

# 5830

VH

82L/6E

CANADIAN SUPERIOR EXPLORATION LIMITED

VERNON HILL PROJECT

REPORT ON GEOLOGICAL MAPPING, GEOCHEMICAL SURVEYS

AND PERCUSSION DRILLING TO DECEMBER, 1975

5830

LOCATION: On Vernon Hill, 4 miles East of Vernon, B.C. .

Lat: 50° 17' N Long: 119° 7' W

CLAIM NAMES: VH, VI, VJ, VK

WORK PERIOD: June 10 - July 15, 1975

J. Baker, B. Sc.

Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT

NO. 5830 MAP X

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INTRODUCTION:

The Vernon Hill property is a porphyry copper/molybdenum environment held by Canadian Superior Exploration Limited under option from King Graybarr Mines Limited since January 31, 1975. Work programs undertaken by Canadian Superior during 1975 included preparation of topographic and orthophoto maps, geological mapping, relocating the claims, rock geochemistry and percussion drilling 8 holes totalling 1980 feet.

SUMMARY:

Regionally, Vernon Hill lies at the juncture of two major fault systems, and is underlain largely by Precambrian and Permian metavolcanic and metasedimentary units cut by altered porphyry dikes.

Within the claims, the intersection of several fault zones has resulted in extensive fracturing over an area 4000' in diameter, accompanied by prominent pyritisation and limonite staining. Metal zoning is indicated by a peripheral Pb-Zn-Ag assemblage about a geochemically anomalous copper core. Hydrothermal alteration is not well developed except adjacent to porphyry dikes, where copper mineralization is best developed but generally low grade.

In June 1975 a percussion drilling program was implemented to test the copper geochemical focus which appeared to be reflected by a structurally controlled topographic depression containing no outcrops.

Assays showed negligible copper values, suggesting the areal extent of copper mineralization exposed along the Western Margin of the drill grid is severely restricted.

CONCLUSIONS AND RECOMMENDATIONS:

Geological mapping and rock geochemistry have indicated the presence of a cupiferous hydrothermal center, however drilling results indicate very low grades. There is evidence in support of a possibly mineralized porphyry intrusive at depth, although alteration intensity and sulphide volumes suggest the occurrence to lie at several thousands of feet below surface, and therefore is not a priority target under present economic conditions.

No significant alternatives have emerged to the weak mineralization exposed in trenches, and it is therefore recommended that Canadian Superior terminate its option on the property.

PHYSIOGRAPHY AND ACCESS:

Vernon Hill lies at the Eastern edge of the Okanagan Valley and rises to an elevation of 4500', 3300' above the City of Vernon, 4 miles to the West. The area is thickly forested although access is greatly facilitated by a network of old logging roads. Overburden is generally shallow except in Creek Valleys where up to 150' sections were encountered in drilling.

HISTORY:

The property was originally held by Vernon Copper Ltd. who vended their interest to King Graybarr Mines Ltd. Since 1969 King Graybarr has undertaken extensive stripping and trenching, initially exploring Pb-Zn-Ag veins, diamond drilling 5 holes, ground and airborne magnetic surveys, EM surveys and soil geochemistry (Rubianic field analysis).

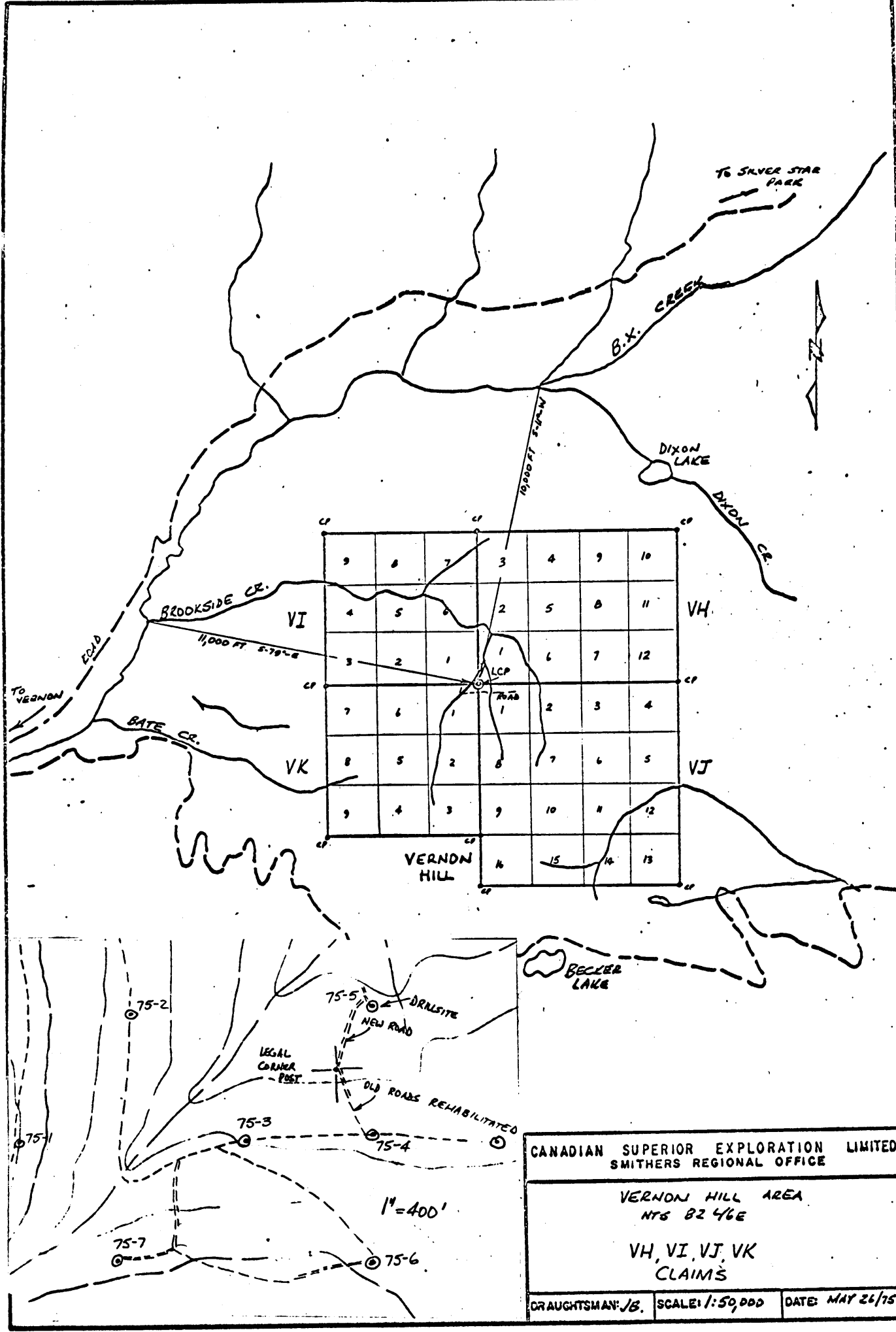
CLAIM STATUS:

In May 1975 Canadian Superior abandoned the 87 preexisting claims









CANADIAN SUPERIOR EXPLORATION LIMITED  
SMITHERS REGIONAL OFFICE

VERNON HILL AREA  
NTS 82 46E

VH, VI, VJ, VK  
CLAIMS

DRAUGHTSMAN: J.B. SCALE: 1:50,000 DATE: MAY 26/75

Claim Status: Cont'd.

subject to the option agreement, and relocated claims according to the modified grid system, resulting in four claims incorporating a total of 47 units. On the basis of assessment work applied in 1976 the claims are in good standing to June 11, 1977.

REGIONAL GEOLOGY:

The area East of the Okanagan fault system is underlain mainly by Shuswap metamorphic rocks locally as at Vernon Hill, unconformably overlain by Permian metavolcanics and metasediments. These sequences are cut by a number of structurally controlled, small Jurassic intrusives satellite to the batholithic masses to the Southwest and Southeast. Numerous vein-type mineral occurrences have been found associated with faults in the area.

PROPERTY GEOLOGY:

Rock exposures are unevenly distributed on the property and found almost exclusively in road cuts and trenches. Geological mapping was performed with the aid of topographic and orthophoto maps at a scale of 1" = 400ft.(1:4800), supplemented by pace and compass traversing.

Copper mineralization is closely related to structure and porphyry dikes, and accordingly mapping emphasis was placed on defining sulphide distribution, the more important structural features and alteration.

The oldest rocks on the property are the Monashee Group (Precambrian Shuswap Terrane) which occupy a largely fault bounded positive region in the Western claim area and outcrop along hills to the Northeast, forming a crude amphitheatre open to the Northwest. Unconformably overlying Permian Cache Creek Group rocks occur as a faulted wedge in the central part,

Property Geology: Cont'd.

and flank Shuswap units to the West and South.

Lithology:

The Monashee is a metasedimentary sequence, which on the property consists mainly of fine to medium grained quartz feldspar biotite gneiss. Megascopically the rock is a pale to rusty weathering unit with a speckled appearance imparted by up to 10% brownish biotite. Foliation is moderately well developed although banding absent. Less common interlayered units are thin dark green bands of amphibolite gneiss, minor metaconglomerate, and near the Northern Contact, augen gneiss. The latter is generally a dark grey biotitic rock with abundant 2-5 mm quartz feldspar segregations. Hornfelsed equivalents of the Monashee occur at two locations along the ridge South of the Molybdenite showing.

The Cache Creek group consists of essentially two rock groups; a metavolcanic sequence comprised of chloritic and schistose meta-andesite found in the Southeast quadrant, and a metasedimentary sequence including mainly biotite rich pelitic schists, with lesser sericite and chlorite schists to the Northwest.

Monashee and Cache Creek groups are cut by three types of intrusive dikes: fine grained lamprophyres and minettes, a fresh medium to coarse grained quartz diorite, and feldspar porphyry. The latter type is economically the most important and occurs at two localities West of the drilling grid. Typically the dike is rather diffuse and may be best described as a structurally controlled altered or metasomatised zone up to 100 feet wide. Locally, as at the King trench, a distinctly intrusive



Lithology Cont'd.

appearance is exhibited, with 50% 3-5 mm sericitised euhedral feldspar contained in a matrix of quartz, feldspar and 10% brownish biotite with rare chloritised pyroxene. Elsewhere, the dike as defined in mapping consists of altered quartz feldspar biotite gneiss with fairly abundant euhedral, but frequently diffuse, sericitised feldspars, with erratic areas of well developed intrusive texture. Kaolinised fault breccia has been observed at the dike contact and alteration diminishes rapidly with distance from the dike. It is hypothesised that better defined intrusive relationships may be found at depth.

Structure:

Cache Creek units are tightly folded and appear to describe a Northwest trending antiform exposing a core of Monashee gneisses. Local dips are highly variable, a function of faulting and shearing of which the two dominant trends are Easterly and Northerly, paralleling the Okanagan graben system. These structures are defined both on the ground and as prominent topographic lineaments, and are strongly reflected in joint patterns on the property. The intersection of these two regional fault systems has resulted in a wide area of pronounced fracturing.

Alteration:

Hydrothermal alteration is best developed in the vicinity of the porphyry dike and consists of sericitisation of feldspars and patchy, very localised brown secondary biotite occurring as fine grained interstitial masses. Kaolinisation is common along shears and as a weathering product where abundant pyrite is present. Silicification as quartz veinlets is found in near the porphyry, and to the South in trenched exposures

Alteration: Cont'd.

of albitised rock. A chlorite epidote/calcite assemblage occurs in peripheral areas, notably within metavolcanic units to the East.

Mineralization:

Metal zoning is demonstrated by an inward galena/sphalerite/pyrite/molybdenite/chalcopyrite assemblage. The distribution of pyrite stringers corresponds closely to the overall extent of the highly fractured zone and has resulted in extensive leaching and limonite staining particularly due to the closely spaced fractures and weathering of biotite. It is difficult to quantify pyrite content of the area as a whole, nevertheless it is apparent sulphide content increases to  $\pm 4\%$  within the central area. Massive pyrite veins up to 1 foot wide have been noted at several localities, particularly in the trench East of the drill grid. Cache Creek metavolcanics locally contain up to 10% disseminated pyrite.

Argentiferous galena/sphalerite mineralization occurs in discontinuous quartz veins at the Northwest periphery of the pyrite zone.

Generally sparse molybdenite is found exclusively within the trenched exposures of the prophyry, particularly in a small high grade quartz vein. Chalcopyrite is associated mainly with the dike and occurs as fine disseminations and in quartz/chalcopyrite/pyrite stringers. Other minor occurrences were noted Southwest of 75-1 and in altered metavolcanics East of 75-4 reflecting generally the focus of the rock geochemical anomaly.

A thin veneer of supergene enrichment (chalcocite rimming chalcopyrite) locally gives rise to higher near surface assays. Malachite is present at hole 75-1.

ECONOMIC GEOLOGY:

Early exploration on the property has focused on the PbZnAg quartz veins peripheral to the copper zone. These occurrences are extremely erratic and of little economic significance.

Near surface porphyry copper potential appears limited in that drilling of the best geologic target returned negative results. The area of copper occurrences West of the drill grid is limited and very low grade ( $\leq$  .1% Cu), offering little encouragement.

The diffuse nature of the mineralized porphyry dike, coupled with the wide distribution of sulphides and distinctive metal zoning, suggest there may exist at depth a mineralized zone associated with a buried pluton which may be responsible for the anomalous topography in the vicinity. Such a target is not considered a priority within the foreseeable future.

ROCK GEOCHEMISTRY:

Rock chip samples were collected from each outcrop area on the property and analyzed for total copper to aid in definition of the drill target. Samples consisted of chips approximately 1 inch in diameter taken at 6 inch intervals along a maximum length of 20 feet. The samples were stored in plastic bags and shipped to Acme Analytical Laboratories in Burnaby.

The analytical procedure involved crushing to minus 200 mesh, taking a representative sample, digestion with fuming perchloric acid and final analysis with an atomic absorption spectrophotometer.

Copper background is 40 ppm. with threshold and anomalous conditions established at 75 ppm. and 100 ppm. respectively. Results show a large discrete anomaly remarkably coincident with the area of fracturing,

Rock Geochemistry: Cont'd.

apparently focused on the structural (?) depression central to the pyrite halo. The anomaly is of rather low order, with most values in the 200-400 ppm. range, however outcrops are sparse in crucial areas, rendering quantitative evaluation difficult. The most significant results was geochemical support of the geologic model, providing further impetus to proposed drilling.

PERCUSSION DRILLING:

A percussion drilling program was implemented in June 1975 to test geological and geochemical targets. L & L Drilling and Explorations Ltd. of Cache Creek contracted to drill an initial 6 holes totalling 1800 feet utilising an Atlas Copco air percussion drill mounted on an Army Surplus 6x6 truck. Preparatory to mobilization of drill equipment, access roads and drillsites were built by a local contractor (Double Eagle Enterprises) with an International 500 tractor.

8 holes totalling 1980 feet, were drilled, the latter two holes to supplement others abandoned in overburden or fault zones. Bedrock encountered was Monashee gneiss, and although hole 75-1 was collared adjacent to an impressive chalcopyrite/pyrite showing, no significant copper was intersected in any of the holes. Pyritisation was only weakly developed and weak alteration (sericite) noted in only 75-1

The drill pattern effectively tested the apparent focus of the geochemical anomaly and central region of the sulphide system with negative results. No additional drill targets emerged and the program was therefore terminated.

*John Baker B.Sc.*

### COST STATEMENT

In support of an Affidavit on Application to Record Work on the VH,  
VI, VJ and VK mineral claims, Vernon Mining Division.

Costs incurred in geological mapping, rock geochemical survey and  
percussion drilling from May 27 to July 31, 1975.

#### GEOCHEMISTRY:

67 samples analysed for Copper @ \$2.00	\$134.00
J. Hemelspeck, sampler, 4 days @ \$55/day	<u>\$220.00</u>
total	<u>\$354.00</u>

#### GEOLOGY:

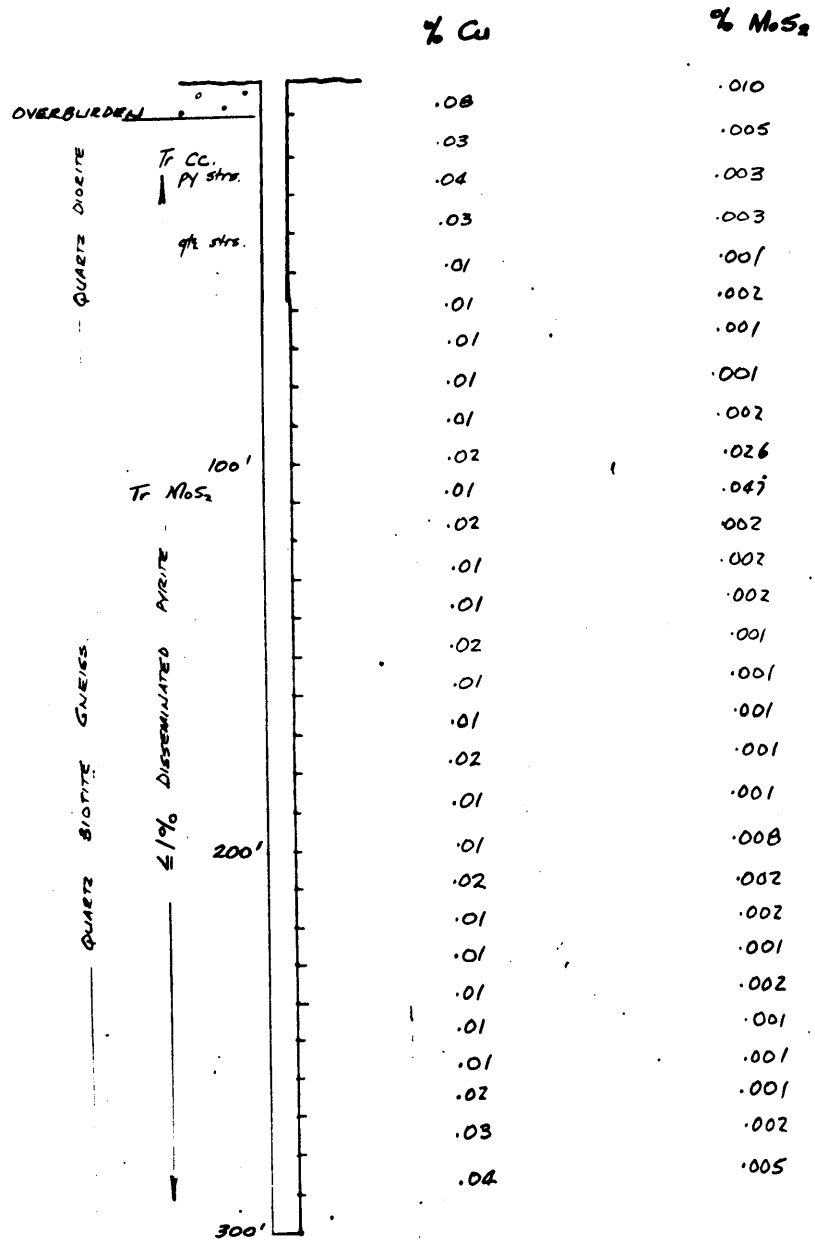
Geological mapping 8 days @ \$60/day (J. Baker - project geologist)	\$480.00
total	<u>\$480.00</u>

#### PERCUSSION DRILLING:

8 holes totalling 1980 feet @ \$2.75/ft. (L & L Drilling - contract basis)	\$5445.00
Mobilization charges	\$600.00
Drying packaging & shipping samples J. Hemelspeck 7 days @ \$55/day	\$385.00
Logging percussion chips & supervision J. Baker 7 days @ \$60/day	\$420.00
Supplies: drying oven, pans etc.	\$200.00
Board and Lodging (J. Baker & J. Hemelspeck)	<u>\$540.00</u>
total	<u>\$7590.00</u>
Draughting, interpretation & reporting J. Baker 7 days @ \$60/day	\$420.00

#### ROAD BUILDING: (includes rehabilitation of old skid roads)

26 hours @ \$18/hr. - Int. 500 tractor & operator (Double Eagle Enterprises, Vernon) (including mobilization charges)	\$468.00
Powersaw clearing of right of way J. Hemelspeck 3 days @ \$55/day	\$165.00
Total	<u><u>\$9477.00</u></u>



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VERNON HILL PROJECT

PERCUSSION HOLE No. 75-1

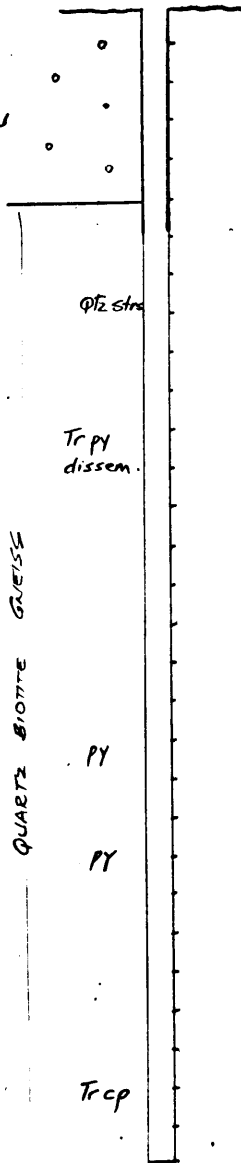
AZIMUTH: / DIP: -90 ELEV. 3550'

LOCATION: 104200 N, 60240 E LENGTH: 300 FT

DRAUGHTSMAN: J.B. SCALE: 1" = 50' DATE: JUNE 1975



OVERBURDEN



% Cu

% MoS<sub>2</sub>

% Cu	% MoS <sub>2</sub>
.01	.001
.01	.001
.01	.001
.01	.001
.02	.001
.01	.001
.01	.001
.01	.001
.01	.001
.01	.001
.01	.001
.01	.001
.01	.001
.02	.001
.02	.001
.02	.001
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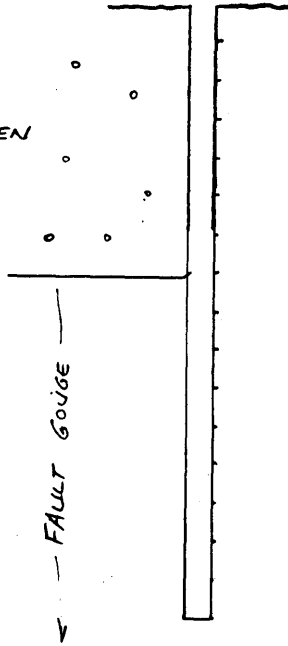
CANADIAN SUPERIOR EXPLORATION LIMITED SMITHERS REGIONAL OFFICE		
VERNON HILL PROJECT		
PERCUSSION HOLE No. 75-2		
AZIMUTH: / DIP: -90° ELEV. 3425'		
LOCATION: 104600 N, 60600 E LENGTH: 270 FT		
DRAWN BY: J.B.	SCALE: 1" = 50'	DATE: JUNE 1975



OVERBURDEN

% Cu

% MoS<sub>2</sub>



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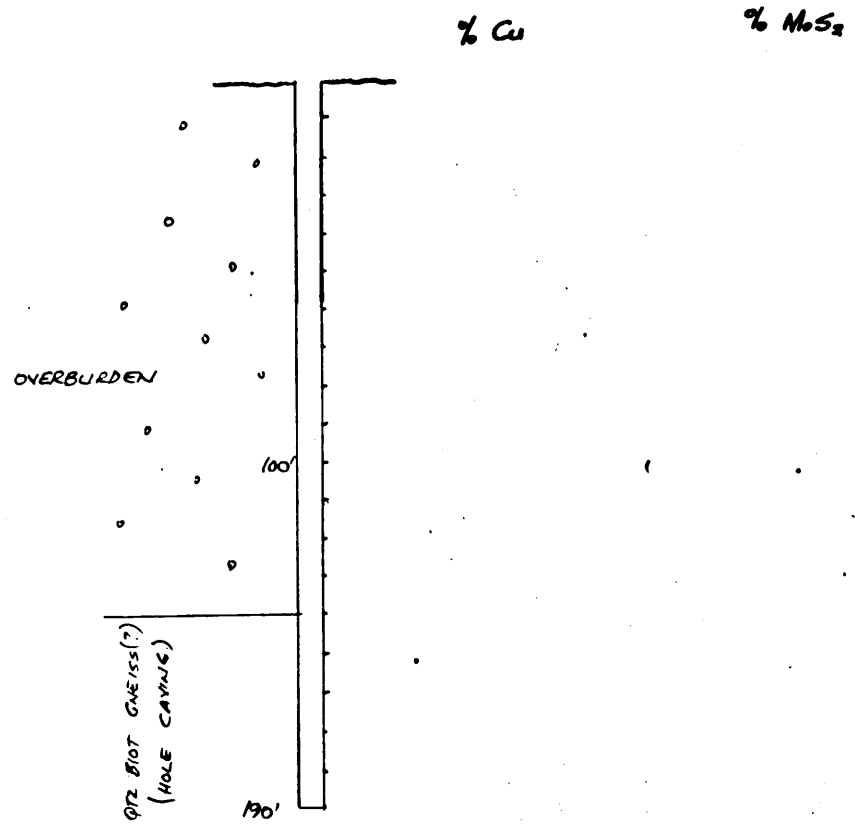
VERNON HILL PROJECT

PERCUSSION HOLE No. 75-4

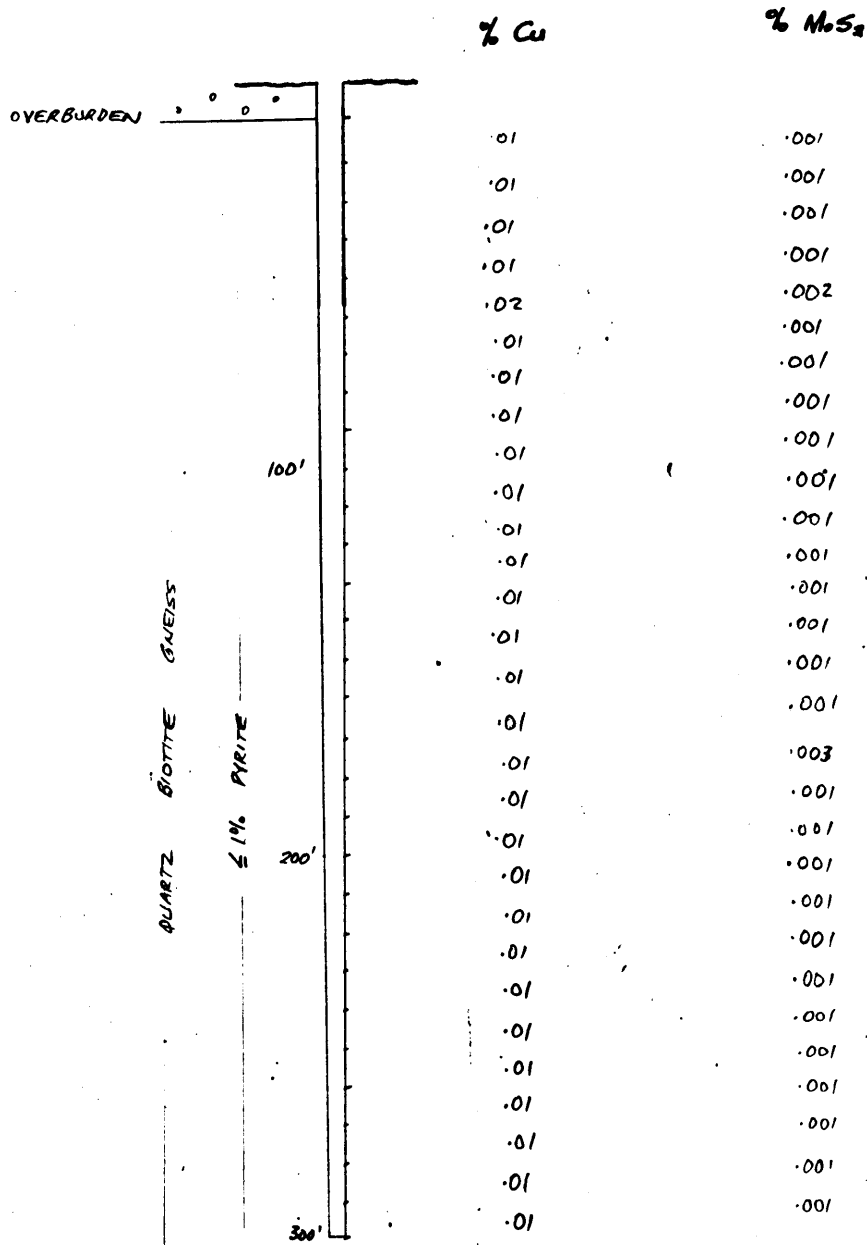
AZIMUTH: / DIP: -90° ELEV. 3380'

LOCATION: 104200N 61800E LENGTH: 160 FT

DRAWN BY: MAF, J.B. SCALE: 1" = 50' DATE: JUNE 1975



CANADIAN SUPERIOR EXPLORATION LIMITED SMITHERS REGIONAL OFFICE		
VERNON HILL PROJECT		
PERCUSSION HOLE No. 75-5		
AZIMUTH: -	DIP: -90°	ELEV. 3300'
LOCATION: 104600N 61400E LENGTH: 190' FT		
DRAUGHTSMAN: JB.	SCALE: 1" = 50'	DATE: JUNE 1975

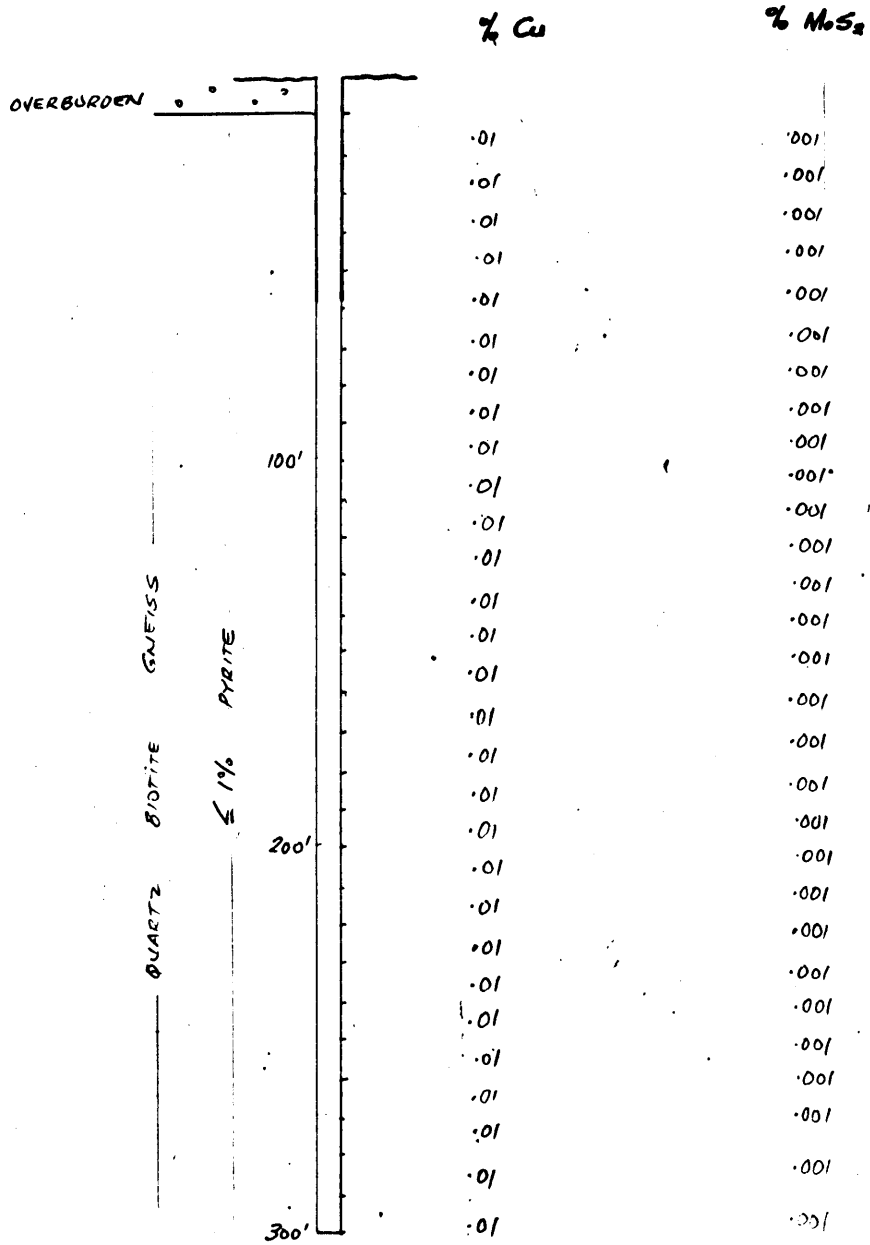


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VERNON HILL PROJECT  
PERCUSSION HOLE No. 75-6  
AZIMUTH: - DIP: -90° ELEV. 3490'  
LOCATION: 103800N 61400E LENGTH: 300 FT  
DRAUGHTSMAN: JB. SCALE: 1" = 50' DATE: JUNE 1975







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VERNON HILL PROJECT

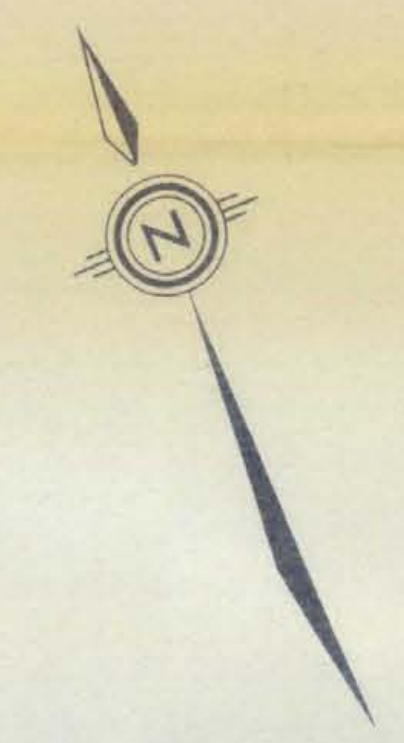
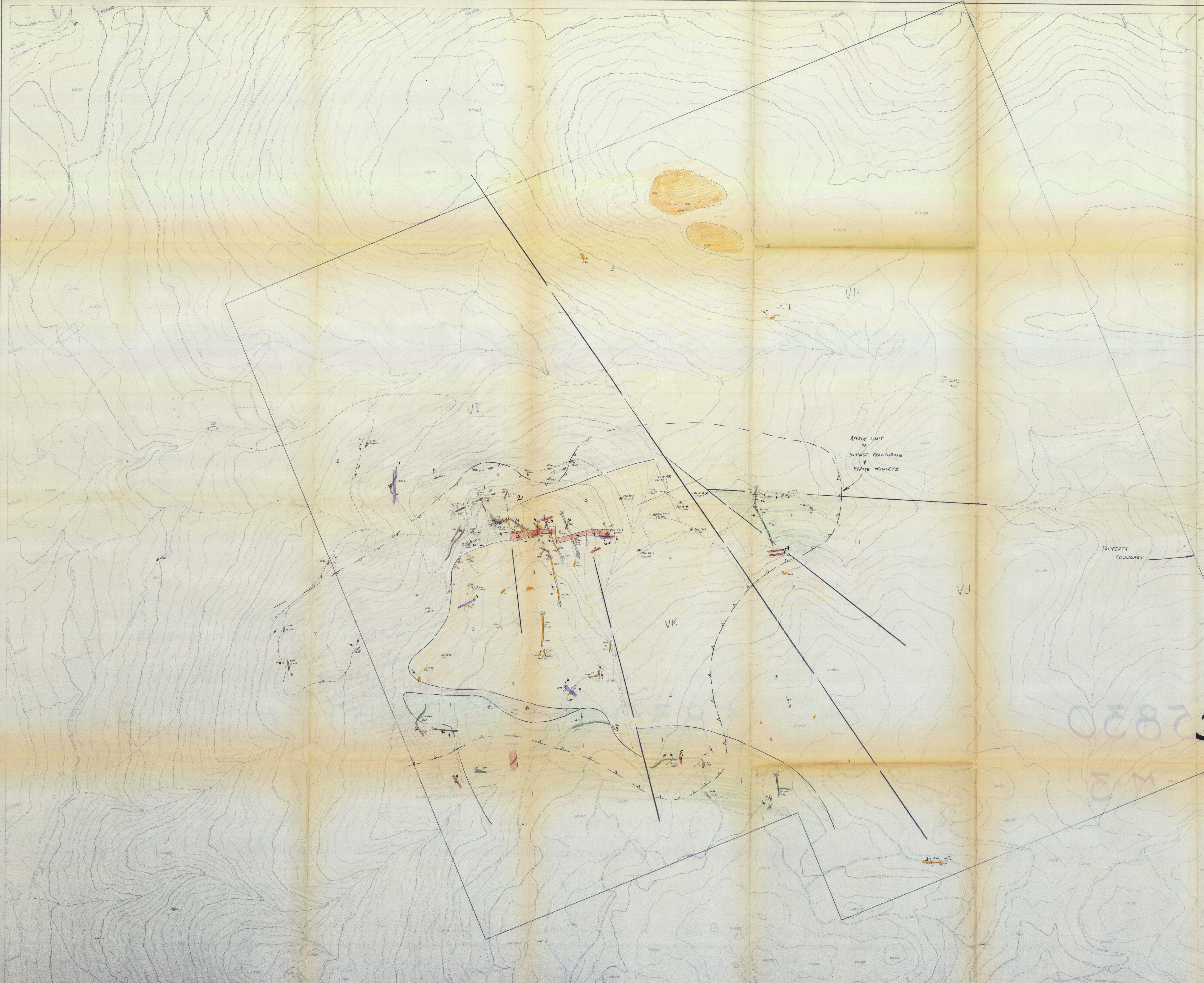
PERCUSSION HOLE No. 75-B

AZIMUTH: -      DIP: -90°      ELEV. 3380'

LOCATION: 104200N 61400E LENGTH: 300 FT

DRAUGHTSMAN: JB.      SCALE: 1" = 50'      DATE: JUNE 1975





- CACHE CO GROUP**
- PERMIAN METAVOLCANICS - Mainly andesites which show some porphyry
  - METASANDSTONES - Mainly sandstones, siltstones
  - MONAGHAN GROUP GNEISS - Mainly quartz, feldspar, mica, amphibole, biotite, chlorite, garnet
- INTRUSIVES (see ?)**
- 1 FELDSINE PORPHYRY
  - 2 QUARTZ DIORITE
  - 3 LAUROPHANITE, MINETTES
- SYMBOLS**
- TECHNICAL DRILL HOLE (1975)
  - OUTCROP DRILL HOLE (PRE 1975)
  - FOLIATION ATTITUDE
  - FRACTURE ATTITUDE
  - FAULT
  - GEOLOGICAL CONTACT
  - WIERRED FAULT
- CP - Chalcopyrite  
 PY - Pyrite  
 MI - Magnetite

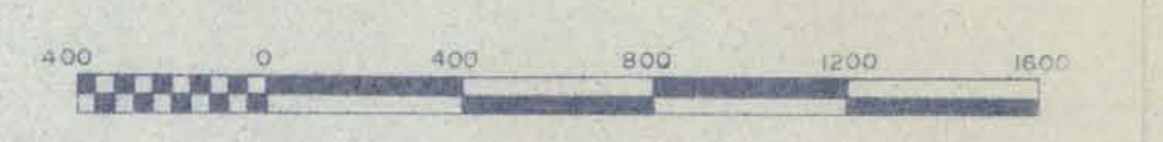
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M-3

Jim Baker B.Sc.

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 5830, MAP 3

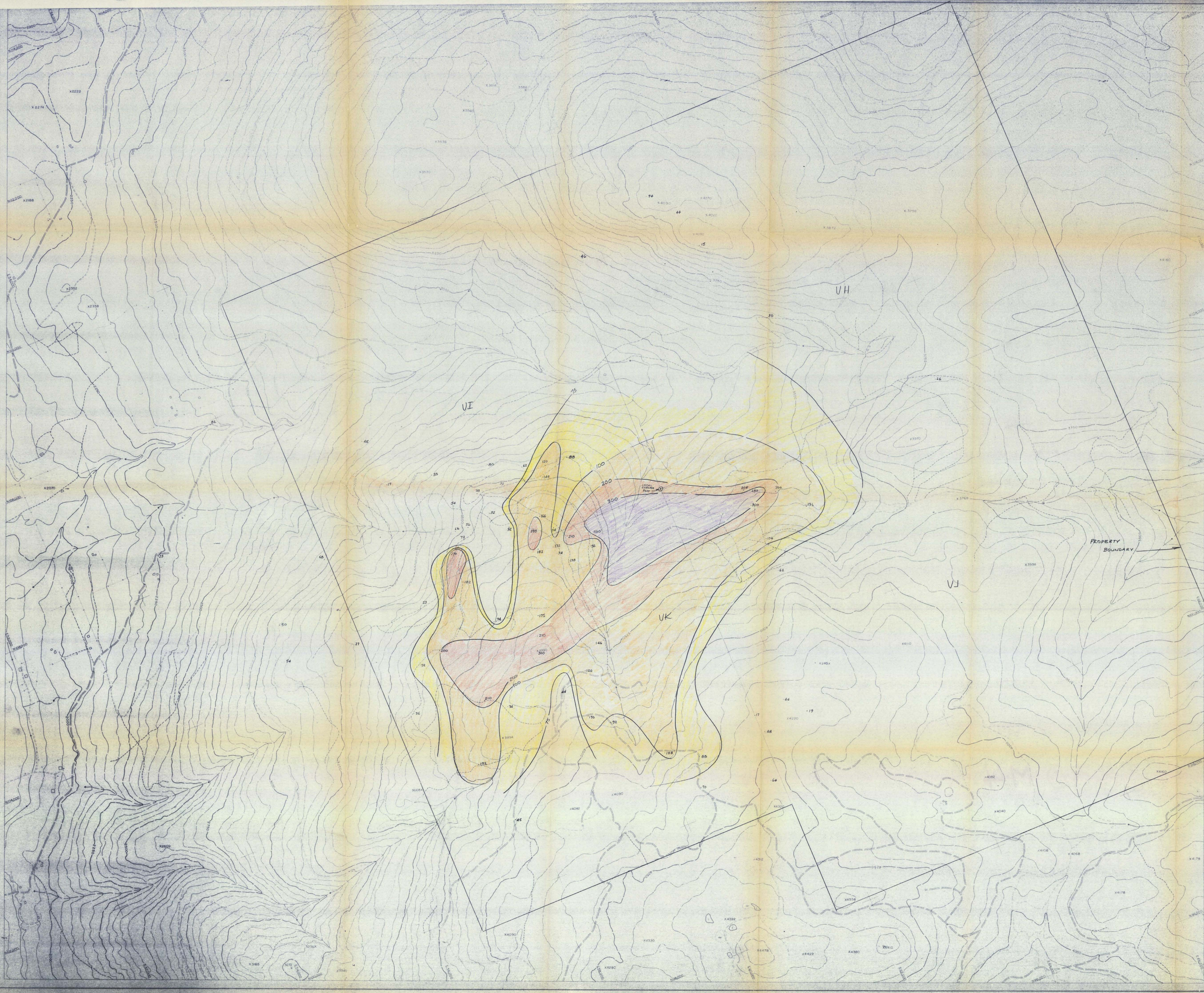
PRELIMINARY RECONNAISSANCE TYPE MAPPING  
 SCALE AND ELEVATION DATUM BASED ON LIMITED GROUND CONTROL  
 RESULTING IN GOOD RELATIVE, BUT UNCERTAIN ABSOLUTE MAP  
 ACCURACY  
 COMPILED FROM AERIAL PHOTOGRAPHY AT AN APPROXIMATE SCALE  
 OF 1 INCH EQUALS 2500 FEET FLOOR IN 1956  
 COMPILED BY  
 MELHARNEY SURVEYING & ENGINEERING LTD  
 REF. No. 05164-D



CANADIAN SUPERIOR EXPLORATION LIMITED  
 SMITHERS REGIONAL OFFICE  
 VERNON HILL PROJECT  
 GEOLOGY

SCALE: 1" = 400'    JS    DATE: APR 4, 1975

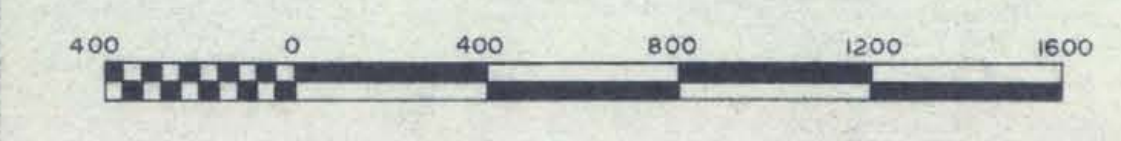




17 ppm Copper in Rock  
Contours @ 75ppm, 100ppm, 200ppm, 300ppm

**5830 M.4**  
John Baker B.Sc.

- PRELIMINARY RECONNAISSANCE TYPE MAPPING  
- SCALE AND ELEVATION DATUM BASED ON LIMITED GROUND CONTROL  
RESULTING IN GOOD RELATIVE, BUT UNCERTAIN ABSOLUTE MAP  
ACCURACY  
- COMPILED FROM AERIAL PHOTOGRAPHY AT AN APPROXIMATE SCALE  
OF 1 INCH EQUALS 2640 FEET FLOWN IN 1966  
- COMPILED BY  
MELHANNBY SURVEYING & ENGINEERING LTD.  
REF. NO. 0564-0



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VERNON HILL PROJECT

ppm Copper in Rock