# GEOPHYSICAL REPORT

## MUNRO LAKE AREA



OSOYOOS MINING DIVISION

NTS 82E/12, 13W

FOR

ALMADEN RESOURCES CORPORATION

BY



DELTA GEOSCIENCE LTD.



JANUARY 29, 1995.

GRANT A. HENDRICKSON, P.GEO.

TABLE OF CONTENTS

## INTRODUCTION

A program of line cutting and induced polarization surveys was carried out on the Rose Claim Group from Oct. 2, 1994 to Nov. 04, 1994.

The objective of the work was to detect and define geophysical anomalies in an area where previous work had outlined a large silver-copper-zinc-molybdenum soil anomaly. A follow-up overburden drilling program in 1987-88 had outlined three coincident northeast-trending geochemical anomalies of gold, silver and zinc.

## LOCATION AND ACCESS:

The property is situated in the Southern Okanagan region of British Columbia about 40 kilometers north-northwest of Penticton and 18 kilometers west-southwest of Peachland on the west side of Okanagan Lake (see Fig. #1).

The NTS location is 82E/12, 13W and the centre of the property is at latitude 49° 43'N and longitude 119° 55'W.

Access to the property can be gained by way of Peachland or Summerland. The best access is via Highway 97 to Peachland and then southwest on the Brenda Mine Road for 11 km to Headwater Road. The Headwater Road leads west for about 8.5 km to Kathleen Main Road which leads southwest for 7.5 km to Deer Creek Road. The property is located 16 km along this road.

An alternate route is via Summerland along the old Summerland Princeton Highway, westerly along the Trout Creek Valley for a distance of about 28 km. At a point about 1 km southeast of Kirton on the C.P.R. Railway, a poorly maintained gravel road leads northerly along O'Hagen Creek to the property.

## PROPERTY DESCRIPTION:

The property is comprised of the Rose, Dale, Lake and Sue claims held by Almaden Resources Corporation and optioned to Lausanne Development Corporation of Vancouver, B.C.

The property consists of 13 contiguous claims totalling 109 claims located in the Osoyoos Mining Division (see Fig. #2). The Rose, Dale and Lake claims have been grouped under the name Rose. The details of the claims are summarized on the next page:

| CLAIM | TENURE NO. | UNITS | EXPIRY DATE |
|---|---|---|---|
| Dale | 2346(11) | 14 | Nov.5,1997 |
| Lake | 2347(11) | 15 | Nov.5,1997 |
| Rose | 2325(9) | 20 | Sept.30,2000 |
| Rose 2 | 2357(11) | 15 | Nov.15,1997 |
| Rose 3 | 2358(11) | 15 | Nov.15,1997 |
| Rose 4 | 2745(11) | 1 | Nov.3,2000 |
| Rose 5 | 2746(11) | 1 | Nov.3,2000 |
| Rose 6 | 2747(11) | 1 | Nov.3,2000 |
| Rose 7 | 2748(11) | 1 | Nov.3,2000 |
| Rose 8 | 2749(11) | 1 | Nov.5,2000 |
| Rose 9 | 2750(11) | 1 | Nov.5,2000 |
| Sue 1 | 332562 | 9 | Nov.4,1995 |
| Sue 2 | 332563 | 15 | Nov.4,1995 |
| | | 109 | |

PHYSIOGRAPHY:

The claims cover portions of a south to southeast trending ridge known locally as Baldy Mountain. The west portion of the property is underlain by a gentle plateau with elevations ranging from 5000 to 5500 feet, the eastern part is underlain by a steep, east-facing slope cut by small creeks.

Stands of pine, spruce and balsam predominate and logging is currently underway on portions of the claim group.

A thick mantle of glacial till varying from 0 to 40 meters covers most of the property with outcrop exposed mainly on steep bluffs and in old trenches on the Rose claim.

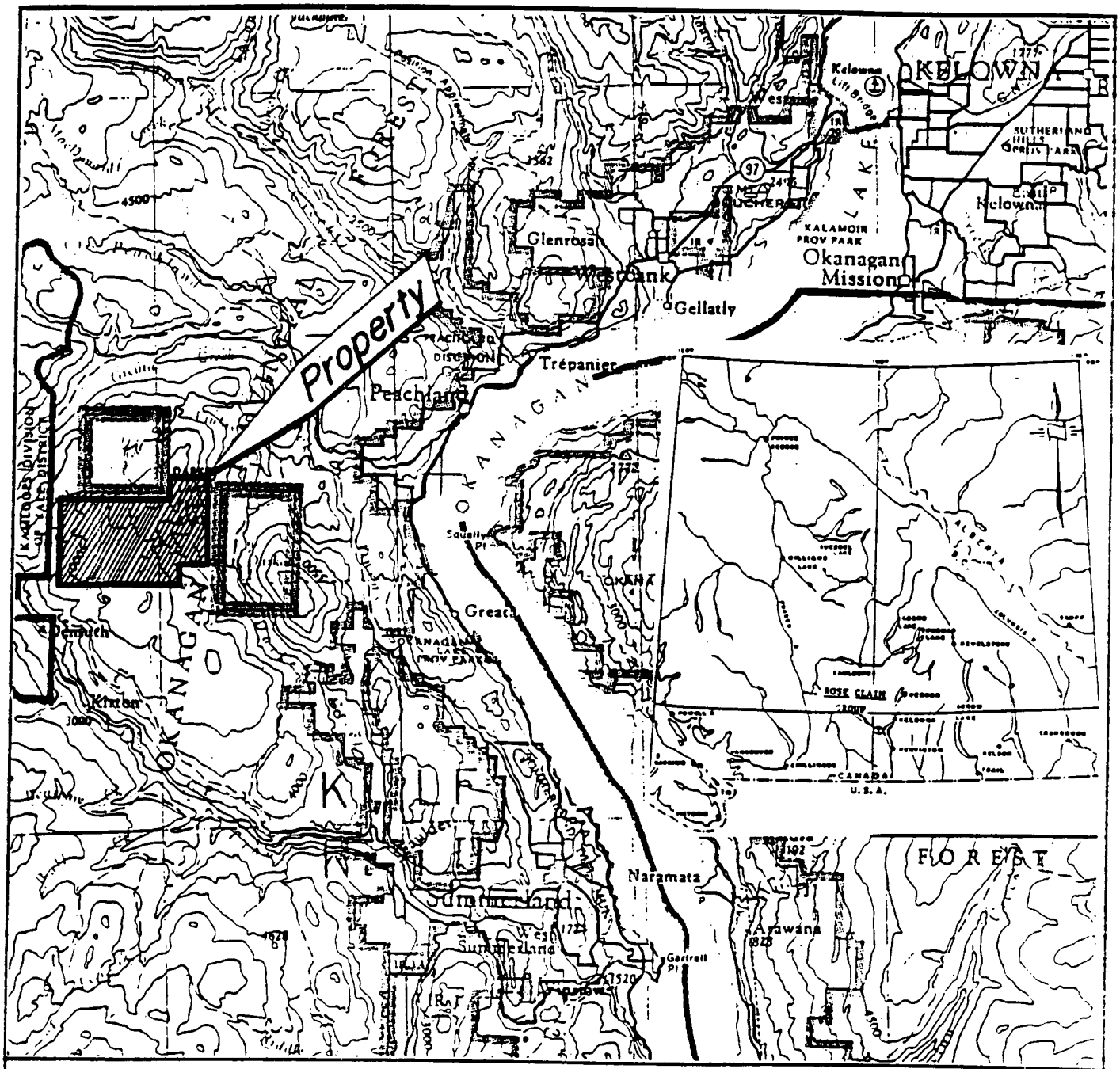



FIGURE 1

ROSE CLAIM GP.

MUNRO LAKE

# LOCATION MAP

SCALE 1 : 250000.

0 5. 10. 15. 20. KM.

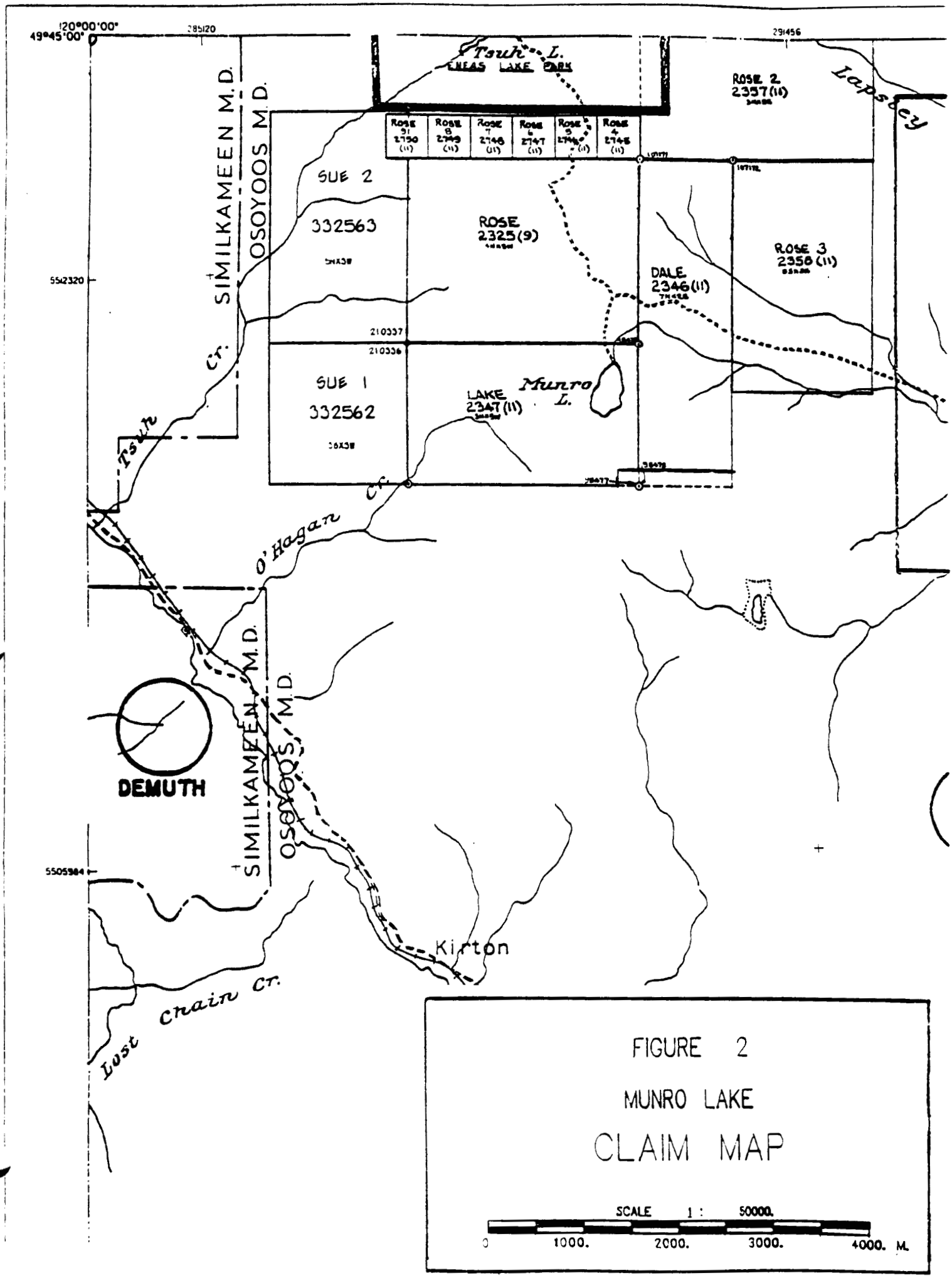



FIGURE 2

MUNRO LAKE

CLAIM MAP

SCALE 1 : 50000.

0 1000. 2000. 3000. 4000. M.

PERSONNEL

Grant Hendrickson - Senior Geophysicist/Supervisor.
Riley Counts - Technician.
Michael Gazetas - Senior Technician.
Jason Shorter - Technician.
Martin Zahorec - Geologist.

EQUIPMENT

2 - B.R.G.M. IP-6 Receivers.
1 - Huntec 7.5 kva Transmitter and Alternator.
7 - Motorola Portable VHF Radios.
1 - Toshiba Field Computer.
1 - Fujitsu Colour Printer.
2 - 4x4 Vehicles.
6 - Reels of I.P. Wire (9 km).

DATA PRESENTATION

The Chargeability and Resistivity data is presented in two styles: a) contour plans and b) stacked profile plans. These maps are at a scale of 1:10,000. In addition, the contour plans are also presented in colour at 1:20,000 for convenience in viewing the data in a page size format.

The profile plans aid in interpretation since the profile shape (the wavelength) is directly related to the depth, attitude and width of an anomalous area. Profile data is presented increasing to the right (east), from a base level (value at the line position).

Contour plans give a good spatial view of the data's intensity and continuity, whereas stacked profile plans give an overall view of the line to line data correlation without the bias that contouring can introduce.

A nine point Hanning filter (smoothing) was applied to the grid files prior to producing the contour plans. This step reduces stretching of the contours.

The Metal Factor display has been calculated for all the data. This display is defined as the I.P. response divided by the resistivity response, with the result multiplied by a factor of 1000. Note that there is no physical basis for the metal factor, other than an assumption that metallic sulphide mineralization should reduce the resistivity of the host rock in conjunction with an increased I.P. response. Metasediments and/or a thickening of the overburden can also result in lower resistivities, which will trigger a modest increased metal factor response. The Metal Factor data display must therefore be used with caution, since anomaly emphasis will change, particularly when dealing with weak I.P. responses. Used properly, the metal factor map can help focus on the most likely areas of near surface alteration and increased sulphide mineralization.

SURVEY PROCEDURE

Almaden Resources Corporation ensured the preparation of the grid lines was well underway prior to the arrival of the Delta Geoscience crew. Line cutting and grid resurrection was contracted out to Amex Exploration Services Ltd of Kamloops, B.C. In all, 56 km of survey were completed during the period October 20 - November 4, 1994.

The gradient array electrode configuration was used for this survey. Basic grid coverage was competed with a current electrode separation "AB" of 1600m. The potential electrode separation "MN" was fixed at 50 meters. It is preferable to keep the "MN" distance as small as proper signal levels will permit, in order to achieve good horizontal resolution. Overlap on each reading was 50%, i.e. 25 meters between data points to maximize the horizontal resolution of the shallower features.

Survey coverage of this large grid required several gradient blocks. The slight shift in the data value that often occurs when switching current electrode locations (blocks) was evaluated by overlapping the block coverage and, if necessary, removed by adjusting and/or averaging the data to one level. The chargeability data repeated very well, whereas the resistivity data varied slightly.

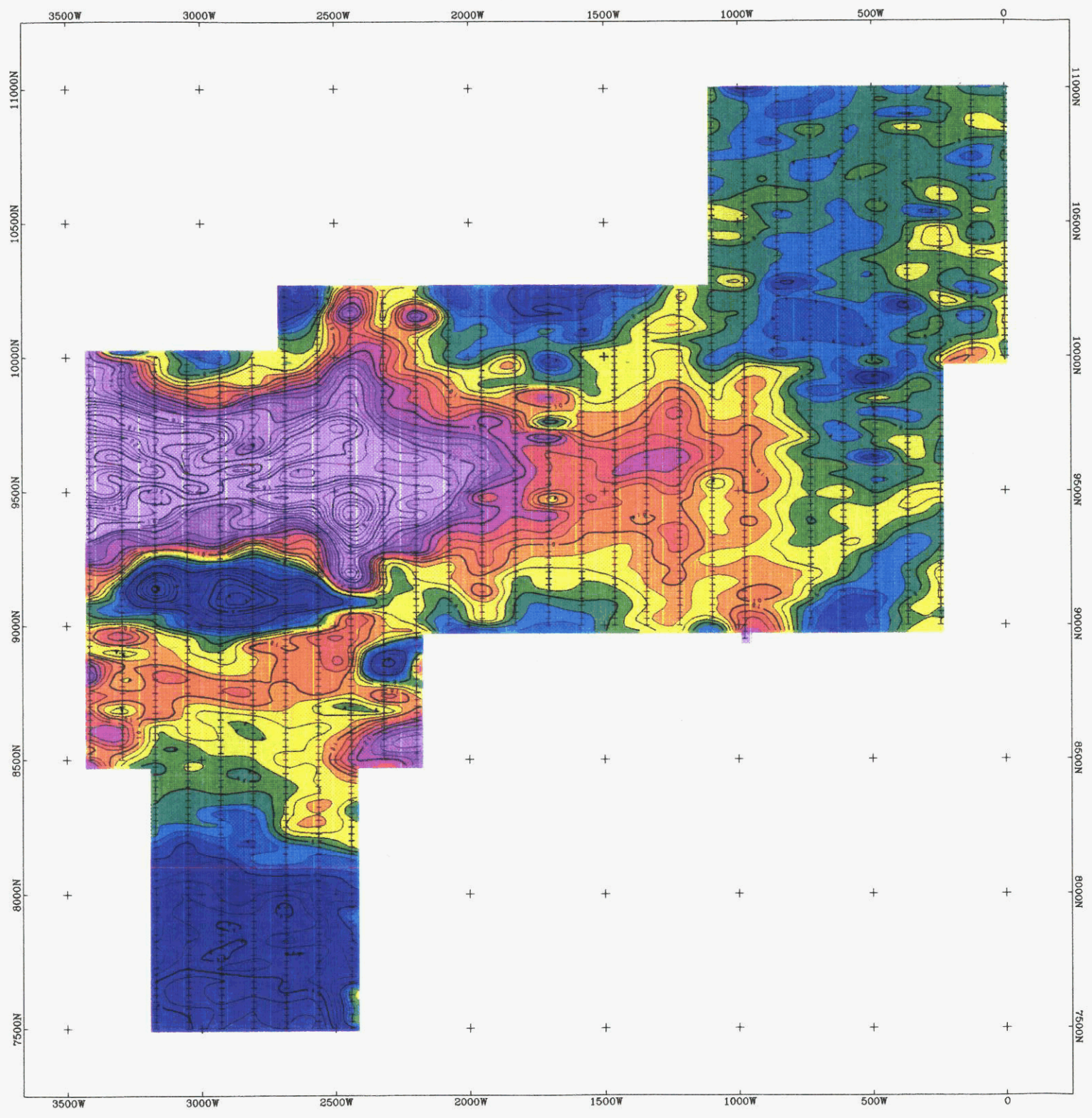
The geophysical survey described above was designed to evaluate the Munro property in a cost effective manner for:

a) the spatial position and strength of any buried disseminated or semi-massive sulphide mineralization. Modelling results indicate the survey area was evaluated to a depth of approx. 260 meters.

b) the spatial position of fault structures, fault offsets and major alteration zones.

c) the delineation of the different lithologies and alteration zones to assist in the geological mapping of the property. Intrusive rocks normally have a high resistivity value, however silicified intrusives can exhibit a much higher resistivity response. Hydrothermally altered intrusive rocks would normally show a much lower resistivity response, in conjunction with an increased I.P. response.

Areas where there is a direct correlation of increased chargeability with decreased resistivity, can signify increased sulphide mineralization, thus generally are the prime exploration targets. Disseminated sulphide mineralization generally has to be quite concentrated (>5%), in order to substantially reduce the bulk resistivity of the host rock. Narrow linear high resistivity zones, coincident with modest I.P. responses, can signify an area of silicified quartz sulphide veining. These types of veins often occur peripheral to porphyry type deposits and would not display much of a metal factor response.




Scale 1:10000

200 0 200 400 600
(meters)

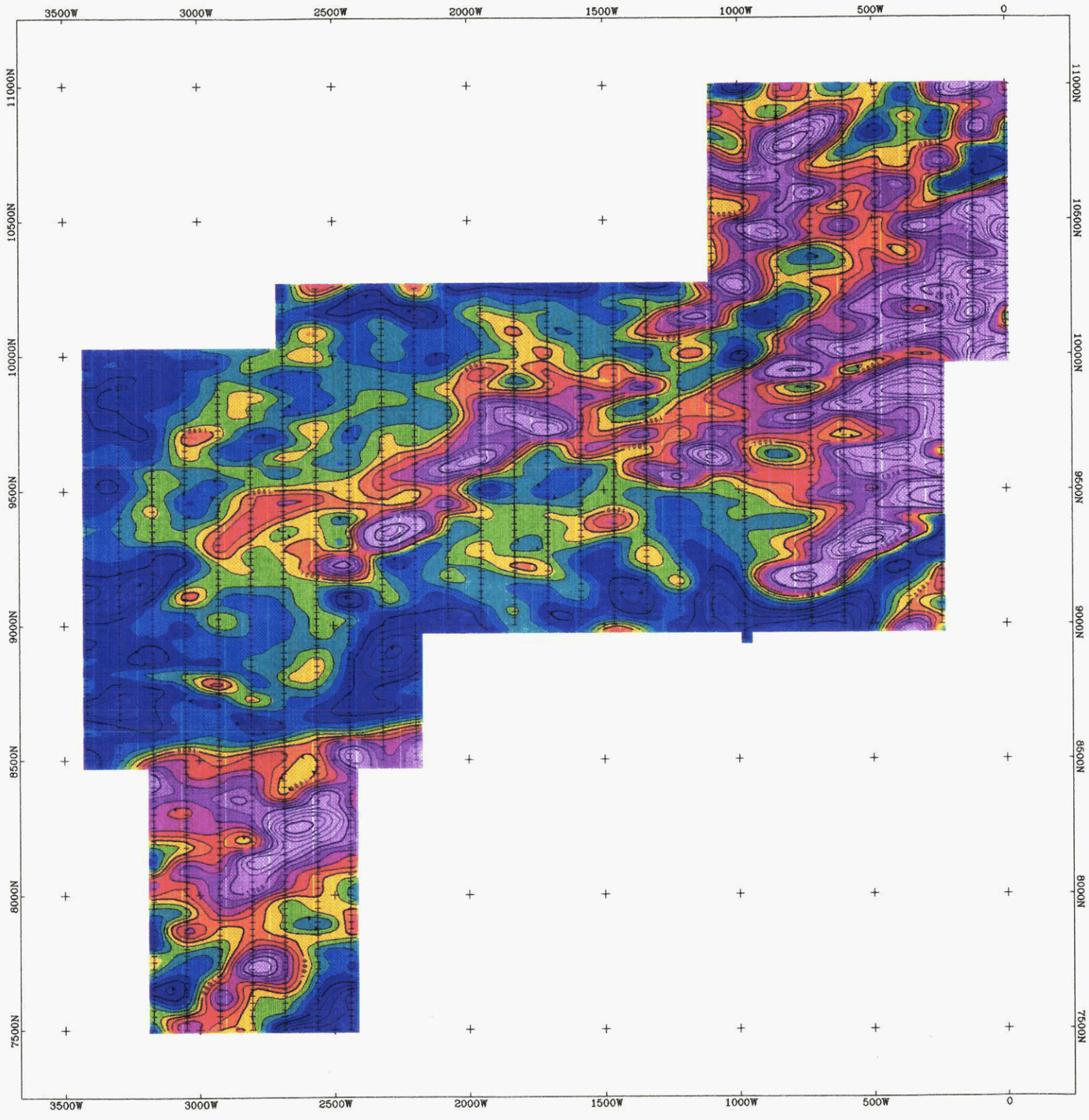
Reduced to 1:20,000.

ALMADEN RESOURCES CORPORATION

**INDUCED POLARIZATION PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 0.5 msec
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Oct-Nov, 1994

*DELTA GEOSCIENCE LTD*




Reduced to 1:20,000.

Scale 1:10000

200 0 200 400 600

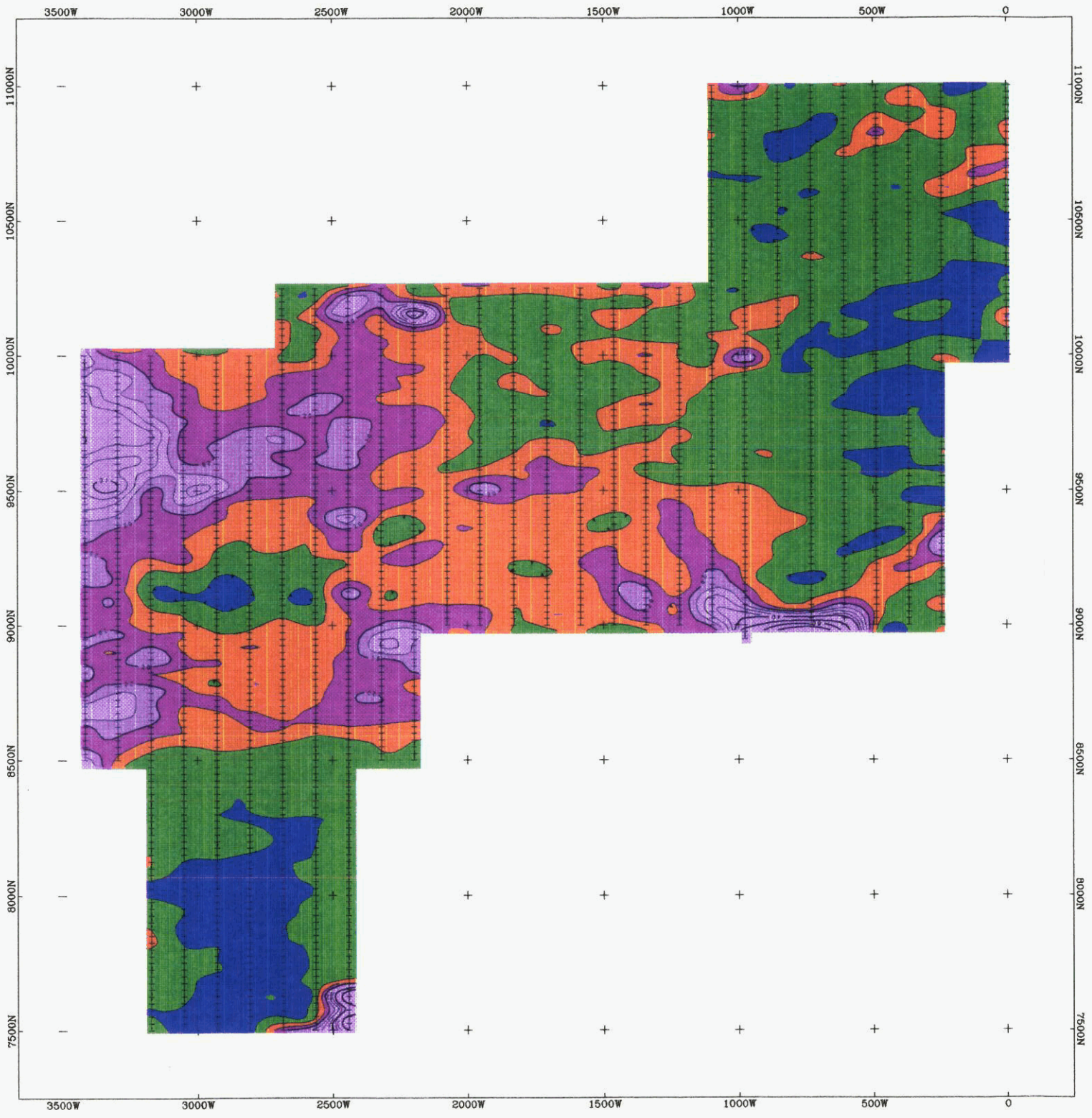
(meters)

ALMADEN RESOURCES CORPORATION

**RESISTIVITY PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 100 ohm-m
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Oct-Nov, 1994

*DELTA GEOSCIENCE LTD*




Scale 1:10000

200 0 200 400 600
(meters)

Reduced to 1:20,000.

ALMADEN RESOURCES CORPORATION

**METAL FACTOR PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 5 units
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Nov, 1994

*DELTA GEOSCIENCE LTD*

DISCUSSION OF THE DATA

This discussion of the geophysical data should be prefaced by a quick description of the geology and mineralization known to occur within the survey area. Previous geologic work by others, has shown the property lies within the Upper Cretaceous Valhalla group of intrusive rock that largely vary between granodiorite, diorites and quartz manzanites. Two styles of mineralization have been observed on the property:

a) weak chalcopyrite-molybdenum mineralization, associated with pyrite in a porphyry system.

b) quartz veining within silicified shear zones with minor sulphides, plus precious metals.

Previous work on the property has also found the overburden thickness to vary between 1 to 40 meters.

The Induced Polarization/Resistivity survey appears to have outlined a very large pyritic alteration zone that in detail is made up of several closely spaced, often intersecting lenticular sulphide rich zones generally oriented to the northeast and east-west. The magnitude of the I.P. response (chargeability) suggests 3-6 volume percent sulphide could be expected over relatively narrow intervals.

An interesting feature of the data is the predominant east-west orientation of the apparent sulphide mineralization, whereas apparent silicified structures (lenticular high resistivity zones) have a more predominant northeast orientation, despite the close correlation of the two data sets. Many stages to the alteration process could explain this feature, which no doubt was controlled by the amount of pre-existing porosity and permeability (fracturing) of the host intrusive rock.

This apparent stockwork of veins (chargeability anomaly) clearly extends further to the west, where it appears to be increasing in strength. The chargeability anomaly is truncated and/or attenuated to the east, possibly by a series of younger northeast trending fault structures that may have down-dropped the chargeable horizon. Another geologic possibility that could also help explain the attenuation of the anomaly to the east and strengthening to the west, is a gentle east plunge to the geology.

The main I.P. anomaly (multiple near surface vein-like targets) may represent the top of a large hydrothermal alteration system that could ultimately become a very broad sulphide (3-4%) porphyry system at a depth of approx. 200 meters. The narrow and more modest-looking I.P. responses that are peripheral to, or radiate out (particularly to the east) from the main I.P. zone, may be caused by large quartz sulphide veins - good targets for precious metal mineralization.

Another somewhat negative proposal that could explain the main I.P. response, is the existence of a pendant of pyritic metasediments. At present time however there is little geologic evidence for this, therefore it should be discounted, but not completely ignored.

## RECOMMENDATIONS AND CONCLUSIONS

The magnitude and size of the induced polarization anomalies, when considered in conjunction with the known anomalous precious metal geochemistry, strongly supports an advanced exploration effort on this interesting property. The geophysical response is quite typical for a porphyry style deposit with significant veining.

The previously collected geologic and geochemistry data, when integrated with the geophysics, should clearly focus the exploration effort. This integration of the data should encourage an expansion of the grid to the west and also to the east near 2200W, 8500N.

In the areas of high interest, further I.P. surveying should be undertaken to allow for the preparation of chargeability and resistivity depth sections. These sections will help in the accurate definition of drill targets.

G. Hendrickson

Grant A. Hendrickson, P.Geo.

STATEMENT OF QUALIFICATIONS

Grant A. Hendrickson.

- B.Science, University of British Columbia, Canada, 1971. Geophysics option.

- For the past 24 years, I have been actively involved in mineral exploration projects throughout Canada, the United States, Europe and Central and South America.

- Registered as a Professional Geoscientist with the Association of Professional Engineers and Geoscientists of the Province of British Columbia, Canada.

- Registered as a Professional Geophysicist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta, Canada.

- Active member of the Society of Exploration Geophysicists, European Association of Exploration Geophysicists and the British Columbia Geophysical Society.

Dated at Delta, British Columbia, Canada, this 29 day of JAN, 1995.

G. Hendrickson

Grant A. Hendrickson, P.Geo.

REFERENCES

Bhattacharya, B.B., and Dutta, I., 1982: Depth of Investigation Studies for Gradient Arrays over Homogeneous Isotropic Half-Space: Geophysics, Vol. 47, 1198-1203.

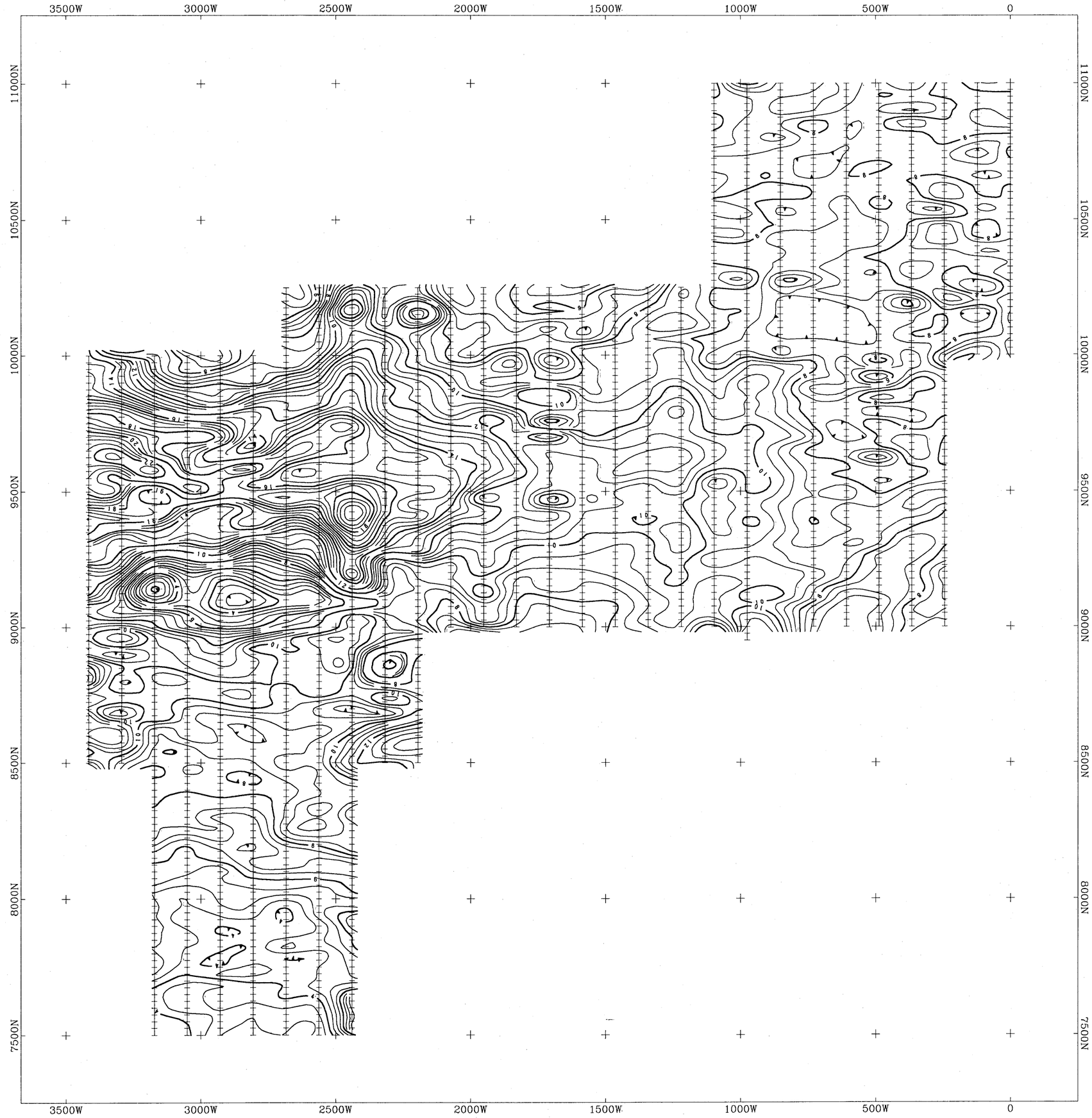
Coggon, J.H., 1973: A Comparison of I.P. Electrode Arrays: Geophysics, Vol. 38, 737-761.

Giroux, G.H., Montgomery Consultants Limited, 1988: Report on the Rose Claim Group, Munro Lake, Osoyoos Mining Division, NTS 82E/12, 13W, Internal Report.

Langore, L., Alikay, P., Gjovreku D., 1989: Achievement in Copper Sulphide Exploration in Albania with I.P. and E.M. Methods: Geophysical Prospecting 37, 975-991.

Malmqvist, L., 1978: Some Applications of I.P. Technique for Different Geophysical Prospecting Purposes: Geophysical Prospecting 26, 97-121.

Ward, Stanley H., 1990: Resistivity and Induced Polarization Methods: Geotechnical and Environmental Geophysics, Vol. 1, Investigations in Geophysics 5, 147-190.




GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,776

Scale 1:10000

200 0 200 400 600
(meters)

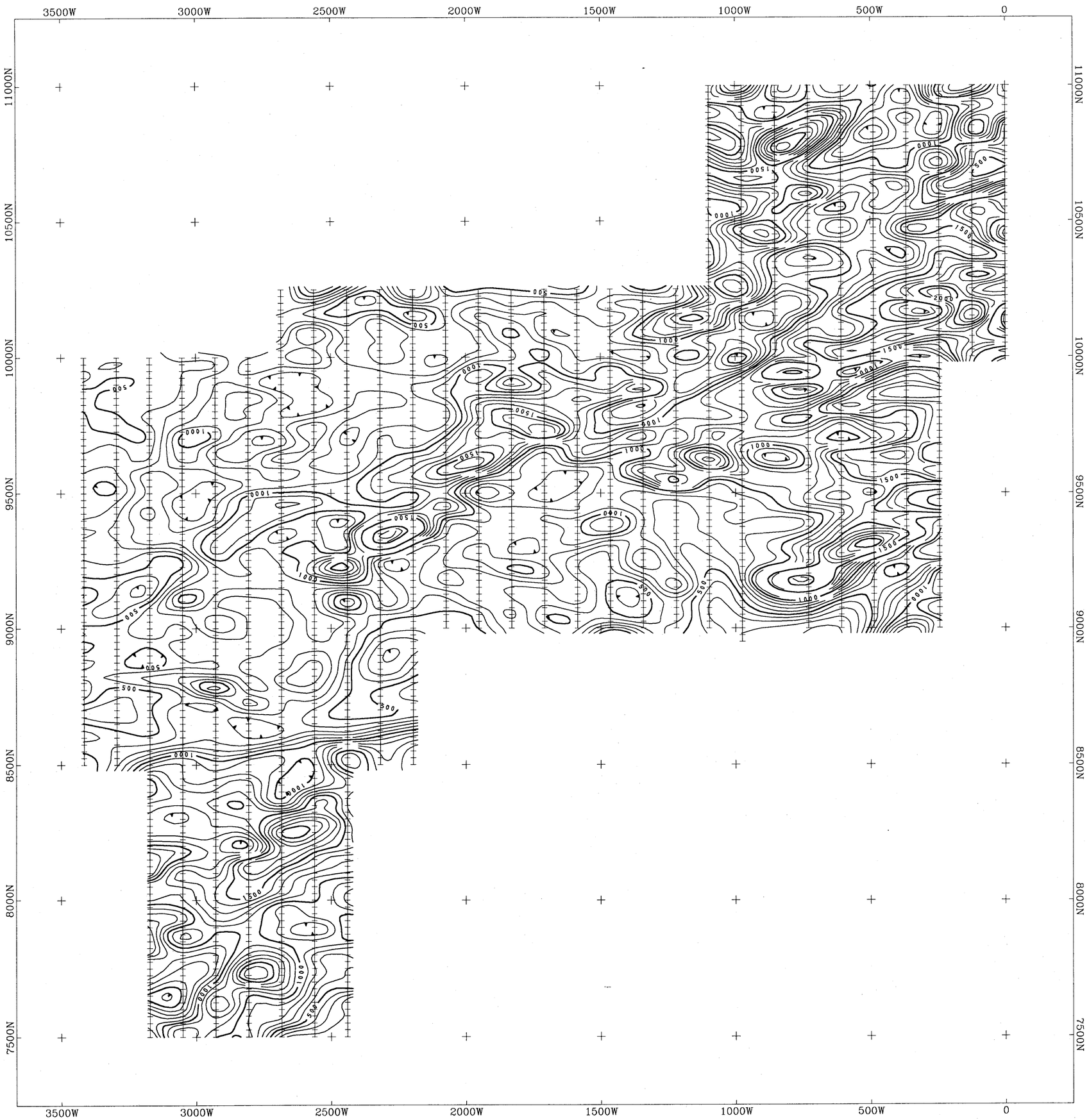
ALMADEN RESOURCES CORPORATION

**INDUCED POLARIZATION PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 0.5 msec
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Oct–Nov, 1994

*DELTA GEOSCIENCE LTD*

FIG. 6




GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,776

Scale 1:10000

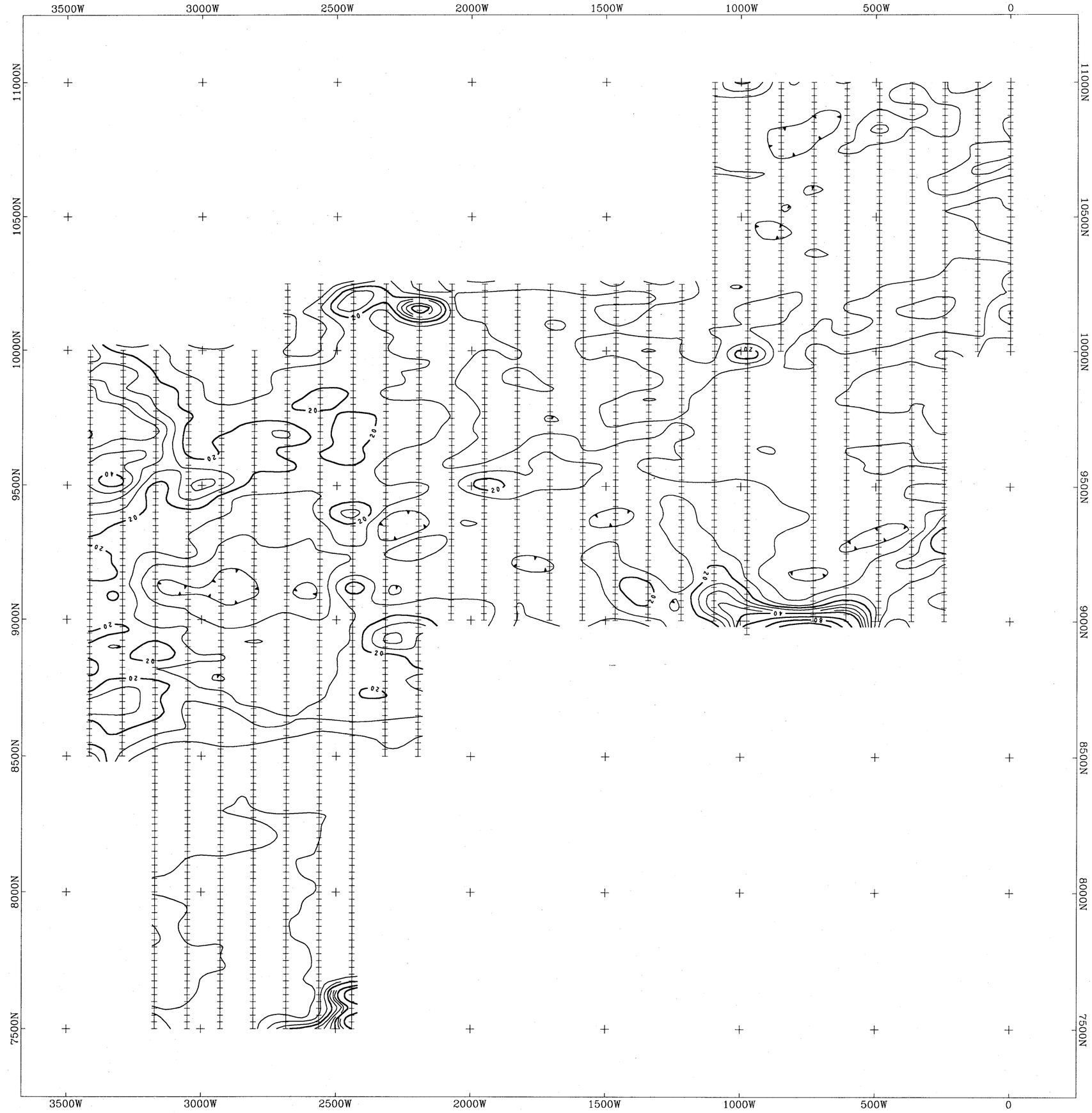
200 0 200 400 600
(meters)

ALMADEN RESOURCES CORPORATION

**RESISTIVITY PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 100 ohm-m
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Oct-Nov, 1994

*DELTA GEOSCIENCE LTD* FIG. 7




GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,776

Scale 1:10000

200 0 200 400 600
(meters)

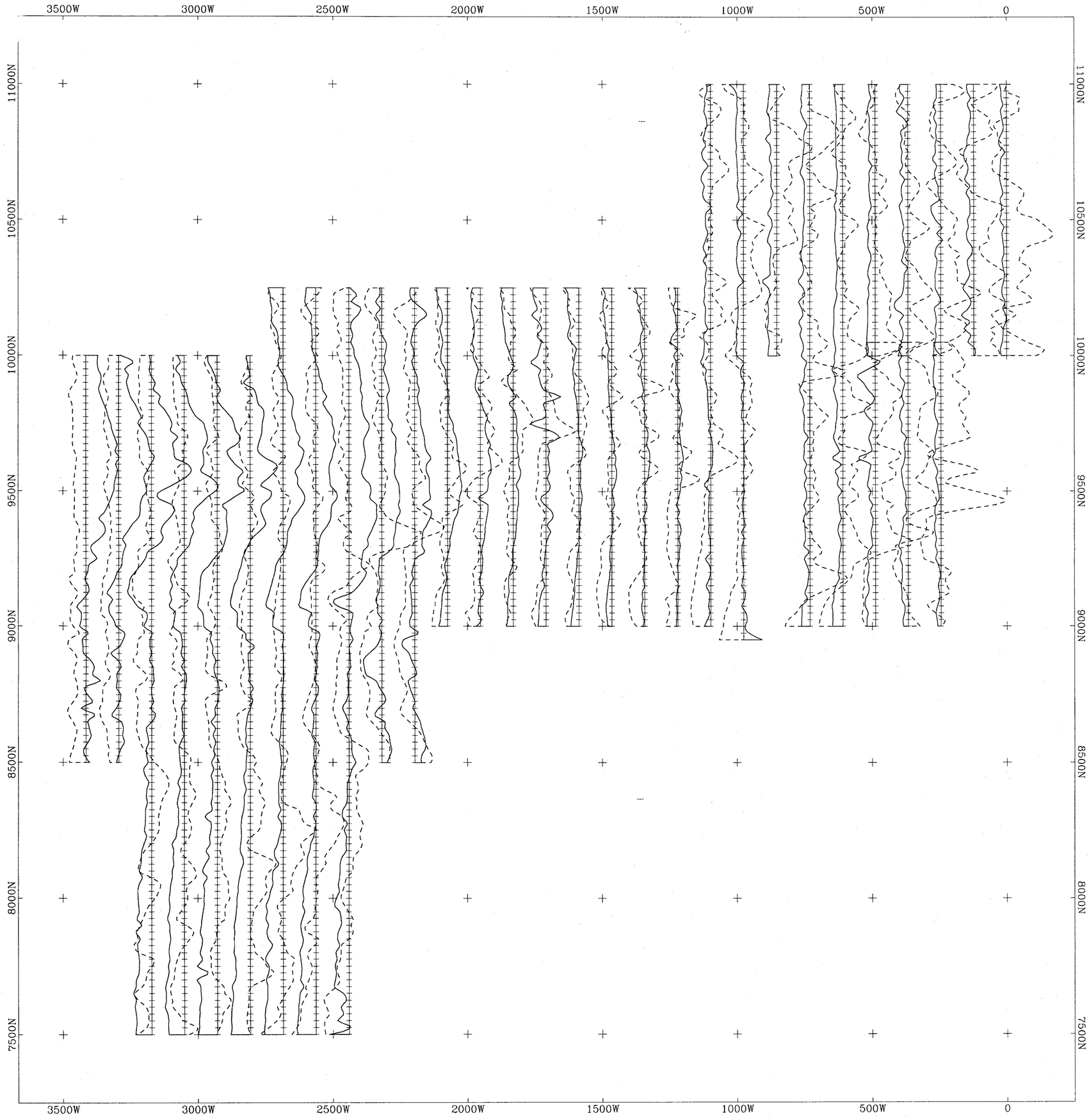
ALMADEN RESOURCES CORPORATION

**METAL FACTOR PLAN**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Contour interval 5 units
Gradient array, AB = 1600 m, MN = 50 m
BRGM instruments
Nov, 1994

*DELTA GEOSCIENCE LTD*

FIG. 8




GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,776

Scale 1:10000

200 0 200 400 600
(meters)

ALMADEN RESOURCES CORPORATION

**INDUCED POLARIZATION / RESISTIVITY PROFILES**
MUNRO LAKE AREA, SUMMERLAND
BRITISH COLUMBIA

Charg. solid line @ 1 cm = 10 msec, base @ 10
Resist. dash line @ 1 cm = 1000 ohm-m, base @ 1000
Gradient array, AB = 1600 m, MN = 50 m
Oct-Nov, 1994

*DELTA GEOSCIENCE LTD*

FIG.9