LOG NO: 1207 RD.
ACTION:
FILE NO:

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LIST OF ILLUSTRATIONS

SUMMARY

Induced polarization and resistivity surveys were carried out in October, 1989 over a portion of the Dev claims located on Allin Creek, 9.0 km due east of Goosly Lake, British Columbia. The purpose of the work was to test a mercury anomaly exceeding 400 ppb which is indicative of gold mineralization.

The property is easily accessible by 2-wheel drive vehicle by a series of logging roads from Burns Lake. The terrain consists of gentle to moderate slopes covered with moderately-populated fir, spruce, and cedar trees with light underbrush.

Most of the property is underlain by glacial drift. However, at least three outcroppings of Eocene Goosly Lake volcanic rocks consisting of biotite-pyroxene-plagioclase trachyandesite occur within the property. In addition, at least one outcropping of Eocene Buck Creek volcanics occur on the property and consist of andesite and dacite lavas and volcanic breccia.

No mineralization has so far been located on the property. However, the Goosly deposit, which is currently being mined by Equity Silver Mines Ltd., is located 4 km west of the property boundary. It occurs as tabular zones within a window of Mesozoic volcanics and sediments. The mineralization consists of chalcopyrite, pyrite, pyrrhotite, tetrahedrite, and sphalerite. The metals being mined are gold, silver, copper, and antimony.

The IP and resistivity surveys were carried out using a Huntec receiver operating in the time-domain mode with the dipole-dipole array at 1 to 4 separations. The dipole length and reading interval were 60 m. Two lines were done across the mercury anomaly. The IP and resistivity pseudosections were computer-plotted and -contoured.

CONCLUSIONS

1) The IP/resistivity survey has revealed a low-amplitude resistivity high to directly correlate with the mercury anomaly. Since the mercury is indicative of gold mineralization, the resistivity high is indicative of calcite/silica veining or flooding containing or associated with the possible gold mineralization. A correlation of an anomalous IP high is indicative of associated sulphides.

2) A low-amplitude IP anomaly occurs at the western edge of each line at depth. It has a shallow dip and thus may be reflecting a pyritized or graphitic sedimentary bedrock horizon.

3) The resistivity values across each line is quite low suggesting the underlying bedrock to be sedimentary, possibly volcanic in origin. The low IP values indicate a lack of sulphides occurring within the bedrock.

RECOMMENDATIONS

The mercury high/resistivity high is considered a very positive correlation and thus warrants further exploration. If could be diamond drilled at this point but it would be preferable to more accurately delineate the target. This could likely be done by running two to four lines of IP/resistivity surveying with a smaller electrode spacing of, say, 30 m read to eight to ten separations. At present the resistivity is of greater exploration interest, but the more detailed electrode spacing may reveal a stronger IP correlation.

Magnetic surveying along the same lines may also prove to be useful in interpretation by mapping associated rock contacts and/or pyrrhotite or magnetite possibly associated with the mineralization.

Knowing the depth of overburden is considered to be quite important since this affects the geophysics interpretation. It also effects the decision on whether to excavator trench (considered quite unlikely) and whether to diamond drill. The overburden depth can be determined by seismic refraction.

GEOPHYSICAL REPORT

ON A

INDUCED POLARIZATION AND RESISTIVITY SURVEYS

OVER A PORTION OF THE

DEV CLAIMS

ALLIN CREEK, GOOSLY DEPOSIT AREA

OMINECA M.D.

BRITISH COLUMBIA

INTRODUCTION AND GENERAL REMARKS

This report discusses the instrumentation, theory, field procedure and results of induced polarization (IP) and resistivity surveys carried out over a portion of the Dev claims, located on Allin Creek near the Goosly silver-copper deposit within central British Columbia.

The field work was completed from October 15th to 17th, 1989 under the supervision of the writer and under the field supervision of Eric Hards, geophysicist, who also formed part of the field crew. A geophysical technician as well as two helpers completed the crew of four.

The purpose of the IP and resistivity surveys was to test a strong mercury soil anomaly exceeding 400 ppb. Such an anomaly is quite indicative of gold mineralization.

It is expected for the IP survey to accomplish this by reflecting possible sulphide mineralization associated with the gold mineralization and for the resistivity survey to locate areas of alteration and/or fracturing. Alteration and fracturing often occur with sulphide/gold mineralization and is reflected as a resistivity low which should therefore correlate with an IP high. However, in certain cases, mineralization is reflected by an IP high correlating with a resistivity High.

The exploration on the property was under the supervision of B.H. Kahlert, P.Eng., consulting geological engineer to Normine Resources.

PROPERTY AND OWNERSHIP

The property consists of 7 contiguous claims totalling 136 units as shown on Map 2 and as described below:

Name of Claim	No of Units	Record Number	Anniversary Date
Dev 1	16	7018	May 21
Dev 2	20	7019	May 21
Dev 3	20	7020	May 21
Dev 4	20	7021	May 21
Go 1	20	8053	Nov. 3
Go 2	20	8054	Nov. 3
Go 3	20	8102	Dec. 8
	136		

The seven claims as shown on Map 2 are wholly owned by Kengold Mines Ltd. whose principal is Lorne Warren of Smithers, B.C. and are being optioned to Bema Gold Corporation and Westview Resources Inc. of Vancouver, B.C.

LOCATION AND ACCESS

The Go and Dev claims are located on Allin Creek, 9 km due east of Goosly Lake within central British Columbia. The town of Burns Lake is located 26 km due east.

The geographical coordinates for the center of the property are 54° 10' north latitude and 126° 10' west longitude.

Access is easily gained from the town of Burns lake by travelling northwesterly along Highway 16 for about 16 km to just past Decker Lake. One then turns left (southwesterly) and travels for about 1.5 km on the Decker Lakes Forest Products road to a left-turning turnoff which is just past Decker Lakes office. One then travels to km 39 and takes a right turn which is just past Allin Creek. The survey lines occur at about km 42.

PHYSIOGRAPHY

The property is found on the western side of the physiographic unit known as the Nechako Plateau, which is the northern part of the Interior Plateau System. The Nechako Plateau is an area of low relief with great expanses of flat or gently rolling country. The plateau surface lies between 1,000 and 1,500 meters elevations.

The plateau was occupied by ice, which, in moving across it, marked the surface with thousands of grooves and drumlin-like ridges which are parallel to the ice flow. Numerous depressions left on the plateau surface after the ice retreat are now occupied by myriads of lakes. Glacial drift is widespread and a high percentage of bedrock is obscured.

The elevations vary from 1125 meters (3,690 feet) a.s.l. at the southwestern corner of the Dev #2 claim to 1,465 meters (4,800 feet) a.s.l. along the western edge of the Go #2 claim abutting the Equity Silver property to give an elevation difference of 340 m (1,120 feet).

The property is mainly drained by the southerly-flowing Allin Creek as well as its easterly-flowing tributary. The westerly-flowing Buck Creek drains the southern edge of the property. Small swamps occur along the two creeks.

The vegetation consists mainly of moderately-populated fir, spruce, and poplar trees with very light underbrush except along the creeks where the underbrush is thick.

HISTORY OF PREVIOUS WORK

Much work has been done in the area especially in the early '70's when the Goosly deposit was in an advanced stage of development. In 1970, the southern part of the property was covered by the Dev claims owned by Delbrook Mines Limited. They carried out a magnetometer survey and soil geochemistry sampling. In the same year, the northern part of the property was covered by the Egg and JH claims owned by Dorita Silver Mines Ltd. They carried out line cutting and a soil geochemistry survey.

The writer was also verbally informed that an IP-resistivity survey was carried out, probably in the early '70's as well. One metal factor anomaly was apparently drilled with negative results. A frequency effect anomaly was also discovered but was not drilled.

Since the claims have been staked, soil sampling, IP, resistivity and magnetic surveys have been carried out as well as diamond drilling.

GEOLOGY

The geology of the property is taken from Church's 1973 maps, "Geology of the Buck Creek Area."

Almost the entire property is covered by glacial drift with few outcrops occurring. It is therefore difficult to know what the underlying bedrock is. However, the few outcrops within the property and in close proximity indicate the underlying bedrock may be entirely Eocene volcanics. Nevertheless, the overburden cover is so extensive that the occurrence of other rock-types should not be precluded.

Church shows three outcroppings of the Goosly Lake volcanic rocks of Eocene age occurring within the Dev and Go claims. These are (1) on Allin Creek across the Dev 3 and 4 boundary, (2) on the west central part of the Dev 2 claim, and (3) along the western border of the Go 2 claim. The Goosly Lake group consist of biotite-pyroxene-plagioclase trachyandesite lavas and thick sills or lava flows as well as small stocks of similar rock.

Within the northeastern corner of the Go 3 claim occur outcroppings of the Houston phase of the Buck Creek volcanic rocks which is of Eocene age as well. This group consists of aphanitic andesite and dacite lavas and volcanic breccia as well as minor basalt.

Within 1.5 km west of the Go 2 claim occurs a syenomonzonite stock. It occurs within the center of the Equity Silver property and is thought to be important to the formation of the mineralization of the Goosly deposit.

On the western side of this stock occurs a window of Early and Middle Mesozoic metamorphosed bedded volcanics and sediments which is the host group of the Goosly deposit. This group consists of tuff and lapilli tuff, tuff breccia, tuffaceous argillite, conglomerate, and the host rock, a shattered dacite. These bedded rocks dip steeply to the west and are cut by Tertiary dykes dipping steeply to the east. The dykes are rhyolite, feldspar porphyry, aphanitic pulaskite, and pre-Tertiary diorite.

The Goosly deposit is described by Church (1970) as follows:

> The main mineralized zone, about 175 feet thick, is composed of finely disseminated sulphides and coarse-grained sulphide replacement bodies located in the central part of the dacite tongue. The disseminated sulphide phase forms the bulk of the mineralized zone; the composition is somewhat variable, averaging 0.7 per cent chalcopyrite and 3.8 per cent pyrite and grey sulphides (based on 25 model estimates). The coarse sulphide replacements are irregularly distrubuted in the zone of intense sulphide dissemination. These structures are lens-like bodies as much as 10 feet thick, with an average modal composition of 31 per cent chalcopyrite, 23 per cent pyrite, and 17 per cent pyrrhotite (based on 14 analyses). It is noted that in these massive replacements preservation of the mosaic breccia texture typical of the shattered dacite is locally almost perfect.

The thick chert pebbel conglomerate unit at the base of the section shows local abundance of finely disseminated pyrite and tetrahedrite (?) interstitial to the fragments.

Elsewhere pyrite is scattered sparingly throughout the section in joint and cleavage fillings and less commonly as disseminations in the host rocks. Specularite and sphalerite accompany the pyrite locally.

The alteration attendant to the sulphide-enriched areas has not been studied in detail; however, the country rocks are know to be at lease partially sericitized and have apparently undergone some alteration to clay minerals. In areas of intense sulphide emplacement near the syenomonzonite contact the dacite is transformed by recrystallization and metasomatism, forming a finely felted mottled dark-coloured rock.

As of 1979, the ore reserves were 43.5 million tons grading 2.78 oz/ton silver, 0.026 oz/ton gold, 0.33% copper and a small amount of antimony.

INSTRUMENTATION

The transmitter used for the induced polarization-resistivity survey was a Model IPT-1, manufactured by Phoenix Geophysics Ltd. of Markham, Ontario. It was powered by a 2.0 kw motor-generator, Model MG-2, also manufactured by Phoenix.

The receiver used was a model Mark IV manufactured by Huntec ('70) Limited of Scarborough, Ontario. This is state-of-the-art equipment, with software-controlled functions, programmable through the front panel.

The Mark IV system is capable of time domain, frequency domain, and complex resistivity measurements.

THEORY

When a voltage is applied to the ground, electrical current flows, mainly in the electrolyte-filled capillaries within the rock. If the capillaries also contain certain mineral particles that transport current by electrons (most sulphides, some oxides and graphite), then the ionic charges build up at the particle-electrolyte interface, positive ones where the current enters the particle and negative ones where it leaves. This accumulation of charge creates a voltage that tends to oppose the current flow across the interface. When the current is switched off, the created voltage slowly decreases as the accumulated ions diffuse back into the electrolyte. This type of induced polarization phenomena is known as electrode polarization.

A similar effect occurs if clay particles are present in the conducting medium. Charged clay particles attract oppositely-charged ions from the surrounding electrolyte; when the current stops, the ions slowly diffuse back to their equilibrium state. This process is known as membrane polarization and gives rise to induced polarization effects even in the absence of metallic-type conductors.

Most IP surveys are carried out by taking measurements in the "time-domain" or the "frequency-domain".

Time-domain measurements involve sampling the waveform at intervals after the current is switched off, to derive a dimensionless paramater, the chargeability, "M" which is a measure of the strength of the induced polarization effect. Measurements in the frequency-domain are based on the fact that the resistance produced at the electrolyte-charged particle interface decreases with increasing frequency. The difference between apparent resistivity readings at a high and low frequency is expressed as the percentage frequency effect, "PFE".

The quantity, apparent resistivity, , computed from electrical survey results is only the true earth resistivity in a homogenous sub-surface. When vertical (and lateral) variations in electrical properties occur, as they always will in the real world, the apparent resistivity will be influenced by the various layers, depending on their depth relative to the electrode spacing. A single reading cannot therefore be attributed to a particular depth.

The ability of the ground to transmit electricity is, in the absence of metallic-type conductors, almost completely depending onthe volume, nature and content of the pore space. Empirical relationships can be derived linking the formation resistivity

to the pore water resistivity, as a function of porosity. Such a formula is Archie's Law, which states (assuming complete saturation) in clean formations:

$$\frac{Ro}{Rw} = 0^{-2}$$

Where: Ro is formation resistivity
Rw is pore water resistivity
0 is porosity

SURVEY PROCEDURE

The IP and resistivity measurements were taken in the time-domain mode using an 8-second square wave charge cycle (2-seconds positive charge, 2-seconds off, 2-seconds negative charge, 2-seconds off). The delay time used after the charge shuts off was 200 milliseconds and the integration time used was 1,500 milli-seconds divided into 10 windows.

The configuration used in the field was the dipole-dipole array shown as follows:

The electrode spacing (or dipole length) is denoted at 'a' and was chosen as 60 m. The 'n' was read from 1 to 4 dipole separations ('na') which was therefore 60 to 240 m. This gives a theoretical depth penetration of 150 m which depends not only on the 'na' spacing but also on the ground resistivity.

The dipole-dipole array was chosen because of its symmetry resulting in greater reliability in the interpretation. Smaller targets such as vein-type can be missed entirely by non-symmetrical arrays such as the pole-dipole.

Stainless steel stakes were used for current electrodes. The potential electrodes were comprised of metallic copper in copper sulphate solution, in non-polarizing, unglazed, porcelain pots.

The two survey lines done were 101+00N and 103+00N which occur across the mercury anomaly on the southern grid within the Dev claims as shown on the Plan Map, 89-3. The lines are 200 m apart.

The lines were not cut and this hampered the survey's progress.

COMPILATION OF DATA

The chargeability (IP) values are read directly from the instrument and no data processing is therefore required prior to plotting. The resistivity values are derived from current and voltage readings taken in the field. These values are combined with the geometrical factor appropriate for the dipole-dipole array, to compute the apparent resistivities.

The chargeability and resistivity data were each plotted in pseudosection form on maps 89-4 and 89-5 for lines 101+00N, and

103+00N, respectively, at at scale of 1:2,500. The chargeability data were then contoured at a 2.5 msec interval, and the resistivity data at a logarithmic interval.

DISCUSSION OF RESULTS

The only direct correlation with the mercury anomaly is a low-amplitude resistivity high that dips to the west. On line 101+00N it consisting of values of 50 to 60 ohm-m and on line 103+00N, it consists of values of 66 to 80 ohm-m. On both lines the high is against a local background of 20 to 40 ohm-m.

The overall low values across the entire length of both lines suggest that the underlying bedrock to be sedimentary. However, according to Church (May, 1973) no sedimentary rocks have been mapped in the area, but only Goosly Lake volcanic rocks and Buck Creek volcanic rocks. Nevertheless, the area is widely covered by overburden resulting in scarce outcrops. Thus the occurrence of sedimentary rocks cannot be too easily precluded. Other possible causes of the low resistivity values are sedimentary-type rocks of volcanic origin (tuffs?) or very deep overburden. The latter is not considered that likely.

Considering the possibility of the mercury anomaly reflecting gold mineralization, the cause of the correlting resistivity high would well be calcite and/or silica veining (or in-filling) containing gold mineralization. The suggestion would be a vein-type zone dipping to the west. If this is the case a smaller dipole spacing would delineate the causative source more accurately and perhaps result in higher resistivity values.

There is no correlating IP (chargeability) results on line 103+00N, but on line 101+00N is a correlating anomalous value of

9.7 msec, which is two to three times background. This indicates sulphides may be associated with the anomalous mercury zone. Again, a smaller electrode spacing could result in a greater anomalous IP response.

An IP feature of some interest is a low amplitude anomaly occurring at the western end of each profile at depth. It consists of values of 5 to 9.7 msec (which is the value mentioned above) against a background of three to four msec. It indicates the causative source to dip to the east at a shallow angle. Perhaps the causative source is a graphitic or pyritized sedimentary bed.

Other than what is discussed above, the IP results across the two survey lines are quite flat indicating a minimum occurrence of sulphides.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark
Geophysicist

November 22, 1989

52/G448

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Geology, Exploration and Mining in B.C.,
1969 - pp. 142 to 148
1970 - pp. 125 to 128
1973 - pp. 334 to 338
1976 - pp. 105 to 106
1978 - pp. E215 to E216

Mark, David G., Geophysicial Report on Induced Polarization, Resistivity, and Magnetic Surveys over a Portion of the Dev Project, Allin Creek, Goosly Deposit Area, Omineca M.D., B.C., for Normine Resources Ltd. and Westview Resources Ltd. by Geotronics Surveys Ltd., January 14, 1987.

GEOPHYSICIST'S CERTIFICATE

I, DAVID G. MARK, of the City of Vancouver, in the Province of British Columbia, do hereby certify:

That I am a Consulting Geophysicist of Geotronics Surveys Ltd., with offices located at #530-800 West Pender Street, Vancouver, British Columbia.

I further certify:

1. I am a graduate of the University of British Columbia (1968) and hold a B.Sc. degree in Geophysics.

2. I have been practising my profession for the past 19 years and have been active in the mining industry for the past 22 years.

3. This report is compiled from data obtained from induced polarization and resistivity surveys carried out by a crew of Geotronics Surveys Ltd., under my supervision and under the field supervision of Eric Hards, geophysicist, from October 15th to 17th, 1989.

4. I do not hold any interest in Normine Resources Ltd. or in Westview Resources Ltd., nor in any of the properties discussed in this report, nor will I receive any interest as a result of writing this report.

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark
Geophysicist

November 22, 1989
52/G448

AFFIDAVIT OF EXPENSES

IP and resistivity surveys were carried out over a portion of the Dev Claims from October 15th to 17th, 1989 on Allin Creek in the Goosly Deposit area, Omineca Mining Division, British Columbia to the value of the following:

FIELD:

Field supervisor (Lorne Warren) and truck, 1 day at $275/day	$ 275
Engineer (B.H. Kahlert), 1.5 days at $300/day	450
Mob-demob, at cost	416
4-man crew, 2 days at $1,500/day	3,000
Sub-total	$ 4,141

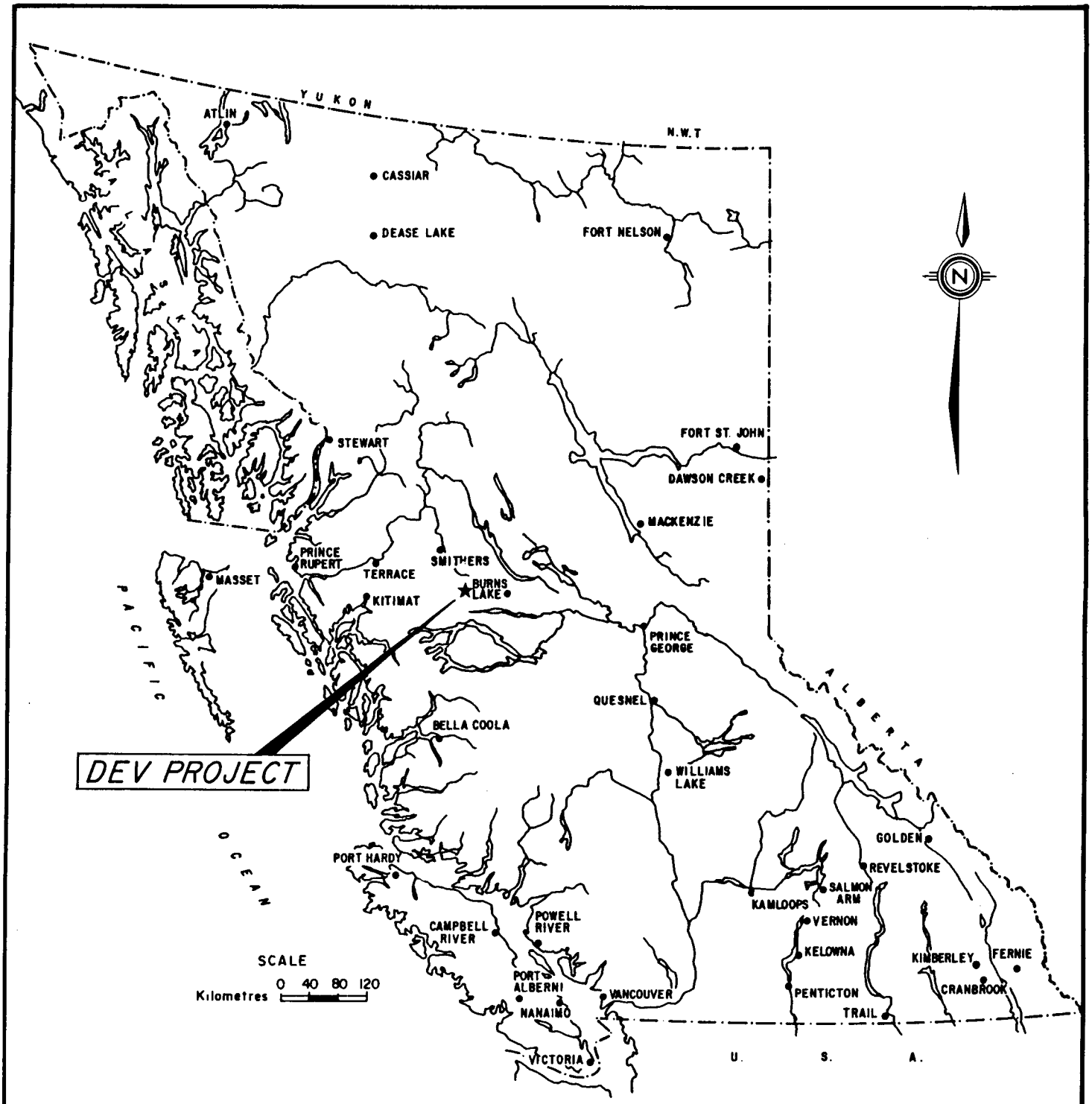
OFFICE:

Senior geophysicist, 5 hours at $45/hour	$ 225
Computer-aided drafting and plotting, 5 hours at $45/hour	225
Report generation and printing	150
Sub-total	$ 600
Grand Total	**$ 4,741**

Respectfully submitted,
GEOTRONICS SURVEYS LTD.

David G. Mark, Geophysicist
Manager

November 22, 1989
52/G448



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DEV PROJECT

ALLIN CREEK, GOOSLY DEPOSIT AREA, OMINECA M.D., B.C.

LOCATION MAP

DRAWN BY	DATE	JOB No.	SCALE	MAP No.
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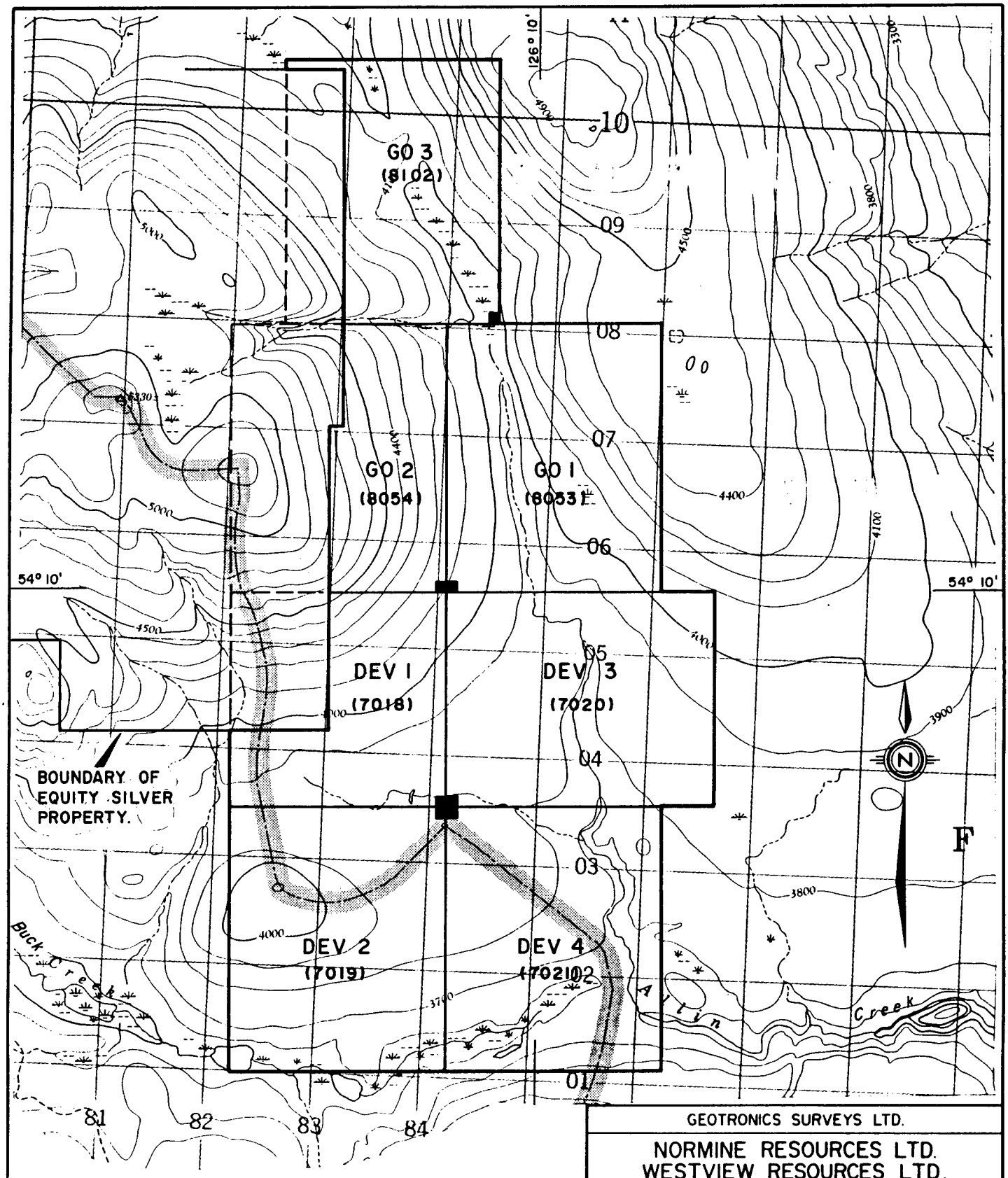

LEGEND

– LEGAL CORNER POST

SCALE

M. 0 1 2 3 M.

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DEV PROJECT

ALLIN CREEK, GOOSLY DEPOSIT AREA, OMINECA M.D., B.C.

CLAIM MAP

DRAWN BY	DATE	JOB No.	SCALE	MAP No.
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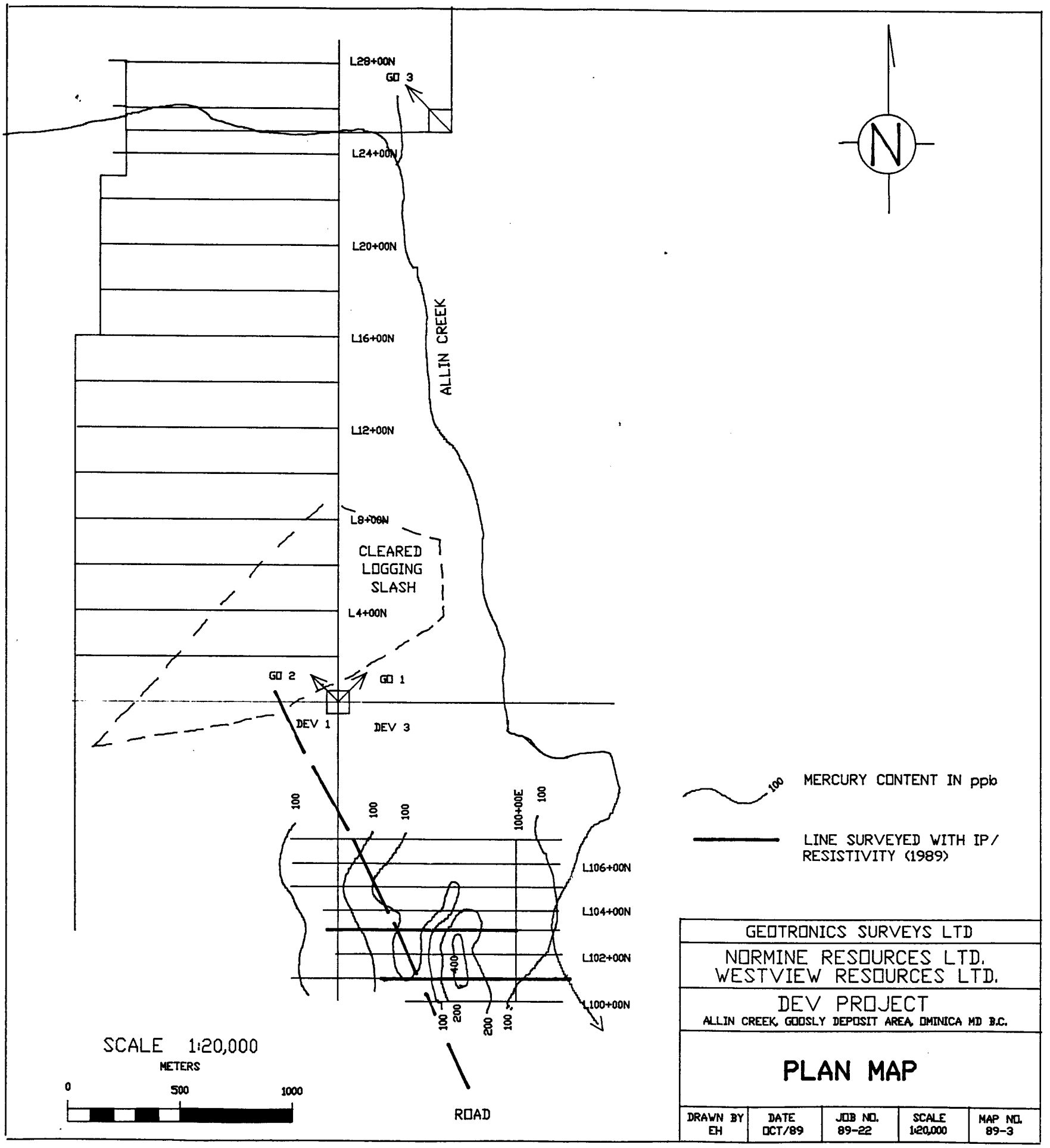

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DEV PROJECT

ALLIN CREEK, GOOSLY DEPOSIT AREA, DMINICA MD B.C.

PLAN MAP

DRAWN BY	DATE	JOB NO.	SCALE	MAP NO.
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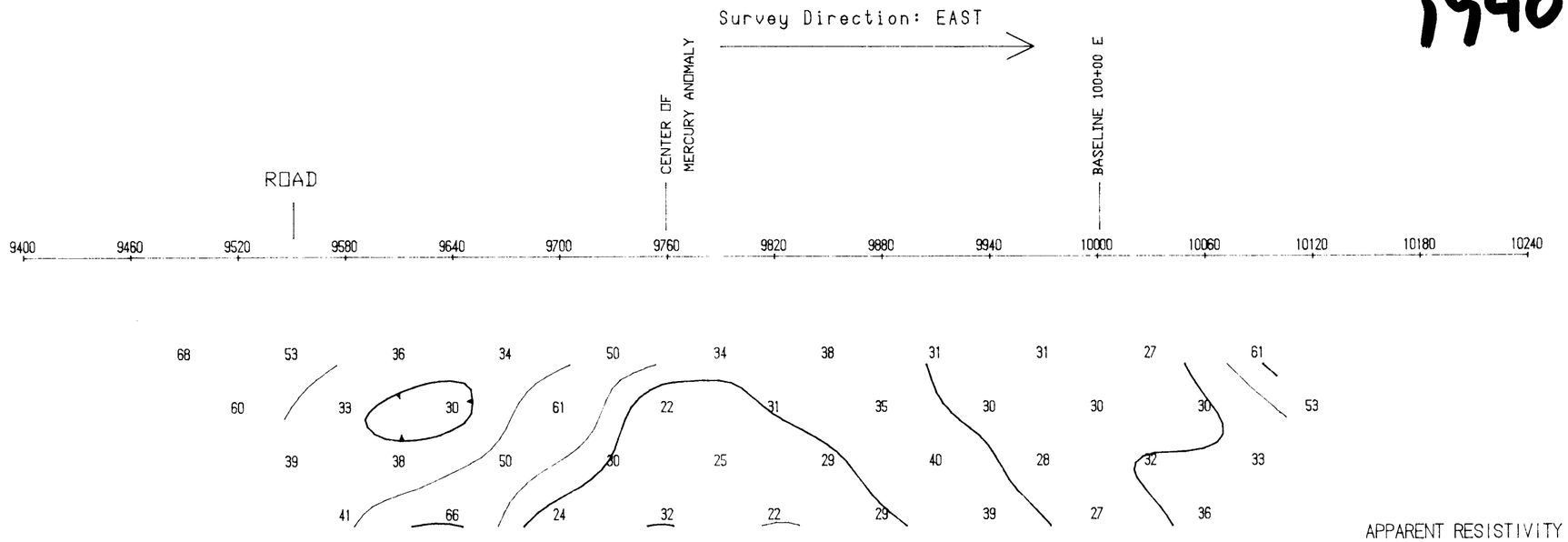
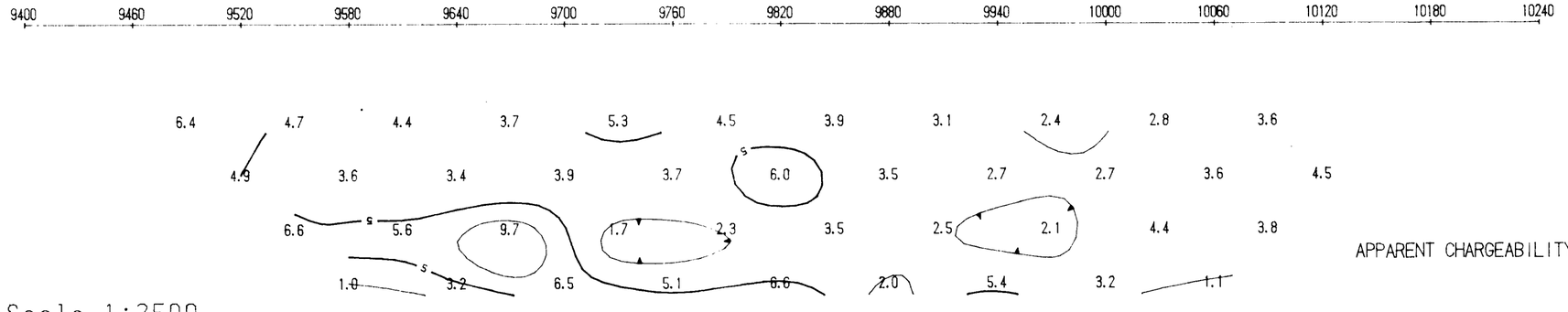
19409



APPARENT RESISTIVITY



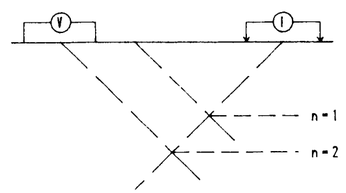
APPARENT CHARGEABILITY

Scale 1:2500

25 0 25 50 75 100 125
(metres)

Surveyed by GEOTRONICS SURVEYS LTD.
October, 1989

Pseudosection Plotting Method



LEGEND

Contour Intervals:
Resistivity : Log Base 10

Chargeability : 2.5 milliseconds

INSTRUMENTATION

Receiver:	Huntec Model MK IV
Transmitter/Generator:	Phoenix Model IPT-1 2.5 kWatt

SURVEY PARAMETERS

Survey Mode:	Time Domain
Array:	Double-Dipole
Dipole Length:	60 metres
Dipole separation:	n=1 to 4
Delay Time:	160 milliseconds
Integration Time:	1580 milliseconds
Charge Cycle:	8 second square wave

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DEV PROJECT

ALLIN CREEK, GOOSLY DEPOSIT AREA
OMINECA, B.C.

APPARENT RESISTIVITY and CHARGEABILITY
PSEUDOSECTIONS
LINE 101+00N

Drawn by:	Job No.	NTS	Scale	Date	Map No.
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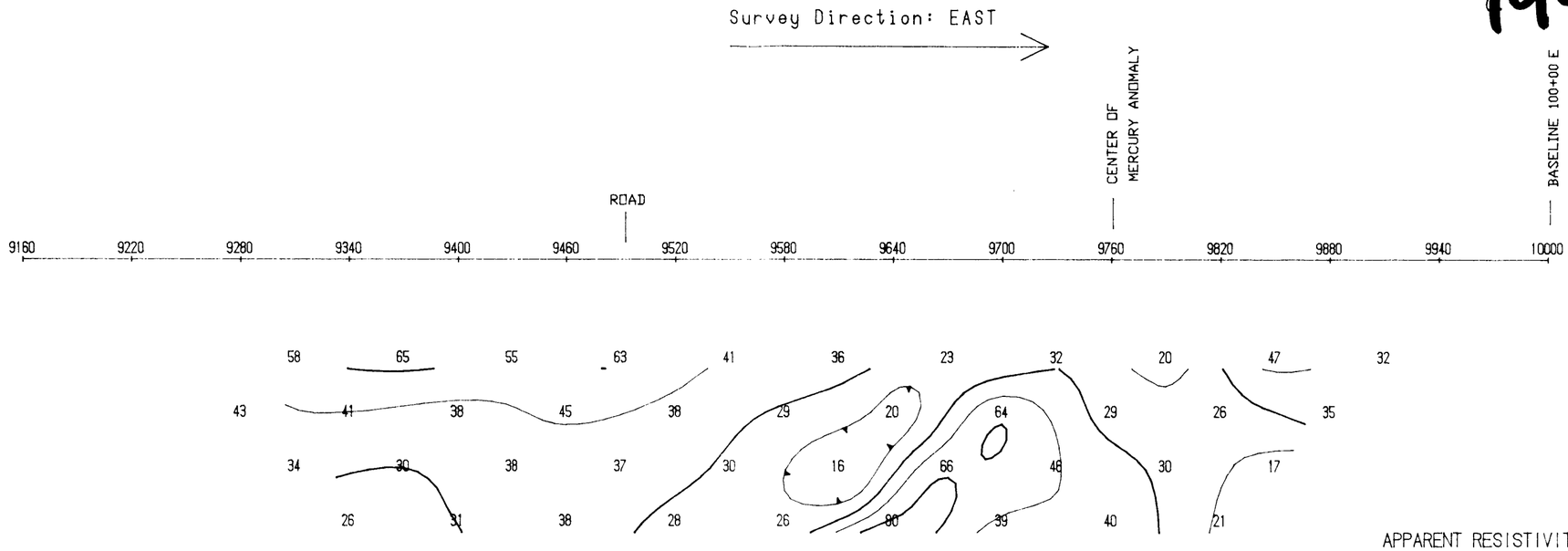
19409



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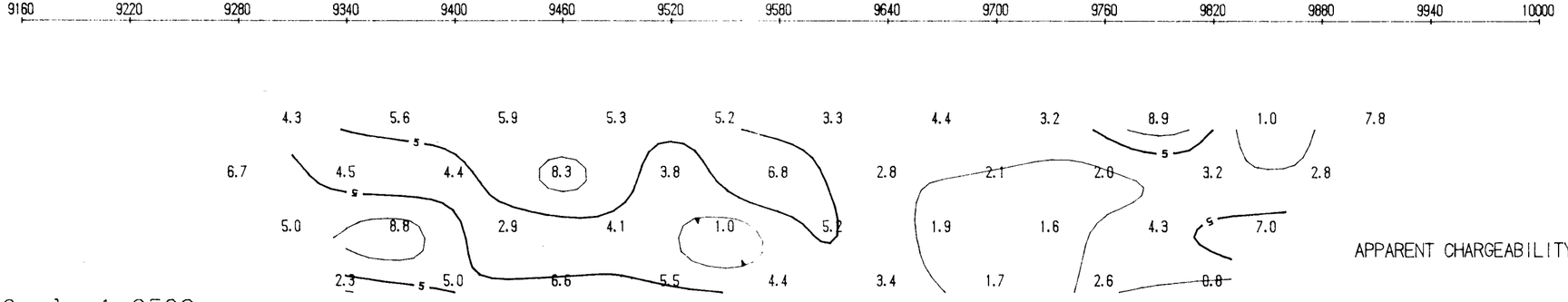
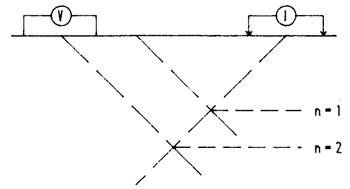


APPARENT CHARGEABILITY

Surveyed by GEOTRONICS SURVEYS LTD.
October, 1989

Pseudosection Plotting Method



LEGEND

Contour Intervals:
Resistivity : Log Base 10

Chargeability : 2.5 milliseconds

INSTRUMENTATION

Receiver:	Huntec Model MK IV
Transmitter/Generator:	Phoenix Model IPT-1 2.5 kWatt

SURVEY PARAMETERS

Survey Mode:	Time Domain
Array:	Double-Dipole
Dipole Length:	60 metres
Dipole seperation:	n=1 to 4
Delay Time:	160 milliseconds
Integration Time:	1580 milliseconds
Charge Cycle:	8 second square wave

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DEV PROJECT

ALLIN CREEK, GOOSLY DEPOSIT AREA,
OMINECA M.D., B.C.

APPARENT RESISTIVITY and CHARGEABILITY
PSEUDOSECTIONS
LINE 103+00N

Drawn by:	Job No.	NTS	Scale	Date	Map No.
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