

ARIS SUMMARY SHEET

District Geologist, Kamloops

Off Confidential: 89.06.23

ASSESSMENT REPORT 17526

MINING DIVISION: Vernon

PROPERTY: Silver Lump  
 LOCATION: LAT 49 53 54 LONG 118 30 31  
 UTM 11 5528199 391653  
 NTS 082E15E 082E16W  
 CLAIM(S): Silver Lump, Lightning Gold, Geo Gold  
 OPERATOR(S): Grazina Res.  
 AUTHOR(S): Borovic, I.  
 REPORT YEAR: 1988, 71 Pages

COMMODITIES

SEARCHED FOR: Silver, Lead, Zinc, Gold

GEOLOGICAL

SUMMARY: Sedimentary and volcanic rocks of the Permian Anarchist Group are intruded by granitic and granodioritic rocks of Cretaceous age. Mineralization composed of pyrite, sphalerite, chalcopyrite, galena with silver and gold occurs as disseminated grains, fracture fillings and massive lenses in quartz-carbonate gangue within fractured and faulted rocks. The regional structure is a roof pendant within Cretaceous granodiorites. Locally large shears control mineralization.

WORK  
 DONE:

Geological, Geophysical, Geochemical  
 EMGR 26.0 km; VLF  
 Map(s) - 4; Scale(s) - 1:5000  
 GEOL 108.0 ha  
 LINE 26.0 km  
 MAGG 26.0 km  
 Map(s) - 1; Scale(s) - 1:5000  
 SOIL 500 sample(s) ; AU, AG, CU, PB, ZN  
 Map(s) - 5; Scale(s) - 1:5000

# IGNA

engineering & consulting ltd.

LOG NO: 0629	PD.
ACTION:	
FILE NO:	

REPORT ON THE MINERAL  
EXPLORATION  
OF  
THE SILVER LUMP PROPERTY

Lat. 49 53'N; Long. 118 29'W

N.T.S. 82 E/15E & 16W

VERNON M. D.

British Columbia

FILMED

1987

SUMMARY AND EVALUATION

## GEOLOGICAL BRANCH ASSESSMENT REPORT

GRAZINA RESOURCES Ltd

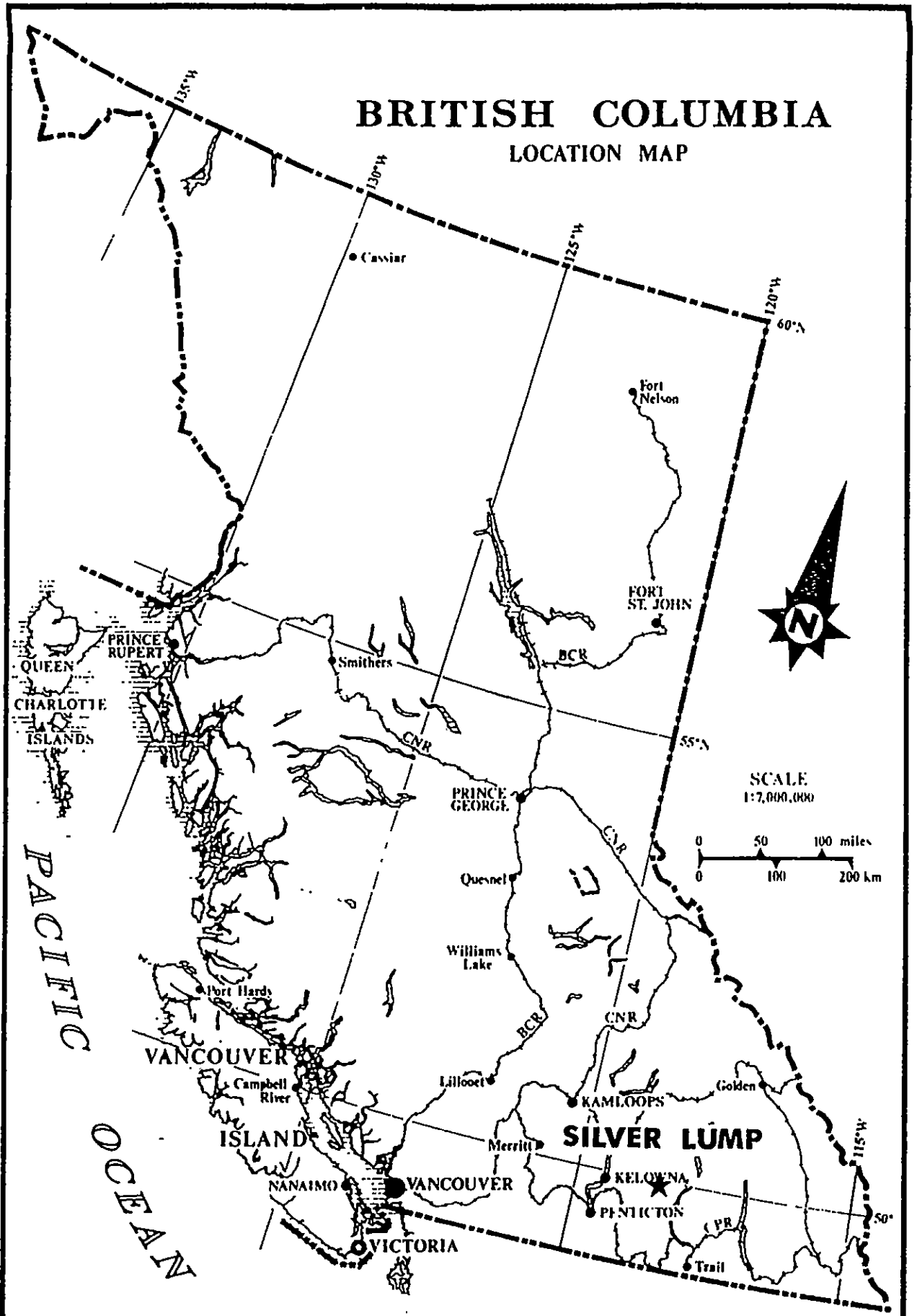
17,526

I. BOROVIĆ, P. Eng.  
geologist

VANCOUVER, B. C.  
Feb 03, 1988.

SUB-RECORDER RECEIVED
JUN 23 1988
M.R. # ..... \$ .....
VANCOUVER, B.C.

# BRITISH COLUMBIA LOCATION MAP



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**GRAZINA RESOURCES Ltd**  
**SILVER LUMP PROPERTY**

DATE FEB. 1988.

FIG. No. 1

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Soil Geochemistry, Zinc (Fig. 16).....	in pckt
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## SUMMARY, CONCLUSIONS AND RECOMMENDATION

The SILVER LUMP property of GRAZINA RESOURCES LTD. is located on the top of Lightning Peak, about 96 km east southeast of Vernon B. C. and about 27 km west of Needles on Lower Arrow Lake.

The property is composed of 5 located claims with 50 units and one reverted crown granted mineral claim called Silver Lump.

The Silver Lump property is well located with respect to potentially favorable geological environs, strong folding, faulting, "hot" contacts and other structures related to mineralizing events.

Past exploration and development work and small scale mining was done on a number of showings related to quartz, pyrite, galena, sphalerite, gold and silver bearing veins located within the sedimentary and volcanic rocks of the Anarchist Group underlying most of the property. The sediments were intruded by granitic and granodioritic rocks of Cretaceous age. Massive limestone lenses were then metamorphosed into various skarns ranging from diopside to garnetite.

The Silver Lump showings are of two general types which include:

- a) sulphide-quartz-carbonate lenses within strong east-west shear zones, and
- b) steeply dipping, northerly trending mineralized quartz veins.

Both types comprise similar paragenesis but proportions of metals contained in the rock are different.

Gold values are present in quartz veins and only minor amounts are present within shear zones. This was demonstrated on numerous occasions recently and in the past.

Recorded values for gold in the shears are from traces to 0.02 oz/t. Gold values in the quartz veins range from 0.12 to 1.0 oz/t. Silver values range from a few oz/t to 480 oz/t. Both are found nearly in equal amounts in both of the vein systems.

Mineral production since 1904 concentrated mainly on high grade veins with very high silver and base metal content. Gold, in the past, was more of a byproduct. It is recorded that some 35 to 55 tons of high grade silver, lead, zinc, gold and copper ore was shipped to smelter in Trail B. C. from 1904 till 1930.

Geological investigations have found a number of mineralized showings within the old Silver Lump area.

The main mineralized zones extend for about 800 m in a north-south direction.

The assays of the samples collected during the 1987 exploration show high grade silver and gold within quartz veins and lower grade silver and minor gold in east-west shears (see page 15 and Fig. 8)

The VLF survey encountered numerous crossovers. Five of the crossovers are considered true conductors. The conductors are coincidental with anomalous soil assays and vertical magnetic field readings.

A geochemical soil survey has shown numerous very significant anomalous assays for silver, zinc and lead in most areas where later we have encountered coincidental VLF conductors or magnetic anomalies.

All the results of exploration show that the property's geological, structural and mineralogical relations point to the possibility of the existence of a mineral deposit in the property area; Therefore a continuation of the exploration efforts is strongly recommended and an adequate, necessary budget proposed.

It is the writer's opinion that because of the nature of the vein type of silver, zinc, lead and gold mineralization, a more economically advantageous mining situation should also be explored since it is "a possibility in finding replacement pyrite gold mineralization in metamorphosed limestone lenses".

An essential operation in an exploration program is an economic appraisal at each critical juncture in addition to the feasibility study prior to development. The present value of the exploration venture at any time in its history should have a marked impact on the design of the remainder of the exploration program.

It is the writer's opinion that in the next exploration phase trenching and diamond drilling of the various coincidental anomalies should take place.

If that phase is successful phase 2, composed of more diamond drilling, should continue.

#### **EXPLORATION PLAN AND ESTIMATED BUDGET 1988.**

Exploration work should start by opening and enlarging the surface exposures coincidental with VLF, soil and magnetic anomalies. Geological detail mapping and sampling of the trenches, and geological structural studies should continue. In order to test mineralized structures at depth, diamond drilling of the six significant anomalies which are showing the greatest mineral potential should be done.

The cost of the proposed exploration program is estimated at \$185 150.00. Additional work (Phase 2) would be dependent on favorable results of Phase 1.

## PHASE 1

Geology, engineering, supervision, evaluation....	\$	24 000.00
Room & Board.....	\$	6 000.00
Trenching.....	\$	15 000.00
Diamond drilling (1500 ft. @ \$ 70.00/foot)....	\$	105 000.00
Assaying.....	\$	7 000.00
Transportation.....	\$	4 000.00

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Total	\$	161 000.00
-------	----	------------

Contingencies (15% of total).....	\$	24 150.00
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Total Phase 1.....	\$	185 150.00
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## PHASE 2

Geology, engineering, supervision.....	\$	20 000.00
Room and board.....	\$	6 000.00
Diamond drilling (5000 ft. @ \$ 70.00/foot)....	\$	350 000.00
Assaying.....	\$	12 000.00
Transportation.....	\$	5 000.00

-----

Total	\$	393 000.00
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Contingencies (10% of total).....	\$	39 300.00
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Total Phase 2.....	\$	432 300.00
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## INTRODUCTION

GRAZINA RESOURCES Ltd, a Vancouver, B. C. based mineral exploration company, intends to continue the exploration of the gold, silver, lead, zinc and copper bearing mineral property known in the past as Silver Lump, Rampalo or Lightning Peak, located on the top of the Lightning Peak Mtn. some 65 km east south east from the town of Lumby B. C.

The following report is a summary of information obtained from the various published and private reports, which are listed in the Bibliography on page 21, and from the writer's personal knowledge and experience gained through extensive research and exploration work in the Lightning Peak Mtn. area.

The writer visited and examined the Silver Lump property and workings during October, 1987.

Following the writer's recommendations basic exploration work comprising geological mapping, a geochemical soil survey, geophysical VLF and ground magnetic surveys were done during October, November and the first part of December of 1987.

The conclusions expressed in this report are based upon the results of the extensive geological, geochemical and geophysical work done on the Silver Lump property in 1987 and in the past.

#### PROPERTY

##### Locations:

(Fig. 1)

Lat. 49 53'; Long. 118 29' / 82E 15E & 16W

The Lightning Peak area is about 27 km west of Needles on Lower Arrow lake and about 96 km east south east of Vernon, B. C.

##### Access:

Access to the property is by a two lane paved road 96 km east from Vernon along Highway #6 to Inonoaklin Crossing, then by the Kettle River logging road south. At K62 on the Kettle River road a secondary logging road is then followed SE across Winifred Creek up over the divide into the Silver Lump property. This road is in good condition and leads into the middle of the Silver Lump RCG. Numerous roads crisscross the property making the old mine workings and showings very accessible.

##### Claims:

(Fig. 2)

The Property is composed of five located mineral claims with a total of 50 units and one reverted crown grant (RCG) as follows:

Claim(# units)	Rec. No.	Lot No.	Rec. Date
Geo Gold(6)	2326		Aug. 21.1987.
Lightning Gold(18)	2327		Aug, 21.1987.
Pay Day Gold(8)	2328		Aug, 21.1987.
Gold Lump(6)	2329		Aug, 21.1987.
Pay Day Au(12)	2330		Aug, 21.1987.
Silver Lump(RCG)	2301	2409	June,29.1987.

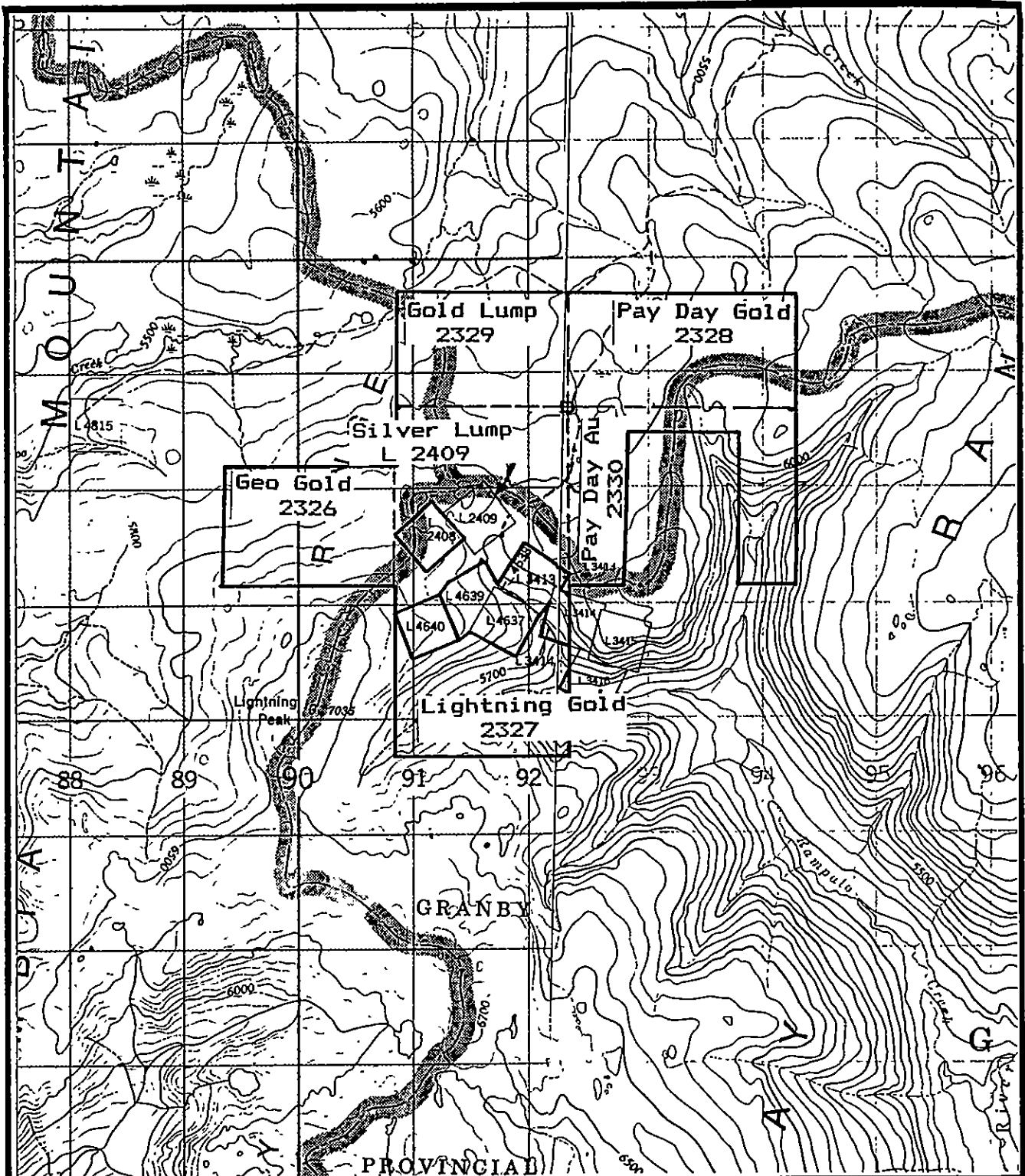
**Owner:** GRAZINA RESOURCES Ltd.  
1407-750 W. Pender St.  
Vancouver, B. C. V6C 2T7

Title of the claims was examined by the writer on Oct., 1987, at the Mining Recorder's office, Vernon, B. C. and claims found to be in good standing.

##### Facilities and Services:

Room and board for the exploration crew is available in the camping place 34 km north of the property at the intersection of the main logging road and Highway #6.. Exploration supplies and equipment are available in Vernon 96 km to the west. There are also all necessary hospital, school and transportation facilities available in Vernon.





**GRAZINA RESOURCES Ltd**  
**SILVER LUMP PROPERTY**

SCALE: 1:50 000

APPROVED BY:

DRAWN BY

DATE: FEB. 1988.

NTS |82 E/15416W

**CLAIM MAP**

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DRAWING NUMBER

**2**

**Property facilities:**

Timber and water are available on the property or in close proximity.

**G E O L O G Y****Regional Geology  
(Fig. 3)**

The regional geology of the Silver Lump area is described in more detail by Cairnes C. E. (1930) and Little H. W. (1957). The area is underlain by a roof pendant composed of sediments and volcanic rocks of the Permian Anarchist Group, and intruded and surrounded by the Nelson and Valhalla granites of the Cretaceous period.

The Anarchist Group is represented by sedimentary and volcanic rocks mainly greenstone, greywacke, limestones and paragneiss. According to Cairnes (1930) the limestone belt extends from the Fotosi group in the west to and across the Silver Lump property. The limestone is metamorphosed into skarn. The skarn type mineralization occurs within the property.

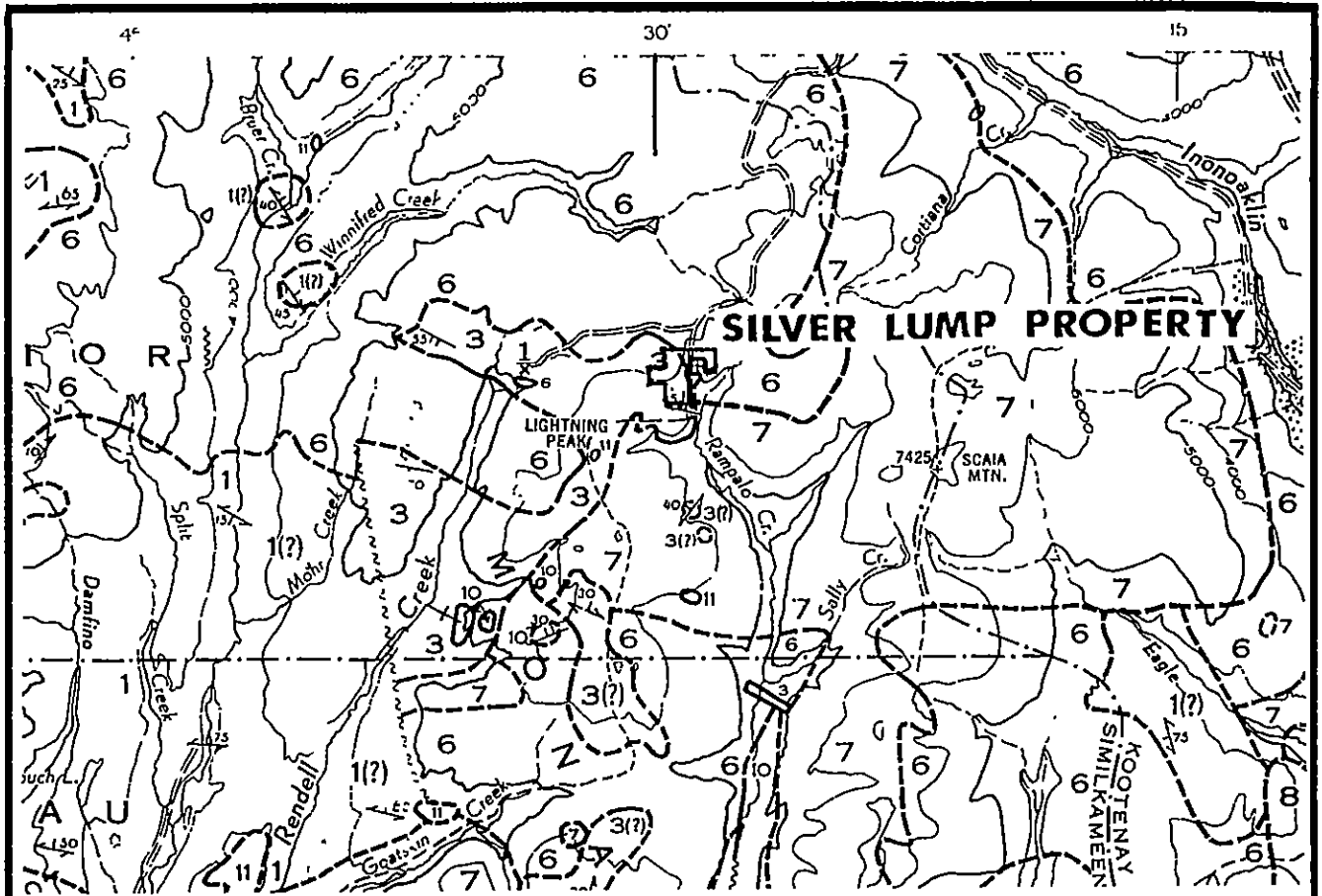
During and following the granitic intrusion the roof pendant sediments became intensely metamorphosed and metasomatized. Specifically, the hot solutions from the granite carrying iron and magnesia changed the sedimentary rocks, particularly the limestone to a variety of skarns ranging from diopside skarn to garnetite.

Subsequent erosion removed the overlying rocks exposing the granites and the roof pendant contacts.

Glacial deposition of till during the Pleistocene age covered much of the bedrock so that outcrops are sparse over large areas.

**Structure**

The Lightning Peak roof pendant structurally represents a westerly plunging syncline. Near the eastern end of the roof pendant, in the area of the Pay Day property, the lithologies are predominantly volcanic flows which are gradually succeeded to the west by tuffaceous and sedimentary rock types. The limestones may be the youngest rocks of The Anarchist Group in the area.



**LEGEND**

Geology by H. W. Little, 1953-1956

CRETACEOUS(?)

6 NELSON INTRUSIONS: granodiorite, porphyritic granite; diorite, monzonite, quartz monzonite

PERMIAN(?)

3 ANARCHIST GROUP  
Greenstone, greywacke, limestone; paragneiss

- Drift-covered area . . . . . [stippled pattern]
- Geological boundary (defined approximate) . . . . . [dashed line]
- Bedding (inclined, overturned) . . . . . [line with 'F' and 'R' symbols]
- Bedding (inclined, vertical; tops unknown) . . . . . [line with 'F' and 'V' symbols]
- Gneissosity (inclined, vertical) . . . . . [line with 'G' and 'V' symbols]
- Fault (defined, approximate, assumed) . . . . . [wavy line]
- Fossil locality . . . . . [circle with 'F']
- Mineral property . . . . . [circle with 'M']

<b>GRAZINA RESOURCES Ltd</b>		
<b>SILVER LUMP PROPERTY</b>		
SCALE: 1" = 4M	APPROVED BY:	DRAWN BY
DATE: FEB. 1988.		NTS 82E/15#16W
<b>REGIONAL GEOLOGY</b>		
<b>IGNA</b>	engineering & consulting ltd.	DRAWING NUMBER <b>3</b>

## Mineralization

(Fig. 4 & 5)

The Lightning Peak roof pendant is extensively mineralized. More than 20 showings were noted and all of them fall within the area of the roof pendant. The showings have been recorded since 1904 and onwards at the time when the major interest of mining companies was centered on the veins with massive high grade mineralization.

It is obvious that granites surrounding the Lightning Peak roof pendant have high heavy metal concentrations as evidenced by the large number of mineral occurrences in the area. Thus it follows that there is a good chance of finding an economic mineral deposit associated with the granites of Lightning Peak.

Mineralized hydrothermal solutions coming from a granitic intrusion have been deposited mainly in the rocks near the granite-sediment contact.

Metamorphosed calcareous tuff of The Anarchist Group of the Upper Paleozoic age is cut by several east-west trending shear zones and injected by many calcite veins and veinlets.

Pyrite, sphalerite, chalcopyrite and galena occur as disseminated grains, fracture fillings, stringers and massive lenses in quartz-carbonate gangue in intensely altered, fractured and faulted rocks.

"The relations between the north-south system of quartz veins and the east-west trending mineralized shear zones is not well understood. Though much of the same mineral paragenesis is present in both, the proportions are quite different. Pyrite is the only visible mineral present in quartz veins and is only a minor constituent of the shear zones.... gold values are significant in the quartz veins and are of minor importance in the shear zones. High grade silver minerals are present in both systems, but are more abundant in the east-west veins which include conspicuous amounts of ruby and native silver, whereas the north-south veins contain more grey copper. The inference is that the two vein systems were formed at different times or under different conditions." (Cairnes, C. E. 1930)

## Property Geology

Two different rock types were recognized in the field: recrystallized limestone and intrusive granite to granodiorite.

The limestone is recrystallized to a coarse marble. The colour varies from white to rusty red at the surface and gray to greenish gray below the surface.

The intrusive rocks are light to dark gray in colour, fine to coarse grain, and massive. The composition of intrusive is variable from almost of alaskite composition to that of a mafic granodiorite.

The intrusive vary from massive bodies to narrow vertical dykes. The contacts between the limestone and the intrusive are usually deeply weathered and have the appearance of gossan where observed at the surface. The gossan zones vary from a few cm to over 1 m in width.

## Structure

The strikes of the contacts vary considerably from place to place as the intrusive bodies appear to be irregular in shape and size.

The mineralized zone of the Silver Lump Showing is apparently associated with two shear zones. The limestone horizon, as mapped previously in the property area, is at least 220 meters long and at least 80 meters wide.

## HISTORY OF EXPLORATION AND MINING

(Location of mineral showings and properties are shown on Fig. 4 & 5)

1904

About 16 miles of pack trail was built from Fire Valley to the Lightning Peak Group property. A small group of men carried on development till the end of the year.

1917

Development on the Waterloo property consisted of open-cuts and tunnels. The 4 foot wide lead was not developed to any great depth.

1918

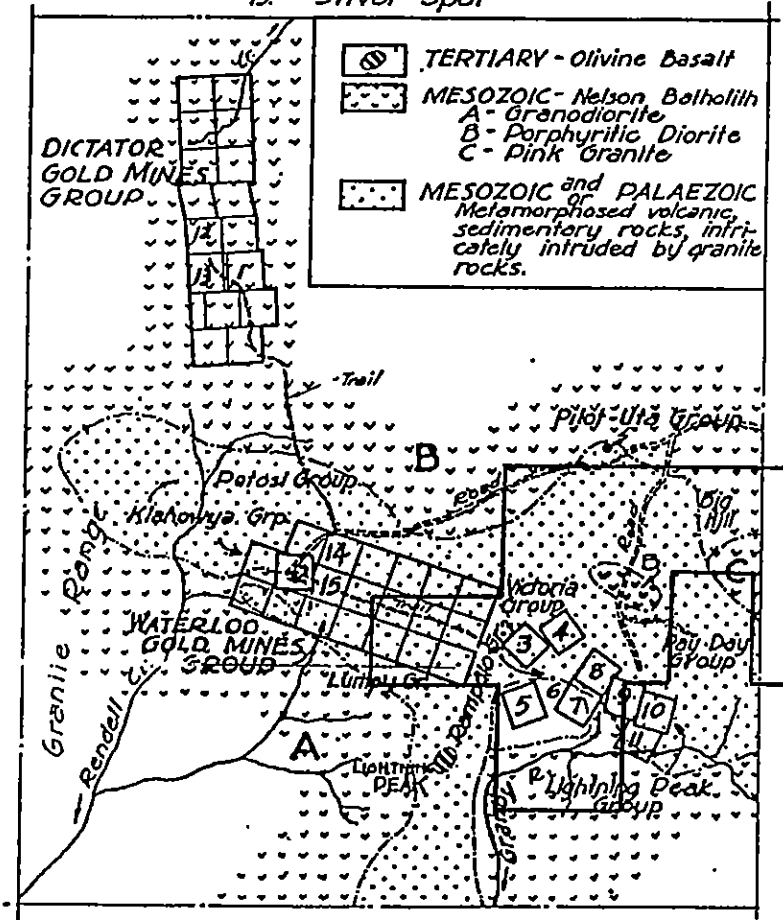
Some high grade silver ores at Lightning Peak were discovered.

**SKETCH MAP SHOWING GEOLOGY & CLAIM GROUPS  
LIGHTNING PEAK AREA.**

SCALE 0 5000 10000 20,000 Feet.

**LEGEND**

- |                            |                      |
|----------------------------|----------------------|
| 1 Dictator, C.G.           | 8 Thunder Hill, C.G. |
| 2 Waterloo, C.G.           | 9 First Chance, C.G. |
| 3 Rampala, C.G.            | 10 West Fork, C.G.   |
| 4 Silver Lump, C.G.        | 11 Jim Hill, C.G.    |
| 5 Lost Cayuse, C.G.        | 12 Morning           |
| 6 Lucky Jim Fraction, C.G. | 13 Cordova           |
| 7 Killarney                | 14 A.U.              |
| 15 Silver Spot             |                      |



*With report by P.D. Freeland, 1933,  
Resident Mining Engineer,  
Penticton, B.C.*

*B.C. Department of Mines.*

**GRAZINA RESOURCES Ltd  
SILVER LUMP PROPERTY**

SCALE:

APPROVED BY:

DRAWN BY

DATE: FEB. 1988.

NTS 82E/15#16W

**GEOLOGY & CLAIM GROUPS**

**IGNA**

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**4**

1919

The Lightning Creek and Extension (Equinox Group) property was worked by W. A. Calder and two men. Development consisted of shafts, 97 feet, tunnels, 150 feet, crosscuts, 37 feet, and open-cuts, 50 feet. Ten tons of silver lead ore were shipped to the Trail smelter.

Development on the Rampalo property, owned by T. Cortiana, consisted of 75 feet of open-cut and tunnel.

1920

W. A. Calder shipped 6 tons of ore to Trail from the Lightning Peak claim of the Equinox group which carried some silver and high values in lead.

Development on the Rampalo was advanced by the owner and was continued during the winter.

1921

The Lightning Peak mine was leased to William Williams and a 400-foot drift commenced with the idea of developing the vein about 40 feet below the winze. Some good ore, with high lead content, was encountered in segregations in a 4-foot lead.

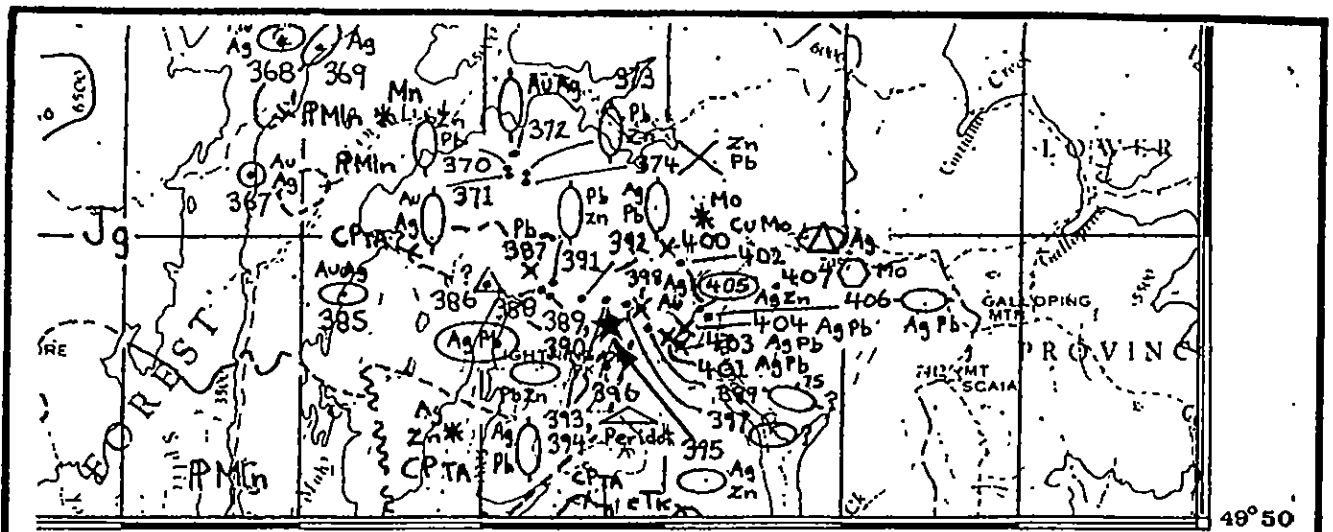
Work done on the Rampalo and Silver Lump claims consisted of a 400-foot tunnel and 27-foot upraise. Silver sulfide ore was struck in this tunnel scattered through the limestone, carrying values of 137 oz Ag, 0.35 oz Au, to the ton.

1922

Development done on the West Fork claim, one of the old Equinox group, leased by W. Williams, consisted of a tunnel driven 70 feet on the lead, and a shaft sunk 19 feet in depth and 29 feet from the face of the tunnel. The ore, in silver-lead and zinc sulfides with specks of chalcopyrite, occurred in lenses in a 4-foot lead. High silver and lead values were found near the shaft. Seven and a half tons of silver-lead ore from the lower tunnel were shipped to the Trail smelter. A general sample of sorted ore carried 23 oz Ag, 54% Pb, and 5.5% Zn to the ton. Samples from the shaft carried 150 oz Ag, 64% Pb, and 4% Zn to the ton.

The Killarney claim was owned by W. Bunting of Edgewood. Prior to 1922 two tunnels of 25 and 50 feet respectively were driven into the wash and broken ground near the creek. A few tons of silver-lead ore were taken out of this ground, but the vein in-place was not found.

Only assessment-work was done on the Waterloo and Potosi claims. On the Waterloo further exploration of the lower tunnel developed more lower grade ore than was found near the surface. No further ore developments were made on the Potosi.



118°45'

118°30'

118°15'

49°50'

387	49°54:6	118°33:6	11	387989	5529572	POTOSI (LOCATION 6)	Pb	UNKNOWN
388	49°54:0	118°33:6	11	387966	5528460	WATERLOO (WATERLOO No. 3)	Ag Pb Zn Cd Cu Sb	VEIN, SHEAR, SKARN?
389	49°54:0	118°33:3	11	388325	5528453	SILVER SPOT, LOC. 8	Ag Cu Pb Sb	VEIN, SHEAR
390	49°54:0	118°33:3	11	388325	5528453	SILVER SPOT, LOC. 9	Pb Zn Ag Au	VEIN, SHEAR
391	49°54:2	118°33:2	11	388453	5528821	AU	Pb Zn Cu Ag Au	VEIN, SHEAR
392	49°54:0	118°37:4	11	389403	5528430	SILVER SPOT, LOC. 11	Ag Pb Zn	VEIN, SHEAR
393	49°54:0	118°31:8	11	390121	5528416	SILVER SPOT, LOC. 12 (Loc. 4)	Pb	VEIN, SHEAR
394	49°54:0	118°31:3	11	390121	5528416	SILVER SPOT, LOC. 13	Pb Zn	VEIN, SHEAR
395	49°53:4	113°31:3	11	390098	5527304	LUMPY	Ag Zn Pb Au	SHEAR?
396	49°52:6	118°31:8	11	390068	5525922	P	PERIDOT	CONCORD V
397	49°54:0	118°31:2	11	390839	5528401	RAMPALO, LOC. 15	?	VEIN
398	49°53:4	118°30:6	11	391535	5527775	RAMPALO, LOC. 16	Ag Au Pb	UNKNOWN
399	49°53:3	118°30:5	11	391651	5527087	CONDOR (RAMPALO GROUP, LOC. 17)	?	SHEAR
400	49°55:2	118°30:0	11	392320	5530596	PILOT - UTA	Cu Mo	UNKNOWN
401	49°53:4	118°30:0	11	392253	5527260	KILLARNEY	Ag Pb Zn Cu	UNKNOWN
402	49°54:6	118°29:6	11	392776	5529474	BIG HILL	Ag	SHEAR, SKARN?
403	49°52:8	118°29:6	11	392710	5526139	LIGHTNING PEAK, LOC. 19	Ag Pb Zn Cu	UNKNOWN
404	49°53:3	118°29:5	11	392848	5527063	LIGHTNING PEAK, LOC. 20	Ag Pb	UNKNOWN
405	49°53:7	118°29:0	11	393461	5527792	PAY DAY	Ag Zn Cu	VEIN, SHEAR, CONCORD V?
406	49°53:6	118°28:9	11	393577	5527605	PAY CHECK	Ag Pb Zn	VEIN, SHEAR
407	49°54:0	118°27:0	11	395866	5528301	TP	Mo	IGNEOUS,

## GRAZINA RESOURCES Ltd SILVER LUMP PROPERTY

SCALE:

APPROVED BY:

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DATE: FEB. 1988.

NTS 82 E/15416 W1

### MINERAL SHOWINGS

# IGNA

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DRAWING NUMBER

# 5



1923

Ten tons of silver-lead ore were shipped to the Trail smelter from the West Fork claim.

1924

Only a few tons of ore were shipped from the West Fork claim.

On the Killarney claim an open-cut 20 feet deep was excavated. Development opened up a lead 4 to 8 inches wide, containing galena, gold and silver, but not consistently mineralized. A new crosscut was driven below present workings to give 72 feet more depth.

1925

Practically all development work was done at the extreme ends of a mineralized belt on the Lightning Peak group and very little was known regarding the possibilities in between due to a heavy overburden of gravel and loam.

Veins so far developed measured from 2 inches to 6 feet in width, with the values decreasing as the vein widened. Samples from the smaller veins on the Killarney and West Fork carried values from 20 oz Ag to the ton, 8% Pb and 9% Zn to 180 oz Ag to the ton, 50% Pb and 15% Zn. From the larger veins such as on the Waterloo claim, values amounted to 18 oz Ag to the ton, 8.5% Pb and 9% Zn with much higher values obtained with close sorting.

Development-work on the Lightning Peak Group consisted of several hundred feet of tunnels and a shaft 95 feet deep, but there was very little ore developed, although several hundred tons had been shipped. A sample of the sorted ore assayed 50 oz Ag to the ton and 50% Pb.

A sample from the Killarney claim assayed a trace Au, 180 oz Ag to the ton, 49% Pb and 3% Zn. A crosscut was driven 125 feet below to tap the vein uncovered in an open-cut.

No work was done on the Rampalo Group.

On the AU and Silver Spot No. 2 surface trenching, open-cuts and shallow shafts excavated about 200 feet apart developed a vein about 1,500 feet in length. A sample from a shaft 10 feet deep, where the vein was 10 inches wide, assayed 0.12 oz Au, 24.5 oz Ag to the ton, 13% Pb and 4.5% Zn.

Development on the IXL claim consisted of trenching, open-cuts, and shallow pits.

1926

The Lightning Peak Section was not visited during the season, but assessment-work was reported on other claims. The Government cut out and partially graded a snow-road.

1929

Development on the Fay Day group consisted of numerous open-cuts along a mineral-zone 600 feet in length, which measured 2 feet across in the narrowest and 6 feet in the widest part. The ore-minerals were pyrite, sphalerite, galena, and specks of chalcopyrite in a siliceous gangue. At an elevation of about 30 feet below, a crosscut tunnel was driven which intersected the vein. A ten foot sample of the more solid sulfides assayed: Au, trace; Ag, 30 oz to the ton; Cu, 4.2%; Pb, nil; Zn, 12%; Ni, nil; Arsenic, nil; bismuth, trace.

An assay from the southwest section of the property contained: Au, .70 oz to the ton; Ag, 480 oz to the ton.

The First Chance group, worked by W.A. Calder of Edgewood, had a lower tunnel driven in an easterly direction for 685 feet along the strike of the vein. The ground had been faulted and only small segments of ore were found. Some high grade ore was mined and shipped from this section in former years.

A 21 foot crosscut was driven under the upper open-cut on the slope of the creek and the vein drifted on for 44 feet on the Killarney claim, owned by W. J. Banting of Edgewood.

1930

Shipments of silver-lead-zinc ore were made to the Trail smelter. Development continued on the Waterloo No. 2 tunnel and a lean zone was struck on each side of a narrow tongue of diorite which intruded into the limestone about 30 feet from the face at the time of examination. Some stoping on a high-grade ore-shoot was done about 70 feet from the face. A new tunnel, No. 3, about 90 feet lower in elevation than No. 2 was commenced and driven about 50 feet.

A 10 inch sample taken 14 feet down the shaft assayed: Au, 0.36 oz to the ton; Ag, 16.6 oz to the ton; Pb, 8.2%; Zn, trace.

A preliminary geological survey was made of the area by C. E. Cairnes, of the G.S.C.

Work on the Lightning Peak Group was chiefly concerned with the exploration and development of the main vein or vein zone. Workings on the main vein zone included a shaft, 95 feet deep, four adits, and considerable surface work and investigation of the main vein over a vertical range of about 200 feet and a length of nearly 1,000 feet on either side of the First Chance and West Fork claim boundaries. Most of the production came from workings in the vicinity of the main shaft on the West Fork claim. This shaft was sunk on the vein.

Some surface exploration was done on a quartz vein occurring along the hanging-wall, east side, of a wide dyke of quartz porphyry.

Development work on the Pay Day group included numerous trenches and an adit 60 feet long. A sample assayed: Au, trace; Ag, 30 oz to the ton; Cu 4.2%; Pb, nil; Zn, 12%; Ni, nil; Arsenic, nil, Bismuth, trace.

The principal work that was done in the Rampalo group area was on either side of the boundary between the Rampalo and Silver Lump claims. There three adits varying in length from 60 to 390 feet were driven to develop a quartz vein. This adit was 60 feet long and followed the claim. 250 oz Ag and \$10 in gold are said to have been obtained.

On the Victoria claim surface work exposed two narrow quartz veins each about 6 inches wide in which some mineralization occurred.

On the Condor fraction a little surface work was done to investigate a shear zone several feet wide.

Most of the work on the Killarney property was done on the Killarney claim. Two main adits and three shorter adits were driven and considerable trenching and stripping were done.

1931

Development during the early part of the season concentrated upon sinking the inclined shaft on the AU claim, commenced in 1930, to a depth of 70 feet and drifting on the vein 72 feet, with a crosscut at the end of the drift 40 feet long. During the autumn this work was discontinued and a lower tunnel (No. 4) was driven on the Waterloo claim. A sample of ore taken from the bottom of the shaft assayed: Au, 1 oz per ton; Ag, 24.5 oz per ton; Pb, 10.5%; Zn, 8%. This compares with a ten-inch sample taken 14 feet down the shaft in 1930 which assayed: Au, 0.36 oz per ton; Ag, 16.6 oz per ton; Pb, 8.2%; Zn, trace.

The No. 4 tunnel was driven ahead for a total distance of 165 feet.

Tunnel measurements to date are as follows:

No. 1, 150 feet; No. 2, 380 feet, No. 3, 75 feet; No. 4, 165 feet.

Assessment-work was done on the un-Crown-Granted claims and development on most of the others. No spectacular finds, but interesting mineralization was discovered on the Morning and Potosi groups.

1932

Very little work was done on the property this year, except the cleaning out of No. 4 tunnel on the Waterloo claim which had caved in. A car load of mixed ore was shipped to the Trail smelter that assayed \$30 Au and \$13 Ag per ton.

An assay from the Fay Day group contained 68% Pb and 5 oz Ag per ton.

The inclined shaft upon the AU claim was deepened to 70 feet and a drift driven 72 feet in a southerly direction with a crosscut 10 feet long near the end and across the dyke. A sample of sorted ore from the bottom of the shaft assayed: Au, 1 oz to the ton; Ag 24.5 oz to the ton; Pb, 10.5%; Zn, 8%. This compared with a 10-inch sample taken 14 feet down the shaft in 1930 which assayed: Au, 0.30 oz to the ton; Ag, 16.6 oz to the ton; Pb, 8.2%; Zn, trace.

1933

In the Lightning Peak Area the No. 4 level, 150 feet below the original ore-outcrop, was driven approximately 900 feet and followed the general east-west strike of the main shear-zone.

In the No. 1 and No. 2 tunnels a considerable amount of high-grade ore was mined and shipped to the smelter. Low-grade ore was found in the intermediate and No. 3 tunnels.

1934

Development on the Waterloo No. 3 and Silver Spot consisted of driving No. 4 to a total distance of about 1,780 feet to the east, with occasional short crosscuts north and south excavating numerous open-cuts on the strike of the shear-zone to the east as well as sinking a shallow winze and raising on one of the better-mineralized shear-zones. The end of the No. 4 level is approximately 195 feet below the surface.

On the Lightning Peak group the No. 4 level was extended 17 feet to the south through a fault, and the vein, about 3 feet wide with free walls, containing tetrahedrite, galena, pyrite, and sphalerite, was disclosed.

A channel sample assayed: Au, 0.05 oz per ton; Ag 40 oz per ton.

1935

Further development-work was done on No. 4 adit-level on Lightning Peak. This drift was advanced through a faulted area, and what appears to be the vein, though narrow in width, has been picked up on the south side of the fault.

Further surface-stripping was continued on the Potosi-Spokane.

A. Williams and W. B. Johnstone, of Edgewood, continued prospecting and development on the Pay Cheque (formerly Pay Day) claim, located 1,000 to 1,500 feet east of Pay Day.

W. J. Banting, of Edgewood, continued development-work on the Killarney property during the year.

1936

A raise started from No. 4 level and intended to reach No. 2 was driven for some distance when operations were discontinued for the winter on the Waterloo property.

W. A. Calder, of Edgewood, shipped 2 tons of ore from the Lightning Peak property. The metal contents were 214 oz Ag, 363 lb. Pb, and 228 lb. Zn.

1966

Reconnaissance geochemical soil survey of the Hope group was done.

1968

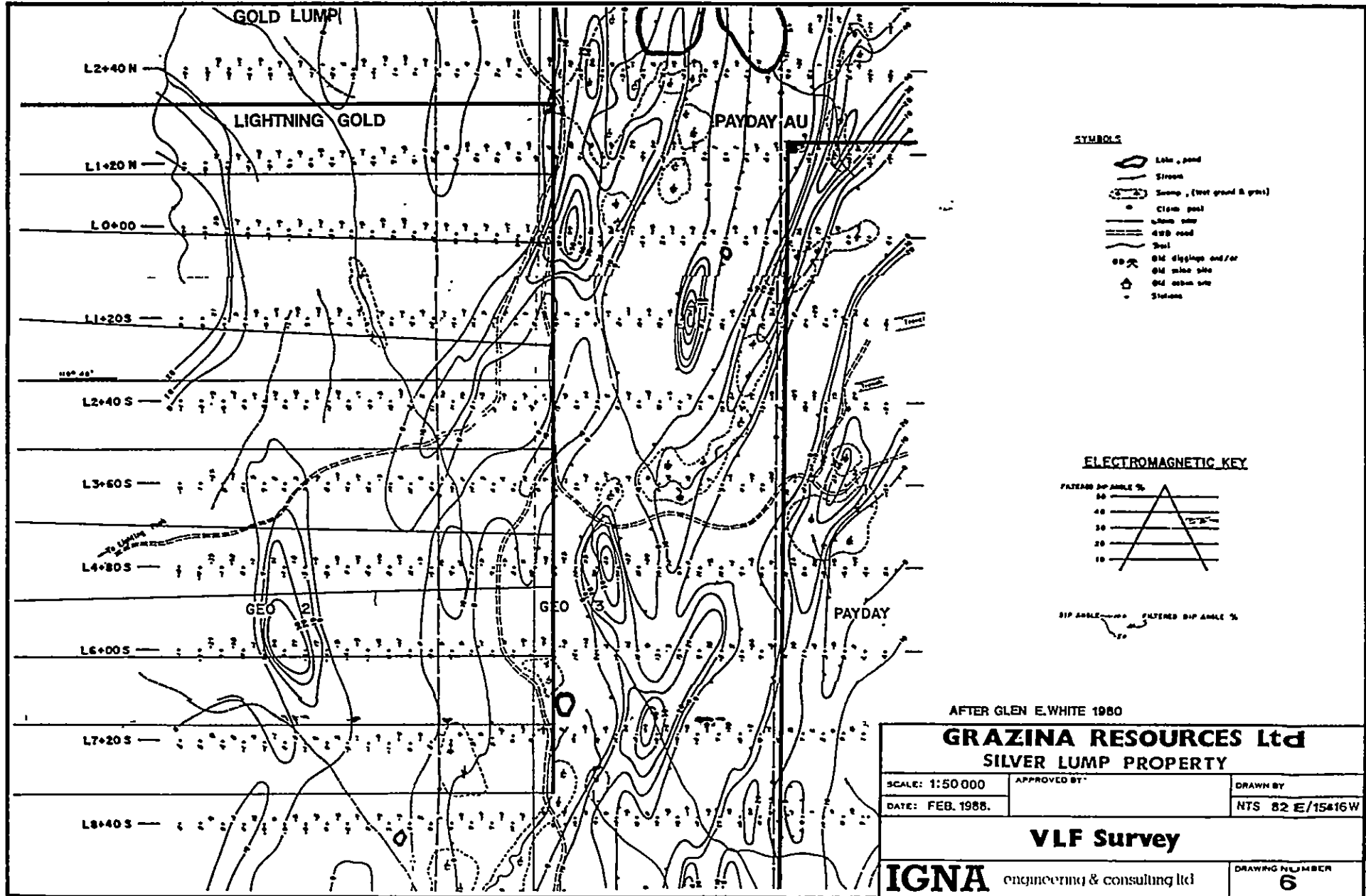
Geochemical and topographic survey. Companies staked 203 mineral claims. Results of geochemical survey were inconclusive.

1973

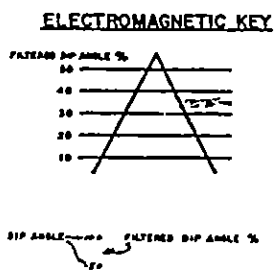
Development-work on the Pay Day property included geological mapping of the Pay Day 2 adit at a scale of 1 inch equals 20 feet. Metals included silver, zinc, copper, lead, and minor gold.

1974

Work done on the Pay Day property included surface geological mapping, 1 inch equals 50 feet, and ground magnetometer and electromagnetic survey, 1.5 line-miles, 50-foot grid spacing covering Pay Day 1 and 2. Surface diamond drilling of two holes totalling approximately 300 feet on Pay Day 1 was also done. Metals include silver, copper, lead and zinc. Two diamond drill holes were drilled near the Pay Day adit. Assay results are not available.



- SYMBOLS**
- Lake, pond
  - Stream
  - Scarp, (wet ground & gullies)
  - Clear post
  - 4mm wire
  - 400 road
  - Soil
  - Old diggings and/or
  - Old mine site
  - Old claim site
  - Station



AFTER GLEN E. WHITE 1980

**GRAZINA RESOURCES Ltd**  
SILVER LUMP PROPERTY

SCALE: 1:50 000	APPROVED BY:	DRAWN BY
DATE: FEB. 1988.		NTS 82 E/15416W

**VLF Survey**

<b>IGNA</b> engineering & consulting ltd	DRAWING NUMBER <b>6</b>
--	----------------------------

1980 (Fig. 6)

Geophysical survey of Geo 1, 2, 3 and Pay Day claims. Results are shown on Fig. 7. Northeast/southwest trending conductors possible fault-shear zone.

1981

Geological survey of the same area as in 1980.

1984

Geological survey of the Big P. Group.

#### WORK DONE 1987.

( see Fig. 7 for grid location)

An extensive geological, geophysical and geochemical survey was performed in the central part of the Silver Lump property during October, November and the first part of December, 1987.

#### GEOLOGICAL MAPPING AND PROSPECTING

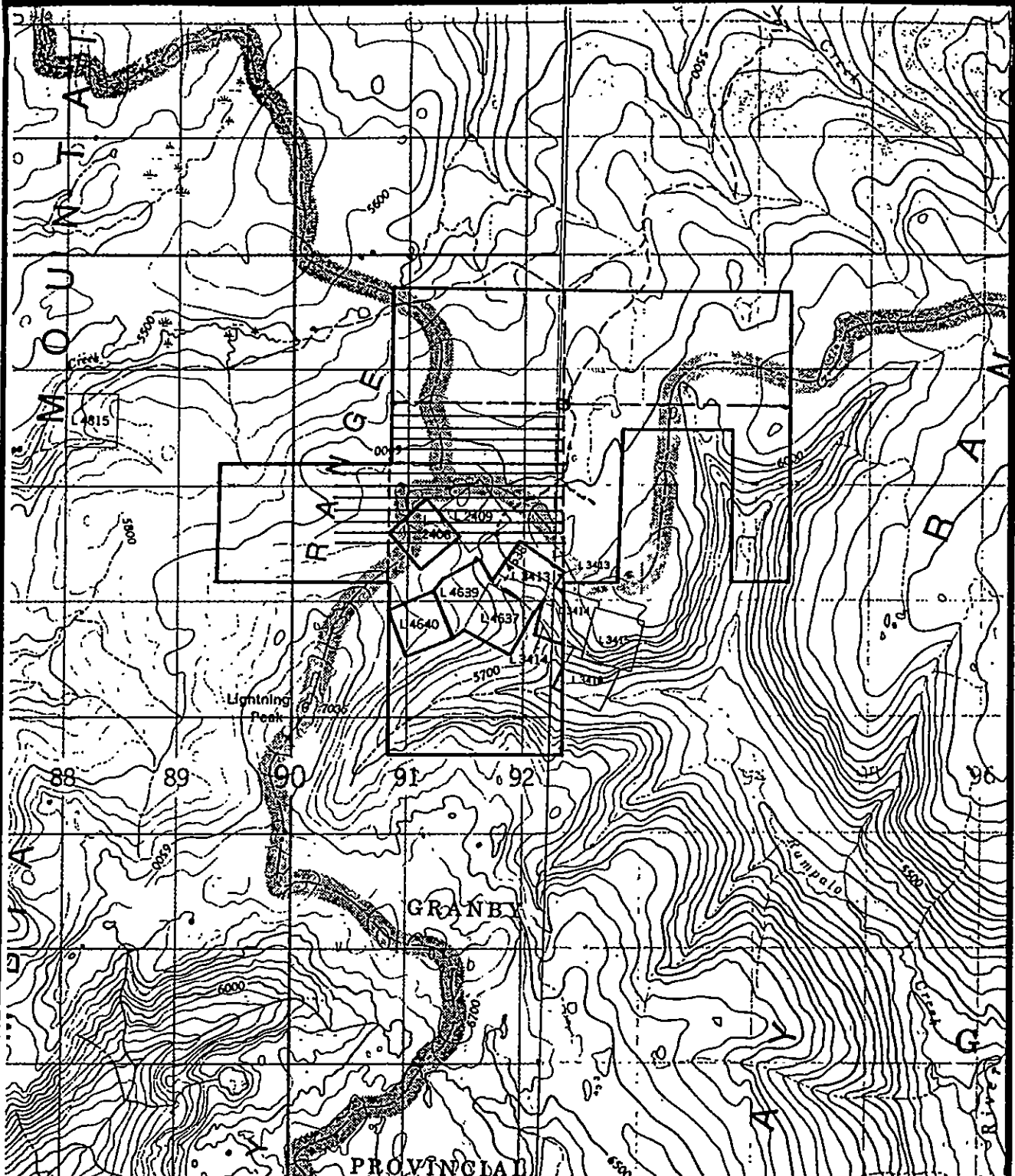
##### Detail Geology

(Fig. 8)

Biotite-Hornblende Granodiorite (Fig. 8, # 3) has intruded and highly altered fine-grained clastic and crystalline sediments and/or volcanic (Tuff?). The appearance of the intrusive on most of the mapped area suggests a "roof pendent" environment. Limestones and limy sediments (Fig. 8, # 1a & 1b) are altered to skarn with pyrite and pyrrhotite content. Strong quartz veins within these rocks are mineralized with pyrite, chalcopyrite, galena, malachite and marcasite.

The strike of the vein in the Upper adit (samples #4811, 4812) intersects the strike of mineral veins on line 0; St 9+00W (samples 4809, 4810 & 4814). These samples contain 1-2% pyrite and galena. This structural trend continues to line 3N 6+80W (sample 4815). The sample also contains pyrite and pyrrhotite. Therefore it seems that the mineralized zone striking N 30 E may extend from the upper adit for an approximate strike length of 1.0 km to the northeast.

Another mineralized zone extends from line 4+50 S, 8+00W (sample 4813) through to line 2+00N, and 4+50W (samples 4816 & 4817) also on a trend of N 30 E. Even though the sample 4813 is found in veins striking due north this zone is seen 10 m to the north from location 4813 trending at N 30 E.



<b>GRAZINA RESOURCES Ltd</b>		
<b>SILVER LUMP PROPERTY</b>		
SCALE: 1:50 000	APPROVED BY:	DRAWN BY
DATE: FEB. 1988.		NTS 82 E/15416 W
<b>EXPLORATION GRID</b>		
<b>IGNA</b>	engineering & consulting ltd.	DRAWING NUMBER <b>7</b>

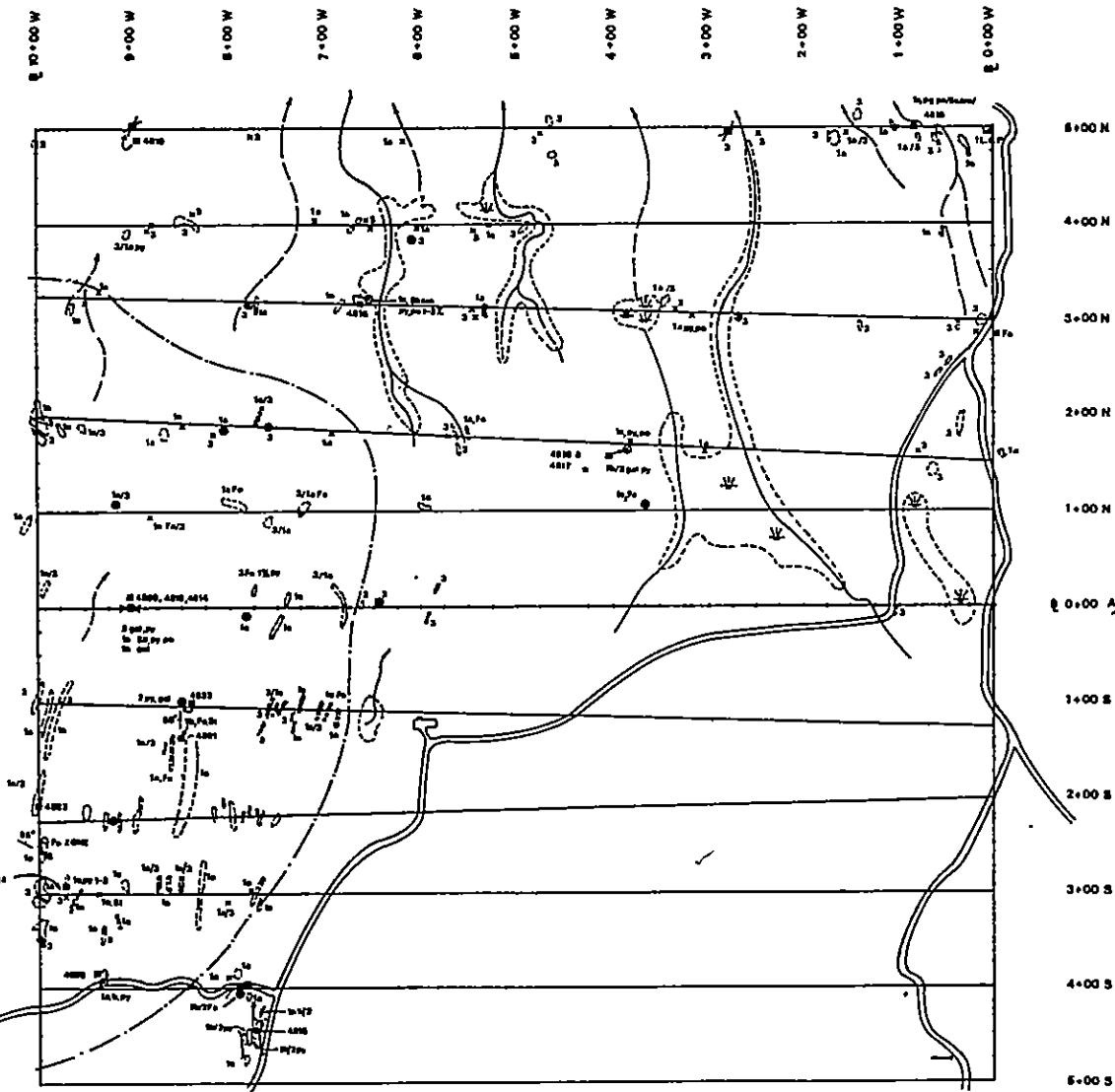


ROCK SAMPLES

	As	Ag	Pb	Zn	Cu
	g/t	g/t	%	%	%
4809	0.220	0.85	0.007	0.28	0.02
4810	0.210	10.17	0.006	0.08	0.08
4811	0.120	12.84	0.020	0.12	0.59
4812	0.040	34.81	0.083	0.73	0.10
4813	0.070	0.30	0.003	0.03	0.03
4814	0.004	0.15	0.021	0.01	0.01
4815	0.010	0.10	0.017	0.01	0.01
4818	0.006	0.08	0.003	0.02	0.01
4817	0.006	0.06	0.002	0.01	0.01
4818	0.004	0.08	0.013	0.01	0.01
4819	0.006	0.50	0.082	0.01	0.01
4820	0.870	8.18	0.002	8.81	0.81
4821	0.004	0.30	0.002	0.02	0.01
4822	0.232	8248	0.003	0.43	0.01
4823	0.012	0.12	0.007	0.81	0.01
4824	0.820	8.53	0.018	8.02	0.01



1:4,200 scale, and  
480 75 00'



LEGEND

- Horrefused Sediments &/or Volcanics (Greenstone) - Dark green-black, fine-medium grained, fractured. Qtz/cal in filling, limy sections - Skarns (py, ss, highly meta).
- Horrefused Limestone (Marble) - opaque milky white, medium grained, (crystalline), rusty with cubic pyrite, highly altered.
- Quartz Vein - Translucent, silky quartz (eprite, galena, chalcocite, malachite).
- Diatite-Hornblende Granodiorite - Medium gray to greenish grained, generally equigranular; coarser grained quartz parashyries also occur.
- large outcrop
- ◡ small outcrop
- subcrop/angular float
- rock sample
- ⋄ pyrite
- ⋄⋄ pyrrhotite
- ⋄⋄ galena
- ⋄⋄ rusty
- ⋄⋄ chalcocopyrite
- ⋄⋄ malachite
- ⋄⋄ silicious
- GRID (baseline, x-line)
- open adit
- X trench
- previous drill site (data lost)
- == road
- creek
- dry gully
- swampy clearing
- change of slope

0 100 200m

IGNA  
Engineering &  
Consulting Ltd

GRAZINA RESOURCES Ltd  
SILVER LUMP PROPERTY  
GEOLOGY MAP

NTS: 432/3000

DATE: FEB 1990

FIG. 8

All sixteen samples (from 4809 to 4824) were analysed for gold, silver, lead, zinc and copper content. Locations of samples are shown on Fig. 8.

The results are as follows:

MARKED	GOLD		SILVER		Lead	Zinc	Copper
	oz/st	oz/st	oz/st	oz/st	Pb (%)	Zn (%)	Cu (%)
<u>SILVER LUMP ORES</u>							
4809	0.230	0.65	0.007	0.25	0.02	0.02	0.02
4810	0.210	10.17	0.006	0.05	0.06	0.06	0.06
4811	0.120	17.84	0.020	0.12	0.39	0.39	0.39
4812	0.040	34.61	0.083	0.73	0.10	0.10	0.10
4813	0.010	0.20	0.003	0.03	0.03	0.03	0.03
4814	0.004	0.15	0.021	0.01	0.01	0.01	0.01
4815	0.010	0.10	0.017	0.01	0.01	0.01	0.01
4816	0.006	0.05	0.003	0.02	0.01	0.01	0.01
4817	0.006	0.05	0.002	0.01	0.01	0.01	0.01
4818	0.004	0.06	0.013	0.01	0.01	0.01	0.01
4819	0.006	0.10	0.002	0.01	0.01	0.01	0.01
4820	0.010	0.15	0.002	0.01	0.01	0.01	0.01
4821	0.004	0.10	0.002	0.02	0.01	0.01	0.01
4822	0.232	52.45	0.003	0.43	0.01	0.01	0.01
4823	0.012	0.12	0.007	0.01	0.01	0.01	0.01
4824	0.020	0.13	0.015	0.02	0.01	0.01	0.01

## GEOPHYSICAL SURVEY 1987

### Ground Magnetic Survey (Total Field)

(Fig. 9)

#### Field Method and Instrumentation

The ground magnetic survey on the Silver Lump property was performed simultaneously with the VLF survey. The Scintrex IGS unit with magnetometer and VLF was used for both surveys. The grid used is described in the GROUND VLF SURVEY. Magnetic readings were taken in conjunction with the VLF readings.

For the survey a portable unit and a base station, fitted with similar proton precision sensors, were used. The base station was programmed to sample the magnetic field every two seconds. The portable unit records the magnetic data, time and station coordinates; corrections are made automatically at the end of the days survey by connecting the portable and base stations to each other.

#### Data Presentation (Fig. 9)

Corrected values were plotted on 1:5000 scale plan and contoured. Contour intervals are 50 gammas.

## Discussion of Results

The magnetic anomalies correlate well with the VLF data. VLF-Conductors #1, 2 and 3 have coincidental magnetic anomalies, although they tend to be displaced west of the VLF crossovers as the survey extends toward south on the property. The large amplitude anomaly is on Line 3S at 1625 W. It can be traced south and extends north as well. This body likely contains iron, magnetite or some other medium with very high magnetic susceptibility properties.

This anomaly is apparently separate from conductor #4.

Another strong magnetic anomaly lies west of conductor #5 and trends north-south (opposite the VLF conductor #5 which runs NW to SE).

Three distinct anomalies lie on 3N at 125 W, 250 W, 350 W as well, with only the 350W anomaly correlating to the VLF crossover found there.

The largest amplitude anomaly is on lines 500 S 1350 W and on line 600 S 1200 and 1300 W. It is coincidental with soil anomalous values for zinc, lead and silver.

## Ground VLF-EM Survey

### Field Method and Instrumentation

A Scintrex IGS VLF-magnetometer instrument was utilized.

A flagged grid was used for the survey, the lines being spaced at 100 meter intervals and the stations every 50 meters. Readings were taken at 25 meter intervals, generally, and at 12.5 meters in some of the anomalous areas.

The Scintrex IGS-2 unit was set up to receive two stations, NKL Seattle, Washington, 24.8 kHz and NSS Annapolis, Maryland 21.4 kHz, measuring the horizontal field strength and the in-phase and out-of phase or quadrature components of the vertical field. The instrument was a three coil system, one horizontal coil and two vertical coils all at 90 angles to each other. The horizontal coil is used to scale the in-phase and quadrature readings, to correct for changes in the strength of the VLF signal at different points on the property. The frequency reference needed to obtain quadrature readings is accomplished by using the magnetic field's frequency.

## Data Presentation (Fig. 10/11 ; 12/13)

The in phase and quadrature components of the electromagnetic field are shown as total field values in profiles superimposed on 1:5000 scale maps, one for Seattle and one for Annapolis.

The conductors are graded according to their inductive quality and their size (see Fig. 9 and 11). The conductor's quality is expressed as the phase lag of the imaginary from the in-phase reading. Ninety degrees is a perfect conductor while values approaching zero show essentially no conductivity.

## Discussion of Results

Seattle and Annapolis  
(Fig. 10&11)(Fig. 12&13)

Conductor #1 has a characteristic "signature" of a very large phase lag value ( $85^\circ$ ) and extremely wide surface crossover points, of for example 75 to 50 m wide on line 3S at stations 800, 825, 850. All three of these stations had a zero value for in phase. This indicates a wide shallow or very wide and deep conductor, while the phase lag shows excellent inductive properties.

This "signature" is shown by circled crossover points. It is interesting to note that these conductors had numerous trenches dug in their vicinity such as line 4S at about 1050 west; where a trench extends about 10 m off a logging road.

Conductor #2, west of #1 again, has this signature at 4S and 1050 W on the Seattle map.

Conductor #3 joins conductor #2 in this area. These conductors separate in a "V" shape northwards. The associated phase lags on these conductors is in the high seventies or low eighties, excellent prospects.

Conductor #4 traverses lines 3S to 5S with this signature seen on the Annapolis map at 5S, 1550 W, another excellent prospect given low seventies and mid eighties for phase lags.

Conductor #5 on the east edge of line 3S and at 250W on line 2S has the wide crossovers, but the phase lag is in the mid seventies, a good prospect.

Conductor #6 at 450W on line 3N has the discussed signature, with phase lags of mid sixties to high seventies.

Conductor #7 is an isolated very good conductor at 2S and 25W.

Conductors #1 through #4 show the most promise in the surveyed area.

## GEOCHEMICAL SURVEY 1987

### Summary of Results and Correlation with Geophysical, Magnetometer and VLF Surveys.

A geochemical soil survey was done over the central part of the property on a 24.9 km/line grid.

#### Sampling method:

Samples were taken from the reddish brown "B" horizon which is about 15 to 25 cm below the surface. In most cases a layer of humus is only 2 to 4 cm thick and an underlying leached layer is from 4 to 10 cm thick. The soil material was collected with a spoon; cleaned of larger size particles and put in the standard soil sample envelope which was marked with a coordinate location. Samples were collected at regular 50 m intervals along the lines.

#### Analytical methods:

Soil samples were dried, pulverized, screened to -80 mesh, and the subsequent AA analyses were done by General Testing Laboratories of Vancouver, B.C.

Samples were assayed for silver, lead, zinc, gold and copper.

### Summary of Results

#### Silver (Fig. 14)

Anomalous values begin at 1.0 ppm to 3.5 ppm. Values above 3.5 ppm are highly anomalous.

Highly anomalous values are located in the central area surrounding the Upper adit vein and showings.

#### Significant anomalies:

-L 400 N St 1400 W.

-L 300 N St 750 to 800W. This anomaly extends south to L 600 S St 750 W for about 800 m of strike length. It is coincidental with a strike of the vein structure located on the same place and also with fault-shear zone indicated by magnetic survey. A very strong crossover-conductor is mapped by VLF on approximately same location.

-L 200 N St 1100 W also extends southwest across L 100 S St 1350 W to L 700 S St 1300 to 1400 W for about 800 m strike length.

-L 100 S St 1000 W extends to L 600 S 1150 W.

-L 100 S St 1650 W.

-L 600 S St 1600 W.

## Lead (Fig. 15):

Lead being a less mobile element than zinc shows great anomalies beginning at 30 ppm and highly anomalous values beginning at 100 ppm.

## Significant anomalies:

L 300 N St 750 W;  
L 0 S St 200 W; 1050 W; 1350-1450 W.

L 300 N ST 800 & 700 W to  
L 200 S 700 to 800 W &  
L 100 N to L 100 S ST 450 to 500 W.

## Zinc (Fig. 16):

Dispersion of zinc throughout the soils in the grid area shows that the amount of zinc in the underlying rocks is not large. Anomalous values begin at 50 ppm and highly anomalous values are 100 ppm and higher.

## Significant anomalies:

L 400 N St 1600 W extends south across L 0 N St 1050 W spreads south to significantly anomalous area on L 300 S St 850 W; L 400 S St 850 to 1000 W and L 600 S St 800 to 1150 W.

## Gold (Fig. 17)

Gold dispersion is fairly uniform except for a few anomalous peaks. Background values of 0.02 ppm (20 ppb) gold is very high. Anomalous values start at 0.025 ppm (25 ppb) and significant anomalies begin at 0.03 ppm (30 ppb).

## Significant anomalies:

L 400 N St 400 W and 1050 W.  
L 300 N St 1350 W.  
L 200 N St 0 and 250 W.  
L 100 N St 1500 W.  
L 200 S St 800 W.

## Copper (Fig 18):

Copper dispersion is minimal. It is obvious that copper is a minor constituent of the mineralized veins or mineralized zones.

### Discussion of Results

Significant silver, lead, zinc and gold anomalies occur in the surveyed area and the correlation with the geological and geophysical surveys shows very strong coincidental subparallel soil, VLF and magnetic anomalies. These anomalies are also aligned with known mineral showings which were mapped on the property.

It is my opinion that the strong coincidental soil, VLF and magnetic field anomalies are mainly caused by underlying mineralized rocks. These areas should be excavated and drilled in order to examine the horizontal and vertical extent of the underlying mineralization.

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Mining Division



## COST BREAKDOWN OF PHASE 1 PROGRAM

RE: Silver Lump Project

-----  
EXPLORATION GRID ESTABLISHMENT:

26 km/lines @ \$600.00/km/	\$	15 600.00
materials	\$	1 350.23

## GEOLOGICAL MAPPING, SAMPLING:

(Two geologists and an assistant)

41 man/days @ \$ 350.00 man/day	\$	14 500.00
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## Supervision-management:

2 days @ \$ 500.00/day	\$	1 000.00
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## GEOPHYSICAL SURVEY:

(VLF-EM and Magnetometer)

Equipment rental	\$	5 445.90
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Two geophysicists

16 man/days @ \$ 400.00 man/day	\$	6 400.00
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## GEOCHEMICAL SURVEY:

500 samples @ 17.00/sample	\$	8 500.00
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Assaying rocks and soils ( General Testing Lab.)	\$	5 587.11
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Camp cost

Room and board	\$	3 423.26
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Transportation

Truck and skidoo rentals plus gas	\$	3 449.90
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Air fares	\$	640.03
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Computer plotting, stats.	\$	967.50
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Draughting	\$	730.00
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## REPORT AND OFFICE COSTS:

Geological interpretation, report

26 man/days @ \$400.00	\$	10 300.00
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Word processing 21 hours @ 30.00	\$	630.00
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Blackline printing	\$	380.00
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Photocopying, binding	\$	390.00
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TOTAL FOR PHASE I	\$	78 193.93
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C E R T I F I C A T E

I, I. Borovic, of the city of Vancouver, B. C., do hereby certify that:

1. I have personally supervised the exploration program carried out in the area of the Silver Lump property of Grazina Resources Ltd. located 96 km east south east of Vernon, B.C.
2. The expenditures claimed for the performance of the work are correct.

Respectfully submitted



I. Borovic, P.Eng.

Vancouver, Feb. 3, 1988.

A P P E N D I X #1

## Appendix #1: VLF Theory

The signal transmitted by the VLF station is recorded by the vertical coils as:  $H_p = A \sin \omega t$ ;  $H_s = B \cos (\omega t - \phi)$  (1.0)

where  $H_p$  = primary signal  
 $H_s$  = secondary (phase lag) signal  
 $\omega$  = frequency  
 $t$  = time  
 $\phi$  = phase lag

A = amplitude of primary signal

B = amplitude of secondary signal

These two received signals combine giving an ellipse, which has two axis corresponding to the maximum length and minimum width of the ellipse.

$$\text{ie: } \frac{H_p^2}{A^2} + \frac{H_s^2}{B^2} - 2 \frac{H_p H_s}{AB} \sin \phi = \cos^2 \phi \quad (2.0)$$

By measuring the angle from horizontal of the long axis of the ellipse, a conductor is located when this tilt angle is zero.

The Scintrex IGS VLF measures the primary vertical (in phase)  $H_p$  and the secondary (quadrature)  $H_s$  to obtain a conductor's location (from  $H_p$ ) and the conductor's quality using both  $H_p$  and  $H_s$ . ie

$$\theta = \frac{1}{2} \tan^{-1} \left( \frac{2 H_p / 100 (1 - e^2)}{H_s} \right)$$

where  $\theta$  = tilt angle (degrees)

$H_p$  = vertical in phase, expressed as a %

$$\phi = \tan^{-1} (H_p / H_s)$$

where  $\phi$  = phase lag (degrees)

$H_p$  = vertical in phase (any units)

$H_s$  = vertical quadrature (same units as  $H_p$ )

Since the quadrature readings require a magnetic field phase reference, using unpublished means, the phase lag value is untested and should be considered qualitative only, but is likely reasonably precise (the readings are repeatable), but may or may not be accurate (the correct value).

A P P E N D I X # 2

## IGS EDITED DATA FILE SUMMARY

EDITED DATA FILE --&gt; b:mag3.CLN

R1D: 1. LINE: 700.8

STATION	TOT-FLD	TIME
2000.W	57561.5	11:07:23
1975.W	57552.6	11:06:25
1950.W	57575.6	11:05:38
1925.W	57588.5	11:04:48
1900.W	57567.3	11:03:48
1875.W	57604.3	11:03:01
1850.W	57643.8	11:02:10
1825.W	57576.0	11:00:59
1800.W	57546.7	11:00:07
1775.W	57587.6	10:59:15
1750.W	57516.2	10:58:26
1725.W	57599.1	10:57:35
1700.W	57603.4	10:56:43
1675.W	57556.6	10:55:47
1650.W	57513.4	10:54:44
1625.W	57524.1	10:53:53
1600.W	57522.4	10:52:55
1575.W	57524.2	10:52:07
1550.W	57492.9	10:51:10
1525.W	57485.5	10:50:19
1500.W	57531.0	10:49:23
1475.W	57567.3	10:48:20
1450.W	57601.7	10:46:47
1425.W	57490.6	10:45:25
1400.W	57503.0	10:44:35
1375.W	57498.8	10:43:41
1350.W	57514.6	10:42:44
1325.W	57497.9	10:41:07
1300.W	57512.4	10:39:31
1275.W	57536.6	10:37:58
1250.W	57706.9	10:36:41
1225.W	57632.3	10:35:29
1200.W	57716.0	10:34:08
1175.W	58014.6	10:33:15
1150.W	57706.6	10:31:31
1125.W	57490.4	10:30:28
1100.W	57476.4	10:29:43
1075.W	57473.6	10:28:35
1050.W	57483.5	10:26:54

MID: 1. LINE: 700.5

STATION	TOT-FLD	TIME
1025.W	57448.8	10:25:38
1000.W	57576.8	10:23:28
975.W	57498.3	10:22:34
950.W	57549.0	10:21:08
925.W	57543.8	10:19:12
900.W	57510.7	10:15:13
875.W	57551.7	10:13:36
850.W	57275.4	10:12:21
825.W	57372.2	10:11:06
800.W	57493.4	10:10:12
775.W	57537.0	10:09:23
750.W	57545.8	10:08:41
725.W	57502.4	10:07:51
700.W	57522.3	10:06:58
675.W	57536.0	10:06:10
650.W	57429.3	10:05:19
625.W	57528.0	10:04:25
600.W	57529.7	10:03:30
575.W	57526.6	10:02:38
550.W	57547.9	10:01:49
525.W	57548.0	10:00:58
500.W	57567.5	10:00:01
475.W	57556.5	09:59:10
450.W	57548.4	09:58:26
425.W	57508.9	09:57:37
400.W	57530.6	09:56:50
375.W	57529.1	09:55:56
350.W	57498.9	09:54:59
325.W	57523.5	09:53:58
300.W	57561.3	09:53:09
275.W	57515.0	09:52:20
250.W	57542.4	09:51:37
225.W	57556.9	09:50:51
200.W	57559.4	09:49:56
175.W	57538.6	09:48:28
150.W	57541.1	09:47:42
125.W	57554.0	09:46:51
100.W	57523.4	09:45:04
75.W	57432.8	09:44:08
50.W	57540.7	09:43:15
25.W	57509.5	09:42:01
0.	57516.9	09:40:01

TRID: 1. LINE: 600.S

STATION	TOT-FLD	TIME
2000.W	57685.6	11:11:17
1975.W	57674.9	11:12:16
1950.W	57593.8	11:13:10
1925.W	57554.4	11:14:00
1900.W	57566.3	11:14:53
1875.W	57569.3	11:15:43
1850.W	57592.7	11:16:54
1825.W	57641.2	11:17:51
1800.W	57694.9	11:18:43
1775.W	57763.1	11:19:41
1750.W	57691.4	11:20:42
1725.W	57584.2	11:21:33
1700.W	57471.8	11:22:20
1675.W	57460.0	11:23:07
1650.W	57477.1	11:24:01
1625.W	57495.2	11:25:01
1600.W	57529.5	11:25:57
1575.W	57506.8	11:27:18
1550.W	57516.3	11:28:13
1525.W	57560.3	11:29:08
1500.W	57549.3	11:30:12
1475.W	57573.0	11:31:18
1450.W	57662.4	11:32:12
1425.W	57646.9	11:33:22
1400.W	57654.7	11:34:34
1375.W	57527.2	11:35:26
1350.W	57497.5	11:36:26
1325.W	57537.8	11:37:43
1300.W	58085.8	11:38:55
1275.W	57531.2	11:40:37
1250.W	57587.7	11:41:23
1225.W	57605.9	11:42:17
1200.W	57972.8	11:43:12
1175.W	59183.8	11:44:18
1150.W	57881.8	11:45:25
1125.W	57430.1	11:46:38
1100.W	57474.1	11:47:49
1075.W	57511.3	11:49:53
1050.W	57532.3	11:50:52
1025.W	57589.3	11:51:36
1000.W	57510.4	11:52:49
975.W	57520.2	11:53:44
950.W	57507.2	11:54:27
925.W	57517.4	11:55:10
900.W	57523.4	11:56:47
875.W	57531.7	11:57:49
850.W	57524.7	11:58:46
825.W	57537.2	12:00:10
800.W	57525.1	12:01:28
775.W	57538.7	12:02:25
750.W	57545.4	12:03:49
725.W	57548.7	12:05:22
700.W	57577.7	12:06:28
675.W	57570.1	12:08:19
650.W	57561.9	12:09:29



RID: 1. LINE: 600.S

STATION	TOT-FLD	TIME
625.W	57565.7	12:10:14
600.W	57558.3	12:11:36
575.W	57542.4	12:12:35
550.W	57553.0	12:13:44
525.W	57550.3	12:15:13
500.W	57572.7	12:16:31
475.W	57527.5	12:17:48
450.W	57575.5	12:18:50
425.W	57582.9	12:20:43
400.W	57585.5	12:21:35
375.W	57589.0	12:22:32
350.W	57529.8	12:23:42
325.W	57573.5	12:24:41
300.W	57515.5	12:26:19
275.W	57525.0	12:27:08
250.W	57586.6	12:27:58
225.W	57492.5	12:29:12
200.W	57545.2	12:30:11
175.W	57526.0	12:31:02
150.W	57600.7	12:32:03
125.W	57565.8	12:33:00
100.W	57521.8	12:33:42
75.W	57517.0	12:34:31
50.W	57529.6	12:35:58
25.W	57524.3	12:36:59

TRID: 1. LINE: 500.8

STATION	TOT-FLD	TIME
2000.W	57456.3	14:25:07
1975.W	57437.9	14:23:56
1950.W	57552.2	14:22:39
1925.W	57473.1	14:21:35
1900.W	57483.2	14:20:34
1875.W	57470.1	14:19:43
1850.W	57478.6	14:19:00
1825.W	57486.3	14:18:08
1800.W	57464.8	14:17:05
1775.W	57636.8	14:16:13
1750.W	57512.9	14:15:32
1725.W	57528.5	14:14:46
1700.W	57541.8	14:13:51
1675.W	57532.0	14:12:58
1650.W	57537.2	14:11:59
1625.W	57521.6	14:11:06
1600.W	57520.6	14:10:20
1575.W	57519.7	14:09:37
1550.W	57543.1	14:07:38
1525.W	57591.9	14:06:54
1500.W	57608.5	14:05:39
1475.W	57439.1	14:04:28
1450.W	57476.7	14:03:38
1425.W	57512.6	14:02:35
1400.W	57489.9	14:01:47
1375.W	57567.0	14:00:57
1350.W	57907.6	14:00:11
1325.W	58400.2	13:59:04
1300.W	57348.0	13:57:39
1275.W	57426.3	13:56:25
1250.W	57436.9	13:53:10
1225.W	57716.4	13:51:31
1200.W	57704.7	13:50:01
1175.W	57685.7	13:48:03
1150.W	57382.5	13:47:05
1125.W	57466.7	13:44:38
1100.W	57508.3	13:40:50
1075.W	57523.9	13:39:36
1050.W	57530.7	13:38:43
1025.W	57539.2	13:37:51
1000.W	57543.1	13:36:42
975.W	57529.7	13:35:10
950.W	57553.3	13:34:23
925.W	57550.4	13:33:24
900.W	57547.5	13:32:08
875.W	57541.2	13:30:53
850.W	57533.6	13:29:53
825.W	57552.4	13:29:09
800.W	57545.3	13:28:12
775.W	57545.6	13:27:24
750.W	57545.0	13:26:33
725.W	57539.1	13:25:34
700.W	57529.8	13:24:45
675.W	57541.0	13:23:48
650.W	57580.2	13:23:06

RID: 1. LINE: 500.8

STATION	TOT-FLD	TIME
625.W	57541.5	13:22:11
600.W	57547.9	13:21:21
575.W	57522.7	13:20:27
550.W	57539.3	13:19:37
525.W	57580.1	13:07:57
500.W	57588.5	13:07:05
475.W	57599.9	13:06:16
450.W	57539.0	13:05:24
425.W	57571.6	13:04:37
400.W	57552.5	13:03:31
375.W	57564.0	13:02:30
350.W	57573.1	13:01:41
325.W	57563.1	13:00:58
300.W	57554.6	13:00:12
275.W	57527.0	12:59:14
250.W	57523.6	12:58:21
225.W	57539.1	12:57:26
200.W	57528.2	12:56:26
175.W	57498.1	12:55:39
150.W	57532.0	12:54:39
125.W	57558.2	12:53:47
100.W	57557.3	12:52:54
75.W	57558.3	12:52:02
50.W	57567.8	12:50:59
25.W	57558.4	12:49:18
0.	57542.1	12:47:28

## IGS EDITED DATA FILE SUMMARY

EDITED DATA FILE --&gt; b:mag2.CLN

ID: 1. LINE: 400.S

STATION	TOT-FLD	TIME
750.W	57542.1	15:55:56
725.W	57556.6	15:55:08
700.W	57550.9	15:54:07
675.W	57556.2	15:53:01
650.W	57541.6	15:51:58
625.W	57549.3	15:50:56
600.W	57611.6	15:50:13
575.W	57537.1	15:49:21
550.W	57558.5	15:48:32
525.W	57502.5	15:45:23
500.W	57595.8	15:44:40
475.W	57585.2	15:43:44
450.W	57572.9	15:42:48
425.W	57655.7	15:41:57
400.W	57570.1	15:40:59
375.W	57568.8	15:40:13
350.W	57584.3	15:39:23
325.W	57538.3	15:38:32
300.W	57566.1	15:37:31
275.W	57587.9	15:36:38
250.W	57605.0	15:35:41
225.W	57547.5	15:34:32
200.W	57563.7	15:33:43
175.W	57593.6	15:32:53
150.W	57554.0	15:32:15
125.W	57574.4	15:31:25
100.W	57586.0	15:30:22
75.W	57584.3	15:29:29
50.W	57624.5	15:28:45
25.W	57527.7	15:27:57
0.	57574.4	15:27:11

ID: 1. LINE: 300.6

STATION	TOT-FLD	TIME
750.W	57573.0	14:57:26
725.W	57590.0	14:58:38
700.W	57539.8	15:00:09
675.W	57555.2	15:00:56
650.W	57546.7	15:01:46
625.W	57556.7	15:02:32
600.W	57577.4	15:03:24
575.W	57564.9	15:04:17
550.W	57529.5	15:05:20
525.W	57477.4	15:06:27
500.W	57500.5	15:07:25
475.W	57542.8	15:08:15
450.W	57733.7	15:09:03
425.W	57587.6	15:09:46
400.W	57592.7	15:10:32
375.W	57583.9	15:11:22
350.W	57575.4	15:12:10
325.W	57576.5	15:13:00
300.W	57568.5	15:13:46
275.W	57585.2	15:14:28
250.W	57537.1	15:15:10
225.W	57599.8	15:15:50
200.W	57590.4	15:16:49
175.W	57560.2	15:17:37
150.W	57582.1	15:18:28
125.W	57588.0	15:19:27
100.W	57838.9	15:20:19
75.W	57645.6	15:21:04
50.W	57552.5	15:22:11
25.W	57612.5	15:22:56
0.	57573.9	15:23:55

RID: 1. LINE: 200.S

STATION	TOT-FLD	TIME
2000.W	57510.7	14:38:15
1975.W	57530.5	14:39:09
1950.W	57616.7	14:40:02
1925.W	57534.3	14:40:58
1900.W	57583.0	14:43:10
1875.W	57531.8	14:44:02
1850.W	57682.7	14:45:28
1825.W	57591.7	14:46:23
1800.W	57634.9	14:47:17
1775.W	57608.6	14:48:15
1750.W	57505.3	14:49:13
1725.W	57513.6	14:49:47
1700.W	57642.6	14:50:15
1675.W	57584.2	14:51:09
1650.W	57656.3	14:53:33
1625.W	57628.0	14:55:20
1600.W	57658.5	14:56:30
1575.W	57664.7	14:57:53
1550.W	57567.1	14:59:11
1525.W	57523.6	15:00:08
1500.W	57536.6	15:01:22

## IGS EDITED DATA FILE SUMMARY

EDITED DATA FILE --&gt; b:mag4.CLN

RIRID: 1. LINE: 100.5

STATION	TOT-FLD	TIME
2000.W	57634.7	11:17:00
1975.W	57588.5	11:17:45
1950.W	57645.4	11:18:40
1925.W	57587.2	11:19:45
1900.W	57612.7	11:22:01
1875.W	57604.6	11:23:39
1850.W	57600.7	11:24:30
1825.W	57605.6	11:25:50
1800.W	57635.7	11:27:26
1775.W	57620.5	11:28:53
1750.W	57644.7	11:30:23
1725.W	57560.5	11:32:01
1700.W	57577.4	11:33:40
1675.W	57611.2	11:36:50
1650.W	57639.2	11:38:37
1625.W	57723.7	11:39:56
1600.W	57617.2	11:41:13
1575.W	57617.2	11:42:47
1550.W	57595.3	11:43:41
1525.W	57577.0	11:44:32
1500.W	57590.8	11:45:54
1475.W	57630.3	11:47:25
1450.W	57624.6	11:48:47

RID: 1. LINE: 0.

STATION	TOT-FLD	TIME
2000.W	57645.2	11:08:40
1975.W	57677.7	11:06:53
1950.W	57703.2	11:05:48
1925.W	57635.6	11:04:16
1900.W	57647.6	11:02:53
1875.W	57612.3	11:01:23
1850.W	57667.3	10:59:56
1825.W	57711.1	10:58:14
1800.W	57725.5	10:56:36
1775.W	57622.9	10:55:05
1750.W	57635.8	10:53:49
1725.W	57634.3	10:52:41
1700.W	57662.8	10:51:13
1675.W	57686.2	10:50:03
1650.W	57642.6	10:48:48
1625.W	57630.8	10:46:09
1600.W	57661.9	10:44:50
1575.W	57651.9	10:43:18
1550.W	57795.7	10:41:58
1525.W	57614.0	10:38:13
1500.W	57634.4	10:36:57



RID: 1. LINE: 0.

STATION	TOT-FLD	TIME
1525.W	57641.8	12:19:51
1500.W	57658.4	12:21:10
1475.W	57670.7	12:21:59
1450.W	57682.1	12:22:47
1425.W	57651.0	12:23:44
1400.W	57670.9	12:24:35
1375.W	57681.6	12:25:28
1350.W	57719.2	12:26:15
1325.W	57681.6	12:27:01
1300.W	57665.8	12:27:55
1275.W	57725.4	12:29:20
1250.W	57704.1	12:31:18
1225.W	57705.4	12:32:32
1200.W	57701.9	12:33:57
1175.W	57699.4	12:35:00
1150.W	57722.6	12:35:47
1125.W	57786.3	12:37:41
1100.W	57703.7	12:38:57
1075.W	57729.6	12:40:10
1050.W	57710.4	12:41:41
1025.W	57748.1	12:44:07
1000.W	57795.6	12:45:42
975.W	57700.9	12:46:44
950.W	57673.1	12:47:57
925.W	57712.9	12:48:46
900.W	57703.7	12:50:40
875.W	57741.2	12:52:28
850.W	57639.5	12:53:39
825.W	57625.1	12:54:21
800.W	57619.2	12:55:08
775.W	57591.0	12:55:53
750.W	57592.2	12:56:34
725.W	57612.7	12:57:16
700.W	57542.2	12:57:57
675.W	57618.9	12:58:44
650.W	57547.7	12:59:29
625.W	57618.5	13:00:20
600.W	57529.9	13:01:13
575.W	57589.8	13:02:31
550.W	57575.8	13:03:33
525.W	57601.2	13:04:20
500.W	57652.0	13:05:38
475.W	57594.5	13:06:24
450.W	57618.8	13:07:30
425.W	57629.1	13:08:20
400.W	57580.1	13:09:08
375.W	57564.2	13:10:01
350.W	57597.0	13:11:19
325.W	57592.1	13:12:08
300.W	57625.8	13:13:12
275.W	57611.4	13:13:57
250.W	57630.4	13:14:52
225.W	57699.8	13:15:41
200.W	57715.3	13:16:32
175.W	57608.8	13:17:34

TRID: 1. LINE: 0.

STATION	TOT-FLD	TIME
150.W	57615.0	13:18:54
125.W	57612.8	13:19:47
100.W	57631.4	13:21:18
75.W	57508.9	13:23:22
50.W	57742.3	13:24:26
25.W	57397.5	13:25:26
0.	57725.4	13:27:09

RID: 1. LINE: 100.N

STATION	TOT-FLD	TIME
1500.W	57669.4	12:13:12
1475.W	57696.5	12:12:19
1450.W	57799.8	12:10:12
1425.W	57943.7	12:09:11
1400.W	57823.7	12:08:16
1375.W	57696.8	12:07:26
1350.W	57710.6	12:06:50
1325.W	57704.7	12:05:59
1300.W	57737.1	12:05:11
1275.W	57735.3	12:04:33
1250.W	57744.4	12:03:40
1225.W	57712.2	12:02:32
1200.W	57728.9	12:01:24
1175.W	57762.9	11:59:42
1150.W	57815.2	11:58:54
1125.W	57961.2	11:58:05
1100.W	57962.1	11:57:01
1075.W	57897.2	11:56:23
1050.W	57897.9	11:55:20
1025.W	57857.1	11:52:21
1000.W	57971.1	11:51:27
975.W	57812.9	11:49:07
950.W	57735.7	11:48:22
925.W	57765.3	11:47:24
900.W	57780.9	11:46:25
875.W	57841.0	11:45:42
850.W	57677.7	11:44:49
825.W	57644.8	11:43:34
800.W	57686.5	11:41:42
775.W	57602.7	11:40:32
750.W	57586.4	11:39:26
725.W	57679.5	11:38:32
700.W	57636.1	11:37:29
675.W	57456.2	11:35:18
650.W	57518.3	11:33:58
625.W	57646.4	11:32:07
600.W	57593.2	11:31:11
575.W	57593.0	11:30:20
550.W	57592.2	11:29:20
525.W	57591.2	11:28:29
500.W	57585.9	11:27:40
475.W	57577.6	11:26:57
450.W	57583.8	11:25:58
425.W	57605.5	11:25:05
400.W	57674.1	11:24:11
375.W	57596.5	11:23:12
350.W	57591.1	11:22:04
325.W	57605.7	11:21:09
300.W	57582.2	11:20:11
275.W	57577.6	11:19:17
250.W	57588.5	11:18:26
225.W	57607.5	11:17:31
200.W	57612.4	11:16:51
175.W	57593.5	11:16:02
150.W	57638.6	11:15:10

ID: 1. LINE: 100.N

STATION	TOT-FLD	TIME
125.W	57661.5	11:14:10
100.W	57628.3	11:13:31
75.W	57616.9	11:12:39
50.W	57626.6	11:11:57
25.W	57704.1	11:10:50
0.	57678.1	11:09:34

ID: 1. LINE: 200.N

STATION	TOT-FLD	TIME
1500.W	57675.7	10:00:13
1475.W	57776.7	10:01:23
1450.W	57776.5	10:02:10
1425.W	57902.3	10:03:08
1400.W	57663.7	10:04:08
1375.W	57655.0	10:05:07
1350.W	57719.8	10:06:00
1325.W	58000.8	10:06:59
1300.W	57935.0	10:08:11
1275.W	57783.4	10:09:05
1250.W	57805.9	10:10:20
1225.W	58028.3	10:11:30
1200.W	57903.6	10:12:39
1175.W	57970.8	10:14:09
1150.W	58076.3	10:15:05
1125.W	57937.0	10:16:18
1100.W	57911.6	10:17:20
1075.W	58073.7	10:18:19
1050.W	57935.3	10:19:27
1025.W	57915.1	10:20:25
1000.W	57893.9	10:22:29
975.W	57840.4	10:23:20
950.W	57766.3	10:24:27
925.W	57669.4	10:25:51
900.W	57817.1	10:26:47
875.W	57842.2	10:27:37
850.W	57705.2	10:28:35
825.W	57605.5	10:29:16
800.W	57792.4	10:30:07
775.W	57644.3	10:30:51
750.W	57608.1	10:31:42
725.W	57632.8	10:32:28
700.W	57523.5	10:33:19
675.W	57567.2	10:34:09
650.W	57609.3	10:35:00
625.W	57593.7	10:36:32
600.W	57601.5	10:37:30
575.W	57607.1	10:38:29
550.W	57588.9	10:39:38
525.W	57604.5	10:41:18
500.W	57585.1	10:42:16
475.W	57568.5	10:43:09
450.W	57580.8	10:44:28
425.W	57583.1	10:45:25
400.W	57568.1	10:46:16
375.W	57597.6	10:47:06
350.W	57577.2	10:47:52
325.W	57611.8	10:48:43
300.W	57592.8	10:49:45
275.W	57600.3	10:50:35
250.W	57629.8	10:51:33
225.W	57592.2	10:53:22
200.W	57613.2	10:54:46
175.W	57681.2	10:55:48
150.W	57647.2	10:56:51

VID: 1. LINE: 200.N

STATION	TOT-FLD	TIME
125.W	57669.8	10:57:45
100.W	57570.4	10:58:47
75.W	57690.6	11:02:05
50.W	57713.8	11:02:45
25.W	57688.1	11:03:18
0.	57685.0	11:04:06

R1D: 1. LINE: 300.N

STATION	TOT-FLD	TIME
1500.W	57713.2	09:55:44
1475.W	57785.8	09:54:56
1450.W	57814.6	09:53:58
1425.W	57762.7	09:53:01
1400.W	57694.0	09:52:03
1375.W	57816.1	09:50:59
1350.W	57695.5	09:50:11
1325.W	57941.5	09:49:29
1300.W	57932.9	09:48:39
1275.W	57840.4	09:47:49
1250.W	58087.8	09:46:55
1225.W	57839.6	09:46:11
1200.W	57939.1	09:45:09
1175.W	57794.4	09:44:17
1150.W	57825.2	09:43:32
1125.W	57661.1	09:42:34
1100.W	57709.8	09:41:33
1075.W	57752.2	09:40:41
1050.W	57904.4	09:39:51
1025.W	57759.1	09:38:55
1000.W	57630.7	09:36:51
975.W	57738.8	09:34:25
950.W	57662.5	09:33:35
925.W	57755.8	09:32:42
900.W	57702.8	09:31:54
875.W	57652.3	09:30:59
850.W	57581.3	09:30:09
825.W	57586.7	09:29:19
800.W	57605.8	09:28:16
775.W	57593.1	09:27:13
750.W	57601.5	09:26:03
725.W	57600.6	09:25:05
700.W	57656.2	09:24:16
675.W	57680.1	09:23:26
650.W	57635.1	09:22:34
625.W	57498.8	09:21:24
600.W	57637.4	09:20:40
575.W	57607.0	09:19:52
550.W	57664.8	09:18:55
525.W	57609.6	09:17:39
500.W	57588.1	09:16:53
475.W	57591.4	09:15:59
450.W	57641.4	09:15:02
425.W	57612.9	09:14:27
400.W	57603.3	09:13:30
375.W	57673.3	09:12:51
350.W	57756.8	09:12:02
325.W	57604.3	09:11:17
300.W	57618.6	09:10:30
275.W	57658.6	09:09:39
250.W	57698.5	09:09:06
225.W	57673.7	09:08:28
200.W	57641.3	09:07:46
175.W	57681.4	09:07:06
150.W	57693.2	09:06:23

RID: 1. LINE: 300.N

STATION	TOT-FLD	TIME
125.W	57768.4	09:04:58
100.W	57631.2	09:04:17
75.W	57657.1	09:03:28
50.W	57655.3	09:02:20
25.W	57693.8	09:00:59
0.	57470.1	09:00:06



## IGS EDITED DATA FILE SUMMARY

EDITED DATA FILE --&gt; b:magi.CLN

SID: 1. LJNE: 400.N

STATION	TOT-FLD	TIME
1500.W	57741.6	02:36:02
1475.W	57918.1	02:37:45
1450.W	57913.7	02:38:47
1425.W	57916.8	02:40:20
1400.W	57909.9	02:41:48
1375.W	58238.9	02:43:40
1350.W	58114.4	02:45:03
1325.W	57542.6	02:46:37
1300.W	57725.0	02:47:43
1275.W	57977.2	02:50:00
1250.W	57962.6	02:51:24
1225.W	57886.2	02:53:24
1200.W	58027.8	02:54:59
1175.W	57956.9	02:56:01
1150.W	57860.2	02:57:23
1125.W	57933.9	02:58:43
1100.W	57902.2	02:59:49
1075.W	57901.9	03:01:18
1050.W	57918.5	03:02:52
1025.W	57920.1	03:04:08
1000.W	58045.4	03:05:22
975.W	57838.9	03:07:03
950.W	57905.9	03:09:00
925.W	57769.3	03:10:24
900.W	57557.7	03:12:08
875.W	57579.3	03:13:27
850.W	57694.2	03:14:54
825.W	57726.4	03:16:12
800.W	57677.4	03:17:28
775.W	57660.6	03:18:43
750.W	57639.7	03:20:16
725.W	57642.3	03:21:25
700.W	57580.2	03:22:55
675.W	57606.7	03:24:08
650.W	57727.8	03:25:35
625.W	57710.2	03:27:12
600.W	57753.2	03:28:53
575.W	57618.3	03:30:23
550.W	57527.9	03:32:01

RID: 1. LINE: 400.N

STATION	TOT-FLD	TIME
525.W	57543.1	03:33:47
500.W	57892.0	03:35:31
475.W	57956.3	03:39:43
450.W	57466.9	03:42:31
425.W	57918.6	03:44:33
400.W	57899.9	03:46:02
375.W	58044.5	03:47:38
350.W	57572.2	03:49:20
325.W	57555.0	03:50:54
300.W	57665.4	03:52:46
275.W	57763.1	03:54:19
250.W	57447.0	03:56:50
225.W	57625.8	03:58:32
200.W	57673.1	04:00:25
175.W	57639.7	04:01:45
150.W	57661.1	04:02:59
125.W	57652.6	04:04:18
100.W	57615.7	04:05:33
75.W	57673.6	04:06:59
50.W	57709.0	04:08:50
25.W	57648.9	04:10:40
0.	57593.6	04:12:04

BRID: 1. LINE: 500.N

STATION	TOT-FLD	TIME
1500.00W	57843.7	02:26:00
1475.00W	57839.3	02:24:22
1450.00W	57720.8	02:23:19
1425.00W	57945.0	02:22:01
1400.00W	57811.5	02:20:44
1375.00W	57930.2	02:18:59
1350.00W	58268.7	02:17:51
1325.00W	58385.9	02:16:33
1300.00W	58295.0	02:15:10
1275.00W	58231.3	02:13:05
1250.00W	58035.2	02:11:44
1225.00W	57715.0	02:09:49
1200.00W	57648.1	02:08:15
1175.00W	57737.9	02:06:26
1150.00W	57758.2	02:04:59
1125.00W	57796.0	02:02:48
1100.00W	58014.1	02:01:33
1075.00W	57772.2	02:00:05
1050.00W	57512.3	01:58:49
1025.00W	57397.3	01:57:37
1000.00W	57466.7	01:56:09
975.00W	57618.9	01:54:05
950.00W	57537.7	01:52:27
925.00W	57657.8	01:51:12
900.00W	57653.8	01:49:38
875.00W	57694.5	01:48:02
850.00W	58003.9	01:46:32
825.00W	57886.9	01:45:26
800.00W	57932.8	01:35:26
775.00W	57745.6	01:34:06
750.00W	57795.6	01:30:06
725.00W	57807.7	01:29:45
700.00W	57767.2	01:28:28
675.00W	57548.7	01:27:16
650.00W	57586.5	01:26:01
625.00W	57595.5	01:24:42
600.00W	57702.3	01:23:12
575.00W	57713.0	01:21:30
550.00W	57656.4	01:20:07
525.00W	57571.4	01:18:43
500.00W	57543.6	01:16:46
475.00W	57671.0	01:15:29
450.00W	57594.9	01:13:52
425.00W	57720.3	01:12:22
400.00W	57643.2	01:10:48
375.00W	57657.8	01:09:10
350.00W	57777.7	01:07:43
325.00W	57986.6	01:05:35
300.00W	57768.6	01:03:24
275.00W	57752.7	01:01:43
250.00W	57702.4	01:00:24
225.00W	57813.1	00:58:49
200.00W	57773.5	00:56:40
175.00W	57663.3	00:54:30
150.00W	57676.0	00:52:28

RID: 1. LINE: 500.N

STATION	TOT-FLD	TIME
125.00W	57647.0	00:50:56
100.00W	57643.6	00:49:41
75.00W	57741.1	00:48:10
50.00W	57754.8	00:46:44
25.00W	57733.2	00:38:58
0.	57980.4	00:45:14

# CERTIFICATE OF ASSAY

Date: December 14, 1987

File: 8711-2052



**SGS SUPERVISION SERVICES INC.**  
**General Testing Laboratories Division**

1001 East Pender Street,  
 Vancouver, B.C., Canada. V6A 1W2  
 Telephone: (604) 254-1647  
 Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING  
 LTD.  
 4258 West 10th Ave.  
 Vancouver, B.C.  
 V6R 2H4

We hereby certify that the following are the results of assays on:

soil samples (SILVER LUMP)

MARKED	GOLD	SILVER	Copper	Lead	Zinc	XXXXXXXXXXXXXXXXXXXX		
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
BL 0+00 NS								
0+00 W	0.02	0.8	10	22	33			
0+50	0.02	0.5	5	19	12			
1+00	0.03	0.9	7	12	36			
2+00	0.03	1.0	3	76	24			
2+50	0.03	0.2	4	10	23			
3+00	0.02	0.3	6	9	23			
3+50	0.02	0.2	4	10	17			
4+00	0.02	0.8	5	13	21			
4+50	0.02	0.8	8	13	22			
5+00	0.02	0.7	6	12	17			
5+50	0.02	0.9	3	10	20			
6+00	0.02	0.6	6	14	16			
6+50	0.02	1.2	10	12	23			
7+00	0.02	0.7	5	12	22			
7+50	0.02	0.7	12	18	31			
8+00	0.02	0.7	8	12	22			
8+50	0.03	0.5	9	10	20			
9+00	0.02	1.0	10	15	22			
9+50	0.02	0.5	10	42	33			
10+00	0.02	0.8	14	158	22			
10+50	0.02	1.0	18	367	82			
11+00	0.02	0.6	12	25	25			
11+50	0.02	1.6	8	74	30			
12+00	0.03	0.8	5	12	18			
12+50	0.02	0.9	8	15	22			
13+00	0.02	0.8	10	457	28			
13+50	0.02	0.7	10	596	34			
14+00	0.02	0.4	9	460	22			
14+50	0.02	0.6	6	944	14			
15+00	0.03	0.6	8	179	19			
15+50	0.02	0.7	8	120	17			
16+00	0.02	1.7	6	118	22			
16+50	0.03	0.8	10	32	25			
17+00	0.03	0.4	6	17	14			
17+50	0.03	0.2	9	11	23			

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REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS. ON REQUEST PULPS AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

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L. Wong  
 PROVINCIAL ASSAYER

**Analytical and Consulting Chemists, Bulk Cargo Specialists, Surveyors, Inspectors, Samplers, Weighers**

MEMBER: American Society For Testing Materials • The American Oil Chemists Society • Canadian Testing Association  
 REFEREE AND OR OFFICIAL CHEMISTS FOR: National Institute of Oilseed Products • The American Oil Chemists' Society  
 OFFICIAL WEIGHMASTERS FOR: Vancouver Board Of Trade

# CERTIFICATE OF ASSAY

Date: December 15, 1987

File: 8711-2052



**SGS SUPERVISION SERVICES INC.**  
General Testing Laboratories Division

1001 East Pender Street,  
Vancouver, B.C., Canada. V6A 1W2  
Telephone: (604) 254-1647  
Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING  
LTD.  
4258 West 10th Ave.  
Vancouver, B.C.

( page 2 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD		SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxx
	Au (ppm)	Ag (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)		
<u>BL 0+00 NS</u>								
18+00 W	0.02	0.1		11	11	16		
18+50	0.03	1.5		2	13	103		
19+00	0.02	0.2		5	10	14		
19+50	0.02	0.2		4	6	9		
20+00	0.02	0.4		16	16	17		
<u>L1+00 S</u>								
0+50 W (A)	0.02	1.0		14	15	24		
0+50 (B)	0.02	2.0		14	19	25		
1+00	0.02	1.2		14	17	34		
1+50	0.02	1.4		17	20	47		
2+00	0.02	1.0		6	14	16		
2+50	0.02	1.1		14	14	26		
3+50	0.02	0.9		8	12	26		
4+50	0.02	1.4		12	16	28		
5+00	0.02	1.8		10	16	22		
5+50	0.02	2.6		10	16	17		
6+00	0.02	0.8		16	17	19		
6+50	0.02	0.8		12	18	28		
7+00	0.02	1.7		12	12	18		
7+50	0.02	1.0		15	16	33		
8+00	0.02	0.6		9	15	20		
8+50	0.02	1.0		16	16	21		
9+00	0.02	0.7		10	16	17		
9+50	0.02	0.5		12	15	19		
10+00	0.02	0.9		5	12	12		
10+50	0.02	1.4		6	60	38		
11+00	0.03	0.3		8	13	18		
11+50	0.02	0.8		7	15	18		
12+00	0.02	0.8		5	11	18		
12+50	0.02	0.7		6	11	13		
13+00	0.02	1.0		4	13	16		
13+50	0.02	0.7		5	10	18		

/ continued on page 3 .....

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L. Wong

PROVINCIAL ASSAYER

**Analytical and Consulting Chemists, Bulk Cargo Specialists, Surveyors, Inspectors, Samplers, Weighers**

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OFFICIAL WEIGHMASTERS FOR: Vancouver Board Of Trade

# CERTIFICATE OF ASSAY

Date: December 15, 1987

File: 8711-2052



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General Testing Laboratories Division

1001 East Pender Street,  
Vancouver, B.C., Canada. V6A 1W2  
Telephone: (604) 254-1647  
Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING  
LTD.

( page 3 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxxx	xxxxxxx
	Au(ppm)	Ag(ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
L1+00 S								
14+00 W	0.02	0.7	6	11	18			
14+50	0.02	0.7	4	12	17			
15+50	0.02	1.1	4	16	15			
16+00	0.02	1.1	4	10	13			
16+50	0.02	2.1	3	10	15			
17+00	0.02	1.2	9	17	23			
18+00	0.02	0.9	3	14	15			
18+50	0.02	0.5	6	30	14			
19+00	0.02	0.8	4	10	19			
19+50	0.02	0.4	8	15	24			
20+00 W	0.02	0.8	4	14	17			
DO N								
0+00 W	0.02	1.1	16	15	27			
0+50	0.02	0.9	11	17	27			
1+00	0.02	0.6	8	13	14			
1+50	0.02	0.2	25	18	35			
2+00 (A)	0.04	0.1	7	12	20			
2+00	0.02	0.1	8	11	15			
3+00	0.02	0.2	10	12	28			
3+50	0.02	0.1	11	14	22			
4+00 (A)	0.02	0.3	7	16	16			
4+00 (B)	0.02	1.5	8	14	29			
4+50	0.02	0.7	9	10	14			
5+00	0.03	1.0	10	27	41			
5+50	0.02	0.2	12	10	30			
6+00	0.02	0.7	13	21	14			
6+50	0.02	0.6	17	19	36			
7+00	0.02	0.7	20	23	31			
7+50	0.02	2.6	13	15	32			
8+00	0.02	0.4	10	16	36			
8+50	0.02	0.6	17	16	23			
9+00	0.02	0.7	13	19	31			
9+50	0.02	0.5	9	15	38			

/ continued on page 4 .....

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L. Wong  
 PROVINCIAL ASSAYER

**CERTIFICATE OF ASSAY**

Date: December 15, 1987

File: 8711-2052



**SGS SUPERVISION SERVICES INC.**

General Testing Laboratories Division

1001 East Pender Street,  
Vancouver, B.C., Canada. V6A 1W2  
Telephone: (604) 254-1647  
Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING LTD.

( page 4 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxx	xxxxxxx
	Au (ppm)	Ag(ppm)	Cu (ppm)	Pb(ppm)	Zn (ppm)			
<b>L1+00 N</b>								
10+00 W	0.03	0.4	18	17	30			
10+50	0.03	0.3	5	16	23			
11+00	0.02	0.2	7	11	18			
11+50	0.02	0.1	4	16	22			
12+00	0.02	0.4	4	14	14			
12+50	0.02	0.2	8	10	14			
13+00	0.02	0.5	6	16	26			
13+50	0.02	1.0	3	12	27			
14+00	0.02	0.1	8	9	20			
14+50	0.02	0.3	11	17	40			
15+00	0.04	0.1	10	12	26			
<b>L2+00 N</b>								
0+00 W	0.04	0.5	50	18	62			
0+50	0.02	0.3	6	17	19			
1+00	0.02	0.1	6	13	17			
1+50	0.02	0.1	9	14	19			
2+00	0.02	0.1	4	11	23			
2+50	0.05	0.2	8	13	18			
3+00	0.02	0.3	10	20	32			
3+50	0.02	0.5	15	18	21			
4+00	0.02	0.7	13	16	19			
4+50	0.02	0.1	12	14	33			
5+00	0.02	0.1	2	11	20			
5+50	0.02	0.1	2	11	20			
6+00	0.02	0.6	4	18	37			
6+50	0.02	0.5	6	16	27			
7+00	0.02	0.1	3	10	17			
7+50	0.02	0.1	9	16	38			
8+00	0.02	0.1	5	7	21			
8+50	0.02	0.1	5	11	31			
9+00 (A)	0.02	0.3	4	20	23			
9+00 (B)	0.02	0.2	8	13	25			
9+50	0.02	0.1	15	16	55			
10+00	0.02	0.3	14	15	19			
10+50	0.02	0.1	4	11	16			

/ continued on page 5 .....

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TO: IGNA ENGINEERING & CONSULTING  
LTD.

( page 5 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	XXXXXXXXXXXXXXXXXXXX	XXXXXXXX
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)		
<u>L2+00 N</u>							
11+00 W	0.02	1.3	13	20	24		
11+50	0.02	0.1	7	15	45		
12+00	0.02	0.3	5	12	34		
12+50	0.02	0.1	13	10	15		
13+00	0.02	0.3	8	16	25		
14+00	0.02	0.1	6	13	22		
14+50	0.02	0.1	4	12	15		
15+00	0.02	0.1	8	8	13		
<u>L2+00 S</u>							
0+00 W	0.02	0.2	8	14	20		
0+50	0.02	0.1	6	13	23		
1+00	0.02	0.1	7	14	19		
1+50	0.02	0.3	70	14	77		
2+00	0.02	0.1	10	12	16		
2+50	0.02	0.1	6	11	21		
3+00	0.02	0.1	7	8	18		
3+50	0.02	0.1	8	14	29		
4+00	0.03	0.3	5	12	13		
4+50	0.02	0.4	8	14	23		
5+00	0.02	0.1	5	16	35		
5+50	0.04	0.1	6	12	19		
6+00	0.03	0.1	6	16	18		
6+50	0.02	0.1	5	19	24		
7+00	0.02	0.1	6	20	41		
7+50	0.03	0.1	10	21	34		
8+00	0.04	0.9	20	14	25		
8+50	0.02	1.4	37	17	59		
9+50	0.02	0.5	6	21	78		
10+00	0.02	4.2	5	9	16		
10+50	0.02	0.1	3	18	23		
11+00	0.02	0.1	3	11	26		
11+50	0.02	0.1	3	15	26		
12+00	0.02	0.2	7	14	33		
12+50	0.02	4.3	6	12	16		

/ continued on page 6 ....

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TO: IGNA ENGINEERING & CONSULTING LTD.

( page 6 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD		SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxx	xxxxxxxxx
	Au (ppm)	Ag (ppm)	Ag (ppm)	Cu (ppm)	Pb(ppm)	Zn (ppm)			
<u>L2+00 S</u>									
13+00	W	0.02	6.9	9	11	30			
13+50		0.02	0.1	5	7	10			
14+00		0.02	0.1	9	17	13			
14+50		0.02	0.1	8	16	17			
15+00		0.02	0.5	7	18	24			
15+50		0.02	0.1	5	17	19			
16+00		0.02	0.1	8	19	21			
16+50		0.02	0.1	9	15	17			
17+00		0.02	0.1	5	16	20			
17+50	(A)	0.02	0.1	7	16	14			
17+50	(B)	0.02	0.2	4	6	10			
18+00		0.02	0.1	8	21	32			
18+50		0.02	0.1	4	15	12			
+00		0.02	0.1	5	20	29			
<u>L3+00 N</u>									
0+00	W	0.02	0.5	24	27	50			
0+50		0.02	0.2	6	21	24			
1+00		0.02	0.1	4	22	18			
1+50		0.02	0.1	5	13	15			
2+00		0.02	0.1	6	25	28			
2+50		0.02	0.2	6	12	36			
3+00		0.02	0.1	9	23	37			
3+50		0.02	0.1	10	15	20			
4+00		0.02	0.1	5	23	24			
4+50		0.02	0.1	6	18	25			
5+00		0.02	0.5	12	15	30			
5+50		0.02	0.2	8	20	25			
6+00		0.02	0.4	5	26	36			
6+50		0.02	0.1	7	22	30			
7+00		0.02	0.5	6	6	31			
7+50		0.02	4.5	8	269	33			
8+00		0.02	3.8	13	155	44			
8+50		0.02	0.4	3	36	32			

/ continued on page 7 .....

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( page 7 )

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MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxx	xxxxxxxxxxxx	xxxxxx
	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Sn (%)			
<u>L3+00N</u>								
9+00 W	0.02	0.5	5	35	44			
9+50	0.02	0.5	13	37	28			
10+00	0.02	0.4	20	21	44			
10+50	0.02	0.1	10	28	32			
11+00	0.02	0.1	8	25	33			
11+50	0.02	0.1	8	18	16			
12+00	0.02	0.1	8	24	19			
12+50	0.03	0.1	10	22	29			
13+00	0.04	0.1	8	23	26			
13+50	0.04	0.1	18	39	28			
14+00	0.02	0.1	12	37	20			
14+50	0.02	0.1	10	35	23			
15+00	0.02	0.2	9	14	21			
<u>L3+00S</u>								
1+00 W	0.02	0.1	6	15	18			
1+50	0.02	0.1	6	19	20			
1+00	0.02	0.1	6	15	21			
1+50	0.02	0.1	5	15	19			
1+00	0.02	0.1	3	17	18			
2+50	0.02	0.1	2	16	20			
3+00	0.02	0.1	3	15	18			
3+50	0.02	0.1	6	17	20			
4+00	0.02	0.1	4	10	16			
4+50	0.02	0.2	13	19	96			
4+00	0.02	0.1	9	25	39			
4+50	0.02	0.1	9	20	20			
6+00	0.02	0.1	5	20	27			
6+50	0.02	0.1	9	15	30			
6+00	0.02	0.1	5	17	16			
7+50	0.02	0.1	8	19	17			
8+00	0.02	0.1	10	30	122			
8+50	0.03	0.2	10	63	102			
9+00	0.02	0.1	7	28	57			
9+50	0.02	0.4	20	25	62			

/ continued on page 8 .....

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TO: IGNA ENGINEERING & CONSULTING  
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( page 8 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	XXXXXXXX	XXXXXXXXXXXX	XXXXXXXX
	Au(ppm)	Ag(ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
<u>L3+00S</u>								
10+00 W	0.02	0.1	9	17	38			
10+50	0.02	0.1	10	32	71			
11+00	0.02	0.1	5	18	37			
11+50	0.03	0.1	8	17	33			
12+00	0.02	0.3	10	22	32			
12+50	0.02	0.3	10	24	27			
13+00	0.03	0.1	8	27	21			
13+50	0.02	0.1	7	20	28			
14+00	0.02	1.0	9	23	35			
14+50	0.02	0.2	16	21	34			
15+00	0.02	0.1	3	19	38			
15+50	0.02	0.1	8	19	24			
16+00	0.03	0.1	6	14	14			
16+50	0.03	0.1	3	20	14			
17+00	0.03	0.2	7	21	16			
17+50	0.03	0.3	4	16	28			
18+00	0.02	0.3	5	5	19			
18+50	0.02	0.7	8	28	17			
19+00	0.02	0.3	10	23	18			
19+50	0.02	0.2	11	20	33			
<u>L4+00 N</u>								
0+00 W	0.02	0.4	20	24	30			
0+50	0.02	0.6	14	22	28			
1+00	0.02	0.2	12	21	30			
1+50	0.02	0.3	19	18	20			
2+00	0.02	0.2	13	24	33			
2+50	0.02	0.2	12	17	19			
3+00	0.02	0.4	12	31	37			
3+50	0.02	0.2	12	23	32			
4+00	0.06	0.4	12	16	22			
4+50	0.02	0.2	9	20	40			
5+00	0.02	0.4	11	23	35			

/ continued on page 9 ....

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TO: IGNA ENGINEERING & CONSULTING  
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( page 9 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxx	xxxxxxxxxxxx	xxxxx
	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)			
<u>L4 +00N</u>								
5+50 W	0.02	0.8	12	23	26			
6+00	0.02	0.5	13	20	25			
6+50	0.02	0.9	18	26	45			
7+00	0.02	0.9	19	25	40			
7+50	0.02	0.7	13	35	39			
8+00	0.02	0.3	11	23	30			
8+50	0.02	0.2	12	23	50			
9+00	0.02	0.4	12	20	24			
9+50	0.02	0.4	35	23	28			
10+00	0.03	0.2	21	32	105			
10+50	0.05	0.1	13	20	20			
11+00	0.02	0.5	19	28	40			
11+50	0.02	0.5	18	23	28			
12+00	0.02	1.0	29	51	30			
12+50	0.02	0.3	13	22	31			
13+00	0.02	0.2	12	18	15			
13+50	0.02	0.1	17	23	20			
14+00	0.02	0.2	19	37	22			
14+50	0.02	0.2	15	23	34			
15+00	0.02	0.6	11	17	13			
<u>L4+00S</u>								
0+00W	0.02	0.6	14	23	28			
0+50	0.02	0.6	15	28	27			
1+00	0.02	0.6	13	23	26			
1+50	0.02	0.4	13	14	38			
2+00	0.02	0.7	13	11	30			
2+50	0.02	0.7	13	11	29			
3+00	0.02	0.6	6	9	26			
3+50	0.02	1.0	17	13	23			
4+00	0.02	0.5	19	21	35			
4+50	0.02	1.0	13	9	16			
5+00	0.02	1.2	6	13	21			

/ continued on page 10 .....

RE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS. ON REQUEST PULPS AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

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TO: IGNA ENGINEERING & CONSULTING  
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( page 10 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb(ppm)	Zn (ppm)			
<u>L4+00 S</u>								
5+50 W	0.02	1.3	8	20	24			
6+00	0.02	1.3	14	24	22			
6+50	0.02	0.6	16	15	12			
7+00	0.02	0.8	15	22	24			
7+50	0.02	0.8	16	36	36			
8+00	0.02	0.3	23	38	97			
8+50	0.02	0.6	25	37	218			
9+00	0.02	0.4	20	31	100			
9+50	0.02	1.0	15	48	187			
10+00	0.02	0.8	18	40	196			
10+50	0.02	0.6	19	34	71			
11+00	0.02	0.5	17	32	84			
11+50	0.02	0.7	31	28	70			
12+00	0.02	0.9	23	27	71			
12+50	0.02	0.6	23	28	70			
13+00	0.02	0.6	21	25	50			
13+50	0.02	1.0	18	30	37			
14+00	0.02	0.2	16	19	39			
14+50	0.02	1.0	14	26	43			
15+00	0.02	0.7	18	31	130			
15+50	0.02	0.5	13	24	53			
16+00	0.02	0.4	21	26	38			
16+50	0.02	0.3	13	19	34			
17+00	0.02	0.6	12	24	33			
17+50	0.02	0.6	12	26	56			
18+00	0.02	0.6	13	22	30			
18+50	0.02	0.4	16	24	37			
19+00	0.02	1.0	21	24	44			
19+50	0.02	0.5	17	25	35			
20+00 W	0.02	1.2	12	22	15			
<u>L5 +00N</u>								
0+00 W	0.02	0.8	12	34	58			
0+50	0.02	1.2	20	27	48			
1+00	0.02	0.9	56	35	78			

/ continued on page 11 .....

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**SGS SUPERVISION SERVICES INC.**  
**General Testing Laboratories Division**

1001 East Pender Street,  
 Vancouver, B.C., Canada. V6A 1W2  
 Telephone: (604) 254-1647  
 Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING  
 LTD.

( page 11 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxxx	xxxxxxxxxxx
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
<b>L5+00 N</b>								
1+50 W	0.02	0.4	24	33	51			
2+00	0.02	0.4	26	39	53			
2+50	0.02	0.6	26	29	69			
3+00	0.02	0.8	19	35	35			
3+50	0.02	1.4	18	25	50			
4+00	0.02	1.0	24	33	78			
4+50	0.02	0.9	24	37	88			
5+00	0.02	0.7	13	27	43			
5+50	0.02	1.0	18	39	44			
6+00	0.02	0.7	24	35	41			
6+50	0.02	0.3	17	28	36			
7+00	0.02	0.8	20	27	41			
7+50	0.02	0.6	23	34	78			
8+00	0.02	0.9	22	29	49			
8+50	0.02	1.6	42	39	77			
9+00	0.02	0.6	26	55	65			
9+50	0.03	1.0	22	24	24			
10+00	0.04	0.8	36	33	42			
<b>L5+00 S</b>								
0+00 W	0.02	0.7	20	33	55			
0+50	0.02	0.8	18	48	66			
1+00	0.02	1.1	18	34	42			
1+50	0.03	1.0	24	42	50			
2+00	0.02	0.5	15	13	60			
2+50	0.02	0.6	12	17	48			
3+00	0.02	0.4	4	7	52			
3+50	0.02	2.0	18	30	28			
4+00	0.02	0.5	14	21	26			
4+50	0.02	0.2	14	21	24			
5+00	0.02	0.1	18	22	33			
5+50	0.02	0.4	16	20	26			
6+00	0.02	0.2	16	27	33			
6+50	0.02	0.4	16	27	41			

/ continued on page 12 .....

NOTE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS. ON REQUEST PULPS AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR

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I. Wong

PROVINCIAL ASSAYER

**Analytical and Consulting Chemists, Bulk Cargo Specialists, Surveyors, Inspectors, Samplers, Weighers**

MEMBER: American Society For Testing Materials • The American Oil Chemists Society • Canadian Testing Association  
 REFEREE AND OR OFFICIAL CHEMISTS FOR: National Institute of Oilseed Products • The American Oil Chemists' Society  
 OFFICIAL WEIGHMASTERS FOR: Vancouver Board Of Trade

# CERTIFICATE OF ASSAY

Date: December 15, 1987

File: 8711-2052



**SGS SUPERVISION SERVICES INC.**  
**General Testing Laboratories Division**

1001 East Pender Street,  
 Vancouver, B.C., Canada. V6A 1W2  
 Telephone: (604) 254-1647  
 Telex: 04-507514

TO: IGNA ENGINEERING & CONSULTING  
 Ltd.

( page 12 )

We hereby certify that the following are the results of assays on: soil : samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxxxx	xxxxxxx
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
<b>L5+00 S</b>								
7+00 W	0.02	0.4	32	41	81			
7+50	0.02	0.9	25	36	46			
8+00	0.02	1.6	40	30	77			
8+50	0.02	1.8	27	32	89			
9+00	0.02	0.5	24	30	58			
9+50	0.02	1.0	24	52	154			
10+00	0.02	0.6	16	8	143			
10+50	0.02	0.9	27	48	95			
11+00	0.02	0.5	18	18	114			
11+50	0.02	0.9	56	39	94			
12+00	0.02	0.3	26	25	66			
12+50	0.02	0.5	25	28	65			
13+00	0.02	1.3	45	33	87			
13+50	0.02	0.5	14	23	35			
14+00	0.02	0.2	19	25	45			
14+50	0.02	0.3	20	25	46			
15+00	0.02	0.5	20	27	65			
15+50	0.02	1.0	26	30	69			
16+00	0.02	0.3	20	23	37			
16+50	0.02	0.9	20	33	27			
17+00	0.02	0.4	18	33	38			
17+50	0.02	0.9	18	27	28			
18+00	0.02	0.7	20	21	22			
18+50	0.02	0.9	27	34	31			
19+00	0.02	1.2	22	33	43			
19+50	0.02	1.1	26	56	35			
20+00	0.02	0.3	16	19	20			
<b>L6+00 S</b>								
0+50 W (A)	0.02	0.3	34	33	62			
0+50 (B)	0.02	1.3	24	74	133			
1+00	0.02	0.5	16	52	48			
1+50	0.02	0.4	13	25	36			
2+00	0.02	1.1	23	50	54			
2+50	0.02	2.0	25	25	46			

/ continued on page 13 .....

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L. Wong

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General Testing Laboratories Division

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TO: IGNA ENGINEERING & CONSULTING  
LTD.

( page 13 )

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxxx	xxxxxxxxxxx	xxxxxxxxxxxxxxx
	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)			
<u>L6 +00S</u>								
3+00 W	0.02	0.6	24	43	37			
3+50	0.02	0.7	22	36	44			
4+00	0.02	0.8	17	27	27			
4+50	0.02	0.3	13	20	27			
5+00	0.02	0.2	17	22	30			
5+50	0.02	0.2	18	21	46			
6+00	0.02	0.3	25	32	54			
6+50	0.02	0.5	29	34	58			
7+00	0.02	0.2	23	30	49			
7+50	0.02	1.6	69	40	120			
8+00	0.02	0.2	24	26	39			
8+50	0.02	0.2	29	27	56			
9+00	0.02	0.4	20	32	150			
9+50	0.02	0.2	17	18	118			
10+00	0.02	0.9	20	40	79			
10+50	0.03	0.5	23	28	92			
11+00	0.02	0.6	36	39	101			
11+50	0.02	1.3	64	35	118			
12+00	0.02	0.2	18	12	19			
12+50	0.02	0.2	5	13	23			
13+00	0.02	0.6	27	27	53			
13+50	0.02	0.3	26	28	49			
14+00	0.02	0.6	17	22	36			
14+50	0.03	0.7	10	22	25			
15+00	0.02	1.0	25	30	45			
15+50	0.02	1.6	23	35	53			
16+00	0.02	0.8	26	24	37			
16+50	0.02	0.9	22	34	78			
17+00	0.02	0.3	13	20	22			
17+50	0.02	0.7	17	19	38			
18+00	0.02	1.6	27	29	57			
18+50	0.02	0.8	29	30	45			
19+00 (A)	0.02	0.8	29	25	35			
19+00 (B)	0.02	0.5	24	24	40			
19+50	0.02	0.5	26	26	33			
20+00	0.02	0.4	18	18	20			

/ continued on page 14 ...

REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR

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*L. Wong*

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( page 14)

We hereby certify that the following are the results of assays on: soil samples

MARKED	GOLD	SILVER	Copper	Lead	Zinc	xxxxxx	xxxxxxxxxxxx	xxxxxxxxxx
	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)			
L7 +00 S								
10+50 W	0.02	0.2	25	24	69			
11+00	0.02	0.5	30	33	59			
11+50	0.02	0.8	26	22	54			
12+00	0.02	1.0	32	30	113			
12+50	0.02	1.5	39	27	55			
13+00	0.02	2.3	20	27	82			
13+50 (A)	0.02	0.4	17	15	26			
13+50 (B)	0.02	1.2	25	29	39			
14+00	0.02	1.1	26	32	55			
14+50	0.02	0.4	16	18	34			
15+00	0.02	0.2	17	24	34			
16+00	0.02	0.2	15	20	30			
16+50	0.02	0.1	38	31	52			
17+00	0.02	0.9	15	12	25			
17+50	0.02	1.5	28	24	40			
18+00	0.02	1.2	22	25	46			
18+50	0.02	1.3	29	40	102			
19+50	0.02	1.1	22	27	41			
20+00	0.02	1.7	23	34	71			
BL2+00S 10+00W	0.02	1.7	50	42	124			
BL7+00S 20+00W	0.02	1.3	22	22	28			

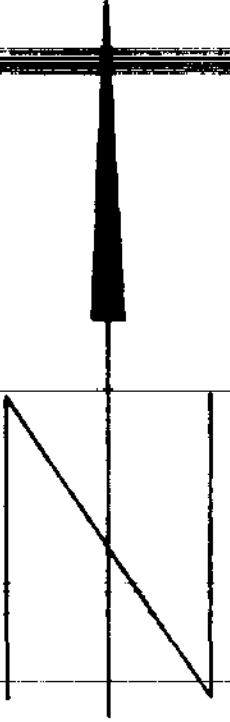
REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

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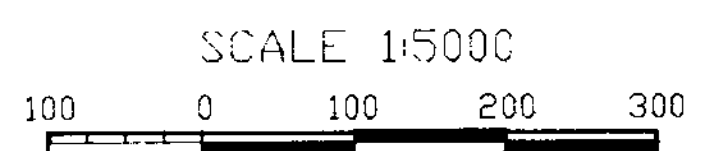
L. Wong  
 PROVINCIAL ASSAYER

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 OFFICIAL WEIGHMASTERS FOR: Vancouver Board Of Trade



CONTOUR INTERVAL  
 0.2 PPM (BELOW 1.0 PPM)  
 1.0 PPM (ABOVE 1.0 PPM)  
 (MAXIMUM CONTOUR SHOWN: 5.0 PPM)  
 TICKS SIGNIFY AREAS BELOW 0.2 PPM

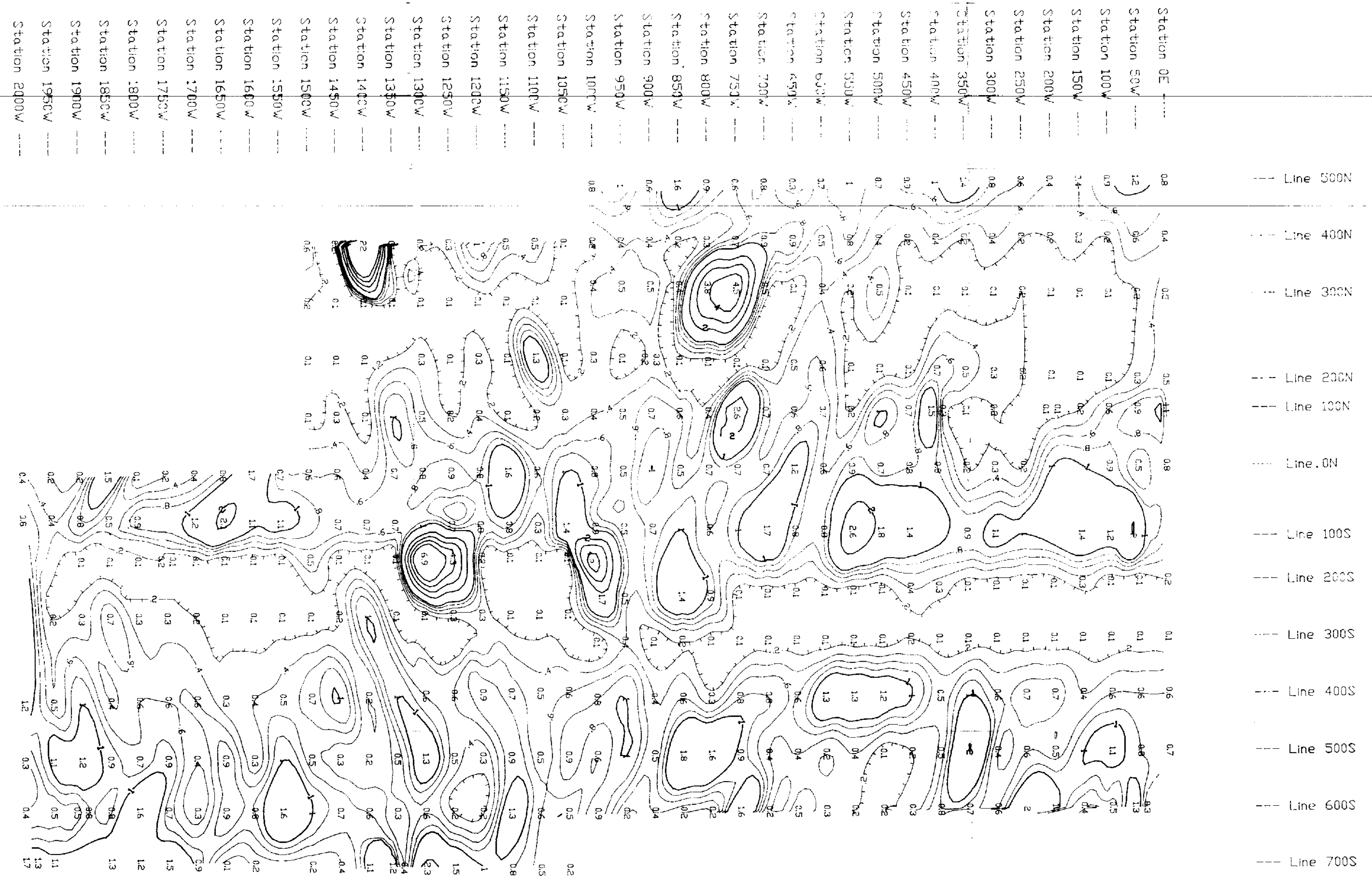


SCALE 1:5000  
 100 0 100 200 300  
 METERS

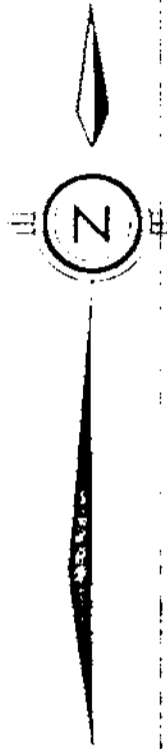
17,526

ACCOMPANY REPORT BY:  
 I. BOROVIC, P.ENG.

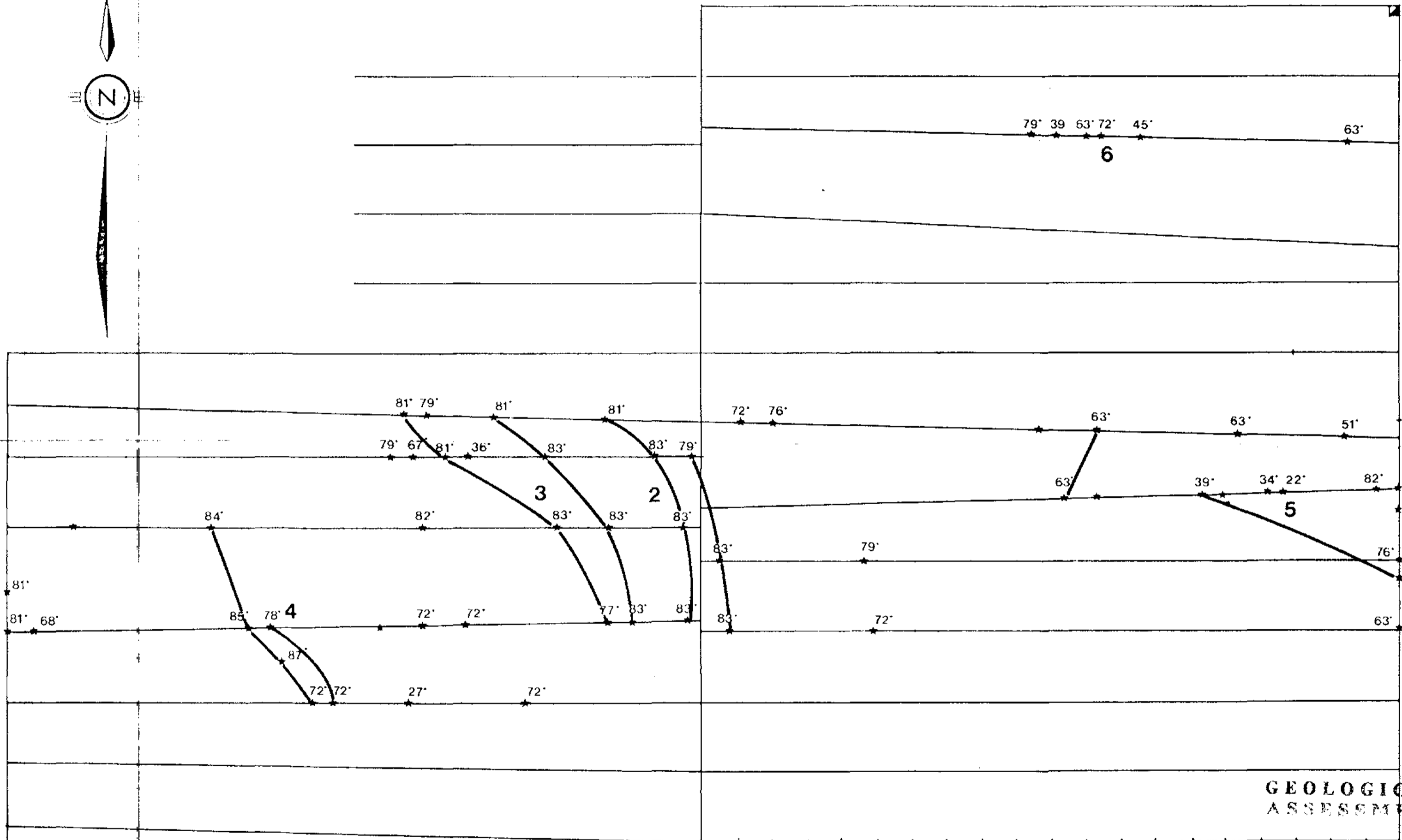
SILVER LUMP PROPERTY	
FOR: GRAZINA RESOURCES LTD.	
BY: IGNA ENGINEERING AND CONSULTING LTD.	
PLOTTED BY: RPM MAPPING AND COMPUTER SERVICES LTD.	
REALISTIC GRID SOIL GEOCHEMISTRY SILVER	
VERNON M.D., B.C.	
N.T.S.: 82E-15E, 82E-16W	DATE: JANUARY 1988
PLOTTED BY R.P.M.	FIGURE NO. 14



- 20+00 W  
 - 19+00 W  
 - 18+00 W  
 - 17+00 W  
 - 16+00 W  
 - 15+00 W  
 - 14+00 W  
 - 13+00 W  
 - 12+00 W  
 - 11+00 W  
 - 10+00 W  
 - 9+00 W  
 - 8+00 W  
 - 7+00 W  
 - 6+00 W  
 - 5+00 W  
 - 4+00 W  
 - 3+00 W  
 - 2+00 W  
 - 1+00 W  
 - 0+00 W



5+00 N  
 4+00 N  
 3+00 N  
 2+00 N  
 1+00 N  
 0+00  
 1+00 S  
 2+00 S  
 3+00 S  
 4+00 S  
 5+00 S  
 6+00 S  
 7+00 S



GEOLOGICAL BRANCH  
 ASSESSMENT REPORT

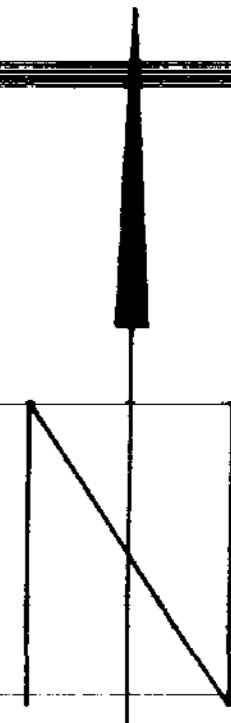
**17,526**

**LEGEND**

- \* crossover
- 81° phase lag of quadrature from inphase
- conductors
- 6 excellent prospects



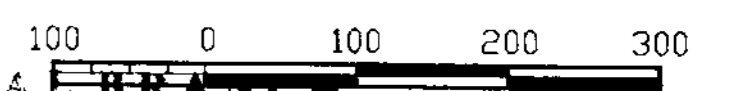
IGNA engineering & consulting ltd	<b>GRAZINA RESOURCES Ltd</b> SILVER LUMP PROPERTY	NTS 82 E/15416 W
	<b>VLF Survey</b> interpretation	DATE FEB. 1988. FIG. 13



CONTOUR INTERVAL  
10 PPM (BELOW 100 PPM)  
50 PPM (ABOVE 100 PPM)

TICKS SIGNIFY AREAS BELOW 20 PPM

SCALE 1:5000



GEOLOGICAL BRANCH  
ASSESSMENT REPORT

METERS

# 17,526

TO ACCOMPANY REPORT BY:  
I. BOROVIC, P.ENG.

SILVER LUMP PROPERTY

FOR: GRAZINA RESOURCES LTD.

BY: IGNA ENGINEERING AND CONSULTING LTD.

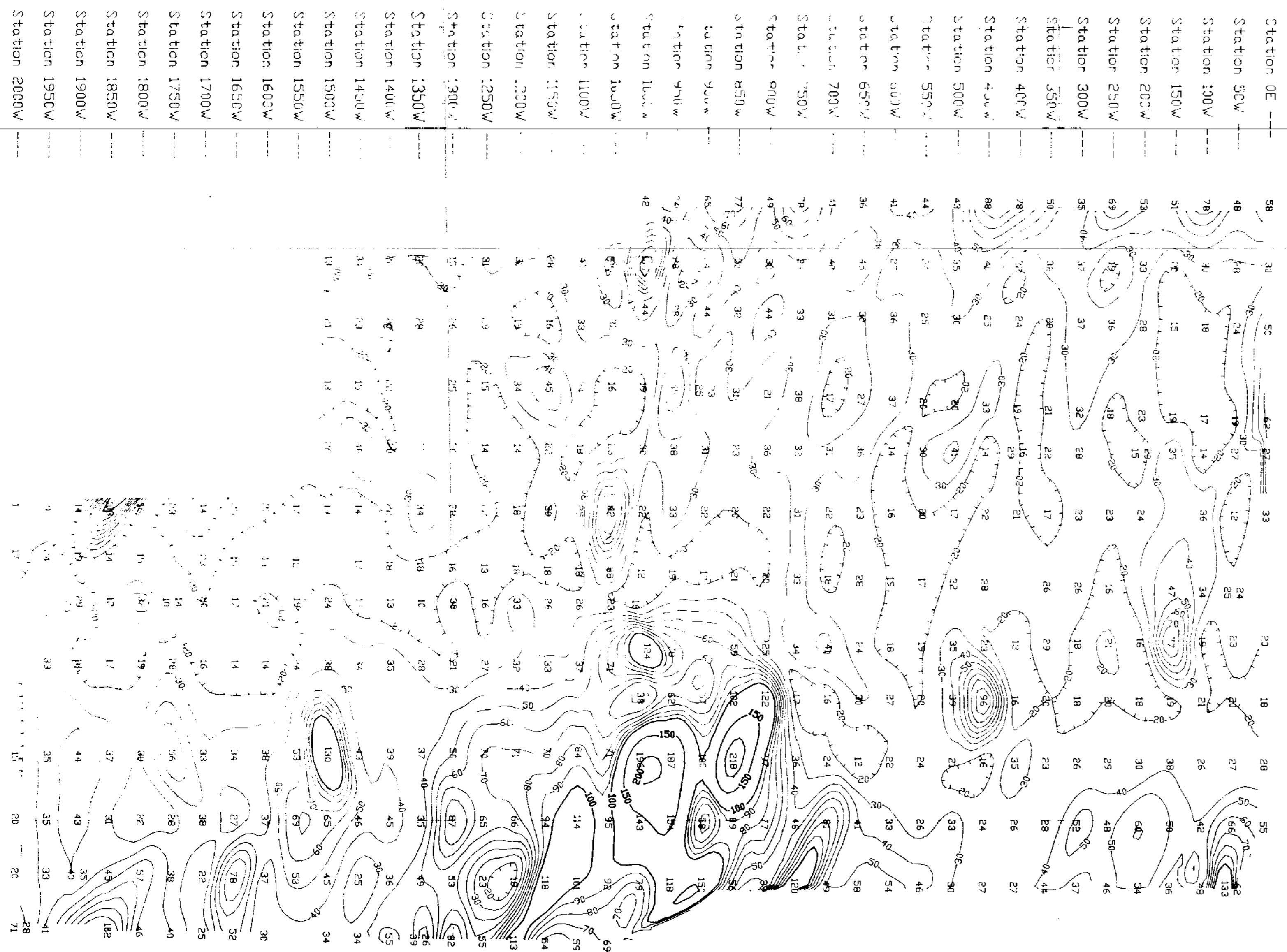
PLOTTED BY: RPM MAPPING  
AND COMPUTER SERVICES LTD.

REALISTIC GRID  
SOIL GEOCHEMISTRY  
ZINC

VERNON M.D., B.C.

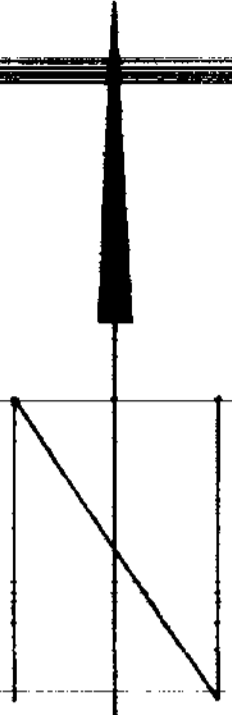
N.T.S. 82E-15E, 82E-16W  
PLOTTED BY R.P.M.

DATE: JANUARY 1988  
FIGURE NO. 16



- Line 500N
- Line 400N
- Line 300N
- Line 200N
- Line 100N
- Line 0N
- Line 100S
- Line 200S
- Line 300S
- Line 400S
- Line 500S
- Line 600S
- Line 700S

Station 0E  
Station 50W  
Station 100W  
Station 150W  
Station 200W  
Station 250W  
Station 300W  
Station 350W  
Station 400W  
Station 450W  
Station 500W  
Station 550W  
Station 600W  
Station 650W  
Station 700W  
Station 750W  
Station 800W  
Station 850W  
Station 900W  
Station 950W  
Station 1000W  
Station 1100W  
Station 1150W  
Station 1200W  
Station 1250W  
Station 1300W  
Station 1350W  
Station 1400W  
Station 1450W  
Station 1500W  
Station 1550W  
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Station 1700W  
Station 1750W  
Station 1800W  
Station 1850W  
Station 1900W  
Station 1950W  
Station 2000W

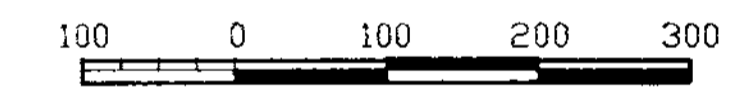


CONTOUR INTERVAL  
BELOW 100 PPM: 10 PPM  
ABOVE 100 PPM: 100 PPM

HIGHEST CONTOUR SHOWN: 500 PPM

TICKS SIGNIFY AREAS BELOW 10 PPM

SCALE 1:5000



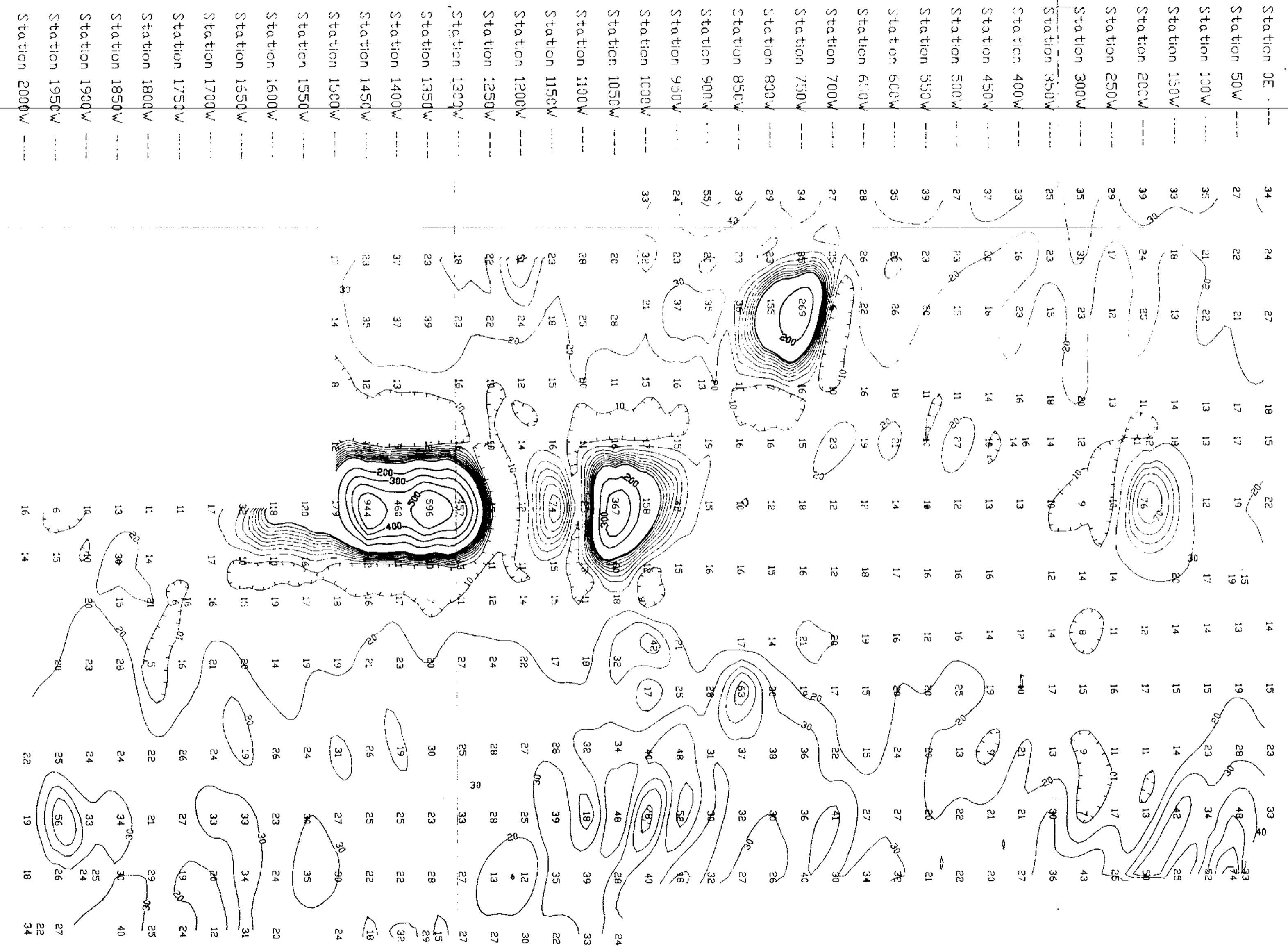
**GEOLOGICAL BRANCH  
ASSESSMENT REPORT METERS**

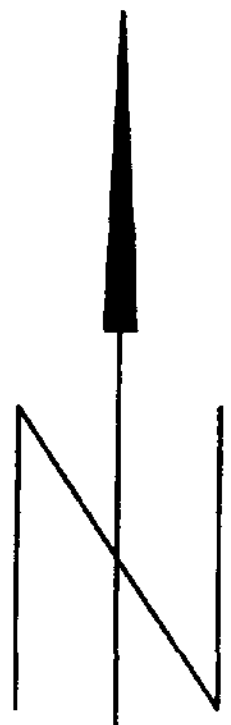
**17,526**

TO ACCOMPANY REPORT BY:  
I. BOROVIĆ, P.ENG.

SILVER LUMP PROPERTY	
FOR: GRAZINA RESOURCES LTD.	
BY: IGNA ENGINEERING AND CONSULTING LTD.	
PLOTTED BY: RPM MAPPING AND COMPUTER SERVICES LTD.	
REALISTIC GRID SOIL GEOCHEMISTRY LEAD	
VERNON M.D., B.C.	
N.T.S.: 82E-15E, 82E-16W	DATE: JANUARY 1988
PLOTTED BY R.P.M.	FIGURE NO. <b>15</b>

- Line 500N
- Line 400N
- Line 300N
- Line 200N
- Line 100N
- Line 0N
- Line 100S
- Line 200S
- Line 300S
- Line 400S
- Line 500S
- Line 600S
- Line 700S

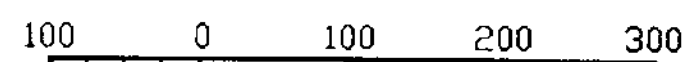




BASE VALUE: 57250 GAMMAS  
CONTOUR INTERVAL: 100 GAMMAS

HIGHEST CONTOUR: 1500 GAMMAS

SCALE 1:5000



GEOLOGICAL BRANCH  
ASSESSMENT REPORT METERS

# 17,526

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I. BOROVIC, P.ENG.

SILVER LUMP PROPERTY

FOR: GRAZINA RESOURCES LTD.

BY: IGNA ENGINEERING AND CONSULTING LTD.

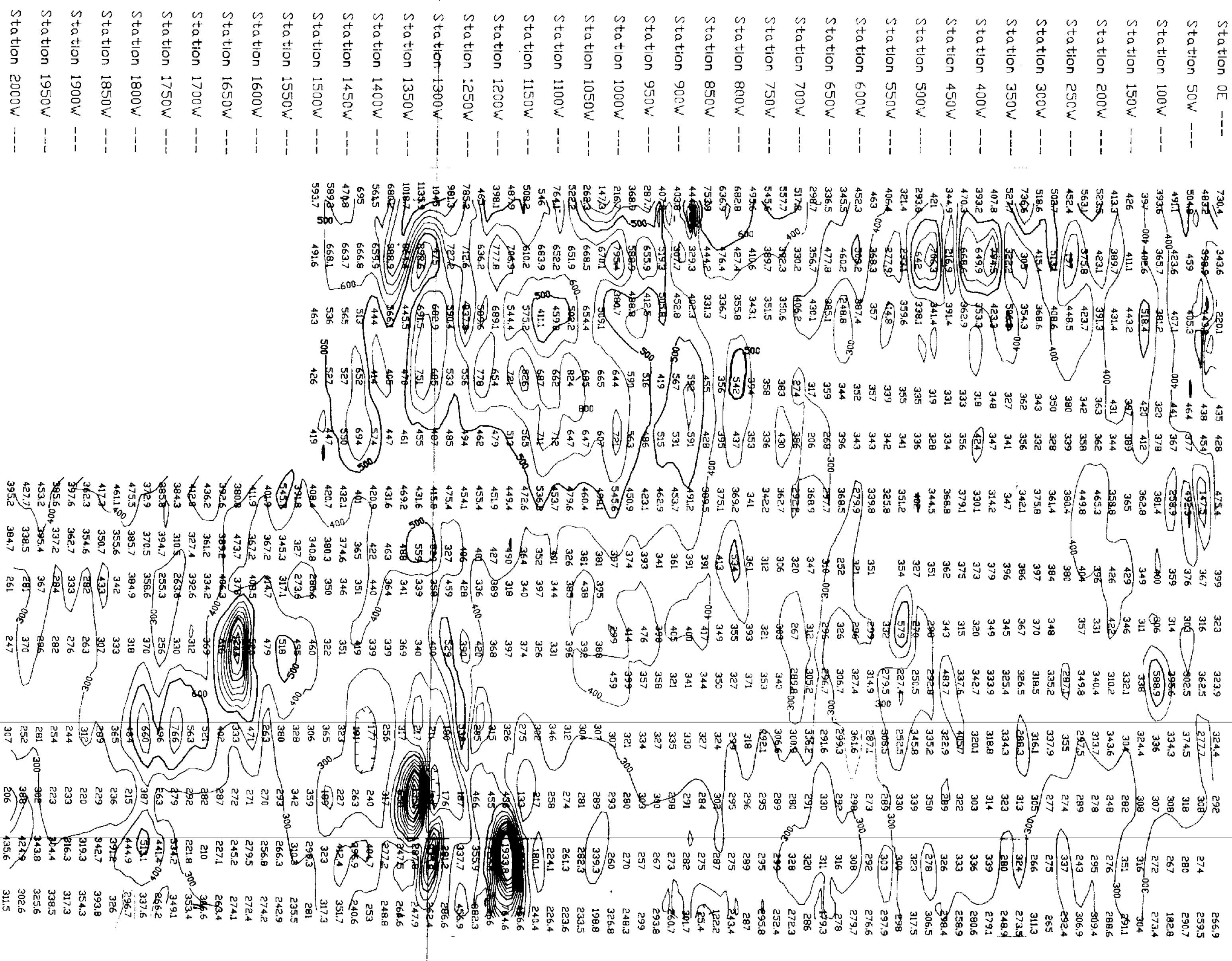
PLOTTED BY: RPM MAPPING  
AND COMPUTER SERVICES LTD.

REALISTIC GRID  
TOTAL MAGNETIC  
FIELD STRENGTH

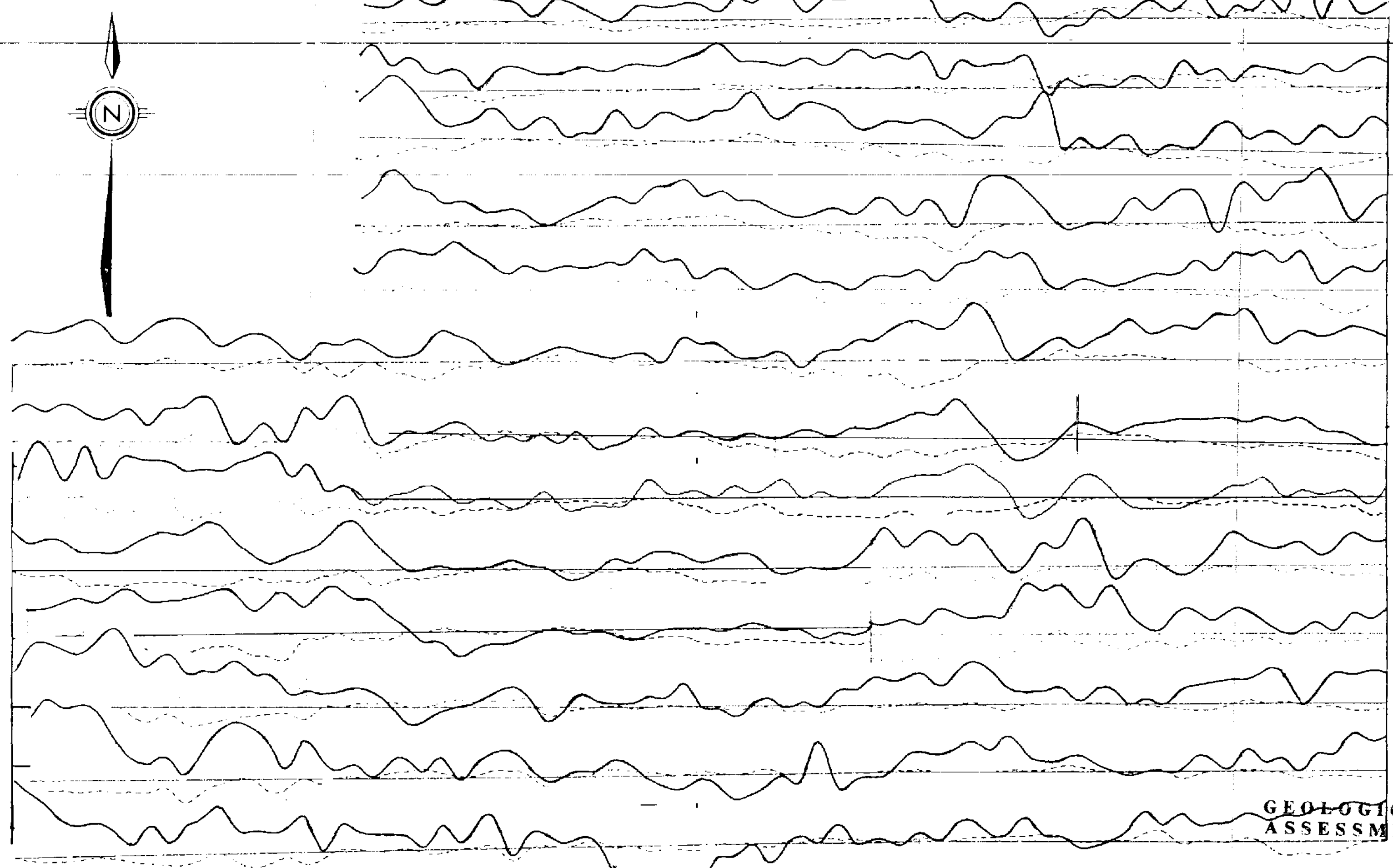
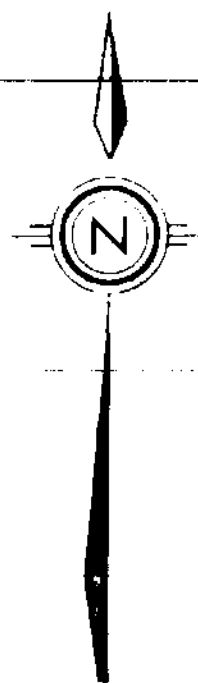
VERNON M.D., B.C.

N.T.S.: B2E-15E, B2E-16W  
PLOTTED BY R.P.M.

DATE: JANUARY 1988  
FIGURE NO. 9



-B 20+00 W  
- 19+00 W  
- 18+00 W  
- 17+00 W  
- 16+00 W  
- 15+00 W  
- 14+00 W  
- 13+00 W  
- 12+00 W  
- 11+00 W  
-B 10+00 W  
- 9+00 W  
- 8+00 W  
- 7+00 W  
- 6+00 W  
- 5+00 W  
- 4+00 W  
- 3+00 W  
- 2+00 W  
- 1+00 W  
- 0+00 W



5+00 N  
4+00 N  
3+00 N  
2+00 N  
1+00 N  
B 0+00  
1+00 S  
2+00 S  
3+00 S  
4+00 S  
5+00 S  
6+00 S

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

LEGEND:

- in phase
- - - quadrature

VERTICAL SCALE

20% expressed in % of vertical component of VLF field over horizontal component  
0  
20%

100 50 0 100 200m

17,526  
EATLE

<p>IGNA engineering &amp; consulting ltd</p>	<p><b>GRAZINA RESOURCES Ltd</b> SILVER LUMP PROPERTY</p> <p><b>VLF Survey</b></p>	<p>NTS 82 E/15416 W DATE FEB. 1988. FIG. 10</p>
--	---	---



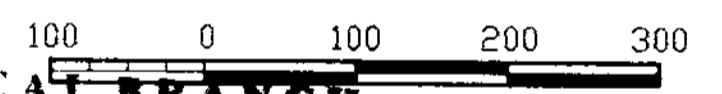




CONTOUR INTERVAL  
20 PPM

TICKS SIGNIFY AREAS BELOW 20 PPM

SCALE 1:5000



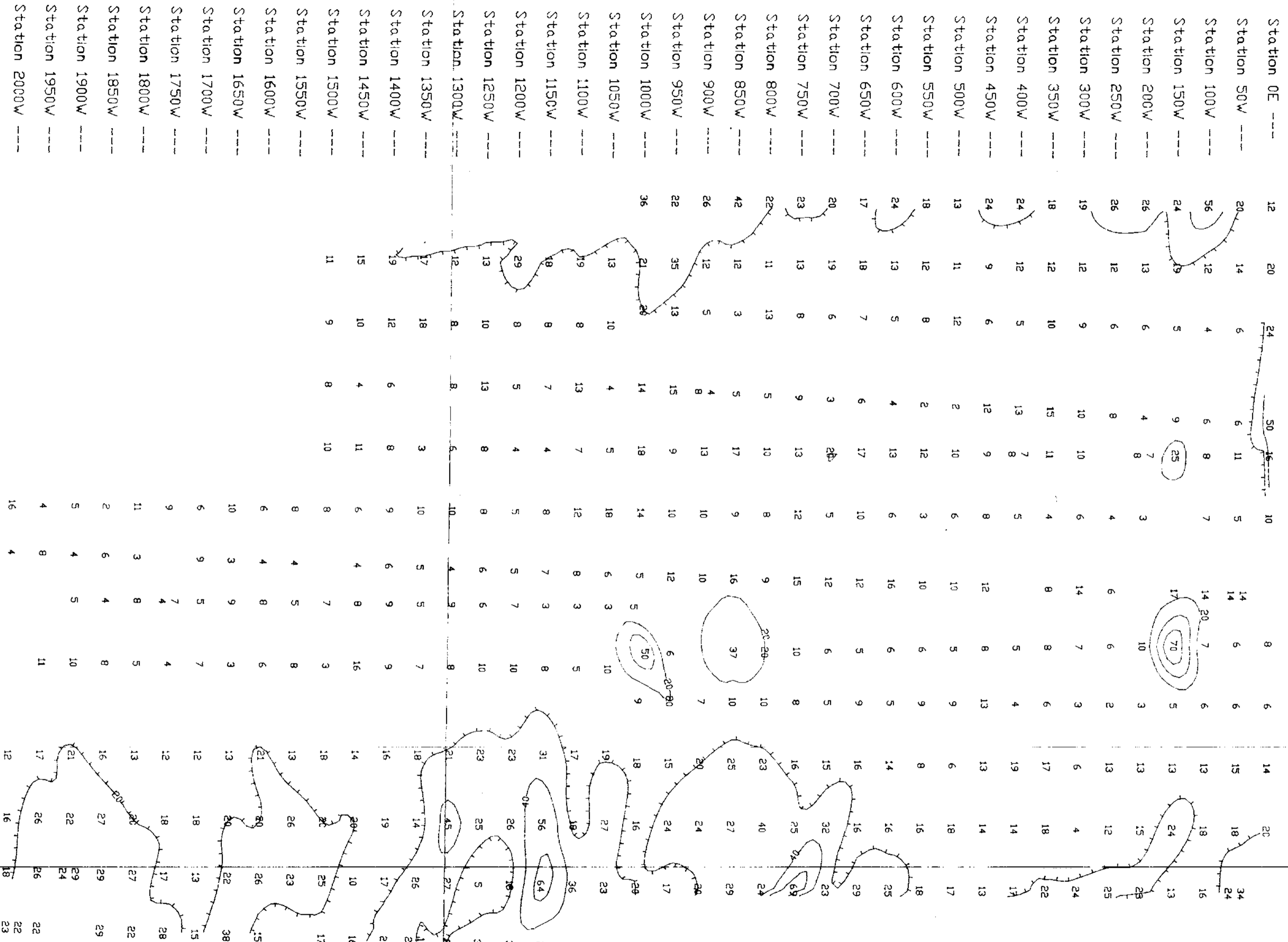
**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**  
METERS

# 17,526

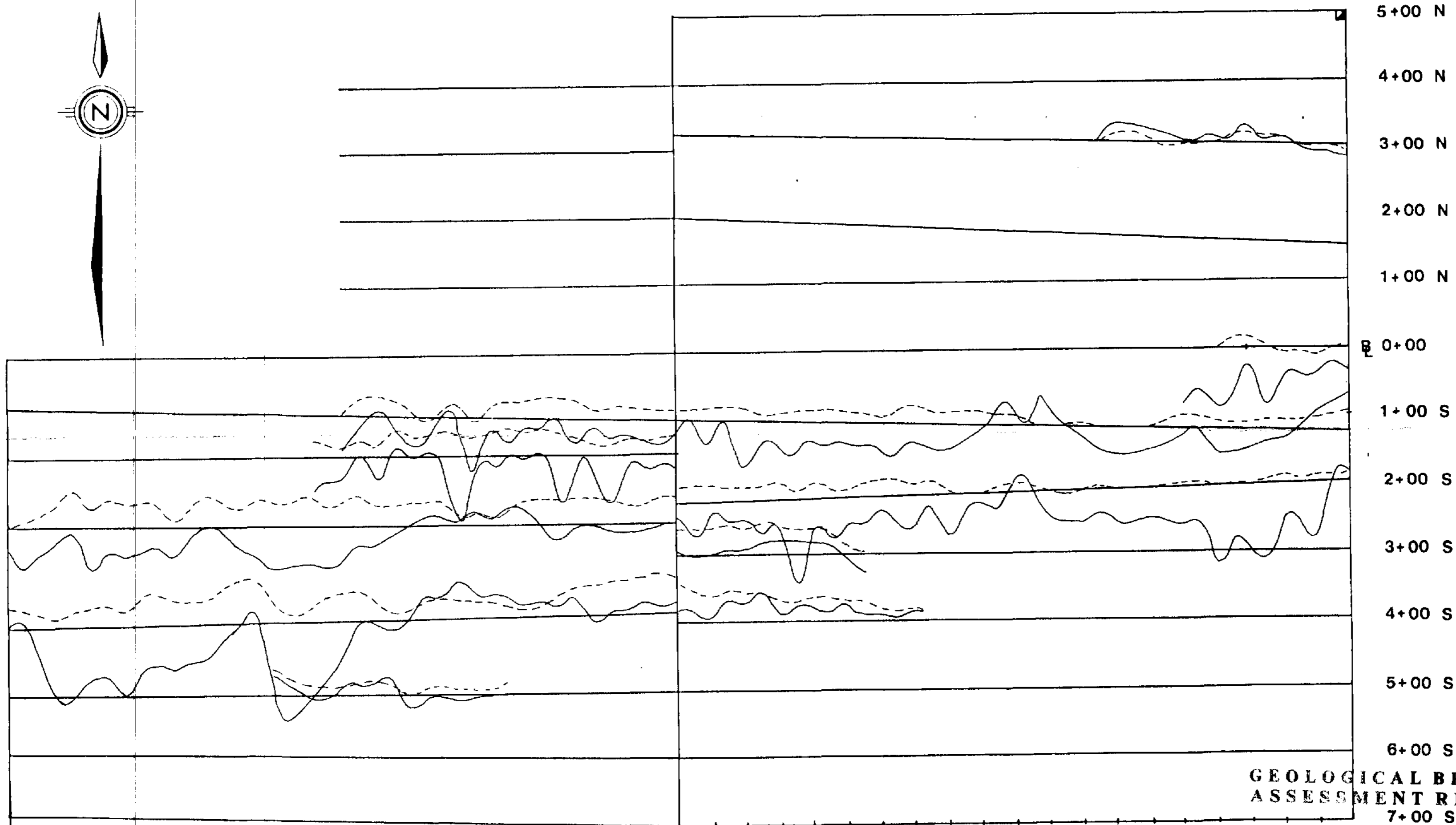
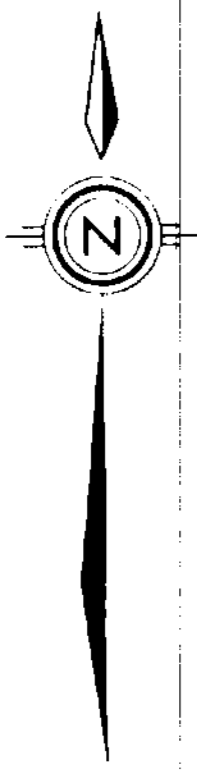
TO ACCOMPANY REPORT BY:  
I. BORDVIC, P.ENG.

SILVER LUMP PROPERTY	
FOR: GRAZINA RESOURCES LTD.	
BY: IGNA ENGINEERING AND CONSULTING LTD.	
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VERNON M.D., B.C.	
N.T.S. 82E-15E, 82E-16W	DATE: JANUARY 1988
PLOTTED BY R.P.M.	FIGURE NO. <b>18</b>

- Line 500N
- Line 400N
- Line 300N
- Line 200N
- Line 100N
- Line 0N
- Line 100S
- Line 200S
- Line 300S
- Line 400S
- Line 500S
- Line 600S
- Line 700S



- 20+00 W  
 - 19+00 W  
 - 18+00 W  
 - 17+00 W  
 - 16+00 W  
 - 15+00 W  
 - 14+00 W  
 - 13+00 W  
 - 12+00 W  
 - 11+00 W  
 - 10+00 W  
 - 9+00 W  
 - 8+00 W  
 - 7+00 W  
 - 6+00 W  
 - 5+00 W  
 - 4+00 W  
 - 3+00 W  
 - 2+00 W  
 - 1+00 W  
 - 0+00 W

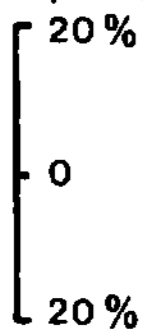


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 7+00 S

**17,526**  
 ANNE POLIS

**LEGEND:**

- in phase
- - - quadrature



**VERTICAL SCALE**

expressed in % of vertical  
 component of VLF field over  
 horizontal component

100 50 0 100 200m



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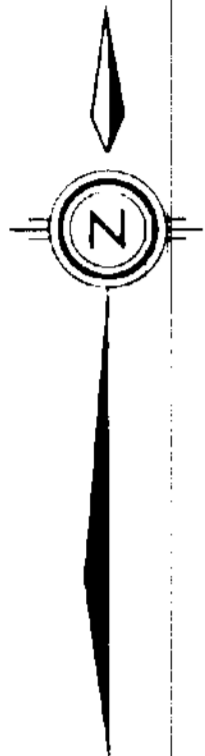
**VLF Survey**

NTS 82 E/15#16 W

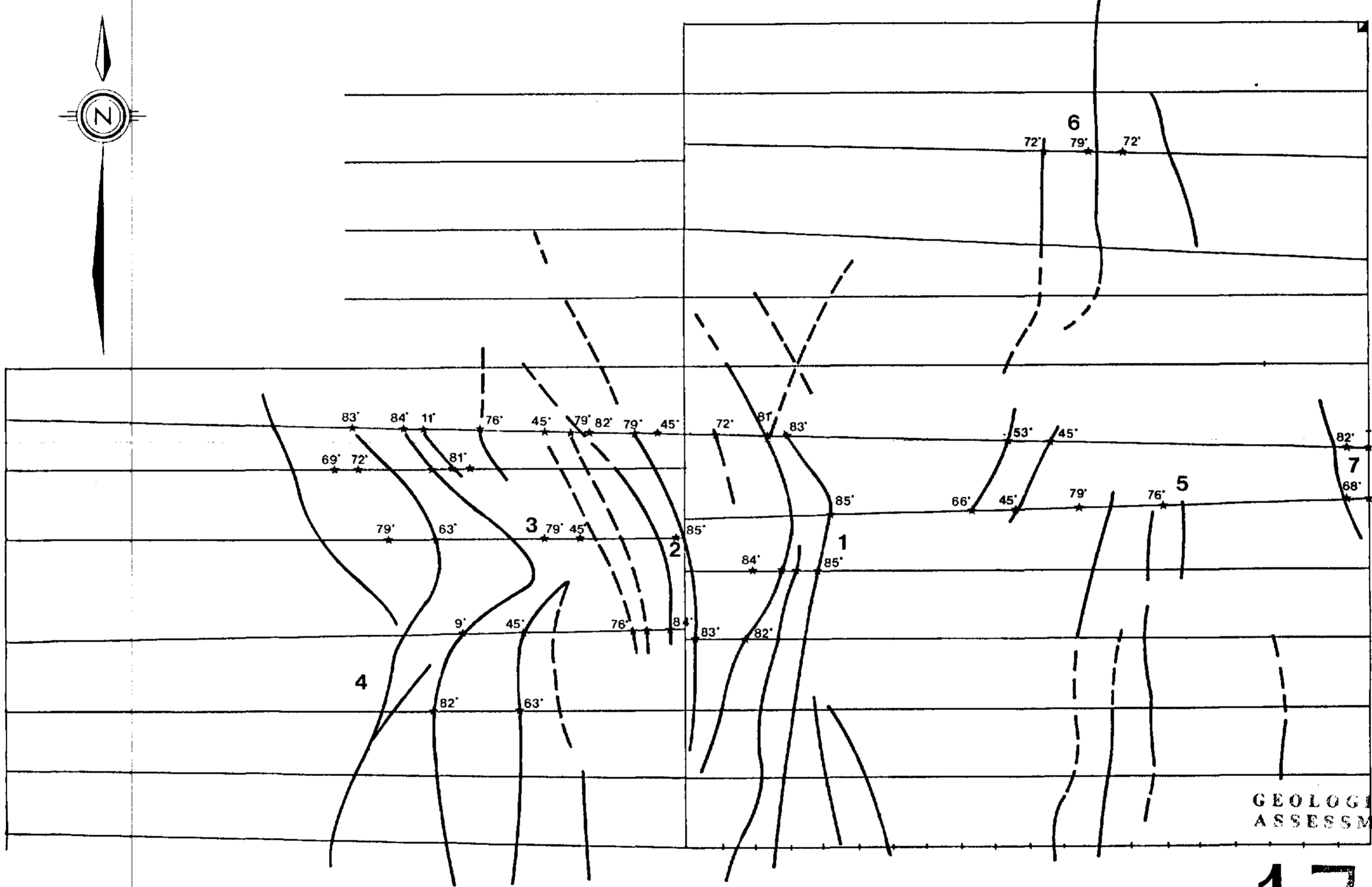
DATE FEB. 1988.

FIG. 12

- B 20+00 W  
 - 19+00 W  
 - 18+00 W  
 - 17+00 W  
 - 16+00 W  
 - 15+00 W  
 - 14+00 W  
 - 13+00 W  
 - 12+00 W  
 - 11+00 W  
 - B 10+00 W  
 - 9+00 W  
 - 8+00 W  
 - 7+00 W  
 - 6+00 W  
 - 5+00 W  
 - 4+00 W  
 - 3+00 W  
 - 2+00 W  
 - 1+00 W  
 - 0+00 W



5+00 N  
 4+00 N  
 3+00 N  
 2+00 N  
 1+00 N  
 B 0+00  
 1+00 S  
 2+00 S  
 3+00 S  
 4+00 S  
 5+00 S  
 6+00 S  
 7+00 S

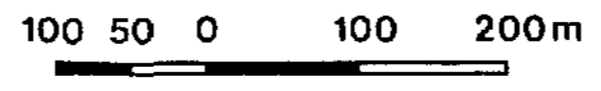


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**LEGEND**

- ★ crossover
- 8r° phase lag of quadrature from inphase
- conductors
- 2 excellent prospects



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	<b>VLF Survey</b> interpretation	DATE FEB. 1988. FIG. 11