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R. H. SERAPHIM ENGINEERING LIMITED  
GEOLOGICAL ENGINEERING

316 - 470 GRANVILLE STREET  
VANCOUVER 2, B.C.

REPORT  
on the  
HEATH and CAT CLAIMS  
TCHENTLO LAKE, OMINECA M.D.  
for  
NATION LAKE MINES LTD.  
of  
201 - 1595 Fifth Ave.  
PRINCE GEORGE, B.C.

by  
R.H. SERAPHIM, PH.D. P.ENG.  
316 - 470 GRANVILLE ST.,  
VANCOUVER 2, B.C.

June 18, 1973.

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HEATH AND CAT CLAIMS

TCHENTLO LAKE

OMINECA M.D.

SUMMARY AND CONCLUSIONS

The Heath and Cat groups, totalling 43 claims, are located near Tchentlo Lake, sixty-five miles northwest of Fort St. James B.C. Chalcopyrite mineralization accompanied by chlorite, pink feldspar, and epidote alteration has been found in a dozen or more outcrops within an area of approximately 6000 feet by 3000 feet. Geochemical surveys have indicated that the copper mineralization is widespread, probably continuing beyond the individual exposures currently known.

Some of the copper exposures are mineralized chloritic shear zones, with widths of one or two to as much as fifteen feet if some sections of barren material are included.

Grades in the shear zones are in the range of 1% to 5% or more copper. These shear zones strike northwesterly, and lie near the southwest contact of a 'phasey' dioritic to syenitic intrusive. Lower grade copper mineralization in the intrusive itself is associated with pink feldspar and epidote alteration.

The only work completed towards subsurface exploration is a few hand-trenches dug across the shear zones by the original prospector. The geological, geochemical, and geophysical surveys completed have added some background information, but have not been followed up.

The copper showings of major interest, and the associated geochemical anomalies are found mostly on the Heath 1 to 11 claims, as shown on the accompanying sketch. The Cat 24 to 26 claims are not included in the recommended program.

## RECOMMENDATIONS

Further exploration is recommended to determine if a group of the shear zones form an area or areas with grades sufficiently high; or if the disseminated copper mineralization in the intrusives is sufficiently widespread and good grade in some areas to make bulk mining attractive.

An induced polarization survey should, because of the relative scarcity of pyrite, provide a more precise target regarding the location of copper mineralization within the geochemical anomalies. The I.P. might also provide information on whether or not the mineralized shear zones are in places closely enough spaced to make a zone with overall widths attractive for large scale mining.

More precise outcrop mapping, particularly with emphasis on mineralization and alteration, would also provide better information on the potential mineralization in the many and extensive areas of overburden. These surveys could be limited, initially at least, to the areas where the better geochemical anomalies have been obtained.

Several zones of copper mineralization, with the more widespread associated alteration, such as that near the baseline at 1600 N., likely continue under the overburden. These zones are prime targets for trenching by bulldozer or backhoe, and should be trenched along with targets developed by the I.P. survey and the detailed geological mapping.

Diamond drilling would be contingent upon favorable results from the trenching, and is therefore listed as 'Phase Two' program.

COSTS

Phase One

I.P. Survey, 12 line miles at \$400/mile	\$ 4,800.00
Geological Mapping & Brunton survey of claim group perimeters	1,500.00
Bulldozing - 300 hours @ \$30/hour	9,000.00
Transportation 'dozer in and out	6,000.00
Camp Supplies, equipment, subsistence	3,000.00
Transportation, communication, expedition	<u>3,000.00</u>
	\$ 27,300.00
Contingency approx.	<u>2,700.00</u>
	\$ 30,000.00

Phase Two

Diamond Drilling - 2,000, ft @ \$20.00	
overall cost	<u>\$ 40,000.00</u>
	<u><u>\$ 70,000.00</u></u>



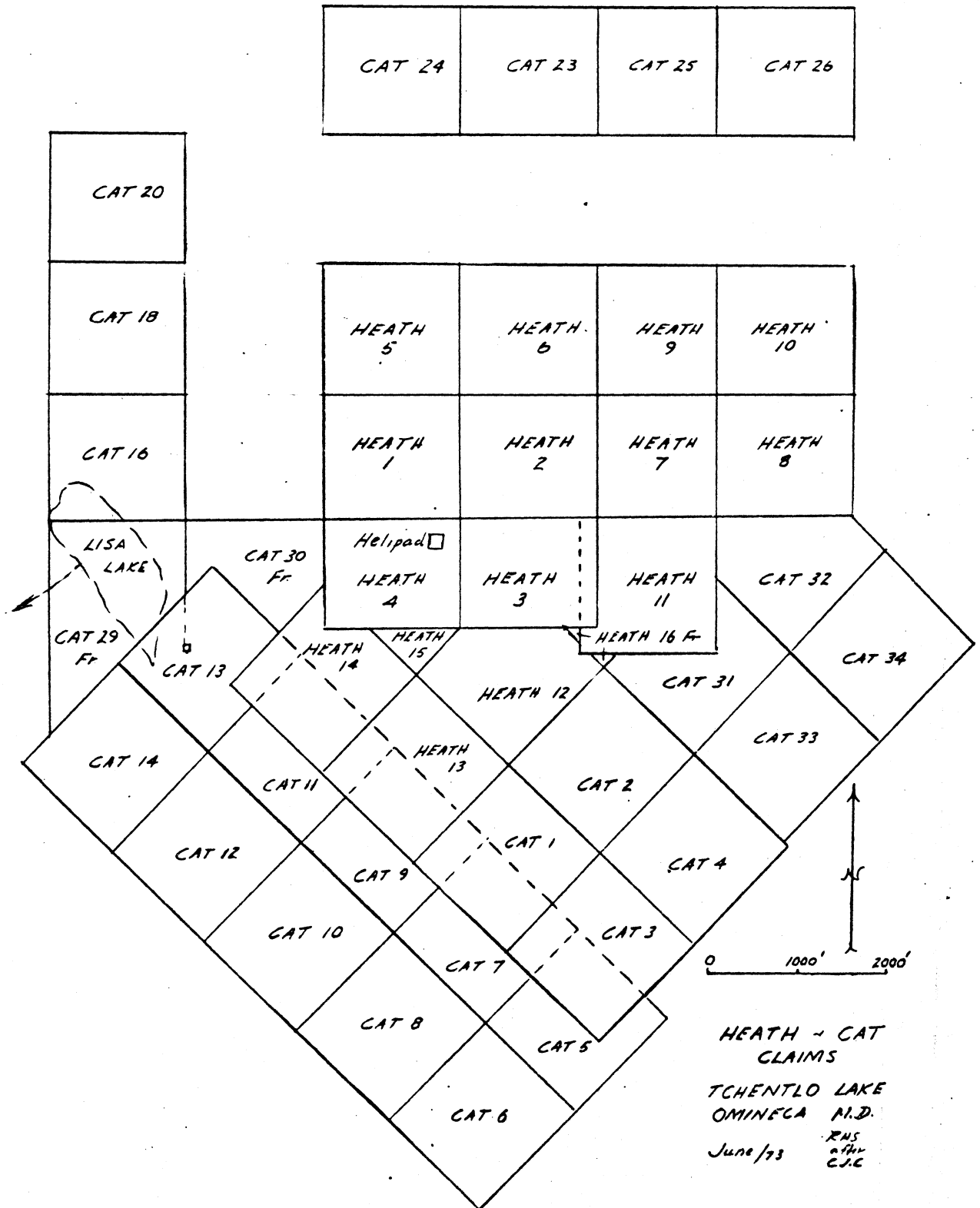


INTRODUCTION

The Heath copper prospect was examined initially on October 8, 1969. A report dated January 2, 1970 for Senate Mining covered this examination and subsequent further claim acquisition. A second examination was completed on June 16, 1973. The copper mineralization observed on the initial examination had been exposed further by some additional hand trenching, but otherwise the surface had not been altered. The claim holding was changed due to some optioned ground being dropped, and some new claims being located.

The information gained from the initial examination, information obtained from Senate Mining concerning their magnetic, geological, and geochemical surveys, and information obtained from the recent examination is summarized herein.

1P (12.2 miles)



CLAIMS

The 16 Heath claims examined originally and reported under option from C.J. Campbell to Nation Lake Mines are listed as follows under the name of C.J. Campbell in the Vancouver Records Office:

<u>Name</u>	<u>Record No.</u>	<u>Expiry Date</u>
Heath 1-4	61647-61650	Aug. 6, 1974
Heath 5-6	62461-62462	Aug. 17, 1973
Heath 7-11	63404-63408	Sept. 13, 1973
Heath 12-15	78882-78884	Aug. 21, 1973
Heath 15 Fr.	78885	Aug. 21, 1973
Heath 16 Fr.	78886	Aug. 21, 1973

The further 27 Cat claims which were staked in 1972 and which are also under option from C.J. Campbell to Nation Lake Mines are listed as follows:

<u>Name</u>	<u>Record No.</u>	<u>Expiry Date</u>
Cat 1-14	114367-114380	Aug. 10, 1973
Cat 16, 18, 20	114381, 114382, 114383	Aug. 10, 1973
Cat 23-26	114384-114387	Aug. 10, 1973
Cat 29 Fr.	114388	Aug. 10, 1973
Cat 30 Fr.	114389	Aug. 10, 1973
Cat 31-34	114390-114393	Aug. 10, 1973

LOCATION AND ACCESS

The property is on the west slope of Mount Nation, and on the east shore of Tchentlo Lake, at 55°15' N latitude and 125°15' W longitude. Access at present is easiest by helicopter or float plane from Fort St. James, which is 65 air miles to the southeast. The P.G.E. railroad extension to Takla lake will pass about 20 miles west of the property. The old Sylvester Creek road, which leads from the Fort St. James - Germansen road, is about 30 miles to the east of the property.

TOPOGRAPHY AND TIMBER

The claim groups are located on a southwest to west facing hillside, at 3000 to 4000 feet elevation. Timber is thick and some swamps exist on the lower claims. Rock outcrop makes less than 10% of the area, and is most abundant at the higher elevations.

## HISTORY

The copper mineralization was a new discovery by Colin Campbell in 1968. Campbell has completed a dozen or so hand trenches. Amax Exploration completed geochemical and geological surveys in 1969. Senate Mining's work included some further geochemical and geological surveys, and a magnetic survey. The claims covering most of the known mineralization reverted to Campbell in 1972, and were optioned to Nation Lake Mines.

## REGIONAL GEOLOGY

Geological Survey of Canada Maps 907 A and 42-11 A show that the property lies on or near the contact of the Omineca Intrusions with Triassic 'Takla' andesites. The Pinchi Fault, one of the major fault zones in British Columbia, trends northwesterly near the west boundary of the property.

LOCAL GEOLOGY

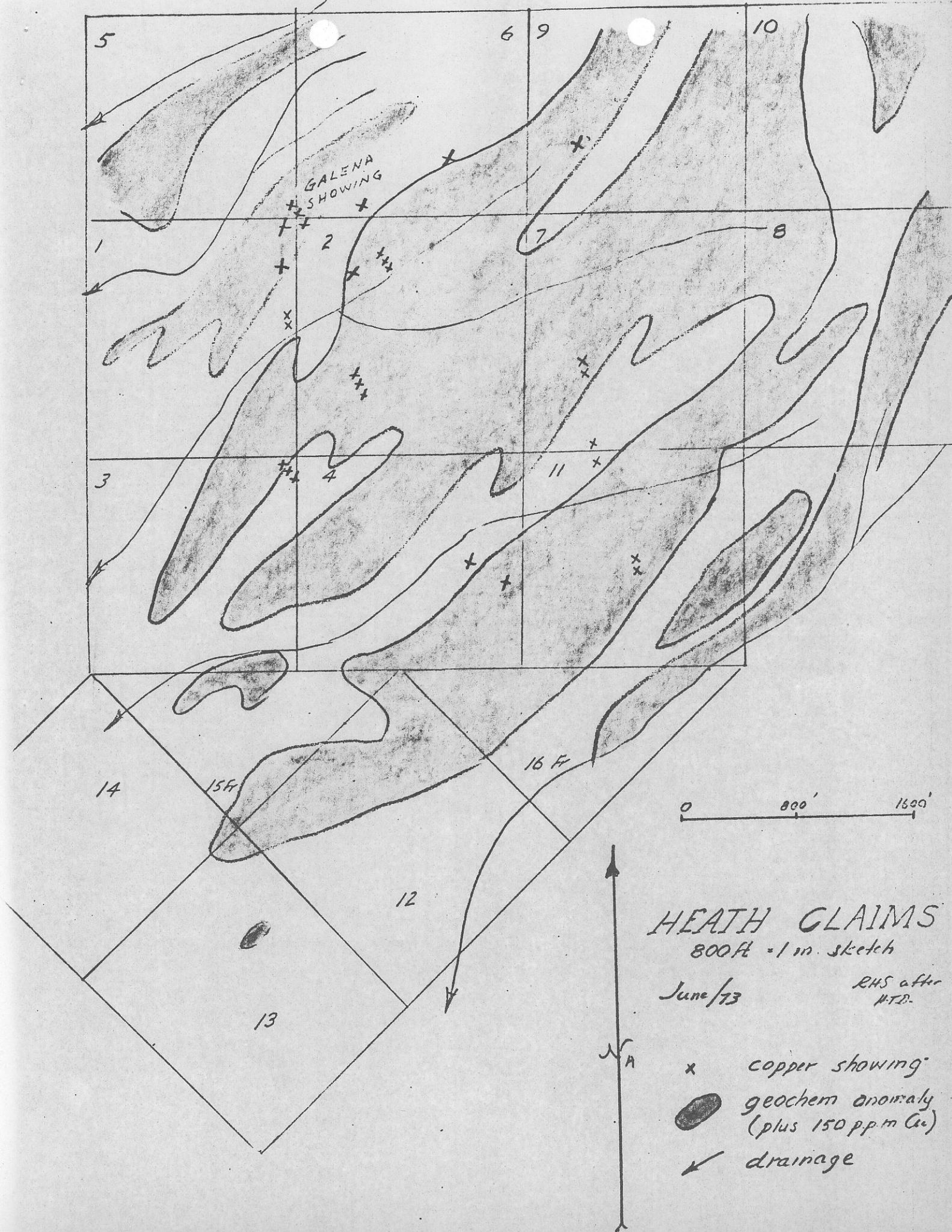
The rock types observed on the Heath 1 to 16 claims include hornblende biotite diorite, syenite, and andesitic volcanics. The diorite is in places very coarse grained, dark green to grey in color, and locally contains unusually abundant magnetite. The syenite is medium to fine-grained, pink to grey, and may intrude the diorite or may be a related phase of the same intrusion. Only one small outcrop of andesite was observed; it is massive, dark-green, and typical of the Triassic Takla and Nicola andesites found in most of the copper belts in the province. The distribution of these rock types is not yet determined, but the diorite was found chiefly in the southwest and the syenite in the north and east parts of the claims. Pink feldspathic alteration, in places with epidote, chlorite and pyrite, was noted in several outcrop areas.

### MINERALIZATION

Chalcopyrite was observed in a dozen or more areas on the part of the claim group examined. It occurs in northwest striking shear zones in the diorite, and as a sparse dissemination (in the order of 0.1% Cu or less) in one or two exposures of the syenite. A sample across seven feet, one of the widest mineralized shear zones showing in a trench, assayed .03 oz gold, 1.3 oz silver, and 3.25% copper. Minor galena and sphalerite were found with chalcopyrite in another hand trench, and a character sample of this mineralization assayed 0.02 ounces gold, 3.4 ounces silver, 0.15% copper and 0.3% lead. Several small outcrops with copper mineralization and gossan are grouped in the vicinity of the galena showing. This is one of the areas recommended for bulldozer trenching.

### GEOCHEMISTRY

A geochemical survey was completed over the Heath claims, and a summary of the results is shown herewith. Analyses showed more than 150 ppm Cu in more than half the samples. Some further geochemical surveying by Crest Laboratories confirmed the anomalous results, which are as abundant in topographic highs as they are in the drainages and swamps.



**HEATH CLAIMS**  
800 ft = 1 in. sketch

June/73

RHS after  
M.T.D.

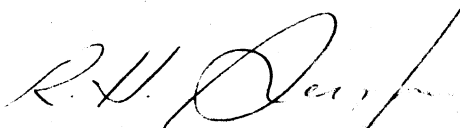
- x copper showing
- geochem anomaly (plus 150 pp.m Cu)
- ↘ drainage



GEOPHYSICS

A magnetic survey was completed over the Heath claims by Livgard Consultants. This survey does not indicate a good correlation between the magnetics, either high or low, with the geochemical anomalies. The magnetics does show lows near the copper mineralized shear zones in the volcanics. The configuration of the lows tends to confirm that these shear zones trend northwesterly, which information was previously deduced from the geology and topography. It is noteworthy that a magnetic low which is approximately 1000 feet wide extends for 2500 feet or more northwesterly in low ground near and west of the area of gossan and scattered mineralization near the 'galena showing'.

June 18, 1973.

  
R.H. Seraphim, Ph.D. P.Eng.

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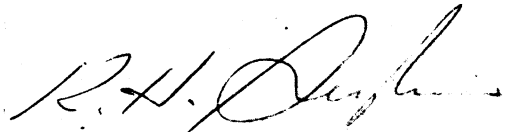
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CERTIFICATION

I, Dr. R.H. Seraphim, of the City of Vancouver, Province of British Columbia, hereby certify as follows:

1. I am a geological engineer residing at 4636 West 3rd Ave., Vancouver, B.C., and with office at 316-470 Granville St., Vancouver, B.C.
2. I am a registered Professional Engineer of British Columbia. I graduated from the University of British Columbia in 1947, and from Massachusetts Institute of Technology in 1951.
3. I have practiced my profession for 25 years.
4. I have no interest, direct or indirect, in the Heath and Cat groups of claims, or in the securities of Nation Lake Mines Ltd., or its affiliates, nor do I expect to receive any.
5. The above report is based on an October 8, 1969 examination of the Heath claim group, on a second examination June 15, 1973, and on the available government reports.
6. Claim posts for the Heath 1, 2, 3, 4, 5 and 6, and the Cat 23 and 24 were examined and found to be in accordance with the requirements of the Mineral Act. No indication of any contravention was discovered during the examination.

DATED at Vancouver, B.C. this 18th day of June, 1973.

  
R.H. Seraphim, Ph.D. P.Eng.