Geological and Geochemical Summary

Report on the Hat 1 and 2 Claim

Omineca Mining Division,
British Columbia

N.T.S. 93 K/16W
Longitude: 124°24' West
Latitude: 54°47' North

for

Grand America Minerals Ltd. (Owner)
501 - 540 Burrard Street
Vancouver, B.C.
V6C 2K1

and

Harvard Capital Corporation (Operator)
#402 - 1311 Beach Avenue
Vancouver, B.C.
V6E 1V6

December, 1990

Len P. Gal M.Sc.
Michael P. Moore B.Sc

Nicholson and Associates
Natural Resources Development Inc.

.c:32760

SUMMARY

The Hat claims are situated in the Omineca Mining Division at 54°47'North latitude and 124°24' West longitude, between Tezzeron and Inzana Lakes. The claim block comprises 40 units in two contiguous 20 unit blocks. The claims were staked in 1990 for Grand America Minerals Ltd., to cover a magnetic anomaly in favouable Upper Triassic to Middle Jurassic Takla Group rocks. Subsequent airborne magnetic-VLF survey performed for Nicholson and Associates in the spring of 1990 corroborated earlier government work and further defined the potential target zones for porphyry type mineralization.

In the fall of 1990, a ground follow up program was initiated by Nicholson and Associates on behalf of Harvard Capital Corp., which is earning an interest in the property. Prospecting, geochemical sampling and geological mapping of the property was performed over a one week period.

Outcrop was found to be sparse and mineralization limited. The property is underlain principally by volcanics and lesser sediments of the Takla Group, although most of the property is covered by a layer of glacial till. Gold values from stream sediment and rock samples were subanomalous. The highest copper value obtained was 214ppm in one rock sample. The only results of interest were a strong lead-zinc anomaly from a silt, and a nickel-chromium anomaly from a mafic - ultramafic intrusion (?). A small possible subcrop exposed a strongly potassic altered granitoid. If the exposure is in fact outcrop or sub-crop, it could represent the core of a classically altered porphyry type intrusion.

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INTRODUCTION

The Hat claims are situated at 54°47' North latitude and 124°24' West longitude on NTS map sheet 93K/16 W. Harvard Capital Corp. is earning an interest in the 40 unit claim block from Grand America Minerals Ltd.

A GSC airborne magnetic survey in 1961 indicated that the Hat claims were situated on the northern flank of a large northwest trending magnetic high west of Hat Lake. It was on the basis of this anomaly that the claims were staked for Grand America Minerals Ltd. An aeromagnetic survey was flown over the property in August of 1990 to reaffirm the magnetic high as well delineated related target zones just off the flank of the high. A VLF survey flown concomitantly yielded less definitive results.

Crews of Nicholson and Associates performed follow-up groundwork in the fall (October 7 - October 13) of 1990. Stream sediment sampling, prospecting and geological mapping were carried out. A total of seven silt samples and 18 rock samples were collected for analysis. Particular attention was given to areas coincident with geophysical anomalies, although it was found that outcrops in those areas were very rare.

LOCATION AND ACCESS

The Hat claim block is situated at longitude 124°24' West and latitude 54°47' North within the Omineca Mining Division (see Figure 1). The property is located 45km southwest of the Mt. Milligan gold-copper porphyry deposit. The property is accessible by road from Fort St. James by following the Manson Creek logging road north for 39 kilometers, then approximately 7 kilometers along the west branch of the Hat Lake access road which passes through the property. A number of spur roads off the Hat Lake road provide good access to much of the property, and in addition expose several small roadcuts.

GRAND AMERICA MINERALS

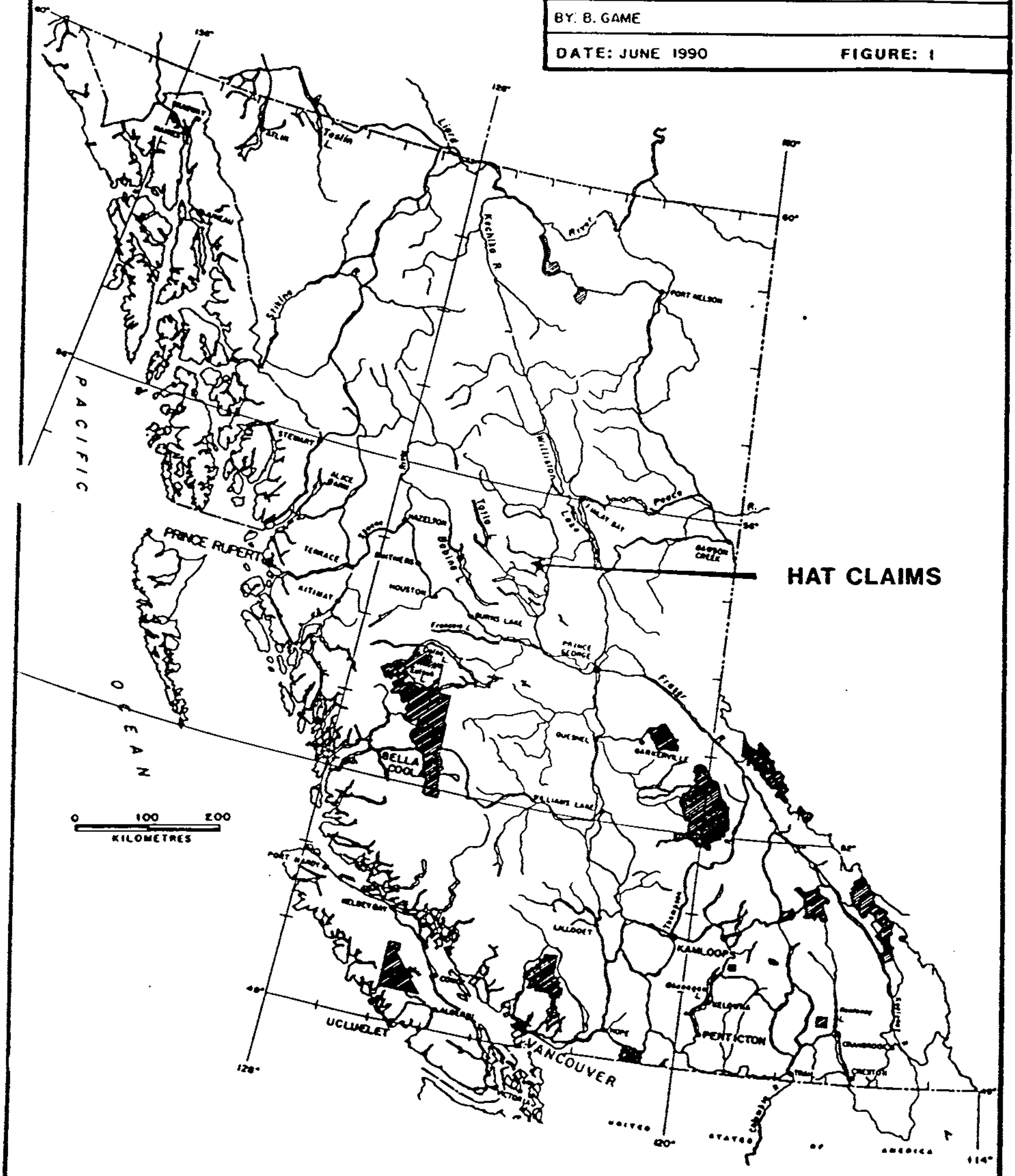
LOCATION MAP

HAT CLAIMS

OMINECA MINING DIVISION, B.C. NTS: 93 K/16

BY: B. GAME

DATE: JUNE 1990 FIGURE: 1

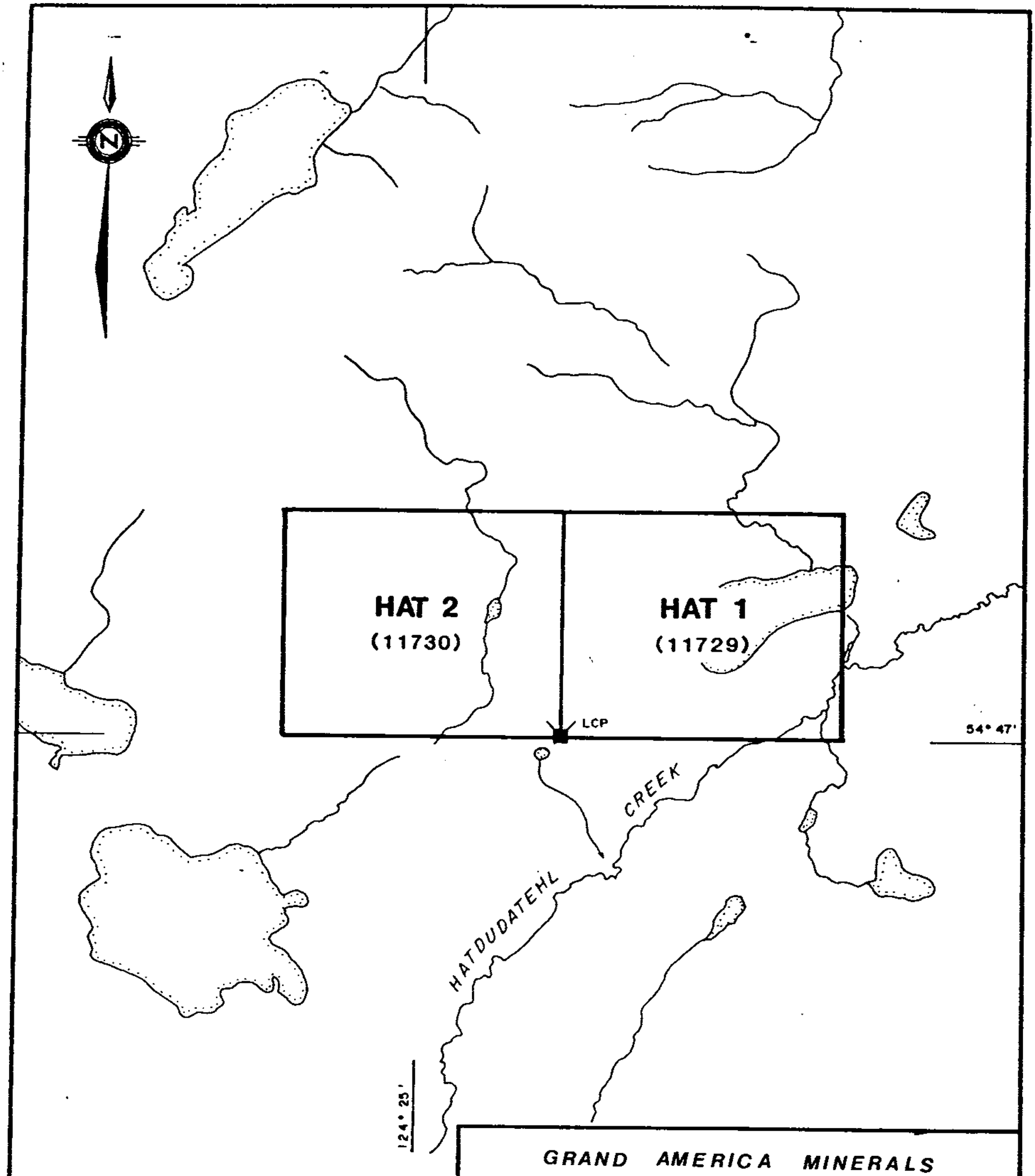


RWR

CLAIM STATUS

The Hat claim block consists of 2 - 4x5 unit claims, totalling 40 units. The claims were staked in April, 1990 in accordance with the new modified grid system. The pertinent claim information is summarized below. See Figure 2 for an outline map of the claim group.

Claim	Units	Record #	Mining Division	Date of Record
Hat 1	20	11729	Omineca	April 8, 1990.
Hat 2	20	11730	Omineca	April 8, 1990.



GRAND AMERICA MINERALS

HAT CLAIMS

OMINECA MINING DIVISION, B.C. NTS: 93 K/16W

CLAIM MAP

0 1 2 3 4 Km

SCALE 1:50 000

DATE: JUNE, 1990
BY: B.G./rwr

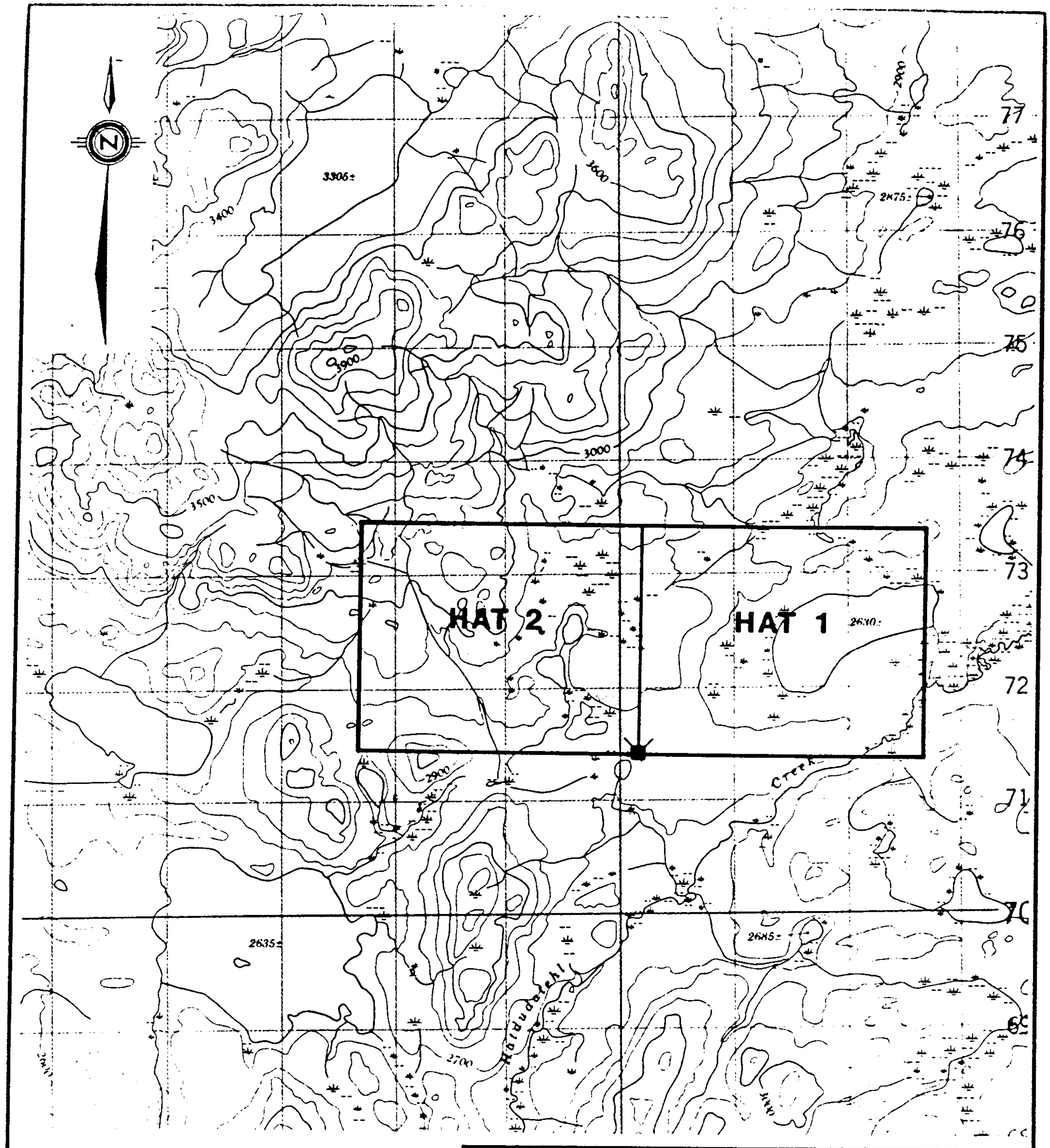
FIGURE No. 2

PHYSIOGRAPHY AND CLIMATE

The Hat claims are situated on the northern margin of the Interior Plateau. The range in elevation is only 152 m, from 802 m in the east end of the property to just over 945 m on several small knolls in the western part of the claim block (Figure 3).

The claim group is predominantly covered by mature stands of lodgepole pine with small stands of spruce, alder, cottonwood and poplar. Underbrush in forested areas is moderate but patches of underbrush can be very thick along drainages, and adjacent to swamps and small lakes. Swampy and marshy ground is common in the eastern and central portions of the property. Water is plentiful. Glacial overburden covers much of the area, and rock outcroppings are few and small.

The climate is moderate with hot dry summers and long cold winters. Precipitation averages 150 cm per year and snowfall can be heavy. The property is workable most of the year, although snowfall quickly obscures outcrops, so geological mapping and prospecting are generally limited from spring to fall.



GRAND AMERICA MINERALS

HAT CLAIMS

OMINECA MINING DIVISION, B.C. NTS: 93 K/16W

TOPOGRAPHIC MAP

0 1 2 3 4 Km

SCALE 1:50 000

DATE: JUNE, 1990
BY: B.G./rwr

FIGURE No. 3

HISTORY

The Hat Claims have seen little previous work. Much of the ground was previously held as recently as 1986 (Monday 1 and 2 claims), but an assessment report could not be found in government files. Remnants of flagged stations and diggings indicate that a soil sampling grid was established.

The GSC mapped the region in the 1940's (Armstrong et al., 1948, Map 907A, Figure 4). A regional airborne magnetic survey was conducted by the GSC in 1961 (Map 1583G, Figure 5).

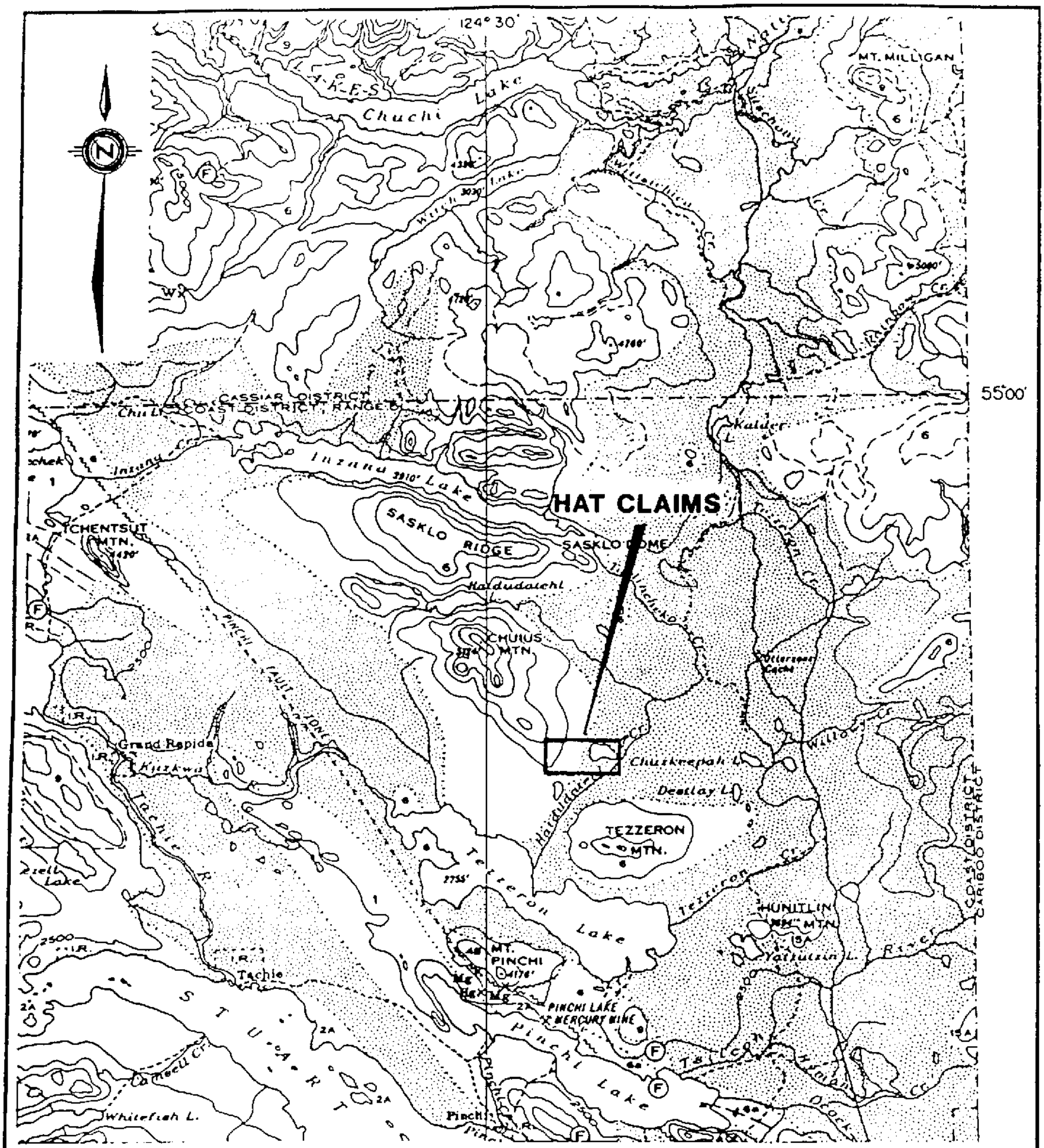
The Hat claims are located in the Omineca porphyry gold-copper district. This area has seen sporadic exploration activity until recently. During the 1960's, Falcon Bridge Ltd. discovered 2 million tons of ore grading 0.6% Cu on their Col property. In the next decade, Kennco's Lorraine property was found to have 10 million tons grading 0.67% Cu and .006 oz/ton Au. The only mine to reach production was the Pinchi Lake Mercury Mine (Cominco), located 25km south of the Hat claims on the Pinchi Fault zone.

The most significant find to date has been the Mt. Milligan copper-gold deposit (Continental Gold Corp.). Discovered in the late 1980's, Mt. Milligan has reserves over 385 million tons grading .016oz/ton gold and 0.22% copper. Since Continental's discovery the area has experienced a resurgence in activity and several new areas of mineralization have been identified. The Tas property (Noranda/Black Swan), located only 15km northeast of the Hat claims, has published drill results of 11.2 ft grading 1.25 oz/ton Au and 1.64% Cu, as well as 54' of trenching grading 0.12% Cu. Other significant showings in the area include the Chuchi property (BP Minerals/Digger Resources) with drill results of 328' grading 0.28% Cu and .009 oz/ton gold; the Indata property (Eastfield Resources) with 20' of 0.92 oz/ton gold, and the Snowbird gold property (X-Cal) on Stuart Lake, with approximate reserves of 300,000 tons grading 0.21 oz/ton gold.

REGIONAL GEOLOGY

The Hat claim group is covered in the regional map of Armstrong et al. (GSC Map 907A, 1948, Figure 4). The property is situated within the Intermontane Belt in the northwest trending Quesnel Trough. This graben is bounded on the west side by the Pinchi Fault. The Quesnel Trough hosts Upper Triassic to Lower Jurassic Takla Group volcanics and lesser sediments. Takla volcanics are dominated by andesite and basalt flows, pyroclastics and breccias with subordinate intercalated argillites, lithic sandstones and conglomerates. The volcanic strata are intruded by Upper Jurassic to Lower Cretaceous Omineca intrusions as at Mt. Milligan. The intrusions consist of comagmatic syenite to diorite stocks, and acid to basic dykes up to 100' thick.

Large areas of the region, and most of the property, are covered by considerable thicknesses of glacial and glaciofluvial drift.



After GSC Map 907A

GRAND AMERICA MINERALS

HAT CLAIMS

OMINECA MINING DIVISION, B.C. NTS: 93 K/16

REGIONAL GEOLOGY MAP

0 6 12

Scale 1" = 6 Miles

DATE: JUNE, 1990

BY: B.G./rwr

FIGURE No. 4

MESOZOIC

UPPER JURASSIC OR LOWER CRETACEOUS

OMINECA INTRUSIONS

9	*Granodiorite, quartz diorite, diorite; minor granite, syenite, gabbro, and pyroxenite*

JURASSIC AND (?) CRETACEOUS

TACHEK GROUP

8	*Andesite and andesite breccia; basalt and rhyolite*

PART OF HAZELTON GROUP

7	*Andesite, trachyte, basalt, and related breccias*

TRIASSIC AND JURASSIC

UPPER TRIASSIC AND LATER

TAKLA GROUP

6	*Andesitic and basaltic flows, tuffs, breccias, and agglomerates; interbedded conglomerate, shale, greywacke, limestone, and coal; 6a, shale, greywacke, conglomerate, tuff, and limestone (Upper Triassic)*

PALÆOZOIC

PERMIAN (?) AND/OR LATER

POST-MIDDLE PERMIAN, PRE-UPPER JURASSIC (?)

TOPLEY INTRUSIONS

5A-5C	*5A, granite and granodiorite* *5B, syenite* *5C, diorite*

POST-MIDDLE PERMIAN, PRE-UPPER TRIASSIC (?)

TREMBLEUR INTRUSIONS

4A, 4B	*4A, peridotite, dunite; minor pyroxenite and gabbro; serpentinized and steatized equivalents* *4B, pyroxenite, minor peridotite and gabbro; serpentinized and steatized equivalents.* *May be in part post-Triassic*

PENNSYLVANIAN (?) AND PERMIAN

CACHE CREEK GROUP

3	*Andesitic flows, tuffs, and breccias with minor basic intrusions (greenstones); chlorite and hornblende schists; minor argillite, chert, and limestone. May include some Takla group rocks (6)*
2A, 2B	*2A, ribbon chert, argillaceous quartzite, argillite, slate, greenstones similar to 3, limestone; minor conglomerate and greywacke; metamorphosed equivalents; small bodies of 4* *2B, argillite, slate, greenstones similar to 3; minor chert and limestone. Relation of 2B to 2A not known; both in part older than 1, and may be in part younger than 3*
1	*Massive limestone; minor argillite, slate, chert, and greenstone*

After GSC Map 907A

GRAND AMERICA MINERALS

HAT CLAIMS

OMINECA MINING DIVISION, B.C.

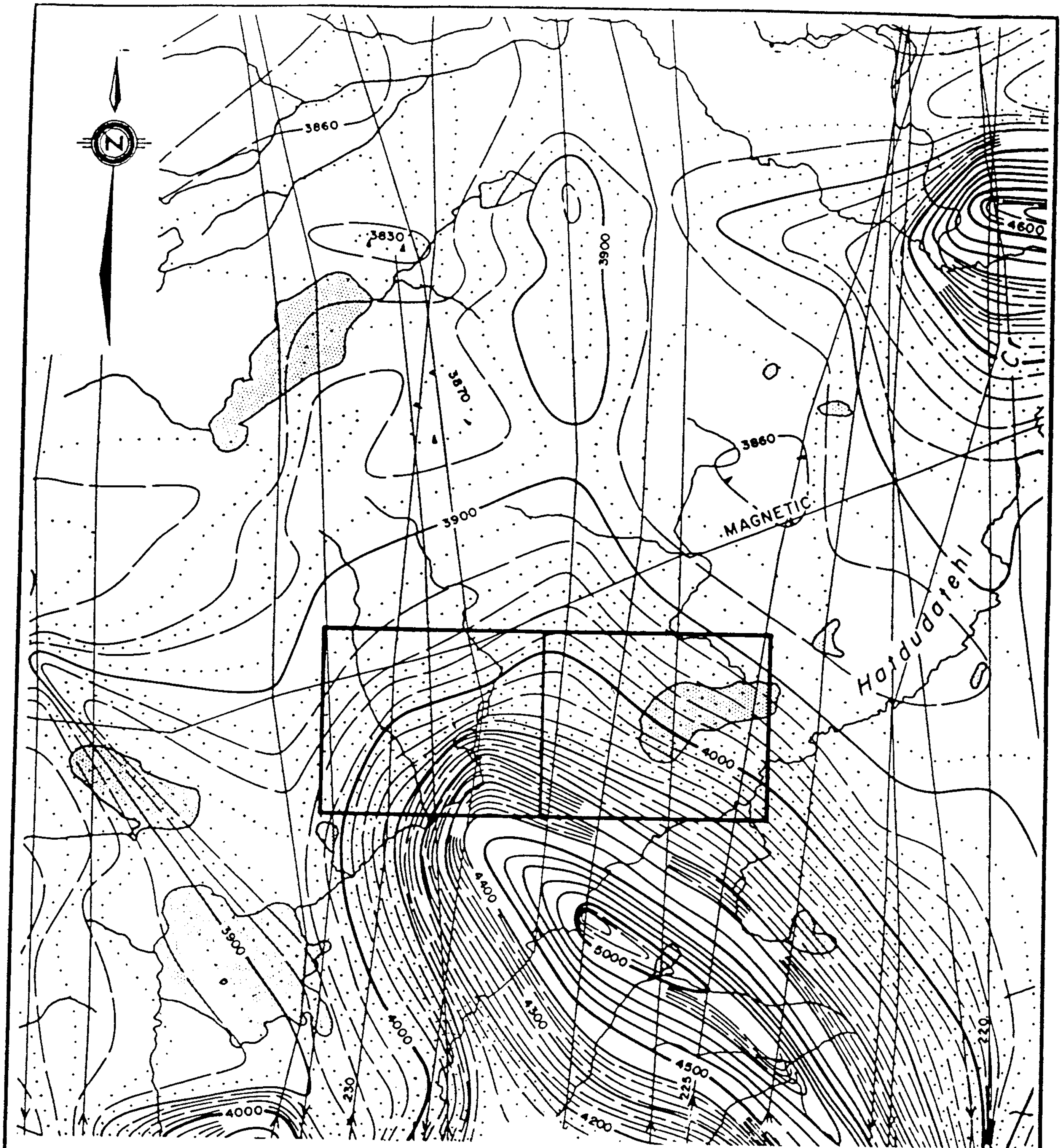
NTS: 93 K/16

LEGEND for FIGURE 4

DATE: JUNE, 1990

BY: B.G./rwr

FIGURE No.



GRAND AMERICA MINERALS

HAT CLAIMS

OMINECA MINING DIVISION, B.C. NTS: 93 K/16W

AEROMAGNETIC PLAN

MILES 0 1 2 3

1 : 63,360

DATE: JUNE, 1990
BY: B.G./rwr

FIGURE No. 5

LOCAL GEOLOGY

The Hat claims are underlain by intermediate to mafic volcanics and lesser sediments of the Upper Triassic to Middle Jurassic Takla Group. Outcrops are rare on the property, particularly the eastern half. The bulk of the exposed rocks are fine grained, black to medium green andesites and basalts. Plagioclase, hornblende and pyroxene phenocrysts are fairly common. Hornblende phenocrysts up to 1cm occur in some intermediate porphyries. The flow rocks are interbedded with intermediate plagioclase crystal and lapilli tuffs. The lapilli range up to 15mm in size. At one location, a hornblendite was observed (MCCR9). This dark green rock is composed of approximately 90% hornblende crystals 2-3mm in size. The geochemistry and fabric of this rock suggest that it is an intrusive, but it may be genetically related to the intermediate and mafic flows and porphyries. Plagioclase - hornblende gabbros outcrop at several locations. These fine to medium grained bodies could be hypabyssal feeder dykes to comagmatic tuffs and flows.

The only felsic rocks observed on the property were two small outcrops of a quartz - feldspar porphyry (rhyolite) in the southwest corner of the Hat 2 claim. At one outcrop, the rhyolite porphyry was in the footwall of a one meter wide fault zone separating rhyolite from chloritic intermediate tuffs. This was the only fault observed on the property. Other faults may be inferred from weak lineaments on airphotos, but the cover of glacial till hides these features and prevents unequivocal interpretation.

Sediments are subordinate to the volcanic rocks, outcropping in a north-northwest trending belt in the western part of the property. The sediments are generally thinly bedded with a good foliation in the argillites that is near parallel to bedding. Other lithologies include cherty siltstone, fine to medium grained lithic sandstone, arkosic sandstone, and minor carbonate pebble conglomerate, with 2cm carbonate pebbles in a sandy matrix. The sediments strike north-northwest and dip steeply both east and west. Just north of the property boundary, the approximate eastern contact between sediments and volcanics is inferred to be offset by a fault as it is apparently displaced by several hundred meters. However, no corresponding lineament was observed on airphotos.

At sample location HCLR10, an area of possible outcrop, about 10m in diameter was noted. In this area, many angular boulders of felsic intrusive rock, less than 1m across, occur. The angularity of the rubble contrasted with well rounded boulders found on the rest of the property. Most boulders were partly buried and it was not possible to ascertain whether they were float or subcrop. Coarse gravel derived from the intrusive rock was also observed. It is likely that this exposure is the topmost, broken surface of a large buried boulder or an outcrop that is almost completely buried by glacial till.

If these rocks are outcrop or subcrop, they are of some importance in that the rock type is a strongly potassic altered granite. It is comprised of potassium feldspar megacrysts up to 1cm long, with smaller 1-3mm potassium feldspar and 1-2mm biotite crystals in a greenish , epidotized quartz - feldspar matrix. The biotite crystals are unaltered in a matrix of slightly epidotized feldspar and may be secondary minerals themselves. This, coupled with the abundance of relatively fresh-looking potassium feldspar, is good evidence for potassic alteration. This type of alteration is classically found at the core of intrusions in porphyry-type mineralized zones.

Propylytic alteration is apparent in the volcanic rocks. Chloritization of intermediate and mafic volcanic rocks is very common. Epidote was noted as an alteration of plagioclase phenocrysts and rarely in thin fractures. Rusty-weathering carbonate alteration zones, consisting mainly of veins up to 30cm thick, were fairly common. Disseminated and stringer pyrite was also associated with the carbonate veins. Also locally abundant were white quartz veins. The quartz veins were generally thinner and of more random orientation than carbonate veins at a given outcrop. Sulphide mineral associations with quartz veins were not observed.

The thick deposits of glacial till that cover much of the property also mask structural features that might otherwise be apparent from aerial photos. A number of glacial ridges, perhaps eroded drumlins, can be seen in such photos to cover the northern and western portions of the property. Their long dimensions trend 070°, parallel to the direction of Pleistocene ice travel. A couple of north and northwest trending lineaments are weakly expressed on the photos and may be buried faults. The stronger of these lineaments is indicated on Figure 6.

MINERALIZATION

Mineralization is confined mainly to the volcanic rocks. Pyrite and lesser pyrrhotite occur as disseminations, replacement minerals, and less commonly as fine stringers, less than 1mm wide. Chalcopyrite was only rarely reserved in minor amounts. Sediments are more weakly mineralized than volcanic rocks with disseminated pyrite and pyrrhotite.

GEOCHEMICAL SURVEY RESULTS

A total of seven silt samples and 16 rock samples were collected for analysis. Sample sites were marked with flagging tape and samples were placed in numbered plastic bags and shipped to Min-En Labs in North Vancouver for geochemical analyses. Analytical and preparation techniques, and results, are summarized in Appendix iv. Gold, copper, and arsenic values for each sample are plotted on Figure 7.

A maximum of 2.7 ppm silver was obtained from silt sample HCLS-1, and 2.8 ppm from rock HCLR-1. Arsenic values were low, with the exception of one silt (HCLS-4, 33ppm As) and one rock (HCLR-91, 16ppm). Copper values from silt samples did not exceed 97 ppm. The maximum copper value from a rock was 214 ppm (HCLR-02). Gold values did not exceed 5ppb in any sample. Highly anomalous lead and moderately anamalous zinc values were returned from HCLS-7 (556ppm Pb and 232ppm Zn). Maximum values of lead and zinc from rock samples were 73ppm and 131ppm respectively. The anomalous silt sample is interesting in that two other samples from the same stream (HCLS-1 and 2) did not have anomalous results and neither galena nor sphalerite were observed in any rock samples on the property.

One slightly anomalous Sb value of 11ppm was obtained from HCLR-12. A sample from the previously mentioned hornblendite (HCLR-9) yielded strongly anomalous nickel (192ppm) and chromium (429ppm). This is evidence that the rock may be part of an ultramafic body, perhaps occupying a fault zone that is partly suggested by a weak lineament on the airphotos.

AIRBORNE GEOPHYSICAL SURVEY RESULTS

An airborne magnetic and VLF-EM survey was flown over the property in the spring of 1990 (Carbone, 1990). East - west lines were flown at 100m spacings. Colour contour plots of total magnetic field, calculated vertical gradient and VLF-EM total field results were produced (Appendix vi).

Total field magnetics

The total field magnetic values in the survey area vary over a range from 57,900 to 58,610 nanoteslas. The Hat property is dominated by a strong high on the south central portion of the claim block. Two small "satellite" knobs (magnetic highs) are apparent to the north of the main magnetic high. The main magnetic high is flanked to the northwest and northeast by magnetic lows.

The magnetic highs are interpreted to be representations of intrusive bodies which could be a source of mineralizing fluids in a porphyry type system. The flanks of these magnetic highs and especially those peripheral areas with numerous strong "satellite" nodes are the main areas of interest.

Calculated Vertical Gradient

The vertical magnetic gradient calculation has the effect of removing the regional background and of emphasizing and providing greater resolution of shallow, closely spaced features. The zero contour level roughly corresponds to the contact between rocks of differing magnetic susceptibilities (Carbone, 1990). The above characteristics make the vertical gradient data useful in that a contour map may be used as a pseudo-geology map.

The eastern portion (Hat 1) of the property is difficult to interpret since no strong continuous trends are evident. The Hat 2 claim does, however, reveal a possible geological feature trending in a northwest-southeast direction. In addition, the magnetic high apparent in the total field magnetic plot is more enhanced in the vertical gradient plot. The northern flank of the anomaly is very steep in passing through the zero contour, which lends further credence to the possibility that this steep flank represents a contact between intrusive and volcanic rocks along the southern boundary of the property.

VLF-EM Total Field

Examination of the VLF-EM contour map reveals a moderate northwest-southeast trending lineament on the western portion of the Hat 2 claim. This anomaly roughly correlates with: 1) an inferred fault trace observed on aerial photographs and 2) the eastern lithologies contact between argillites and volcanics observed during the fall field work.

CONCLUSIONS AND RECOMMENDATIONS

The Hat property is underlain by intermediate to mafic volcanics of the Upper Triassic to Middle Jurassic Takla Group, including lesser sediments in a north-northwest striking, steeply dipping band near the western boundary of the property. A possible potassic altered granitoid may be partly exposed in the south central part of the Hat 2 claim. Major structural features are difficult to recognize due to the paucity of outcrops.

A total of twenty-three rock and silt samples were collected on the property. Precious metal values were not anomalous, nor were base metal values, with the exception of a silt sample that ran 556ppm Pb and 232ppm Zn. Copper values did not exceed 214ppm. A sample of hornblendite yielded high Ni and Cr values.

Target zones based on airborne magnetic survey were visited but outcrop was very sparse and not encouraging. Soils were examined in these target zones for signs of mineral enrichment or adequate soil development. In most cases, the soils were sands and fine gravels of glacial origin.

Despite the relatively disappointing results, from the standpoint of a copper/gold porphyry target, the geophysical anomaly (magnetic) is strong and warrants further investigation. It is proposed that further ground work be carried out, including an induced polarization (IP) survey, further prospecting and examination of float boulders, mapping any further outcrops encountered, and possibly soil sampling. The IP survey (and requisite linecutting) would be concentrated in the southern half of the property, covering the very steep flank of the magnetic high and the 'satellite' nodes associated with this high. Approximately 70km of cut lines would be required. Soil sampling could take place along these lines at 25 or 50m intervals. The ground geophysical and further geological and geochemical work could further delineate anomalies and possibly bring the property to the stage of drill target selection.

STATEMENT OF QUALIFICATIONS

I, Leonard P. Gal, of 3373 West Seventh Avenue, Vancouver, British Columbia, V6R 1V9 do hereby certify that:

1/ I am a contract geologist in the employ of Nicholson and Associates, Natural Resource Development Inc., with offices at #606-675 West Hastings Street, Vancouver, B.C.

2/ I am a graduate of the University of British Columbia (B.Sc. Geology) and the University of Calgary (M.Sc. Geology), and have worked in British Columbia and the Northwest Territories since 1986.

3/ I am the co-author of this report and my findings are based on work undertaken on the property between October 8 and October 11, 1990, and examination of published and unpublished reports.

4/ I have no interest, direct or indirect, in Harvard Capital Corporation, nor in any of its properties, nor do I expect to recieve any such interest.

5/ This report may be used by Harvard Capital Corporation in whole or in part, as so required.

Dated at Vancouver, British Columbia this 12th day of December, 1990

Leonard P. Gal, M.Sc.

STATMENT OF QUALIFICATIONS

I, Michael P. Moore of #56-1386 Nicola Street, Vancouver, B.C., hereby certify that:

1. I am a graduate of Carleton University with a Bachelor of Science (Honours) degree in Geology.
2. I have practised mineral exploration for the past six years in the provinces of Ontario, Quebec, Nova Scotia, New Brunswick, British Columbia and the Yukon and the state of Idaho, U.S.A.
3. I am an employee of Nicholson & Associates Natural Resource Development Inc. with offices at #606 - 675 W. Hastings Street, Vancouver, B.C.
4. The present report is based on study of published and unpublished reports as well as field work completed during the summer of 1990 while employed by Nicholson and Associates.
5. I have not received, nor do I expect to receive, any interest, direct and indirect, in the properties or securities of Harvard Capital Corporation or in those of their associated companies.
6. Harvard Capital Corporation and their affiliates are hereby authorized to use this report in, or in conjunction with, any prospectus or statement of material facts.

Dated at Vancouver, B.C. this 12th day of December, 1990.

Michael P. Moore, B.Sc.

REFERENCES

Armstrong, J.E., Gray, J.G., Lang, A.H. et al. (1948). Fort St. James map area (Map 2094), Geological Survey of Canada, 1948.

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APPENDIX II

STATEMENT OF COSTS

STATEMENT OF COSTS

PROJECT: Hat 1,2 Claims for Grand America Minerals

PERIOD: Aug. 16 - Dec. 1990

Personnel	
___ man days @ $275/day	
6.5 man days @ $240/day (Len Gal)	1,560.00
11 man days @ $225/day (C. Lynes)	2,475.00
2 man days @ $215/day (M.Beaupre)	430.00
Helicopter	
___ hours @ ______/hour (fuel included)	N/A
Room and Board	
19 man days @ $ 65/day	1,235.00
___ man days @ $40/day (fly camp)	
Vehicle	
~~@ $1,350/month~~ 11 days/$50/day	550.00
Field Supplies	
--- days @ $20/man/day	100.00
Samples	
18 Rock @ $20/sample	360.00
___ Soil @ $20/sample	
7 Silt @ $20/sample	140.00
Mob./Demob.	1,200.00
Office (Report prep. / Filing fees)	1,400.00
Miscellaneous	
1. Airbourne Mag, VLF-EM Survey)	7,850.00
2. Fuel	160.00
3. Handheld radios 19 days/$8/day	152.00
Subtotal	
Contingency	
TOTAL TO DATE	17,612.00

E. & O.E.

APPENDIX IV

ASSAY TECHNIQUES AND RESULTS

MINERAL
• ENVIRONMENTS
LABORATORIES

Division of Assayers Corp. Ltd.

GOLD ASSAY PROCEDURE:

Samples are dried @ 95 C and when dry are crushed on a jaw crusher. The 1/4 inch output of the jaw crusher is put through a secondary roll crusher to reduce it to - 1/8 inch. The whole sample is then riffled on a Jones Riffle down to a statistically representative 300 - 400 gram sub-sample (in accordance with Gy's statistical rules). This sub-sample is then pulverized on a ring pulverizer to 95% minus 120 mesh, rolled and bagged for analysis. The remaining reject from the Jones Riffle is bagged and stored.

Samples are fire assayed using one assay ton sample weight. The samples are fluxed, a silver inquart added and mixed. The assays are fused in batches of 24 assays along with a natural standard and a blank. This batch of 26 assays is carried through the whole procedure as a set. After cupellation the precious metal beads are transferred into new glassware, dissolved, diluted to volume and mixed.

These aqua regia solutions are analyzed on an atomic absorption spectrometer using a suitable standard set. The natural standard fused along with this set must be within 3 standard deviations of its known or the whole set is re-assayed. Likewise the blank must be less than 0.015 g/tonne.

OFFICE AND LABORATORIES:
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CANADA V7M 1T2

PHONE: (604) 980-5814 (604) 988-4524
TELEX: VIA USA 7601067
FAX: (604) 980-9621

MINERAL
• ENVIRONMENTS
LABORATORIES

Division of Assayers Corp. Ltd.

ANALYTICAL PROCEDURE REPORT FOR ASSESSMENT WORK

PROCEDURE FOR AU, PT OR PD FIRE GEOCHEM

Geochemical samples for Au Pt Pd are processed by Min-En Laboratories, at 705 West 15th St., North Vancouver, B. C., laboratory employing the following procedures:

After drying the samples at 95 C, soil and stream sediment samples are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis. The rock samples are crushed and pulverized on a ring mill pulverizer.

A suitable sample weight; 15.00 or 30.00 grams is fire assay preconcentrated. The precious metal beads are taken into solution with aqua regia and made to volume.

For Au only, samples are aspirated on an atomic absorption spectrometer with a suitable set of standard solutions. If samples are for Au plus Pt or Pd, the sample solution is analyzed in an inductively coupled plasma spectrometer with reference to a suitable standard set.

OFFICE AND LABORATORIES:
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MINERAL
• ENVIRONMENTS
LABORATORIES

Division of Assayers Corp. Ltd.

AG, CU, PB, ZN, NI, AND CO ASSAY PROCEDURE:

Samples are dried @ 95 C and when dry are crushed on a jaw crusher. The -1/4 inch output of the jaw crusher is put through a secondary roll crusher to reduce it to -1/8 inch. The whole sample is then riffled on a Jones Riffle down to a statistically representative 300 - 400 gram sub-sample (in accordance with Gy's statistical rules). This sub-sample is then pulverized in a ring pulverizer to 95% minus 120 mesh, rolled and bagged for analysis. The remaining reject from the Jones Riffle is bagged and stored.

A 2.000 gram sub-sample is weighed from the pulp bag for analysis. Each batch of 70 assays has a natural standard and a reagent blank included. The assays are digested using a HNO3 - KCL04 mixture and when reaction subsides, HCL is added to assay before it is placed on a hotplate to digest. After digestion is complete the assays are cooled, diluted to volume and mixed.

The assays are analyzed on atomic absorption spectrometers using the appropriate standard sets. The natural standard digested along with this set must be within 3 standard deviations of its known or the whole set is re-assayed. If any of the assays are >1% they are re-assayed at a lower weight.

OFFICE AND LABORATORIES:
705 WEST FIFTEENTH STREET, NORTH VANCOUVER, B.C.

PHONE: (604) 980-5814 (604) 988-4524

MINERAL
• ENVIRONMENTS
LABORATORIES

Division of Assayers Corp. Ltd.

MERCURY ANALYTICAL PROCEDURE FOR ASSESSMENT FILING

Samples are processed by Min-En Laboratories at 705 West 15th St., North Vancouver, B. C., employing the following procedures.

After drying the samples @ 30 C, soil, and stream sediment samples are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis. The rock samples are crushed by a jaw crusher and pulverized by ring pulverizer.

A 0.50 gram subsample is digested for 2 hours in an aqua regia mixture. After cooling samples are diluted to standard volume.

Mercury is analyzed by combining with a reducing solution and introducing it into a flameless atomic absorption spectrometer. A three point calibration is used and suitable delutions made if necessary.

FFICE AND LABORATORIES:
5 WEST FIFTEENTH STREET, NORTH VANCOUVER, B.C.
ANADA V7M 1T2

PHONE: (604) 980-5814 (604) 988-4524
TELEX: VIA USA 7601067

MINERAL
• ENVIRONMENTS
LABORATORIES

Division of Assayers Corp. Ltd.

ANALYTICAL PROCEDURE REPORT FOR ASSESSMENT WORK:

PROCEDURE FOR TRACE ELEMENT ICP

Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cu,
Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb,
Sr, Th, U, V, Zn, Ga, Sn, W, Cr

Samples are processed by Min-En Laboratories, at 705 West 15th Street, North Vancouver, employing the following procedures.

After drying the samples at 95 C, soil and stream sediment samples are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis. The rock samples are crushed by a jaw crusher and pulverized on a ring mill pulverizer.

0.50 gram of the sample is digested for 2 hours with an aqua regia mixture. After cooling samples are diluted to standard volume.

The solutions are analyzed by computer operated Jarrall Ash 9000 ICAP or Jobin Yvon 70 Type II Inductively Coupled Plasma Spectrometers.

OFFICE AND LABORATORIES:
705 WEST FIFTEENTH STREET, NORTH VANCOUVER, B.C.
PHONE: (604) 980-5814 (604) 988-4524

COMP: NICHOLSON & ASSOC.
PROJ: HAT
ATTN: G.NICHOLSON

MIN-EN LABS — ICP REPORT

705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE NO: OV-1614-LJ1
DATE: 90/10/19
* SILT * (ACT:F31)

SAMPLE NUMBER	AG PPM	AL PPM	AS PPM	B PPM	BA PPM	BE PPM	BI PPM	CA PPM	CD PPM	CO PPM	CU PPM	FE PPM	K PPM	LI PPM	MG PPM	MN PPM	MO PPM	NA PPM	NI PPM	P PPM	PB PPM	SB PPM	SR PPM	TH PPM	U PPM	V PPM	ZN PPM	GA PPM	SN PPM	W PPM	CR PPM	AU PPB
HCLS-1	2.7	16950	7	37	162	.7	1	11260	.1	12	97	22380	680	32	8400	446	1	190	30	620	43	7	15	1	1	83.1	72	1	1	2	39	4
HCLS-2	1.8	13030	1	28	113	.3	1	10700	.1	12	34	29010	530	21	7480	1084	1	140	14	650	32	1	12	1	1	74.9	64	1	1	1	24	2
HCLS-3	1.8	17540	1	24	153	.5	1	12540	.1	15	58	30980	1120	21	7580	695	1	200	31	730	30	2	20	1	1	94.4	86	1	1	1	39	2
HCLS-4	1.8	17910	33	18	207	.5	1	12280	2.3	15	64	29960	1010	18	7920	788	2	180	39	650	36	3	18	1	1	89.5	89	2	1	1	36	1
HCLS-5	1.1	14850	1	14	111	.4	2	12600	.5	14	47	30090	960	15	8400	1002	1	140	19	700	27	1	24	1	1	85.8	69	1	1	1	20	5
HCLS-6	1.1	17740	1	14	164	.3	1	12500	.9	15	51	32310	1110	14	7930	1052	2	180	29	670	29	1	19	1	1	95.1	101	1	1	2	37	2
HCLS-7	1.0	12770	1	10	156	.3	1	10030	1.2	15	36	32760	960	8	6740	1330	1	230	30	640	556	1	16	1	1	82.5	232	1	1	2	39	3

COMP: NICHOLSON & ASSOC.
ROJ: HAT
ATTN: G.NICHOLSON

MIN-EN LABS — ICP REPORT

705 WEST 15TH ST., NORTH VANCOUVER, B.C. V7M 1T2
(604)980-5814 OR (604)988-4524

FILE NO: 0V-1614-RJ1
DATE: 90/10/19
* ROCK * (ACT:F31)

SAMPLE NUMBER	AG PPM	AL PPM	AS PPM	B PPM	BA PPM	BE PPM	BI PPM	CA PPM	CD PPM	CO PPM	CU PPM	FE PPM	K PPM	LI PPM	MG PPM	MN PPM	MO PPM	NA PPM	NI PPM	P PPM	PB PPM	SB PPM	SR PPM	TH PPM	U PPM	V PPM	ZN PPM	GA PPM	SN PPM	W PPM	CR PPM	AU PPB
HCLR-01	2.8	22420	1	18	52	.1	5	12540	.1	28	156	48490	450	23	16390	603	1	1230	25	960	31	1	23	1	1	143.6	82	1	1	2	71	2
HCLR-02	2.7	20770	1	8	71	.1	6	18920	.1	30	214	55590	5960	24	15710	540	1	720	6	1530	29	1	7	1	1	161.2	91	1	1	1	22	3
HCLR-03	1.3	11390	1	5	57	.2	1	34230	.1	23	105	47390	6370	5	19200	1077	1	570	5	1410	27	1	26	1	1	164.6	131	1	1	1	26	5
HCLR-04	2.1	26280	1	38	72	.1	6	14540	.1	30	143	62830	1400	14	16370	861	1	840	10	1440	17	1	110	1	1	168.5	81	1	1	1	31	2
HCLR-05	1.1	9310	1	1	386	.1	1	40150	.2	15	72	46350	370	4	19710	1372	1	120	1	800	46	1	81	1	1	105.9	104	1	1	1	28	1
HCLR-06	2.7	28210	1	14	59	.1	6	17430	.1	22	137	58660	1090	16	15740	736	4	630	3	1060	21	1	67	1	1	156.0	71	1	1	1	50	2
HCLR-07	2.3	31180	1	1	445	.1	4	37420	.1	32	63	59690	1860	30	31840	1119	1	410	24	840	23	1	62	1	1	213.0	62	1	1	2	83	1
HCLR-08	1.7	13460	6	7	35	.1	2	24390	.3	14	29	20780	370	5	9080	369	1	250	10	500	13	1	29	1	1	54.7	23	1	1	1	91	2
HCLR-09	1.4	23280	16	1	56	.4	1	18170	.1	25	32	28530	1640	19	40230	440	1	2200	192	980	21	1	31	1	1	73.9	38	1	1	4	429	2
HCLR-10	.3	13170	1	1	950	.7	1	6890	1.1	6	8	14150	4010	3	4490	497	2	810	9	690	25	1	34	1	1	26.6	77	1	1	1	53	1
HCLR-11	.1	10280	1	1	232	.3	1	2510	.1	5	8	9310	2090	4	1020	183	3	70	10	360	35	1	14	1	2	12.5	38	1	1	1	45	2
HCLR-12	.1	20280	1	5	272	1.7	1	4510	.1	21	91	37520	3900	12	2560	666	4	140	15	510	73	11	26	1	1	88.6	76	1	1	1	32	1
HCLR-13	2.0	29320	1	1	95	.1	4	28550	.1	29	115	54910	910	8	21710	911	1	480	21	890	25	1	43	1	1	206.6	48	2	1	1	42	3
HCLR-14	2.1	37050	1	1	80	.1	3	26140	.1	31	81	56500	460	11	26260	880	1	460	26	730	26	1	3	1	1	216.1	52	2	1	1	54	4
HLGR-355	2.5	28970	1	1	260	.1	7	16630	.1	25	54	52570	2590	20	22210	1430	1	620	17	780	20	1	16	1	1	139.8	77	1	1	1	20	1
HLGR-356	2.3	25660	1	1	53	.1	7	19070	.1	25	74	39260	1440	12	17270	605	1	690	12	950	21	1	33	1	1	126.8	33	1	1	1	54	1
HMBR-1	1.6	27320	1	1	94	.5	3	22320	.1	18	128	41310	2750	11	15070	965	1	1020	26	1080	31	1	12	1	1	116.9	66	2	1	1	39	2
HMBR-2	2.2	25780	1	1	110	.1	3	20060	.1	22	92	43800	3160	10	14470	910	1	1170	6	960	20	1	33	1	1	128.3	67	1	1	1	25	1

APPENDIX V

SAMPLE DESCRIPTIONS

ROCK SAMPLE DESCRIPTION RECORD

Page: 1 of 4 | Project: HAT | Location: | Operator: NICHOLSON

Sample No.	Location	Description	Au ppb.	Ag	Pb	Zn	Cu	Other
			Analytical Results ppm except Au					
HCLR-1		CHLORITIC GREEN FINE GRAINED VOLCANIC FLOW WITH SOME DISSEMINATED PYRITE (± PYRRHOTITE) BULL QUARTZ VEINS UP TO 2cm THICK	2	2.8	31	82	156	
HCLR-2		SIMILAR TO HCLR-1	3	2.7	29	91	214	
HCLR-3		SIMILAR TO HCLR-1 DISSEMINATED SULPHIDES.	5	1.3	27	131	105	
HCLR-4		RUSTY WEATHERED GREEN LAPILLI TUFF WITH ABUNDANT LAPILLI UP TO 15mm. DISSEMINATED PYRITE AND PYRRHOTITE AND PYRRHOTITE + VERY MINOR CHALCOPYRITE IN FINE FRACTURES.	2	2.1	17	81	143	
HCLR-5		RUSTY WEATHERING (CARBONATE ALTERED) ZONE NEAR HCLR-4	1	1.1	46	104	72	

ROCK SAMPLE DESCRIPTION RECORD

Page: 2 of 4		Project: HAT	Location:			Operator: NICHOLSON		
Sample No.	Location	Description	Analytical Results ppm except Au(ppb)					
			Au ppb	Ag	Pb	Zn	Cu	Other
HCLR-6		RUSTY WEATHERED GREY-GREEN VOLCANIC WITH DISSEMINATED PYRITE AND SOME FINE STRINGERS OF SULPHIDES. VARIABLY CHLORITE ALTERED.	2	2.7	21	71	137	
HCLR-7		CHLORITE - CARBONATE - QUARTZ ALTERED AND VEINED FLOW OR CRYSTAL TUFF. IN ROUGHLY NORTH TRENDING ZONE OF ABUNDANT CARBONATE VEINS AND SULPHIDE STRINGERS	1	2.3	23	62	63	
HCLR-8		SAME AS HCLR-7, 6m TO SE.	2	1.7	13	23	29	
HCLR-9		MEDIUM TO COARSE GRAINED HORNBLENDITE. MAINLY 90-90% INTERLOCKING 2-3mm HORNBLENDE CRYSTALS.	2	1.4	21	38	32	16 As 192 Ni 429 Cr
HCLR-10		FLOAT? OR SUBCROP OF POTASSIC ALTERED GRANITOID. K-SPAR MEGACRYSTIC GRANITE WITH 2mm UNWEATHERED BIOTITE (~5% MAFICS)	1	0.3	25	77	8	

ROCK SAMPLE DESCRIPTION RECORD

Page: 3 of 4	Project: HAT	Location:	Operator: NICHOLSON.

Sample No.	Location	Description	Au ppb	Ag	Pb	Zn	Cu	Other
HCLR-11		QUARTZ FELDSPAR PORPHYRY. PHENO-CRYSTS ~2mm. FELSIC VOLCANIC (RHYOLITE).	2	0.1	35	38	8	
HCLR-12		1m GOUGE ZONE (FAULT) TRENDING 056/22 SE. BETWEEN RHYOLITE AND CHLORITIZED INTERMEDIATE VOLCANIC IN HANGING WALL.	1	0.1	73	76	91	
HCLR-13		ALTERED (CHLORITIC) INTERMEDIATE VOLCANIC (TUFF?) ADJACENT FAULT ZONE.	3	2.0	25	48	115	
HCLR-14		PLAGIOCLASE - HORNBLENDE GABBRO WITH STRINGERS OF PYRITE	4	2.1	26	52	81	

Analytical Results ppm except Au

ROCK SAMPLE DESCRIPTION RECORD

Page:		Project: HAT (H)	Location:				Operator: NICHOLSON & ASSOCIATES	
Sample No.	**Location**	**Description**	**Analytical Results**					
			Au	**Ag**	**Pb**	**Zn**	**Other**	
HLGR355		DARK GREY-GREEN SILTSTONE, ARKOSE, GREYWACKE WITH SOME PYRITE REPLACEMENT (+ PYRRHOTITE) OF GRAINS IN ARKOSE.						
HLGR356		GREEN FINE GRAINED ANDESITE/BASALT. PLAGIOCLASE AND MAFIC PHENOCRYSTS WITH SOME CARBONATE VEINS AND A FEW DISSEMINATED PYRITE GRAINS						

APPENDIX VI

AIRBORNE GEOPHYSICAL TECHNICAL REPORT

REPORT ON
COMBINED HELICOPTER-BORNE
MAGNETIC AND VLF SURVEY
FORT ST. JAMES
BRITISH COLUMBIA

FOR
NICHOLSON & ASSOCIATES NATURAL RESOURCE DEVELOPMENT INC.
BY
AERODAT LIMITED
September 17, 1990

J9045

Adriana Carbone
Geologist

TABLE OF CONTENTS

<u>List of Maps</u>
(Scale 1:10,000)

Basic Maps: (As described under Appendix B of the Contract)

1. **TOPOGRAPHIC BASE MAP;**
   Prepared from available 1:50,000 NTS maps and photographically enlarged to 1:10,000 scale.

2. **FLIGHT LINE MAP;**
   Showing all flight lines and fiducials with the base map.

3. **TOTAL FIELD MAGNETIC CONTOURS;**
   Showing magnetic values corrected of all diurnal variation with flight lines, fiducials, and base map.

4. **VERTICAL MAGNETIC GRADIENT CONTOURS;**
   Showing magnetic gradient values calculated from the total field magnetics with flight lines, fiducials and base map.

5. **VLF-EM TOTAL FIELD CONTOURS;**
   Showing VLF total field response from the line transmitter with flight lines, fiducials, and base map.

1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Nicholson & Associates by Aerodat Limited. Equipment operated during the survey included a high sensitivity cesium vapour magnetometer, a two frequency VLF-EM system, a video tracking camera, radar altimeter, and an electronic positioning system. Magnetic and altimeter data were recorded both in digital and analog forms. Positioning data was stored in digital form, encoded on VHS format video tape and recorded at regular intervals in local UTM coordinates, as well as being marked on the flight path mosaic by the operator while in flight.

The survey area is located north of Fort St. James, British Columbia, and is referred to as the HAT Claim Group. The survey was flown on August 18, 1990. Data from one flight was used to compile the survey results. The flight line was oriented at an angle of 90 degrees, with a nominal line spacing of 100 metres (according to Appendix "A" of the contract). Geophysical information is provided in the form of maps at 1:10,000. Coverage and data quality were considered to be well within the specifications described in the service contract.

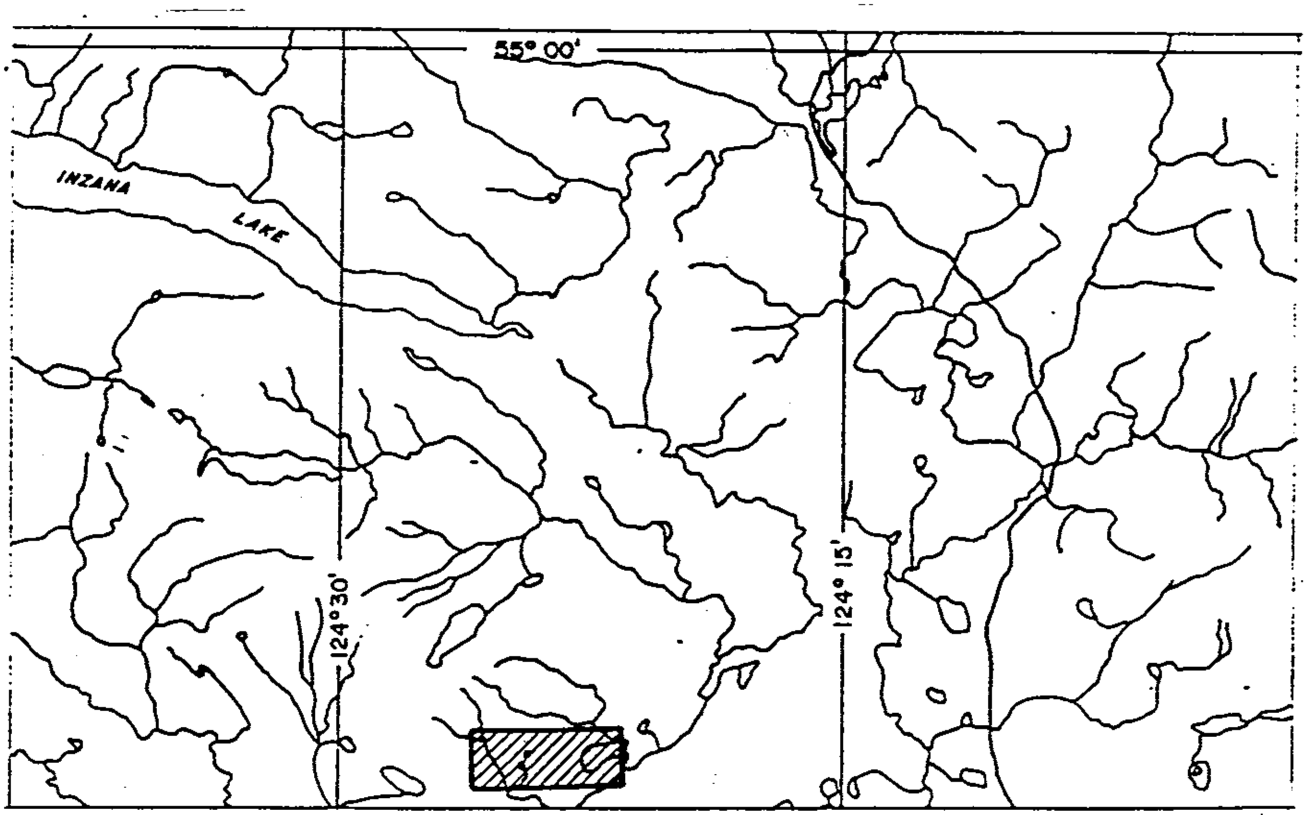
The purpose of the survey was to record airborne geophysical data over ground that is of interest to Nicholson & Associates.

The HAT claim consisted of 100 line kilometres of the recorded data that were compiled in a map form at a scale of 1:10,000. The maps are presented as part of this report according to specifications laid out by Nicholson & Associates.

2. SURVEY AREA LOCATION

The survey area is depicted on the following index map.

The HAT claim is centred at approximate geographic latitude 54 degrees 47 minutes North, longitude 124 degrees 24 minutes West.



HAT CLAIM GROUP

3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

An Aerospatiale A-Star 350 B helicopter, (C-GYHT), piloted by R. Mitchinson, owned and operated by Peace Helicopters Limited, was used for the survey. J. Moisan of Aerodat acted as navigator and equipment operator. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey equipment was flown at a mean terrain clearance of 60 metres.

3.2 Equipment

3.2.1 VLF-EM System

The VLF-EM System was a Herz Totem 2 A. This instrument measures the total field and quadrature component of the selected frequency. The sensor was towed in a bird 30 metres below the helicopter.

3.2.2 Magnetometer System

The magnetometer employed a Scintrex Model VIW 2321 H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument was 0.1 nanoTeslas. The sensor was towed in a bird 30 metres below the helicopter.

3.2.3 Magnetic Base Station

An IFG proton precession magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.4 Altimeter System

A King KRA 10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

3.2.5 Tracking Camera

A Panasonic video flight path recording system was used to record the flight path on standard VHS format video tapes. The system was operated in continuous mode and the flight number, real time and manual fiducials were registered on the picture frame for cross-reference to the analog and digital data.

3.2.6 Analog Recorder

An RMS dot-Matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data was recorded:

Channel	Input	Scale
VLT	VLF-EM Total Field, Line	25 %/cm
VLQ	VLF-EM Quadrature, Line	25 %/cm
VOT	VLF-EM Total Field, Ortho	25 %/cm
VOQ	VLF-EM Quadrature, Ortho	25 %/cm
RALT	Radar Altimeter	100 ft./cm
MAGF	Magnetometer, fine	25 nT/cm
MAGC	Magnetometer, coarse	250 nT/cm

3.2.7 Digital Recorder

A DGR 33:16 data system recorded the survey on magnetic tape. Information recorded was as follows:

Equipment	Recording Interval
VLF-EM	0.20 seconds
Magnetometer	0.20 seconds
Altimeter	0.20 seconds
Nav System	0.20 seconds

3.2.8 Radar Positioning System

A Mini-Ranger MRS-III radar navigation system was used for both navigation and flight path recovery. Transponders sited at fixed locations were interrogated several times per second and the ranges from these points to the helicopter were measured to a high degree of accuracy. A navigational computer triangulated the position of the helicopter and provided the pilot with navigation information. The range/range data was recorded on magnetic tape for subsequent flight path determination.

4. DATA PRESENTATION

4.1 Base Map

A topographic base at a scale of 1:10,000 was prepared from available 1:50,000 NTS maps and enlarged to the required scale.

4.2 Flight Path Map

The flight path was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second and the position of the helicopter was calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 metres with respect to the topographic detail on the base map.

The flight lines have the time and the navigator's manual fiducials for cross reference to both analog and digital data.

4.3 Magnetics

4.3.1 Total Field Magnetic Contours Map

The magnetic data from the high sensitivity cesium magnetometer provided virtually a continuous magnetic reading when recording at 0.2 second intervals. The system is also noise free for all practical purposes.

A sensitivity of 0.1 nanoTesla (nT) allows for the mapping of very small inflections in the magnetic field, resulting in a contour map that is equal to or exceeds ground data in quality and accuracy.

The aeromagnetic data was corrected for diurnal variations by adjustment with the digitally recorded base station magnetic values. No correction for regional variation was applied. The corrected data was interpolated onto a regular grid at a 25 metre true scale interval using an Akima spline technique. This grid provided the basis for threading the presented contours at a 2 nT interval.

The contoured aeromagnetic data has been presented on a Cronaflex copy of the base map with flight lines.

4.3.2 Vertical Gradient Contour Map

The vertical magnetic gradient was calculated from the total field magnetic data. Contoured at a 0.2 nT/m interval, the data was presented on a cronaflex copy of the base map with flight lines.

4.4 VLF-EM Total Field Contours

The VLF data was interpolated onto a regular grid at a 25 metre true scale interval using an Akima spline technique. This grid provided the basis for threading the contours at a 2% interval.

The VLF-EM signal from the line transmitting station was compiled as contours in map form on cronaflex copies of the base map with flight lines.

The VLF stations used were NSS, Annapolis, Md., U.S.A., broadcasting at 21.4 kHz and NAA, Cutler Maine, broadcasting at 24.0 kHz. NSS was used as the line transmitting station. NAA was used as the orthogonal station.

Respectfully submitted,

Adriana Carbone

September 17, 1990

Adriana Carbone
Geologist

APPENDIX I

PERSONNEL

FIELD

Flown	August, 1990
Pilot	Ron Mitchinson
Operator	Jep Moisan

OFFICE

Processing	A. Carbone G. McDonald
Report	A. Carbone

APPENDIX II

GENERAL INTERPRETIVE CONSIDERATIONS

Magnetics

A digital base station magnetometer was used to detect fluctuations in the magnetic field during flight times. The airborne magnetic data was levelled by removing these diurnal changes. The Total Field Magnetic map shows the levelled magnetic contours, uncorrected for regional variation.

The Calculated Vertical Gradient map shows contours of the magnetic gradient as calculated from the total field magnetic data. The zero contour shows changes in the magnetic lithologies and will coincide closely with geologic contacts assuming a steeply dipping interface. Thus this data may be used as a pseudo-geologic map.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground to depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

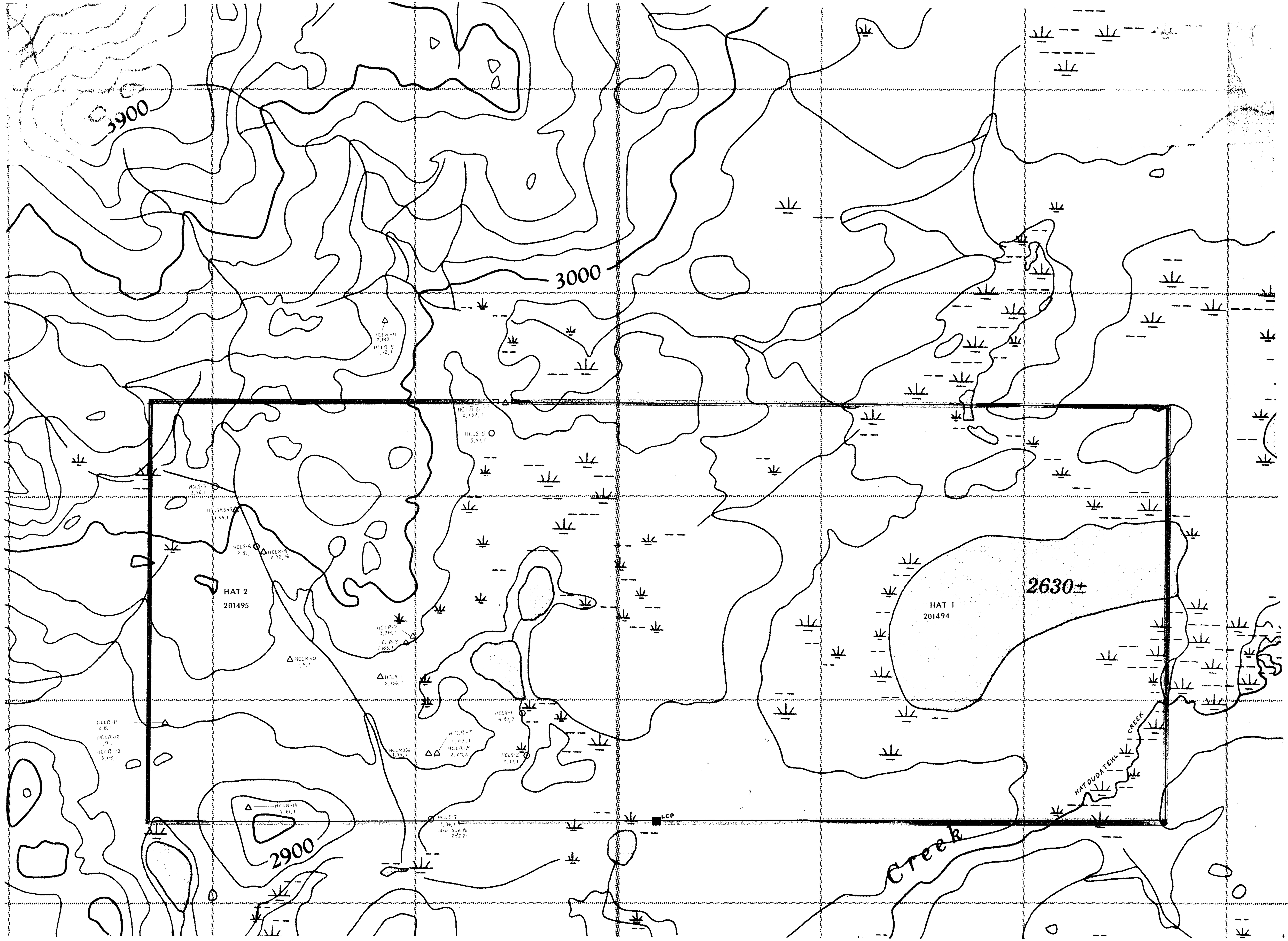
The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by thisaltered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase

shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

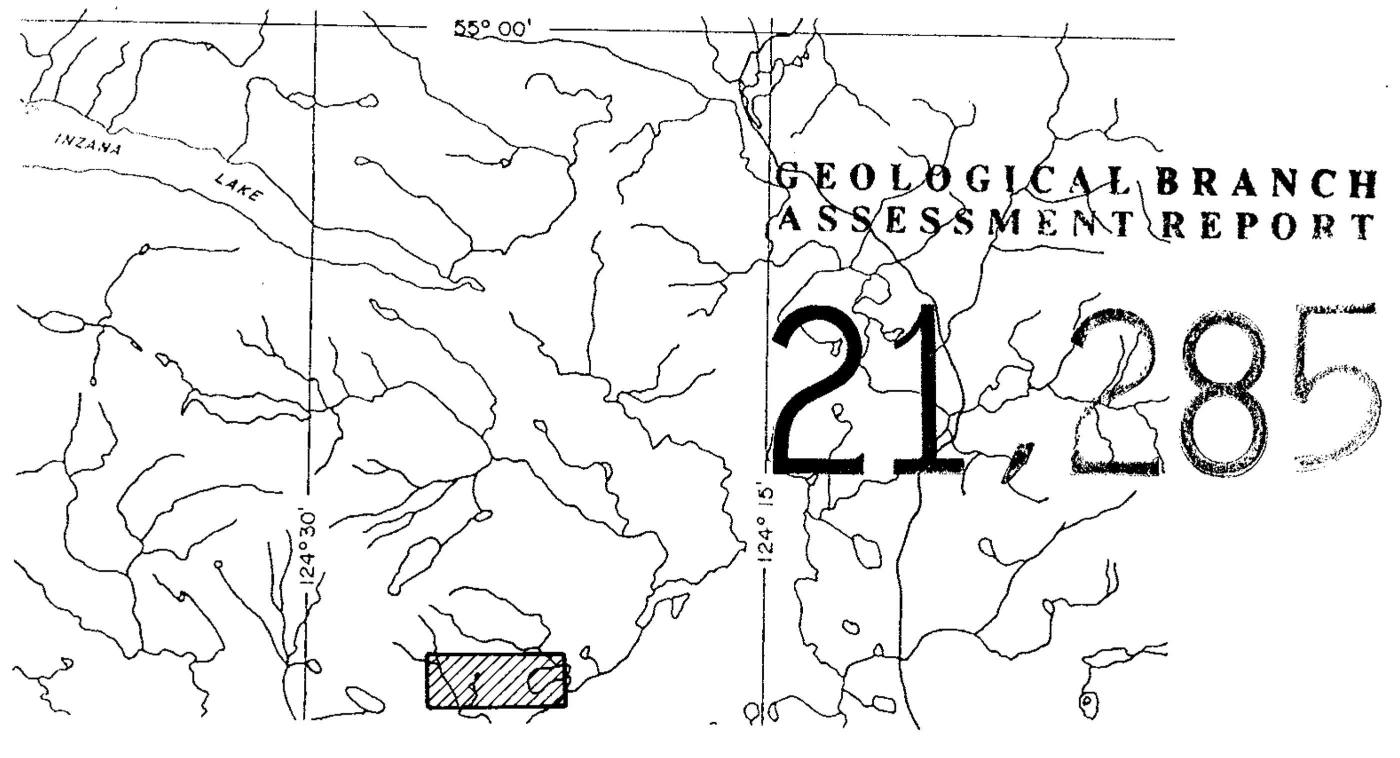
A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.



HARVARD CAPITAL CORPORATION

HAT PROPERTY MAP #2

LOCATION MAP HAT PROPERTY



GEOLOGICAL BRANCH
ASSESSMENT REPORT

21,285

HAT PROPERTY SCALE 1:10000

SAMPLE LOCATIONS AND GEOCHEMISTRY

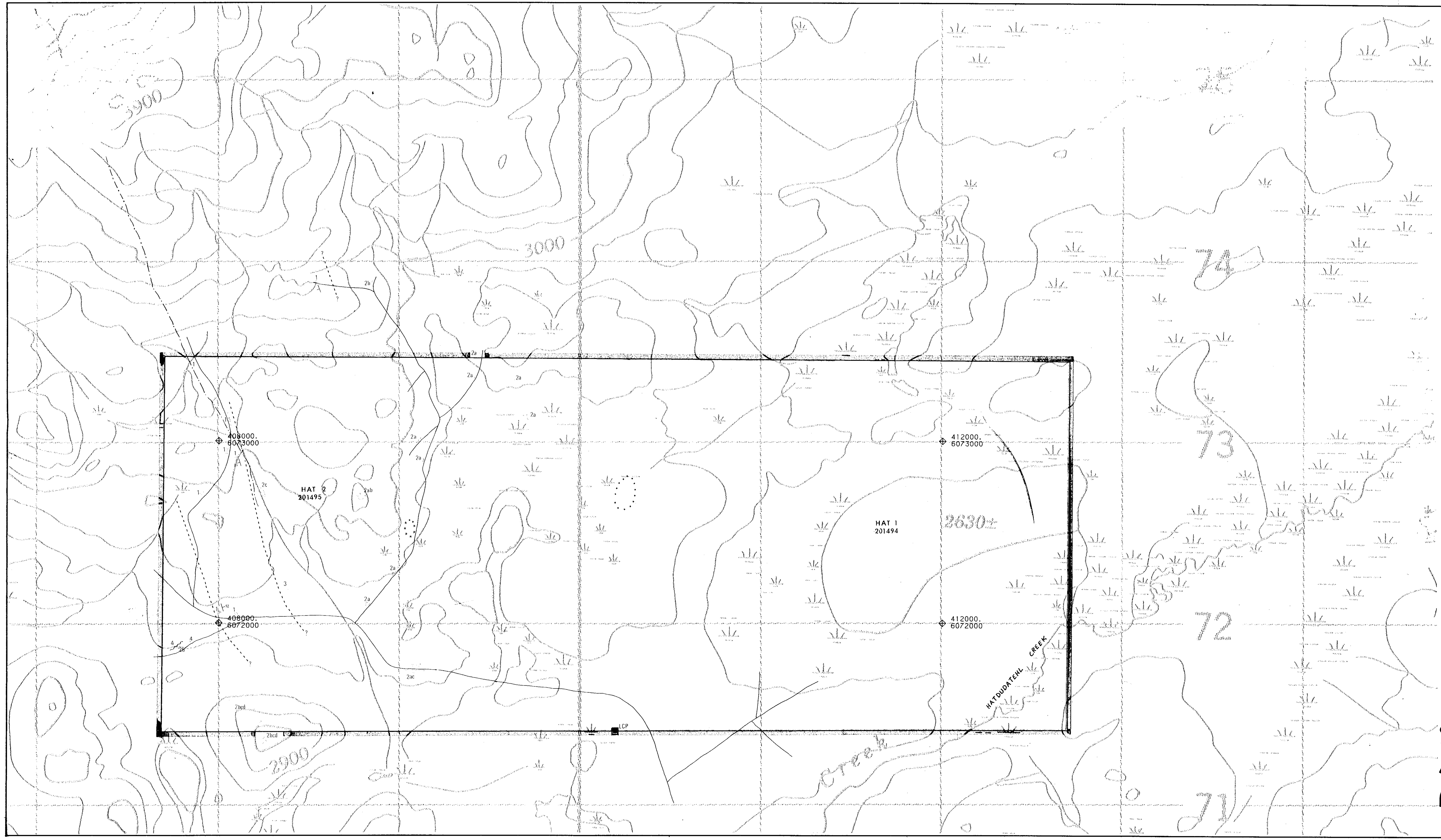
△ ROCK

○ SILT

2,29,6 Au (ppb) Cu (ppm) As (ppm)

N

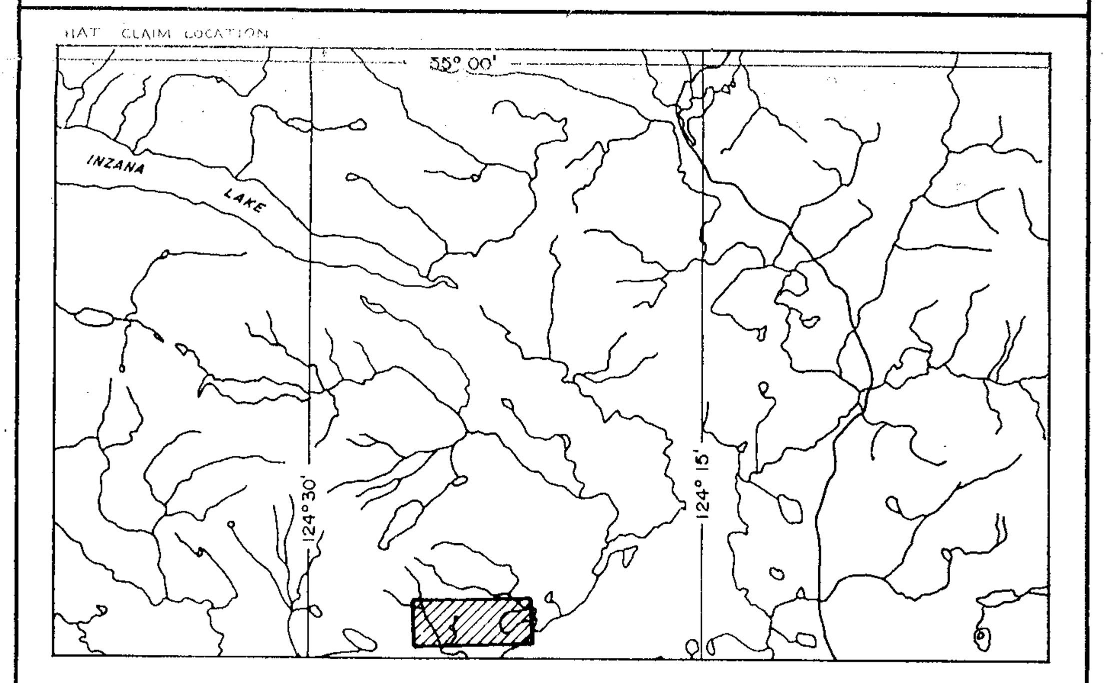
NICHOLSON AND ASSOCIATES



N

LEGEND

- lineament (inferred)
- fault
- outcrop
- approximate contact
- bedding
- road
- 1 argillite, arkose, greywacke, conglomerate
- 2a basalt – andesite
- 2b intermediate crystal and lapilli tuffs
- 2c hornblende porphyry, hornblendite
- 2d gabbro
- 3 granitoid
- 4 rhyolite porphyry
- magnetic anomaly outlier



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HARVARD CAPITAL CORP.

GEOLOGY

HAT CLAIM GROUP

BRITISH COLUMBIA

SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

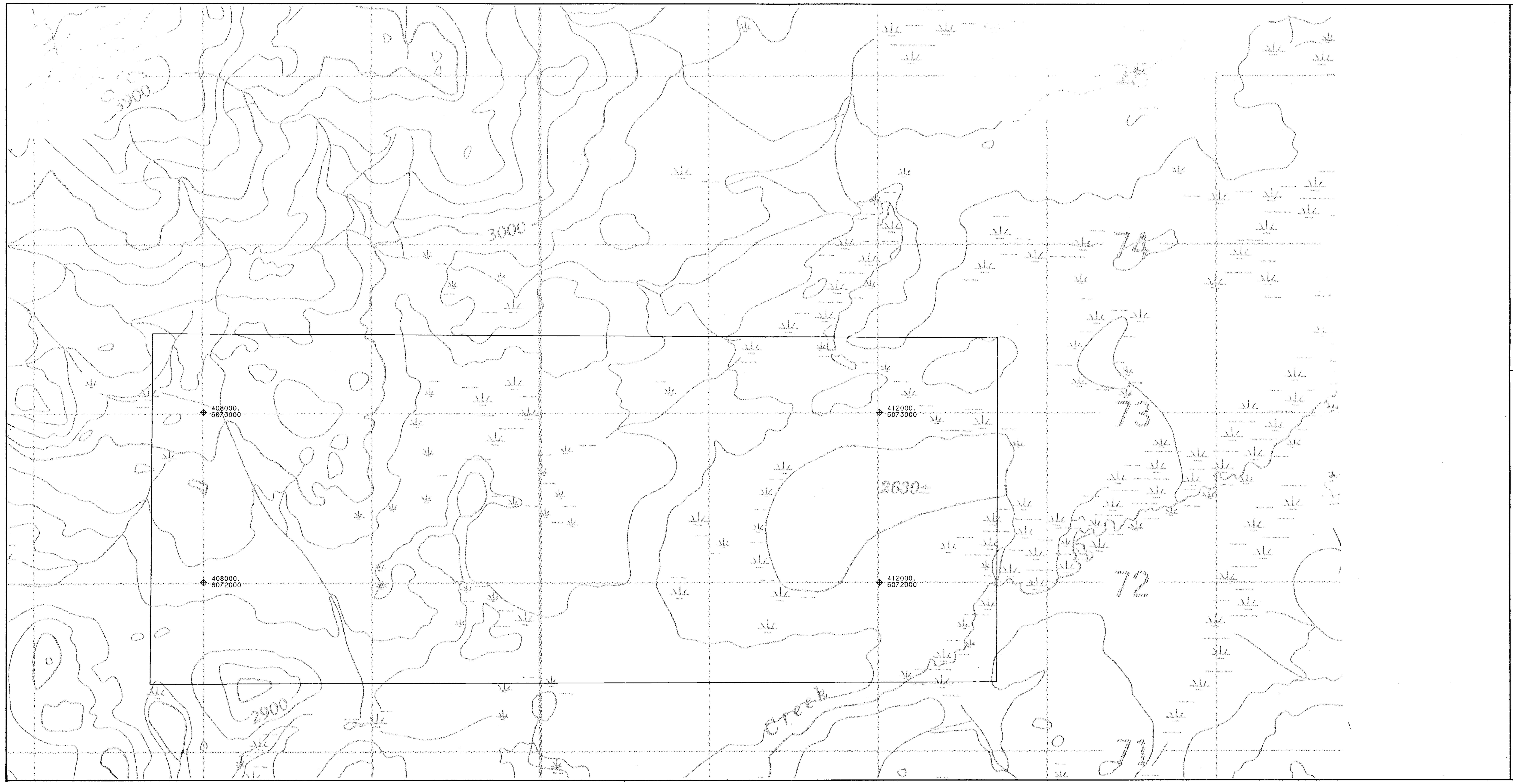
NICHOLSON AND ASSOCIATES

DRAWN

DATE: NOVEMBER 1990

NTS No: 93 K/16

MAP No: 1 J9045 - 1



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ASSESSMENT REPORT

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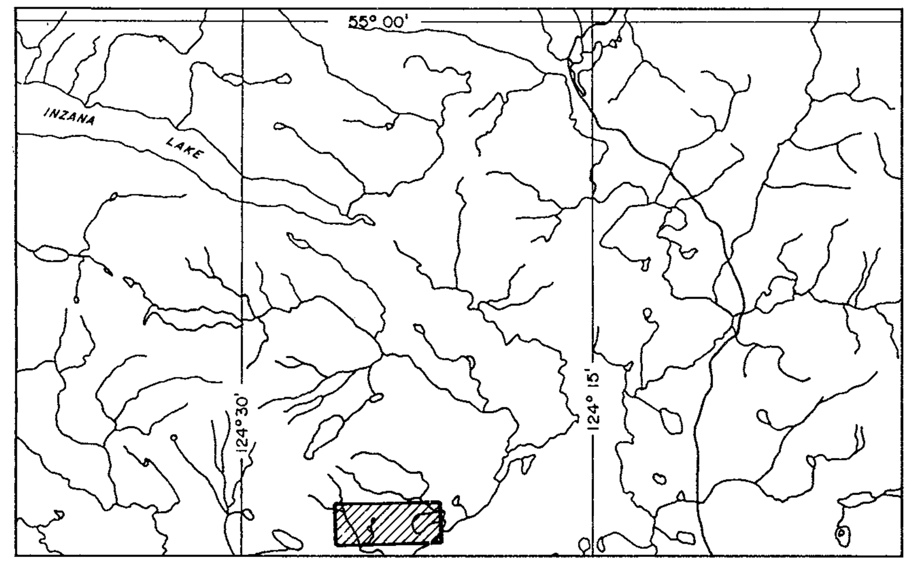


NICHOLSON & ASSOCIATES

BASE MAP

HAT CLAIM GROUP

BRITISH COLUMBIA

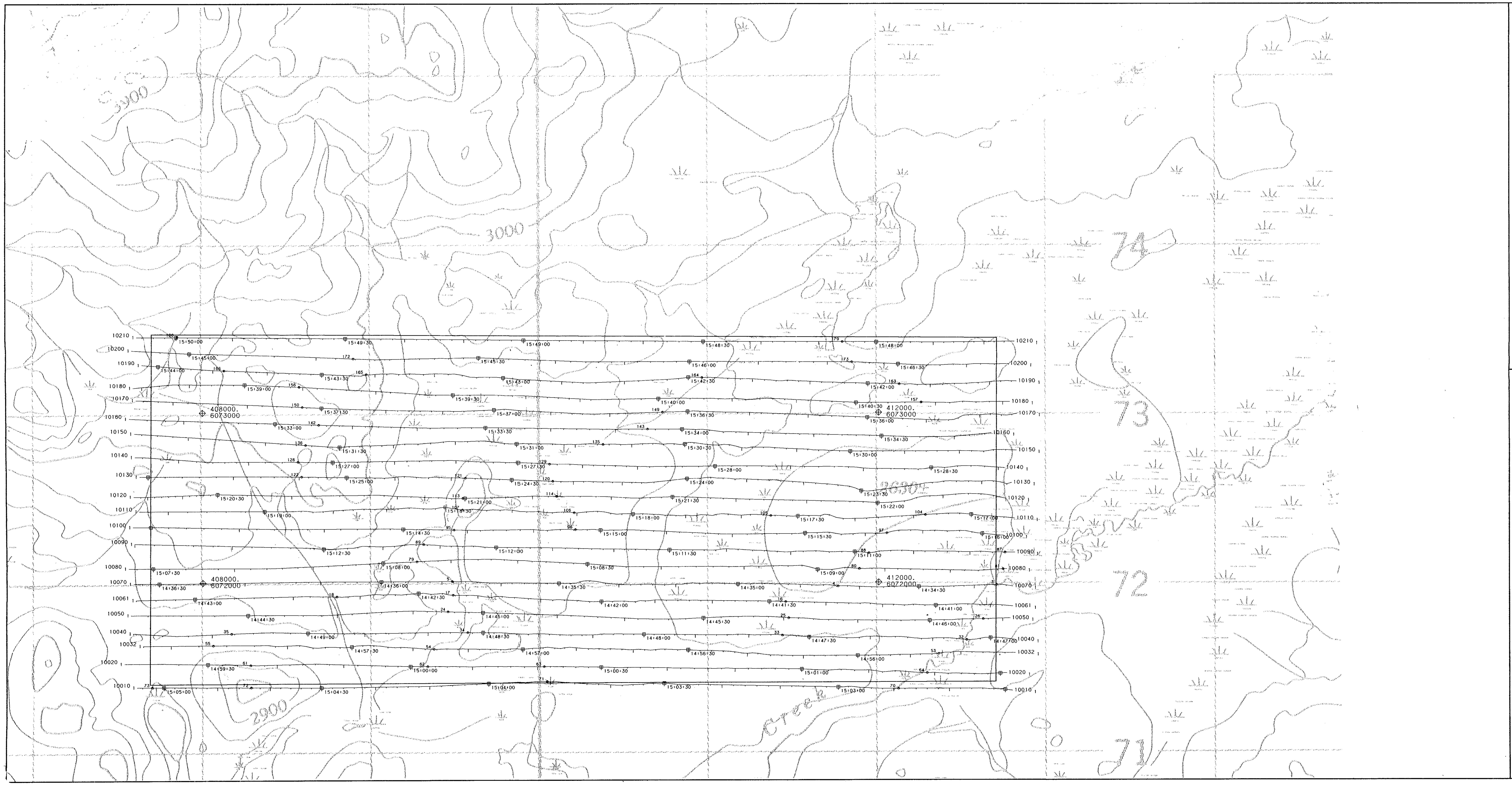
SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	AUGUST 1990
NTS No:	93 K/16
MAP No:	1 J9045 - 1



N

Flight Path

Navigation and recovery using a Motorola Mini-Ranger (MRS III) navigation system.

Average terrain clearance 60m
Average line spacing 100m

GEOLOGICAL BRANCH ASSESSMENT REPORT

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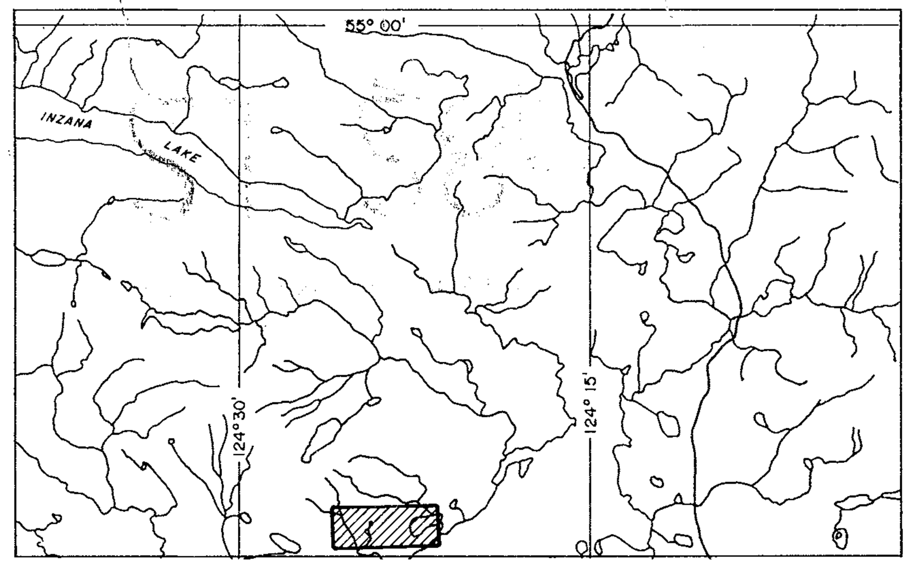


NICHOLSON & ASSOCIATES

FLIGHT PATH

HAT CLAIM GROUP

BRITISH COLUMBIA

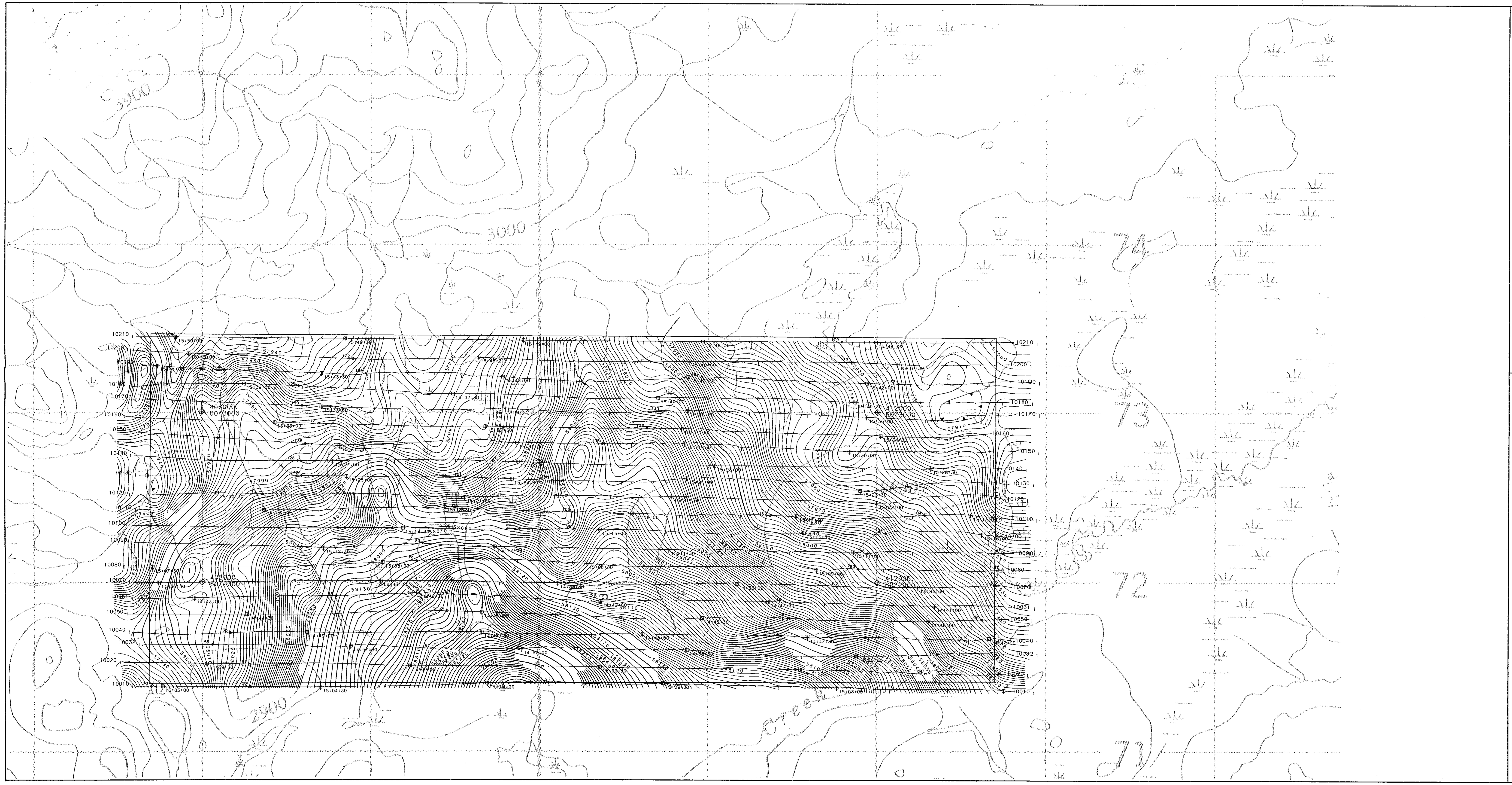
SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	AUGUST 1990
NTS No:	93 K/16
MAP No:	2 J9045 - 1



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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Flight Path

Navigation and recovery using a Motorola Mini-Ranger (MRS III) navigation system.

Average terrain clearance 60m
Average line spacing 100m

Magnetics

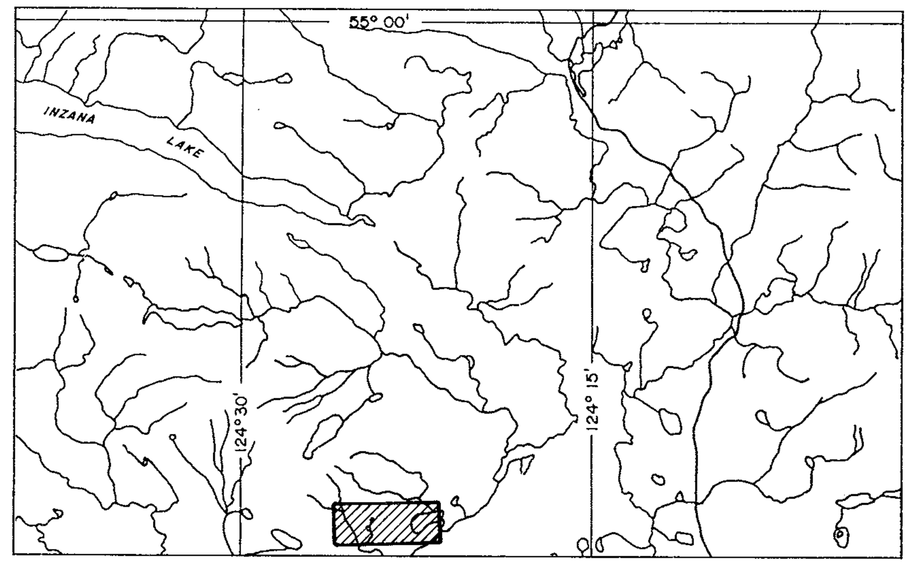
Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

2 nT
10 nT
50 nT
250 nT
1000 nT



NICHOLSON & ASSOCIATES

TOTAL FIELD MAGNETIC CONTOURS

HAT CLAIM GROUP

BRITISH COLUMBIA

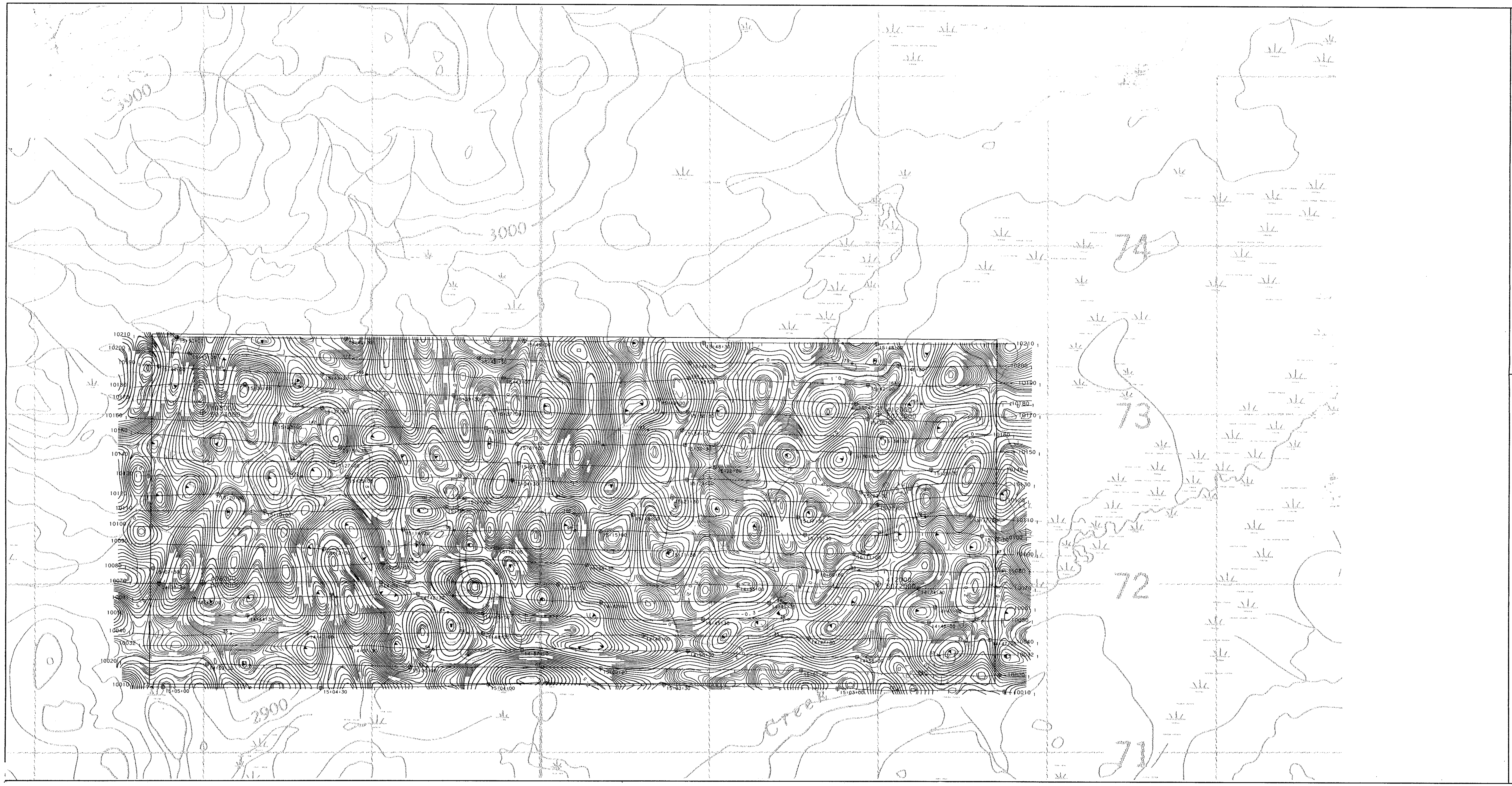
SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	AUGUST 1990
NTS No:	93 K/16
MAP No:	3 J9045 - 1



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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Flight Path

Navigation and recovery using a Motorola Mini-Ranger (MRS III) navigation system.

Average terrain clearance 60m
Average line spacing 100m

Vertical Gradient

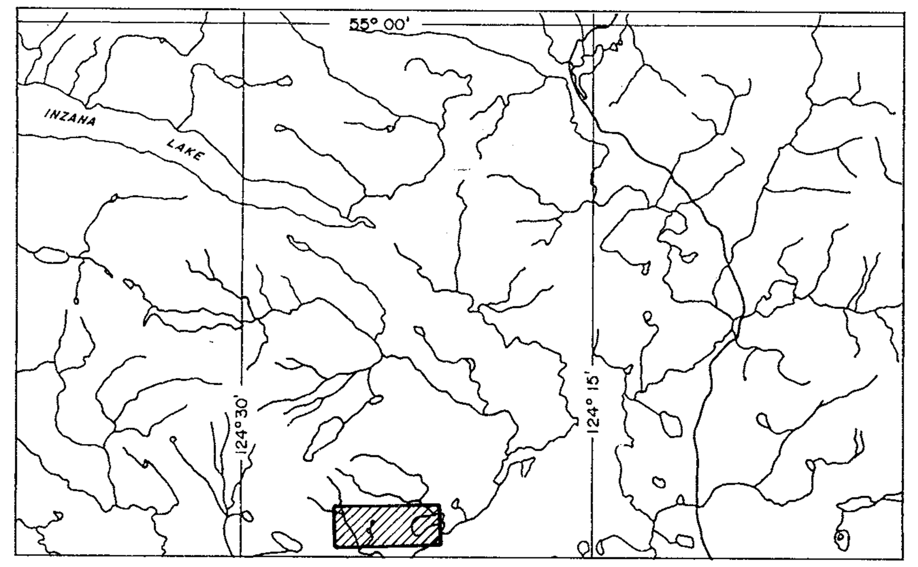
Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

0.02 nT
0.10 nT
0.50 nT
2.50 nT
10.00 nT



NICHOLSON & ASSOCIATES

CALCULATED VERTICAL MAGNETIC GRADIENT

HAT CLAIM GROUP

BRITISH COLUMBIA

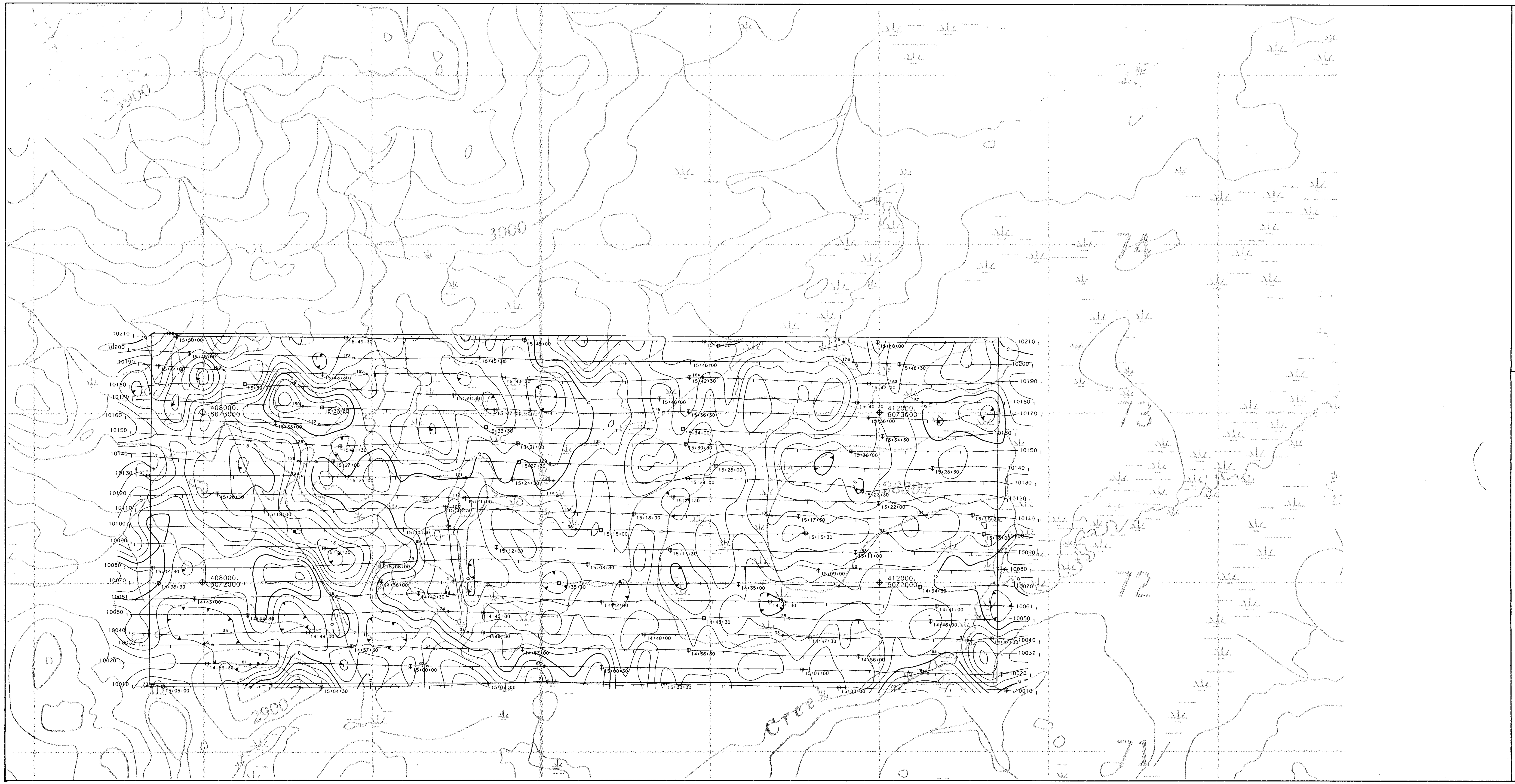
SCALE 1:10,000

0 330 660 1320 2640 Feet

0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	AUGUST 1990
NTS No:	93 K/16
MAP No:	4 J9045 - 1



GEOLOGICAL BRANCH
ASSESSMENT REPORT

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Flight Path

Navigation and recovery using a Motorola Mini-Ranger (MRS III) navigation system.

Average terrain clearance 60m
Average line spacing 100m

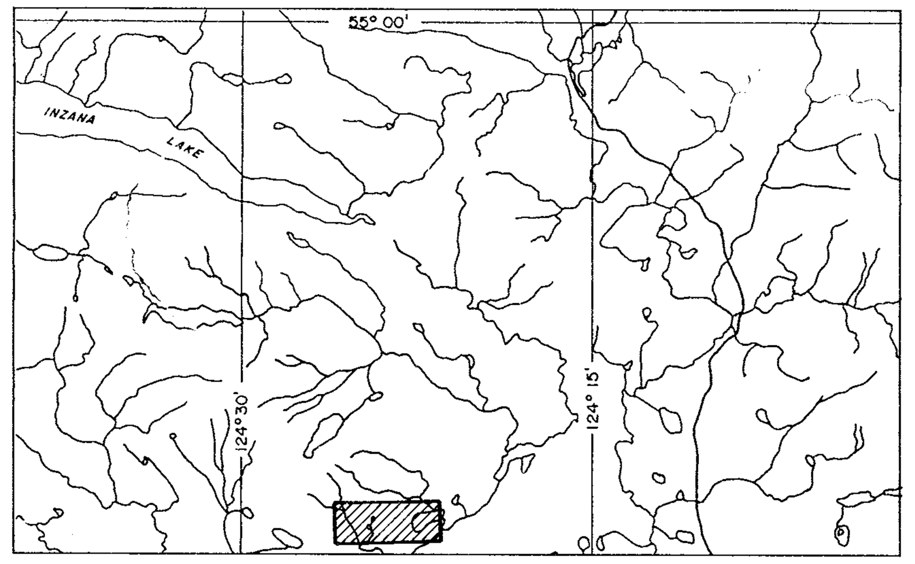
VLF-EM

VLF-EM Total Field Intensity in percent.

Station: NSS
Annapolis, Maryland
21.4 kHz

Sensor elevation 45m

Map contours are multiples c those listed below
1 %
5 %
25 %
100 %



NICHOLSON & ASSOCIATES

VLF-EM TOTAL FIELD CONTOURS (LINE CHANNEL)

HAT CLAIM GROUP

BRITISH COLUMBIA

SCALE 1:10,000
0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE:	AUGUST 1990
NTS No:	93 K/16
MAP No:	5 J9045 - 1