A Geophysical Report on an Induced Polarization and Magnetic Survey on the Huckleberry Mine Property

Omineca Mining Division

NTS 93E/11
Latitude 53° 41' N
Longitude 127° 10' W

Owner and Operator:
Huckleberry Mines Ltd.
Suite 420 - 355 Burrard Street
Vancouver, B.C.
V6C 2G8

By
Steve Blower

March 7, 2000

Table of Contents

List of Figures

Appendix

1.0 Summary

During the period November 1 to November 20, 1999, a total of 18 km of grid lines were cut and surveyed with Induced Polarization/Resistivity (IP) and Magnetic (Mag) geophysics at the TMF2 West zone at the Huckleberry Mine site. The TMF2 West target area is located immediately west of the TMF2 tailings impoundment area. The eastern end of the grid is located about 2 km west of the Main zone pit. The work identified several subtle features in the IP, Resistivity and Mag data that warrant follow up.

2.0 Location, Access and Physiography

The Huckleberry Mine is located 120 km south of Smithers, B.C., approximately 1 km north of the Kemano reservoir (figure 1). Access to the property is by 121 km of good quality all weather forest service road (Morice FSR) leading southwest from Houston. Relief on the property is moderate with Huckleberry mountain (1526 m.) forming the highest point of the property on the north side of the claims. The mine is located in an east-west oriented valley south of Huckleberry Mtn. at an elevation of 1030 m. The treeline is located at approximately 1500m.

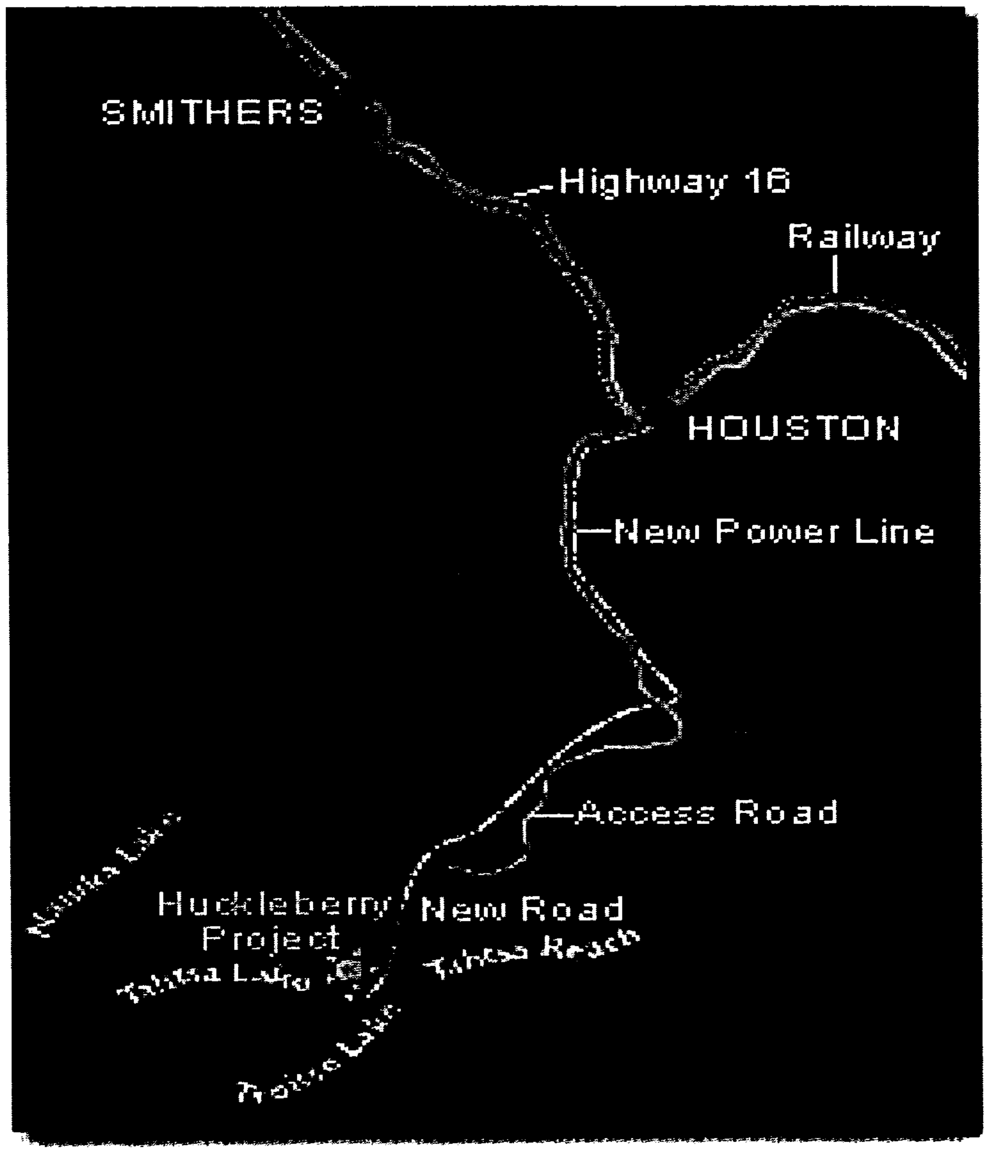
3.0 Claim Status

The property is 100% owned by Huckleberry Mines Ltd. Table 1 summarizes the claim status. Figure 2 shows the claim locations.

Table 1 - Claim Status

	Name	Tenure #	Units	Recorded	Expiry Date
Leases	ML353594	353594		June 25, 1997	June 25, 2000
Claims	Huckleberry 12	328396	10	July 19, 1994	December 15, 2005
	Huckleberry 11	328394	2	July 19, 1994	December 15, 2005
	Huckleberry 10	328386	4	July 19, 1994	December 15, 2005
	Huckleberry 9	328385	18	July 19, 1994	December 15, 2005
	Huckleberry 8	328383	4	July 19, 1994	December 15, 2005
	White	326499	20	June 12, 1994	December 15, 2005
	Huckleberry 7	328382	2	July 19, 1994	December 15, 2005
	Huckleberry 6	328381	4	July 19, 1994	December 15, 2005
	Huckleberry 5	328380	9	July 19, 1994	December 15, 2005

Figure 1 - **Location Map**



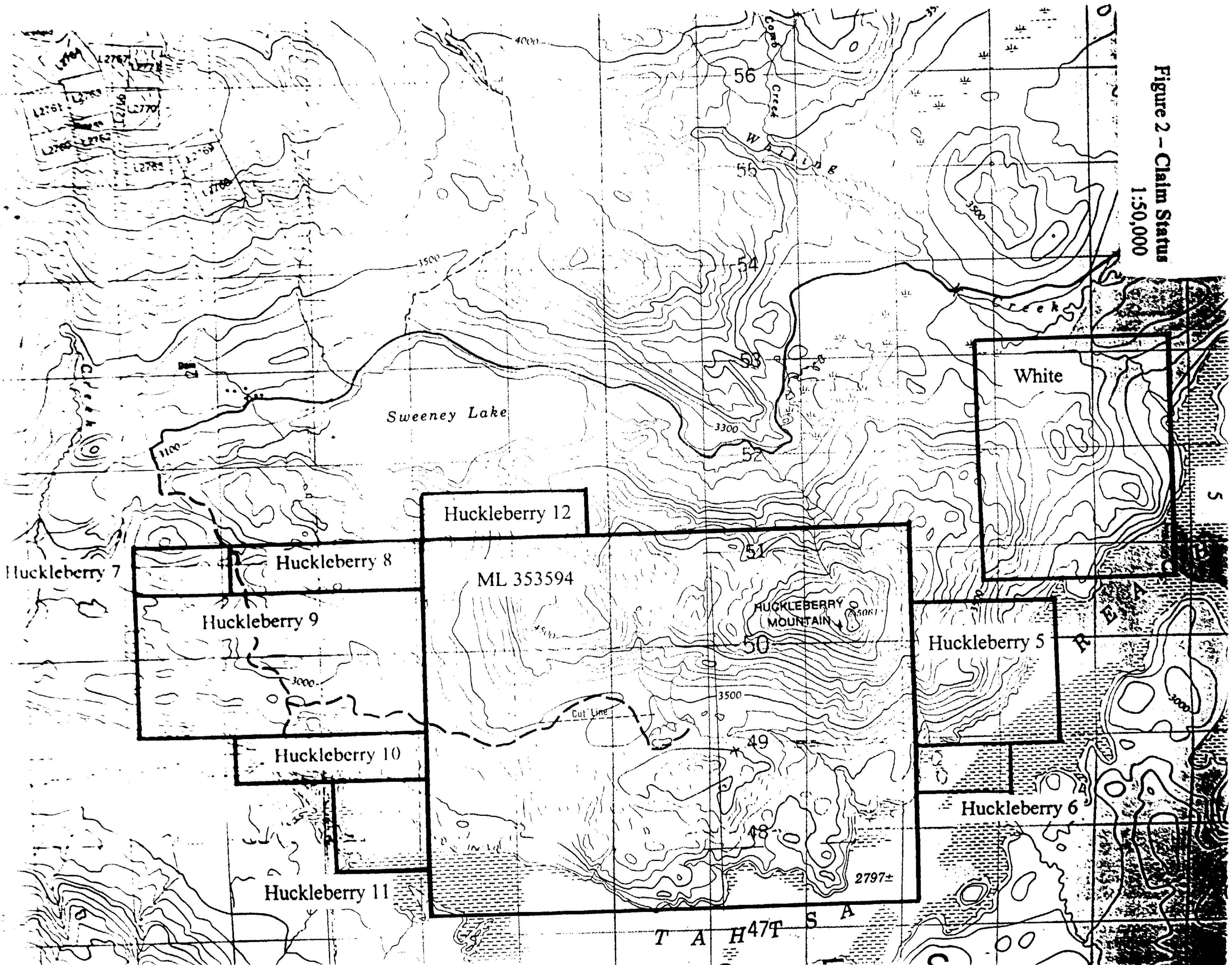


Figure 2 – Claim Status
1:50,000

4.0 History

Kennco Explorations Ltd. in 1962 originally discovered copper mineralization while investigating the source of anomalous stream water and stream sediment samples collected in 1960. Chalcopyrite, tenorite, and malachite were located in a small outcrop of granodiorite that has since come to be known as the Main zone stock. Kennco carried out extensive programs of mapping, geochemistry, geophysics, trenching and core drilling at the Main zone over the period 1962-1971. Granby Mining Company Ltd. optioned the property in 1972 and completed an extensive program of definition diamond drilling over the Main zone. The property remained idle until 1988 when Noranda completed a program of soil and rock geochemistry over a zone of gold bearing quartz and arsenopyrite veins.

New Canamin Resources Ltd. optioned the property from Kennecott in 1992 and drilled additional holes at the Main zone before discovering a new zone of mineralization (the East zone) during a program of geotechnical drilling at a proposed tailings disposal site. An extensive program of diamond drilling was completed in 1993 and 1994 to define the East zone deposit (Jackson and Illerbrun, 1995). New Canamin was acquired by Princeton Mining in 1995 and construction of the mining and milling facilities was begun. Production followed in September of 1997.

5.0 Regional Geology

Regionally the area is underlain by sedimentary and volcanic rocks of the Early to Middle Jurassic Hazelton Group. The Hazelton Group is primarily an island-arc complex of andesitic to dacitic calc-alkaline volcanics with interbedded sediments. Middle to Late Jurassic Bowser Lake Group sedimentary rocks and Early Cretaceous Skeena Group sediments and volcanics locally overlie (unconformably) the Hazelton Group.

Many Late Cretaceous to Early Tertiary intrusive bodies intrude the Jurassic and Cretaceous rocks. Significant copper mineralization is related to several of these intrusives - most notably the Late Cretaceous Bulkley Suite. The Bulkley Intrusions are commonly hornblende-biotite granodiorite stocks and larger zoned intrusions. Some associated mineral deposits include Huckleberry, Whiting Creek and Ox Lake (MacIntyre, 1985).

6.0 Property Geology

6.1 Lithology

The Huckleberry mine property is dominated by Telkwa Fm. pyroclastic andesites of the Hazelton Gp.. They are typically bedded lapilli and ash tuffs with minor massive flows (?) when encountered in relatively unaltered outcrops. Near the East and Main deposits, however, the rocks are intensely altered and primary textures are usually obliterated. Outcrop is very scarce to the west of the TMF2 tailings impoundment and the geology there is not well documented. However, a few outcrops of a volcanic conglomerate or crowded heterolithic lapilli tuff are present. The unit is commonly pyritic, especially near the TMF2 tailings dam.

6.2 Alteration

The volcanics near the East and Main zones have been altered to a biotite-magnetite hornfels within the thermal aureole of the granodiorite bodies. Potassic alteration also occurs within the intrusives as secondary biotite and orthoclase envelopes around quartz veins. Alteration grades outward away from the intrusives to a zone of widespread chlorite and pyrite (propylitic) alteration. Minor zones of clay and sericite alteration can be found locally as isolated, structurally controlled lenses.

6.3 Mineralization

Sulphide mineralization is simple and consists of chalcopyrite (1-3%), molybdenite (<0.3%), and pyrite (1-3%) within the core of the mineralized areas – grading outward to a pyrite rich (1-5%) halo with minor chalcopyrite (0-0.3%). Only traces of supergene chalcocite and native copper have been seen near the overburden contact. Minor malachite and tenorite can occur at the bedrock surface, especially on the flanks of the hills outside of the pit limits on either side of the Huckleberry valley – but rarely exist below the top 10 m. of bedrock. Within the open pits, secondary copper minerals are very rare.

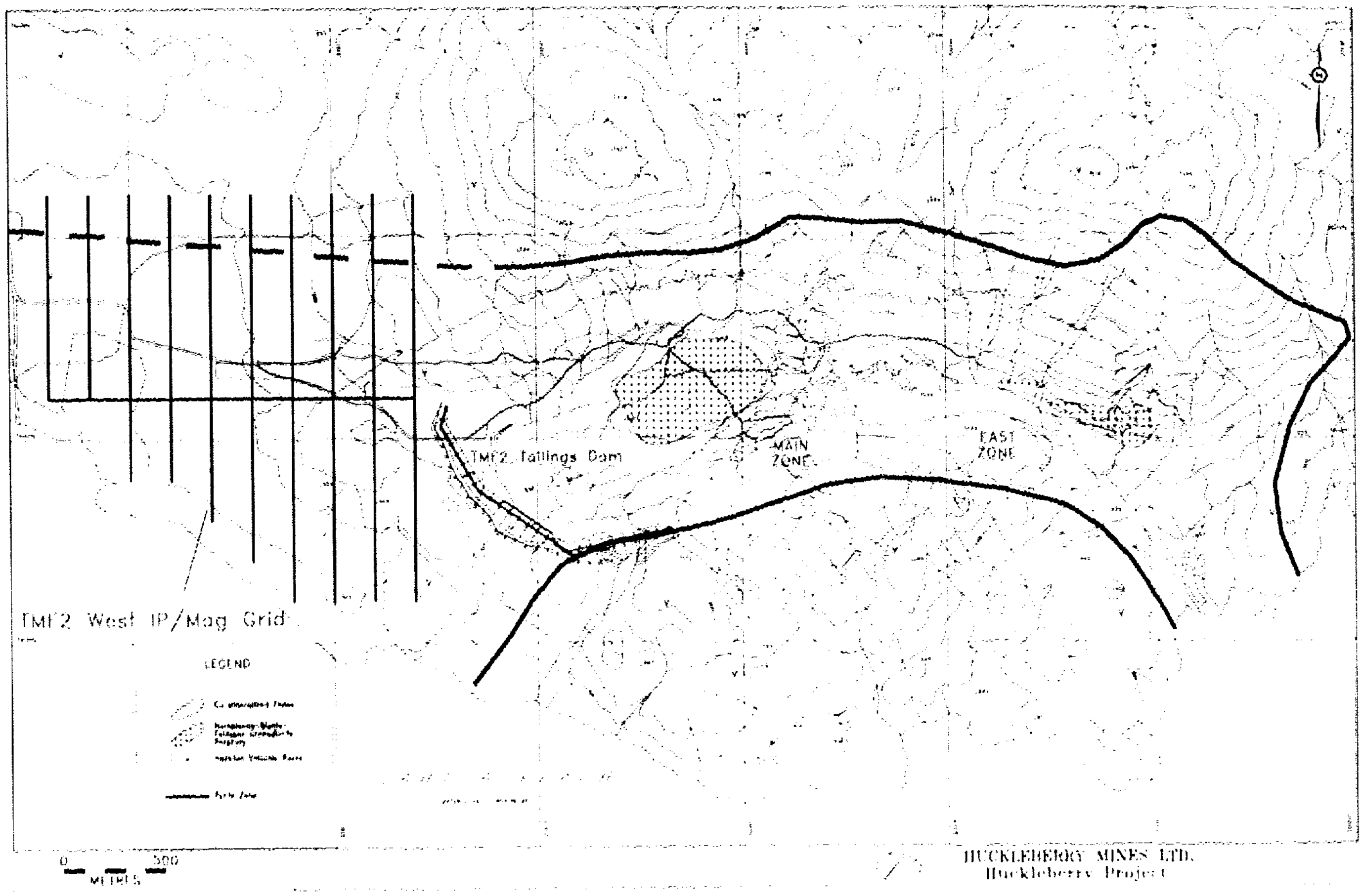
Most (80%) of the sulphides occur as fracture fillings – especially within the volcanics. The rest of the sulphides occur with quartz in veins 5-30 mm thick. In the granodiorite, the ratio is reversed – with most (70%) of the sulphides occurring with quartz in veins while the remainder occurs as disseminations and fracture fillings.

6.4 Structure

Mineralization at Huckleberry is strongly structurally controlled. For example in the East zone starter pit, the E105 fault (oriented at 105/75 NE) localizes high grade mineralization in its footwall and also offsets copper grade boundaries dextrally. As well, most of the chalcopyrite and molybdenite bearing quartz veins within the volcanics are oriented subparallel to this fault.

A similar but orthogonal structural pattern seems to exist in the Main zone where a fault system oriented at 020/70E localizes most of the high grade mineralization.

Figure 3 - **Property Geology and Grid Location**



7.0 Work Performed

The objective of the IP and Mag survey was to locate additional mineralization along the east-west Huckleberry trend to the west of the TMF2 tailings impoundment. Thick glacial till cover in this area may have hidden sulphide bodies from previous explorationists.

Between November 1 and November 6, 1999, 18 km of north-south grid lines were cut with a line spacing of 200 m. along an 1800 m. baseline. Figure 2 shows the grid layout. The grid coordinates match the Huckleberry mine grid and the starting point for the base line (11400E, 14+200N was surveyed before the grid was cut. The lines were surveyed with induced polarization and magnetic geophysics by Lloyd Geophysics Inc. of Vancouver, B.C. during the period November 9-20. They employed a pole-dipole array with a dipole length of 50 m. (n=1 to 6). The details on instrumentation and sampling methods are summarized within the appended report prepared by Lloyd Geophysics.

8.0 Results

Figures 4 and 5 (back pocket) show the triangular filtered chargeabily and resitivity contours. Figure 6 (back pocket) is a contoured map of the total field magnetic data.

9.0 Conclusions and Recommendations

The chargeability data (figure 5 in the appended report from Lloyd Geophysics) shows a pronounced high (18-40+ ms) area on the east end of the grid that extends to 11000E but diminishes rapidly beyond that. This may represent the western edge of the pyrite halo surrounding the Huckleberry mineralized trend. Further to the east a small area of weak chargeability response (8-10 ms) occurs along 9800E.

A pronounced east-west break in the resistivity data (figure 6 in the Lloyd Geophysics report) occurs at about 14500N. This may represent a large structure that could potentially localize sulphide mineralization.

The magnetic data displays several east-west and northeast-southwest trends that maybe late magnetic dykes. As well a large magnetic low zone occurs in the southwest corner of the grid.

Follow-up rotary drilling should be carried out on:

1. The weak chargeability high zone on Line 9800E,
2. The resistivity low zones along 14500N and 10400E, and
3. The magnetic low in the southwest corner of the grid.

10.0 Bibliography

Jackson, A. and Illerbrun, K. (1995), **Huckleberry porphyry copper deposit, Tahtsa Lake district, west-central British Columbia**, in Porphyry Deposits of the Northwest Cordillera of North America, CIM Special Volume 76.

McIntyre, D.G. (1985), **Geology and Mineral Deposits of the Tahtsa Lake District, West Central B.C.**, EMPR Bulletin #75.

11.0 Cost Statement

Item		Cost (including GST)
Line cutting	18km x $458/km	$8244
Geophysics	11 days x $2548 (incl. exp)	$28028
Supervision and Report Writing	4 days @ $250/day	$1000
Total		**$37272**

12.0 Statement of Qualification

I, Steven J. Blower, of Smithers, B.C. certify that:

- I am a graduate of the U. of British Columbia with a B.Sc. degree in geology.
- I am also a graduate of Queen's University with an M.Sc. degree in geology.
- I have been involved with the exploration and mining industry since my graduation from U.B.C. in 1988 (10 years).
- I am employed by Huckleberry Mines Ltd. of Suite 420-355 Burrard St. Vancouver, B.C..
- I personally supervised this linecutting and geophysical program.
- I am the author of this report.

Steve Blower March 7, 2000

Appendix

Report by Lloyd Geophysics

HUCKLEBERRY MINES LTD.

A GEOPHYSICAL REPORT ON
AN INDUCED POLARIZATION AND GROUND MAGNETIC SURVEY
ON THE TMF2 WEST TARGET
HUCKLEBERRY MINE AREA, BRITISH COLUMBIA

OMINECA MINING DIVISION

NTS 93E/11
LATITUDE 53°41'N
LONGITUDE 127°10'W

BY

S. John A. Cornock, B.Sc.

LLOYD GEOPHYSICS INC.
VANCOUVER, BRITISH COLUMBIA

DECEMBER 1999

Lloyd Geophysics

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

From November 7th to November 21st, 1999, Lloyd Geophysics Inc. carried out Induced Polarization and ground magnetic surveys on the TMF2 West target for Huckleberry Mines Ltd.

The purpose of these surveys was to locate and identify the pyrite halo and alteration zones associated with a porphyry system.

2.0 PROPERTY LOCATION AND ACCESS

The TMF2 West target is located in the West Dam area at the Huckleberry Mine approximately 138 kilometres southwest of Houston, British Columbia. It is centered at 53°41'N latitude, 127°10'W longitude in the Omineca Mining Division, NTS 93E/11 (Figure 1).

Access to the property is by truck along Forest Service roads from Houston, British Columbia.

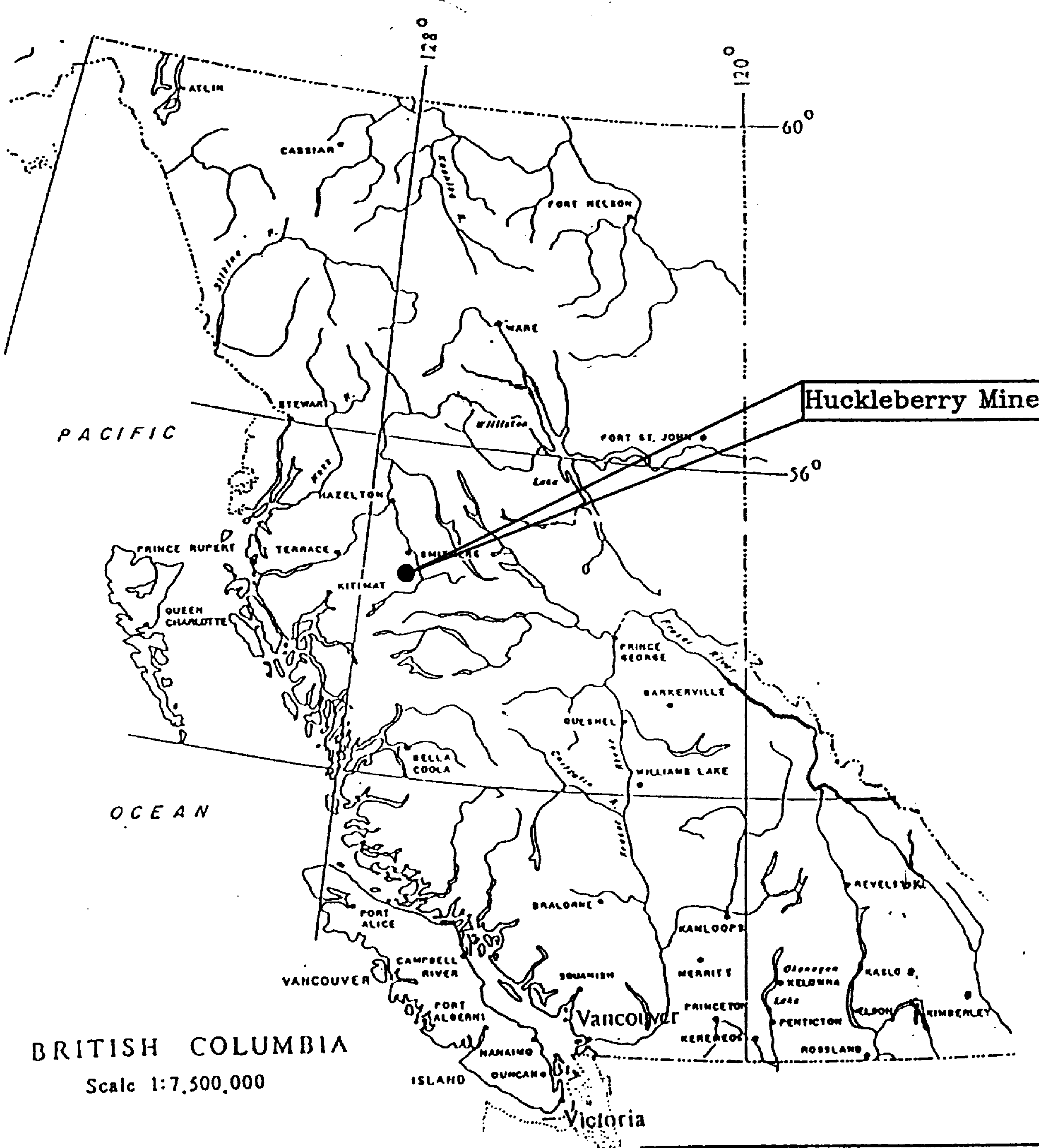
3.0 INSTRUMENT SPECIFICATIONS

3.1 Induced Polarization Survey Equipment

The equipment used to carry out this survey was a time domain measuring system consisting of a Honda 6500 motor generator and a VIP 4000 transmitter manufactured by Iris Instruments Ltd, Orleans, France and a six channel ELREC-6 receiver manufactured by BRGM Instruments, Orleans, France.

The transmitter was operated with a cycle time of 8 seconds and the duty cycle ratio: [(time on)/(time on + time off)] was 0.5 seconds. This means the cycling sequence of the transmitter was 2 seconds current "on" and 2 seconds current "off" with consecutive pulses reversed in polarity.

The IP-6 receiver can measure up to 6 dipoles simultaneously. It is microprocessor controlled, featuring automatic calibration, gain setting, SP cancellation and fault diagnosis. To accommodate a wide range of geological conditions, the delay time, the window widths and hence the total integration time is programmable via the keypad. Measurements are calculated automatically every 2 to 4 seconds from the averaged waveform which is accumulated in memory.



HUCKLEBERRY MINES LTD.

TMF2 West Target, Huckleberry Mine Area
Omineca Mining Division

PROPERTY LOCATION

FIGURE 1 **NTS 93E/11**

LLOYD GEOPHYSICS INC.

The window widths of the IP-6 receiver can be programmed arithmetically or logarithmically. For this particular survey the instrument was programmed arithmetically into 10 equal window widths or channels, Ch_0, Ch_1, Ch_2, Ch_3, Ch_4, Ch_5, Ch_6, Ch_7, Ch_8, Ch_9 (see Figure 2). These may be recorded individually and summed up automatically to obtain the total chargeability. Similarly, the resistivity (ρ_a) in ohm-metres is also calculated automatically.

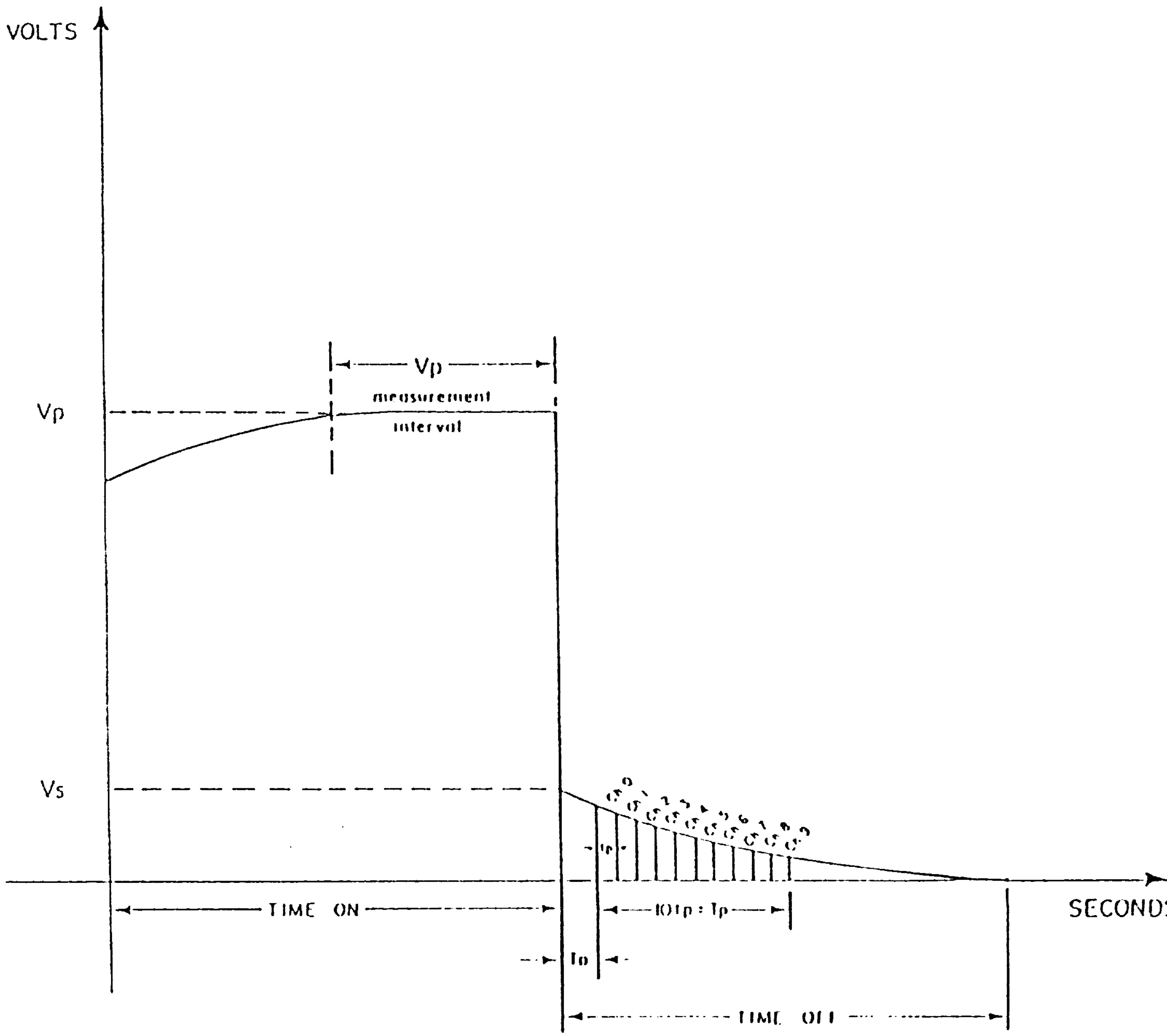
The instrument parameters chosen for this survey were as follows:

Cycle Time (T_c)	= 8 seconds
Ratio $\frac{\text{(Time On)}}{\text{(Time Off)}}$	= 1:1
Duty Cycle Ratio $\frac{\text{(Time On)}}{\text{(Time On) + (Time Off)}}$	= 0.5
Delay Time (T_D)	= 120 milliseconds
Window Width (t_p)	= 90 milliseconds
Total Integration Time	= 900 milliseconds

3.2 Ground Magnetic Survey Equipment

The equipment used on this survey was the OMNI Plus ground magnetometer and an OMNI IV recording base station magnetometer both manufactured by EDA Instruments Inc., Toronto, Canada.

The system is completely software/microprocessor controlled. A portable proton precession magnetometer measures and stores in memory the total earth's magnetic field at the touch of a key. It also identifies and stores the location and time of each measurement and computes the statistical error of the reading and stores the decay and strength of the signal being measured. Throughout each survey day a similar base station magnetometer measures and stores in memory the daily fluctuations of the earth's magnetic field. The use of two magnetometers eliminates the need for a network of base stations on the grid. At the end of each day, the field data is merged with the base station data in the field computer and automatic diurnal corrections are applied to correct the field data, resulting in a very accurate (+/- 5 nT) measurement of the earth's total magnetic field.



BRGM IP-6 RECEIVER PARAMETERS

Figure 2

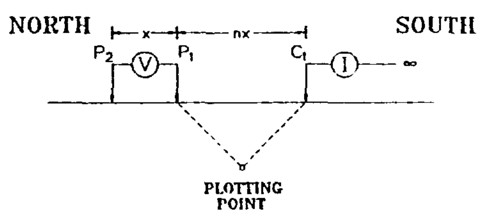
Lloyd Geophysics

4.0 SURVEY SPECIFICATIONS

4.1 Induced Polarization Survey Specifications

The configuration of the pole-dipole array used for the survey is shown below:

POLE–DIPOLE ARRAY



x = 50 metres   n = 1,2,3,4,5 and 6

The dipole length (x) is the distance between P_1 and P_2 and mainly determines the sensitivity of the array. The electrode separation (nx) is the distance between C_1 and P_1 and mainly determines the depth of penetration of the array.

The Induced Polarization survey was carried out with the current electrode, C_1, **south** of the potential measuring dipole P_1P_2. Here the survey lines were 200 metres apart and measurements were taken for x = 50 metres and n = 1,2,3,4,5 and 6.

4.2 Ground Magnetic Survey Specifications

The ground magnetic data was acquired at 12.5 metre station intervals on lines 200 metres apart.

5.0 DATA PROCESSING

The data collected was processed in the field at the end of each survey day using a portable 486 computer and a Fujitsu printer.

The IP pseudo-sections were plotted out in the field and contoured using in-house software based on the mathematical solution known as kriging.

In the office, the data was transferred to mylar using a PENTIUM P90 computer coupled to an HP DesignJet plotter for the preparation of the final maps and pseudo-sections.

6.0 DISCUSSION OF RESULTS

An IP response depends largely on the following factors:

1. The volume content of sulphide minerals
2. The number of pore paths that are blocked by sulphide grains
3. The number of sulphide faces that are available for polarization
4. The absolute size and shape of the sulphide grains and the relationship of their size and shape to the size and shape of the available pore paths.
5. The electrode array employed
6. The width, depth, thickness and strike length of the mineralized body and its location relative to the array.
7. The resistivity contrast between the mineralized body and the unmineralized host rock.

The sulphide content of the underlying rocks is one of the critical factors that we would like to determine from field measurements. Experience has shown that this is both difficult and unreliable because of the large number of variables, described above, which contribute to an IP response. The problem is further complicated by the fact that rocks containing magnetite, graphite, clay minerals and variably altered rocks produce IP response of varying amplitudes.

A detailed study has been made of the pseudo-sections which accompany this report. These pseudo-sections are not sections of the electrical properties of the sub-surface strata and cannot be treated as such when determining the depths, width and thickness of a zone which produces an anomalous pattern. The anomalies are classified into 4 groups; definite, probable, and possible anomalies and anomalies which have a much deeper source. These latter anomalies are mostly related to deeper overburden cover.

This classification is based partly on the relative amplitudes of the chargeability and to a lesser degree on the resistivity response. In addition the overall anomaly pattern and the degree to which this pattern may be correlated from line to line is of equal importance.

The IP survey on the TMF2 West target has defined a strong chargeability high along the east edge of the grid (See Figure 5). Chargeability values within this zone increase to over 62 milliseconds above a background of around 8 milliseconds. Geological information obtained immediately to the east, where the tailings pond now lies, suggests that this chargeability anomaly is due to a high pyrite concentration in the underlying rocks which contain little or no chalcopyrite.

Other chargeability anomalies located on the grid are weak, narrow zones which are interpreted as faults and/or possibly dykes. These anomalies are indicated on the accompanying pseudosections.

The resistivity map (Figure 6), and to some extent the magnetic contour map (Figure 3), provides a significant amount of information regarding the geology of this area. First of all, there appear to be two parallel faults, labelled F1 and F2 on the resistivity map, which strike approximately 85 degrees. F1, the more northern fault, strikes from 14450N on line 9600E to 14600N on line 11400E and has a coincident low magnetic response. F2 is roughly 400 metres south of F1 and extends from around 14050N on line 10000E to 14200N on line 11400E. The magnetic response does not define this fault as well as it does F1 but it is associated, for the most part, with relatively low magnetic values. The second feature observed on the resistivity map is a zone of low resistivity approximately 400 metres wide which extends from the south edge of the grid at 10600E to the north end of the grid at 10200E. The higher resistivity zones to the north of F1 and south of F2 are believed to be the same rocks. It appears that these low resistivity zones are igneous rocks which have cross-cut and intruded into the higher resistivity rocks.

There was a concern that a thick, dense layer of till-like material may have hindered the penetration of the signal thus resulting in the flat IP response across most of the grid. The resistivity data shows a number of different rock types and geological contacts and/or faults which go to depth. If there was an impermeable layer of material one would not see these changes in resistivity as it would appear as a uniform, probably highly resistive layer. It would be similar to taking readings in an area where there was permafrost.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The IP and ground magnetic surveys described in this report provided some geological information which could be useful in the planning of future exploration programmes. The surveys were not however successful in locating a central intrusive body and its surrounding pyritic halo related to large porphyry-style systems.

Respectfully submitted,

LLOYD GEOPHYSICS INC.

John Cornock, B.Sc.,
Geophysicist

APPENDIX A

PERSONNEL EMPLOYED ON SURVEY

Name	Occupation	Address	Dates Worked
J. Cornock	Geophysicist	#455-409 Granville Street Vancouver, B.C. V6C 1T2	Nov. 7-21/99 Dec. 28-30/99
G. Hoornenborg	Geophysical Technician	#455-409 Granville Street Vancouver, B.C. V6C 1T2	Nov. 7-21/99
G. Boothe	Helper	#455-409 Granville Street Vancouver, B.C. V6C 1T2	Nov. 7-21/99
J. Struthers	Helper	#455-409 Granville Street Vancouver, B.C. V6C 1T2	Nov. 7-21/99
L. Davis	Helper	#455-409 Granville Street Vancouver, B.C. V6C 1T2	Nov. 7-21/99

APPENDIX B

COST OF SURVEY AND REPORTING

The acquisition of the IP data was contracted on a per diem basis while the ground magnetic data was acquired on a per kilometre rate. Mobilization/Demobilization, truck rental, living and travelling expenses, data processing, reprographics and interpretation, and report writing were additional costs. The breakdown of these costs is as follows:

Mobilization/Demobilization and Data Acquisition		$22,342.88
Truck Charges		1,761.10
Living and Travelling		754.75
Data Processing and Reprographics		1,386.72
Interpretation and Report Writing		1,360.00
	Subtotal	$27,605.45
	G.S.T.	1,932.38
	Total Cost:	$29,537.83

APPENDIX C

CERTIFICATION OF AUTHOR

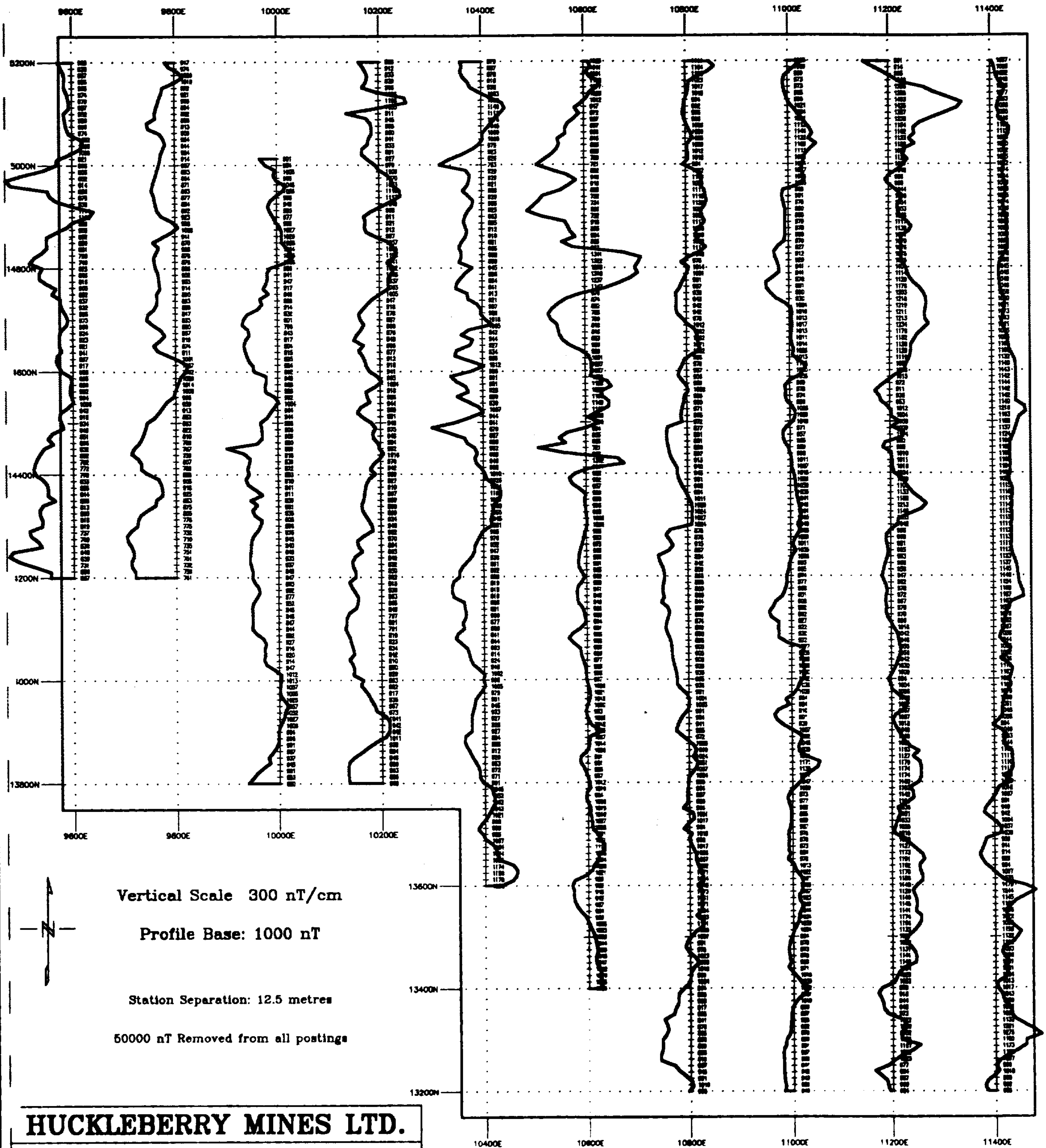
I, John A. Cornock, of #455 - 409 Granville Street, in the City of Vancouver, in the Province of British Columbia, do hereby certify that:

1. I graduated from the University of British Columbia in 1986 with a B.Sc. in Geology and a minor in Geophysics.

2. I am a member in good standing of the Society of Exploration Geophysicists of America, British Columbia Geophysical Society, British Columbia and Yukon Chamber of Mines and the Northwest Mining Association.

3. I have practised my profession continuously since 1987.

Vancouver, B.C.



HUCKLEBERRY MINES LTD.

TMF2 West Target

West Dam Area, Huckleberry Mine

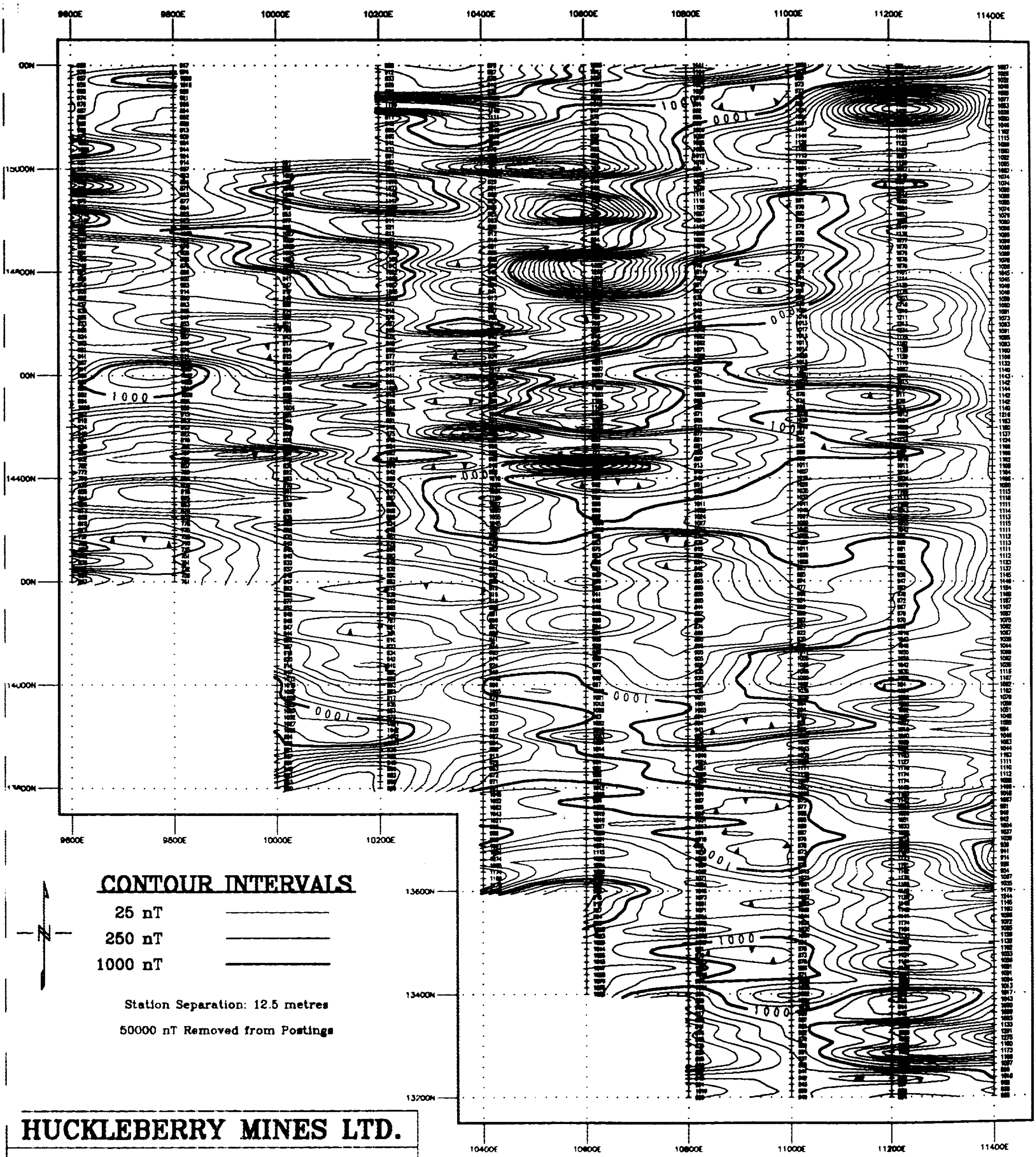
TOTAL FIELD MAGNETICS

Scale 1:10000 NTS 93E/11 Drawing No. 99437-11

LLOYD GEOPHYSICS INC.

Scale 1:10000

Figure 3



CONTOUR INTERVALS

25 nT

250 nT

1000 nT

Station Separation: 12.5 metres

50000 nT Removed from Postings

HUCKLEBERRY MINES LTD.

TMF2 West Target

West Dam Area, Huckleberry Mine

TOTAL FIELD MAGNETICS

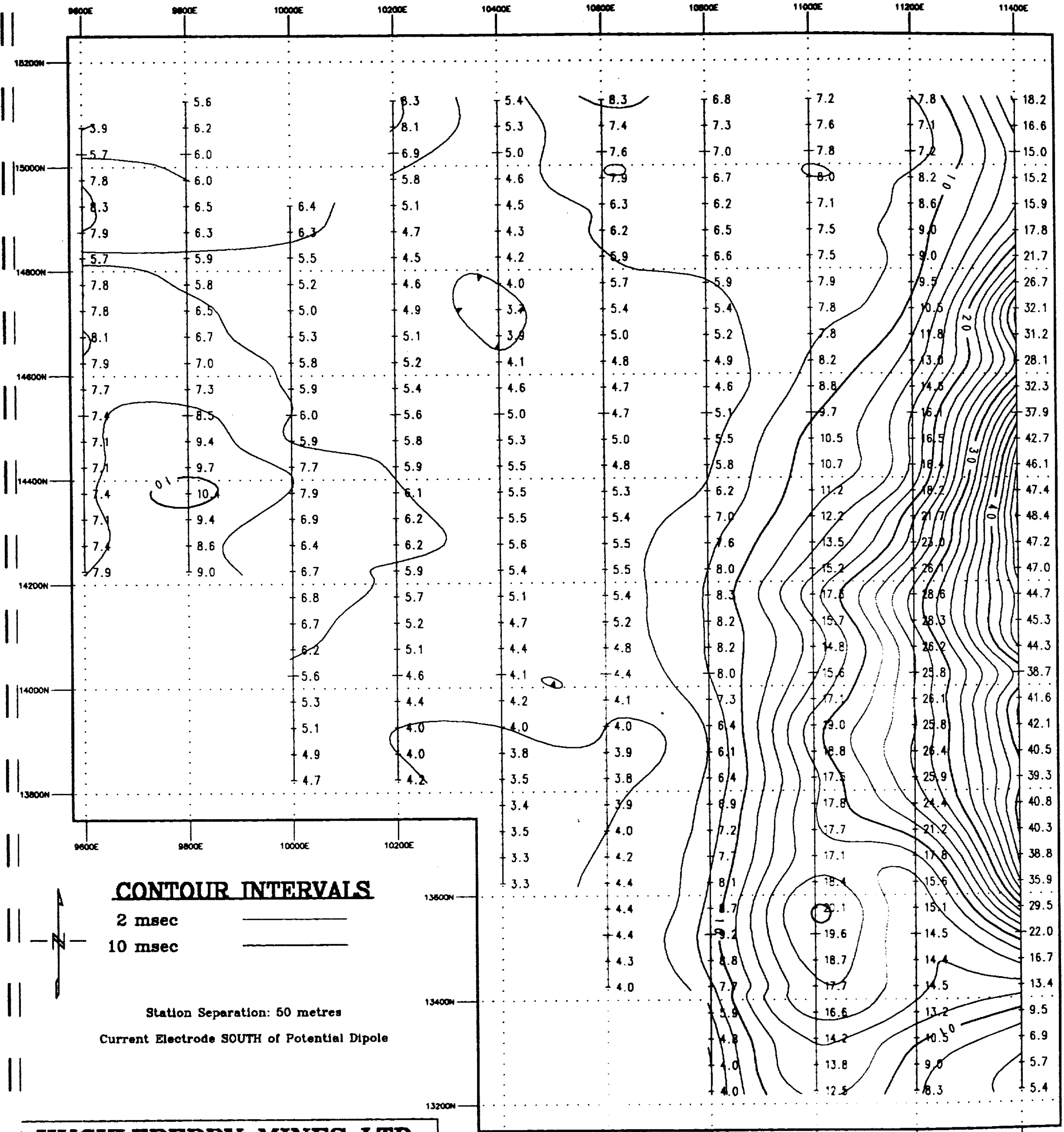
Scale 1:10000 NTS: 93E/11 Drawing No: 99437-12

LLOYD GEOPHYSICS INC.

Scale 1:10000

100 0 100 200 300 400

Figure 4



HUCKLEBERRY MINES LTD.

TMF2 West Target

West Dam Area, Huckleberry Mine

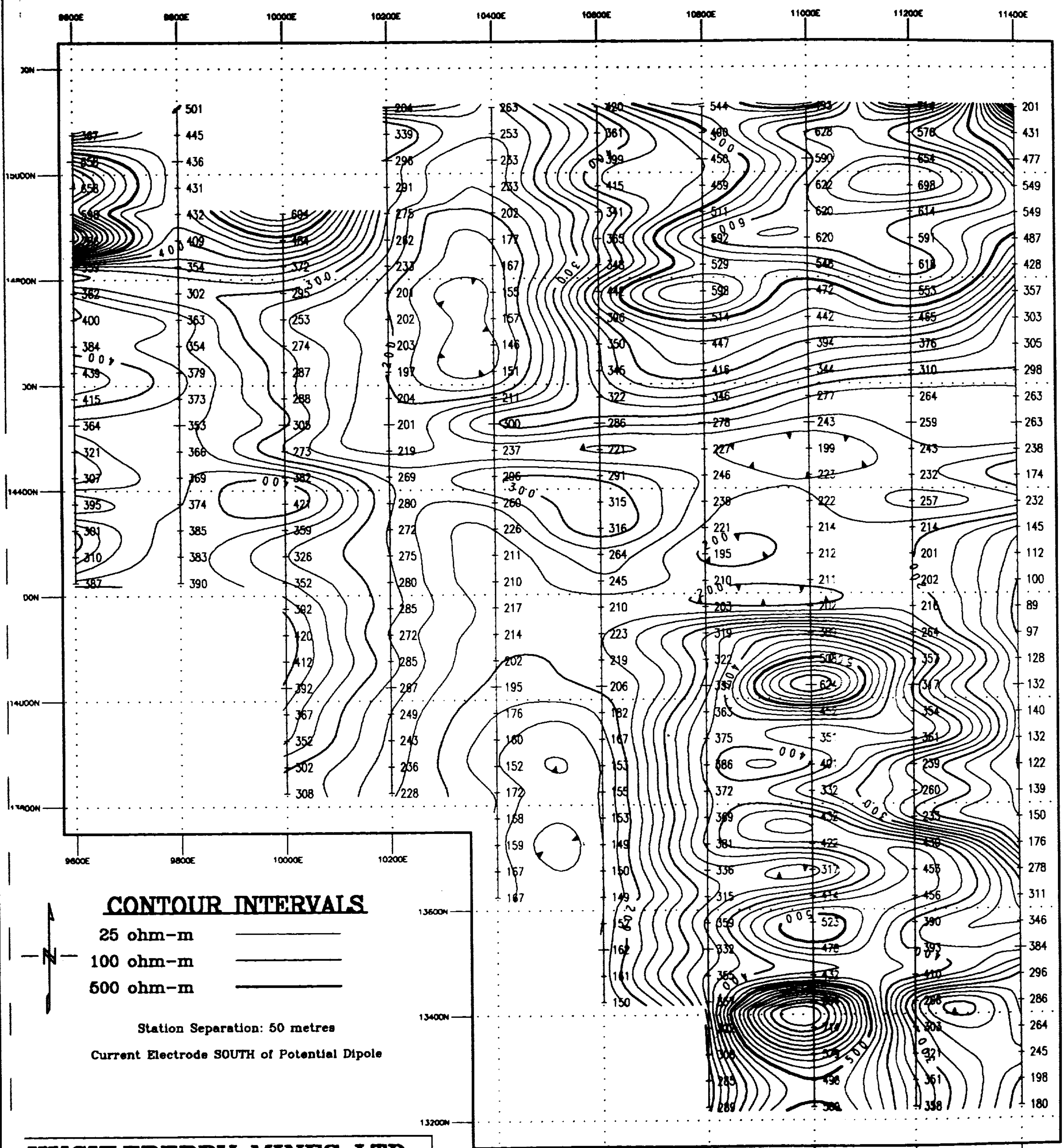
FILTERED CHARGEABILITY

Scale 1:10000 NTS 93E/11 Drawing No. 99437-13

LLOYD GEOPHYSICS INC.

Scale 1:10000

Figure 5



CONTOUR INTERVALS

25 ohm-m
100 ohm-m
500 ohm-m

Station Separation: 50 metres

Current Electrode SOUTH of Potential Dipole

HUCKLEBERRY MINES LTD.

TMF2 West Target

West Dam Area, Huckleberry Mine

FILTERED RESISTIVITY

Scale 1:10000 NTS 93E/11 Drawing No. 99437-14

LLOYD GEOPHYSICS INC.

Scale 1:10000

100 0 100 200 300 400

(metres)

Figure 6