Contents

Geological Mapping performed by:

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SUMMARY

The H Claims (H1 - H30) were staked subsequent to the release of results from a G.S.C. Geochemical Survey on the 6th April 1965, (H1-14), the remainder (H15-H30) on the 6th June 1965.

The claim group contains approximately 40% outcrop. The consensus of opinion was that a preliminary geological reconnaissance program, augmented by a geochemical survey, would furnish information which would define areas for more detailed follow-up work.

PROPERTY

The H Claim Group was staked for and is held by United Keno Hill Mines Limited, Elsa, Yukon. The group is made up of the following claims.

H 1 to H14 Grant Nos. 84232 - 84245

H15 to H30 Grant Nos. 84490 - 84505

LOCATION

The claim group (H1-H14) is partially located on the northeast ridge of Mount Haldane and (H15-H30) partly on the northeast slope of Mount Haldane. The area is accessible by helicopter.

TOPOGRAPHY

The claim encloses a number of ridges and valleys. The minimum elevation is approximately 3,000 feet. It attains a maximum elevation of 5,500 feet.

The property is mainly above tree line except for eight claims at lower elevations which have vegetation composed of spruce and buckbrush.

GENERAL GEOLOGY

The general geology of the area has been described by W. E. Cockfield (1919) and L. H. Green (1958).

The rocks underlying the H claims belong to the Yukon Group and have been described as being PreCambrian or early Palaeozoic in age. Quartzites, thick and thin bedded, sericite schist, graphite schist and greenstone. A pronounced quartz vein is the dominant feature in the southwestern sector of the claim groups.

The consolidated rocks have a northwest strike and dip to the southwest.

West of the H claim group is ground held by Peso Silver Mines and contains a number of small showings. Evidence of mineralization in the Mount Haldane area had been found as early as 1913.

I GEOLOGICAL SURVEY

A. Detailed Geology

The claim group contains approximately 40% outcrop, the remainder being covered with felsenmeer and overburden.

Geological mapping was done utilizing claim baselines and aerial photos as reference. Rugged topography inhibited accurate representation of geological data. The area is underlain by thin bedded as well as massive quartzites, graphite schist, sericite schist, greenstone and a prominent quartz vein in the southwest.

Predominantly, strike definition in the area is northwest with localized strikes of various orientations and varying dips indicative of localized complex folding.

(a) Massive Quartzites - Light to dark grey in colour, gneiscoid in texture with varying thickness.

(b) Thin Bedded Quartzites - Minor thick bedded quartzite with varying thickness with a maximum of five feet. Thin bedded quartzites alternate with bands of graphitic phyllite being only inches in thickness. These thin bedded quartzites are from dark grey to black in colour.

(c) Graphite Schist - Black in colour, highly contorted with stringers and lenses of quartz.

(d) Sericite Schist - Mainly a light grey green to olive green in colour. Some chlorite is invariably present. This schist is highly contorted with local dragfolds and are impregnated with quartz both as stringers and as lenses.

(e) Greenstone - Grey green to dark green in colour occur usually as lens like bodies. The longer greenstone bodies show original texture whereas smaller and thinner bodies have developed a foliation parallel to the sediments.

B. Structure

The rocks in the area show varying strikes and dips indicative of localized folding. The prominent strike orientation is to the northwest.

Float breccia as well as a number of barren faults associated with limonite are indicative of structural deformation.

C. Mineralization

Reconnaissance prospecting revealed a minor discontinuous quartz vein carrying a trace of galena. Highest assay returned Tr. Ag/ton. South of the II group reconnaissance prospecting revealed a 2 foot quartz vein containing ¼" stringers of galena. This vein was traced for a strike length of 680 feet. The highest assay returned 180 oz. Ag/ton and 3.5% Pb.

II GEOCHEMICAL SURVEY

The claim baselines were used for setting up a grid for soil sampling.

(a) Sampling - A total of 1552 soil samples were taken in 34 man days. Preliminary sampling was done on 300 foot line spacings with samples taken at 100 foot intervals on the lines.

Samples approximately one cup in size were taken, using a mattock. Holes from 6 to 18 inches deep were dug in order to obtain an "organic free" sample. All samples were tagged and placed in small plastic sample bags.

(b) Lab Procedure for Chemical Analysis of Soil Samples for Lead, Zinc and Copper.

(i) General

The initial laboratory techniques and methods of analysis were set up by Dr. R. E. Delevault of the University of British Columbia, during a three week visit early in the 1964 season. He felt that the techniques as set up were those best applicable to the particular conditions of the area.

(ii) Sampling

1. Place approximately 200 grams of the soil sample on a clean sheet of paper and allow to dry thoroughly.
2. When soil has dried, mix thoroughly and crush.
3. With one gram scoop select a sample which possesses as little organic matter as possible and disregard any rock fragments larger than 1 mm. (a one mm. mesh seive may be used.)
4. Place the one gram soil sample in a small aluminum cup (made from aluminum foil) and tag.

(iii) Digestion

1. Place the one gram (well crushed) soil sample into a 22 x 175 mm. test tube, add one ml. of aqua regia and heat gently (about an hour) in the fume hood until the aqua regia has evaporated.
2. Allow the sample residue to cool for 10 or 15 minutes.
3. Add 1 ml. of dilute hydrochloric acid (1HCl:10 H_2O) to the residue and gently heat (approx. 15 minutes) until the soil is just moist.
4. Dilute to 20 mls. with demineralized water and shake well.

(iv) Copper Test

1. Make a series of copper standards by diluting the 100 γ/ml. stock solution to 1/ml., i.e. take 1 ml. of 100 γ/ml. solution and dilute it to 100 mls. with demineralized water. The copper standards should be 0 γ, 0.2 γ, 0.5 γ, 0.7 γ, 1 γ, 2 γ, 3 γ, 4 γ, 6 γ, 10 γ. Therefore measure with a pipette respectively 0.2, 0.5, 0.7, 1.0, 2.0 mls., etc. of the 1 γ solution into separate 18 x 150 mm. test tubes. Add the reagents for this test described below. These standards will keep for days, even weeks, if well stoppered.

2. To an aliquot of the sample solution in a 18 x 150 mm. test tube add 2 ml. of the ammonium citrate-sodium acetate-acetic acid buffer solution, enough demineralized water to make the total volume 6 to 8 mls., mix, and add 1 ml. of the biquinoline solution.
3. Put a plastic stopper on the test tube and shake about 20 seconds or 100 strokes.

(v) Lead Test

1. To an aliquot of the sample solution add 5-10 milligrams of ascorbic acid, wait a few minutes, then add $\frac{1}{2}$ ml. of the potassium cyanide solution, and 1 ml. of ammonium-citrate buffer solution. Wait at least two minutes if much iron is present.
2. Add $\frac{1}{2}$ or 1 ml. of dithizone working solution (dithizone dissolved in chloroform).
3. Shake and compare with the standards unless the color is the pink color of the pure complex. In such case, add more dithizone until a mixed color persists and match to the standards. The amount contained in a matching standard must, of course, be multiplied by the total number of $\frac{1}{2}$ mls. of dithizone used.
4. Prepare a series of standards in the same manner as for copper and add the reagents as in "1" above. The standards should have the following range:
γ's lead 0, 0.2, 0.5, 0.8, 1, 1.5, 2, 3, 4, 5, 8 mls. of Dz. 1 ml. $\frac{1}{2}$ ml, $\frac{1}{2}$ ml, 1 ml, 1 ml, 2 ml, 2 ml, 3 ml, 3 ml, 4 ml.
For higher amounts than 8γ per ml. add dithizone and shake until color for 8 is reached then there are 2γ per ml. used. These standards will keep for about 4 hours at normal room temperatures.

(vi) Zinc Test

1. Make a series of zinc standards by diluting the 100 γ/ml. stock solution to 1 γ/ml. solution in the same manner as for copper. The zinc standards should be 0γ, 0.2γ, 0.5γ, 0.6γ, 0.8γ, 1γ. Add the reagents for the test described below. These standards will keep for about 1$\frac{1}{2}$ hours at normal room temperatures.
2. To an aliquot of the unknown sample solution add 5-10 milligrams of ascorbic acid, wait a few minutes, and then add 2 mls. of the sodium-acetate buffer solution, and 2 mls. of the dithizone working solution (dithizone dissolved in toluene-10 milligrams/liter).
3. Shake from 30 to 40 seconds and compare to standards.

NOTES

1. Extreme care must be taken to prevent contamination from any source. This necessitates good cleaning of glassware with metal-free water. Acetone and/or ethyl ether can be used as a rinser. Extreme care must be exercised with these latter organic solvents as they are extremely flammable.
2. Lead and zinc standards are very unstable (at normal room temperatures they keep from 1 to 4 hours), in presence of light and heat the metal dithizonate tends to break down. If standards wish to be preserved for a limited time, they should be put in a cold, dark place, e.g., a refrigerator. The author experimented with artificial standards by mixing suitable colored inks. These artificial standards were found to be unsatisfactory as the colors faded slightly in a short time and the accuracy desired was not possible.

(c) Interpretation of Results

All samples taken were analyzed for lead, zinc and copper. From three years of previous work on Galena and Keno Hills, soil sampling has been proven to be an effective tool in locating vein zones in areas of relatively shallow overburden. i.e. less than 10 feet. Copper analysis of soil samples is no longer done on local work as values have been proven to be very erratic and usually reflect areas of greenstone and sericite schist.

It was felt that a three metal determination (lead, zinc and copper) should be done on outside property examinations to determine the cause of G.S.C. anomalies which were given as Total Heavy Metals.

In contouring lead and copper values are cut at 50 parts per million (p.p.m.). Zinc values are cut at 100 p.p.m. Lead has been proven to be the most reliable indicator for finding silver bearing vein zones. Zinc values usually correspond with lead values but in a number of cases they are erratic and widespread making interpretation from zinc values very difficult. Copper very seldom reflects vein zones but anomalous values have been obtained over areas of greenstone and sericite schist.

In the case of the H Group, interpretation is based primarily on the lead plot although further study will be made to determine the caus of anomalous values for zinc and copper, which at present are attributed to the rock types.

The lead anomalies on the H Group are favourably associated with geological data, i.e. faults, breccia and minor lead mineralization associated with quartz vein.

Zinc anomalies correspond with lead values but show a much greater dispersion.

Copper values which are anomalous correspond favourably with lead and zinc values. Other copper values correspond with areas which are predominantly greenstone or sericite schist.

CONCLUSIONS AND RECOMMENDATIONS

Reconnaissance prospecting revealed mineralization ranging from Tr. Ag/ton - 180 oz. Ag/ton.

Soil sampling indicates minor lead anomalies with corresponding zinc and copper values.

It is recommended that:-

(a) Anomalies be resampled on a closer grid.

(b) Hand trenching dependent on geochemical results.

(c) Rock samples be collected in the area and chemically analyzed for background areas.

SUMMARY OF WORK

1. Geological Mapping August 8th - August 27th, 1965

Two men prospected the claim area and mapped on a scale of 1" = 400 feet for a total of 24 man days.

2. Geochemical Survey August 8th - August 27th, 1965

Three men collected 1,552 soil samples for a total of 34 man days. All samples were analyzed in the Geochemical Lab at Calumet.

Geological Mapping

Two Party Chiefs @ $450.00 per month by 24 man days	$ 348.48

Geochemical Survey

Three soil samplers @ $375.00 per month by 34 man days	$ 411.40
1,552 soil samples @ $2.00 per sample for 3 analysis (lead, zinc, copper)	$ 3,104.00
	$ 3,515.40

Geological Mapping	$ 348.48
Geochemical Survey	$ 3,515.40
Total	$ 3,863.88

AFFIDAVIT OF COSTS

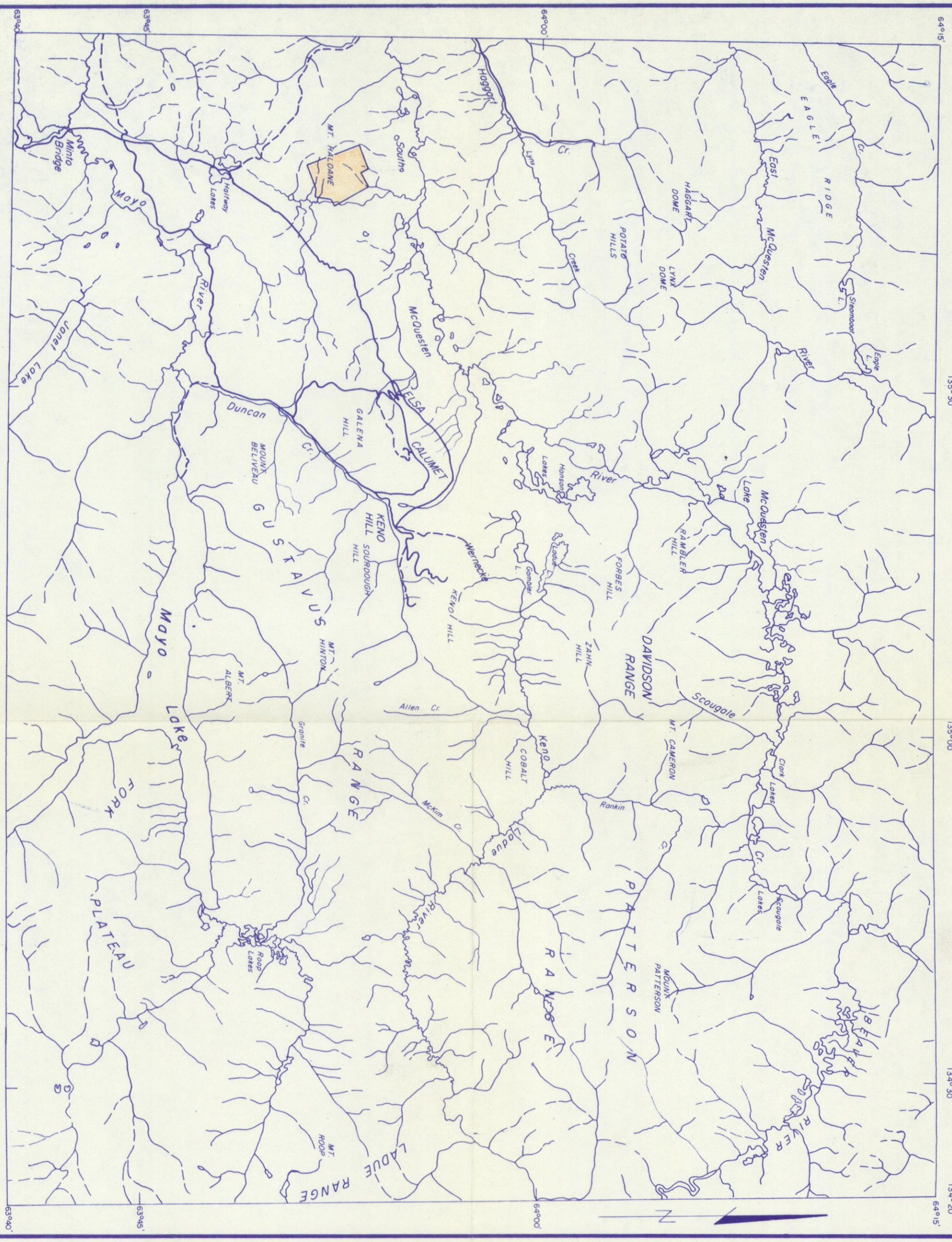
I, Terry Heard, of Calumet in the Yukon Territory, make oath and say:

That the cost statement on page six of the Geological and Geochemical Report on the H 1 - H 14 and H 15 - H 30 Mineral Claims, to the best of my knowledge and belief, is the true amount of money spent on the geological reconnaissance and geochemical survey of the said claims in 1965.

Sworn before me at Mayo in the Yukon Territory this 28 th day of April, 1966.

Terry Heard

A Commissioner for Oaths
for Yukon Territory.



UNITED KENO HILL MINES LTD.

ELSA YUKON

EXPLORATION DEPARTMENT

H CLAIM GROUP - MOUNT HALDANE AREA

Latitude: 63°52' N Longitude: 135°50' W

Staking Sheet No. 105-M-13

4 2 0 4 8 12

Scale : 1 inch = 4 miles

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EXPLORATION DEPARTMENT

H CLAIM GROUP

GENERAL GEOLOGY

Sediments

1 Limestone

2 Quartzite — 2a Quartzite with Graphite Schist — 2b Quartzite (broken or crushed)

3 Pale Siliceous Quartzite

4 Graphite Schist — 4a Graphite Schist with Quartzite

5 Sericite Schist

Intrusives

6 Greenstone — 6a Greenstone (altered or highly schistose)

7 Acid Dyke

8 Lamprophyre

Vein Material

Vein Material (breccia, siderite, limonite etc.)

Sulfides (galena, sphalerite etc.)

Geological Contact (observed) — Geological Contact (assumed)

Vein (observed) — Vein (projected or possible)

Fault (observed) — Fault (assumed)

Bedding — Lineations

Schistosity

Photo Center — Trail

Spot Height — Cut Line

Buildings — Roads

Bluff — Bulldozer Trench

Swamp — Hand Trench

Stream — Workings

Slide Rock or Frost Heave — Adit

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

(discrepancy due to rugged topography)

Baseline N 11° W

H 20 H 21 H 22 H 23 H 24 H 25 H 26 H 27 H 28 H 29 H 30

H 1 H 2 H 3 H 4 H 5 H 6 H 7 H 8 H 9 H 10 H 11 H 12 H 13 H 14 H 15 H 16 H 17 H 18 H 19

STAR 1 STAR 2

Quartzite Felsenmeere

Quartzite talus

Fe stn.

Fe stn. talus with fault breccia

Fe stn. Tr arsenopyrite

breccia float

small PbS crystals in 3' long qtz vein

breccia

Qtzite vein float minor arsenopyrite

Fe stn. schist float

barren breccia

fault breccia float

limonitic fault breccia

barren joint breccia

joint

Breccia, Qtz, PbS 47oz Ag, 7.02% Pb

3-2 oz Breccia, sld with calcite minor PbS

18" qtz vein minor arsenopyrite and PbS

21 oz Ag, 5.5% Pb

0.4 oz Ag, 0.44% Pb

5.6 oz Ag, 6.9% Pb

0.6 oz Ag, 0.65% Pb

18 oz Ag, 3.5% Pb

1.2 oz Ag, 0.2% Pb

4.4 oz Ag, 0.7% Pb

5.5 oz Ag, 1.05% Pb

2 qtz veins 1/4" PbS and arsenopyrite

Quartz vein 8" - 19" Top of vein 1/4" discontinuous PbS and arsenopyrite

Vein drawn from distance

Mount Haldane 6032'

RIDGE LINE

SLOPE

Drawn by T.H. and G.S. Nov. 1965

Geology by M.J. Russell and G.S. Zimmer August 1965

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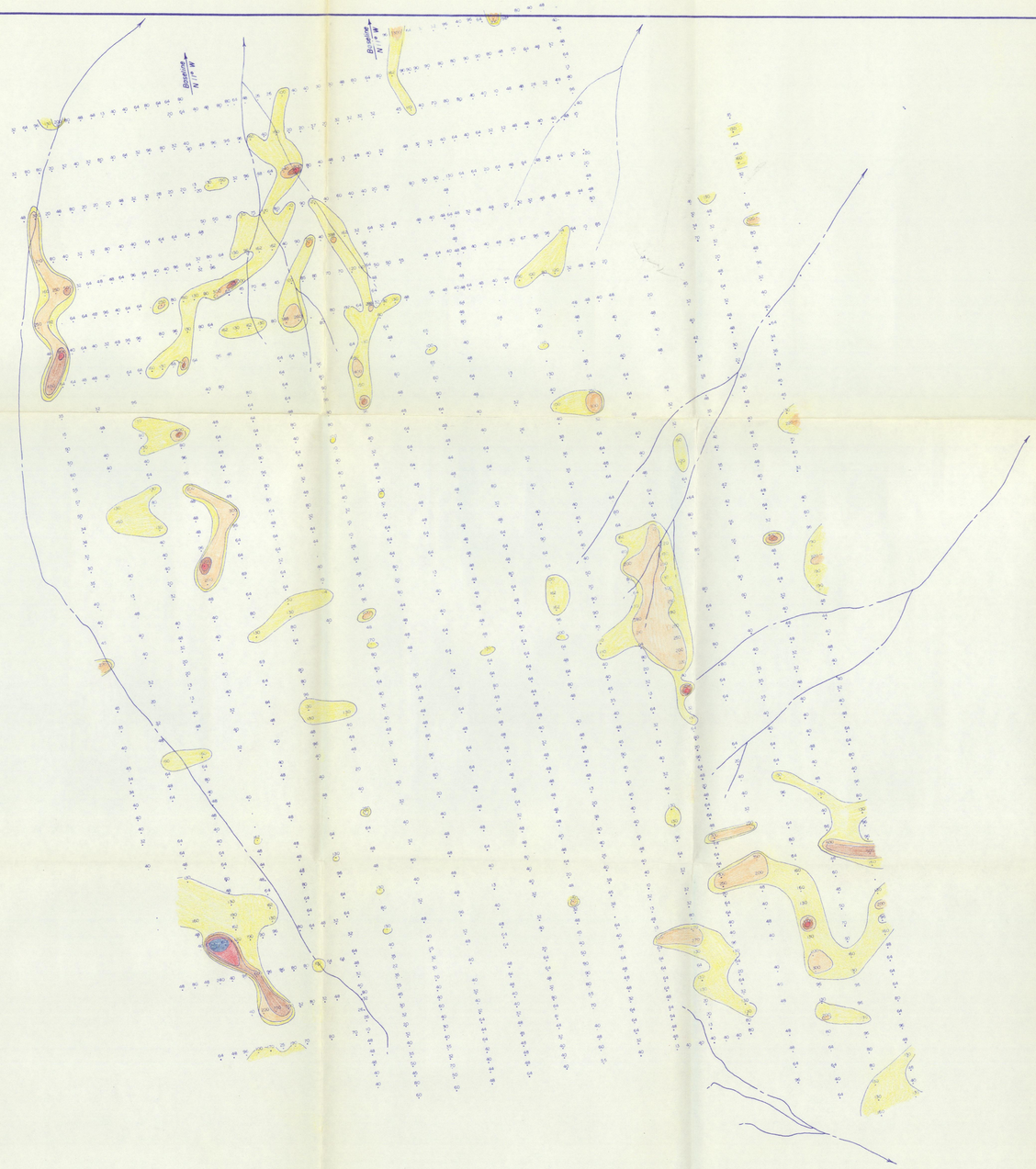
H CLAIM GROUP

SOIL SAMPLING
ZINC PLOT



CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	100
	100	-	200
	200	-	400
	400	-	800
	800	-	1600
	1600	-	3200
	3200	-	6400
	6400	-	12,800
	12,800	-	25,600
	over 25,600		

-64 -48 -80
-96 -40 -64 Zinc plot in parts per million (ppm)

+ Photo Center	Trail
Spot Height	Cut Line
Buildings	Roads
Bluff	Bulldozer Trench
Swamp	Hand Trench
Stream	Workings
Slide Rock or Frost Heave	Adit

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

Drawn by T.H. and G.S. Dec 1965

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EXPLORATION DEPARTMENT

H CLAIM GROUP

SOIL SAMPLING
LEAD PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	50
	50	-	100
	100	-	200
	200	-	400
	400	-	800
	800	-	1600
	1600	-	3200
	3200	-	6400
	6400	-	12,800
	over 12,800		

-3 -13 -13
-48 -7 -16 Lead plot in parts per million (ppm)

(5) Anomaly Reference Number

+ 267 Photo Center

· 3770 Spot Height

Buildings

Bluff

Swamp

Stream

Slide Rock or Frost Heave

Trail

Cut Line

Roads

Bulldozer Trench

Hand Trench

Workings

Adit

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

Baseline N 11° W

Baseline N 11° W

Drawn by T.H. and G.S. Dec. 1965

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EXPLORATION DEPARTMENT

H CLAIM GROUP

SOIL SAMPLING
COPPER PLOT

CONTOUR INTERVALS IN PARTS PER MILLION (PPM)

	0	-	50
	50	-	100
	100	-	200
	200	-	400
	400	-	800
	800	-	1600
	1600	-	3200
	3200	-	6400
	6400	-	12,800
	over 12,800		

16 40 32
40 16 48 Copper plot in parts per million (ppm)

+ 267	Photo Center	— — —	Trail
3770	Spot Height	— · —	Cut Line
□	Buildings		Roads
	Bluff		Bulldozer Trench
	Swamp		Hand Trench
	Stream	□	Workings
	Slide Rock or Frost Heave	>—	Adit

400 200 0 400 800 1200 1600

SCALE: 1 inch = 400 feet

Baseline N 17° W

Baseline N 17° W

Drawn by T.H. and G.S. Dec. 1965