# EXPLORATION REPORT

## on the

# STU PROPERTY



Liard Mining Division

British Columbia, Canada

N.T.S. 104 B / 10 West

Latitude 56° 38' North     Longitude 130° 55' West

| Claim Name | Record Number | No. of Units | Record Date |
|---|---|---|---|
| STU 1 | 3716 | 18 | December 5, 1987 |
| STU 2 | 3717 | 18 | December 5, 1987 |



Field Work Period: September 1 to December 4, 1989

- Prepared for -

Owner and Operator: KESTREL RESOURCES LTD.

Suite 1124 - 470 Granville Street
Vancouver, B.C. V6C 1V5
(604) 683 - 9177

- Prepared by -

Consultants:

MINOREX CONSULTING LTD.
11967 - 83A Avenue
Delta, B.C. V4C 2K2
(604) 596 - 8474

RANGEX SERVICES
Suite 1124 - 470 Granville Street
Vancouver, B.C. V6C 1V5
(604) 683 - 9177

December 4, 1989

J.D. Blanchflower, F.G.A.C.
Consulting Geologist

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## INTRODUCTION

Kestrel Resources Ltd. of Suite 1124 - 470 Granville Street, Vancouver, B.C. owns and operates the STU property that is situated in the Iskut River area of the Liard Mining Division in northwestern British Columbia.

This report, prepared at the request of Kestrel Resources Ltd., describes the 1989 exploration program on the subject property. This program included: prospecting all accessible areas of the property; lithogeochemical sampling during prospecting and geological mapping (66 samples); detailed geological surveying of the Billy Goat Bowl and Ridge Zones at scales of 1:1,000 and 1:2,500, respectively; establishment of a two chained and flagged geophysical survey grids totalling 12.4 km.; geophysical surveying - UTEM electromagnetics (10.8 km.), magnetics (10.4 km.) and VLF electromagnetics (200 m.)); trenching (6 trenches for 40 m.); channel and chip sampling (25 samples); and documentation of the results.

The exploration program was undertaken to evaluate the economic potential of a number of mineralized zones that had been discovered during the 1987 and 1988 exploration work, and to evaluate the other accessible areas of the claims which had not been previously tested. The field program was conducted between September 1st and 27th, 1989, and this report was prepared following the receipt of the analytical results.

## SUMMARY

The STU property is situated approximately 10 kilometres southeast of the Bronson airstrip, or 110 kilometres northwest of the city of Stewart, British Columbia. The geographic coordinates of the property are centred at 56° 38' North latitude by 130° 55' West longitude. It is accessible by helicopter from the Bronson airstrip.

The subject property is located in the Liard Mining Division. It is owned and operated by Kestrel Resources Ltd.

The claims cover the mountainous and glaciated terrain surrounding Zappa glacier and its drainage, just north of Zappa Peak, on the slopes of Snippaker Mountain. Elevations within the claims range from less than 915 metres A.M.S.L. along the northeasterly-facing slopes of Snippaker Creek to 2,012 metres A.M.S.L. at Zappa Peak. The climate is typical of the Boundary Range physiographic region with annual precipitation in excess of 150 to 200 inches and annual temperatures ranging from -40° to +25 °C.

The exploration season can extend year-round with a high degree of logistical support; although the usual field season is from May, at the lower elevations, to mid October. Outcrop is abundant within the exposed, snow-free portions of the claims; however, hiking or helicopter access to many areas is limited by the rugged topography.

The Iskut River area has received sporadic exploration attention since the turn of the century. The first recorded work was in 1907 when a prospecting party from Wrangell, Alaska recorded nine mineral claims north of Johnny Mountain. In 1954, Hudson Bay Mining and Smelting Limited discovered high grade gold-silver-lead-zinc mineralization in float on Johnny Mountain. Later regional reconnaissance programs by several major mining companies in the 1960's led to the recognition of the area for its precious metal-bearing sulphide potential.


To accompany a report by J.D. Blanchflower.

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KESTREL RESOURCES LTD.
VANCOUVER, B.C.

**LOCATION MAP**
STU PROPERTY
LIARD MINING DIVISION, B.C.

| | |
|---|---|
| DATE: Dec. 4, 1989 | SCALE: 1: 10,000,000 |
| DWN. BY: J.D.B. | DWG. NO.: 1 |

The current exploration interest in the Iskut River area is centred on several noteworthy projects, including: the Johnny Mountain mine that is owned by Skyline Gold Corporation with reported geological reserves of 876,000 tons grading 0.55 o.p.t. gold; the SNIP gold-silver-copper deposit that is owned by Prime Resources Corporation and Cominco Ltd. with indicated geological reserves of 1,032,000 tons grading 0.875 o.p.t. gold; the INEL property belonging to Inel Resources Ltd. that has eight zones of high grade gold, silver, copper and zinc mineralization; and the McLYMONT property of Gulf International Minerals Ltd. with two zones of high grade gold, silver and copper mineralization.

In 1987, the subject property was explored by Pamicon Developments Ltd. on behalf of its owner. The results of their work identified four zones of precious metal-bearing sulphide mineralization, including: the Billy Goat Bowl, tongue of the Zappa Glacier, central STU 2, and Magnetite Zones. In 1988, the property was explored by airborne magnetic and electromagnetic surveying, limited prospecting and lithogeochemical sampling. The results of this later work identified several mineralized structures on the STU 1 mineral claim.

The Iskut River area is situated regionally along the margin between the Coast Plutonic Complex and Intermontane tectonic belts of the west-central Cordillera. It is a geologically complex area of stratigraphic, plutonic, structural and metamorphic transitions between four tectonostratigraphic elements: Paleozoic Stikine assemblage, Triassic and Jurassic Stikinian strata and plutons, Middle and Upper Jurassic Bowser Lake Group overlap assemblage, and Tertiary Coast Plutonic Complex (Anderson, 1989). Of these elements precious metal vein deposits seem to be most commonly associated with the Lower Jurassic volcanics, their associated alkaline granitic rocks and related dykes of the Stikinian assemblage.

The 1989 exploration program was undertaken to evaluate the remaining accessible but unexplored portions of the property and the four known zones of mineralization, namely the Billy Goat Bowl, tongue of the Zappa Glacier, central STU 2 and Magnetite Zones. Between September 1st and 27th, 1989, the accessible portions of the property were prospected and all of the mineralized structures were sampled (62 lithogeochemical samples); detailed geological surveying was conducted on the Billy Goat Bowl Zone (1:1,000 scale, 440 m. by 370 m. area) and Ridge Zone (1:2,500 scale, 1.38 km. by 1.05 km. area, and 7 lithogeochemical samples); two flagged geophysical survey grids were established totalling 12.4 km.; detailed geophysical surveying was undertaken over the Ridge Zone (10.8 line-km. UTEM and 10.4 line-km. magnetics), Bear Zone (200 line-m. VLF-EM, 200 line-m. magnetics) and tongue of the Zappa Glacier (1.6 line-km. electromagnetics and magnetics); and the Bear Zone was trenched (6 trenches totalling 40 m.), geologically mapped (1:500 scale, 75 m. by 25 m. area) and sampled (28 samples).

The prospecting work discovered a number of narrow shear or fracture filling vein structures throughout the property; however, most of these veins were found to be less than 30 centimetres wide, widely-spaced and discontinuous. Several samples from some of these structures returned anomalous values of copper, lead, and/or zinc but only one sample (sample no. 83320), across a 5-centimetre wide quartz-calcite vein, returned significant silver and gold values (35.7 p.p.m. silver and 0.876 o.p.t. gold). The rest of the samples returned gold values less than 0.026 o.p.t. while most of them were less than 1 p.p.b.

The geological surveying results show that the property is underlain by intercalated Upper Triassic volcanic, pyroclastic and sedimentary rocks that have been intruded by a number of stocks and dykes of alkaline composition. The strata have undergone uplift and structural deformation by major north-northeasterly to east-northeasterly trending, normal and transcurrent faulting prior to the emplacement of the alkaline plutons. Furthermore, an easterly trending set of open tensional fractures was created during this deformation, and it was along these fracture voids that the majority of the narrow, precious metal-bearing vein structures were emplaced. Later, the strata were again deformed by northeasterly normal faulting which provided conduits for the emplacement of the feldspar porphyry and diorite dykes. Subsequent north-northeasterly transcurrent faulting has displaced all of the lithologies.

All of the volcanic and sedimentary rocks have undergone regional metamorphism of the lower greenschist facies grade. In the immediate vicinity of the dioritic intrusions the volcanic and sedimentary rocks have been thermally metamorphosed, propylitically-altered and pyritized; however, this alteration rarely extends beyond 20 metres from the intrusive contact.

The results of the prospecting and detailed geological mapping over the quartz-actinolite-epidote skarn zone show that it is sparsely mineralized with pyrrhotite and minor chalcopyrite over its entire strike length. However, the semi-massive and massive mineralization at the Bear Zone has very limited strike and depth potential; and the individual lenses of semi-massive mineralization are very discontinuous, commonly have long axes of less than 5 metres and widths of less than 3 metres.

The sampling results for the Bear Zone indicate that the chalcopyrite mineralization can be quite rich (i.e. greater than 2 per cent copper) and it does have significant silver values, but it does not host any gold values like the volcanic-hosted, chalcopyrite-bearing vein structures. All of the gold values are less than 1 p.p.b.

It is the writer's opinion that structurally-controlled, gold-bearing vein mineralization has very limited economic potential because of its very narrow widths, widely-spaced distribution, discontinuity and location. Any further exploration work should be directed towards evaluating the calcic skarn zone. Although the exploration results show that it is sparsely mineralized, this type of copper-iron calcic skarn is known to host significant gold values.

## RECOMMENDATIONS

Mr. Syd Visser, the geophysical consultant, and the writer recommend that any further exploration work should be directed towards evaluating and defining any possible gold-bearing sulphide mineralization that might be spatially and/or genetically associated with both the calcic skarn and the hematite-ankerite fault structure that transects the Ridge Zone. Such work should be staged and include a HLEM (Max-Min 1) geophysical survey, trenching, and a limited diamond drilling program pending the surveying and trenching results.

The details and cost estimates for the proposed exploration work follow.

**Stage I**

| | | |
|---|---|---|
| 1) | HLEM (Max-Min 1) geophysical survey | $ 15,000.00 |
| 2) | Geological mapping and project supervision | 10,000.00 |
| 3) | Trenching | 12,000.00 |
| 4) | Lithogeochemical sampling and analyses | 5,000.00 |
| 5) | Board and Lodging | 7,000.00 |
| 6) | Helicopter support | 19,000.00 |
| 7) | Expendable Field Supplies | 1,000.00 |
| 8) | Equipment Rental Expenses | 1,000.00 |
| | **Total Estimated Cost of the Stage I Exploration Program** | **$ 70,000.00** |

Pending positive results from the Stage I program, the following program should be undertaken.

**Stage II**

| | | |
|---|---|---|
| 1) | Diamond drilling - 3 holes totalling 1,000 feet @ $40.00/ft | 40,000.00 |
| 2) | Helicopter support | 8,000.00 |
| 3) | Geological logging and project supervision | 8,000.00 |
| 4) | Drill core sampling and analyses | 4,000.00 |
| 5) | Report and map preparation | 6,000.00 |
| | **Total Estimated Cost of the Stage II Exploration Program** | **$ 66,000.00** |
| Contingency (~ 10 per cent of Estimated Cost) | | 14,000.00 |
| **Total Estimated Cost of the Proposed Exploration Program** | | **$ 150,000.00** |

# GENERAL DESCRIPTION

## Location and Access

The STU 1 and 2 mineral claims are situated on the mountainous southern slopes of Snippaker Mountain, known locally as Zappa Peak. They are located 10 kilometres southeast of the Bronson airstrip at the confluence of Bronson Creek with the Iskut River, or approximately 110 kilometres northwest of the city of Stewart, British Columbia. The geographic coordinates of the claims are centred at 56° 38' North latitude by 130° 55' West longitude (N.T.S. 104B/10W).

The property is accessible by helicopter from the Bronson airstrip. During the field season there are regularly scheduled fixed-wing aircraft flights to the Bronson airstrip from both Smithers and Terrace in British Columbia and from Wrangell, Alaska. There are also fixed-wing airstrips at the Johnny Mountain mine of Skyline Gold Corporation on Johnny Flats, approximately 9 kilometres west of the property, and at the Snippaker River which is located 13 kilometres southeast of the STU property.

There have been recent governmental announcements regarding the planning and construction of an all-weather road to the Bronson airstrip via the Iskut River valley from the Bob Quinn junction on the Stewart-Cassiar highway. If such a road is constructed it would pass within 5 kilometres north of the property.

## Property and Ownership

The subject claims are located in the Liard Mining Division. The location and configuration of the mineral claims are shown on Figures 1 and 2 of this report. The following table summarizes the pertinent claim data.

| Claim Name | Record Number | No. of Units | Record Date | Expiry Year |
|---|---|---|---|---|
| STU 1 | 3716 | 18 | December 5, 1987 | 1992 |
| STU 2 | 3717 | 18 | December 5, 1987 | 1992 |

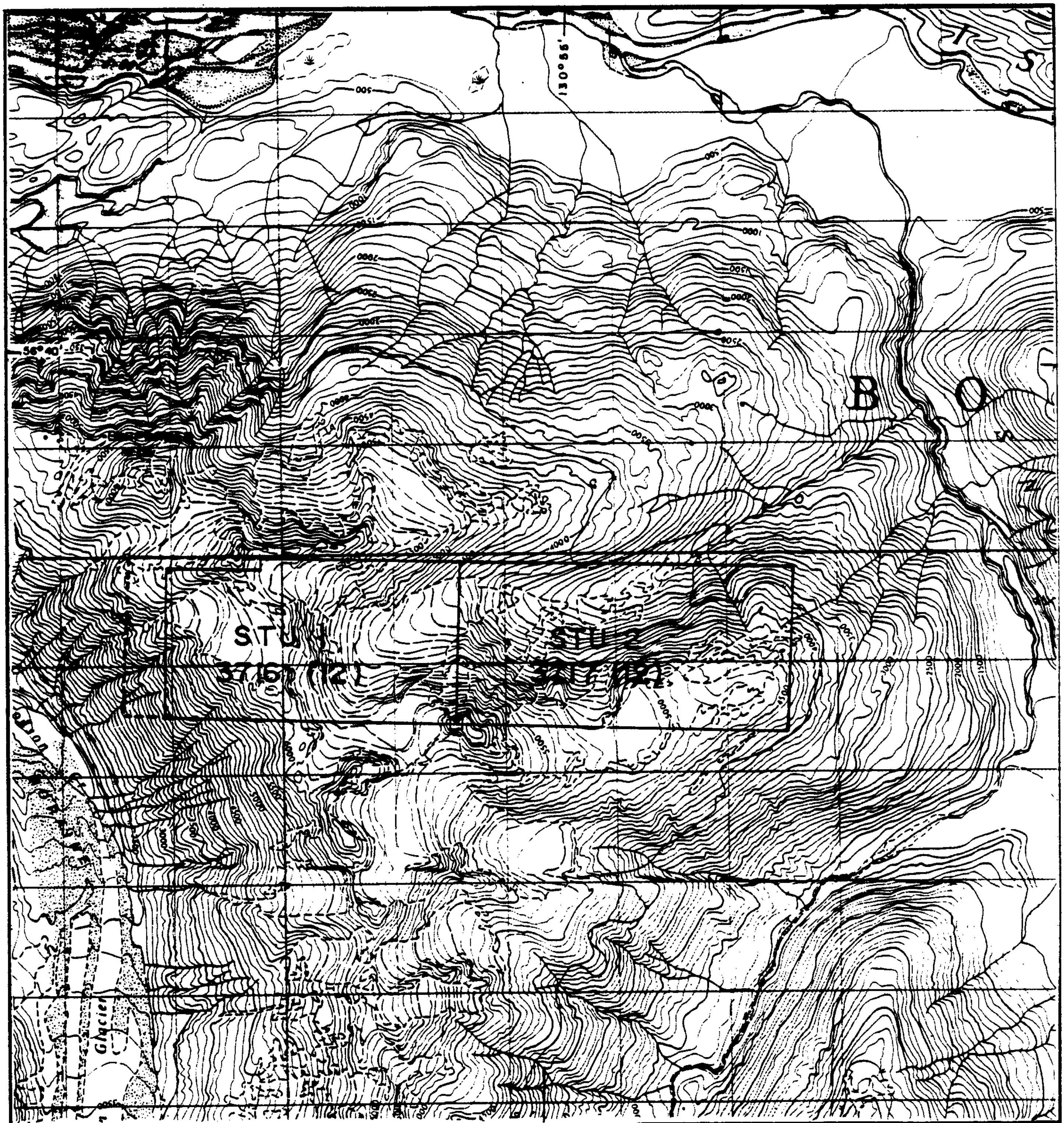
According to the claim information available to the writer, the STU 1 and 2 mineral claims are owned and operated by Kestrel Resources Ltd. subject to an option agreement with Mr. I. Hagemoen, a director of the company.

The location of the common legal corner post for the subject claims was not confirmed by the writer nor by the other field personnel during the program.

## Physiography

The property covers the mountainous and glaciated terrain surrounding Zappa glacier and its drainage, just north of Zappa Peak. Elevations within the claims range from less than 915 metres A.M.S.L. along the northeasterly facing slopes of Snippaker Creek to 2,012 metres A.M.S.L. at Zappa Peak.

The climate is typical of the Boundary Range physiographic region with annual precipitation in excess of 150 to 200 inches and annual temperatures




AFTER B.C.M.M. Claim Map 104 B/10W

SCALE

1 0 1 2 3 km

To accompany a report by J.D. Blanchflower.

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# CLAIM MAP

## STU PROPERTY

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| DATE: Dec.4,1989 | SCALE: 1:50,000 |
| DWN. BY: J.D.B. | DWG. NO.: 2 |

ranging from -40° to +25 °C. The exploration season can extend year-round with a high degree of logistical support; although the usual field season is from May, at lower elevations, to mid October.

Most of the property is located above treeline with only minimal ground cover of shrubs and grasses. The extreme eastern portion of the STU 2 mineral claim is covered with sub-alpine vegetation of spruce, balsam, alder and thick undergrowth.

Outcrop is abundant within the exposed, snow-free portions of the claims; however, hiking or helicopter access to many areas is limited by the rugged topography.

## History

The Iskut River area has received sporadic exploration attention since the turn of the century; although, most of the early activity in this region concentrated in and around the Stewart mining camp. As the placer and lode miners explored northward placer gold operations were intermittently active along both the Iskut and Unik Rivers.

The first recorded work in the Iskut River area was in 1907 when a prospecting party from Wrangell, Alaska recorded nine mineral claims north of Johnny Mountain.

Hudson Bay Mining and Smelting Limited discovered high grade gold-silver-lead-zinc mineralization in float on the upper slopes of Johnny Mountain in 1954. This occurrence, called the "Pickaxe" showing, was evaluated but the covering claims were eventually allowed to lapse.

In the 1960's several major mining companies, including Newmont Mining Corporation of Canada and Kennco Explorations (Canada) Limited, conducted reconnaissance exploration programs in the Iskut River area for porphyry copper mineralization similar to the Liard Copper and Galore Creek copper deposits to the north. It was during this period that Cominco Ltd. first became interested in the pyritization near the confluence of Bronson Creek with the Iskut River.

Skyline Explorations Ltd. discovered massive polymetallic sulphide mineralization in float on the Bronson Creek glacier in 1969, and staked the source area as the INEL property. After the company restaked the REG property on Johnny Mountain in 1980 they explored both the high grade gold-bearing veins there and the sulphide mineralization on the INEL property until 1987.

In January, 1988 Skyline Explorations Ltd. reported geological reserves at their Stonehouse deposit of 1,087,875 tons grading 0.704 o.p.t. gold, including significant silver and copper values, over mineable widths with good lateral and vertical continuity. They proceeded directly from underground exploration to production with the establishment of a fixed-wing supported mining operation in 1988. Production difficulties and corporate problems affected the operation until recently. After renovating the milling process and increasing recovery and exploration funding, they have reduced mining costs and discovered a number of very interesting precious metal showings. The latest combined geological reserves (April 30) for all categories are 876,000 tons grading 0.55 o.p.t. gold at a cutoff grade of 0.3 o.p.t. gold (Northern Miner, Aug. 21/89).

In 1986, Delaware Resources Ltd. (now Prime Resources Corporation) and Cominco Ltd. commenced detailed exploration of the SNIP property, located immediately north of Reg property on the northern slopes of Johnny Mountain. Their surface and underground exploration efforts over the last three years have been successful in defining a geological reserve of 1,032,000 tons grading 0.875 o.p.t. gold using a cutoff grade of 0.35 o.p.t. gold and a dilution factor of 20 percent at zero grade (G.C.N.L. No. 214, Nov. 7/89). The joint venture partners are presently completing a feasibility study on the deposit.

Aside from the Johnny Mountain mining operation and the SNIP gold deposit, there are a number of other advanced projects in the Iskut River area, including: the INEL property belonging to Inel Resources Ltd. that has eight zones of high grade gold, silver, copper and zinc mineralization; and the McLYMONT property of Gulf International Minerals Ltd. with two zones of high grade gold, silver and copper mineralization.

There is no reported exploration in the vicinity of the STU 1 and 2 mineral claims prior to 1980. In May, 1980, Du Pont of Canada Exploration Ltd. collected several heavy mineral separate samples from the Snippaker Creek drainage. These samples returned anomalous gold values, and Du Pont subsequently staked the Zappa claim (now the GIM claim) in July to cover the drainage (Strain, 1981). Later followup heavy mineral separate sampling in 1980 and soil sampling in 1981 pinpointed the probable source of the anomalous geochemical values to the headwaters of a drainage now covered by the STU 2 mineral claim (Korenic, 1982). Du Pont did not discover the mineralized source and allowed their claim to lapse.

In 1983, Bluegrass Petroleum Inc. acquired an option on the then HEMLO WEST 5 and 6 mineral claims. The STU 1 mineral claim now overlies most of the old HEMLO WEST 5 mineral claim. Bluegrass Petroleum carried out a limited soil geochemical sampling and geological mapping program. Their work located three mineralized quartz vein occurrences and the soil sampling discovered three zones of anomalous gold-in-soil values (Ricker, 1983). Despite their encouraging results, no further work was undertaken and their claims were allowed to lapse.

Placer Development Limited conducted a Dighem III airborne survey over the Johnny Mountain and Snippaker Mountain area in July, 1983 (Dvorak, 1983). Even though the survey did not include the area of the subject claims, it did locate a number of electromagnetic conductors northwest of the STU 1 claim.

During the 1987 and 1988 field seasons, the property was explored by Pamicon Developments Ltd. on behalf of its owner. In 1987, Pamicon Developments prospected most of the accessible areas and collected 256 rock and 47 soil geochemical samples. The results of their work identified four main zones of precious metal-bearing sulphide mineralization including: the Billy Goat Bowl, tongue of the Zappa Glacier, central STU 2, and Magnetite Zones (Todoruk and Ikona, 1988).

In 1988, an airborne magnetic and electromagnetic survey was conducted over the property. Later, a limited prospecting and lithogeochemical sampling program was carried out in August and September. The results of this work identified several mineralized structures on the STU 1 mineral claim (Todoruk and Ikona, 1989). Pamicon Developments recommended that the company should undertake detailed geological and geochemical surveying of the known mineralization during the 1989 field season.

## GEOLOGICAL SETTING

### Regional Geology

Despite its recent high level of exploration attention, there is a paucity of available geological publications regarding the Iskut River area and, specifically, for the subject property itself. The latest geological publication, G.S.C. Open File 2094 (1989), does not cover the property although it does provide information for the region eastward and northward along the Forrest-Kerr River drainage. Both G.S.C. Maps 9-1957 (1:250,000) and 1418A (Iskut River, 1979, 1:1,000,000) are too regional to be of much use at a property scale. Thus, the following geological discussion is based largely upon a recent report by R.G. Anderson (1989) and the writer's extrapolations of geological data from recent geological studies adjacent to the property.

The Iskut River area is situated regionally along the margin between the Coast Plutonic Complex and Intermontane tectonic belts of the west-central Cordillera. It is a geologically complex area of stratigraphic, plutonic, structural and metamorphic transitions between four tectonostratigraphic elements: Paleozoic Stikine assemblage, Triassic and Jurassic Stikinian strata and plutons, Middle and Upper Jurassic Bowser Lake Group overlap assemblage, and Tertiary Coast Plutonic Complex (Anderson, 1989). Of these elements, precious metal vein deposits seem to be most commonly associated with the Lower Jurassic volcanics, their associated alkaline granitic rocks and related dykes of the Stikinian assemblage.

According to R.G. Anderson (1989), the geological setting of the Iskut River map area is:

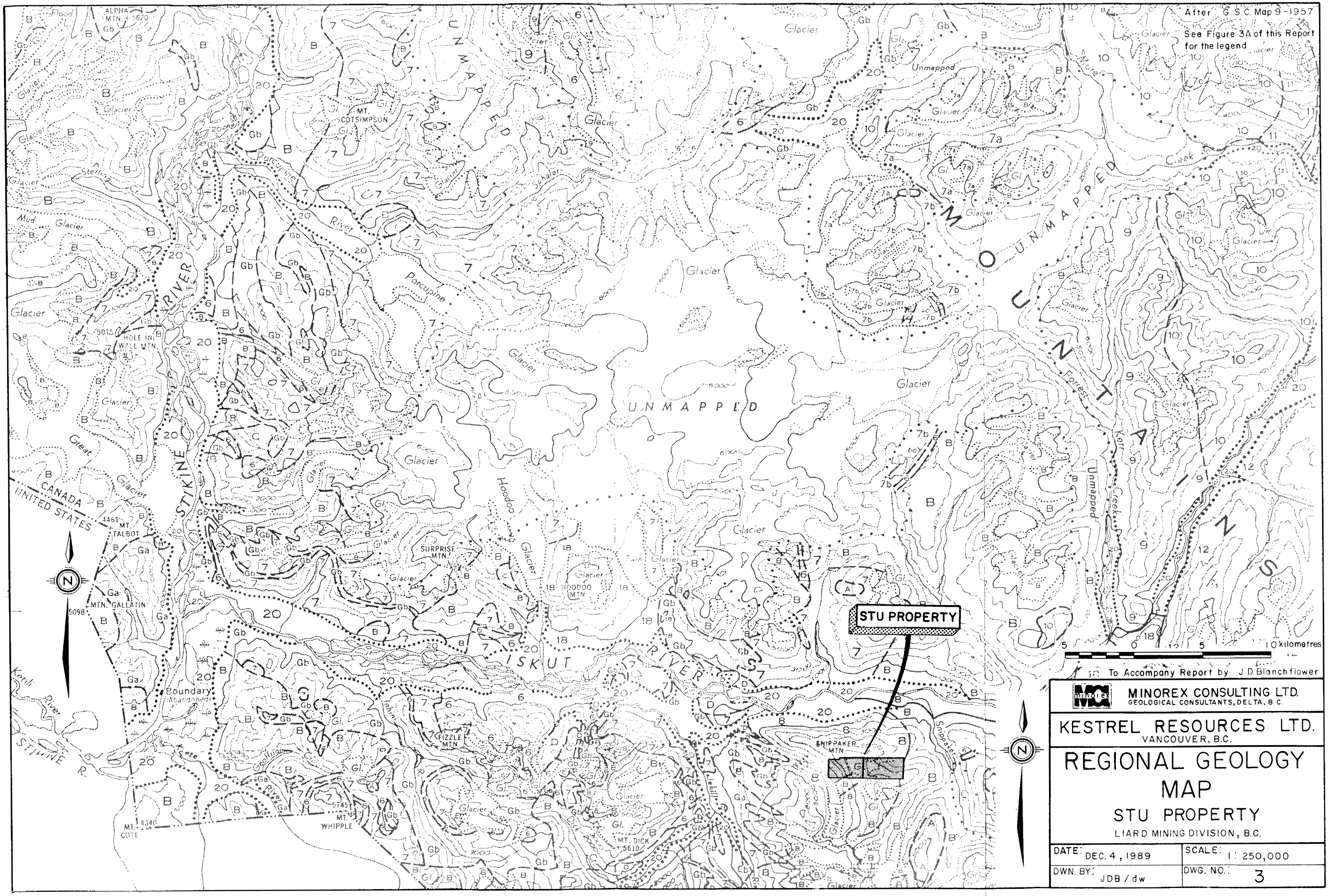
> "Early Devonian to Early Permian coralline limestone reef and mafic to felsic volcanic rocks make up the Stikine assemblage and include some of the most intensely deformed rocks in the region. Distinctive porphyritic dykes link Upper Triassic and Lower Jurassic volcanics with their plutonic equivalents. Lower and Middle Jurassic basinal limestone, radiolarian-bearing siliceous shale and tuff mark the end of the Triassic-Jurassic volcanic arc-building event. Middle and Upper Jurassic fine- and medium-grained siliciclastics are part of an overlap assemblage which, to the north, demonstrably links Stikinia and Cache Creek terranes. Post-tectonic, fresh, felsic plutons of mainly Tertiary age characterize the Coast Plutonic Complex along the southwest margin of the map area. Younging of strata from west to east attests to intrusion and uplift of the Coast Plutonic Complex. The eastern margin of the complex is defined by: the extent of the Tertiary plutons and local zones of high strain in the southeast; intrusive contacts in the central part of the map area; and an abrupt increase in metamorphic grade an change in plutonic style across the Stikine River in the west.
>
> Unconformities seem to bound the major stratigraphic assemblages. Stratigraphic relationships among members of the Stikine assemblage are poorly known. The regionally extensive Permo-Triassic event is marked by local polymictic conglomerate, a regional decrease in conodont colour alteration index with age and, possibly, an angular unconformity between recumbent isoclinally folded Lower Permian

limestone and overlying Upper Triassic (?) mafic volcanics (?). A regionally important sub-Toarcian unconformity and a local but metallogenetically important Pliensbachian unconformity characterize the Lower Jurassic strata in the area.

The Lower Jurassic Hazelton Group and alkaline members of the cogenetic Early Jurassic Texas Creek plutonic suite have proved the most productive and prospective for precious metal lodes. Fossiliferous Upper Triassic Stuhini Group and Lower to Middle Jurassic Spatsizi Group strata provide recognizable biostratigraphically restricted, bounding markers which define the economically important but mainly unfossiliferous and heterogeneous Lower Jurassic volcanic strata of the Hazelton Group metallotect."

The subject property is dominantly underlain by intercalated Upper Triassic volcanic and sedimentary strata that have been intruded by a number of stocks and dykes of alkaline composition. It is situated immediately east of the structural contact between the recumbent isoclinally folded Lower Permian Cache Creek strata, belonging to the Stikinia assemblage, and the overlying Upper Triassic and Lower to Middle Jurassic strata of the Stikine terrane.

Due to the paucity of local geological information, none of the observed structural deformation within the claims can be correlated to any major regional features; however, it is obvious from the results of the writer's geological surveying that all of the volcanic, sedimentary and plutonic rocks have undergone varying degrees of uplift and deformation. The survey results also show that the Upper Triassic strata have been regionally metamorphosed to lower greenschist facies and, locally, they have been propylitically- to potassically-altered, and pyritized near the intrusive bodies.


After G.S.C. Map 9-1957
See Figure 3A of this Report for the legend
UNMAPPED
MOUNTAINS
STIKINE RIVER
ISKUT RIVER
Porcupine River
CANADA
UNITED STATES
MT. SCOTSIMPSON
ALPHA MTN.
HOLE IN WALL MTN.
MT. TALBOT
MTN. GALLATIN
SURPRISE MTN.
HOODOO MTN.
FIZZLE MTN.
MT. DICK
MT. WHIPPLE
MT. COTE
SNIPPAKER MTN.
Great Glacier
Hoodoo Glacier
Forrest Kerr Creek
Boundary (Abandoned)
STU PROPERTY
10 kilometres
To Accompany Report by J.D. Blanchflower
MINOREX CONSULTING LTD.
GEOLOGICAL CONSULTANTS, DELTA, B.C.
KESTREL RESOURCES LTD.
VANCOUVER, B.C.
REGIONAL GEOLOGY MAP
STU PROPERTY
LIARD MINING DIVISION, B.C.
DATE: DEC. 4, 1989
SCALE: 1:250,000
DWN. BY: JDB / dw
DWG. NO.: 3

# LEGEND

## SEDIMENTARY AND VOLCANIC ROCKS

### CENOZOIC

**QUATERNARY**

**RECENT**

**20** Unconsolidated glacial and fluvial clay, silt, sand, gravel; till; peat, muskeg

**19** Tufa, hot spring deposits

**18** Olivine basalt, ash, cinders

**TERTIARY**

**PLEISTOCENE AND (?) EARLIER**

**17** Basalt, rhyolite, ash, tuff, agglomerate; locally may include 16; 17a, rhyolite, pisolitic siliceous tuff, chalcedonic rhyolite breccia

**EOCENE**

**16** Basalt, rhyolite and associated volcanic rocks; minor conglomerate, sandstone, shale

**CRETACEOUS AND TERTIARY**

**UPPER CRETACEOUS AND PALEOCENE**

**15** Conglomerate, sandstone, shale, minor coal

### MESOZOIC

**CRETACEOUS**

**POST LOWER CRETACEOUS**

**14** Volcanic rocks, breccia

**JURASSIC AND CRETACEOUS**

**UPPER JURASSIC AND LOWER CRETACEOUS**

**12** Argillite, greywacke, conglomerate, coal; 12a, andesite, chert; tuff, conglomerate, shale, greywacke

**CRETACEOUS AND /OR EARLIER**

**PRE UPPER CRETACEOUS**

**13** Mainly volcanic rocks; minor conglomerate, greywacke; chert, argillite

**JURASSIC**

**LOWER AND MIDDLE JURASSIC**

**11** Conglomerate, greywacke, grit, siltstone, shale; 11a, may include younger rocks

**JURASSIC AND /OR EARLIER**

**PRE UPPER JURASSIC**

**9 | 10** 9. Mainly volcanic rocks; minor conglomerate; greywacke, argillite
10. Mainly sedimentary rocks

**TRIASSIC**

**8** Tuff, siltstone, limestone, conglomerate, breccia

**PERMIAN AND/OR TRIASSIC**

**7** 7, Volcanic and sedimentary rocks undivided; 7a, mainly andesitic and basaltic volcanic rocks; flows, breccia, tuff breccia, tuff; 7b, mainly greywacke, siltstone, conglomerate; 7c, mainly limestone

PALAEOZOIC

PERMIAN AND (?) EARLIER

**6** Limestone, greenstone, chert, argillite, phyllitic quartzite, greywacke; meta-andesite and meta-diorite locally abundant near ultramafic bodies. May include younger greenstone; 6a, Carboniferous or Permian, mainly andesitic flows, breccia, tuff; minor sedimentary rocks

DEVONIAN AND MISSISSIPPIAN

UPPER DEVONIAN AND MISSISSIPPIAN

**5** Chert, argillaceous quartzite, argillite, greywacke, greenstone, conglomerate, limestone

DEVONIAN

MIDDLE DEVONIAN

**4** Limestone, dolomite, quartzite

ORDOVICIAN AND SILURIAN

UPPER ORDOVICIAN AND LOWER SILURIAN

**3** Limestone, cherty limestone, quartzite, red and green chert, shale

CAMBRIAN AND ORDOVICIAN

MIDDLE AND (?) UPPER CAMBRIAN, LOWER AND MIDDLE ORDOVICIAN

**2** Shale, phyllite, slate, calcareous slate, limestone

CAMBRIAN

LOWER CAMBRIAN

**1** Limestone, dolomite, quartzite, slate, phyllite

INTRUSIVE ROCKS

**A** Felsite, felsite porphyry

**B** Mainly quartz monzonite, granodiorite, granite

**C** Mainly diorite; minor gabbro

**D** Granite porphyry, granophyre, syenite and related rocks

**E** Serpentinite, peridotite; locally includes meta-andesite and meta-diorite

## METAMORPHIC ROCKS

TRIASSIC OR EARLIER

| F | Phyllite, sericite schist, hornfels, granulite, fine-grained biotite-hornblende gneiss; Fa, may include or be equivalent to 9 |
|---|---|

PERMIAN AND/OR EARLIER
PRE MIDDLE PERMIAN

| G | Ga, Gneiss; Gb, phyllite, quartzite, minor crystalline limestone, highly altered and sheared greywacke and volcanic rock |
|---|---|

MAINLY CARBONIFEROUS AND PERMIAN

| H | Biotite-quartz-feldspar gneiss, biotite-muscovite schist, crystalline limestone, greenstone, quartzite, phyllite |
|---|---|

MISSISSIPPIAN AND EARLIER

| J | Gneiss, schist, crystalline limestone, crystalline dolomite, quartzite |
|---|---|

## 1989 EXPLORATION PROGRAM

The 1989 exploration program was undertaken to evaluate the four mineralized zones that Pamicon Developments had recommended for further detailed exploration and evaluation. The field program was carried out between September 1st and 27th, 1989.

Kestrel Resources Ltd. contracted Rangex Services of Vancouver, B.C. to manage the project and, in turn, Rangex Services contracted Minorex Consulting Ltd. of Delta, B.C. to undertake the field supervision of the program and carry out the geological surveying. Kestrel Resources Ltd. contracted Mr. Syd Visser of SJ Geophysics Ltd. of Delta, B.C. to establish the geophysical survey control grid and conduct the geophysical surveying. Mr. Neil De Bock, an experienced and qualified prospector, was contracted by Rangex Services carry out the prospecting work. Both the writer, a consulting geologist and employee of Minorex Consulting Ltd., and Mr. De Bock were assisted by Messrs. K. Forster, J. Lee and J. Elmore, employees of Rangex Services.

The writer and Mr. De Bock supervised the surface blasting of the hand trenches since both field personnel held valid B.C. Ministry of Energy, Mines and Petroleum Resources blasting certificates. The drilling and mucking work was undertaken by Messrs. M. Bashford and D. Legere, both employees of Rangex Services.

Northern Mountain Helicopters, with temporary bases at both the Bronson airstrip and the main Kestrel Resources Ltd. field camp on the Forrest-Kerr River, provided Hughes 500D helicopter support for the program.

### Prospecting Work

The 1989 field season was unusually warm for this region and, as a result, many of the usually snow-covered areas were exposed during the first half of September. The reconnaissance prospecting and lithogeochemical sampling work were directed towards evaluating these newly exposed areas and any other accessible areas which might not have been tested by the previous programs.

Messrs. N. De Bock and J. Elmore prospected the Ridge Zone and then they expanded their work to include the helicopter-accessible areas along Zappa Glacier and along the western slopes of Zappa Peak. Following the discovery of the "Bear" copper-bearing skarn zone, Mr. De Bock traced this zone along strike and collected lithogeochemical samples from various sites along its exposed length.

A total of 62 grab or chip samples were collected during the prospecting work from any vein, skarn, or shear structures with any suspected precious and base metal-bearing mineralization.

The reconnaissance prospecting traverses and lithogeochemical sample sites are shown on Figures 4A and 4B of this report. The lithogeochemical sample descriptions and their analytical results accompany this report as Appendices II and III, respectively.

## Geological Survey

The detailed geological surveying was directed towards identifying and evaluating the geologic settings of the Billy Goat Bowl, Central STU 2 and Magnetite Zones. Since the Billy Goat Bowl Zone has restricted access it was mapped separately from the other two zones which occur along the southern ridge of Zappa Creek. The two latter zones are collectively referred in this report as the "Ridge" Zone since they are indistinguishable.

The writer mapped the geological setting of the Billy Goat Bowl Zone at a scale of 1:1,000. The limits of the survey were determined by extremely steep cliffs, both east and west of the zone, a glacier to the south, and steep till-covered cliffs to the north. The mapped portion of the zone encompasses an area of 440 metres north-south by 370 metres east-west.

The Ridge Zone was geologically mapped at a scale of 1:2,500. The limits of the survey were determined by the southern boundary of the property, the north-facing cliffs of Zappa Creek, and the eastern and western limits of the known mineralization. The geological survey covered an area measuring 1.05 kilometres north-south by 1.38 kilometres east-west.

During the geological survey of the Ridge Zone, the Bear copper-bearing skarn zone was discovered, and it was subsequently hand trenched, geologically mapped and chip, panel, or channel sampled. The writer mapped the geology of this zone and the hand trenches at a scale of 1:500, and collected 25 lithogeochemical samples. The mapped portion of the zone covers an area measuring 25 metres north-south by 75 metres east-west.

Due to the time constraints of the 1989 exploration program and the topography of the property, no survey control grid was established prior to the prospecting work and geological survey. The writer and his assistant chained and compassed between geological survey reference stations, recorded the observed geological data, and plotted slope-corrected traverse routes in the field. Hand specimens of the bedrock were collected at each geological survey station and these samples were later re-examined prior to transferring the field data to the finished geological plan. During and after the establishment of the geophysical survey control grid, the writer cross-referenced the geological survey stations to the established survey control grid stations.

## Lithogeochemical Sampling

No lithogeochemical samples were collected during the survey of the Billy Goat Bowl Zone since it had been previously well sampled; however, the writer did collected 7 lithogeochemical grab samples during the mapping of the Ridge Zone from various mineralized structures that had not been sampled.

A total of 94 lithogeochemical samples were collected during the entire program, and all of these samples were properly bagged, described and labelled in the field. Later, the samples were shipped by air and ground freight to Vangeochem Lab Ltd. in Vancouver, B.C. for analysis under the supervision of professional assayers. All of the lithogeochemical samples were analyzed for gold, using fire assay and atomic absorption procedures, and for a 25-element suite by inductively coupled argon plasma (ICAP) methods.

At Vangeochem Lab Ltd., each rock sample was ground to -100 mesh and a 0.5 gram pulp was digested with 5 millilitres of 3:1:2 hydrochloric acid to nitric acid to water at 95$^{\circ}$C. for 90 minutes, and then diluted to 10 millilitres with water. The resulting precipitate was then analyzed by ICAP methods for: silver, aluminum, arsenic, barium, bismuth, calcium, cadmium, cobalt, chromium, copper, iron, potassium, magnesium, manganese, molybdenum, sodium, nickel, phosphorus, lead, antimony, tin, strontium, uranium, tungsten and zinc.

A 20.0 to 30.0 gram pulp was split from each of the ground samples, mixed with flux, fused at 1,900$^{\circ}$F. to form a button, and subsequently digested in an aqua regia solution. This solution was then analyzed for gold by a Techtron model AA5 Atomic Absorption Spectrophotometer with a gold hollow cathode lamp. Some of the samples were later fire assayed for their gold, silver, copper, lead and/or zinc values when the results exceeded geochemical limits.

The lithogeochemical sample descriptions, their analytical results, and the analytical procedures accompany this report as Appendices II, III, and IV, respectively. Figures 4, 5 and 7 of this report show the location of the sample sites.

Geophysical Survey

Two chained and flagged geophysical survey control grids, totalling 12.4 line-kilometres, were established by SJ Geophysics Ltd.; one over the Ridge Zone (10.8 line-km.) and another, much smaller one, over the glacial alluvium at the tongue of Zappa Glacier (1.6 line-km.).

The survey grid over the Ridge Zone totals 10.8 line-kilometres. It has a baseline oriented 060$^{\circ}$ along the southern grid boundary from grid lines L 14 E to L 28+50 E, a distance of 1,450 metres. The grid line interval is 100 metres, and survey stations were established at a 20-metre spacing. A combined UTEM electromagnetics and magnetics survey was conducted over this grid with UTEM readings every 20 metres and magnetic readings every 10 metres.

The small reconnaissance geophysical survey grid near the tongue of Zappa Glacier totals 1.6 line-kilometres. It consists of two east-west lines (090$^{\circ}$ to 270$^{\circ}$), arbitrarily called grid lines L 700 N and L 850 N, and three north-south lines (000$^{\circ}$ to 180$^{\circ}$), arbitrarily called grid lines L 100 E, L 200 E and L 300 E. The survey stations were established at a 20-metre spacing. Both Very Low Frequency (VLF) electromagnetic and magnetic surveying were conducted.

Following the discovery of the Bear skarn zone, detailed Very Low Frequency (VLF) electromagnetic and magnetic profiling were conducted to trace the buried extensions of the sulphide mineralization. No control grid was established, but 200 metres of geophysical surveying were undertaken.

See Appendix I of this report for the geophysical report by Mr. Syd Visser of SJ Geophysics Ltd.

## DISCUSSION OF RESULTS

The exploration program evaluated the known mineralization on the property and discovered a copper-bearing skarn zone; however, it did not define or discover any significant precious metal-bearing mineralization.

### Prospecting

The prospecting work discovered a number of narrow shear or fracture filling vein structures. All of these structures are hosted by propylitically-altered volcanic flows, flow breccias, or tuffaceous fine-grained sediments of Upper Triassic age. The individual veins are commonly less than 30 centimetres wide, widely-spaced, and they pinch and swell over discontinuous strike lengths.

Sulphide mineralization usually comprises less than 5 per cent of the vein material; although, on a very local scale, the sulphides may occur in semi-massive quantities within narrow and discontinuous tensional gash zones. Pyrite is the most common sulphide mineral. Chalcopyrite, galena and sphalerite also occur locally, with or without their oxidized equivalents. The gangue of the vein structures is commonly quartz and calcite with lesser amounts of epidote, chlorite, and/or ankerite. Orthoclase feldspar is not commonly found within the vein structures except in the immediate vicinity of alkaline intrusions.

Several of the samples from the various vein structures returned anomalous values of copper, lead, and/or zinc but only one sample returned significant silver and gold values. This grab sample, number 83320, was collected from a 5 centimetre wide quartz-calcite vein near the Zappa Peak. It assayed greater than 20,000 p.p.m. copper, 9,277 p.p.m. lead, 1,097 p.p.m. zinc, 35.7 p.p.m. silver and 0.876 o.p.t. gold. All the rest of the reconnaissance lithogeochemical samples returned gold values less than 0.026 o.p.t. with most of them being less than 1 p.p.b. gold.

Reconnaissance prospecting and sampling along the quartz-actinolite-epidote skarn zone discovered locally disseminated pyrrhotite and minor chalcopyrite, galena and/or sphalerite throughout its length; however, no semi-massive or massive sulphide mineralization, like at the Bear Zone, was discovered. Many of the grab samples from the exposed skarn-hosted mineralization returned geochemically anomalous base metal values, ranging up to 19,964 p.p.m. copper (sample 83422), 2,393 p.p.m. lead (sample 25054), and 10,373 p.p.m. zinc (sample 25054), but these samples were collected over widths less than 30 centimetres. The silver values with the base metal mineralization range up to 42.9 p.p.m., and they appear to be proportionate to the copper content of the mineralization. All of the samples from the skarn-hosted sulphide mineralization had gold values less than 1.0 p.p.b.

This property has now been prospected during three field seasons and all of the accessible areas have now been examined. The results show that the volcanic and, to a lesser extent, the pyroclastic units commonly host narrow, discontinuous, fracture-controlled vein mineralization. Selective grab samples from some of these structures, at Zappa Peak and within the Billy Goat Bowl and Ridge Zones, can return significant gold values up to 2.0 ounces per ton but the economic potential of these structures is very limited due to their very narrow widths, widely-spaced distribution and location.

## Geological Survey

The geological surveying results for the Billy Goat Bowl, Ridge and Bear Zones are documented as Figures 5, 6 and 7 of this report. The lithology, structure, metamorphism, alteration and mineralization of these three zones will be discussed in the following text.

### 1) Lithology

According to Geological Survey of Canada Map 1418A (1979), the property is dominantly underlain by intercalated Upper Triassic volcanic and sedimentary strata that have been intruded by a number of stocks and dykes. The volcanic and sedimentary strata were apparently deposited during or shortly after the deposition of the Upper Triassic Stuhini Group of volcanic and sedimentary rocks which have been mapped to the north. Furthermore, the property is regionally situated east of the structural contact between the recumbent isoclinally folded Lower Permian Cache Creek strata, belonging to the Stikinia assemblage, and the overlying Upper Triassic and Lower to Middle Jurassic strata of the Stikine terrane.

The lithologic units have been tentatively correlated stratigraphically, in order of decreasing age, as follows.

#### i) Andesite Flow and Flow Breccia (Unit 1)

These volcanic rocks underlie most of the property, and based upon bedding attitudes, assuming tops up, they are probably the basement rocks. The stratigraphic contacts between the volcanic members of this unit are both indistinct and discontinuous; exemplifying relatively rapid accumulations of volcanic rocks, in probably an subaqueous setting, prior to any period of quiescence and sedimentation.

The volcanic rocks are usually light to dark grey/green in colour, and they are quite massive to very poorly banded. The subangular to subrounded clasts of the monomictic flow breccia may range up to 40 centimetres or more in size.

Based upon macroscopic studies, the flow and flow breccia rocks are of andesitic composition. Plagioclase feldspar and, to a lesser degree, hornblende occur locally as porphyritic phenocrysts, up to 1 centimetre, within a grey to green, aphanitic groundmass. The flow members are usually quite aphanitic while the flow breccia members are easily distinguished in weathered outcrops by their more porphyritic clasts within an aphanitic matrix. Hornblende phenocrysts are often partially or completely replaced by epidote, chlorite, quartz and magnetite, and biotite occurs locally, usually as a secondary alteration product. Magnetite and pyrite in minor amounts are common constituents of the rocks as very fine-grained disseminations or microfracture infillings.

#### ii) Lithic Tuff and Chert (Unit 2)

This unit appears to be both intravolcanic and conformably overlie the basal volcanic flows and flow breccias at both the Billy Goat Bowl and Ridge Zones. The lithic tuff and chert are interbedded but quite massive; like exhalative pyroclastic rocks that have accumulated rapidly during and after volcanism from dense subaqueous plumes.

This unit is commonly light to medium grey to brown in colour, quite siliceous and well indurated. Both of the lithologic members are quite aphanitic and similarly coloured.

The lithic tuff member is distinguishable by its granular texture, and it often contains angular and subangular andesitic tuffaceous fragments that range up to 1 centimetre in length. The groundmass of the tuffaceous member is a crystal tuff containing euhedral to anhedral plagioclase and quartz phenocrysts. Fine-grained secondary epidote, chlorite, quartz, calcite, biotite and sericite occur as alteration products of saussuritization, or locally as a result of metasomatism near intrusive bodies. Very fine-grained to fine-grained pyrite and magnetite are common accessory minerals, especially near intrusions.

The chert member also contains angular and subangular tuffaceous fragments, but it is distinguishable by its cryptocrystalline texture.

iii) **Limestone (Unit 3)**

Light to medium grey, massive limestone crops out near the theoretical M.G.S. claim coordinate 1 North by 5 East of the STU 2 mineral claim. It is bounded on the north by a major east-northeasterly trending fault with prominent hematite and ankerite alteration. On the south, it appears to be interbedded with the lithic tuff and chert unit (Unit 2). Along its south-southeastern margin it has been metasomatized to a quartz-actinolite-epidote skarn. The stratigraphic contact between the limestone and the pyroclastic rocks is quite sharp and distinct, but the margins of the skarn zone are typically vague with large, angular clasts of unaltered limestone surrounded by resistant skarn material.

The limestone unit initially appears in outcrop to be intravolcanic, but it is more likely to occur stratigraphically at the transition from dominantly volcanic to sedimentary facies. It is the writer's opinion that this unit may have been downfaulted to its present position by juxtaposed transcurrent fault movement, both north and south of the exposure.

Recrystallization and fracture healing by secondary calcite is common in outcrop, but there is no primary sulphide mineralization. The disseminated mineralization near the contacts of the limestone with the skarn zone appears to have be emplaced during the metasomatic event.

iv) **Argillite, Siltstone and Minor Lithic Tuff (Unit 4)**

Near M.G.S. claim coordinate 0 North by 4 East of the STU 2 mineral claim, finely-laminated argillaceous sediments occur interbedded within the fine-grained sediments of Unit 5. This unit is distinct from Unit 5 because of its dominantly argillaceous component. In outcrop, these sediments are medium brown to black in colour, fissile and quite carbonaceous.

Within shear zones, gypsum was found to occur infilling fracture voids as pale yellow, waxy, prismatic crystals, locally up to 15 centimetres long. Minor magnetite is ubiquitous throughout this unit and diagenetic pyrite was found to occur within the argillaceous members. Local silicification with associated pyritization, oxidized to hematite and/or limonite, is restricted to shear zones and the margins of feldspar porphyry dykes.

v) **Siltstone, Sandstone, Chert, Lithic Tuff and Argillite (Unit 5)**

Near the southern boundaries of the STU 2 mineral claim, predominantly fine-grained, finely-laminated sedimentary rocks with a strong pyroclastic component overlie the older volcanic and pyroclastic units. These rocks appear to have been deposited within submarine basins following volcanism and pyroclastic deposition. Bedding attitudes show that the sedimentary rocks have been tilted up to -15$^{\circ}$ southward.

The stratigraphic contact between Unit 5 and the underlying pyroclastic unit is not exposed, nor is the apparent structural contact between Unit 5 and the andesitic volcanics (Unit 1) that occurs westward. It is the writer's opinion that the fine-grained sediments have been downfaulted with respect to the older volcanic rocks, and that the faulting occurred along a number of northeasterly trending, transcurrent faults that cut the stratigraphy.

Within local shear zones and near the margins of feldspar porphyry dykes, the fine-grained sediments are silicified and pyritized over short distances. Fine-grained magnetite is ubiquitous throughout the sedimentary sequence but in very minor amounts.

vi) **Feldspar Porphyry Dyke (Unit 6)**

This unit occurs throughout the property, but it is especially prolific within the Billy Goat Bowl zone. It is light to medium grey in colour, medium-grained, barren, massive and poorly fractured. Plagioclase feldspar often form euhedral porphyritic phenocrysts, up to 2 centimetres, within an aphanitic quartz and plagioclase feldspar groundmass. Variations of this unit include a non-porphyritic variety and a hornblende-rich variety with poikilitic grains. These varieties commonly coexist within the same dyke structure.

Near the northwestern margin of the diorite stock, at M.G.S. claim coordinates 1 North by 5 East, the diorite stock gradually changes texturally to resemble the feldspar porphyry unit at its intrusive contact. Along the southern margin of the same intrusion, a feldspar porphyry dyke cuts the diorite-pyroclastic contact. Based upon these observations, it is apparent that the feldspar porphyry unit is probably dioritic in composition, and coeval and cogenetic with the dioritic intrusion (Unit 8).

This unit is dominantly controlled by northerly to northeasterly trending shear and fault structures. Within the Billy Goat Bowl Zone the feldspar porphyry dykes are relatively wide, up to 40 metres, and very continuous. At the Ridge Zone the dykes are noticeably narrower, usually less than 3 metres, and generally quite discontinuous.

vii) **Diorite Dyke (Unit 7)**

This unit is medium grey in colour, aphanitic, barren, massive and very poorly fractured. It commonly occurs as narrow structures, less than 1 metre wide, that occupy northerly to northeasterly trending fault structures with sharp, non-chilled margins. No crosscutting features were observed between units 6 and 7 to establish their age relationship.

It is the writer's opinion that the diorite dykes are comagmatic with the feldspar porphyry dykes (Unit 6) and the dioritic intrusion (Unit 8), and they may be feeder structures for now-eroded, overlying volcanic strata. Their distribution within similarly oriented, but much more restricted, structures as Unit 6 suggests that the diorite dykes may be slightly younger in age.

viii) **Diorite, Monzonite (Unit 8)**

Two stocks of diorite to monzonite composition occur within the mapped portion of the Ridge Zone, at M.G.S. claim coordinates 3 East and 1 North by 5 East. Near M.G.S. claim coordinate 3 East, along the southern boundary of the STU 2 mineral claim, a small diorite stock has intruded andesitic flows. The immediate margins of this stock are propylitically-altered and locally pyritized but the alteration and mineralization does not extent more than 20 metres from its intrusive contact.

At M.G.S. claim coordinates 1 North by 5 East there is an east-west elongated stock of diorite which grades inward to a monzonitic core. This is the stock that has a northwestern margin similar in composition and texture to Unit 6. The andesitic flow, lithic tuff and chert surrounding the intrusion are propylitically-altered and pyritized for a distance of 20 to 30 metres. An orthoclase feldspar vein cuts the western intrusive contact, infilling a northeasterly trending shear structure, while the eastern core of the stock is orthoclase feldspar-rich.

The dioritic member is medium green to grey in colour while the monzonitic member tends to be slightly pinkish to orange. Both intrusive varieties are medium-grained and poorly foliated. Porphyritic plagioclase and hornblende often occur as euhedral phenocrysts within a finer-grained feldspar-rich groundmass. Very fine-grained magnetite is ubiquitous, and pyrite commonly occurs as disseminations and fracture filling with epidote, chlorite and calcite.

ix) **Quartz-Actinolite-Epidote Skarn (Unit 9)**

Along the southern margins of the limestone unit (Unit 7), there is a quartz-actinolite-epidote skarn zone that has been mapped westward for more than 350 metres and traced eastward by prospecting to the eastern boundary of the STU 2 mineral claim. This zone trends $060^{\circ}$ to $070^{\circ}$ and appears to dip steeply southward. It grades northward into unaltered limestone, its southern contact is buried beneath a snowpack, and westward it is truncated by a northeasterly trending fault structure. This skarn hosts disseminated pyrrhotite, chalcopyrite and lesser amounts of galena and sphalerite along its entire length. Lensoid, semi-massive and massive pyrrhotite and chalcopyrite mineralization occurs along a 75-metre section of the skarn, in the northeastern corner of the Ridge Zone. This occurrence has been called the "Bear" Zone.

The writer recognizes that this unit is not a distinct lithologic entity but rather a product of metasomatic alteration; however, its occurrence, dimensions and possible economic importance require that it be described fully. A weathered outcrop of skarn is medium to dark greenish brown in colour while fresh exposures are medium to dark green in colour. It is quite massive and very brittle. Euhedral actinolite crystals, up to 8 centimetre long, often occur within a medium-grained quartz, actinolite and epidote groundmass. Quartz, calcite, epidote and chlorite with sulphide minerals infill fractures. Near its margins it has large angular clasts of unaltered limestone surrounded by a skarn matrix giving it a brecciated appearance in weathered outcrops.

This unit is a calcic skarn of the copper-iron variety. Since there is no exposed intrusions in the immediate vicinity and this type of skarn is often associated with epizonal granodiorite and quartz monzonite stocks in continental crust, it is the writer's opinion that the skarn was formed after ascending hydrothermal fluids from a buried calc-alkaline pluton contacted the limestone unit. Such a pluton has been mapped by government geologist southeast of the property (G.S.C. Map 1418A), and it probably extends northward under the STU 2 claim. Furthermore, there is strong structural evidence that there is a east-northeasterly trending fault structure along the southern margins of the skarn, and this fault was probably the conduit for the iron- and copper-bearing hydrothermal fluids. If this is the case, then there is the potential for similar mineralization along strike and downdip of the Bear Zone.

2) **Structure**

The volcanic and sedimentary strata have undergone uplift and structural deformation. Numerous faults, shears and fractures cut and displace the strata to a greater degree than the intrusives; suggesting that the deformation of the country rocks predated the tectonic events leading to the emplacement of the alkaline and, possibly, the calc-alkaline plutons.

Based upon the structural data collected during the survey, major normal and transcurrent faulting has occurred primarily in a north-northeasterly to east-northeasterly direction ($030^{\circ}$ to $070^{\circ}$). Dip directions and angles vary but many of the structures dip steeply ($-50^{\circ}$ to $-80^{\circ}$) southeastward.

There is a second fracture pattern within the strata that strikes easterly ($090^{\circ}$ to $110^{\circ}$) and dips moderately southward ($-30^{\circ}$ to $-45^{\circ}$). This fracture set is predominantly of the open tensional variety.

It is the writer's opinion that the Upper Triassic strata were displaced initially by northeasterly to east-northeasterly transcurrent faulting. An easterly trending set of open tensional fractures were created during this deformation, and it was along these fracture voids that the majority of the narrow, precious metal-bearing vein structures were emplaced. The hydrothermal fluids probably emanated from a differentiating buried pluton. Following the precipitation and sealing of the easterly trending fractures, the strata was again deformed by northeasterly trending normal faulting along regional zones of structural weakness. This tectonic event downfaulted the stratigraphy and provided conduits for the emplacement of the feldspar porphyry and diorite dykes. This tectonic event occurred prior to and during the emplacement of the alkaline plutons. Subsequent north-northeasterly transcurrent faulting has displaced all of the lithologies.

There is no definitive evidence within the volcanic or sedimentary rocks of any regional or small-scale folding within the property. The bedding attitudes simply steepen from the fine-grained sedimentary rocks along the southern boundary of the STU 2 mineral claim (i.e. $-13^{\circ}$ southward) to the volcanic strata at Billy Goat Bowl (i.e. $-45^{\circ}$ southward).

3) **Metamorphism and Alteration**

All of the volcanic and sedimentary rocks have undergone regional metamorphism of the lower greenschist facies grade. The andesitic volcanics best display this metamorphism with the alteration of their mafic constituents to epidote, chlorite, calcite, quartz and magnetite. The more leucocratic sedimentary rocks have been epidotized and chloritized to a lesser degree.

The intrusive rocks have also undergone some degree of regional metamorphism; although, it is difficult to distinguish local assimilation features, saussuritization and regional metamorphic alteration products.

Near the diorite stock on the southern boundary of the STU 2 mineral claim, the volcanic rocks have been thermally metamorphosed, propylitically-altered and pyritized. Its contact metasomatic aureole is often quite restricted, less than 20 metres. Near the diorite stock with the monzonitic core, the surrounding pyroclastic rocks have been propylitically- and potassically-altered, and pyritized. Along dyke contacts the country rocks are locally propylitized and pyritized but this alteration rarely extends more than 1 metre beyond their contact.

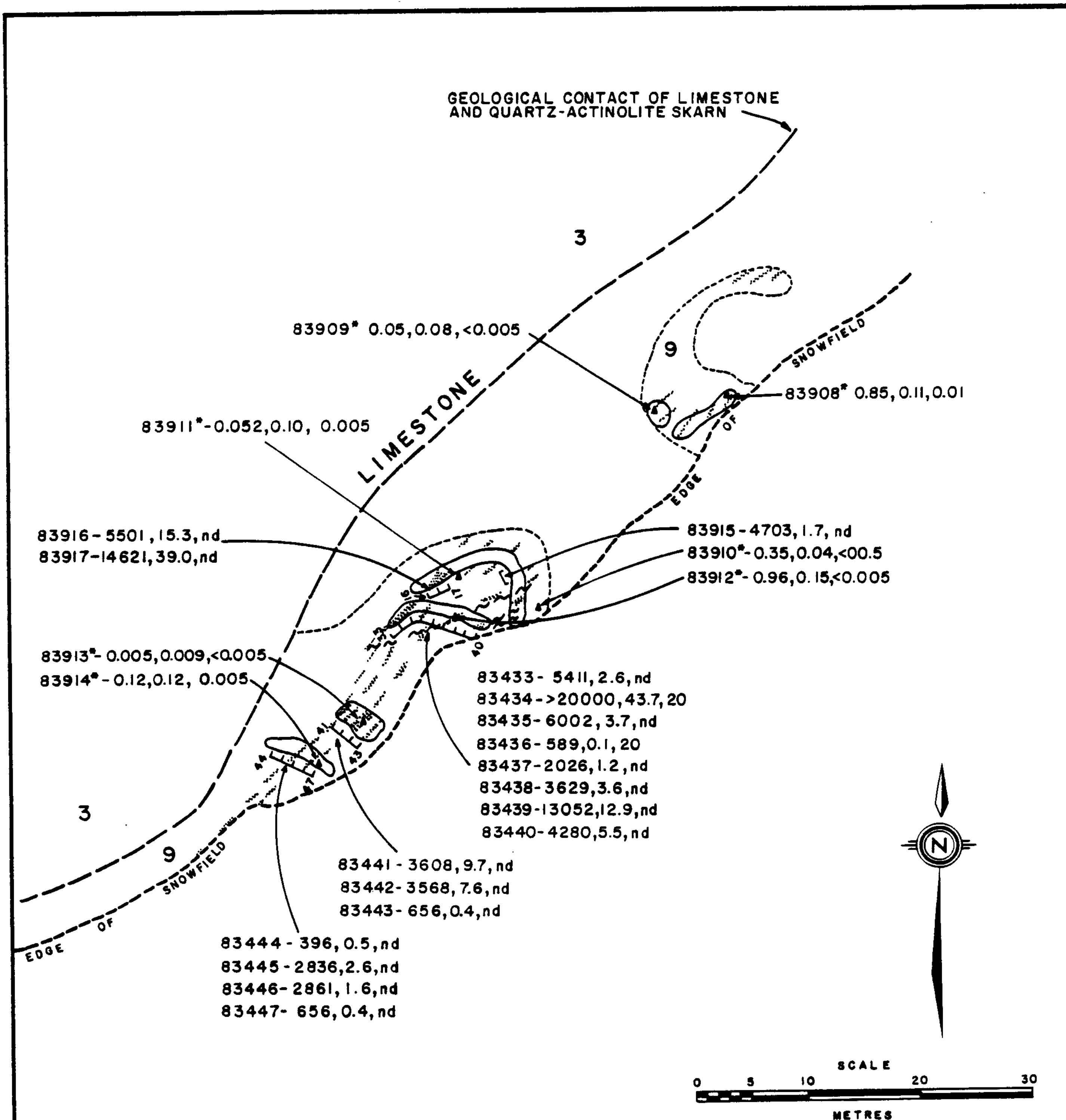
The most prominent alteration feature occurs along a northeasterly trending fault structure that transects the Ridge Zone. Along this structure the volcanic, pyroclastic and sedimentary rocks have been intensely fractured and altered to a bright orange to red colour. Within the fault zone the rock types are often indistinguishable except as an aphanitic quartz, plagioclase, hematite and ankerite groundmass.

4) **Mineralization**

Most of the known precious metal-bearing sulphide mineralization occurs as narrow, discontinuous shear- or fracture-filling vein structures. The geological survey results show that these veins rarely exceed 30 centimetres in width and often pinch out along strike within 5 to 20 metres. They infill older easterly trending open tensional fractures, or younger north-northeasterly trending shear planes. The easterly trending vein structures are invariably cut and, in some cases, displaced by more northerly trending normal and transcurrent shear and fault structures. All of the exposed sulphide-bearing veins were truncated at the intrusive contact of the feldspar porphyry and diorite dykes.

The most common sulphide mineral is pyrite. Pyrite occurs as very fine-grained to fine-grained disseminations and fracture filling as a result of: regional lower greenschist facies metamorphism, propylitic alteration near intrusive bodies, diagenesis of the argillaceous sedimentary rocks, and wallrock alteration adjacent to vein structures. It is notably absent within the quartz-actinolite-epidote skarn zone, except within younger crosscutting structures.

The economic mineralization comprises chalcopyrite, galena and sphalerite. Trace amounts of molybdenite and scheelite may also be present but restricted to the skarn unit. Chalcopyrite, and to a much lesser extent galena and sphalerite occur as fine-grained disseminations and fracture fillings in veins with pyrite and a gangue of quartz, calcite, epidote and chlorite. These same economic sulphide minerals occur with pyrrhotite as disseminations, fracture fillings, and pod-like bodies of semi-massive and massive mineralization within the quartz-actinolite-epidote skarn. Silver values appear to be genetically and proportionately-related to the copper content of the mineralization. Gold values appear to be genetically-related to the chalcopyrite-bearing vein structures and not to the skarn-hosted sulphide mineralization.




LEGEND

- Geologic Contact
- Fault
- Outcrop
- ▲ Panel sample (1 sq. m.)
- Channel sample (1 m.)
- * Denotes assay - % Cu, o.p.t. Ag, o.p.t. Au
- nd Not detected
- 83436-589,0.1,20 Sample No. - ppm Cu, ppm Ag, ppb Au

To accompany a report by J.D. Blanchflower.

MINOREX CONSULTING LTD.
GEOLOGICAL CONSULTANTS, VANCOUVER, B.C.

KESTREL RESOURCES LTD.
VANCOUVER, B.C.

# TRENCHING & LITHOGEOCHEMICAL PLAN
# BEAR ZONE
## STU PROPERTY

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| DATE: Dec. 4, 1989 | SCALE: 1:500 |
| DWN. BY: J.D.B./dw | DWG. NO.: 7 |

### Trenching

Six hand trenches, totalling 40 metres, were excavated along the trend of the Bear Zone sulphide mineralization. These trenches exposed the fresh skarn host and its attendant pyrrhotite and chalcopyrite mineralization. Detailed geological surveying and geophysical profiling (VLF-EM and magnetics) were conducted over the zone, and twenty-five panel or channel samples were collected at 1-metre intervals across the mineralization.

See Figure 7 of this report for the location and configuration of the trenching. This figure also documents the detailed geological and lithogeochemical results.

### Lithogeochemical Sampling

The lithogeochemical results for the prospecting work have already been discussed. None of the reconnaissance sampling results indicated the presence of a wide, precious metal-bearing structure that would warrant further exploration.

The analytical results from the sampling work over the Bear Zone were not encouraging. They show that the chalcopyrite mineralization can be quite rich and it does have significant silver values, but it does not host any gold values like the chalcopyrite-bearing vein structures. The highest copper, lead, zinc and silver values were returned from sample 83434 (greater than 20,001 p.p.b. copper and 43.7 p.p.m.(1.28 o.p.t.) silver) and sample 83917 (2,280 p.p.m. lead and 11,655 p.p.m. zinc). All of the gold values were less than 1 p.p.b.

## EXPLORATION POTENTIAL

Most of the recent exploration work has been directed towards sampling and surveying the more visible, gold-bearing vein structures. It was thought that with further exploration a closely-spaced vein or stockwork zone might be found that would be of economic interest. After three prospecting programs that have covered most of the exposed and accessible portions of the property, no such zone has been discovered.

The results of the detailed geological surveying show that all of the known gold-bearing vein structures are invariably too narrow and discontinuous to be of economic interest. These structures dominantly infill older easterly trending open tensional fractures that have been displaced and truncated by later faulting and intrusive activity.

It is the writer's opinion that further exploration should be directed towards evaluating the calcić skarn zone. The exploration results show that it is well, though sparsely, mineralized, and it probably has considerable depth potential if it is genetically related to a buried calc-alkaline pluton. Furthermore, despite its apparent lack of significant gold-bearing mineralization, this type of copper-iron calcic skarns with low sulfidation states (i.e. pyrrhotite, chalcopyrite) are known to host significant gold values.

## CONCLUSIONS

The 1989 exploration program did not discover any significant gold-bearing mineralization. The prospecting work discovered a number of narrow shear or fracture infilling vein structures; however, most of these veins are less than 30 centimetres wide, widely-spaced and discontinuous.

Several of the vein structure samples returned anomalous values of copper, lead, and/or zinc; but only one sample (no. 83320), across a 5-centimetre wide quartz-calcite vein, returned significant silver and gold values (35.7 p.p.m. silver and 0.876 o.p.t. gold). The rest of the reconnaissance lithogeochemical samples returned gold values less than 0.026 o.p.t. with most less than 1 p.p.b.

The results of the geological surveying show that the property is underlain by intercalated Upper Triassic volcanic, pyroclastic and sedimentary strata that have been intruded by a number of stocks and dykes of alkaline composition. These strata have undergone uplift and structural deformation by major north-northeasterly to east-northeasterly trending, normal and transcurrent faulting prior to the emplacement of the alkaline plutons. Furthermore, an easterly trending set of open tensional fractures was created during this deformation, and it was along these fracture voids that the majority of the narrow, precious metal-bearing vein structures were emplaced. The strata were later deformed by northeasterly normal faulting that provided conduits for the emplacement of the feldspar porphyry and diorite dykes. Subsequent north-northeasterly transcurrent faulting has displaced all of the lithologies.

The volcanic and sedimentary rocks have undergone regional metamorphism of the lower greenschist facies grade. In the immediate vicinity of the dioritic intrusions, these rocks have been thermally metamorphosed, propyliticaily-altered and pyritized; however, this alteration rarely extends beyond 20 metres of the intrusive contact.

The most prominent structural and alteration feature within the STU 2 mineral claim occurs along a northeasterly trending fault structure that transects the Ridge Zone. Along this structure the volcanic, pyroclastic and sedimentary rocks have been intensely fractured and altered to a bright orange, aphanitic, hematite- and ankerite-rich groundmass. There are, however, no base or precious metal values spatially-associated with this feature.

The results of the prospecting and detailed geological mapping over the quartz-actinolite-epidote skarn zone show that it is sparsely mineralized with pyrrhotite and minor chalcopyrite over its entire strike length. The semi-massive and massive mineralization at the Bear Zone has very limited strike and depth potential; and the individual lenses of semi-massive mineralization are very discontinuous, commonly have long axes of less than 5 metres and widths of less than 3 metres.

The analytical results from the Bear Zone sampling are not encouraging. They show that the chalcopyrite mineralization can be quite rich (i.e. greater than 2 per cent copper) and it does have significant silver values, but it does not host any gold values like the volcanic-hosted, chalcopyrite-bearing vein structures. All of the gold values were less than 1 p.p.b.

This property has now been thoroughly prospected. The results show that the volcanic and, to a lesser extent, the pyroclastic units host fracture-controlled vein mineralization. Selective grab samples from some of these structures, at Zappa Peak and within the Billy Goat Bowl and Ridge Zones, can return significant gold values up to 2.0 ounces per ton, but the economic potential of these structures is very limited.

It is the writer's opinion that further exploration should be directed towards evaluating the calcic skarn zone since this type of skarn is known to host significant gold values.

Mr. Syd Visser, the geophysical consultant, and the writer have recommended further exploration work, including: a HLEM (Max-Min 1) geophysical survey, trenching and a limited diamond drilling program. This work should be directed towards evaluating and defining any possible gold-bearing sulphide mineralization that might be hosted by both the calcic skarn and the hematite-ankerite fault structure that transects the Ridge Zone. The estimated budget for this recommended program is $ 150,000.00.

Submitted by,

**MINOREX CONSULTING LTD.**

**J.D. Blanchflower, F.G.A.C.**
Consulting Geologist

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## STATEMENT OF QUALIFICATIONS

I, J. D. BLANCHFLOWER, of the Municipality of Delta, Province of British Columbia, DO HEREBY CERTIFY THAT:

1) I am a Consulting Geologist with a business office at 11967 - 83A Avenue, Delta, British Columbia, V4C 2K2; and President of Minorex Consulting Ltd.

2) I am a graduate in geology with a Bachelor of Science, Honours Geology degree from the University of British Columbia in 1971.

3) I am a Fellow of the Geological Association of Canada.

4) I have practised my profession as a geologist for the past eighteen years.

   Pre-Graduate field experience in Geology, Geochemistry and Geophysics (1966 to 1970).

   Three years as Geologist with the B. C. Ministry of Energy, Mines and Petroleum Resources (1970 to 1972).

   Seven years as Exploration Geologist with Canadian Superior Exploration Limited (1972 to 1979).

   Three years as Exploration Geologist with Sulpetro Minerals Limited (1979 to 1982).

   Seven years as Consulting Geologist and President of Minorex Consulting Ltd. (1982 to 1989).

5) I own no direct, indirect or contingent interest in the subject claims, nor shares in or securities of **KESTREL RESOURCES LTD.**

6) I supervised the 1989 exploration program on the subject property, conducted the geological surveying and prepared this report which documents the results of the program.

J. D. Blanchflower, F.G.A.C.

Dated at Delta, British Columbia, this 4th day of December, 1989.

# STATEMENT OF EXPENDITURES

The following expenditures for conducting the 1989 Exploration Program were supplied to the writer by Rangex Services, on behalf of Kestrel Resources Ltd.

## Field Expenses

### 1) Personnel Expenses

| | |
|---|---|
| J.D. Blanchflower - Project Geologist<br>20 days @ $350.00 per day | $ 7,000.00 |
| J. Buchholz - Geologist<br>2 days @ $300.00 per day | 600.00 |
| N. De Bock - Prospector<br>11 days @ $250.00 per day | 2,750.00 |
| K. Forster - Geological Assistant<br>11 days @ $175.00 per day | 1,925.00 |
| J. Elmore - Geological Assistant<br>12 days @ $150.00 per day | 1,800.00 |
| M. Bashford - Prospector/Driller<br>7 days @ $175.00 per day | 1,225.00 |
| D. Legere - Driller's Assistant<br>4 days @ $150.00 per day | 600.00 |
| J. Lee - Geological Assistant<br>2 days @ $175.00 per day | 350.00 |
| Total Fees, Salaries and Wages | $ 16,250.00 |

### 2) Field Support Expenses

| | |
|---|---|
| Board and Lodging - 82 mandays @ $125.00 per day | $ 10,250.00 |
| Aircraft Support | |
| Fixed Wing Support | 3,569.64 |
| Helicopter Support - 33.9 hours @ $721.86 per hour | 24,471.15 |
| Assaying and Analytical Costs - Vangeochem Lab Ltd. | 1,779.00 |
| Map Purchases and Plan Reproductions | 160.03 |
| Travel and Accommodation Expenses | 1,208.07 |
| Expendable Field Supplies | 1,320.64 |

| | | |
|---|---|---|
| | Freight and Shipping Expenses | 346.23 |
| | Expediting Expenses | 450.00 |
| | Equipment Rental Expenses | 452.97 |
| | Total Field Expenses | $ 44,007.73 |
| 3) | **Subcontractor Expenses** | |
| | SJ Geophysics Ltd. (see Appendix I) | $ 12,054.69 |
| 4) | **Management Fee** (Rangex Services) - 10 % of Total Field Expenses (not including Personnel and Subcontractor Costs and Expenses | $ 4,400.77 |
| 5) | **Office Expenses** | |
| | Report Preparation (Minorex Consulting Ltd.) | $ 4,593.79 |
| | Drafting Expenses | 700.00 |
| | Report Reproduction Expenses | 300.00 |

**TOTAL COST OF 1989 EXPLORATION PROGRAM** **$ 82,306.98**

## APPENDIX I

UTEM and Magnetometer Survey on Ridge Zone

and

Magnetometer and VLF-EM Test Survey on the Bear and Zappa Zones

STU 1 and 2 Mineral Claims

Liard Mining Division, B.C.

by

SJ Geophysics Ltd.

and

Lamontagne Geophysics Ltd.

# UTEM AND MAGNETOMETER SURVEY

ON

RIDGE ZONE, STU 1 AND 2 CLAIMS

AND A

MAGNETOMETER AND VLF-EM TEST SURVEY

ON THE

BEAR AND ZAPPA ZONES, STU 1 AND 2 CLAIMS

FOR

KESTREL RESOURCES LTD.

BY

SJ GEOPHYSICS LTD. AND LAMONTAGNE GEOPHYSICS LTD.

LIARD M.D. N.T.S. 104B/10

NOVEMBER 1989

Report By
Syd J. Visser
SJ GEOPHYSICS LTD.

# TABLE OF CONTENTS

## INTRODUCTION

A UTEM, magnetometer and small VLF-EM test surveys were conducted on the Ridge, Bear and Zappa zones of the Stu 1 and Stu 2 claims, at the request of Kestrel Resources Ltd. during the period of September 8, to September 13, 1989. The Stu 1 and Stu 2 claims are located on the east side of the mountain ridge, located between Bronson creek and Snippaker creek in the Iskut river area of north western B.C. (N.T.S. 104b/10). Access to the claims were by helicopter from the Bronson or Forest-Kerr air strip.

The purpose of the UTEM survey, performed on the Ridge zone, was to search for both shallow and deep seated massive sulphide conductors that may have associated gold values.

The purpose of the magnetometer survey on all the zones (the Bear zone is covered by the northeast corner of the Ridge zone survey) was to aid in geological mapping, search for possible magnetic pyrrhotite and locate any magnetite bodies that may be related to skarn zones.

The purpose of the small magnetometer and VLF-EM test surveys on the Bear and Zappa zones is to test the response of these systems to the known mineral occurrences.

## DESCRIPTION OF UTEM SYSTEM

UTEM is an acronym for "University of Toronto ElectroMagnetometer". The system was developed by Dr. Y. Lamontagne (1975) while he was a graduate student of that University.

The field procedure consist of first laying out a large loop of single strand insulated wire and energizing it with current from a transmitter which is powered by a 2.2 kW motor generator. Survey lines are generally oriented perpendicular to one side of the loop and surveying can be performed both inside and outside the loop.

The transmitter loop is energized with a precise triangular current waveform at a carefully controlled frequency (54.409 Hz for this survey). The receiver system includes a sensor coil and backpack portable receiver module which has a digital recording facility on cassette magnetic tape. The time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units which must be accurate to about one second in 50 years.

The receiver sensor coil measures the vertical or horizontal magnetic component of the electromagnetic field and responds to its time derivative. Since the transmitter current waveform is triangular, the receiver coil will sense a perfect square wave in the absence of geologic conductors. Deviations from a perfect square wave are caused by electrical conductors which may be geologic or cultural in origin. The receiver stacks any pre-set number of cycles in order to increase the signal to noise ratio.

The UTEM receiver gathers and records 10 channels of data at each station. The higher number channels (7-8-9-10) correspond to short time or high frequency while the lower number channels (1-2-3) correspond to long time or low frequency. Therefore, poor or weak conductors will respond on channels 10, 9, 8, 7 and 6. Progressively better conductors will give responses on progressively lower number channels as well. For example, massive, highly conducting sulfides or graphite will produce a response on all ten channels.

It was mentioned above that the UTEM receiver records data digitally on a cassette. This tape is played back into a computer at the base camp. The computer processes the data and controls the plotting on an 11" x 17" graphics printer. Data are portrayed on data sections as profiles of each of the first nine or ten channels, one section for each survey line.

## FIELD WORK AND DISCUSSION OF FIELD PARAMETERS

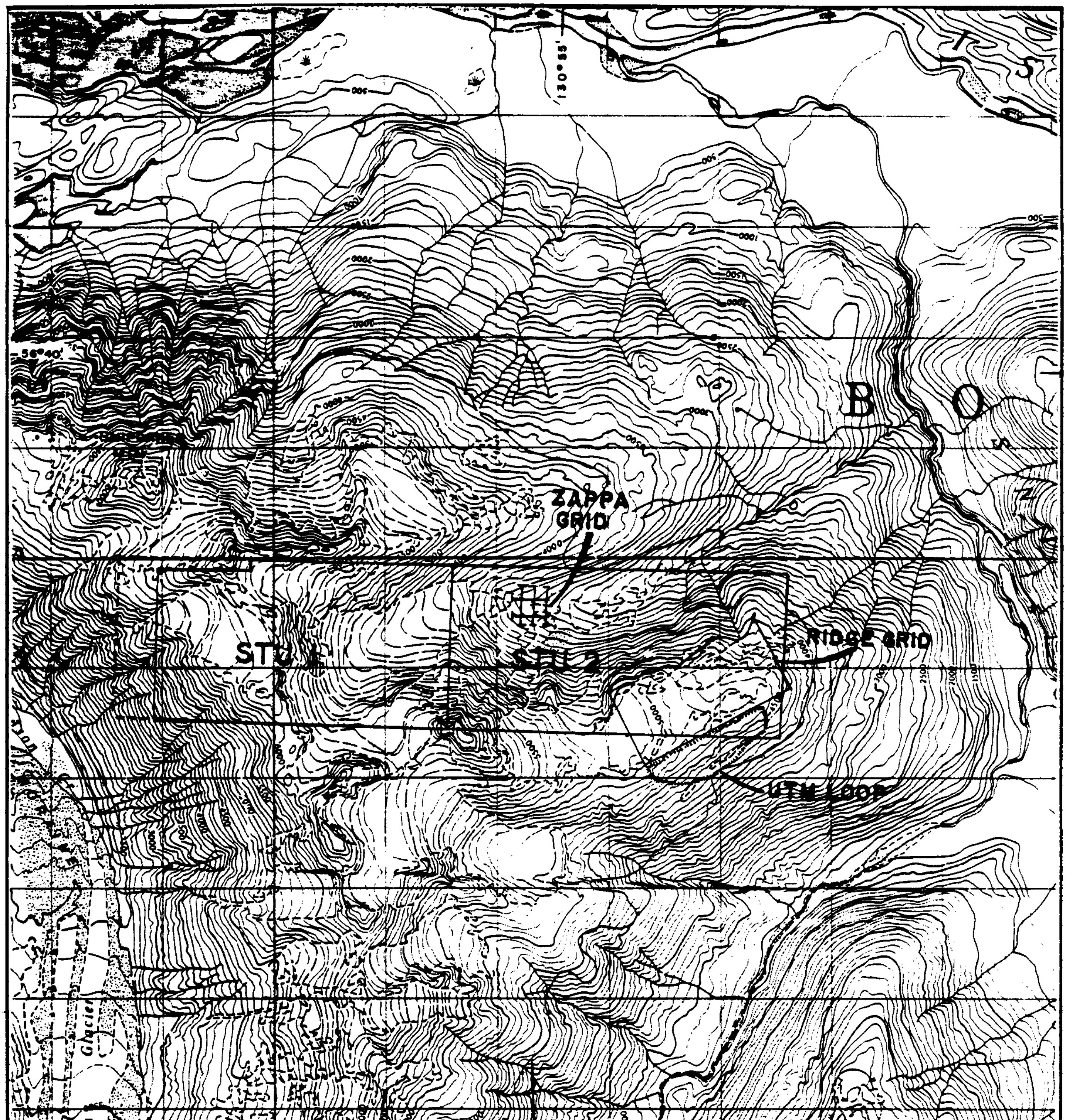
Syd Visser and Rolf Krowinkel, geophysicist with SJ Geophysics Ltd., and the equipment were mobilized by helicopter from the Inel camp to the Forest-Kerr camp. The survey area was accessed each day by helicopter from the Forest Kerr camp. The UTEM survey was performed by SJ Geophysics Ltd. and Lamontagne Geophysics Ltd.

The grid lines on the Ridge grid (Plate G4), totaling approximately 10.8 kilometers, were established by Kestrel Resources Ltd. personal using a hip chain to place stations at 20M intervals along 100M spaced lines. The slope at each station interval was recorded by the geophysics crew and the station spacing and the line spacing, were later corrected by computer, (where data was available) for plotting purposes.

A large UTEM transmitter loop (Plate G4) was placed to the south of the Ridge zone grid because of logistical reasons (the north side of the Ridge is to steep), the east west striking geology and assumed near vertical dips of possible conductors.

Ten UTEM time channels, of the vertical component (Hz) of the electromagnetic field, were measured at each station along the lines. The resultant data was later reduced and plotted in camp by computer. A high base frequency of 54.4 Hz was used for the survey because of the weak (< 50 mhos) conductors expected in the survey area. The response of a weak conductor does not last very late in time. A higher base frequency also narrows the time windows which aids in interpreting weak conductors and to speeds up data collection.

A magnetometer survey, using a Gem-8 Proton Precession magnetometer, was conducted over part of the Ridge zone which includes the Bear zone on the north east corner, at 10M station intervals for a total of approximately 10.5 line kilometers. A small test survey was also conducted on the




AFTER B.C.M.M. Claim Map 104 B/10 W

SCALE

1 0 1 2 3 km

To accompany a report by S. VISSER

**S J GEOPHYSICS LTD.**

KESTREL RESOURCES LTD.
VANCOUVER, B.C.

# GRID LOCATION MAP
## STU PROPERTY

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| DATE: Dec. 4, 1989 | SCALE: 1:50,000 |
| DWN. BY: J.D.B./dw | DWG. NO.: 1 |

Zappa zone (Fig 3). The diurnal corrections were made using the standard loop correction method. The surveys were conducted during a magnetically quit period.

Two small VLF-EM test surveys, using a Geonics EM-16, were conducted on the Bear and Zappa zones (Fig 2 & Fig 4). The transmitter stations used for the survey were Seattle (Jim Creek NLK, 24.8 Khz) for the easterly lines and Annapolis (NSS, 21.4 Khz) and/or Cutler (NAA, 24.0 Khz) for the northerly lines. All the data is positive to the north or east.

## DATA PRESENTATION

The results of the UTEM survey are presented on 30 data sections representing 15 lines of data (Appendix III) and one compilation map. The magnetic data for the Bear zone was combined with the data from the Ridge zone and plotted as profiles and a contour map. The VLF-EM from the Bear zone and the Zappa zone was plotted as profiles on Fig 2 and Fig 4 respectively. The magnetic data from the Zappa zone was plotted as profiles on Fig 3.

The maps are listed as follows:

| | |
|---|---|
| Fig 1 | Location Map |
| Fig 2 | Bear Zone, VLF-EM Test Survey |
| Fig 3 | Zappa Zone, Magnetometer Test Survey |
| Fig 4 | Zappa Zone, VLF-EM Test Survey |
| Plate G1 | Ridge Zone, Magnetometer Survey Profiles |
| Plate G2 | Ridge Zone, Magnetometer Survey Contours |
| Plate G3 | Ridge Zone, UTEM & Magnetometer Compilation |
| Plate G4 | Ridge Zone, Approx. Topographic Map |

Legends for the UTEM data sections are also attached (Appendix II).

In order to reduce the UTEM field data, the theoretical primary field of the loop must be computed at each station. The normalization of the data is a follows:

a) For Channel 1:

$$\% \text{ Ch.1 anomaly} = \frac{\text{Ch.1} - \text{PC}}{/\text{PT}/} \times 100$$

Where:

PC is the calculated primary field in the direction of the component from the loop at the occupied station

Ch.1 is the observed amplitude of Channel 1

PT is the calculated total field

b) For remaining channels (n = 2 to 9)

$$\% \text{ Ch.n anomaly} = \frac{(\text{Ch.n} - \text{Ch.1})}{\text{Ni}} \times 100$$

where Ch.n is the observed amplitude of Channel n (2 to 9)

N = Ch.1 for Ch1 normalized

N = PT for primary field normalized

i is the data station for continuous normalized (each reading normalized by different primary field)

i is the station below the arrow on the data sections for point normalized (each reading normalized by the same primary field)

Subtracting channel 1 from the remaining channels eliminates the topographic errors from all the data except ch.1.

If there is a response in channel 1 from a conductor then this value must be added to do a proper conductivity determination from the decay curves. Therefore channel 1 should not be subtracted indiscriminately.

The data from each line is plotted on at least 2 separate sections consisting of a continues normalized section and a point normalized section. Point normalization data is the absolute secondary field at a "gain setting" related to the normalization point. The data is usually point normalize over the central part of the crossover anomaly to aid in interpretation.

## INTERPRETATION

### RIDGE ZONE

The UTEM anomalies (U1-U5, Plate G3) that were found on the Ridge zone were all near surface very weak conductors (< 1mho) that appear more like contact zones between rocks of different conductivities than discrete conductors.

The contact anomaly U1 is a very weak contact zone probably indicating the contact between the volcanics or sedimentary rock and the diorite as indicated by the magnetometer survey.

The anomalies U2 to U3 appears to be a major structure striking across the width of the grid. The rocks between anomaly U3 and U4 appear to be much more conductive then the surrounding rocks and could very well be mineralized along part of the strike length, as indicated be the mineralization on the Bear zone. The best conductivities in this zone appear to be between lines 2000E and 2400E along the southern contact (U3). Part of this zone also correlates with a weak magnetic anomaly on lines 2300E and 2400E and possible on line 2850E (the later line was not surveyed by UTEM but the contact is expected to extend to line 2850E). Because of the wide weak conductive zone it is very difficult to get dip information.

There is a distinct change in character between the contact anomalies U2-U3 and U4 suggesting that there is a cross structure between lines 1900E and 2000E or a change in rock type. It is not certain if U2 is a continuation of U3 or U4 although there is some suggestion that it may be a continuation of U4, that the structure is dipping to the south and that it is a much weaker anomaly then U3. A south dipping structure would couple poorly with the field from the transmitter loop therefore possible making it appear as a much weaker anomaly.

Anomaly U5 also appears to be a very weak single line anomaly which is very difficult to interpret because of the proximity to the end of the line.

The magnetometer survey indicates a major magnetic zone on the eastern part of the grid (M1, Plate G3) and a number of smaller minor magnetic anomalies (M2- M5).

The Magnetic zone (M1) is likely due to the diorite intrusion known to outcrop in this area. Magnetic anomaly M5 could also be due to a diorite intrusion which may not be outcropping.

The magnetic anomalies M2 to M4 appear to be closely related to the UTEM contact anomalies and therefore should be investigated further if they could be due to magnetite or possibly small pyrrhotite showings.

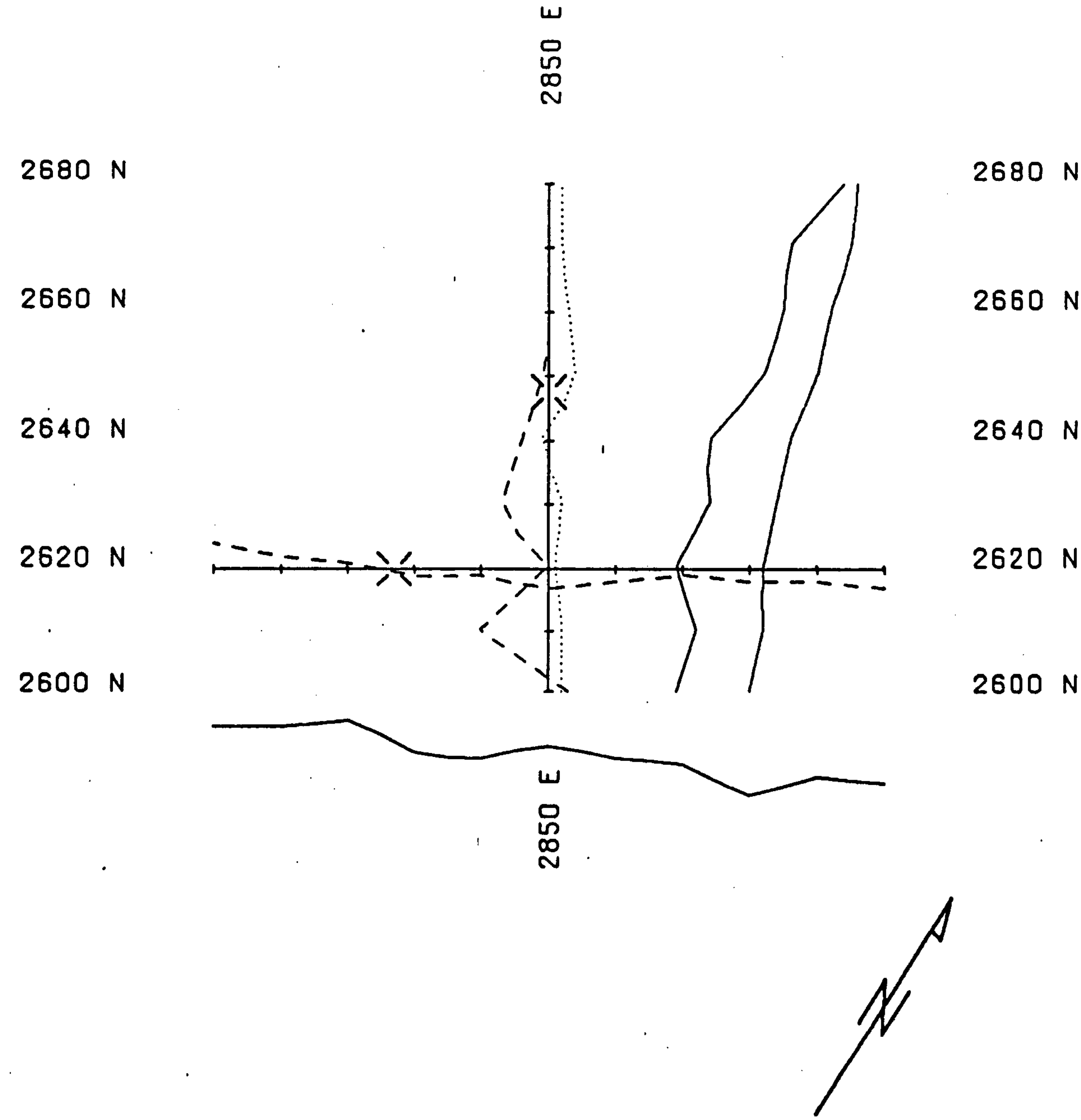
BEAR ZONE

The very weak VLF-EM conductor located at approximately 2640N on line 2850E (Fig 2) correlates very well with the weak magnetic anomaly (M2, Plate G3). These anomalies do not appear to correlate directly with the outcropping sulphide mineralization which is locates at approximately 2620N on line 2850E. A weak VLF-EM anomaly is also located at approximately 2828E on line 2620N. This weak anomaly may show the western extend of the known mineralization.

ZAPPA ZONE

The VLF-EM indicated some very weak quadrature anomalies (Fig 4) which are likely due to overburden. The response noted in the dip angle is likely due to topography.

The magnetic survey did not indicated anything of interest.




WEAK VLF-EM CONDUCTOR

STATION USED
SEATTLE: NORTH LINE
ANNAPOLIS, CUTLER: EAST LINE

PROFILES POSITIVE: LEFT & UP
DIP ANGLE SOLID LINES: 10 %/CM
QUADRATURE DASHED LINES: 10 %/CM

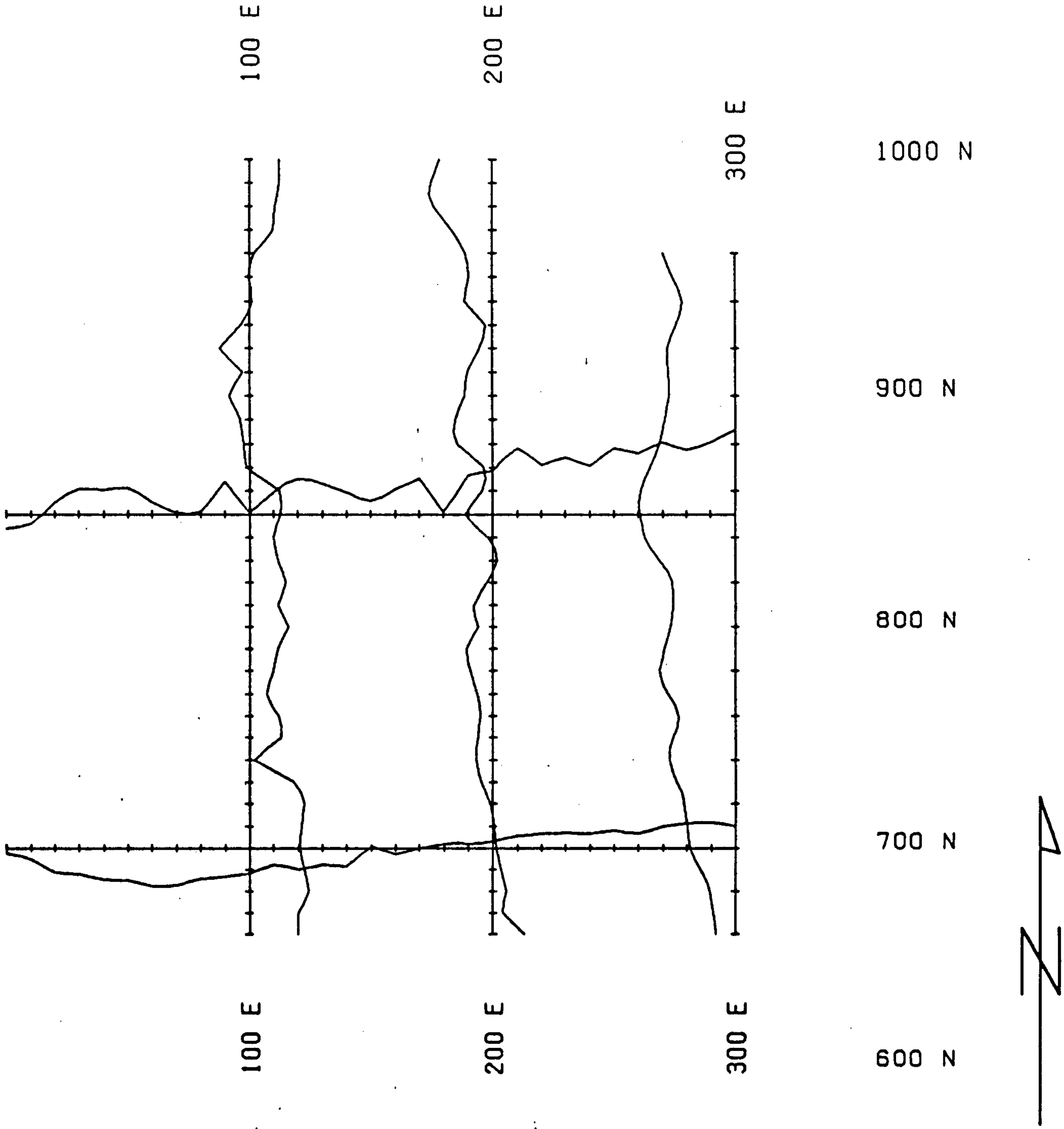
INSTRUMENTATION:
GEONICS EM-16 VLF-EM

KESTREL RESOURCES LTD.
BEAR ZONE, STU 1 & 2 CLAIMS
ISKUT RIVER AREA
VLF-EM TEST SURVEY

LIARD M.D. N.T.S. 104B/10

SCALE 1:1000
10 0 10 20 30

SJ GEOPHYSICS LTD. NOVEMBER 1989 FIG 2




MAGNETIC ANOMALY
SHOWING WIDTH

PROFILES POSITIVE: LEFT & UP
PROFILE SCALE: 100 NT/CM
BASE LEVEL: 57300 NT

INSTRUMENTATION: GEM-8
PROTON PRECESSION MAGNETOMETER

KESTREL RESOURCES LTD.
ZAPPA ZONE, STU 1 & 2 CLAIMS
ISKUT RIVER AREA
MAGNETOMETER TEST SURVEY

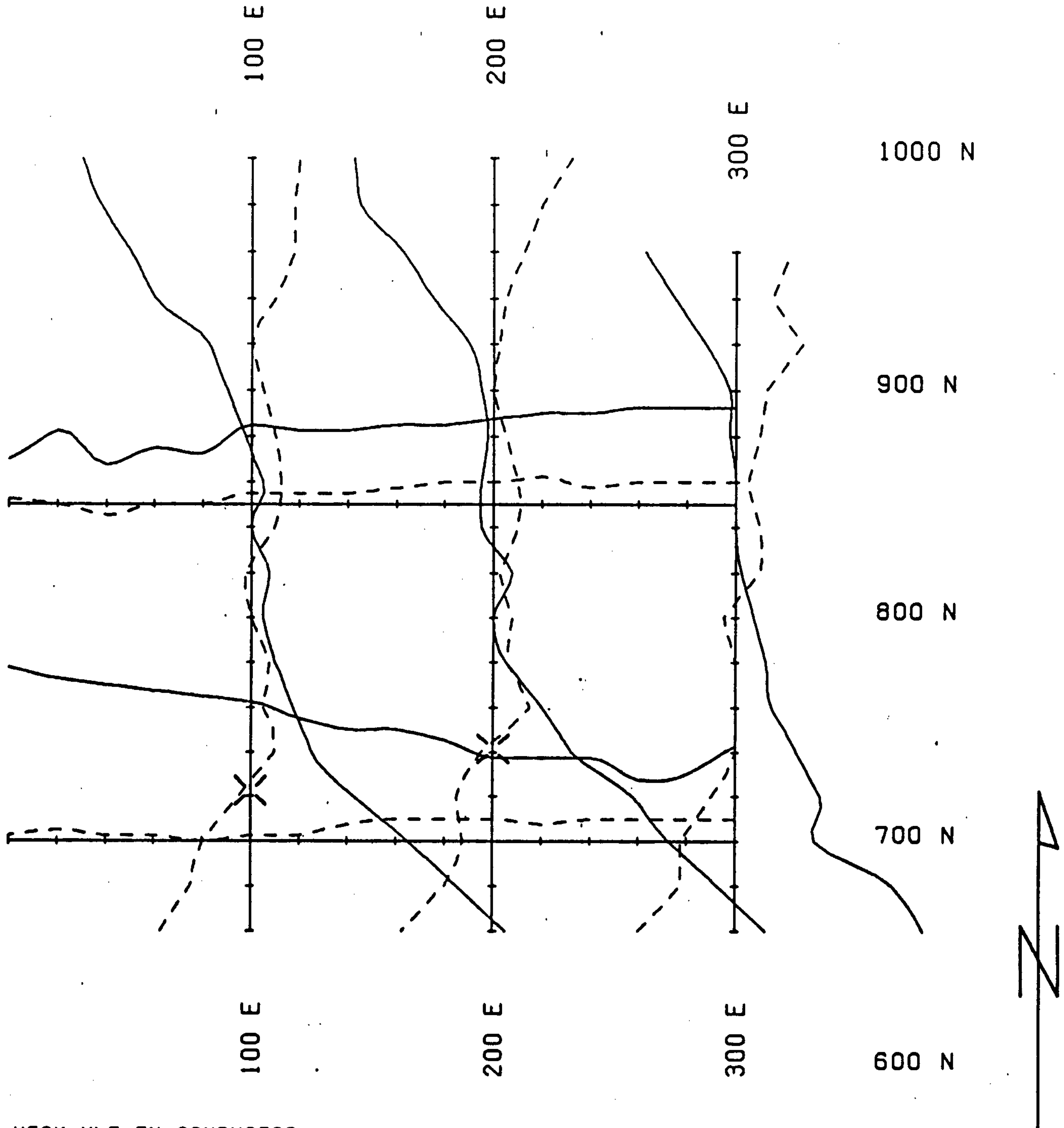
LIARD M.D. N.T.S. 104B/10

SCALE 1:2500
25 0 25 50 75

SJ GEOPHYSICS LTD.

NOVEMBER 1989

FIG 3




WEAK VLF-EM CONDUCTOR

STATION USED:
ANNAPOLIS: EAST LINES
SEATTLE: NORTH LINES

PROFILES POSITIVE: LEFT & UP
DIP ANGLE SOLID LINES: 10 %/CM
QUADRATURE DASHED LINES: 10 %/CM

INSTRUMENTATION:
GEONICS EM-16 VLF-EM

KESTREL RESOURCES LTD.
ZAPPA ZONE, STU 1 & 2 CLAIMS
ISKUT RIVER AREA
VLF-EM TEST SURVEY

LIARD M.D. N.T.S. 104B/10

SCALE 1:2500
25 0 25 50 75

SJ GEOPHYSICS LTD.

NOVEMBER 1989

FIG 4

RECOMMENDATION

It is recommended to closely correlate any of the geological and prospecting information, to verify if there is any potential for mineralization along the main conductive zone U2 to U3 on the Ridge zone, before any further work is done.

The area between the U3 and U4 anomaly, striking from line 2000E to line 2400E, and especially on the magnetic anomaly M3, from lines 2300E to 2400E appears to be the most conductive area and therefore is the most interest for further detail geological investigation with possible trenching.

Because the dip of the conductive zone may be dipping south, which is apparent on lines 1400E to 1900E, and therefore coupling poorly with the UTEM magnetic field, it is recommended to do detail HLEM (Max-Min1) using the high frequencies and short cable separation, over the conductive zone to better delineate the conductor and search for smaller massive sulphide occurrences along the contacts or in the conductive zone. A line spacing of 50M is recommended. The survey should also be extended to the east and west to trace the continuation of this zone.

## CONCLUSION

The UTEM survey indicated a very weak shallow conductive zone striking across the width of the Ridge zone with the best conductivity laying between lines 2000E and 2400E. This anomalous region should be correlated closely to know geology to determine if detail work on this zone is warranted. No deep or strong anomalies were noted in the survey area.

The majority of the magnetic anomalies on the Ridge zone are due do magnetic diorites. A number of weak magnetic that correlated to the UTEM anomalies and a weak VLF-EM anomaly on the Bear zone may be due to pyrrhotite or magnetite associated with a skarn. These weak magnetic anomalies should be investigated further.

The magnetometer and VLF-EM test survey on the Zappa zone did not indicate anything of interest.

Syd Visser F.G.A.C.
Geophysicist

SJ Geophysics LTD.

APPENDIX I

## STATEMENT OF QUALIFICATIONS

I, Syd J. Visser, of 8081 - 112th Street, Delta, British Columbia, hereby certify that,

1) I am a graduate from the University of British Columbia, 1981, where I obtained a B.Sc. (Hon.) Degree in Geology and Geophysics.

2) I am a graduate from Haileybury School of Mines, 1971.

3) I have been engaged in mining exploration since 1968.

4) I am a Fellow of the Geological Association of Canada.

Syd J. Visser, B.Sc., F.G.A.C.
Geophysicist

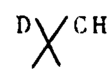
# APPENDIX II

# LEGEND

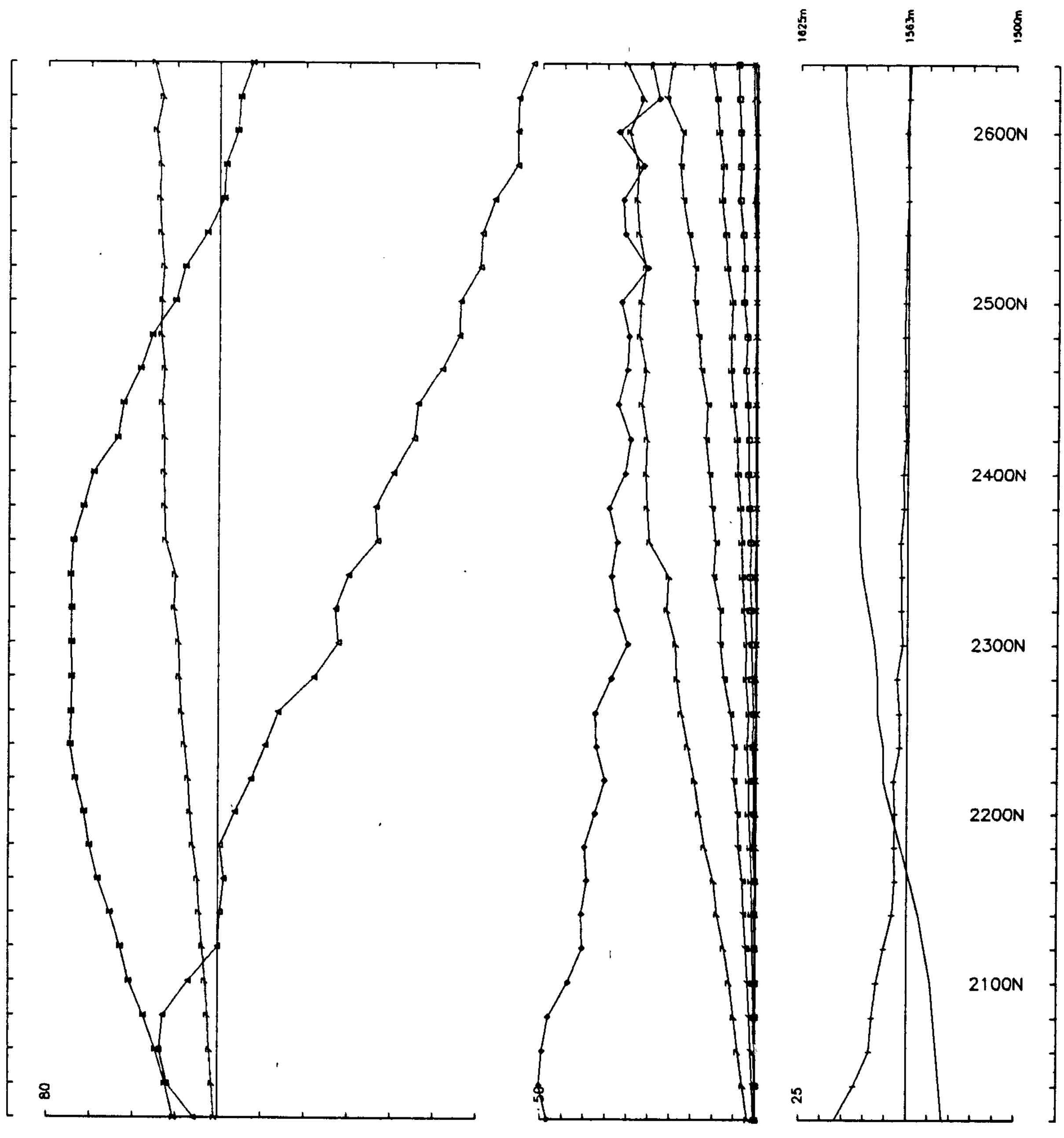
| Channel | Mean delay time<br>Base Freq. 54.4 Hz | Plotting symbol |
|---|---|---|
| 1 | 6.9 ms | 1 |
| 2 | 3.45 | / |
| 3 | 1.725 | \ |
| 4 | 0.863 | □ |
| 5 | 0.432 | ⋝ |
| 6 | 0.216 | ∆ |
| 7 | 0.108 | 7 |
| 8 | 0.054 | ⧗ |
| 9 | 0.027 | △ |
| 10 | 0.014 | ◇ |

Change in conductivity:
Geological contact
Direction of increased conductivity
Top edge of shallow dipping plate

Crossover Axis:
D = depth: S - Shallow depth
M - Medium depth
D - Deep depth
CH = Latest time channel

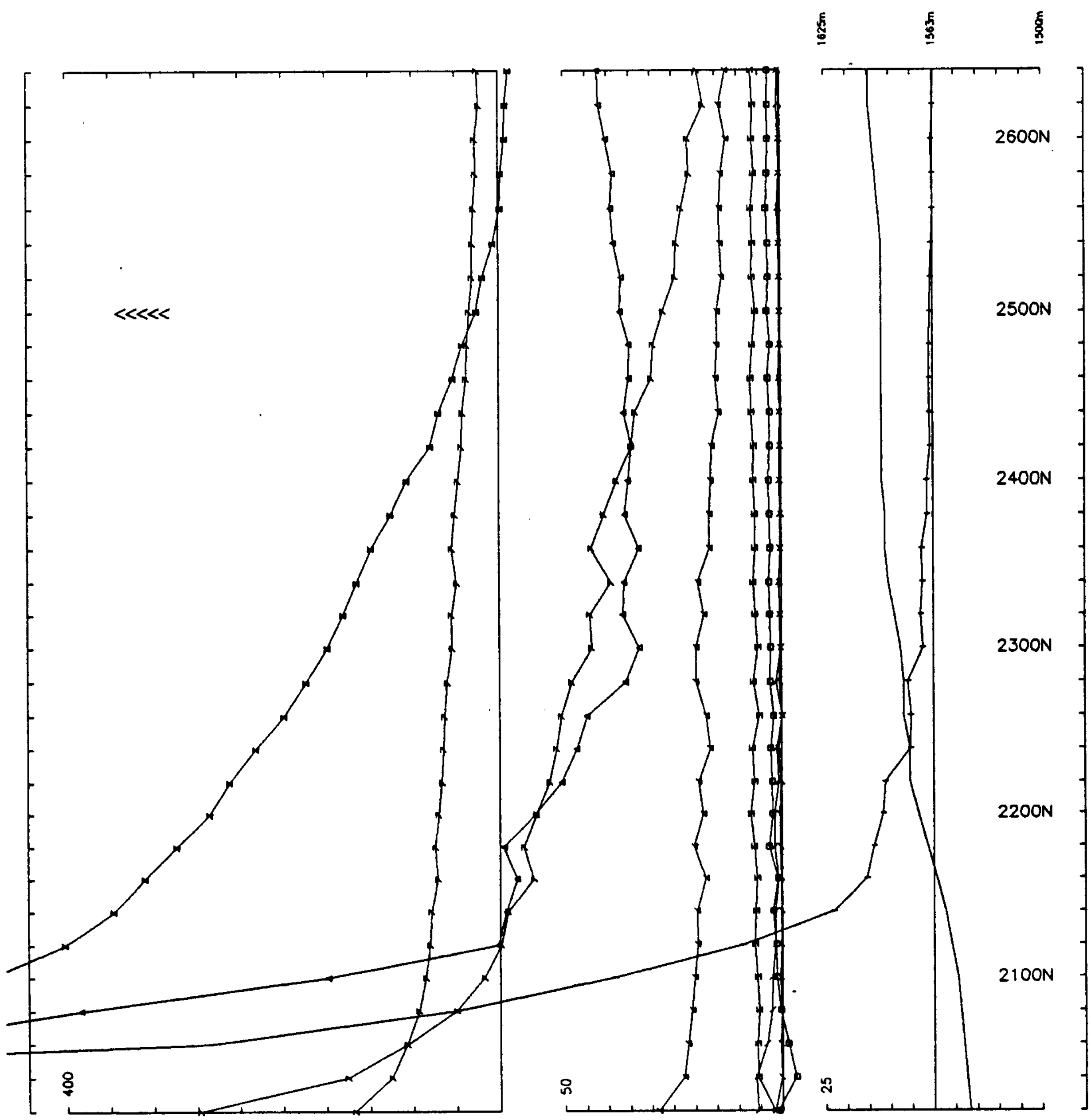


# APPENDIX III




Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 1400E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.

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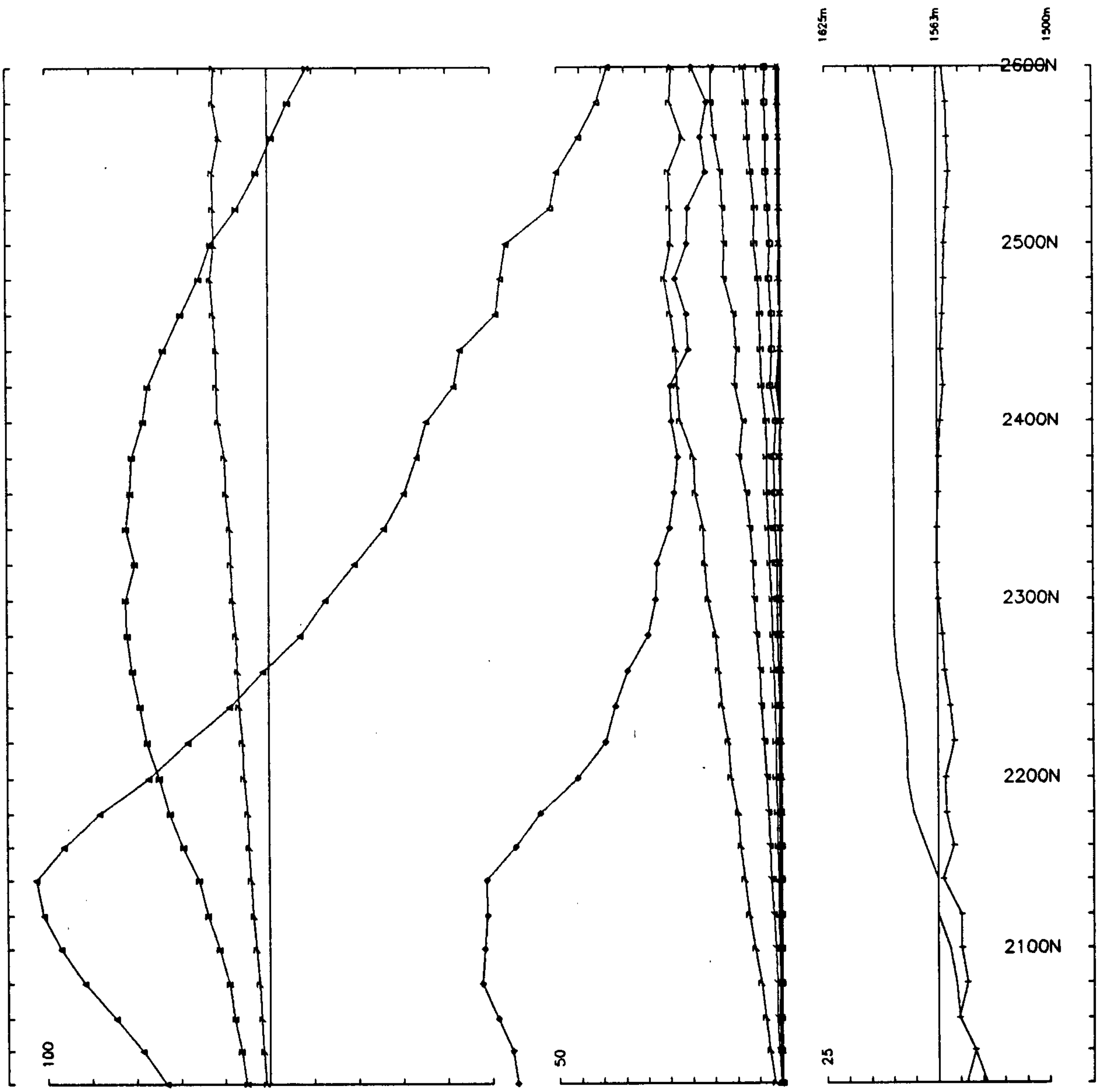
Loopno 1 Line 1400E component Hz secondary Ch 1 normalized Ch 1 reduced point norm.

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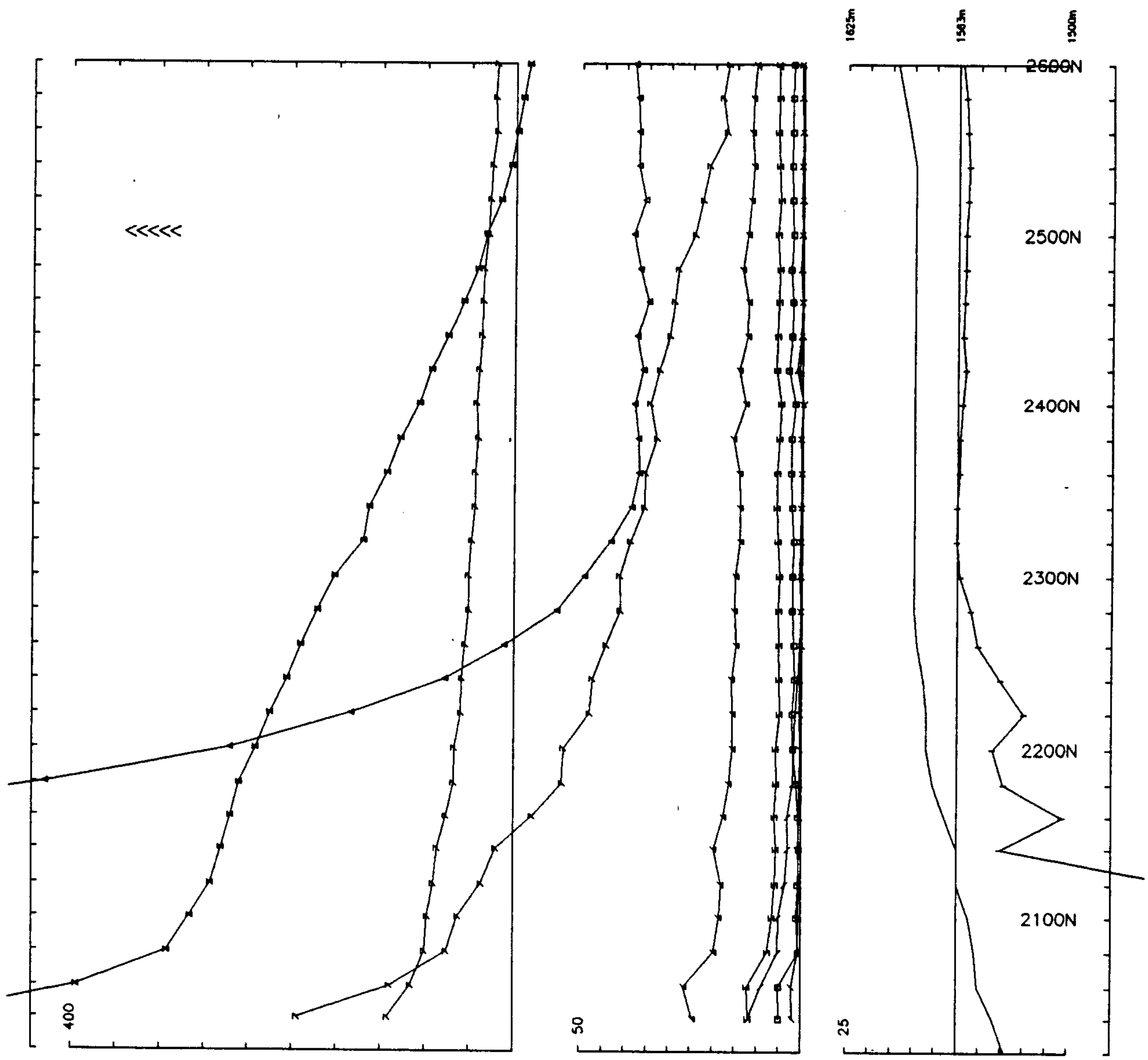


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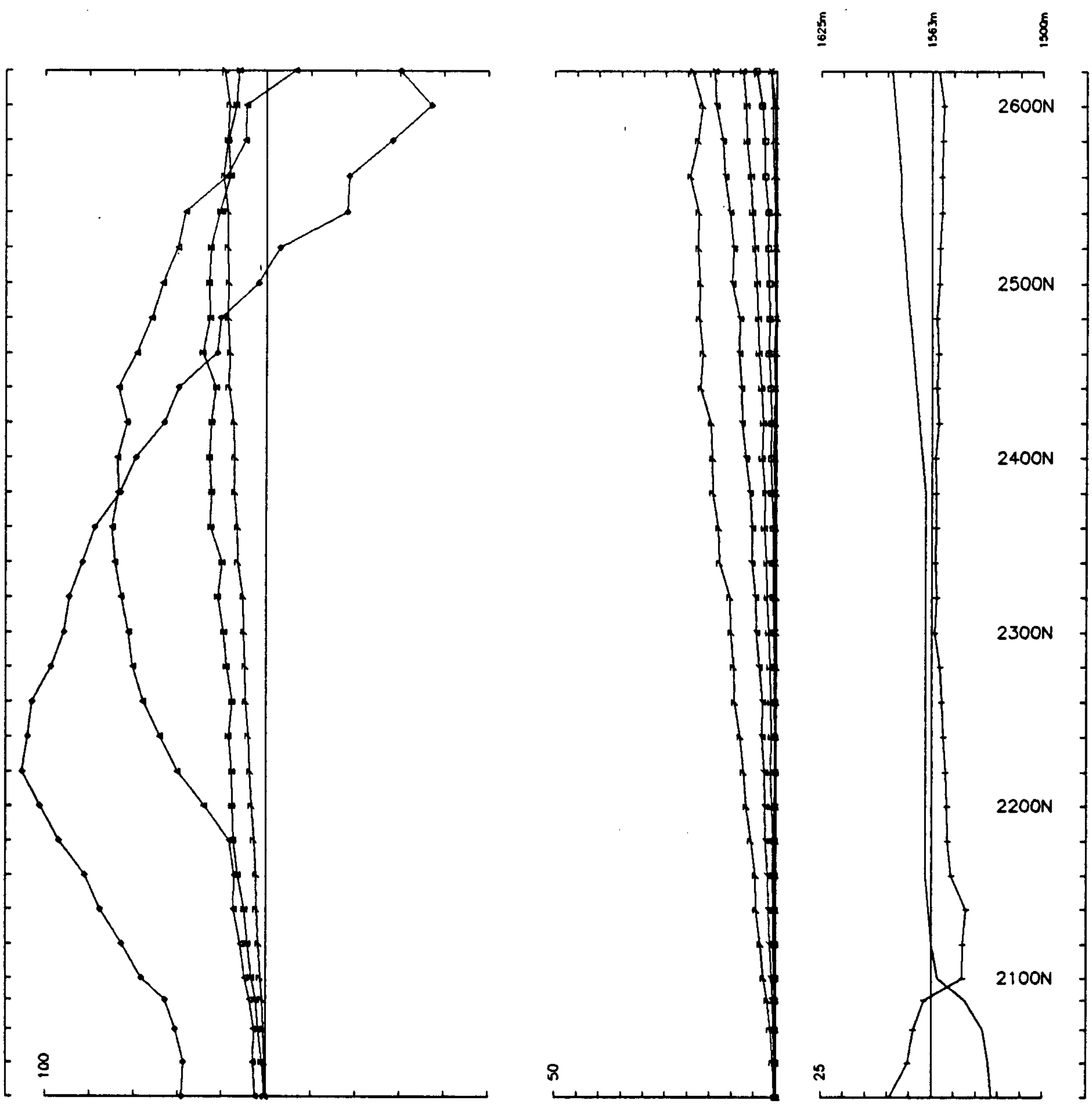


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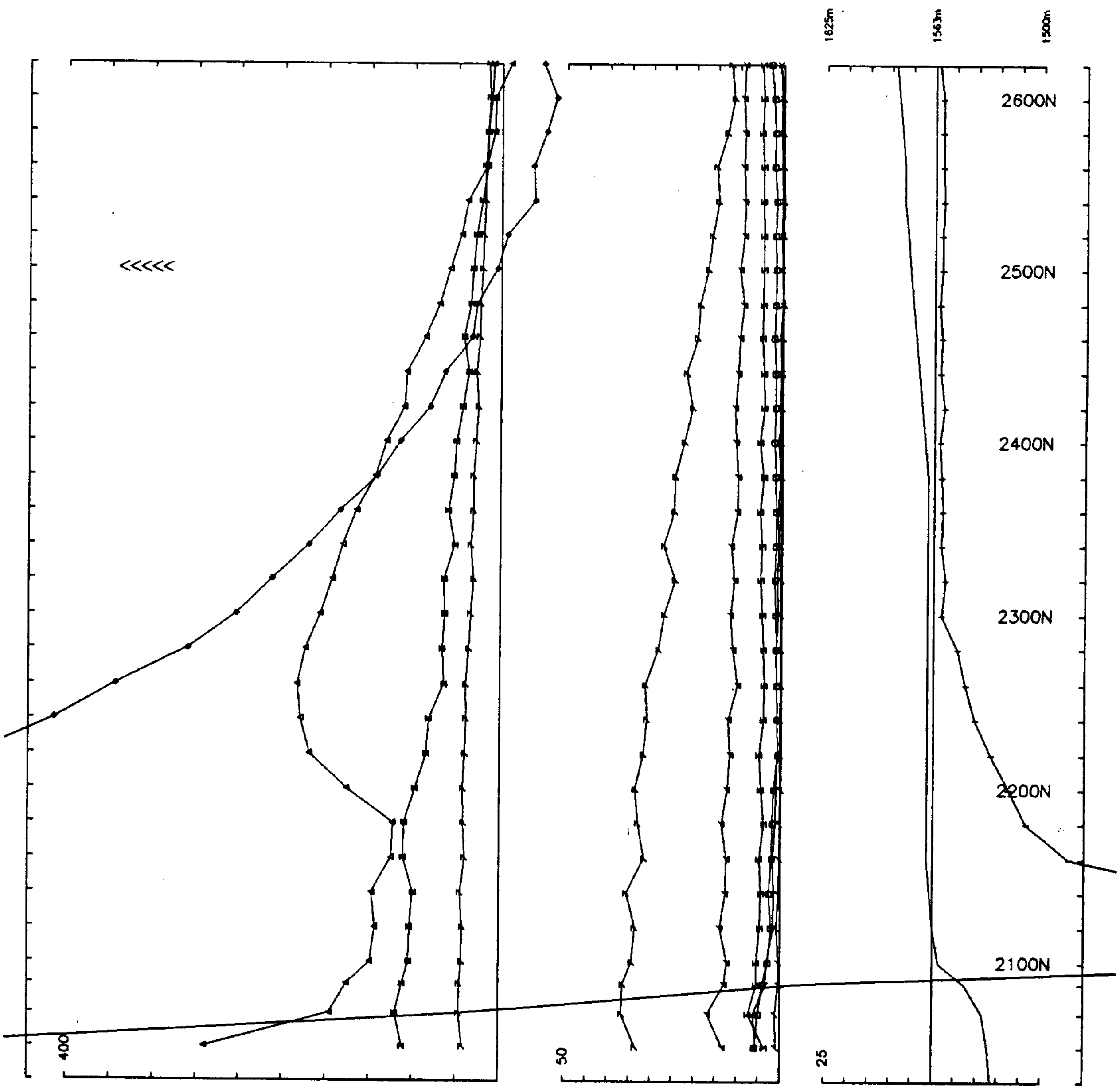


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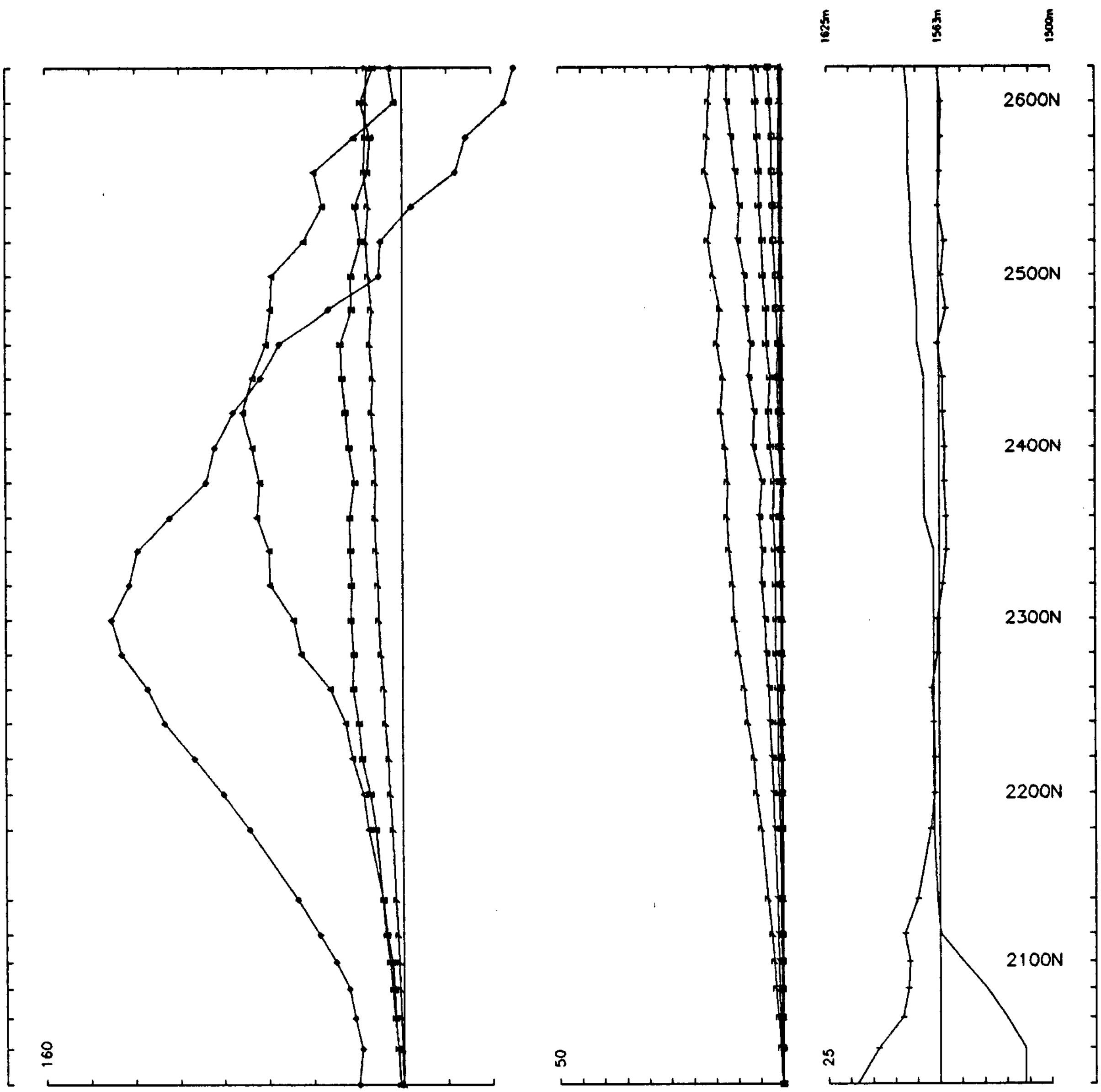
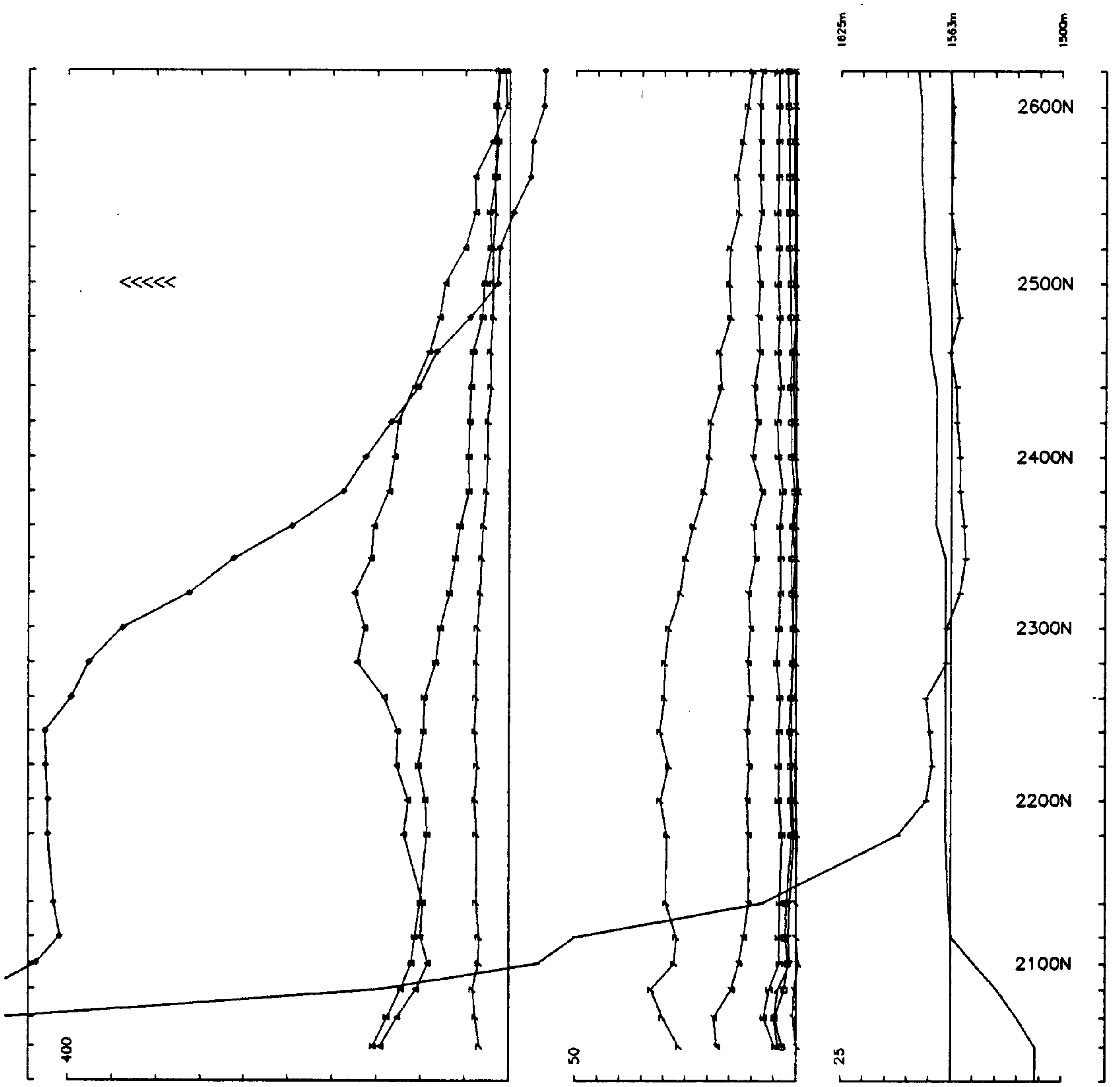



Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 1700E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.

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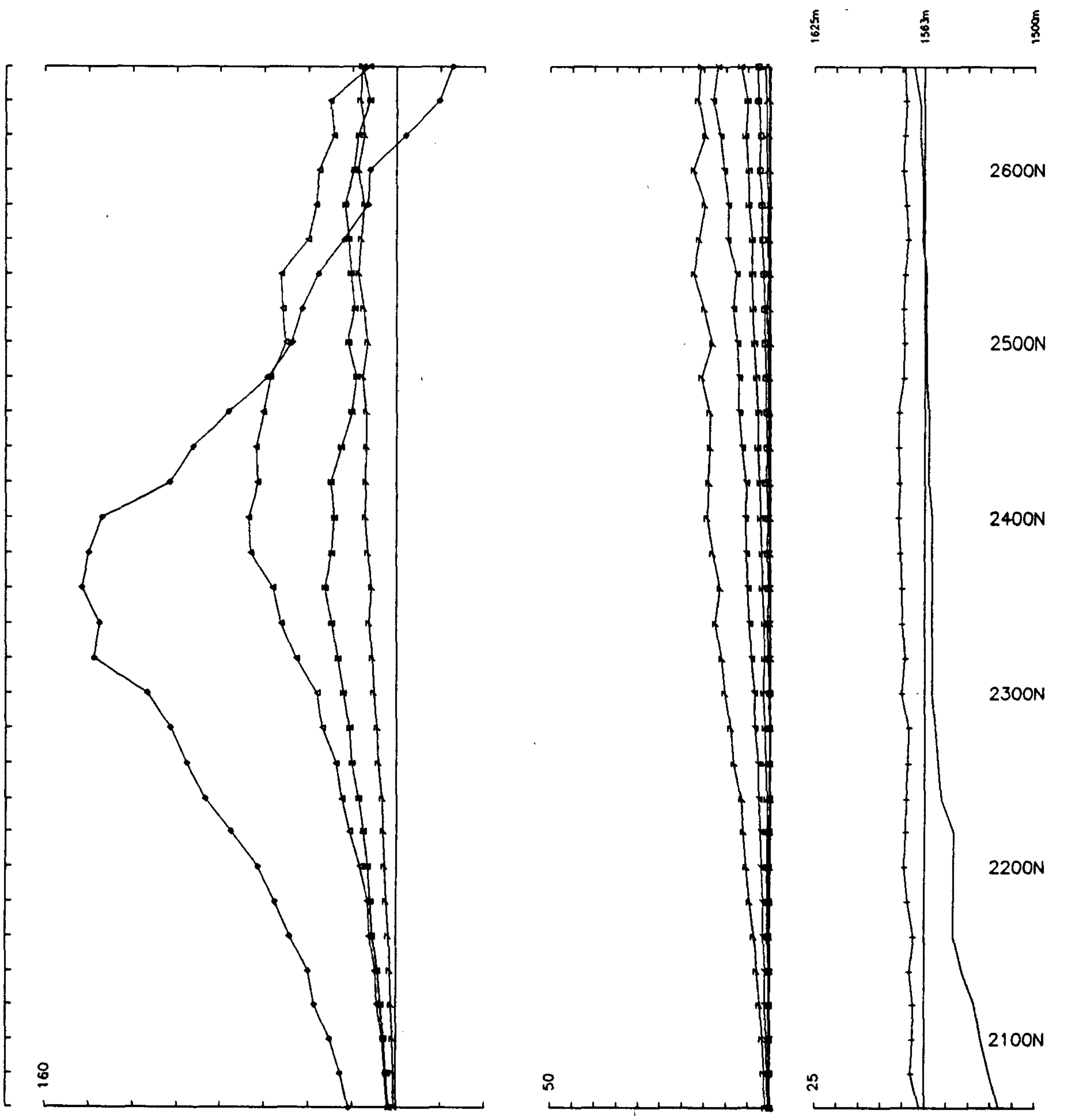
Loopno 1 Line 1700E component Hz secondary Ch 1 normalized Ch 1 reduced point norm.

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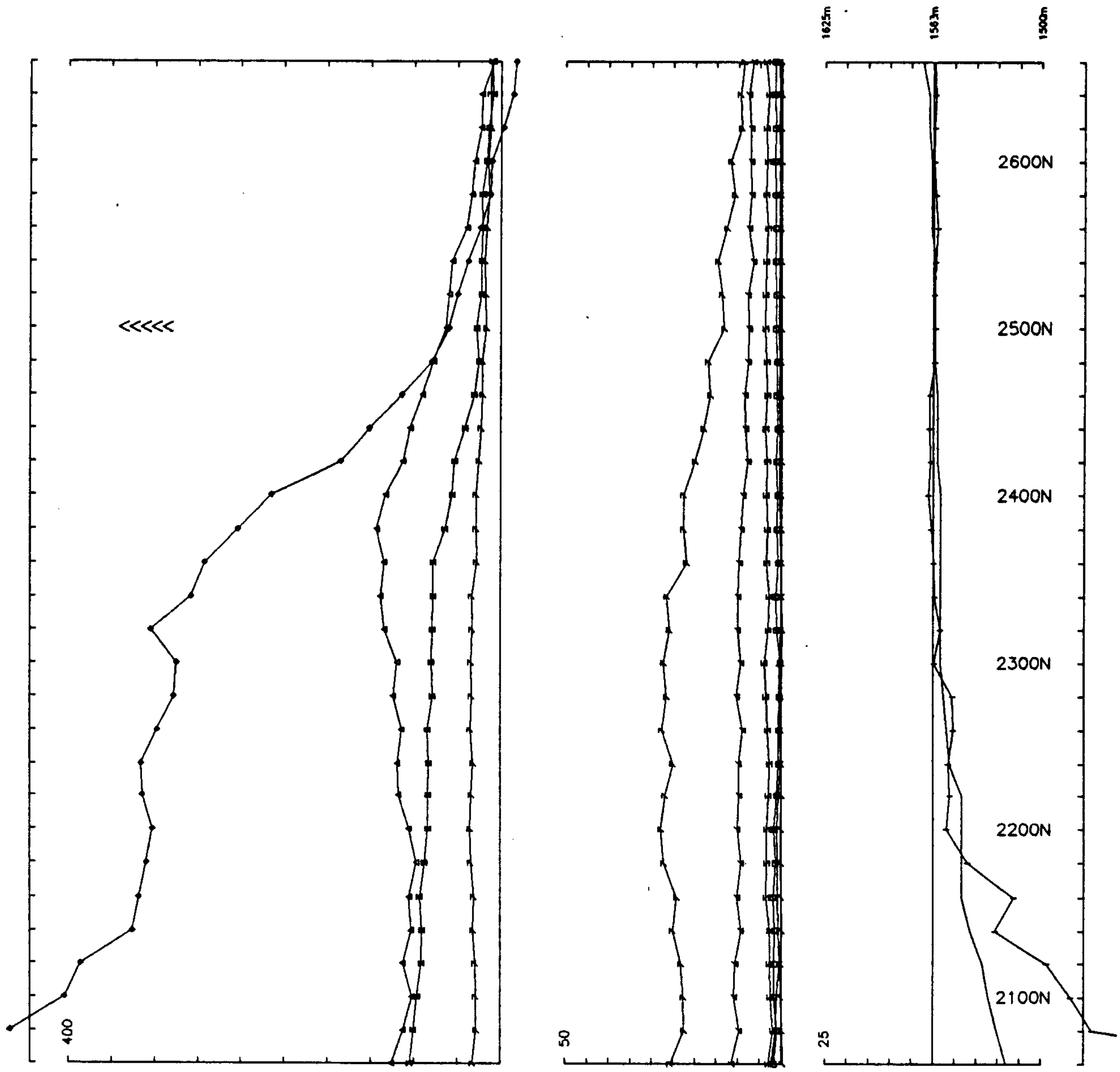
Loopno 1 Line 1800E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.

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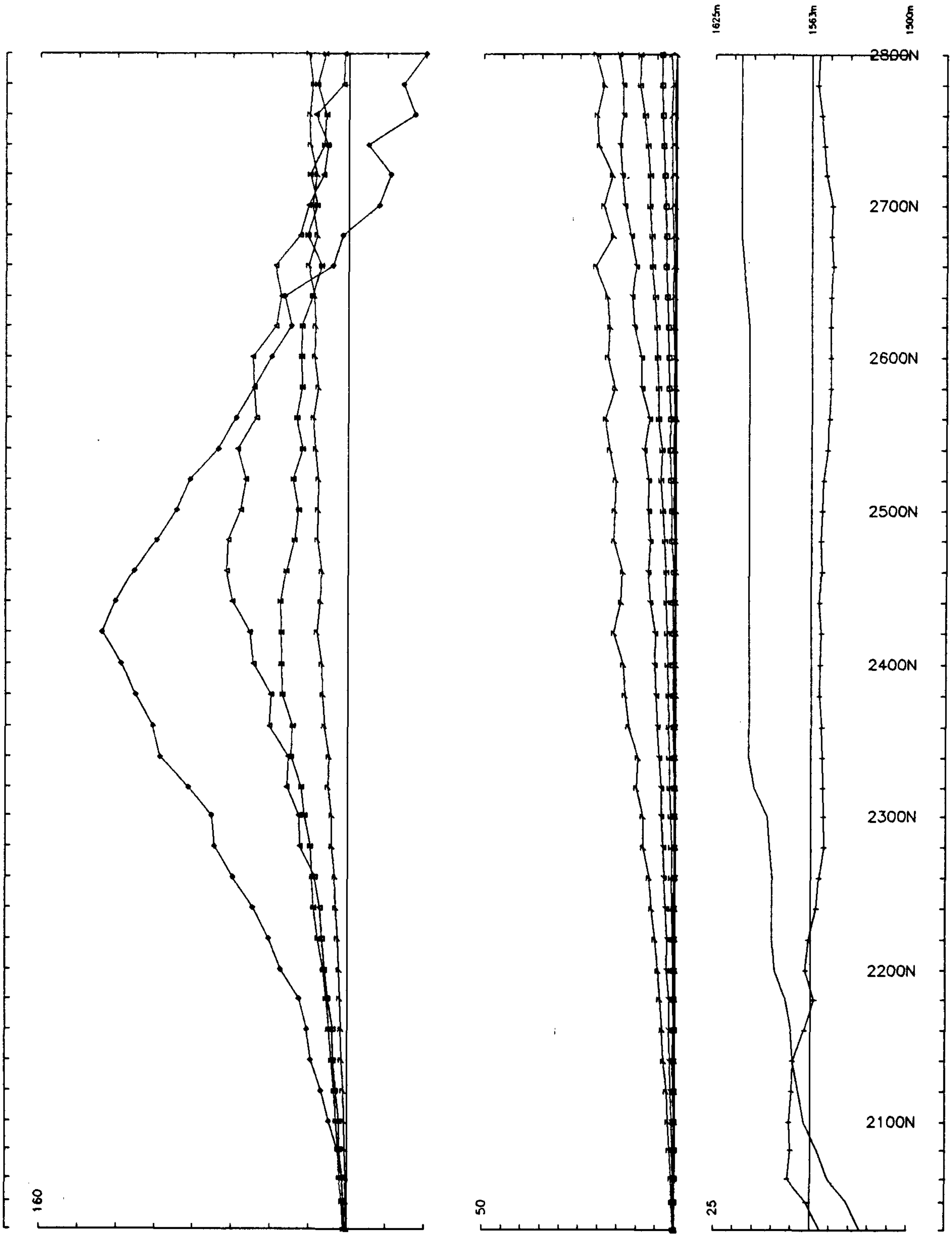


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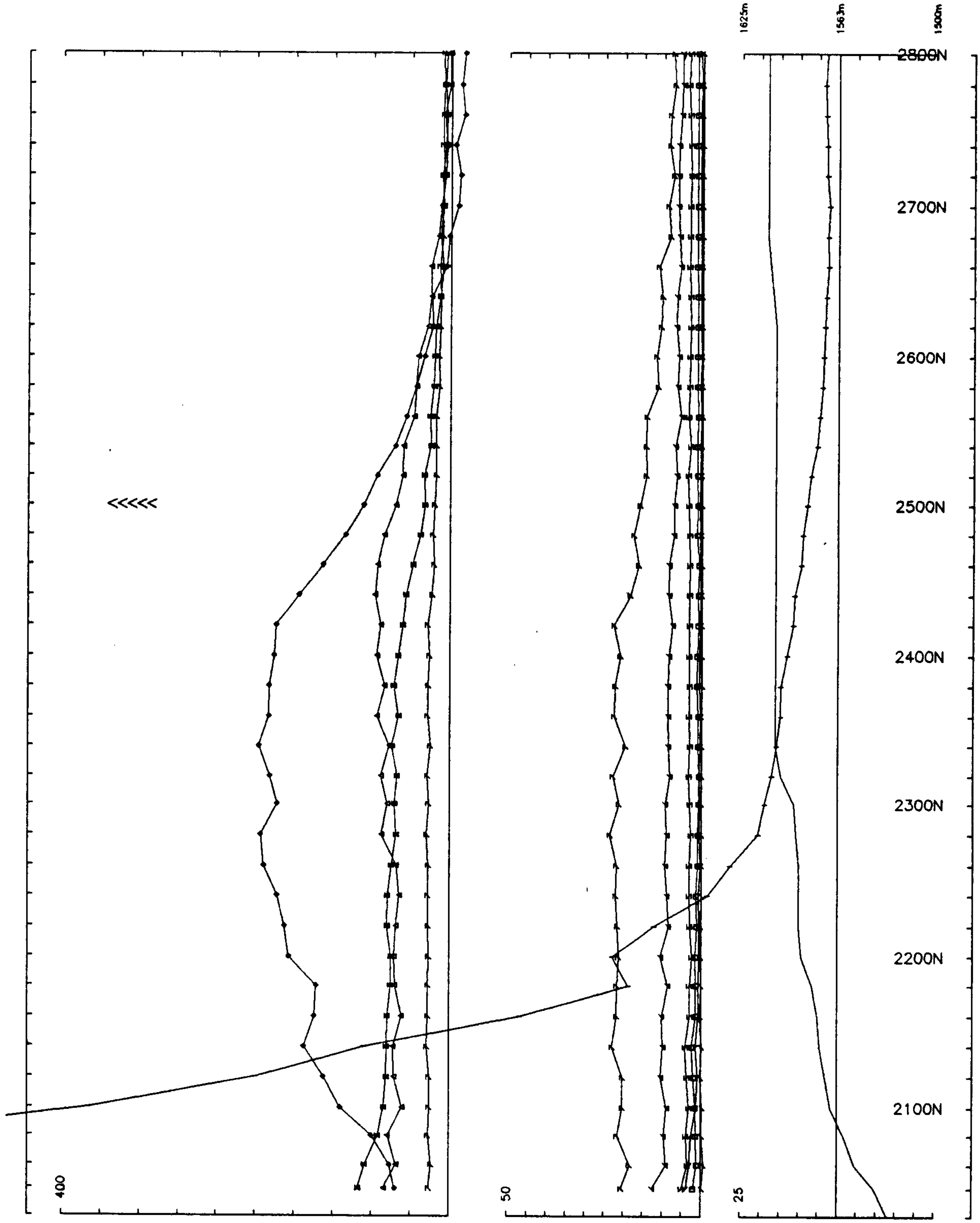


Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

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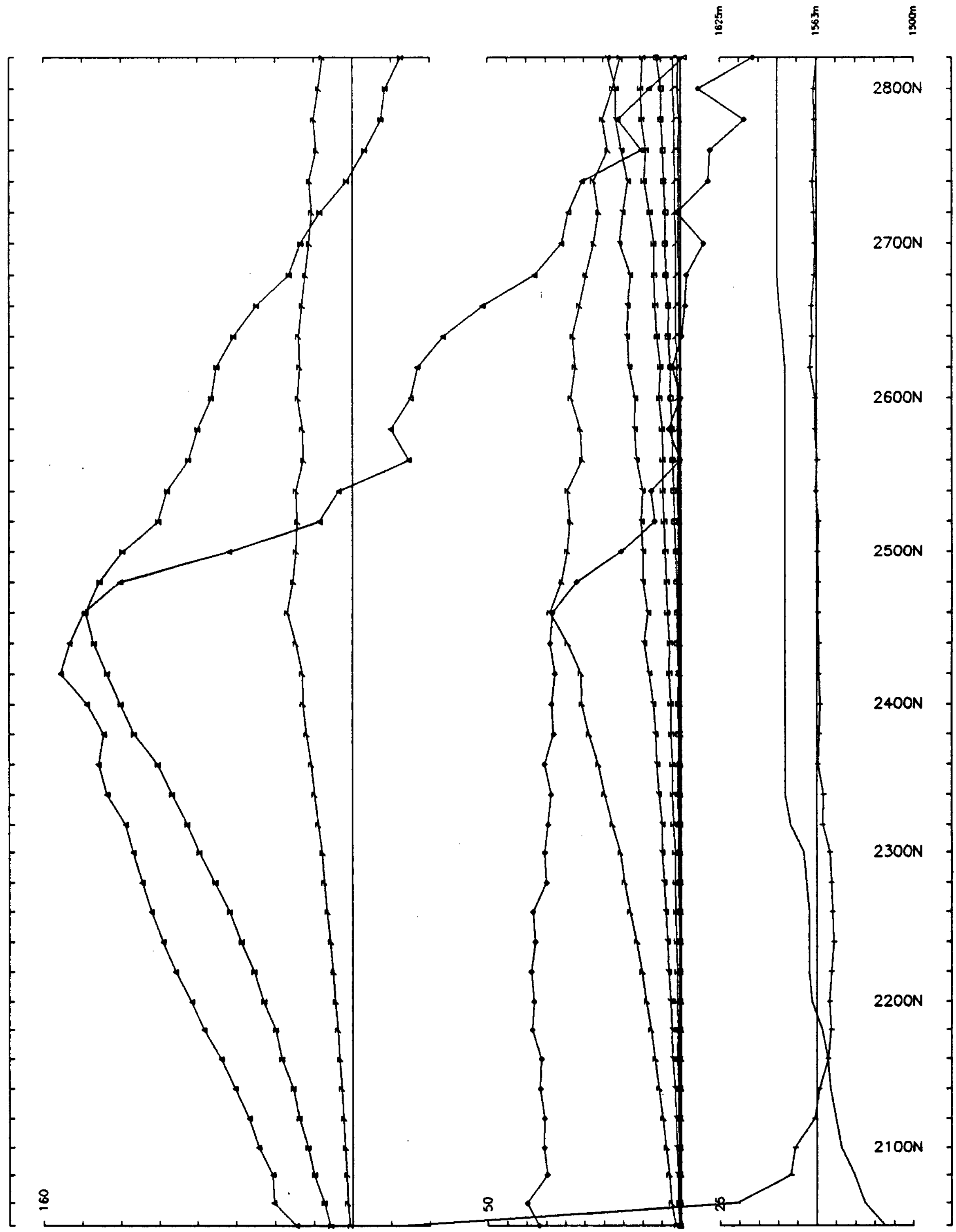


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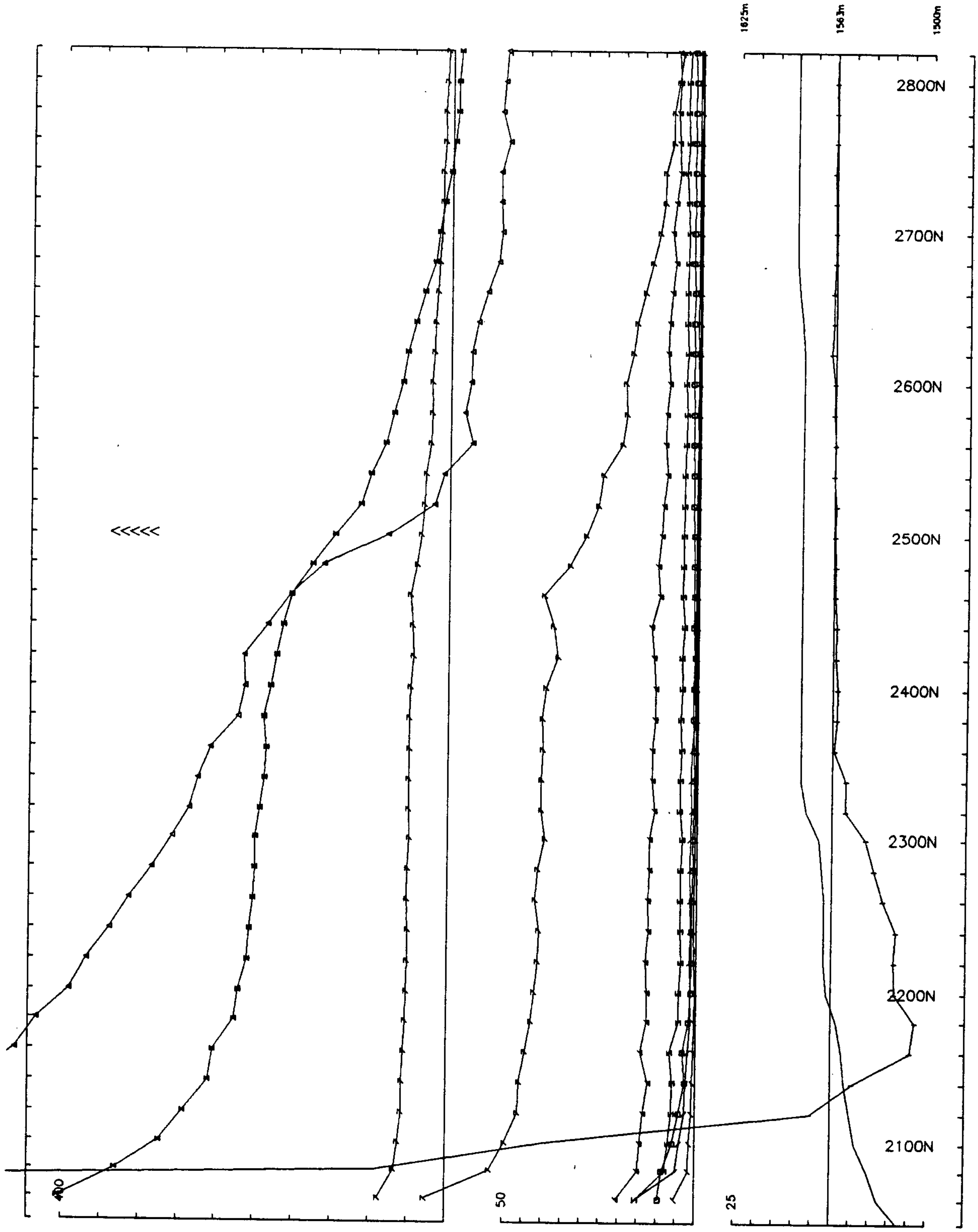
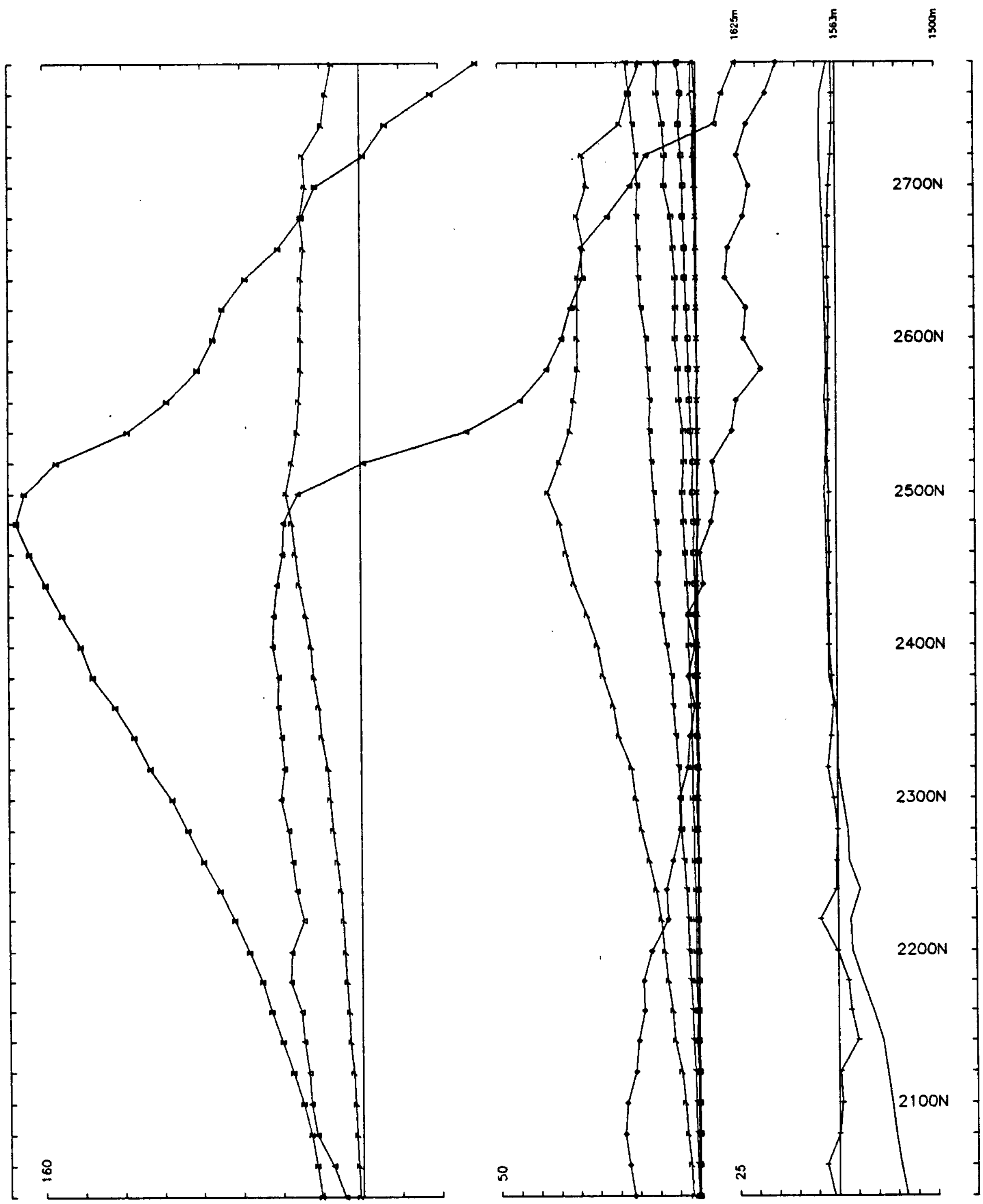


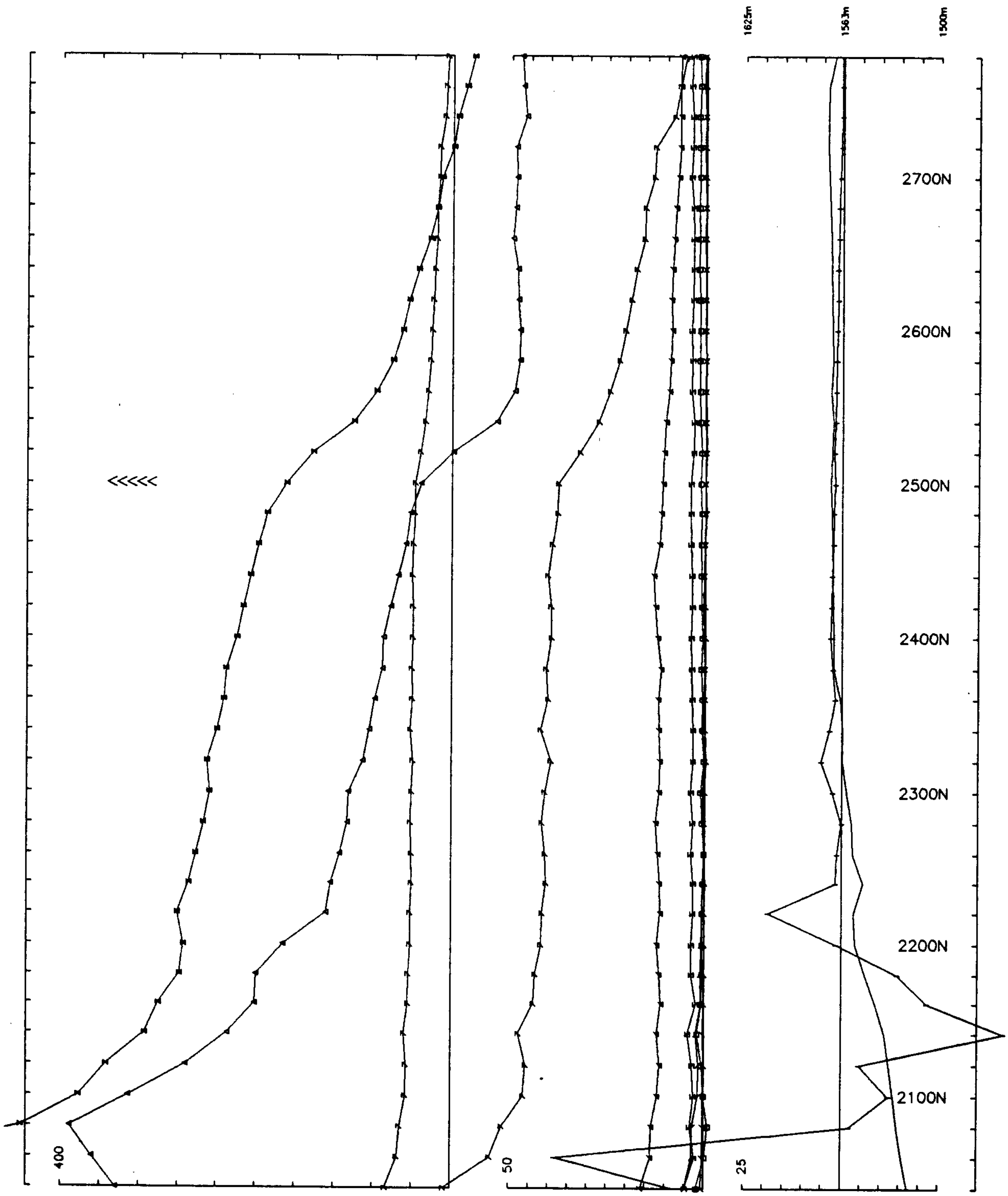

Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2000E component Hz secondary Ch 1 normalized Ch 1 reduced point norm.




Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2100E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.




Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

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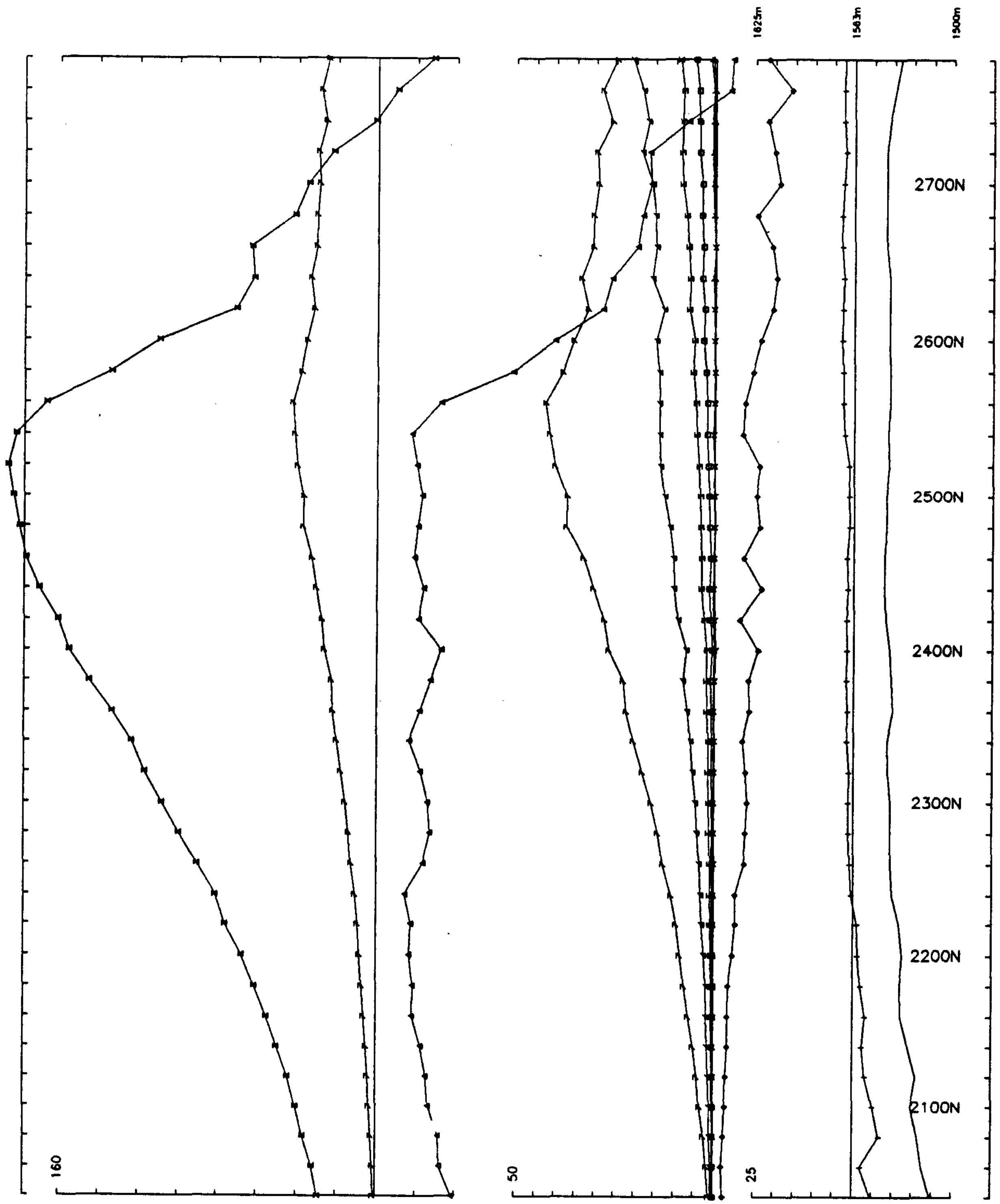
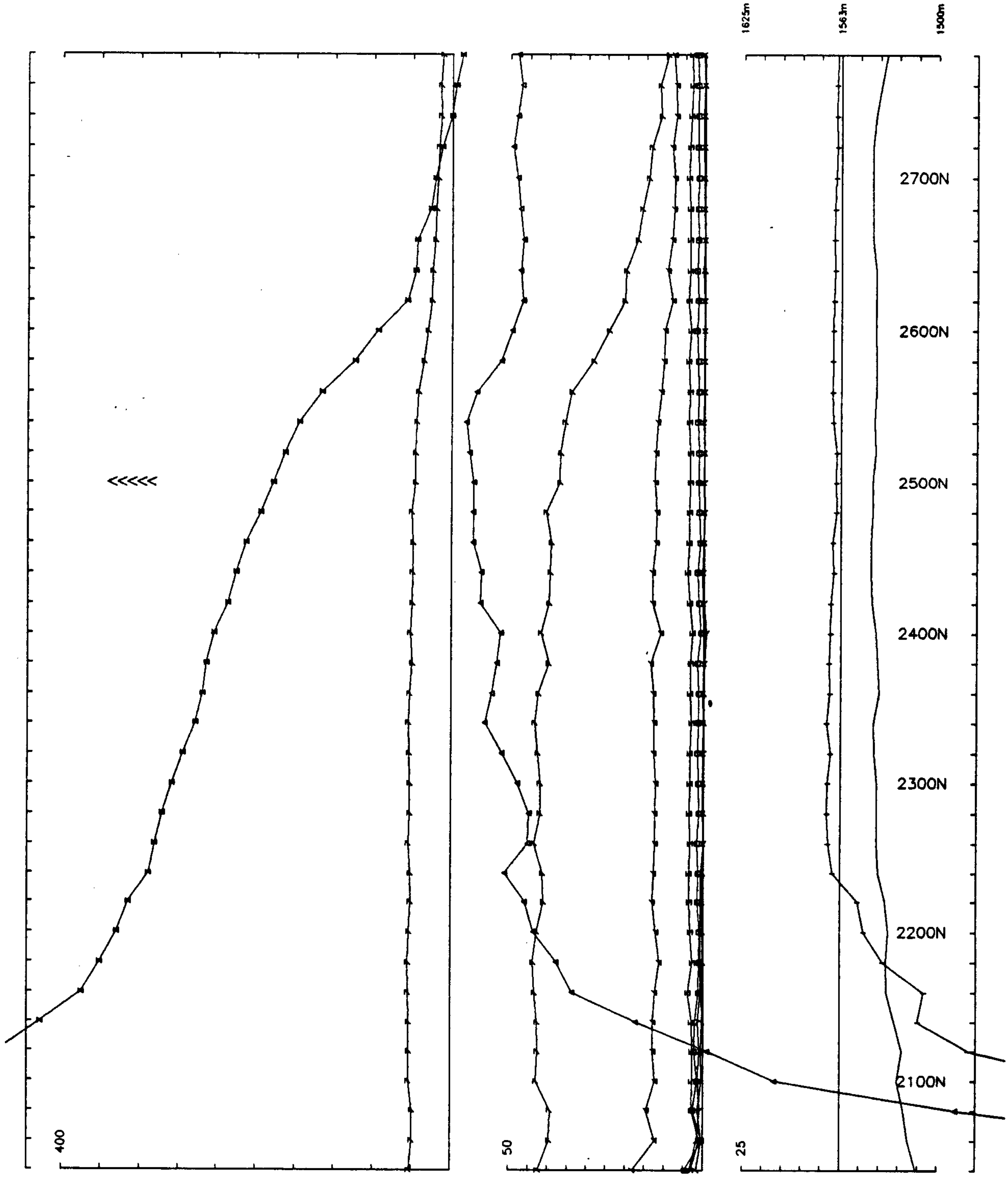



Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2200E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.

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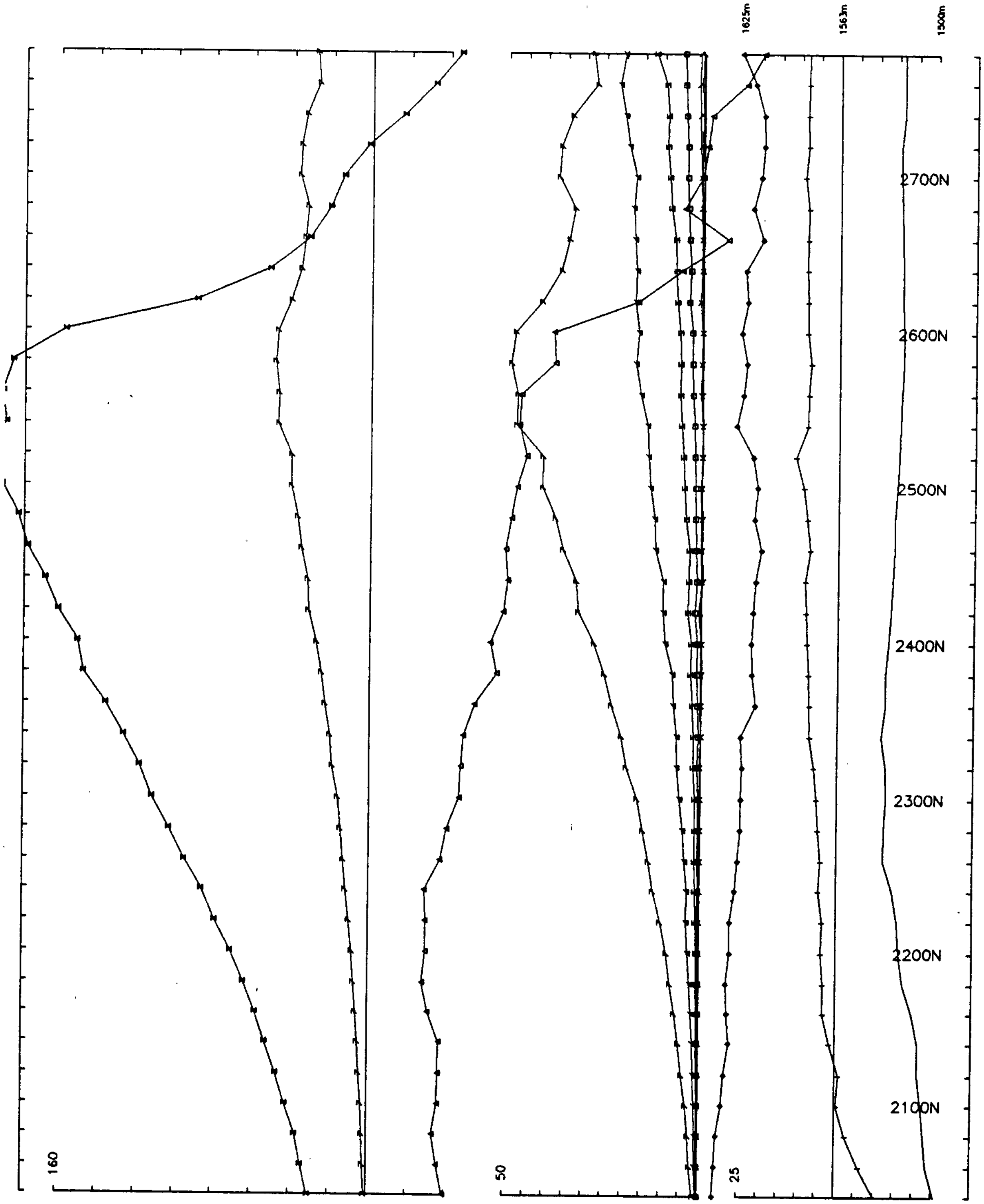


Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

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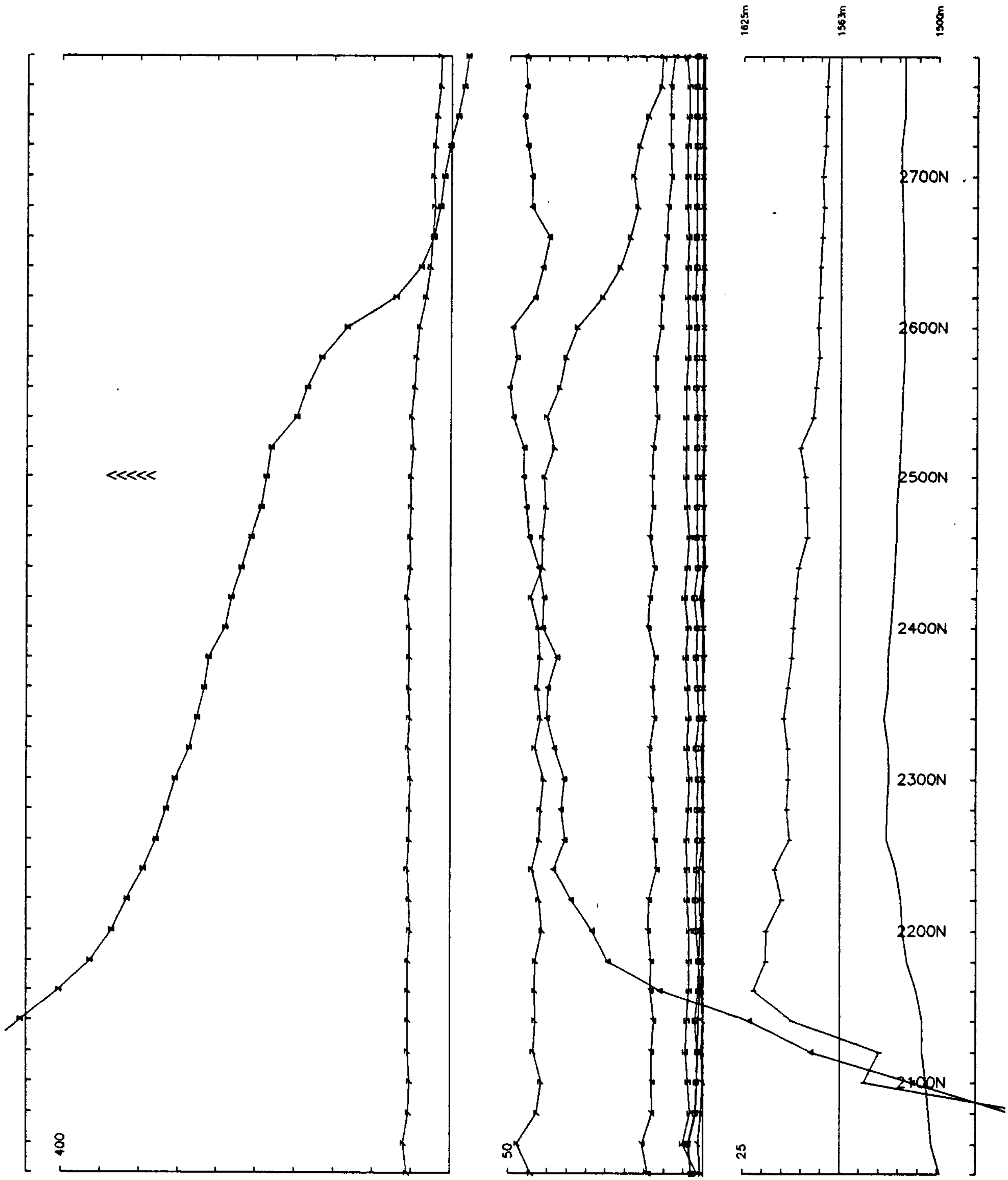


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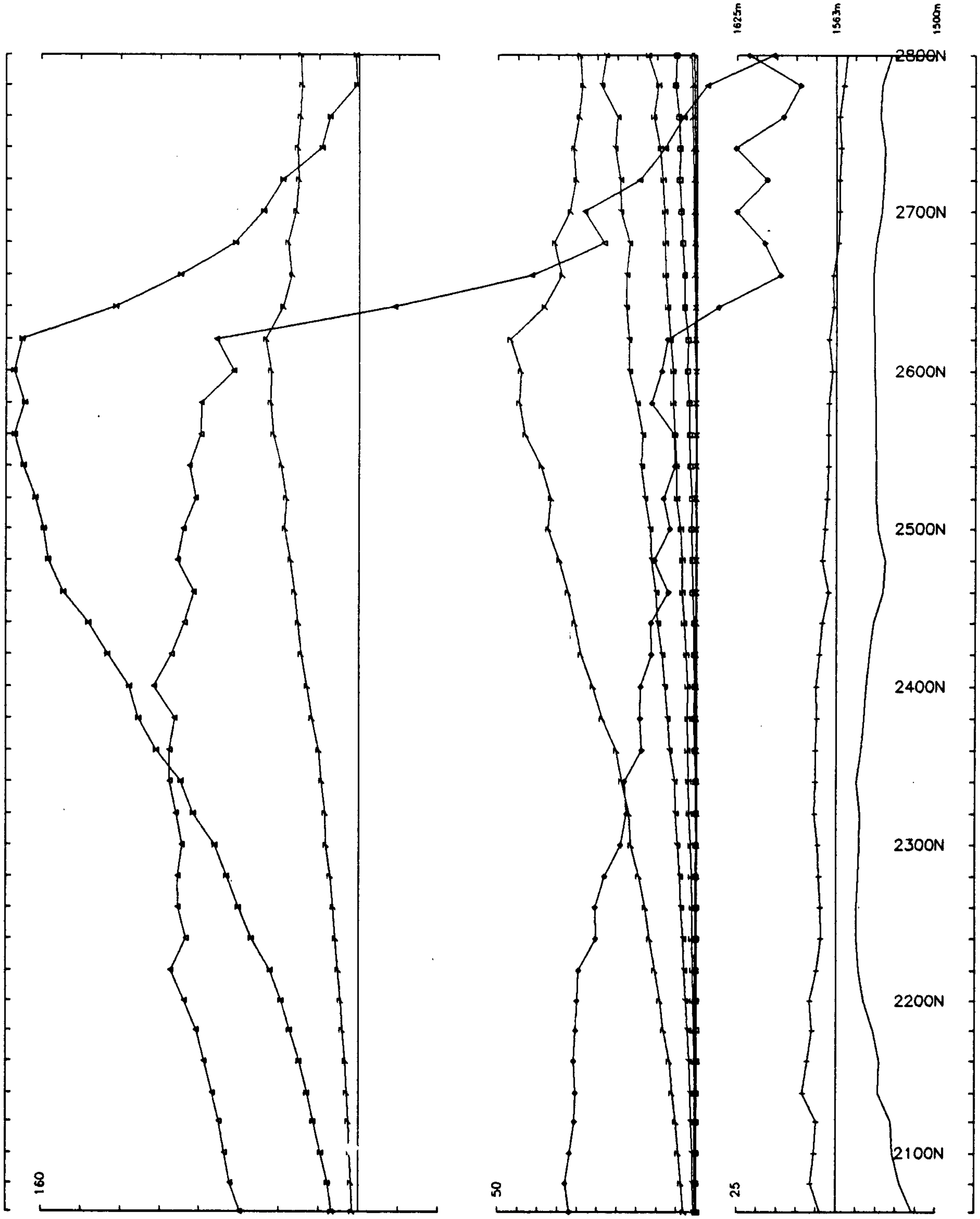


Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

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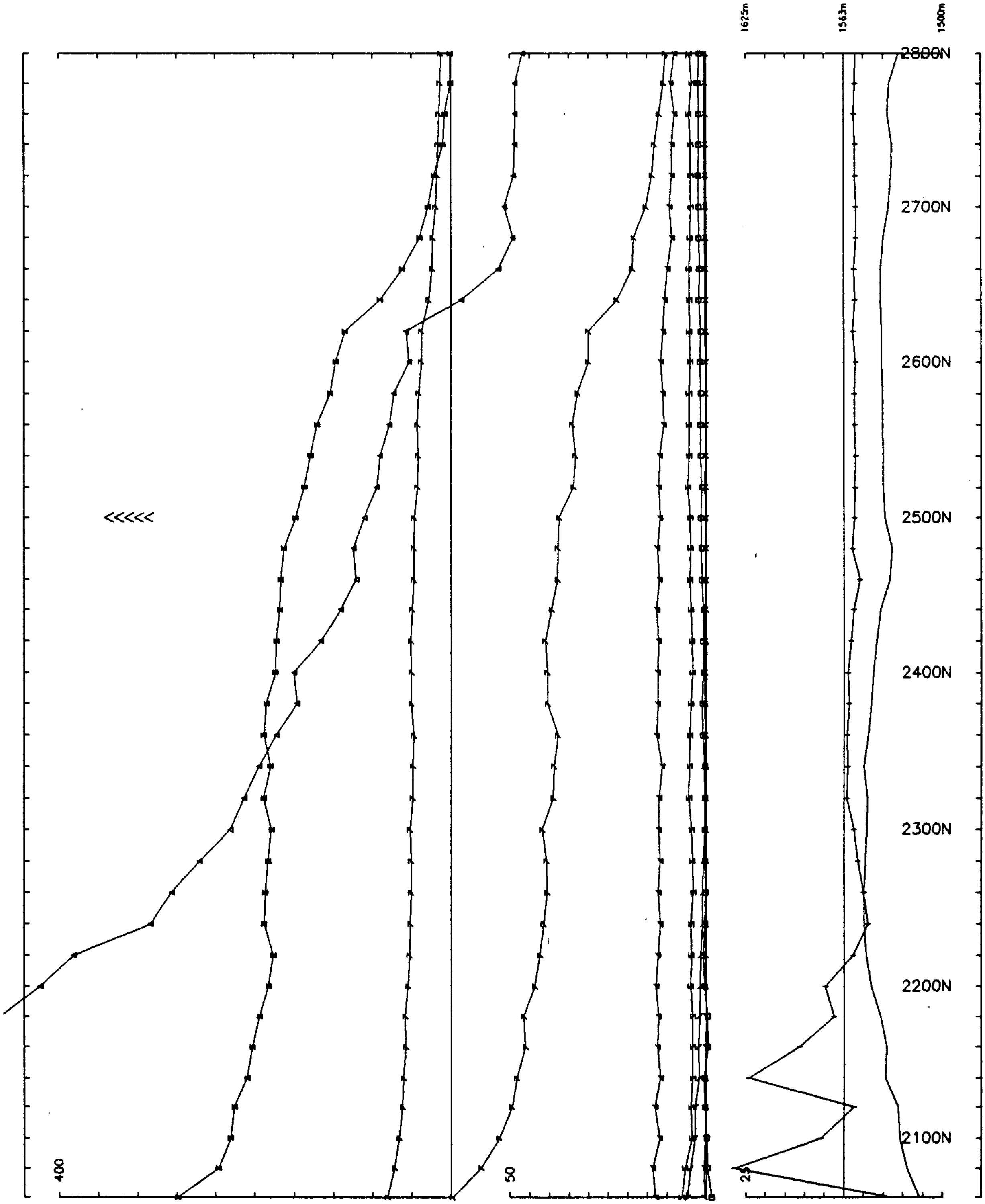


Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

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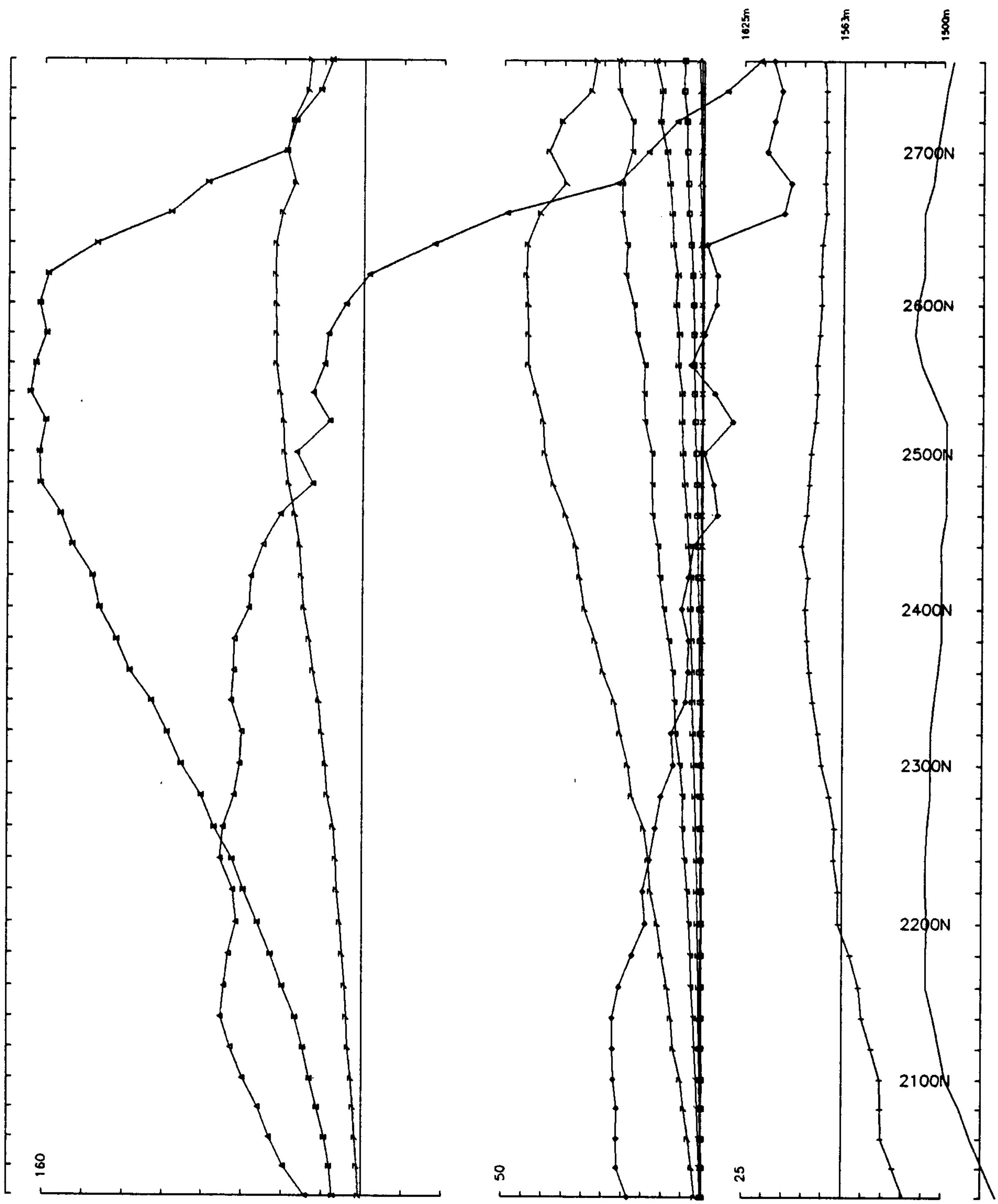


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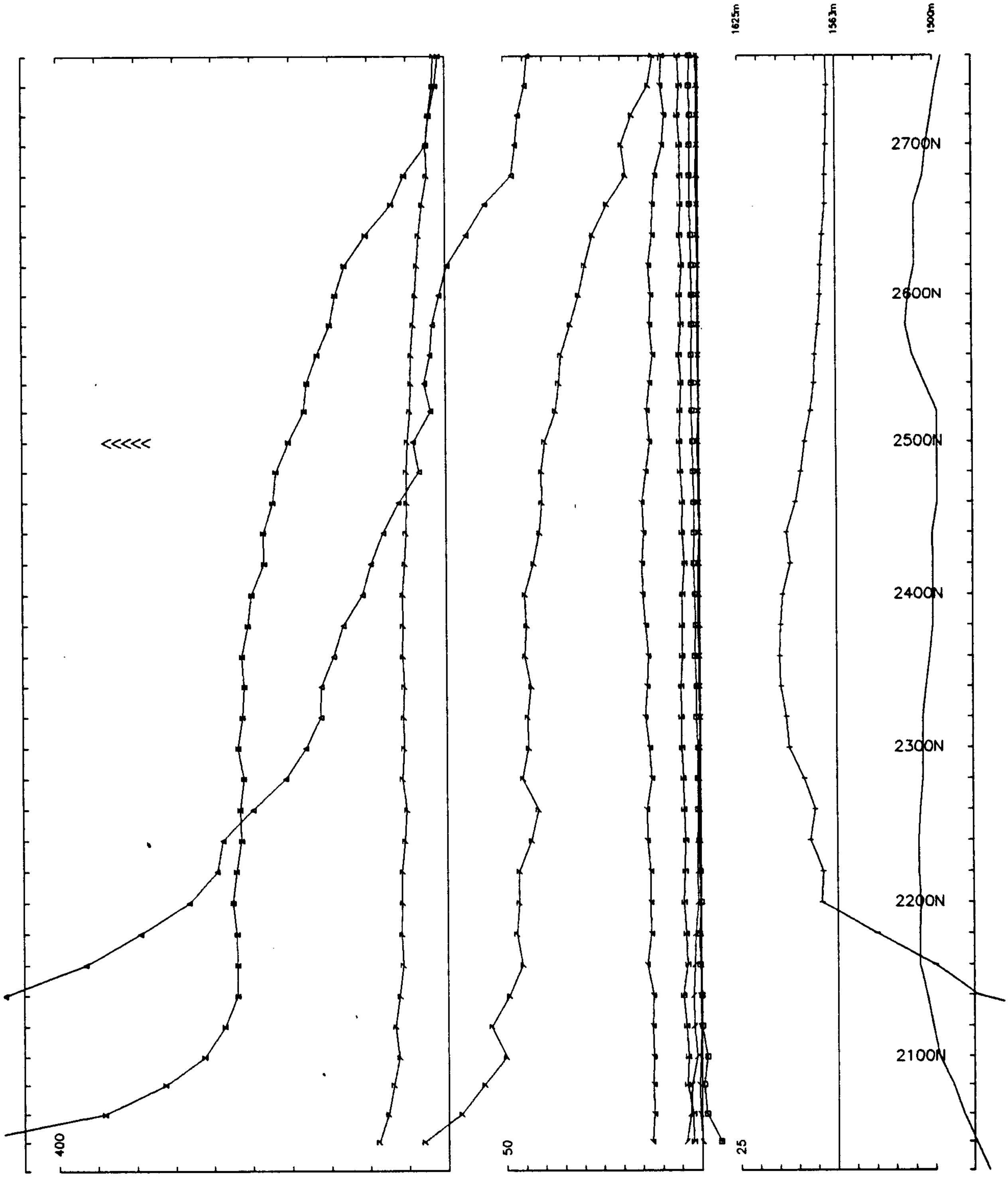


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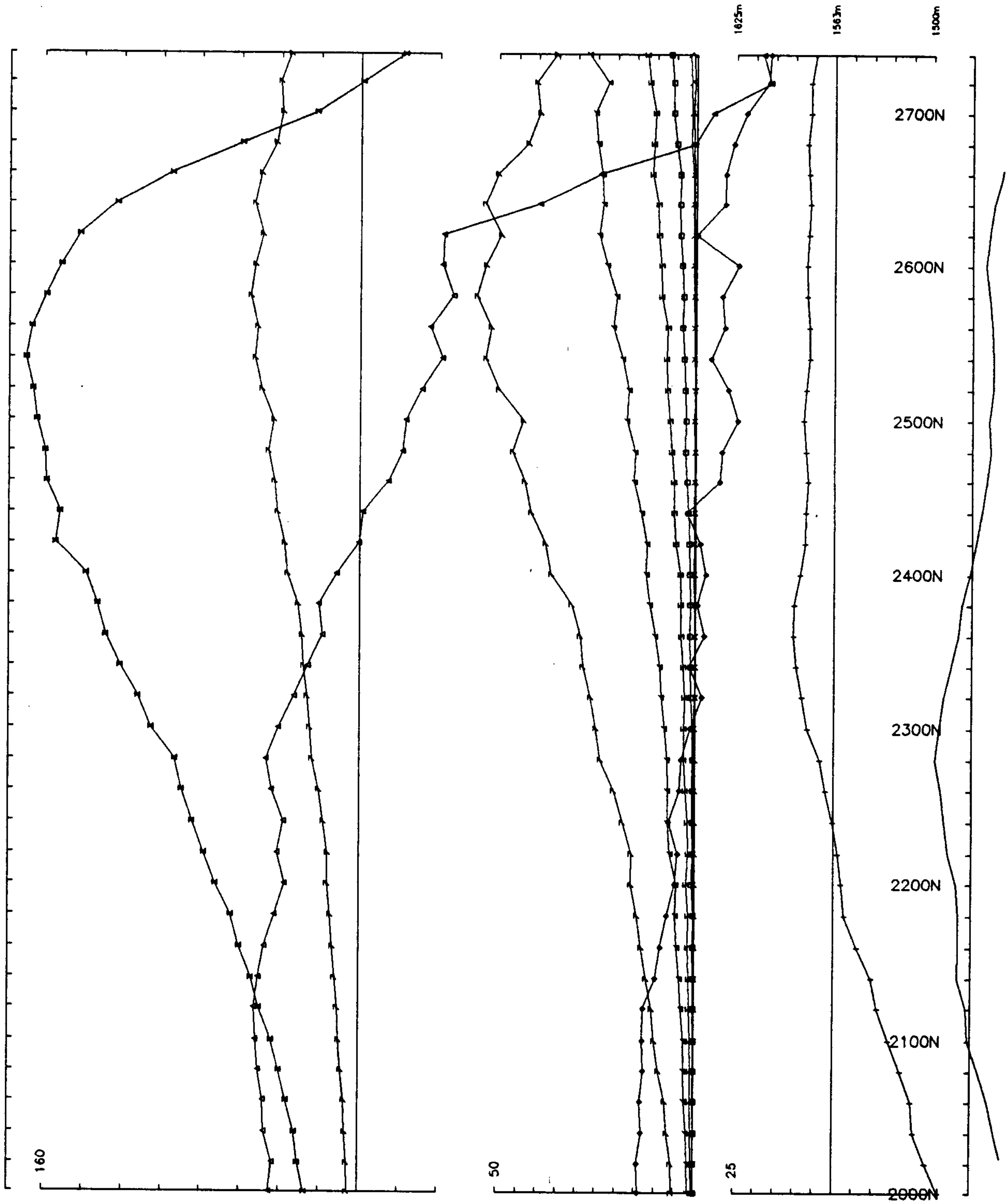
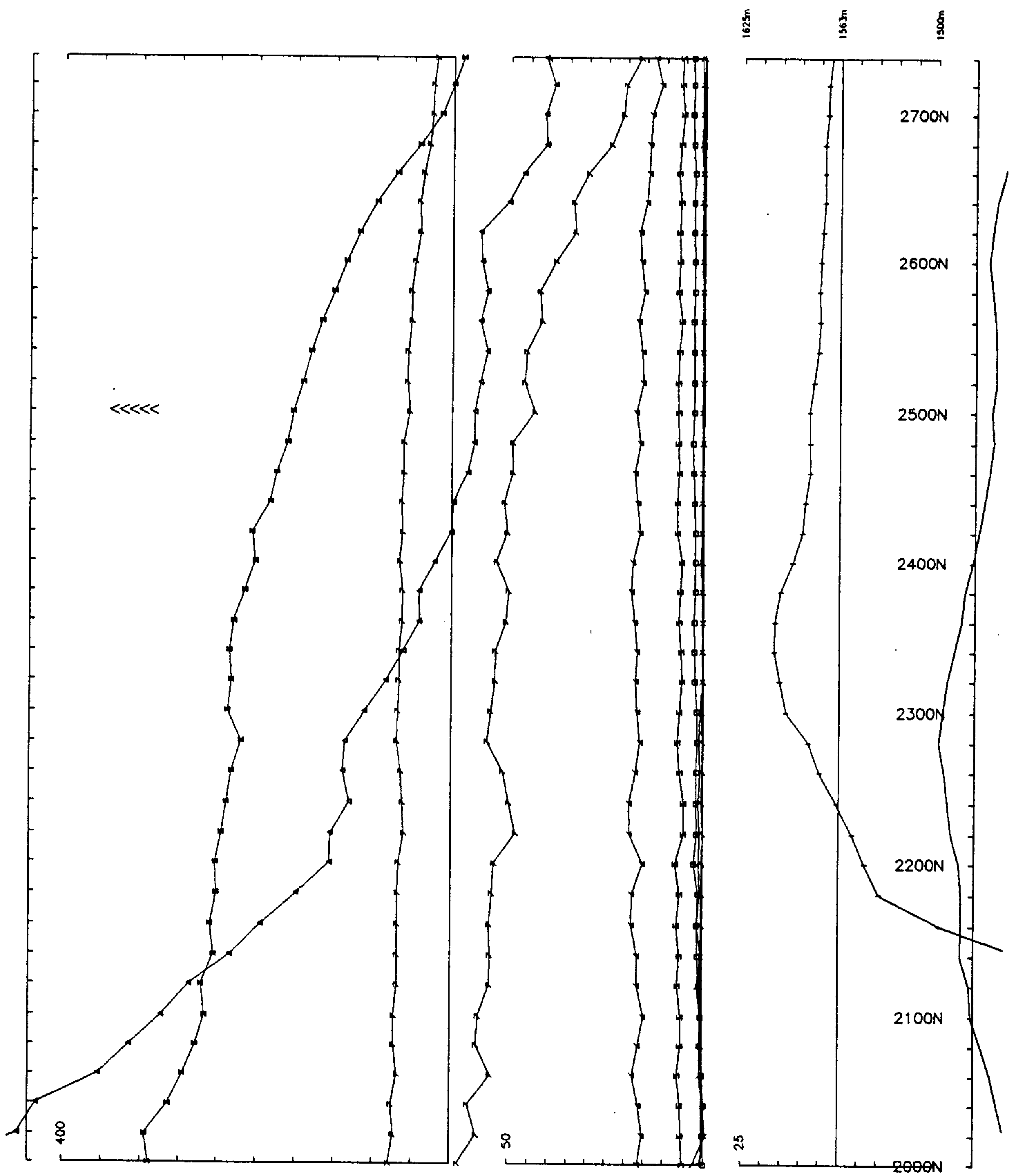


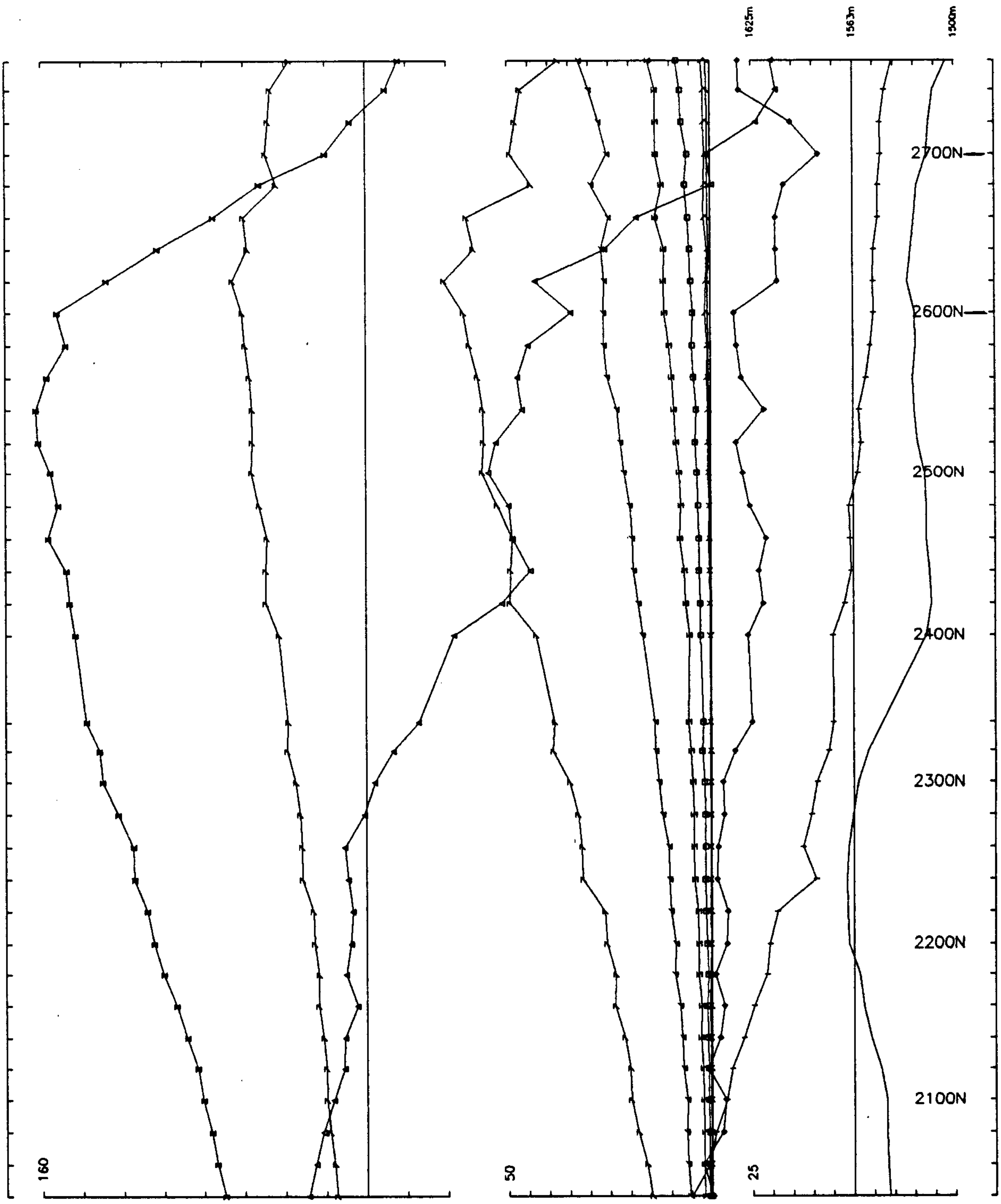

Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2600E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.



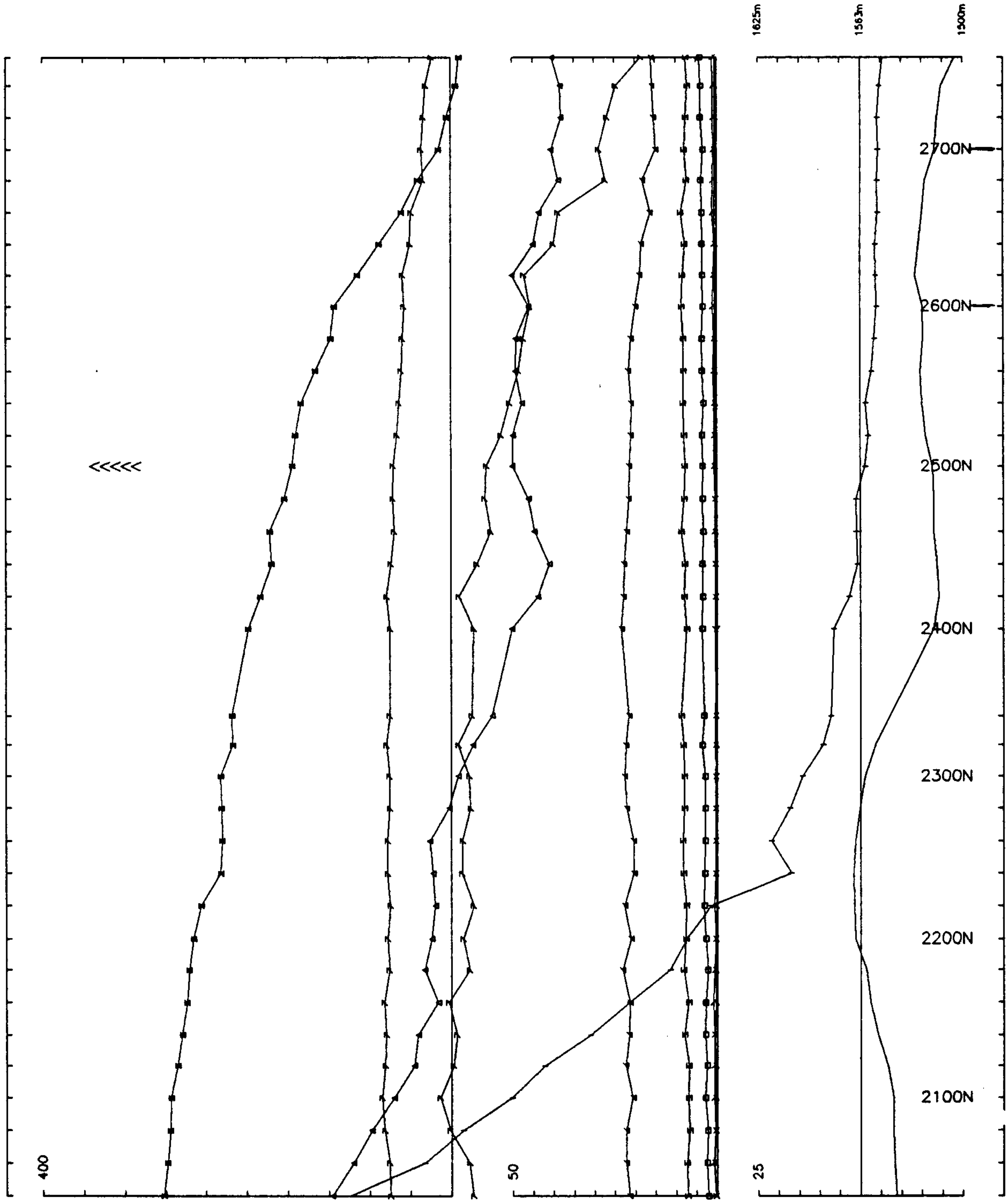

Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2600E component Hz secondary Ch 1 normalized Ch 1 reduced point norm.




Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2700E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.

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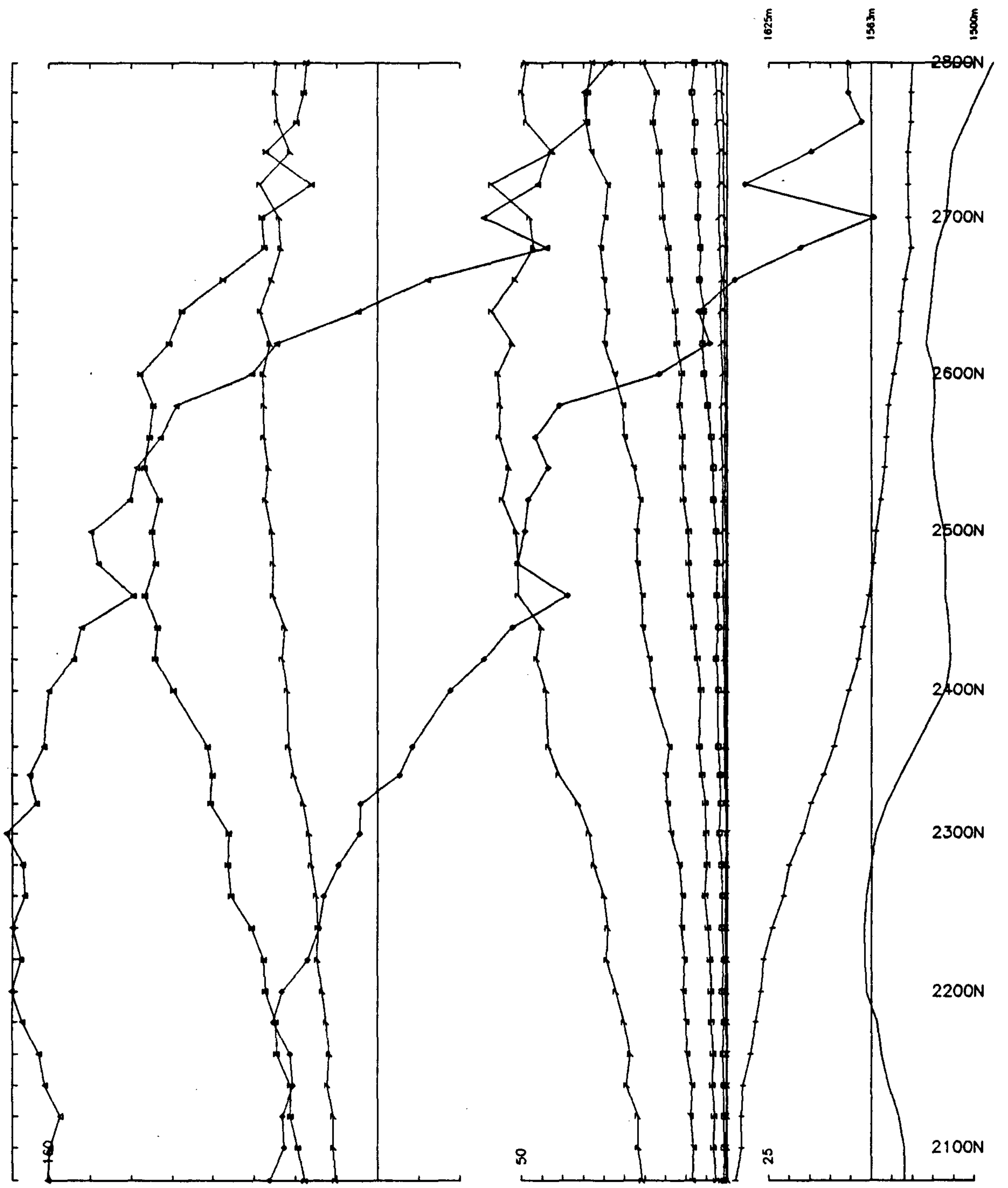
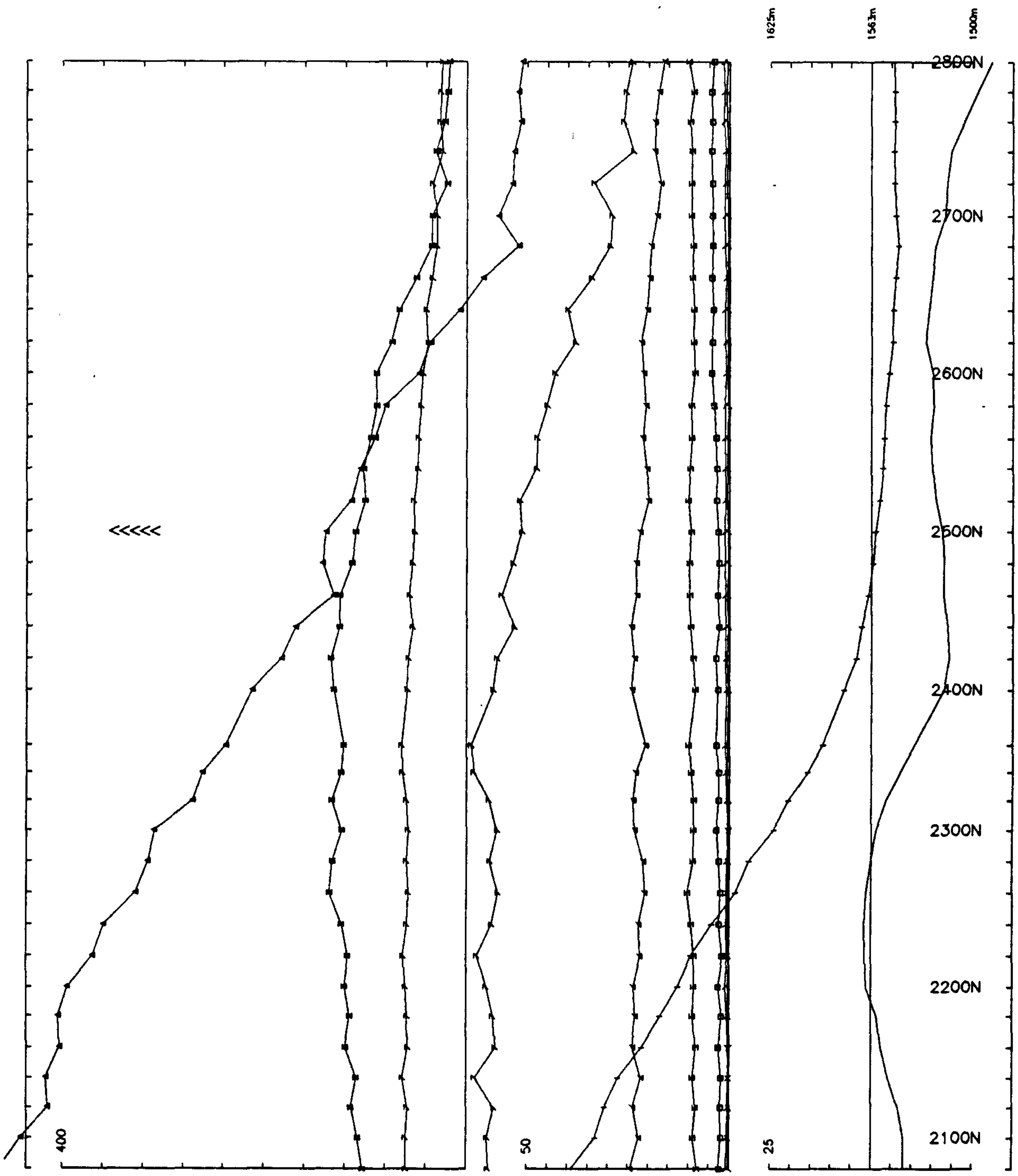



Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2800E component Hz secondary Ch 1 normalized Ch 1 reduced contin. norm.




Area STU 1 & 2 client KESTREL RESOURCES LTD. operator SJ GEOPHYSICS LTD. freq(hz) 54.409

Loopno 1 Line 2800E component Hz secondary Ch 1 normalized Ch 1 reduced point norm.

## APPENDIX II

Lithogeochemical Sample Descriptions

# STU 1 and 2 MINERAL CLAIMS

## Lithogeochemical Sample Descriptions and Analytical Results

| Sample No. | Type | Length (m.) | Area (m.) | Rock Type | Structure | Altn | Min | Area of Mineral | Cu ppm | Pb ppm | Zn ppm | Ag ppm | Au ppb | Au opt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83301 | Grab | 1.00 | | Ands flow | | Ep,Cl,Ca | Py | 2 m. by 5 m. | 461 | 56 | 173 | 0.4 | | 0.010 |
| 83302 | Grab | 0.30 | | Tuff bed | 052o/52oSE | Ep,Cl,Ca | Cp, Py | 35 cm. by 3 m. | 653 | 67 | 67 | 2.9 | | 0.006 |
| 83303 | Grab | 0.30 | | Tuff bed | | Ep,Cl,Ca | Py | 30-40 cm. by 5 m. | 369 | 30 | 40 | 0.9 | -1.0 | |
| 83304 | Grab | 0.30 | | Sil. Tuff | | Ep,Cl,Ca | Py | 30-40 cm. by 10 m. | 630 | 71 | 74 | 0.6 | | 0.006 |
| 83305 | Grab | 1.00 | | Sil. Tuff | | Ep,Cl,Ca | Py | 3 sq. m. | 52 | 22 | 10 | 0.1 | -1.0 | |
| 83306 | Grab | 1.00 | | Quartz vn | | Ep,Cl,Ca | Py,Cp,Gl | 1 m. by 30 m. | 124 | 6,232 | 9,423 | 3.7 | -1.0 | |
| 83307 | Grab | 0.05 | | Qz-Ba vn | 160o/15oW | Ep,Cl,Ca | Py,Cp,Gl | 5 cm. by 20 m. | 205 | 179 | 20,001 | 0.7 | -1.0 | |
| 83308 | Grab | 0.30 | | Qz-Ba vn | 175o/15oW | Ep,Cl,Ca | Py,Cp,Gl | 30 cm. by 10 m. | 628 | 58 | 20,001 | 1.8 | -1.0 | |
| 83309 | Grab | 0.30 | | Qz-Ba vn | 175o/15oW | Ep,Cl,Ca | Py,Cp,Gl | 30 cm. by 10 m. | 353 | 48 | 1,150 | 0.2 | -1.0 | |
| 83310 | Grab | 0.30 | | Qz-Ba vn | 175o/15oW | Ep,Cl,Ca | Py,Cp,Gl | 30 cm. by 10 m. | 59 | 23 | 8,073 | 0.2 | -1.0 | |
| 83311 | Grab | 0.30 | | Qz-Ba vn | 175o/15oW | Ep,Cl,Ca | Py,Cp,Gl | 30 cm. by 10 m. | 1,440 | 74 | 4,229 | 1.6 | -1.0 | |
| 83312 | Grab | 0.30 | | Ca vein | 090o/35oW | Ep,Cl,Ca | Py | 30-40 cm. by 3 m. | 805 | 64 | 298 | 3.6 | -1.0 | |
| 83313 | Grab | 0.40 | | Qz vein | | Ep,Cl,Ca | Py | 40 cm. by 3 m. | 113 | 224 | 2,385 | 6.3 | -1.0 | |
| 83314 | Grab | 2.00 | | Skarn | 085o/15oW | Ep,Cl,Ca | Py | 2 m. by 25 m. | 82 | 25 | 78 | 0.1 | -1.0 | |
| 83315 | Grab | 3.00 | | Qz vein | 085o/15oW | Ep,Cl,Ca | Py | 6 m. by 20 m. | 2 | 16 | 70 | 0.1 | | 0.010 |
| 83316 | Grab | 1.00 | | Qz vein | 085o/15oW | Ep,Cl,Ca | Py | 3 m. by 20 m. | 8 | 14 | 39 | 0.2 | -1.0 | |
| 83317 | Grab | 1.00 | | Skarn | 085o/15oW | Ep,Cl,Ca | Py | 20 m. by 40 m. | 1,152 | 47 | 68 | 2.3 | -1.0 | |
| 83318 | Grab | 0.30 | | Qz vein | 345o/50oW | Ep,Cl,Ca | Py | 30 cm. by 50 m. | 28 | 14 | 12 | 0.1 | -1.0 | |
| 83319 | Grab | 0.30 | | Qz vein | 345o/50oW | Ep,Cl,Ca | Py | 30 cm. by 50 m. | 6 | 11 | 3 | 0.1 | -1.0 | |
| 83320 | Grab | 0.05 | | Qz vein | 350o/50oE | Ep,Cl,Ca | Py,Cp,Gl | 20 cm. by 10 m. | 20,001 | 9,277 | 1,097 | 35.7 | | 0.876 |
| 83321 | Grab | 0.20 | | Qz vein | 323o/70oW | Ep,Cl | Py | 20 cm. by 20 m. | 273 | 76 | 65 | 0.3 | -1.0 | |
| 83322 | Grab | 0.30 | | Qz vein | 030o/15oW | Ep,Cl,Ca | Py | 30 cm. by 10 m. | 96 | 40 | 14 | 0.2 | | 0.006 |
| 83323 | Grab | 0.35 | | Qz vein | 005o/10oW | Ep,Cl,Ca | Py | 50 cm. by 10 m. | 43 | 31 | 18 | 0.5 | -1.0 | |
| 83324 | Grab | 0.20 | | Qz vein | 005o/10oW | Ep,Cl,Ca | Py | 20 cm. by 5 m. | 14 | 16 | 69 | 0.2 | -1.0 | |
| 83325 | Grab | 0.20 | | Qz vein | | Ep,Cl,Ca | Py | 20 cm. by 5 m. | 15 | 9 | 1 | 0.1 | -1.0 | |
| 83326 | Grab | 0.20 | | Qz vein | Float trn | Ep,Cl,Ca | Cp,Py | 20 cm. by 5 m. | 447 | 6 | 37 | 0.5 | -1.0 | |
| 83327 | Grab | 0.20 | | Qz vein | Float trn | Ep,Cl,Ca | Cp,Py | 20 cm. by 5 m. | 25 | 10 | 8 | 0.1 | -1.0 | |
| 83328 | Grab | 0.30 | | Qz vein | | Ep,Cl,Ca | Py | 30 cm. by 10 m. | 21 | 11 | 82 | 0.1 | -1.0 | |
| 83329 | Grab | 0.20 | | Qz vein | 006o/50oW | Ep,Cl,Ca | Cp,Py | 20 cm. by 10 m. | 29 | 10 | 13 | 0.2 | -1.0 | |
| 83330 | Grab | 0.30 | | Qz vein | 017o/60oW | Ep,Cl,Ca | Cp,Py | 30 cm. by 10 m. | 874 | 60 | 55 | 6.6 | -1.0 | |
| 83331 | Grab | 0.10 | | Qz vein | | Ep,Cl,Ca | Py | 10 cm. by 10 m. | 146 | 86 | 21 | 2.6 | -1.0 | |
| 83332 | Grab | 0.10 | | Qz vein | 038o/70oW | Ep,Cl,Ca | Py | 15 cm. by 5 m. | 33 | 14 | 9 | 0.2 | -1.0 | |
| 83333 | Grab | 0.15 | | Qz vein | 044o/45oW | Ep,Cl,Ca | Py | 15 cm. by 5 m. | 16 | 9 | 6 | 0.2 | -1.0 | |
| 83334 | Grab | 0.05 | | Qz vein | 258o/flat | Ep,Cl,Ca | Py | 10 cm. by 10 m. | 46 | 1,332 | 909 | 0.8 | -1.0 | |
| 83335 | Grab | 0.15 | | Qz vein | 253o/10oW | Ep,Cl,Ca | Py | 15-20 cm. by 5 m. | 12 | 120 | 1,345 | 0.2 | -1.0 | |
| 83336 | Grab | 0.25 | | Qz vein | 353o/15oW | Ep,Cl,Ca | Cp,Py | 2 m. by 15 m. | 30 | 65 | 142 | 0.1 | -1.0 | |
| 83337 | Grab | 1.00 | | Sil. Tuff | 255o/10oW | Ep,Cl,Ca | Py | 30 cm. by 300 m. | 8 | 19 | 29 | 0.1 | | 0.010 |
| 83338 | Grab | 0.80 | | Qz vein | 183o/35oW | Ep,Cl,Ca | Cp,Py | 8-10 cm. by 10 m. | 365 | 25 | 123 | 0.1 | -1.0 | |
| 83339 | Grab | 0.80 | | Qz vein | 308o/15oW | Ep,Cl,Ca | Cp,Py | 10 cm. by 20 m. | 335 | 132 | 282 | 0.3 | -1.0 | |
| 83340 | Grab | 1.00 | | Sil. dyke | 062o/10oW | Ep,Cl,Ca | Py | 1 m. by 5 m. | 18 | 15 | 27 | 0.1 | -1.0 | |
| 83341 | Grab | 0.20 | | Qz vein | 183o/35oE | Ep,Cl,Ca | Py | 1 cm. by 10 m. | 2 | 19 | 35 | 0.2 | -1.0 | |
| 83420 | Grab | 0.30 | | Skarn | 090o/+60oS | Qz,Ac,Ep | Po,Cp,Mc | 3 m. by 30 m. | 3,169 | 4 | 9 | 2.5 | -1.0 | |
| 83421 | Grab | 0.20 | | Skarn | 090o/+60oS | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 1,822 | 29 | 32 | 1.8 | -1.0 | |
| 83422 | Grab | 0.20 | | Skarn | 090o/+60oS | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 19,964 | 26 | 230 | 14.0 | -1.0 | |
| 83423 | Grab | 0.15 | | Skarn | 090o/+60oS | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 619 | 19 | 22 | 0.4 | -1.0 | |
| 83424 | Grab | 0.10 | | Ands flow | 090o/+60oS | Ep,Cl,Ca | Po,Cp,Mc | 2 m. by 10 m. | 950 | 58 | 38 | 2.9 | -1.0 | |
| 83425 | Grab | 0.30 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 4 m. by 20 m. | 11,694 | 687 | 1,392 | 38.5 | -1.0 | |
| 83426 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 4 m. by 20 m. | 676 | 349 | 1,008 | 3.4 | -1.0 | |

Lithogeochemical Sample Descriptions and Analytical Results (Continued)

| Sample No. | Type | Length (m.) | Area (m.) | Rock Type | Structure | Altn | Min | Area of Mineral | Cu ppm | Pb ppm | Zn ppm | Ag ppm | Au ppb | Au opt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83427 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 8-10 m. by 300 m. | 16,818 | 943 | 2,246 | 22.2 | -1.0 | |
| 83428 | Grab | 0.30 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 2 m. by 5 m. | 2,738 | 85 | 211 | 6.4 | -1.0 | |
| 83429 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 6,424 | 17 | 85 | 5.7 | -1.0 | |
| 83430 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 8,757 | 47 | 92 | 8.2 | -1.0 | |
| 83431 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 10 m. by 300 m. | 978 | 16 | 22 | 0.8 | -1.0 | |
| 83432 | Grab | 0.20 | | Skarn | 068o/45S | Qz,Ac,Ep | Po,Cp,Mc | 300 m. by 500 m. | 8,121 | 109 | 55 | 42.9 | -1.0 | |
| 83433 | Chnnl | 0.50 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 1st sample W to E | 5,411 | 40 | 85 | 2.6 | -1.0 | |
| 83434 | Chnnl | 0.50 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 2nd sample W to E | 20,001 | 30 | 673 | 43.7 | -1.0 | |
| 83435 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 3rd sample W to E | 6,002 | 47 | 144 | 3.7 | -1.0 | |
| 83436 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 4th sample W to E | 589 | 22 | 16 | 0.1 | -1.0 | |
| 83437 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 5th sample W to E | 2,026 | 24 | 41 | 1.2 | -1.0 | |
| 83438 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 6th sample W to E | 3,629 | 238 | 9,817 | 3.6 | -1.0 | |
| 83439 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 7th sample W to E | 13,052 | 77 | 719 | 12.9 | -1.0 | |
| 83440 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 8th sample W to E | 4,280 | 60 | 147 | 5.5 | -1.0 | |
| 83441 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 1st sample W to E | 3,608 | 365 | 1,480 | 9.7 | -1.0 | |
| 83442 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 2nd sample W to E | 3,568 | 165 | 270 | 7.6 | -1.0 | |
| 83443 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 3rd sample W to E | 4,293 | 226 | 620 | 9.6 | -1.0 | |
| 83444 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 1st sample W to E | 396 | 98 | 260 | 0.5 | -1.0 | |
| 83445 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 2nd sample W to E | 2,836 | 151 | 479 | 2.6 | -1.0 | |
| 83446 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 3rd sample W to E | 2,861 | 47 | 85 | 1.6 | -1.0 | |
| 83447 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Mc | 4th sample W to E | 656 | 46 | 116 | 0.4 | -1.0 | |
| 83448 | Grab | 0.20 | | Ands vol | | Qz,Ep,Cl | Py | 1-2 m. by 15 m. | 1,136 | 1,065 | 2,994 | 5.8 | -1.0 | |
| 83449 | Grab | 0.20 | | Ands vol | | Qz,Ep,Cl | Py | | 756 | 496 | 961 | 10.8 | -1.0 | |
| 83450 | Grab | 0.10 | | Ands vol | 017o/60oW | Qz,Ep,Cl | Py | 20 cm. by 10 m. | 1,271 | 98 | 97 | 6.2 | -1.0 | |
| 25051 | Grab | 0.10 | | Ands vol | 0160o/90o | Qz,Ep,Cl | Py,Cp | 20 cm. by 15 m. | 1,485 | 64 | 28 | 1.7 | -1.0 | |
| 25052 | Grab | 0.20 | | Ands vol | 160o/90o | Qz,Ep,Cl | Py | 3-5 m. by 15 m. | 1,167 | 43 | 11 | 1.1 | -1.0 | |
| 25053 | Grab | 0.30 | | Skarn | 160o/90o | Qz,Ac,Ep | Gl,Sp,Py | 3-5 m. by 30 m. | 407 | 1,479 | 4,058 | 3.2 | -1.0 | |
| 25054 | Grab | 0.20 | | Skarn | 160o/90o | Qz,Ac,Ep | Gl,Sp,Py | 4-5 m. by 500 m. | 190 | 2,393 | 10,373 | 24.9 | -1.0 | |
| 83612 | Grab | Float | | Ands vol | | Ms,Ep,Cl | Py | Tonque of Zappa Glr | 110 | 39 | 149 | 0.8 | -1.0 | |
| 83901 | Chip | 0.30 | | Ands vol | 139o/90o | Kf,Ms | Py | Fp(Hb)pphy dyke | 749 | 118 | 114 | 2.3 | | 0.026 |
| 83902 | Chip | 0.30 | | Qz-Ca brxx | | Qz-Ca vein | Py | Qz-Ca fault brxx | 42 | 30 | 37 | 0.1 | -1.0 | |
| 83903 | Chip | 0.30 | | Ands vol | 283o/90o | Ep,Cl,Ca | Py | Shear zone | 36 | 44 | 34 | 0.5 | -1.0 | |
| 83904 | Chip | 2.00 | | Ands vol | 055o/67S | Qz,Ep,Cl | Py | Siliceous zone | 5 | 10 | 10 | 0.1 | -1.0 | |
| 83905 | Chip | 0.60 | | Ands vol | 135o/90o | Qz,Ep,Cl | Py | Qz-Py zone | 167 | 24 | 18 | 0.7 | -1.0 | |
| 83906 | Chip | 0.20 | | He-An zone | | Qz,He,An | Py | Contact of He-An flt | 41 | 52 | 205 | 0.1 | -1.0 | |
| 83907 | Chip | 0.05 | | Qz-Ca shr | 167o/67oE | Qz,Ca,Cl | Py | Qz-Ca shear zone | 87 | 28 | 64 | 0.2 | 30.0 | |
| 83908 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 7,320 | 64 | 125 | 6.0 | | 0.010 |
| 83909 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 615 | 34 | 77 | 4.2 | -1.0 | |
| 83910 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 3,232 | 18 | 84 | 0.5 | -1.0 | |
| 83911 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 4,953 | 29 | 67 | 1.8 | -1.0 | |
| 83912 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 9,586 | 32 | 138 | 7.2 | -1.0 | |
| 83913 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 649 | 65 | 278 | 1.5 | -1.0 | |
| 83914 | Panel | | 1.00 | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 1,120 | 72 | 53 | 1.8 | -1.0 | |
| 83915 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 4,703 | 23 | 5 | 1.7 | -1.0 | |
| 83916 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 5,501 | 1,535 | 8,363 | 15.3 | -1.0 | |
| 83917 | Chnnl | 1.00 | | Skarn | ~065o/70S | Qz,Ac,Ep | Po,Cp,Gl | Diss'd & f.f. min. | 14,621 | 2,280 | 11,655 | 39.0 | -1.0 | |

## APPENDIX III

Vangeochem Lab Ltd.

Assay Analytical Reports

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890592 AA JOB NUMBER: 890592 RANGEX SERVICES LTD. 

| SAMPLE # | Au oz/st |
|---|---|
| 83301 | .010 |
| 83302 | .006 |
| 83303 | <.005 |
| 83304 | .006 |
| 83305 | <.005 |
| 83306 | <.005 |
| 83307 | <.005 |
| 83308 | <.005 |
| 83309 | <.005 |
| 83310 | <.005 |
| 83311 | <.005 |
| 83312 | <.005 |
| 83313 | <.005 |
| 83314 | <.005 |
| 83315 | .010 |
| 83316 | <.005 |
| 83317 | <.005 |
| 83318 | <.005 |
| 83319 | <.005 |
| 83320 | .876 |

DETECTION LIMIT .005
1 Troy oz/short ton = 34.28 ppm  1 ppm = 0.0001%  ppm = parts per million  < = less than

signed: ____________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.



| SAMPLE # | Au oz/st |
|---|---|
| 83321 | <.005 |
| 83322 | .006 |
| 83323 | <.005 |
| 83324 | <.005 |
| 83325 | <.005 |
| 83326 | <.005 |
| 83327 | <.005 |
| 83328 | <.005 |
| 83329 | <.005 |
| 83330 | <.005 |
| 83331 | <.005 |
| 83332 | <.005 |
| 83333 | <.005 |
| 83334 | <.005 |
| 83335 | <.005 |
| 83336 | <.005 |
| 83337 | .010 |
| 83338 | <.005 |
| 83339 | <.005 |
| 83340 | <.005 |

DETECTION LIMIT .005

1 Troy oz/short ton = 34.28 ppm    1 ppm = 0.0001%    ppm = parts per million    < = less than

signed: ____________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890592 AA JOB NUMBER: 890592 RANGEX SERVICES LTD. 

| SAMPLE # | Au oz/st |
|---|---|
| 83341 | <.005 |
| 83501 | .272 |
| 83502 | <.005 |
| 83503 | <.005 |
| 83504 | <.005 |
| 83505 | <.005 |
| 83506 | <.005 |
| 83507 | <.005 |
| 83508 | <.005 |
| 83509 | <.005 |
| 83510 | <.005 |
| 83511 | <.005 |
| 83601 | <.005 |
| 83602 | <.005 |
| 83741 | .974 |
| 83742 | .022 |
| 83743 | <.005 |
| 83744 | <.005 |
| 83745 | .006 |
| 83746 | .156 |

Ed

Ed.

DETECTION LIMIT .005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ______________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.



| SAMPLE # | Au oz/st |
|---|---|
| 83747 | <.005 |
| 83748 | <.005 |
| 83749 | <.005 |
| 83750 | <.005 |
| 83751 | <.005 |
| 83901 | .026 |
| 83902 | <.005 |
| 83903 | <.005 |
| 83904 | <.005 |
| 83905 | <.005 |
| 83906 | <.005 |

DETECTION LIMIT .005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________

VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

# ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST:

REPORT #: 890592 PA    RANGEX SERVICES    Proj:    Date In: 89/09/13    Date Out:89/09/20    Att: K KAYE    

| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83301 | 0.4 | 2.69 | 108 | 21 | 4 | 0.43 | 0.3 | 55 | 57 | 461 | 8.16 | 0.03 | 2.77 | 923 | 8 | 0.01 | 77 | 0.24 | 56 | <2 | 6 | 22 | <5 | <3 | 173 |
| 83302 | 2.9 | 1.94 | 227 | 21 | 3 | 0.55 | 0.1 | 30 | 77 | 653 | 8.30 | 0.22 | 1.36 | 741 | 7 | 0.02 | 69 | 0.13 | 67 | <2 | 4 | 26 | <5 | <3 | 67 |
| 83303 | 0.9 | 0.73 | 29 | 224 | <3 | 0.13 | 0.2 | 27 | 42 | 369 | 5.95 | 0.03 | 0.62 | 295 | 15 | 0.03 | 15 | 0.17 | 30 | <2 | 9 | 119 | <5 | <3 | 40 |
| 83304 | 0.6 | 0.52 | 259 | 466 | 4 | 0.01 | 0.1 | 15 | 57 | 630 | >10.00 | 0.06 | 0.08 | 362 | 18 | 0.03 | 89 | 0.11 | 71 | <2 | 6 | 22 | <5 | <3 | 74 |
| 83305 | 0.1 | 0.23 | 6 | 374 | <3 | 0.01 | 0.1 | 3 | 68 | 52 | 2.04 | 0.01 | 0.04 | 26 | 2 | 0.01 | 6 | 0.01 | 22 | <2 | 3 | 20 | <5 | <3 | 10 |
| 83306 | 3.7 | 0.03 | <3 | 123 | <3 | 0.01 | 123.1 | 2 | 27 | 124 | 0.33 | 0.33 | 0.02 | 53 | 3 | 0.01 | 32 | 0.01 | 6232 | <2 | <2 | 658 | <5 | <3 | 9423 |
| 83307 | 0.7 | 0.62 | <3 | 25 | <3 | 4.12 | 583.5 | 11 | 33 | 205 | 1.25 | 0.15 | 0.70 | 1931 | 11 | 0.01 | 33 | 0.01 | 179 | <2 | <2 | 704 | <5 | <3 | >20000 |
| 83308 | 1.8 | 0.08 | <3 | 38 | <3 | 0.12 | 267.1 | 5 | 50 | 628 | 0.27 | 0.41 | 0.02 | 66 | 11 | 0.01 | 6 | 0.01 | 58 | <2 | <2 | 857 | <5 | <3 | >20000 |
| 83309 | 0.2 | 0.05 | <3 | 400 | <3 | 0.31 | 0.1 | 2 | 35 | 353 | 0.42 | 0.44 | 0.01 | 233 | <1 | 0.01 | 4 | 0.01 | 48 | <2 | <2 | 529 | <5 | <3 | 1150 |
| 83310 | 0.2 | 0.08 | <3 | 111 | <3 | 0.29 | 83.1 | 3 | 46 | 59 | 0.62 | 0.03 | 0.06 | 254 | 3 | 0.01 | 72 | 0.01 | 23 | <2 | <2 | 562 | <5 | <3 | 8073 |
| 83311 | 1.6 | 0.17 | 5 | 39 | <3 | 1.00 | 34.2 | 10 | 34 | 1440 | 1.92 | 0.56 | 0.54 | 661 | 6 | 0.01 | 65 | 0.09 | 74 | <2 | <2 | 500 | <5 | <3 | 4229 |
| 83312 | 3.6 | 0.43 | 46 | 35 | 4 | 8.12 | 0.1 | 34 | 54 | 805 | 3.67 | 0.43 | 0.28 | 2011 | 3 | 0.01 | 18 | 0.02 | 64 | <2 | <2 | 134 | <5 | <3 | 298 |
| 83313 | 6.3 | 0.12 | <3 | 622 | <3 | 1.63 | 0.1 | 12 | 94 | 113 | 2.69 | 0.11 | 0.07 | 521 | 3 | 0.01 | 115 | 0.01 | 224 | <2 | <2 | 45 | <5 | <3 | 2385 |
| 83314 | 0.1 | 0.26 | 5 | 227 | <3 | 6.85 | 0.2 | 15 | 15 | 82 | 2.64 | 0.40 | 0.26 | 905 | 1 | 0.01 | 38 | 0.03 | 25 | <2 | <2 | 96 | <5 | <3 | 78 |
| 83315 | 0.1 | 0.20 | <3 | 134 | <3 | 1.80 | 0.3 | 6 | 57 | 2 | 2.57 | 0.13 | 0.05 | 1350 | 3 | 0.01 | 25 | 0.04 | 16 | <2 | <2 | 17 | <5 | <3 | 70 |
| 83316 | 0.2 | 0.18 | 14 | 138 | <3 | 0.35 | 0.1 | 5 | 99 | 8 | 1.46 | 0.69 | 0.02 | 1084 | 1 | 0.01 | 7 | 0.04 | 14 | <2 | <2 | 11 | <5 | <3 | 39 |
| 83317 | 2.3 | 2.16 | 40 | 17 | 3 | 1.49 | 0.1 | 46 | 41 | 1152 | 8.12 | 0.21 | 0.79 | 463 | 4 | 0.02 | 25 | 0.20 | 47 | <2 | 5 | 23 | <5 | <3 | 68 |
| 83318 | 0.1 | 0.09 | <3 | 116 | <3 | 0.20 | 0.2 | 3 | 97 | 28 | 0.55 | 0.02 | 0.03 | 403 | 1 | 0.01 | 188 | 0.01 | 14 | <2 | <2 | 10 | <5 | <3 | 12 |
| 83319 | 0.1 | 0.04 | <3 | 118 | <3 | 0.45 | 0.2 | 2 | 117 | 6 | 0.38 | 0.03 | 0.01 | 381 | 2 | 0.01 | 233 | 0.01 | 11 | <2 | <2 | 25 | <5 | <3 | 3 |
| 83320 | 35.7 | 0.21 | 30 | 18 | 5 | 1.02 | 7.2 | 13 | 60 | >20000 | 6.06 | 0.04 | 0.08 | 805 | 5 | 0.01 | 14 | 0.19 | 9277 | <2 | 3 | 62 | <5 | <3 | 1097 |
| 83321 | 0.3 | 1.32 | 3 | 88 | <3 | 0.25 | 0.2 | 5 | 72 | 273 | 2.87 | 0.07 | 0.58 | 711 | 3 | 0.01 | 134 | 0.03 | 76 | <2 | <2 | 10 | <5 | <3 | 65 |
| 83322 | 0.2 | 0.30 | <3 | 151 | <3 | 0.08 | 0.1 | 7 | 106 | 96 | 2.10 | 0.93 | 0.06 | 921 | 1 | 0.01 | 9 | 0.11 | 40 | <2 | <2 | 12 | <5 | <3 | 14 |
| 83323 | 0.5 | 0.16 | 15 | 58 | <3 | 0.11 | 0.1 | 13 | 79 | 43 | 2.20 | 0.97 | 0.04 | 281 | 2 | 0.01 | 145 | 0.08 | 31 | <2 | <2 | 11 | <5 | <3 | 18 |
| 83324 | 0.2 | 0.05 | 3 | 43 | <3 | 0.70 | 0.2 | 3 | 73 | 14 | 1.73 | 1.05 | 0.03 | 220 | 3 | 0.01 | 124 | 0.01 | 16 | <2 | <2 | 13 | <5 | <3 | 69 |
| 83325 | 0.1 | 0.06 | <3 | 63 | <3 | 0.64 | 0.1 | 4 | 141 | 15 | 0.42 | 0.06 | 0.02 | 93 | <1 | 0.01 | 9 | 0.02 | 9 | <2 | <2 | 41 | <5 | <3 | 1 |
| 83326 | 0.5 | 0.02 | <3 | 47 | <3 | 0.63 | 0.2 | 2 | 70 | 447 | 0.47 | 1.09 | 0.01 | 135 | 1 | 0.01 | 119 | 0.01 | 6 | <2 | <2 | 40 | <5 | <3 | 37 |
| 83327 | 0.1 | 0.12 | <3 | 40 | <3 | 0.37 | 0.2 | 3 | 132 | 25 | 0.58 | 0.05 | 0.05 | 124 | <1 | 0.01 | 8 | 0.01 | 10 | <2 | <2 | 43 | <5 | <3 | 8 |
| 83328 | 0.1 | 0.22 | 10 | 51 | <3 | 1.05 | 0.1 | 3 | 93 | 21 | 1.54 | 0.13 | 0.27 | 176 | 2 | 0.01 | 167 | 0.03 | 11 | <2 | <2 | 50 | <5 | <3 | 82 |
| 83329 | 0.2 | 0.08 | <3 | 47 | <3 | 1.60 | 0.1 | 4 | 118 | 29 | 1.22 | 1.32 | 0.05 | 513 | <1 | 0.01 | 9 | 0.01 | 10 | <2 | <2 | 167 | <5 | <3 | 13 |
| 83330 | 6.6 | 0.02 | 473 | 10 | 7 | 0.09 | 0.1 | 120 | 51 | 874 | >10.00 | 0.45 | 0.04 | 112 | 8 | 0.03 | 108 | 0.01 | 60 | <2 | 6 | 5 | <5 | <3 | 55 |
| 83331 | 2.6 | 0.12 | 75 | 54 | <3 | 0.22 | 0.2 | 21 | 113 | 146 | 2.30 | 0.08 | 0.02 | 125 | 1 | 0.01 | 9 | 0.01 | 86 | <2 | <2 | 17 | <5 | <3 | 21 |
| 83332 | 0.2 | 0.11 | <3 | 63 | <3 | 1.85 | 0.3 | 3 | 77 | 33 | 0.83 | 1.45 | 0.02 | 522 | 1 | 0.01 | 125 | 0.01 | 14 | <2 | <2 | 181 | <5 | <3 | 9 |
| 83333 | 0.2 | 0.02 | <3 | 46 | <3 | 0.52 | 0.2 | 2 | 153 | 16 | 0.69 | 1.33 | 0.01 | 265 | <1 | 0.01 | 7 | 0.01 | 9 | <2 | <2 | 12 | <5 | <3 | 6 |
| 83334 | 0.8 | 0.11 | <3 | 403 | <3 | 2.07 | 0.1 | 7 | 72 | 46 | 2.19 | 1.60 | 0.85 | 1181 | 2 | 0.01 | 133 | 0.04 | 1332 | <2 | <2 | 244 | <5 | <3 | 909 |
| 83335 | 0.2 | 0.15 | <3 | 97 | <3 | 1.09 | 4.1 | 3 | 130 | 12 | 1.34 | 0.17 | 0.41 | 900 | 1 | 0.01 | 16 | 0.04 | 120 | <2 | <2 | 117 | <5 | <3 | 1345 |
| 83336 | 0.1 | 0.18 | 10 | 167 | <3 | 1.91 | 0.1 | 5 | 82 | 30 | 1.44 | 1.64 | 0.10 | 1130 | 2 | 0.01 | 131 | 0.02 | 65 | <2 | <2 | 184 | <5 | <3 | 142 |
| 83337 | 0.1 | 0.22 | <3 | 97 | <3 | 1.48 | 0.2 | 1 | 57 | 8 | 0.58 | 0.20 | 0.07 | 674 | <1 | 0.01 | 5 | 0.01 | 19 | <2 | <2 | 94 | <5 | <3 | 29 |
| 83338 | 0.1 | 0.14 | 26 | 86 | <3 | 3.35 | 0.2 | 15 | 58 | 365 | 2.49 | 1.93 | 1.21 | 1889 | 2 | 0.01 | 140 | 0.04 | 25 | <2 | <2 | 231 | <5 | <3 | 123 |
| 83339 | 0.3 | 0.17 | 4 | 93 | <3 | 4.96 | 0.1 | 13 | 59 | 335 | 2.02 | 2.17 | 0.74 | 1188 | <1 | 0.01 | 39 | 0.07 | 132 | <2 | <2 | 281 | <5 | <3 | 282 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum  is = Insufficient Sample  ns = No sample  > = Greater than Maximum  ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83340 | 0.1 | 0.28 | <3 | 59 | <3 | 0.77 | 0.3 | 4 | 45 | 18 | 0.73 | 0.13 | 0.19 | 306 | 1 | 0.01 | 96 | 0.02 | 15 | <2 | <2 | 55 | <5 | <3 | 27 |
| 83341 | 0.2 | 0.62 | 4 | 36 | <3 | 7.35 | 0.1 | 4 | 85 | 2 | 2.85 | 0.26 | 1.50 | 1272 | 1 | 0.01 | 55 | 0.01 | 19 | <2 | <2 | 314 | <5 | <3 | 35 |
| 83501 | 28.2 | 0.92 | 81 | 12 | 7 | 0.57 | 2.5 | 744 | 58 | >20000 | 9.07 | 0.16 | 0.55 | 211 | 6 | 0.01 | 59 | 0.21 | 79 | <2 | 5 | 21 | <5 | <3 | 147 |
| 83502 | 0.5 | 2.08 | 39 | 30 | <3 | 1.36 | 0.1 | 45 | 61 | 788 | 3.90 | 0.15 | 1.07 | 341 | 7 | 0.02 | 111 | 0.11 | 31 | <2 | 5 | 14 | <5 | <3 | 42 |
| 83503 | 0.1 | 0.52 | 41 | 633 | <3 | 6.58 | 0.1 | 15 | 22 | 148 | 4.26 | 0.25 | 2.99 | 1122 | 2 | 0.01 | 30 | 0.03 | 25 | <2 | 2 | 102 | <5 | <3 | 242 |
| 83504 | 1.3 | 1.31 | 37 | 90 | <3 | 1.13 | 0.2 | 26 | 24 | 330 | 3.40 | 0.14 | 0.53 | 370 | 2 | 0.02 | 62 | 0.12 | 34 | <2 | 5 | 29 | <5 | <3 | 48 |
| 83505 | 0.1 | 0.49 | 123 | 716 | <3 | 5.05 | 0.2 | 15 | 40 | 71 | 3.93 | 0.22 | 1.51 | 1018 | 1 | 0.01 | 32 | 0.03 | 20 | <2 | 2 | 49 | <5 | <3 | 122 |
| 83506 | 1.3 | 1.54 | 29 | 212 | <3 | 1.26 | 0.3 | 20 | 29 | 276 | 2.29 | 0.14 | 0.51 | 321 | 1 | 0.02 | 18 | 0.13 | 30 | <2 | 5 | 27 | <5 | <3 | 46 |
| 83507 | 0.1 | 0.30 | 161 | 283 | <3 | 7.78 | 0.2 | 26 | 218 | 64 | 4.18 | 0.27 | 3.09 | 1315 | 1 | 0.01 | 59 | 0.01 | 21 | <2 | 2 | 64 | <5 | <3 | 76 |
| 83508 | 0.1 | 0.56 | 41 | 87 | <3 | 3.61 | 0.1 | 17 | 13 | 149 | 5.89 | 0.20 | 1.86 | 1180 | 2 | 0.01 | 12 | 0.10 | 26 | <2 | 3 | 35 | <5 | <3 | 78 |
| 83509 | 0.2 | 0.66 | 22 | 74 | <3 | 3.64 | 0.2 | 32 | 30 | 431 | 5.04 | 0.20 | 1.44 | 874 | 3 | 0.01 | 46 | 0.12 | 25 | <2 | 2 | 55 | <5 | <3 | 46 |
| 83510 | 1.3 | 1.50 | 19 | 36 | <3 | 0.59 | 0.2 | 19 | 15 | 59 | 2.96 | 0.13 | 0.84 | 264 | 1 | 0.01 | 8 | 0.13 | 23 | <2 | 5 | 31 | <5 | <3 | 30 |
| 83511 | 0.3 | 1.68 | 18 | 23 | <3 | 1.33 | 0.2 | 21 | 32 | 144 | 3.73 | 0.15 | 0.30 | 192 | 6 | 0.02 | 43 | 0.14 | 27 | <2 | 3 | 27 | <5 | <3 | 41 |
| 83601 | 0.5 | 0.94 | 19 | 44 | <3 | 0.99 | 0.1 | 16 | 20 | 105 | 4.06 | 0.14 | 0.50 | 357 | 1 | 0.02 | 36 | 0.12 | 23 | <2 | 4 | 23 | <5 | <3 | 42 |
| 83602 | 0.6 | 0.59 | 3 | 24 | <3 | 0.57 | 0.1 | 24 | 45 | 144 | 3.19 | 0.13 | 0.51 | 191 | 1 | 0.02 | 44 | 0.13 | 20 | <2 | 4 | 12 | <5 | <3 | 32 |
| 83741 | >50.0 | 1.35 | 20 | 69 | 3 | 0.66 | 9.5 | 22 | 60 | 1267 | 5.31 | 0.14 | 0.93 | 432 | 26 | 0.01 | 36 | 0.03 | 36 | <2 | 2 | 7 | <5 | <3 | 637 |
| 83742 | 2.7 | 0.96 | 33 | 96 | <3 | 7.24 | 0.1 | 21 | 26 | 144 | 5.14 | 0.27 | 3.01 | 2356 | 5 | 0.01 | 38 | 0.03 | 27 | <2 | 3 | 40 | <5 | <3 | 45 |
| 83743 | 0.1 | 1.69 | 7 | 162 | <3 | 3.79 | 0.1 | 13 | 49 | 293 | 2.42 | 0.19 | 1.41 | 987 | 1 | 0.01 | 11 | 0.03 | 22 | <2 | <2 | 52 | <5 | <3 | 60 |
| 83744 | 0.1 | 1.75 | 14 | 40 | <3 | 1.01 | 0.2 | 29 | 56 | 305 | 3.26 | 0.14 | 1.35 | 473 | 1 | 0.01 | 10 | 0.01 | 26 | <2 | 2 | 23 | <5 | <3 | 48 |
| 83745 | 0.1 | 1.15 | <3 | 170 | <3 | 3.31 | 0.2 | 8 | 35 | 26 | 2.02 | 0.18 | 0.88 | 1169 | 1 | 0.01 | 20 | 0.01 | 17 | <2 | <2 | 31 | <5 | <3 | 39 |
| 83746 | 25.9 | 1.75 | 21 | 46 | <3 | 0.79 | 22.6 | 25 | 133 | 907 | 4.53 | 0.14 | 1.63 | 403 | 19 | 0.01 | 69 | 0.02 | 33 | <2 | 2 | 10 | <5 | <3 | 1040 |
| 83747 | 9.3 | 1.70 | 769 | 137 | <3 | 0.23 | 9.1 | 32 | 30 | 510 | 4.17 | 0.13 | 0.88 | 327 | 4 | 0.01 | 146 | 0.09 | 324 | <2 | 2 | 10 | <5 | <3 | 2011 |
| 83748 | 0.2 | 0.51 | 7 | 35 | <3 | 0.15 | 0.1 | 4 | 44 | 26 | 0.77 | 0.11 | 0.28 | 137 | 1 | 0.01 | 20 | 0.01 | 18 | <2 | <2 | 9 | <5 | <3 | 60 |
| 83749 | 0.5 | 2.82 | 29 | 157 | <3 | 1.77 | 0.1 | 46 | 42 | 951 | 4.82 | 0.16 | 1.54 | 774 | 3 | 0.01 | 16 | 0.09 | 38 | <2 | 2 | 48 | <5 | <3 | 85 |
| 83750 | 0.5 | 1.07 | 15 | 142 | <3 | 0.34 | 0.2 | 12 | 44 | 198 | 3.30 | 0.01 | 0.76 | 220 | 5 | 0.02 | 15 | 0.07 | 26 | <2 | 4 | 10 | <5 | <3 | 23 |
| 83751 | 0.1 | 0.44 | 16 | 210 | <3 | 5.35 | 0.2 | 14 | 25 | 16 | 4.30 | 0.23 | 1.94 | 1644 | 1 | 0.01 | 38 | 0.07 | 21 | <2 | 2 | 46 | <5 | <3 | 29 |
| 83901 | 2.3 | 3.41 | 187 | 7 | 9 | 0.13 | 0.3 | 64 | 39 | 749 | >10.00 | 0.08 | 1.85 | 1236 | 11 | 0.02 | 53 | 0.09 | 118 | <2 | 7 | 10 | <5 | <3 | 114 |
| 83902 | 0.1 | 0.68 | 15 | 13 | <3 | >10.00 | 0.1 | 8 | 15 | 42 | 3.84 | 0.43 | 1.46 | 2811 | 1 | 0.01 | 25 | 0.02 | 30 | <2 | <2 | 746 | <5 | <3 | 37 |
| 83903 | 0.5 | 1.31 | 52 | 11 | 4 | 0.45 | 0.2 | 27 | 88 | 36 | 8.08 | 0.15 | 1.45 | 464 | 99 | 0.01 | 45 | 0.10 | 44 | <2 | 5 | 75 | <5 | <3 | 34 |
| 83904 | 0.1 | 0.26 | <3 | 524 | <3 | 0.12 | 0.1 | 2 | 45 | 5 | 0.47 | 0.11 | 0.05 | 112 | 1 | 0.01 | 84 | 0.01 | 10 | <2 | <2 | 20 | <5 | <3 | 10 |
| 83904 | 0.7 | 0.69 | 30 | 73 | <3 | 0.63 | 0.1 | 16 | 26 | 167 | 2.71 | 0.13 | 0.42 | 247 | 3 | 0.02 | 19 | 0.24 | 24 | <2 | 6 | 112 | <5 | <3 | 18 |
| 83905 | 0.1 | 0.23 | <3 | 195 | <3 | >10.00 | 0.2 | 8 | 10 | 41 | 1.38 | 0.42 | 0.66 | 1094 | 1 | 0.01 | 11 | 0.06 | 52 | <2 | <2 | 231 | <5 | <3 | 205 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum is = Insufficient Sample ns = No sample > = Greater than Maximum ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890612 GA JOB NUMBER: 890612 **RANGEX SERVICES LTD.** 

| SAMPLE # | Au |
|---|---|
| | ppb |
| 83907 | 30 |

DETECTION LIMIT 5

nd = none detected -- = not analysed is = insufficient sample

**VANGEOCHEM LAB LIMITED**

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

# ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890612 PA    RANGEX SERVICES    Proj: STU    Date In: 89/09/19    Date Out:89/09/22    Att: K KAYE



| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83907 | 0.2 | 1.56 | <3 | 7 | <3 | 1.72 | 1.3 | 11 | 96 | 87 | 1.53 | 0.30 | 0.48 | 404 | 3 | 0.01 | 24 | 0.05 | 28 | <2 | <2 | 45 | <5 | <3 | 64 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum  is = Insufficient Sample  ns = No sample  > = Greater than Maximum  ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

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BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890638 AA    JOB NUMBER: 890638    RANGEX SERVICES LTD.    

| SAMPLE # | Cu % | Pb % | Zn % | Ag oz/st | Au oz/st |
|---|---|---|---|---|---|
| 83908 | .85 | .01 | .04 | .11 | .010 |
| 83909 | .05 | .01 | .02 | .08 | <.005 |
| 83910 | .35 | <.01 | .02 | .04 | <.005 |
| 83911 | .52 | <.01 | .01 | .10 | <.005 |
| 83912 | .96 | .01 | .01 | .15 | <.005 |
| 83913 | .05 | .01 | .03 | .09 | <.005 |
| 83914 | .12 | .01 | <.01 | .12 | <.005 |
| DETECTION LIMIT | .01 | .01 | .01 | .01 | .005 |

1 Troy oz/short ton = 34.28 ppm . 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________

VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

# ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890638 PA RANGEX SERVICES Proj: STUITZ Date In: 89/09/25 Date Out:89/09/29 Att: K KAYE 

| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83908 | 6.0 | 1.26 | 33 | 34 | 4 | 0.60 | 0.2 | 58 | 17 | 7320 | >10.00 | 0.39 | 0.76 | 735 | 2 | 0.01 | 23 | 0.06 | 64 | <2 | 2 | 24 | <5 | <3 | 125 |
| 83909 | 4.2 | 1.61 | 59 | 77 | 3 | 0.24 | 0.1 | 16 | 76 | 615 | 8.24 | 0.28 | 0.78 | 432 | 3 | 0.01 | 8 | 0.06 | 34 | <2 | <2 | 8 | <5 | <3 | 77 |
| 83910 | 0.5 | 0.35 | 33 | 7 | <3 | 6.83 | 0.1 | 35 | 13 | 3232 | 6.60 | 1.22 | 0.46 | 2240 | <1 | 0.01 | 12 | 0.01 | 18 | <2 | <2 | 72 | <5 | <3 | 84 |
| 83911 | 1.8 | 1.60 | 23 | 7 | 3 | 2.61 | 0.1 | 48 | 31 | 4953 | 9.95 | 0.69 | 0.62 | 1032 | 2 | 0.01 | 16 | 0.05 | 29 | <2 | <2 | 52 | <5 | <3 | 67 |
| 83912 | 7.2 | 1.04 | 67 | 13 | 5 | 4.90 | 0.1 | 76 | 11 | 9586 | >10.00 | 1.14 | 0.63 | 1830 | 3 | 0.01 | 13 | 0.02 | 32 | <2 | 2 | 46 | <5 | <3 | 138 |
| 83913 | 1.5 | 0.16 | 82 | 26 | 3 | 3.51 | 0.1 | 70 | 26 | 649 | >10.00 | 0.84 | 0.35 | 1776 | 1 | 0.01 | 13 | 0.04 | 65 | <2 | 2 | 50 | <5 | <3 | 278 |
| 83914 | 1.8 | 0.76 | 169 | 9 | 4 | 3.99 | 0.1 | 80 | 11 | 1120 | >10.00 | 0.93 | 0.62 | 1243 | 4 | 0.01 | 14 | 0.04 | 72 | <2 | 2 | 69 | <5 | <3 | 53 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum is = Insufficient Sample ns = No sample > = Greater than Maximum ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

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BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890680 GA JOB NUMBER: 890680 RANGEX SERVICES LTD. 

| SAMPLE # | Au |
|---|---|
| | ppb |
| 83420 | nd |
| 83421 | nd |
| 83422 | nd |
| 83423 | nd |
| 83424 | nd |
| 83425 | nd |
| 83426 | nd |
| 83427 | nd |
| 83428 | nd |
| 83429 | nd |
| 83430 | nd |
| 83431 | nd |
| 83432 | 20 |

DETECTION LIMIT 5
nd = none detected -- = not analysed is = insufficient sample

# VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717


## ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890680 PA　　RANGEX SERVICES　　Proj: STU 1-2　　Date In: 89/10/02　　Date Out:89/10/10　　Att: K KAYE



| Sample Number | Ag ppm | Al % | As ppm | Ba ppm | Bi ppm | Ca % | Cd ppm | Co ppm | Cr ppm | Cu ppm | Fe % | K % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83420 | 2.5 | 0.02 | 9 | 6 | <3 | 4.41 | 2.4 | 6 | 83 | 3169 | 1.29 | 0.70 |
| 83421 | 1.8 | 0.14 | 27 | 33 | 4 | 2.90 | 0.1 | 67 | 23 | 1822 | >10.00 | 0.75 |
| 83422 | 14.0 | 0.23 | 35 | 117 | 5 | 1.03 | 4.6 | 24 | 12 | 19964 | >10.00 | 0.49 |
| 83423 | 0.4 | 0.10 | 20 | 88 | <3 | 0.65 | 0.1 | 29 | 6 | 619 | 4.27 | 0.22 |
| 83424 | 2.9 | 1.52 | 58 | 22 | 4 | 1.11 | 0.1 | 48 | 31 | 950 | 8.61 | 0.42 |
| 83425 | 38.5 | 3.73 | 134 | 14 | 22 | 0.31 | 6.1 | 82 | 15 | 11694 | >10.00 | 0.39 |
| 83426 | 3.4 | 1.42 | 45 | 16 | <3 | 1.11 | 3.7 | 30 | 15 | 676 | 4.40 | 0.29 |
| 83427 | 22.2 | 0.19 | 141 | 16 | 5 | 3.05 | 32.7 | 66 | 43 | 16818 | >10.00 | 0.82 |
| 83428 | 6.4 | 0.91 | 125 | 16 | 5 | 0.27 | 1.5 | 96 | 20 | 2738 | >10.00 | 0.42 |
| 83429 | 5.7 | 0.14 | 66 | 5 | <3 | 7.07 | 0.1 | 25 | 72 | 6424 | 2.47 | 1.14 |
| 83430 | 8.2 | 0.59 | 144 | 34 | 9 | 0.24 | 2.2 | 100 | 46 | 8757 | >10.00 | 0.59 |
| 83431 | 0.8 | 0.21 | 33 | 73 | <3 | 1.43 | 0.1 | 28 | 8 | 978 | 3.89 | 0.33 |
| 83432 | 42.9 | 0.07 | 491 | 11 | 23 | 0.04 | 4.6 | 223 | 58 | 8121 | >10.00 | 0.75 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 |

| Sample Number | Mg % | Mn ppm | Mo ppm | Na % | Ni ppm | P % | Pb ppm | Sb ppm | Sn ppm | Sr ppm | U ppm | W ppm | Zn ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83420 | 0.06 | 1266 | <1 | 0.01 | 17 | 0.01 | 4 | <2 | <2 | 48 | <5 | <3 | 9 |
| 83421 | 0.34 | 2498 | 3 | 0.01 | 32 | 0.01 | 29 | <2 | 2 | 44 | <5 | <3 | 32 |
| 83422 | 0.82 | 1077 | 5 | 0.01 | 17 | 0.01 | 26 | <2 | 3 | 13 | <5 | <3 | 230 |
| 83423 | 0.45 | 1343 | <1 | 0.01 | 11 | 0.01 | 19 | <2 | <2 | 12 | <5 | <3 | 22 |
| 83424 | 0.87 | 451 | 4 | 0.01 | 17 | 0.18 | 58 | <2 | 6 | 28 | <5 | <3 | 38 |
| 83425 | 2.26 | 1474 | 5 | 0.01 | 25 | 0.08 | 687 | <2 | <2 | 53 | <5 | <3 | 1392 |
| 83426 | 1.08 | 582 | 1 | 0.01 | 17 | 0.23 | 349 | <2 | 3 | 30 | <5 | <3 | 1008 |
| 83427 | 0.08 | 433 | 31 | 0.01 | 12 | 0.05 | 943 | <2 | 3 | 27 | <5 | <3 | 2246 |
| 83428 | 0.52 | 431 | 230 | 0.01 | 33 | 0.13 | 85 | <2 | 4 | 5 | <5 | <3 | 211 |
| 83429 | 0.08 | 908 | 7 | 0.01 | 5 | 0.01 | 17 | <2 | <2 | 63 | <5 | <3 | 85 |
| 83430 | 0.27 | 425 | 9 | 0.01 | 16 | 0.03 | 47 | <2 | 4 | 5 | <5 | <3 | 92 |
| 83431 | 0.36 | 1393 | <1 | 0.01 | 11 | 0.02 | 16 | <2 | <2 | 36 | <5 | <3 | 22 |
| 83432 | 0.14 | 380 | 10 | 0.01 | 65 | 0.01 | 109 | <2 | 5 | 2 | <5 | <3 | 55 |
| Minimum Detection | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum　is = Insufficient Sample　ns = No sample　> = Greater than Maximum　ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
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BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890681 GA JOB NUMBER: 890681 **RANGEX SERVICES LTD.** 

| SAMPLE # | Au |
|---|---|
| | ppb |
| 83612 | nd |

DETECTION LIMIT 5
nd = none detected -- = not analysed is = insufficient sample

# VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717


## ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST:

REPORT #: 890681 PA    RANGEX SERVICES    Proj: STU 1-2    Date In: 89/10/02    Date Out:89/10/10    Att: K KAYE    

| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83612 | 0.8 | 0.89 | 67 | 43 | <3 | 1.81 | 0.5 | 19 | 17 | 110 | 4.15 | 0.40 | 1.25 | 2006 | 2 | 0.01 | 28 | 0.13 | 39 | <2 | <2 | 94 | <5 | <3 | 149 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum is = Insufficient Sample ns = No sample > = Greater than Maximum ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

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MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890685 GA JOB NUMBER: 890685 RANGEX SERVICES LTD. 

| SAMPLE # | Au ppb |
|---|---|
| 83433 | nd |
| 83434 | 20 |
| 83435 | nd |
| 83436 | nd |
| 83437 | 20 |
| 83438 | nd |
| 83439 | nd |
| 83440 | nd |
| 83441 | nd |
| 83442 | nd |

DETECTION LIMIT 5

nd = none detected -- = not analysed is = insufficient sample

# VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717


## ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST:

REPORT #: 890685 PA   RANGEX SERVICES   Proj: STU   Date In: 89/10/02   Date Out:89/10/11   Att: K KAYE   

| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 83433 | 2.6 | 2.33 | 1018 | 58 | <3 | 2.64 | 0.1 | 29 | 23 | 5411 | 6.82 | 0.60 | 1.10 | 1112 | 2 | 0.01 | 22 | 0.11 | 40 | <2 | 3 | 90 | <5 | <3 | 85 |
| 83434 | 43.7 | 0.43 | 207 | 9 | 5 | 0.10 | 6.8 | 440 | 44 | >20000 | >10.00 | 0.94 | 0.15 | 495 | 14 | 0.01 | 58 | 0.01 | 30 | <2 | 7 | 3 | <5 | <3 | 673 |
| 83435 | 3.7 | 0.12 | 285 | 15 | 5 | 0.82 | 0.2 | 286 | 39 | 6002 | >10.00 | 0.78 | 0.11 | 1796 | 9 | 0.01 | 52 | 0.01 | 47 | <2 | 5 | 10 | <5 | <3 | 144 |
| 83436 | 0.1 | 0.26 | 45 | 44 | <3 | 7.24 | 0.1 | 79 | 24 | 589 | >10.00 | 1.39 | 0.45 | 1994 | 1 | 0.01 | 21 | 0.01 | 22 | <2 | 2 | 79 | <5 | 44 | 16 |
| 83437 | 1.2 | 0.12 | 38 | 14 | <3 | 7.68 | 0.1 | 85 | 26 | 2026 | >10.00 | 1.48 | 0.44 | 2076 | 2 | 0.01 | 20 | 0.01 | 24 | <2 | 2 | 100 | <5 | <3 | 41 |
| 83438 | 3.6 | 0.20 | 300 | 5 | 4 | 3.80 | 92.1 | 296 | 40 | 3629 | >10.00 | 1.13 | 0.23 | 2565 | 7 | 0.01 | 28 | 0.01 | 238 | <2 | 4 | 30 | <5 | <3 | 9817 |
| 83439 | 12.9 | 0.06 | 308 | 8 | 6 | 0.90 | 4.3 | 270 | 31 | 13052 | >10.00 | 0.82 | 0.16 | 1238 | 9 | 0.01 | 41 | 0.01 | 77 | <2 | 5 | 11 | <5 | <3 | 719 |
| 83440 | 5.5 | 1.33 | 100 | 21 | 3 | 0.49 | 0.1 | 129 | 22 | 4280 | >10.00 | 0.49 | 0.91 | 690 | 9 | 0.01 | 23 | 0.06 | 60 | <2 | 4 | 17 | <5 | <3 | 147 |
| 83441 | 9.7 | 1.48 | 222 | 6 | 7 | 0.15 | 10.1 | 471 | 29 | 3608 | >10.00 | 0.89 | 0.99 | 726 | 10 | 0.01 | 33 | 0.06 | 365 | <2 | 5 | 4 | <5 | <3 | 1480 |
| 83442 | 7.6 | 0.14 | 282 | 8 | 8 | 0.14 | 2.6 | 462 | 34 | 3568 | >10.00 | 0.96 | 0.21 | 794 | 11 | 0.01 | 41 | 0.06 | 165 | <2 | 6 | 4 | <5 | <3 | 270 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum  is = Insufficient Sample  ns = No sample  > = Greater than Maximum  ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890687 GA    JOB NUMBER: 890687    **RANGEX SERVICES LTD.**    

| SAMPLE # | Au |
|---|---|
| | ppb |
| 25051 | 180 |
| 25052 | 20 |
| 25053 | 100 |
| 25054 | 20 |
| 83443 | nd |
| 83444 | nd |
| 83445 | nd |
| 83446 | nd |
| 83447 | nd |
| 83448 | nd |
| 83449 | 260 |
| 83450 | nd |
| 83915 | nd |
| 83916 | nd |
| 83917 | nd |

DETECTION LIMIT 5
nd = none detected    -- = not analysed    is = insufficient sample

# VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717


## ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to $HNO_3$ to $H_2O$ at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890687 PA    RANGEX SERVICES    Proj: STU 1&2    Date In: 89/10/02    Date Out:89/10/12    Att: K KAYE



| Sample Number | Ag | Al | As | Ba | Bi | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Sn | Sr | U | W | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | % | % | % | ppm | ppm | % | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| 25051 | 1.7 | 3.14 | 265 | 39 | 6 | 1.11 | 0.2 | 75 | 27 | 1485 | >10.00 | 0.64 | 2.11 | 1099 | 11 | 0.01 | 38 | 0.15 | 64 | <2 | 3 | 60 | <5 | <3 | 28 |
| 25052 | 1.1 | 1.49 | 31 | 18 | 3 | 0.44 | 0.1 | 65 | 14 | 1167 | >10.00 | 0.38 | 0.77 | 291 | 8 | 0.01 | 29 | 0.16 | 43 | <2 | 5 | 14 | <5 | <3 | 11 |
| 25053 | 3.2 | 1.25 | 1350 | 17 | <3 | 6.61 | 0.2 | 14 | 9 | 407 | 3.73 | 1.11 | 1.11 | 1319 | 8 | 0.01 | 10 | 0.14 | 1479 | <2 | <2 | 169 | <5 | <3 | 4058 |
| 25054 | 24.9 | 0.12 | 74 | 4 | <3 | 2.05 | 0.1 | 22 | 61 | 190 | 3.20 | 0.40 | 0.08 | 669 | 7 | 0.01 | 28 | 0.01 | 2393 | <2 | <2 | 28 | <5 | <3 | 10373 |
| 83443 | 9.6 | 0.10 | 159 | 5 | 10 | 0.12 | 0.1 | 367 | 26 | 4293 | >10.00 | 0.91 | 0.18 | 632 | 17 | 0.01 | 40 | 0.02 | 226 | <2 | 6 | 2 | <5 | <3 | 620 |
| 83444 | 0.5 | 4.74 | 67 | 36 | 4 | 1.42 | 0.2 | 33 | 17 | 396 | >10.00 | 0.55 | 2.82 | 1189 | 12 | 0.01 | 23 | 0.08 | 98 | <2 | <2 | 31 | <5 | <3 | 260 |
| 83445 | 2.6 | 3.00 | 68 | 15 | 5 | 2.32 | 0.2 | 88 | 17 | 2836 | >10.00 | 0.78 | 1.69 | 1446 | 22 | 0.01 | 30 | 0.13 | 151 | <2 | <2 | 65 | <5 | <3 | 479 |
| 83446 | 1.6 | 0.38 | 48 | 6 | 5 | 2.28 | 0.1 | 129 | 22 | 2861 | >10.00 | 0.82 | 0.38 | 2393 | 11 | 0.01 | 27 | 0.05 | 47 | <2 | 3 | 34 | <5 | <3 | 85 |
| 83447 | 0.4 | 2.48 | 35 | 37 | 4 | 2.77 | 0.1 | 58 | 17 | 656 | >10.00 | 0.77 | 1.78 | 1786 | 16 | 0.01 | 24 | 0.07 | 46 | <2 | <2 | 77 | <5 | <3 | 116 |
| 83448 | 5.8 | 4.10 | 154 | 39 | 8 | 0.32 | 0.2 | 98 | 6 | 1136 | >10.00 | 0.70 | 0.87 | 1160 | 40 | 0.01 | 32 | 0.19 | 1065 | <2 | <2 | 10 | <5 | <3 | 2994 |
| 83449 | 10.8 | 2.20 | 493 | 12 | 11 | 0.11 | 0.2 | 68 | 15 | 756 | >10.00 | 0.84 | 0.55 | 518 | 21 | 0.01 | 49 | 0.08 | 496 | <2 | 3 | 3 | <5 | <3 | 961 |
| 83450 | 6.2 | 2.32 | 1329 | 17 | 8 | 0.19 | 0.1 | 97 | 44 | 1271 | >10.00 | 0.60 | 1.46 | 852 | 12 | 0.01 | 24 | 0.10 | 98 | <2 | 5 | 23 | <5 | <3 | 97 |
| 83915 | 1.7 | 0.09 | 59 | 5 | <3 | 3.33 | 0.1 | 51 | 11 | 4703 | 4.67 | 0.64 | 0.17 | 549 | 4 | 0.01 | 47 | 0.01 | 23 | <2 | <2 | 45 | <5 | <3 | 5 |
| 83916 | 15.3 | 0.04 | 117 | 5 | 11 | 0.26 | 0.2 | 271 | 84 | 5501 | >10.00 | 0.58 | 0.30 | 578 | 15 | 0.01 | 32 | 0.01 | 1535 | <2 | 5 | 4 | <5 | <3 | 8363 |
| 83917 | 39.0 | 0.05 | >2000 | 4 | 12 | 0.12 | 0.1 | 526 | 25 | 14621 | >10.00 | 0.84 | 0.26 | 462 | 23 | 0.01 | 74 | 0.01 | 2280 | <2 | 6 | 2 | <5 | <3 | 11655 |
| Minimum Detection | 0.1 | 0.01 | 3 | 1 | 3 | 0.01 | 0.1 | 1 | 1 | 1 | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 2 | 2 | 2 | 1 | 5 | 3 | 1 |
| Maximum Detection | 50.0 | 10.00 | 2000 | 1000 | 1000 | 10.00 | 1000.0 | 20000 | 1000 | 20000 | 10.00 | 10.00 | 10.00 | 20000 | 1000 | 10.00 | 20000 | 10.00 | 20000 | 2000 | 1000 | 10000 | 100 | 1000 | 20000 |

< = Less than Minimum  is = Insufficient Sample  ns = No sample  > = Greater than Maximum  ANOMALOUS RESULTS = Further Analyses by Alternate Methods Suggested

**APPENDIX IV**

Vangeochem Lab Ltd.

Analytical Procedures

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

November 20, 1989

TO:
Minorex Consultants Ltd.
11967 - 83A Avenue
Delta, B.C. V4C 2K2

FROM: Vangeochem Lab Limited
1988 Triumph Street
Vancouver, British Columbia
V5L 1K5

SUBJECT: Analytical procedure used to determine gold by fire assay method and detect by atomic absorption spectrophotometry in geological samples.

1. <u>Method of Sample Preparation</u>

(a) Geochemical soil, silt or rock samples were received at the laboratory in high wet-strength, 4" x 6", Kraft paper bags. Rock samples would be received in poly ore bags.

(b) Dried soil and silt samples were sifted by hand using an 8" diameter, 80-mesh, stainless steel sieve. The plus 80-mesh fraction was rejected. The minus 80-mesh fraction was transferred into a new bag for subsequent analyses.

(c) Dried rock samples were crushed using a jaw crusher and pulverized to 100-mesh or finer by using a disc mill. The pulverized samples were then put in a new bag for subsequent analyses.

2. <u>Method of Extraction</u>

(a) 20.0 to 30.0 grams of the pulp samples were used. Samples were weighed out using a top-loading balance and deposited into individual fusion pots.

(b) A flux of litharge, soda ash, silica, borax, and, either flour or potassium nitrite is added. The samples are then fused at 1900 degrees Farenhiet to form a lead "button".

(c) The gold is extracted by cupellation and parted with diluted nitric acid.

VGC VANGEOCHEM LAB LIMITED

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RENO, NEVADA, U.S.A.

(d) The gold bead is retained for subsequent measurement.

3. Method of Detection

(a) The gold bead is dissolved by boiling with conentrated aqua regia solution in hot water bath.

(b) The detection of gold was performed with a Techtron model AA5 Atomic Absorption Spectrophotometer with a gold hollow cathode lamp. The results were read out on a strip chart recorder. The gold values, in parts per billion, were calculated by comparing them with a set of known gold standards.

4. Analysts

The analyses were supervised or determined by Mr. Conway Chun or Mr. Raymond Chan and his laboratory staff.

Raymond Chan
VANGEOCHEM LAB LIMITED

VGC VANGEOCHEM LAB LIMITED

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BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

November 20, 1989

TO:

Minorex Consultants Ltd.
11967 - 83A Avenue
Delta, B.C. V4C 2K2

FROM: Vangeochem Lab Limited
1988 Triumph Street
Vancouver, British Columbia
V5L 1K5

SUBJECT: Analytical procedure used to determine hot acid soluble for 25 element scan by Inductively Coupled Plasma Spectrophotometry in geochemical silt and soil samples.

1. Method of Sample Preparation

(a) Geochemical soil, silt or rock samples were received at the laboratory in high wet-strength, 4" x 6", Kraft paper bags. Rock samples would be received in poly ore bags.

(b) Dried soil and silt samples were sifted by hand using an 8" diameter, 80-mesh, stainless steel sieve. The plus 80-mesh fraction was rejected. The minus 80-mesh fraction was transferred into a new bag for subsequent analyses.

(c) Dried rock samples were crushed using a jaw crusher and pulverized to 100-mesh or finer by using a disc mill. The pulverized samples were then put in a new bag for subsequent analyses.

2. Method of Digestion

(a) 0.50 gram portions of the minus 80-mesh samples were used. Samples were weighed out using an electronic balance.

(b) Samples were digested with a 5 ml solution of HCL:HNO3:H2O in the ratio of 3:1:2 in a 95 degree Celsius water bath for 90 minutes.

(c) The digested samples are then removed from the bath and bulked up to 10 ml total volume with demineralized water and thoroughly mixed.

VGC VANGEOCHEM LAB LIMITED

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BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

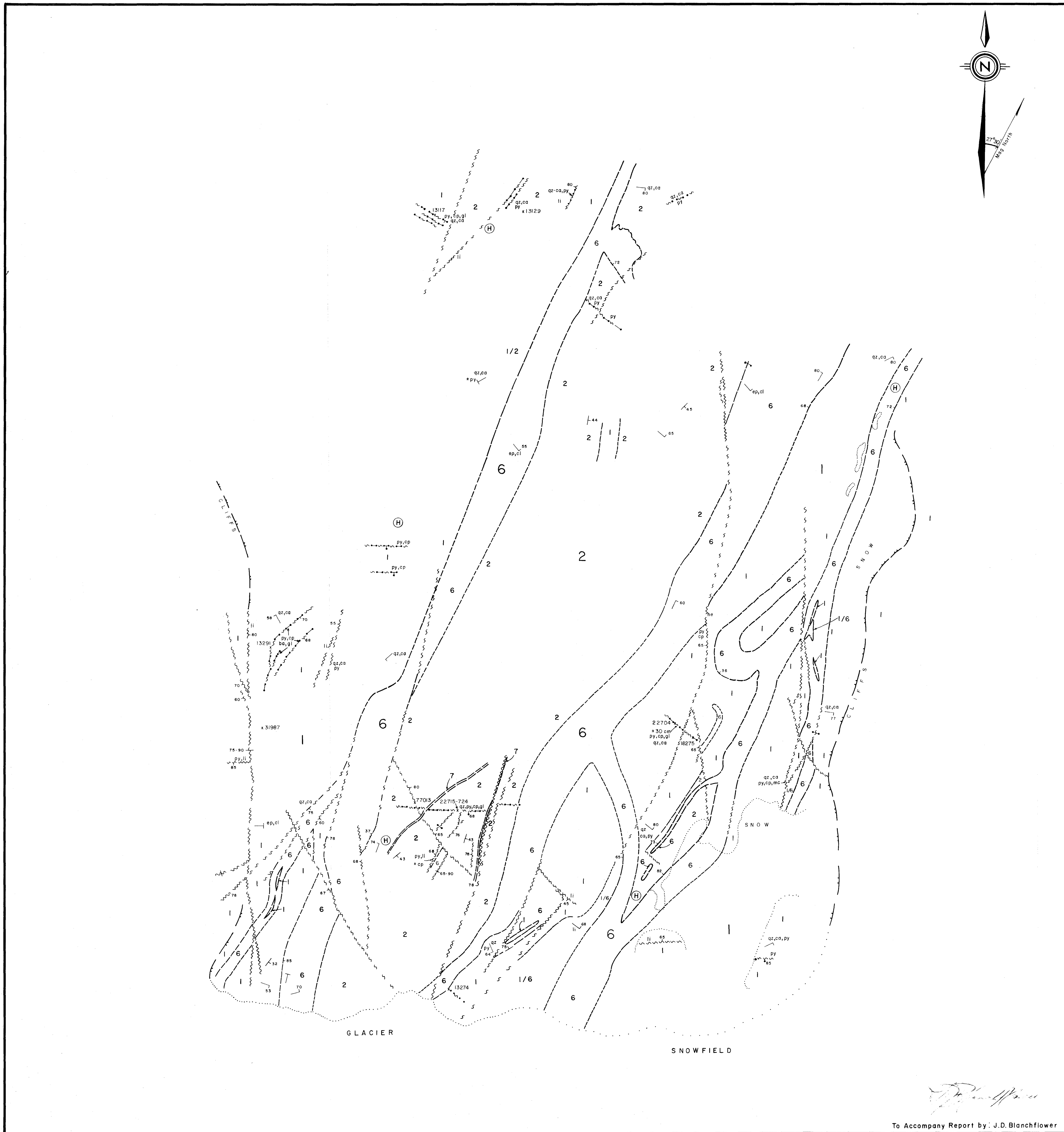
3. Method of Analyses

The ICP analyses elements were determined by using a Jarrel-Ash ICAP model 9000 directly reading the spectrophotometric emissions. All major matrix and trace elements are interelement corrected. All data are subsequently stored onto disk.

4. Analysts

The analyses were supervised or determined by either Mr. Conway Chun, and, the laboratory staff.

Jaime Wong
VANGEOCHEM LAB LIMITED






## – LEGEND –

**TRIASSIC TO CRETACEOUS**

9 Quartz-actinolite-epidote skarn - medium to dark green, metasomatized zone; commonly with sub-angular clasts of unaltered limestone. Hosts disseminated, semi-massive and massive pyrrhotite, chalcopyrite, malachite and minor galena, sphalerite and pyrite mineralization.

8 Diorite, monzonite - medium grey to green, medium-grained and poorly foliated.

7 Diorite Dyke - medium grey, massive, poorly fractured, aphanitic dyke; usually less than 1 metre wide. Possible feeder structures.

6 Feldspar Porphyry Dyke - light to medium grey to green, massive and poorly fractured. Porphyritic plagioclase feldspar phenocrysts up to 2 cm. are common. Varieties include hornblende-rich porphyry dykes.

**UPPER TRIASSIC**

5 Siltstone, sandstone, chert, lithic tuff and argillite - light grey to brown, water-lain, interbedded and locally silicified.

4 Argillite, siltstone and minor lithic tuff - medium brown to black, water-lain, interbedded and locally silicified.

3 Limestone - light to medium grey, massive and locally re-crystallized.

2 Lithic tuff and chert - light to medium grey to brown, poorly bedded and well indurated.

1 Andesite flow and flow breccia - light to dark green to grey, massive to poorly banded, and aphanitic to locally porphyritic plagioclase and/or hornblende. Flow breccias have sub-angular andesitic clasts up to 40 cm.

## – SYMBOLS –

Geological boundary
Outcrop
Bedding (tops unknown)
Fracturing, jointing
Fault (defined, assumed, inferred)
Vein (defined, inferred)
Alteration zone

| | | | |
|---|---|---|---|
| Ankerite | an | Magnetite | mg |
| Calcite | ca | Malachite | mc |
| Chalcopyrite | cp | Pyrite | py |
| Chlorite | cl | Pyrrhotite | po |
| Epidote | ep | Quartz | qz |
| Galena | gl | Sericite | ms |
| Gypsum | gy | Siderite | sd |
| Hematite | he | Sphalerite | sp |
| Limonite | li | Sulphide | sx |

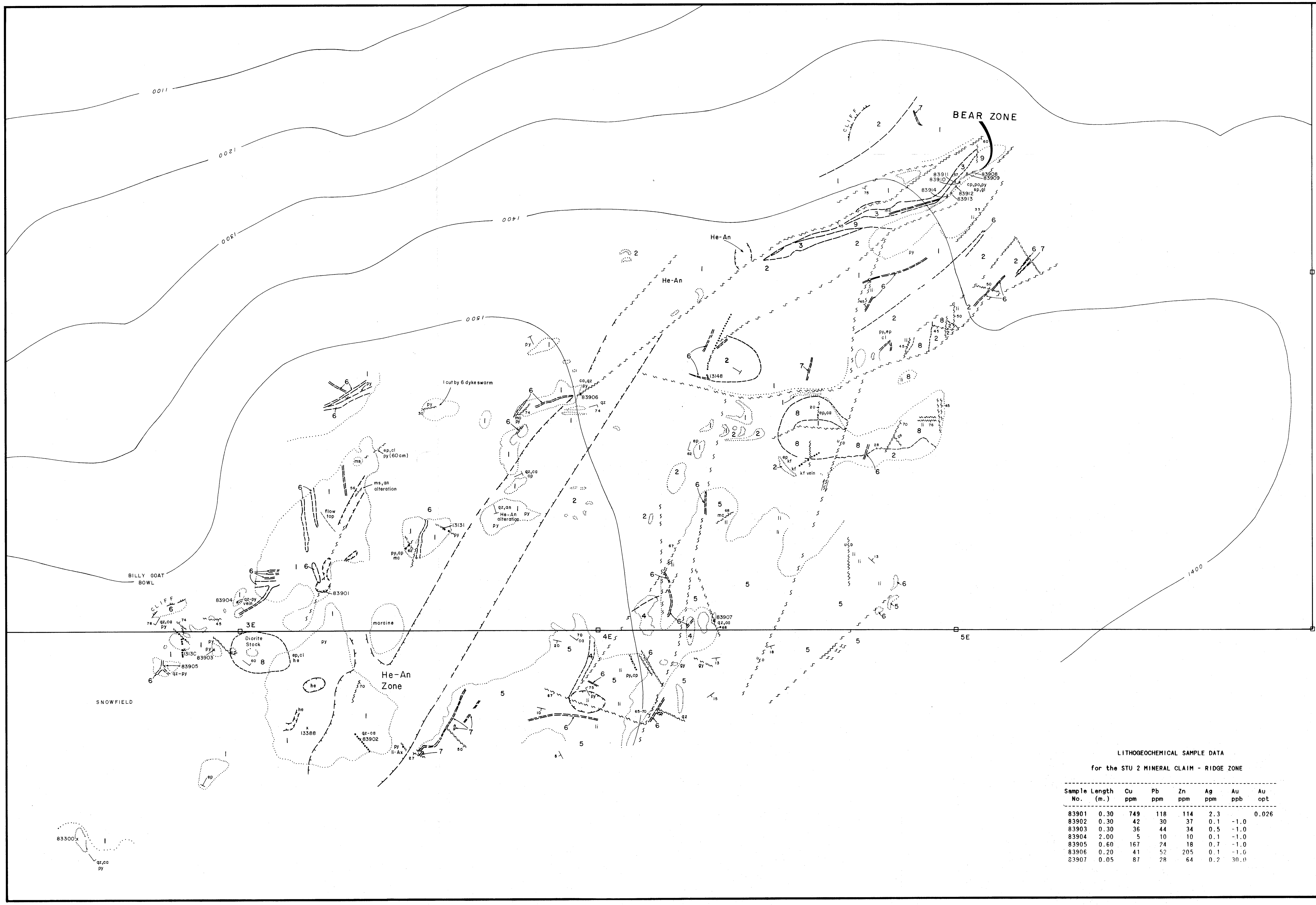
SCALE
10 0 10 20 30 40 50 100
metres

MINOREX CONSULTING LTD.
GEOLOGICAL CONSULTANTS, DELTA, B.C.

KESTREL RESOURCES LTD.
VANCOUVER, B.C.

# GEOLOGICAL PLAN
# BILLY GOAT BOWL ZONE
## STU PROPERTY
LIARD MINING DIVISION, B.C.

| | |
|---|---|
| Geology by: J. D. Blanchflower | Scale: 1:1,000 |
| Drawn by: J. D. Blanchflower / dw | N.T.S. 104 B/10W |
| Date: December 4, 1989 | Figure No. 6 |




## LITHOGEOCHEMICAL SAMPLE DATA

for the STU 2 MINERAL CLAIM - RIDGE ZONE

| Sample No. | Length (m.) | Cu ppm | Pb ppm | Zn ppm | Ag ppm | Au ppb | Au opt |
|---|---|---|---|---|---|---|---|
| 83901 | 0.30 | 749 | 118 | 114 | 2.3 | | 0.026 |
| 83902 | 0.30 | 42 | 30 | 37 | 0.1 | -1.0 | |
| 83903 | 0.30 | 36 | 44 | 34 | 0.5 | -1.0 | |
| 83904 | 2.00 | 5 | 10 | 10 | 0.1 | -1.0 | |
| 83905 | 0.60 | 167 | 24 | 18 | 0.7 | -1.0 | |
| 83906 | 0.20 | 41 | 52 | 205 | 0.1 | -1.0 | |
| 83907 | 0.05 | 87 | 28 | 64 | 0.2 | 30.0 | |

GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,638

To Accompany Report by: J.D. Blanchflower

## - LEGEND -

**TRIASSIC TO CRETACEOUS**

8 **Diorite, monzonite** - medium grey to green, medium-grained and poorly foliated.

7 **Diorite Dyke** - medium grey, massive, poorly fractured, aphanitic dyke; usually less than 1 metre wide. Possible feeder structures.

6 **Feldspar Porphyry Dyke** - light to medium grey to green, massive and poorly fractured. Porphyritic plagioclase feldspar phenocrysts up to 2 cm. are common. Varieties include hornblende-rich porphyry dykes.

**UPPER TRIASSIC**

5 **Siltstone, sandstone, chert, lithic tuff and argillite** - light grey to brown, water-lain, interbedded and locally silicified.

4 **Argillite, siltstone and minor lithic tuff** - medium brown to black, water-lain, interbedded and locally silicified.

3 **Limestone** - light to medium grey, massive and locally re-crystallized.

2 **Lithic tuff and chert** - light to medium grey to brown, poorly bedded and well indurated.

1 **Andesite flow and flow breccia** - light to dark green to grey, massive to poorly banded, and aphanitic to locally porphyritic plagioclase and/or hornblende. Flow breccias have sub-angular andesitic clasts up to 40 cm.

## - SYMBOLS -

Geological boundary
Outcrop
Bedding (tops unknown)
Fracturing, jointing
Fault (defined, assumed, inferred)
Vein (defined, inferred)
Alteration zone

| | | | |
|---|---|---|---|
| Ankerite | an | Magnetite | mg |
| Calcite | ca | Malachite | mc |
| Chalcopyrite | cp | Pyrite | py |
| Chlorite | cl | Pyrrhotite | po |
| Epidote | ep | Quartz | qz |
| Galena | gl | Sericite | ms |
| Gypsum | gy | Siderite | sd |
| Hematite | he | Sphalerite | sp |
| Limonite | li | Sulphide | sx |

SCALE

50 0 50 100 150 200 250

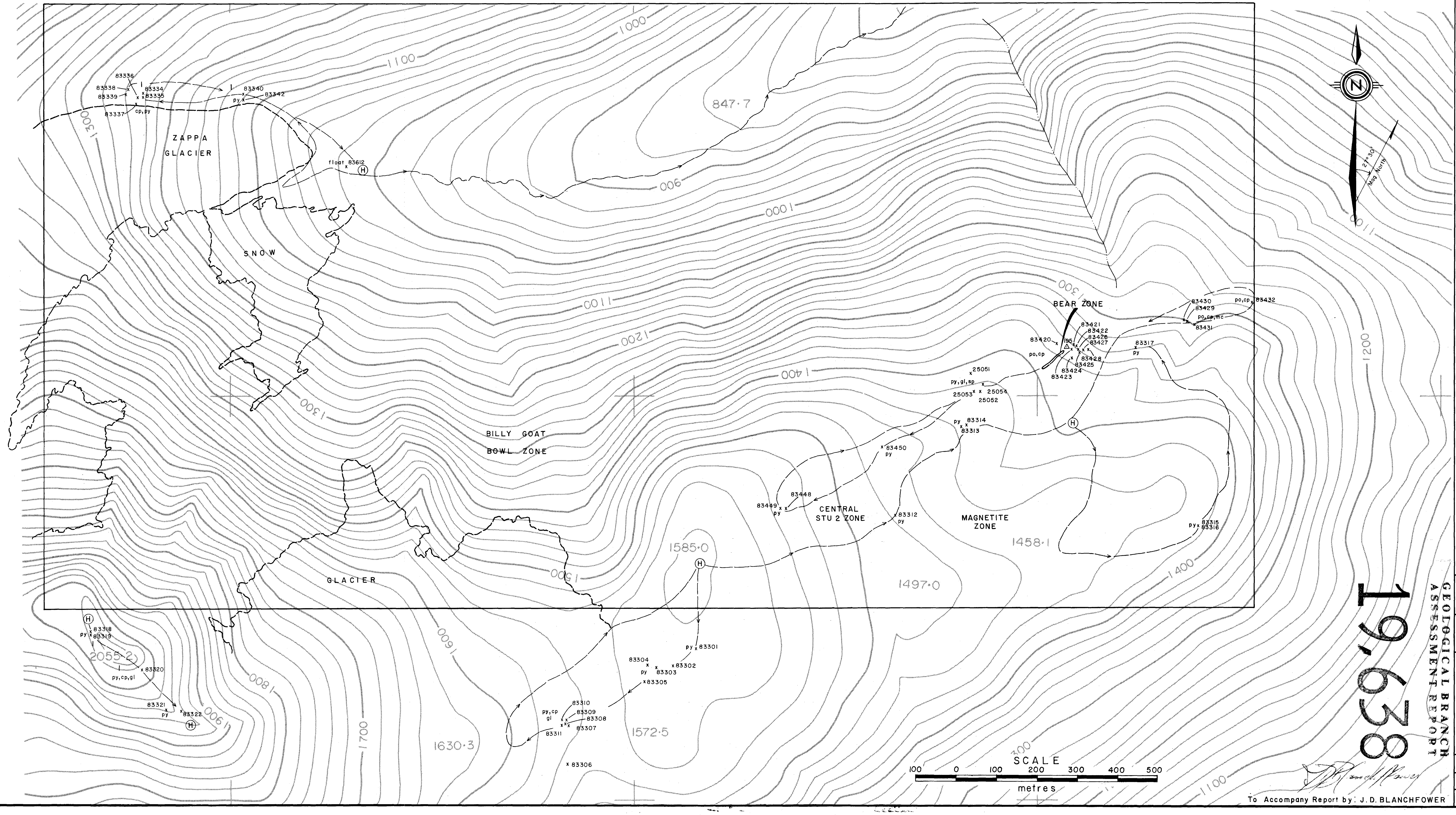
metres

MINOREX CONSULTING LTD.
GEOLOGICAL CONSULTANTS, DELTA, B.C.

KESTREL RESOURCES LTD.
VANCOUVER, B.C.

# GEOLOGICAL PLAN
# RIDGE ZONE
## STU PROPERTY
LIARD MINING DIVISION, B.C.

| | |
|---|---|
| Geology by: J.D. Blanchflower | Scale: 1:2,500 |
| Drawn by: J.D. Blanchflower/dw | N.T.S. 104B/10W |
| Date: December 4, 1989 | Figure No. 5 |




GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,638

LITHOGEOCHEMICAL SAMPLE DATA

for the STU 2 MINERAL CLAIM

| Sample No. | Length (m.) | Cu ppm | Pb ppm | Zn ppm | Ag ppm | Au ppb | Au opt |
|---|---|---|---|---|---|---|---|
| 83301 | 1.00 | 461 | 56 | 173 | 0.4 | | 0.010 |
| 83302 | 0.30 | 653 | 67 | 67 | 2.9 | | 0.006 |
| 83303 | 0.30 | 369 | 30 | 40 | 0.9 | -1.0 | |
| 83304 | 0.30 | 630 | 71 | 74 | 0.6 | | 0.006 |
| 83305 | 1.00 | 52 | 22 | 10 | 0.1 | -1.0 | |
| 83306 | 1.00 | 124 | 6,232 | 9,423 | 3.7 | -1.0 | |
| 83307 | 0.05 | 205 | 179 | 20,001 | 0.7 | -1.0 | |
| 83308 | 0.30 | 628 | 58 | 20,001 | 1.8 | -1.0 | |
| 83309 | 0.30 | 353 | 48 | 1,150 | 0.2 | -1.0 | |
| 83310 | 0.30 | 59 | 23 | 8,073 | 0.2 | -1.0 | |
| 83311 | 0.30 | 1,440 | 74 | 4,229 | 1.6 | -1.0 | |
| 83312 | 0.30 | 805 | 64 | 298 | 3.6 | -1.0 | |
| 83313 | 0.40 | 113 | 224 | 2,385 | 6.3 | -1.0 | |
| 83314 | 2.00 | 82 | 25 | 78 | 0.1 | -1.0 | |
| 83315 | 3.00 | 2 | 16 | 70 | 0.1 | | 0.010 |
| 83316 | 1.00 | 8 | 14 | 39 | 0.2 | -1.0 | |
| 83317 | 1.00 | 1,152 | 47 | 68 | 2.3 | -1.0 | |
| 83318 | 0.30 | 28 | 14 | 12 | 0.1 | -1.0 | |
| 83319 | 0.30 | 6 | 11 | 3 | 0.1 | -1.0 | |
| 83320 | 0.05 | 20,001 | 9,277 | 1,097 | 35.7 | | 0.876 |
| 83321 | 0.20 | 273 | 76 | 65 | 0.3 | -1.0 | |
| 83322 | 0.30 | 96 | 40 | 14 | 0.2 | | 0.006 |
| 83334 | 0.05 | 46 | 1,332 | 909 | 0.8 | -1.0 | |
| 83335 | 0.15 | 12 | 120 | 1,345 | 0.2 | -1.0 | |
| 83336 | 0.25 | 30 | 65 | 142 | 0.1 | -1.0 | |
| 83337 | 1.00 | 8 | 19 | 29 | 0.1 | | 0.010 |
| 83338 | 0.80 | 365 | 25 | 123 | 0.1 | -1.0 | |
| 83339 | 0.80 | 335 | 132 | 282 | 0.3 | -1.0 | |
| 83340 | 1.00 | 18 | 15 | 27 | 0.1 | -1.0 | |
| 83341 | 0.20 | 2 | 19 | 35 | 0.2 | -1.0 | |
| 83420 | 0.30 | 3,169 | 4 | 9 | 2.5 | -1.0 | |
| 83421 | 0.20 | 1,822 | 29 | 32 | 1.8 | -1.0 | |
| 83422 | 0.20 | 19,964 | 26 | 230 | 14.0 | -1.0 | |
| 83423 | 0.15 | 619 | 19 | 22 | 0.4 | -1.0 | |
| 83424 | 0.10 | 950 | 58 | 38 | 2.9 | -1.0 | |
| 83425 | 0.30 | 11,694 | 687 | 1,392 | 38.5 | -1.0 | |
| 83426 | 0.20 | 676 | 349 | 1,008 | 3.4 | -1.0 | |
| 83427 | 0.20 | 16,818 | 943 | 2,246 | 22.2 | -1.0 | |
| 83428 | 0.30 | 2,738 | 85 | 211 | 6.4 | -1.0 | |
| 83429 | 0.20 | 6,424 | 17 | 85 | 5.7 | -1.0 | |
| 83430 | 0.20 | 8,757 | 47 | 92 | 8.2 | -1.0 | |
| 83431 | 0.20 | 978 | 16 | 22 | 0.8 | -1.0 | |
| 83432 | 0.20 | 8,121 | 109 | 55 | 42.9 | -1.0 | |
| 83448 | 0.20 | 1,136 | 1,065 | 2,994 | 5.8 | -1.0 | |
| 83449 | 0.20 | 756 | 496 | 961 | 10.8 | -1.0 | |
| 83450 | 0.10 | 1,271 | 98 | 97 | 6.2 | -1.0 | |
| 25051 | 0.10 | 1,485 | 64 | 28 | 1.7 | -1.0 | |
| 25052 | 0.20 | 1,167 | 43 | 11 | 1.1 | -1.0 | |
| 25053 | 0.30 | 407 | 1,479 | 4,058 | 3.2 | -1.0 | |
| 25054 | 0.20 | 190 | 2,393 | 10,373 | 24.9 | -1.0 | |
| 83612 | Float | 110 | 39 | 149 | 0.8 | -1.0 | |

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# PROSPECTING AND LITHOGEOCHEMICAL PLAN

## STU PROPERTY

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| Prospecting by: N. DeBock | Scale: 1:5,000 |
| Drawn by: J.D. Blanchflower /dw | N.T.S. 104 B/10W |
| Date: December 4, 1989 | Figure No. 4B |

To Accompany Report by: J. D. BLANCHFOWER


LITHOGEOCHEMICAL SAMPLE DATA

for the STU 1 MINERAL CLAIM

| Sample No. | Length (m.) | Cu ppm | Pb ppm | Zn ppm | Ag ppm | Au ppb | Au opt |
|---|---|---|---|---|---|---|---|
| 83323 | 0.35 | 43 | 31 | 18 | 0.5 | -1.0 | |
| 83324 | 0.20 | 14 | 16 | 69 | 0.2 | -1.0 | |
| 83325 | 0.20 | 15 | 9 | 1 | 0.1 | -1.0 | |
| 83326 | 0.20 | 447 | 6 | 37 | 0.5 | -1.0 | |
| 83327 | 0.20 | 25 | 10 | 8 | 0.1 | -1.0 | |
| 83328 | 0.30 | 21 | 11 | 82 | 0.1 | -1.0 | |
| 83329 | 0.20 | 29 | 10 | 13 | 0.2 | -1.0 | |
| 83330 | 0.30 | 874 | 60 | 55 | 6.6 | -1.0 | |
| 83331 | 0.10 | 146 | 86 | 21 | 2.6 | -1.0 | |
| 83332 | 0.10 | 33 | 14 | 9 | 0.2 | -1.0 | |
| 83333 | 0.15 | 16 | 9 | 6 | 0.2 | -1.0 | |

## – LEGEND –

**TRIASSIC TO CRETACEOUS**

7 **Diorite Dyke** - medium grey, massive, poorly fractured, aphanitic dykes; usually less than 1 metre wide. Possible feeder structures.

6 **Feldspar Porphyry Dyke** - light to medium grey to green, massive and poorly fractured dykes. Porphyritic plagioclase feldspar phenocrysts up to 2 cm. are common.

**UPPER TRIASSIC**

5 **Siltstone, sandstone, chert, lithic tuff and argillite** - light grey to brown, water-lain, interbedded and locally silicified.

4 **Argillite, siltstone and minor lithic tuff** - medium brown to black, water-lain, interbedded and locally silicified.

3 **Limestone** - light to medium grey, massive and locally re-crystallized.

2 **Lithic tuff and chert** - light to medium grey to brown, poorly bedded and well indurated.

1 **Andesite flow and flow breccia** - light to dark green to grey, massive to poorly banded, and aphanitic to locally porphyritic plagioclase and/or hornblende. Flow breccias have sub-angular andesitic clasts up to 40 cm.

## – SYMBOLS –

Geological boundary....................

Lithogeochemical sample site........... x

Traverse route.........................

| | | | |
|---|---|---|---|
| Ankerite | an | Magnetite | mg |
| Calcite | ca | Malachite | mc |
| Chalcopyrite | cp | Pyrite | py |
| Chlorite | cl | Pyrrhotite | po |
| Epidote | ep | Quartz | qz |
| Galena | gl | Sericite | ms |
| Gypsum | gy | Siderite | sd |
| Hematite | he | Sphalerite | sp |

SCALE

100 0 100 200 300 400 500

metres

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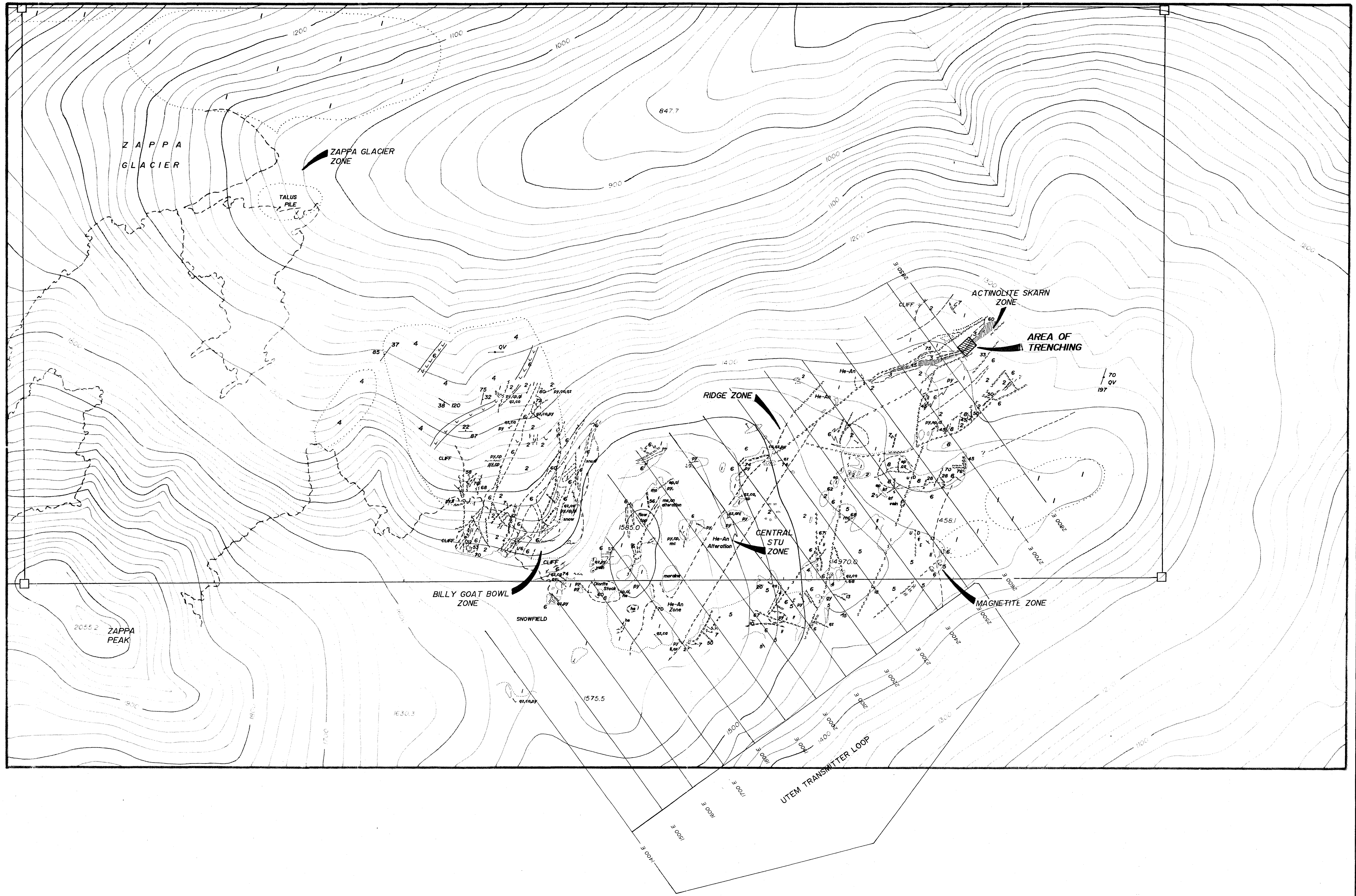
# PROSPECTING AND LITHOGEOCHEMICAL PLAN

STU PROPERTY

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| Prospecting by: N. DeBock | Scale: 1:5,000 |
| Drawn by: J.D. Blanchflower/dw | N.T.S. 104 B/10W |
| Date: December 4, 1989 | Figure No. 4A |




# LEGEND

**TRIASSIC TO CRETACEOUS**

9 Andesite dyke - medium green, medium grained, Poorly fractured

8 Diorite, monzonite - medium grey to green, medium-grained and poorly foliated.

7 Diorite Dyke - medium grey, barren, poorly fractured, aphanitic dyke; usually less than 1 metre wide. Possible feeder structures.

6 Feldspar Porphyry Dyke - light to medium grey to green, massive and poorly fractured. Porphyritic plagioclase feldspar Phenocrysts up to 2 cm. are common. Varieties include hornblende-rich porphyry dykes.

**UPPER TRIASSIC**

5 Siltstone, sandstone, chert, lithic tuff and argillite - light grey to brown, water-lain, interbedded and locally silicified.

4 Argillite, siltstone and minor lithic tuff - medium brown to black, water-lain, interbedded and locally silicified.

3 Limestone - light to medium grey, massive and locally re-crystallized.

2 Lithic tuff and chert - light to medium grey to brown, poorly bedded and well indurated.

1 Andesite flow and flow breccia - light to dark green to grey, massive to poorly banded, and aphanitic to locally porphyritic plagioclase and/or hornblende. Flow breccias have sub-angular andesitic clasts up to 40 cm.

- SYMBOLS -

Geological boundary......................
Outcrop..................................
Bedding (tops unknown)...................
Fracturing, jointing.....................
Fault (defined, assumed, inferred).......
Vein (defined, inferred).................
Alteration zone..........................
Traverse route...........................

| | | | |
|---|---|---|---|
| Ankerite | an | Magnetite | mg |
| Calcite | ca | Malachite | mc |
| Chalcopyrite | cp | Pyrite | py |
| Chlorite | cl | Pyrrhotite | po |
| Epidote | ep | Quartz | qz |
| Galena | gl | Sericite | ms |
| Gypsum | gy | Siderite | sd |
| Hematite | he | Sphalerite | sp |
| Limonite | li | Sulphide | sx |

0 100 200 300 400 500
METRES

A.R. 19638

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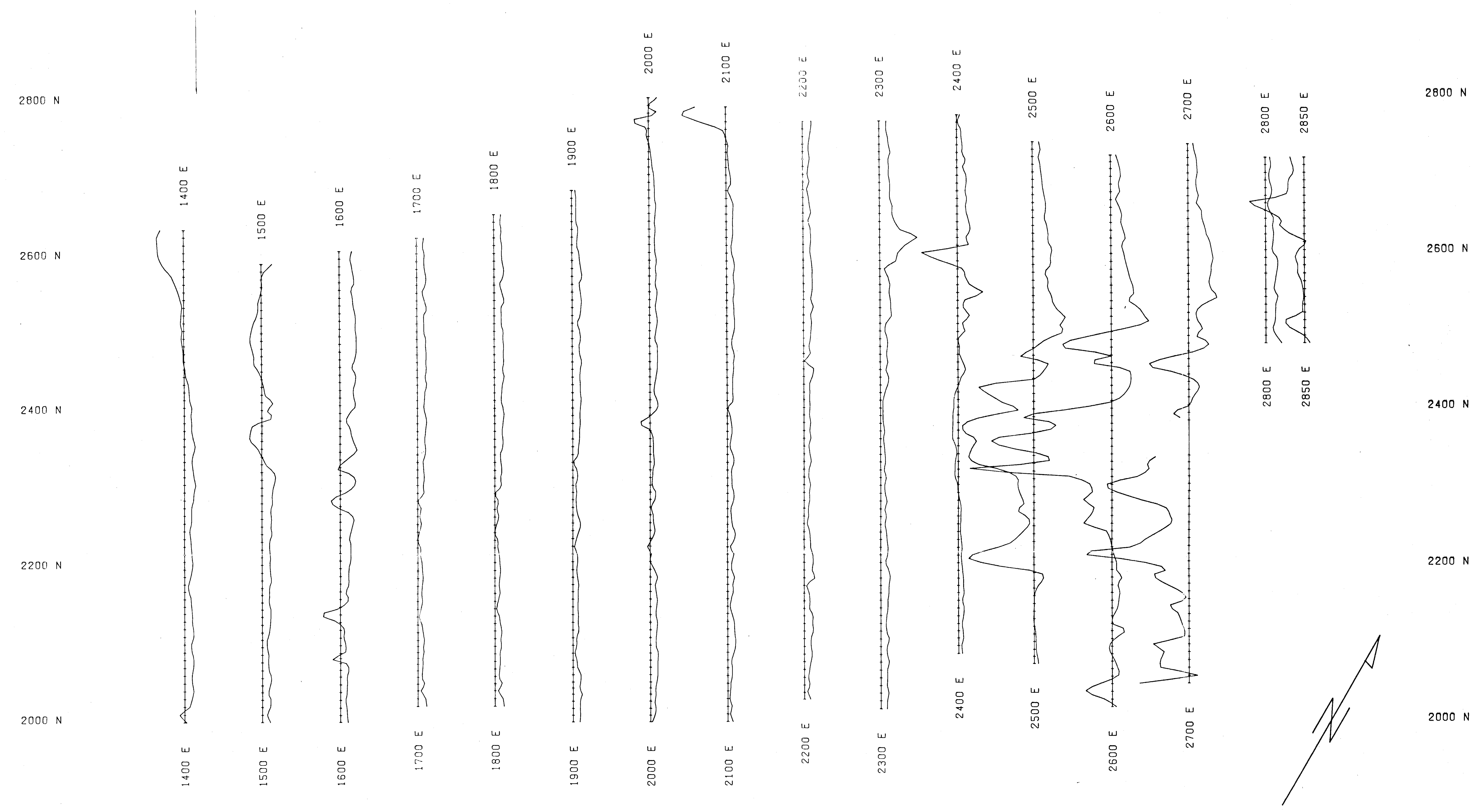
STU PROPERTY

GEOLOGY

STU 2

LIARD MINING DIVISION, B.C.

| | |
|---|---|
| Drawn by : BDS | Scale: 1 : 5,000 |
| Geology by : Minorex/Pamicon | N.T.S. 104 B/10 W |
| Date : December, 1989 | Figure N°. 6A |




PROFILES POSITIVE TO THE LEFT
PROFILE SCALE: 200 NT / CM
BASE VALUE : 57500 NT

INSTRUMENTATION:
GEM-8 PROTON PRECESSION MAGNETOMETER

SJ GEOPHYSICS LTD.

KESTREL RESOURCES LTD.

RIDGE ZONE, STU 1 & 2 CLAIMS

ISKUT RIVER AREA

MAGNETOMETER SURVEY

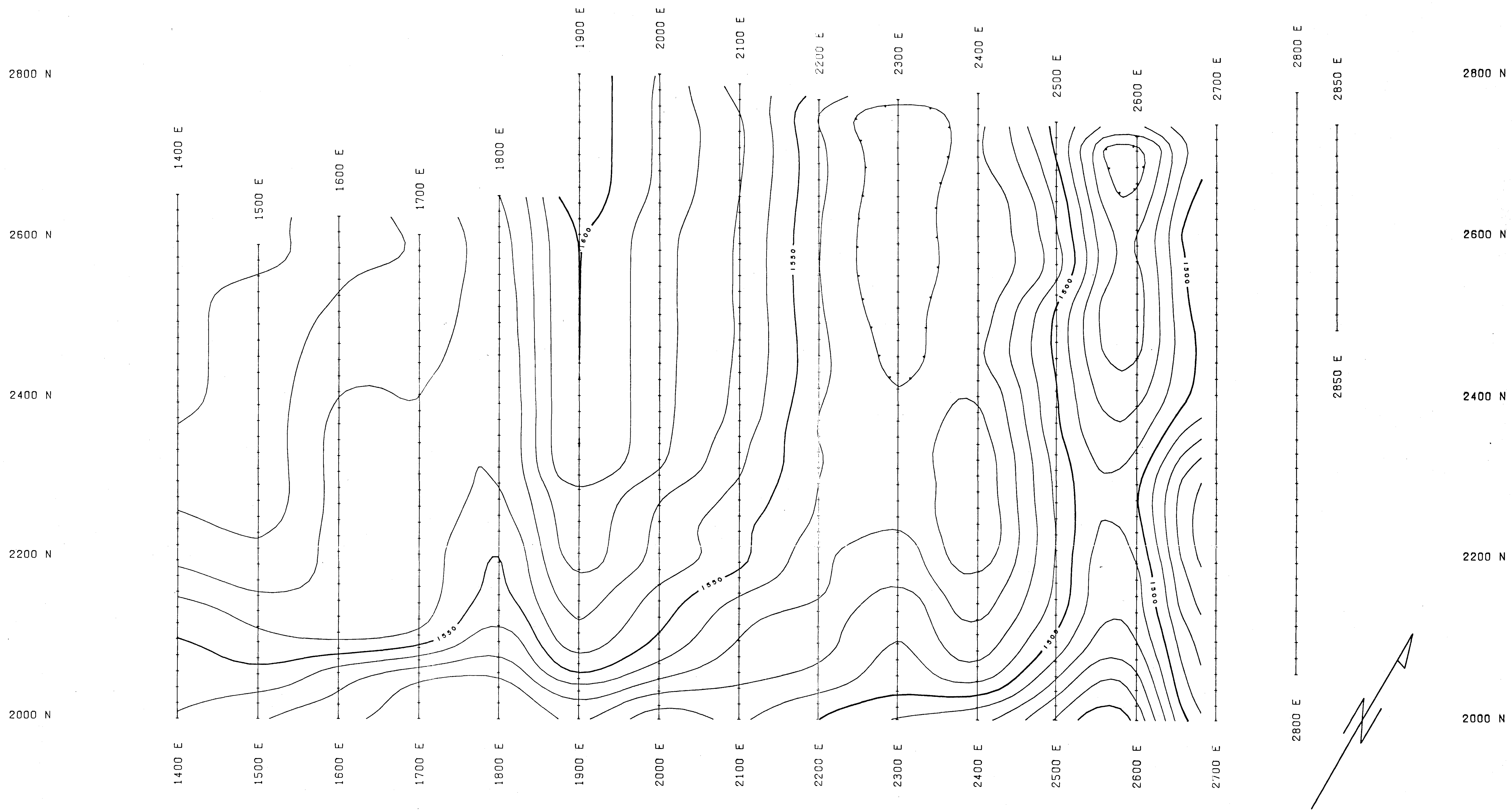
LIARD M.D. N.T.S. 104B/10

SCALE 1:5000

50 0 50 100 150

NOVEMBER 1989 PLATE G1

A.R. 19638




CONTOUR INTERVAL : 10 M
POSTED CONTOUR INTERVAL : 50,100 M
TREND ROTATION : 0 DEG

INSTRUMENTATION:
INCLINOMETER AND HIP CHAIN

SJ GEOPHYSICS LTD.

KESTREL RESOURCES LTD.

RIDGE ZONE, STU 1 & 2 CLAIMS

ISKUT RIVER AREA

## APPROX. TOPOGRAPHIC MAP

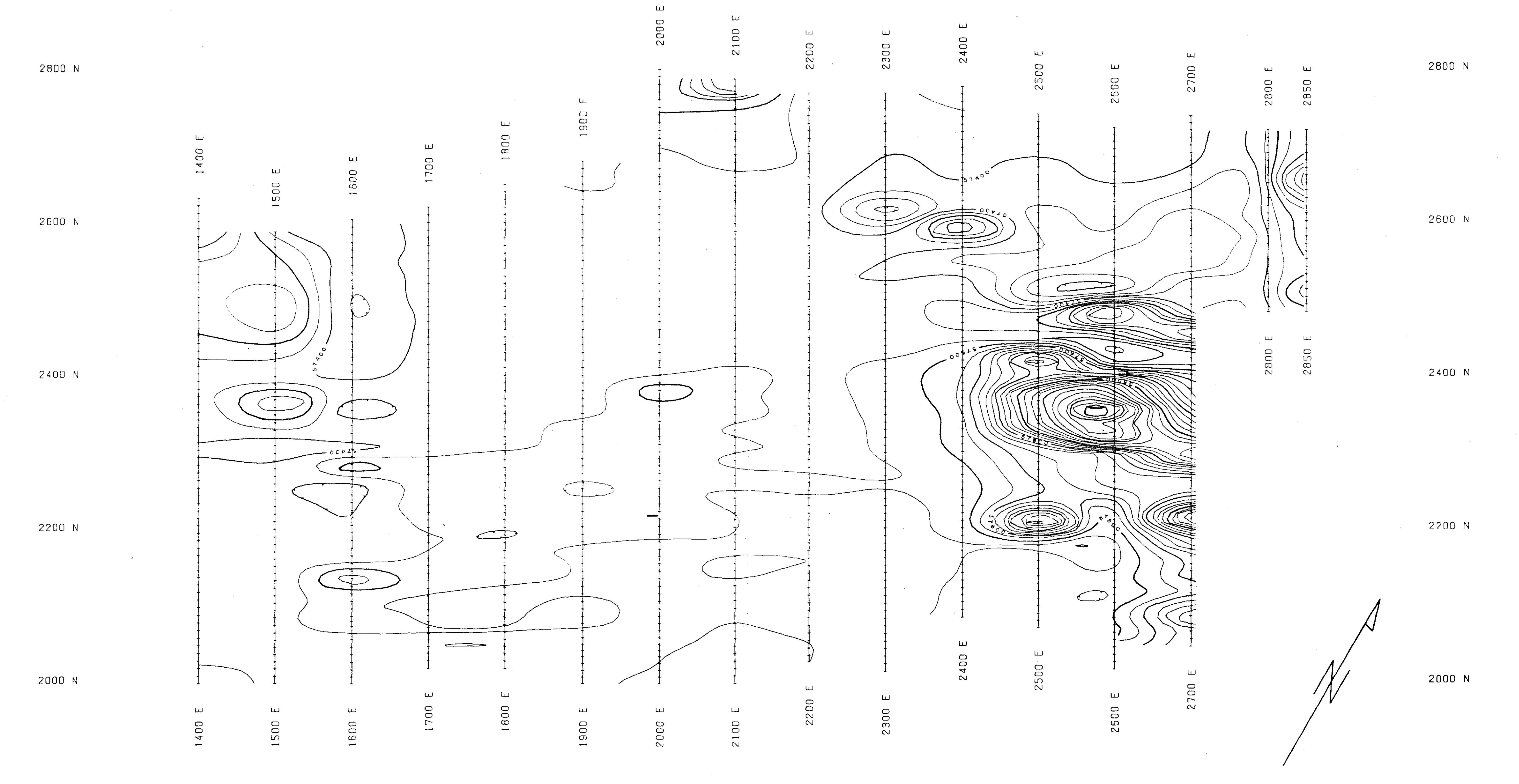
LIARD M.D. N.T.S. 104B/10

SCALE 1:2500

50 0 50 100 150

NOVEMBER 1989 PLATE G4

A.R. 19638

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RIDGE ZONE, STU 1 & 2 CLAIMS
ISKUT RIVER AREA
MAGNETOMETER SURVEY

LIARD M.D. N.T.S. 104B/10

SCALE 1 : 5,000
50 0 50 100 150

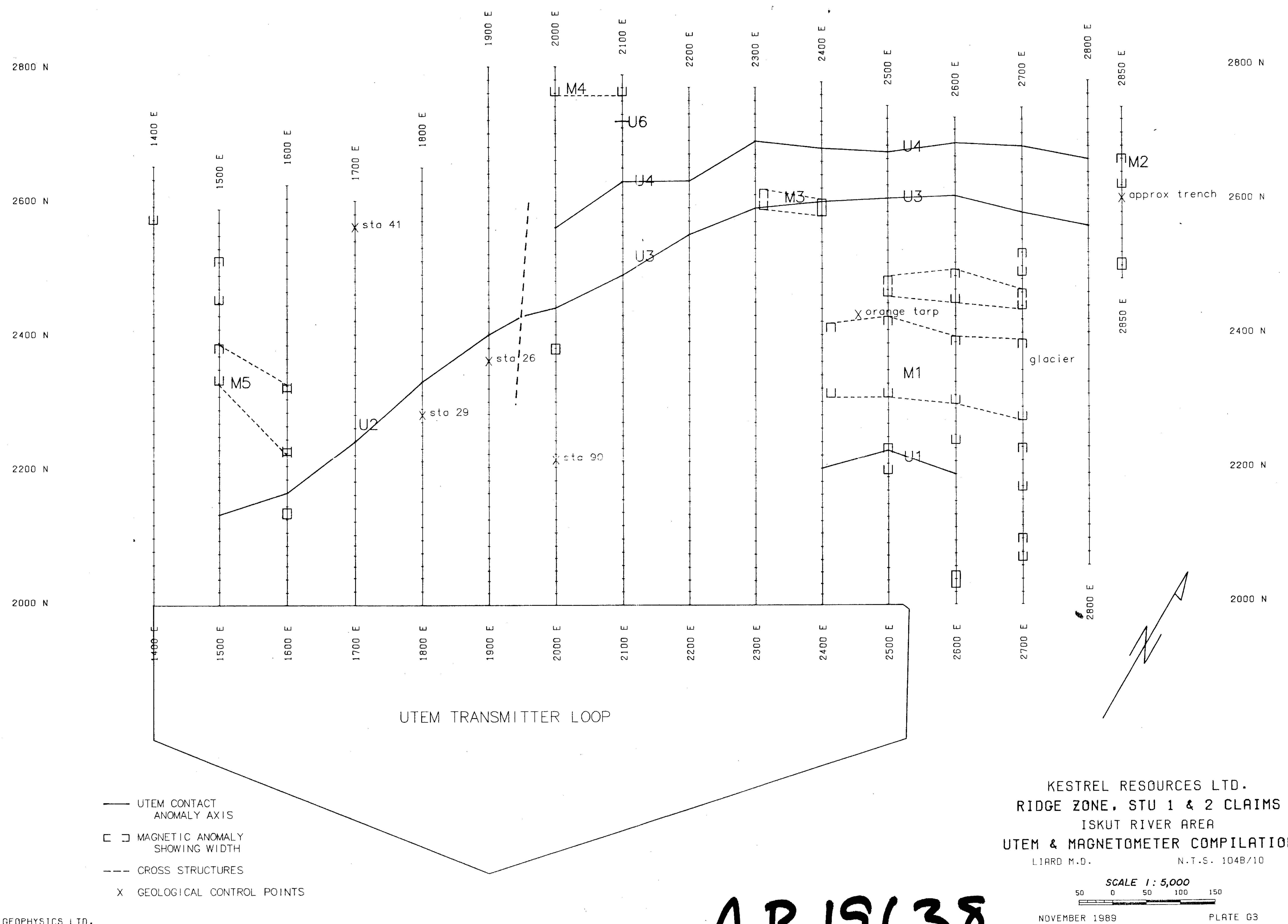
NOVEMBER 1989 PLATE G2

CONTOUR INTERVAL : 50 NT
POSTED CONTOUR INTERVAL : 200.500 NT
TREND ROTATION : 0 DEG

INSTRUMENTATION:
GEM-8 PROTON PRECESSION MAGNETOMETER

SJ GEOPHYSICS LTD.

A.R. 19638




KESTREL RESOURCES LTD.
RIDGE ZONE, STU 1 & 2 CLAIMS
ISKUT RIVER AREA
UTEM & MAGNETOMETER COMPILATION
LIARD M.D. N.T.S. 104B/10

NOVEMBER 1989 PLATE G3

SJ GEOPHYSICS LTD.

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