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ACTION: Back from amendment 93.11.24 SP.
FILE NO:

INDUCED-POLARIZATION SURVEY

ON THE

CHACO BEAR GROUP

MINERAL CLAIMS

N.T.S. 94D

OMINECA MINING DIVISION

Latitude:	**56° 10' NORTH**
Longitude:	**126° 58' WEST**
Owner:	**S.E. APCHKRUM**
Operators:	**S.E. APCHKRUM**
	808 EXPLORATION SERVICES LTD.
Author:	**J.M. ASHTON, P.ENG.**
Consultants:	**DAVID G. MARK, GEOPHYSICIST**
	B.G. RICHARDS, P.ENG.
Submitted:	**6 JULY 1993**

Prepared by: **808 EXPLORATION SERVICES LTD.**
SUITE 201 - 518 BEATTY STREET
VANCOUVER, BRITISH COLUMBIA, V6B 2L3

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NTS 94D/2W
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INDUCED-POLARIZATION SURVEY
ON THE
CHACO BEAR GROUP MINERAL CLAIMS

SECTION 1.0 INTRODUCTION

The earliest work publicly recorded on the Chaco Bear claim group appears to be by Hamilton et al (1968). Apparently a number of quartz-carbonate veins with significant chalcopyrite mineralization had been discovered in and near the head of the creek which forms the headwaters of the Driftwood River. Stream sediment geochemistry was the reason given that lead to the discovery.

As a consequence Hartley conducted an ABEM Minigun horizontal loop electromagnetic (EM) survey over the vein discovery area and extended the survey to cover most of the central part of the valley area which forms the headwaters of the Driftwood River.

The EM survey was unsuccessful in locating any responsive electrical conductors. In this writer's opinion Hartley's report provided a good explanation for the lack of EM response over an apparently well developed system of veins containing significant chalcopyrite, which is a mineral generally very conductive in semi-massive or massive occurrences. He stated that the heavily mineralized vein matter comprised of chalcopyrite and specularite was a poor conductor when tested for continuous conductivity with an ohmmeter. The specularite was found to be a non-conductor; which is normally the case and the chalcopyrite did not always exhibit conductivity because of the electrical insulating effects of myriads of hairline fractures containing what appeared to be a limonite, a non-conductor.

Grains, blebs and semi-massive amounts of conductive material consistently isolated by the effects of insulating minerals such as limonite, hematite and specularite will not, in all probability, respond very well to the electromagnetic induction effect. Notwithstanding, there are many chronicled cases where massive sulphide bodies have not given EM anomalies.

In retrospect, the relative isolation of the conductive chalcopyrite from its neighbours might exhibit an excellent induced-polarization chargeability response when subjected to this measuring technique.

Geological reconnaissance of this area in 1984 by Donnelly et al resulted in the discovery of several quartz-carbonate veins containing high values in copper and gold. Few details were provided, but the lithogeochemical assay results as reported were extraordinary.

The Donnelly discoveries were followed up in 1985 by Hartley et al and included detailed prospecting, a geochemical soil survey, a VLF-EM survey, a magnetometer survey, rock sampling, and some geological mapping and resulted in the discovery of several zones which contained anomalous gold and base metal values (most significant is the copper mineralization).

In general, quartz-carbonate vein structures containing significant copper and gold values would appear to be ubiquitous wherever there is shear and joint development within the volcanic host rocks. Some of the vein structures were reported by Hartley to be up to 2 metres in width.

One large copper and zinc soils geochemical anomaly with an associated en-echelon gold in soils anomaly was delineated in the northwest quadrant of what was the Peteka 4 mineral claim and what is now the Chaco Bear 4 claim. The combined anomalous area is estimated to cover more than 250 acres (100 hectares).

What appears to be significant about this anomaly is that the copper-rich quartz-carbonate veins discovered by Hartley near Driftwood Creek in 1968 occupy the central part of this anomaly which is along the valley bottom. The magnitude of the copper geochemical response near the reported vein locations, although anomalous at 170 ppm Cu and 174 ppm Cu, are in the lower amplitude copper response area as compared to much higher values elsewhere.

Soil pH and Eh of this area is unknown; therefore, the degree to which copper ions are mobilized or fixed in the surrounding soil is not known. Also, the sample interval was 50 metres (164 feet), whereas the known veins of the order of one-half metre to a metre in width at the bottom of the topography, yet a large area upslope shows relatively strong anomalous character which suggested that the unexposed upslope bedrock may contain a significant number of vein structures.

Therefore, given the apparently disseminated nature of the chalcopyrite in the veins and the large upslope area of positive copper geochemistry and the fact that Hartley et al found significant gold along with copper in veins on strike with the southern part of this anomaly; e.g., copper at 5.2% with corresponding gold content of 14,914 ppb; this area was deemed to be a logical target for evaluation by the induced-polarization method.

Not only were the vein structures themselves of interest but, given the extent of the geochemistry, there is a probability that swarms of veins with a potential economic packing factor could underlie the area. In addition, the veins could represent hydrothermal leakage of a much larger bulk mineralizing event within favourable subcropping volcanic lithology. Either of these events relatively near surface are detectable by the induced-polarization method.

SECTION 2.0 LOCATION AND ACCESS

The Chaco Bear 1 to 4, inclusive, mineral claims are located in central British Columbia about 220 miles northwest from the City of Prince George.

National Topographical System (N.T.S.) map reference is 94D/2W; Scale 1:50,000.

The common legal corner post (LCP) of the claims is found near the south end of a 5,400-foot-long glacier-fed lake which forms the headwaters of the southerly flowing Driftwood River. The LCP is located about 3.2 miles west of the east side of Bear Lake.

Access to the property is by helicopter.

Various alternatives are recommended to gain access to the property depending upon the amount of freight and equipment that may be required for advanced exploration work.

Rail and Helicopter
B.C. Rail Ltd. has recently extended the railroad to Bear Lake and will accept freight to this destination. The air-lift to the property from this location is less than 5 miles.

Road and Helicopter
Good grade logging road now extends from Fort St. James about 155 miles southeast of the property to within about 22 miles of the property at a B.C. Rail siding called Driftwood Camp which also has a 4,000-foot gravel airstrip.

Men and equipment can be moved to the property from this location by helicopter.

Fixed-Wing Aircraft and Helicopter
At the northwest end of Bear Lake, there is a 4,000-foot gravel airstrip so access to this location can be made by either wheel or float-equipped aircraft followed by helicopter to the property about 5 miles to the southwest. Northern Mountain Helicopters have a Bell 206 Jet Ranger helicopter on station at Lovell Cove which is on the B.C. Rail line 40 miles southeast of the property. They also have a fuel cache at Bear Lake to service their customers there.

Construction of a road to the property appears quite feasible by following the Driftwood River south of Bear Lake to its source up the Driftwood Valley to where the claims are located.

SECTION 3.0 PROPERTY AND OWNERSHIP

The Chaco Bear 1, 2, 3, and 4 mineral claims are located in the Omineca Mining Division on N.T.S. Map 94D/2, Salix Creek. The claims are held by record by S.E. Apchkrum.

The mineral claims are comprised of the following:

Mineral Claim	Units	Tag #	Record #	Record Date
Chaco Bear 1	20	229326	312051	6 August 1992
Chaco Bear 2	20	229327	312052	6 August 1992
Chaco Bear 3	20	229328	312053	6 August 1992
Chaco Bear 4	20	229329	312054	6 August 1992

SECTION 4.0 EXPLORATION HISTORY

1948 Lord, C.S., 1948; in Geological Survey of Canada Memoir 251 made the following statement about the property area:

"Many small veinlets of chalcopyrite, pyrite, galena, sphalerite, specularite, crustified quartz and calcite were seen in talus fragments of red andesitic tuffs and lavas on the ridge immediately west of Bear Lake. Some of these occurrences are reported to contain appreciable amounts of gold..."

1968 Cominco Ltd. conducted a horizontal loop electromagnetic (EM) survey over the area which is now the northwest sector of the Chaco Bear 4 Mineral Claim. The EM survey was designed to test exposures of copper-bearing veins found by Cominco in the eroded walls of the creek area. No EM conductors were found.

1973 Canadian Nickel Company conducted preliminary exploration on the claim area.

1984 Suncor Inc. Resources Group conducted stream sediment geochemical sampling, lithogeochemical sampling and limited prospecting.

In general, very high geochemical values in gold, silver and copper were obtained from the lithogeochemical samples.

1986 Suncor Inc. Resources Group conducted an extensive soils geochemical survey, a magnetometer survey and a VLF-EM survey over the area which is now the northwest sector of the Chaco Bear 4 mineral claim. Several significant geochemical soils anomalies containing copper, zinc and gold were discovered.

Several weak and a few moderate VLF-EM anomalies were found. All of the VLF-EM anomalies trend north-westerly or north-northwesterly. The magnetometer survey resulted in the delineation of a 500 gamma anomaly within the central part of the area now known as the Chaco Bear 4 mineral claim.

The lithogeochemical sampling program of several quartz-carbonate vein bearing areas of the property was successful in showing that the vein systems contain economically significant amounts of copper and gold.

A carbonatized, silicified and hematized breccia pipe that is also heavily altered with epidote was discovered.

SECTION 5.0 PHYSIOGRAPHY AND OUTCROP

The claim area is mountainous. Elevations range nominally from 6,230 feet (1,900 m) along the high, most ragged serrated and knife-edged ridges and peaks to a low of about 4,000 feet (1,200 m) along the immature Driftwood River Valley bottom.

Tree-line is located at about 5,000 feet elevation and the majority of the claim area is above this level where stable slopes support vegetation of mostly grasses and small entanglements of conifers. Much of the area above tree-line is however composed of talus slopes.

The area below the tree-line is for the most part that area which straddles the headwaters of the Driftwood River and contains abundant yet small alpine fir, white and black spruce and lodgepole pine.

Rock outcrop for the most part is limited to the ridge areas and those steeply incised drainage features which drain the ridges, and along the bottom of the Driftwood Valley where the headwaters of the Driftwood River have carved into the underlying rock. For the most part, the valley bottom on both sides of the Driftwood River is obscured by talus and overburden. Rock outcrop is estimated to represent not more than 5 to 10 percent of the property area.

According to Lord, 1948, the best evidence for the direction of the movement of the ice-sheet was found only in the northeast half of the map area, NTS 94D. Here the ice moved generally from west to east and to the southeast. He suggests that those U-shaped valleys, which includes the headwaters of the Driftwood River where the Chaco Bear 4 claim is located, were eroded by glaciers flowing along them to the southeast.

SECTION 6.0 GEOLOGY

6.1 General

The claim area was regionally mapped by C.S. Lord between 1941 and 1945. His results were reported in Geological Survey of Canada Memoir 241 dated 1948.

The rocks west of Bear Lake are mapped as the Takla Group Volcanics of upper Jurassic and lower Jurassic age which form the west limb of a broad synclinorium that trends northwesterly. The synclinorium itself is greatly complicated by faults and subsidiary folds.

The Takla Group is divided into the Upper and Lower Division. The Lower Division is comprised of andesitic and basaltic tuffs, agglomerates flows and tuffaceous argillites and the Upper Division is composed of pyroclastics, lavas, greywackes conglomerates, shales and argillites with volcanic members predominating among the lower strata and sedimentary members predominating in the upper parts but with interlayered volcanics.

These Upper Division rocks appear to underlie most of the area west of Bear Lake.

Later work by Richard (1976) has reclassified this Lower Division as Hazelton Group volcanics of Upper Triassic to Middle Jurassic age.

The Hazelton Group volcanics (Lower Division Takla Group) have been intruded by Tertiary Kastberg Intrusions of several variable compositions including feldspar and feldspar-quartz porphyries, porphyritic granodiorite, and quartz diorite.

Lord (1948) states that "approximately 18,000 feet of Lower Division volcanic rocks outcrop between Bear Lake village and the Driftwood River where neither their upper nor lower limits were recognized."

Hartley (1986) stated that the claim area is underlain by rocks consisting predominately of the lower members of the Hazelton Group consisting of tuffs, agglomerates and a wide variety of dominantly purple to grey-green rocks of probable andesitic composition. Minor mafic lava flows which are porphyritic with phenocrysts of plagioclase and/or hornblende were locally observed. Minor siliceous interflow sediments were occasionally observed in various localities.

A major fault zone striking northwesterly is postulated up the centre of the Driftwood Valley (Lord, 1948).

Hartley summarized the geology, structure and alteration observed on the property in his 1986 report with the following:

TABLE OF FORMATIONS

Lower to Middle Jurassic

Hazelton Group

Mafic Lava Flows – dark green to purple, locally porphyritic with plagioclase phenocrysts, occasionally calcite filled amygdules are observed.

Mafic to Intermediate Tuff and Agglomerates – predominantly purple tuffs and coarse agglomerates occur locally as grey-green tuffs and agglomerates. This unit is in part subaerial.

Interflow Sediments – siliceous to cherty meta sedimentary volcanoclastic rock.

Tertiary Katsberg Intrusions

Felsic intrusive – quartz and feldspar porphyry dyke rock.

The intrusive rocks consist of narrow quartz-feldspar porphyry dykes of the Tertiary Katsberg Intrusions. The dykes crosscut the volcanic units. The dykes are 1 to 3 metres in width and strike approximately 040 to 045 degrees azimuth. These rocks are fine grained to medium grained with quartz and feldspar phenocrysts. Composition is almost totally feldspar and quartz with less than 1% biotite.

STRUCTURE

Structural features include major joint fractures and shear zones. Major joints strike 140° to 150° and dip 50° to 60° southwest and rarely 70° southwest.

They also strike 040° to 045° and dip 60° to 70° northwest. Minor shears in the Driftwood River cut were found to strike about 170° to 175° azimuth and with dips of 40° to 50° west.

Volcanic flow rocks have the same strike about 150° to 140° azimuth as the mountain ridges on both sides of the Driftwood River Valley. They dip about 30° to 50° northeast according to Lord (1948).

ALTERATION

Alteration consists of minor chloritization of the mafic to intermediate volcanics; moderate to intense epidote alteration of the tuffs and agglomerates and slight to intense hematization of the intermediate volcanics. Carbonate along fractures is locally abundant.

West of the Driftwood River, epidote alteration within intermediate tuffs and agglomerates is moderate to intense and occurs mainly as: fracture fillings, as alteration envelopes around fracture fillings, and as alteration of agglomerate fragments.

Hematization of the volcanic pile throughout the property is ubiquitous, and occurs mainly as red to purple colouring of the pyroclastic rocks. The more intense hematization of the volcanics occurs along that section west of the Driftwood River where local intense hematization envelopes 3 to 6 centimetres wide surround fractures and in some cases colour the entire outcrop. It is readily discernable as dark red staining. Carbonate alteration and silicification appears confined to quartz-carbonate vein material.

6.2 Salient Alteration Features

In September 1992, following the August 1992 reconnaissance induced-polarization survey over the large copper-zinc-gold anomalous area on the Chaco Bear 4 mineral claim, B. Mackie made several reconnaissance traverses over the area of interest, including the quartz-carbonate vein system on the ridge area of the Chaco Bear 3 claim.

Of interest was the character and alteration facies associated with the breccia pipe mapped by Hartley and the surface rock alteration facies of the two anomalous areas, the Ridge Zone on the Chaco Bear 3 claim and the anomalous copper-gold zone associated with the area of the induced-polarization survey on the Chaco Bear 4 claim.

The carbonatized and altered breccia pipe, which covers an area of about 250 metres in length by a maximum exposed width of 110 metres, has been subjected to intense chemical and mechanical effects.

The breccia fragments are composed of a diverse suite of milled clasts of volcanic rock and intrusive porphyry which are variably altered with local intense epidote and hematite. The dacitic matrix is also intensely altered with epidote and is silicified and hematized. Abundant pyrite occurs as disseminations in the matrix and clasts.

Altered intrusive dykes are ubiquitous throughout the area. They are heavily clay altered and pyritized.

Extending part way down both east and west slopes of the Driftwood River valley is a unit of intensely altered felsic volcanics as shown on Figure 8. This unit is composed of silicified sericite schist with up to 10% contained pyrite. It is estimated to be about 15 metres thick. Underlying this altered felsic unit is a partially exposed unit of altered andesite which is variably pyritized and silicified. Lithogeochemical analyses shows that the schist is enriched with potassium and depleted of sodium.

SECTION 7.0 ECONOMIC GEOLOGY

7.1 General

Hydrothermal alteration on the property is pervasive. Intrusive porphyry dykes are intensely argillized; a medium-sized breccia pipe is intensely propylitized; and a volcanic tuff horizon is intensely sericitized.

Pyritization and hematization are ubiquitous with all alteration. Copper and gold bearing quartz-carbonate veins fill shears and joints. Mineral solutions are in all probability related to both underlying and/or neighbouring Tertiary intrusions.

The property could therefore host several types of hypogene mineral deposits including copper-gold porphyries, strata-bound copper-gold zones within favourable volcanic lithologies and copper-gold quartz-carbonate vein systems.

Tertiary period hydrothermal mineralizing events have produced many of the world's most productive and largest and richest gold deposits, including:

Carlin, Nevada: the largest disseminated gold deposits in the United States.

Comstock Lode, Nevada: one of the largest concentrations of gold and silver ever discovered; produced more than 8 million ounces of gold and 200 million ounces of silver.

Cripple Creek, Colorado: produced 20 million ounces of gold.

Copper-gold porphyry deposits of Tertiary age are also significant producers throughout the world.

The alteration facies associated with gold deposits and copper-gold porphyries are as varied as the hosting lithologies and include propylitization, argillization, sericitization, pyritization and carbonatization, etc., as leading indicators. All of these alteration types, along with a preponderance of copper-gold quartz-carbonate veins as found on the surface of the Chaco Bear claims, are leading indicators that a major copper-gold mineralizing event may have permeated the underlying rocks.

It appears that wherever pre-mineral structural breaks are found on the surface of the property, including shears (faults?) and joints, they are filled with quartz-carbonate vein material containing significant copper and gold mineralization that in many cases are of economic tenor. These leakage features are indicative of a large and strong mineralizing event that may have occurred beneath the surface of the property; therefore, any favourable host lithology subcropping the area and connected to the hydrothermal plumbing system could be the locus of a significant body of mineralization.

Regionally, the Takla Group volcanics, which have since been reclassified as part of the Hazelton Group, play host to a large variety of commercial mineral deposits but mainly large-tonnage, low-grade intrusive deposits of several styles and types. Intrusives range in age from Triassic to Tertiary. Two notable Tertiary porphyry deposits that produced significant copper and gold are Bell Copper and Granisle located about 100 miles to the south.

Possible future producers hosted by the Takla volcanics include Mount Milligan, Kemess North, and Kemess South; all of which contain significant copper and gold.

Two recent lode gold-producing deposits of the epithermal vein type hosted by Takla volcanics are the Baker Mine and Lawyers Mine of Cheni Gold.

Geology of the Chaco Bear claims is favourable for the discovery of:

- a large-tonnage, low-grade copper and gold porphyry style deposit (underlying the breccia pipe zone)

- a small to medium-tonnage epithermal vein style deposit with medium to high-grade copper and gold content (six significant zones of epithermal quartz-carbonate veins with copper and gold are known)

- a deposit of the type as described under "Geological Model".

7.2 Geological Model

The current area of interest on the property, the Creek Zone, may be a strata-bound type mineral deposit of the same style and similar metallogeny as the nearby Sustut Copper deposit owned by Falconbridge Nickel Mines Ltd., with the exception being that there appears to be significant gold in the veins associated with the Creek Zone of the Chaco Bear property.

The Sustut Copper deposit, located about 36 miles (58 km) north-northeast from the Chaco Bear claims, has reported geological reserves of 50 million tonnes of 1.25% copper or 1.4 billion pounds of copper.

Its mode of occurrence is the strata-bound disseminated type, hydrothermally introduced, and epigenetic to its heat and solution source. The host horizon is a volcanic sequence of augite porphyry and basalt. Alteration facies includes epidote, chlorite, quartz and calcite.

Sulphide-rich tabular zones up to 76 metres (250 feet) thick contain hematite, pyrite, chalcocite, bornite, chalcopyrite and native copper; in decreasing order of abundance.

The mineralization occurs as very fine-grained disseminations throughout the clasts and matrix of the volcaniclastic unit. There are increased mineral concentrations within the fine-grained tuff fractions. Hematite is ubiquitous throughout the copper zone and pyrite forms an incomplete halo around it.

Wilton and Sinclair (1979) proposed a model for mineral deposition whereby the ore fluid and copper were derived from below and migrated into a permeable volcanic host horizon through vertical shears, joints and faults (structural zone) which later defined themselves as swarms of copper-bearing veins and veinlets.

The upward flow of hot solutions within this structural zone produced a confined zone of geothermal intensity that allowed the development of concentrations of copper mineralization and pyrite. Tabular copper zones and local sets of veins and veinlets appear to have formed interconnected channel ways permeable to ore-forming fluids thereby resulting in their deposition. The veins and veinlets are thus an integral part of the mineralizing system and observation of their presence in a similar geological environment could be an important clue as to the location of similar subcropping mineral deposits.

An analogous mechanism could have occurred within the area of the Chaco Bear claims as the geological, structural and mineralogical aspects appear to have more similarities than differences with the Sustut deposit.

SECTION 8.0 INDUCED-POLARIZATION SURVEY

8.1 Introduction

An Induced Polarization (IP) Survey was carried out over an area identified by Hartley (1986) as containing highly anomalous copper, zinc and gold in soils within volcanic rocks of the Upper-Triassic to Lower Jurassic Hazelton Group.

Lithogeochemical sampling by Hartley (1986) and Donnelly (1984) showed that quartz-carbonate-specularite vein structures found within or proximal to the geochemically anomalous area contained significant copper and gold mineralization. Copper assays of several percent are common and gold values up to 0.44 ounces per ton were obtained. This area of interest was also the focus of a horizontal loop electromagnetic survey by Hamilton et al (1968). Hamilton's work was not successful in delineating any electromagnetic conductors. However, Hamilton's observations of the nature of the physical and electrical properties of the mineralization found in the vein structures is of geophysical significance.

He stated that the specularite (specular hematite) when tested with an ohmmeter was found to be non-conductive and that upon close examination of the chalcopyrite there were found many hairline fractures filled with a rusty material which was possibly limonite. It would appear, therefore, that this mode of mineralization would behave electrically as a disseminated body that would be ideally responsive to the induced-polarization effect rather than a massive unitary or semi-massive conductor that is responsive to the electromagnetic effect.

The induced-polarization survey was chosen to test the well-defined geochemically anomalous area because of the probability that the style of mineralization causing the anomaly would replicate that found in the associated vein structures.

Prior to commencing the field work, the Chaco Bear 1 to 4 mineral claims were staked on August 5 and August 6. The induced-polarization survey itself was carried out on August 7 and August 8, 1992.

The following four personnel carried out the survey:

Personnel	Duties
J.M. Ashton, P.Eng.	Site Selection, Project Manager and Transmitter Operator
Alain Charest	Receiver Operator and Data Processing
Guy Dion Arthur von Kursell	Placement of: Current Electrode Cables and Current Electrodes; Potential Electrode Cables and Potential Electrodes

8.2 Grid Preparation

Grid preparation was facilitated by the fact that the two survey lines, Line 1 and Line 2, were located above the tree-line. Each survey line was located by compass azimuth as shown on the drawings. The two lines were similarly tied together by compass bearing and topo-chain measurement, and one line was similarly tied to the common legal corner post of the mineral claim group.

Compass declination used was 29 degrees east as defined by N.T.S. Map Sheet 94D.

The potential electrode cable also provided the necessary distance measurement and survey station locations as the cable was complete with potential electrode connections at every consecutive 30-metre mark along its length. Once the cable was properly positioned, each connection location was marked with flagging and/or in some cases with Tyvex Tags, to enable future station re-location.

Clinometer readings were taken between each electrode station to provide a ground elevation profile which was used in conjunction with the computer-generated induced-polarization survey chargeability and resistivity pseudosections. A total of 1,080 metres of induced-polarization survey were completed.

8.3 Instrumentation

Induced-polarization survey equipment consists of an engine-generator set (energy source), transmitter, receiver, electrodes and cables.

The engine-generator set was a Model MG-2 as manufactured by Phoenix Geophysics Ltd. of Markham, Ontario, with a rated generator output of 2.5 kW at 400 Volts ac. The engine was a 5.0 horsepower Honda. The engine-generator unit is the power source for the transmitter unit.

The transmitter unit was a Model IPT-1 manufactured by Phoenix Geophysics Ltd.

The receiver unit was a Model IV manufactured by Huntec (1970) Limited of Scarborough, Ontario. This unit is of advanced technology, complete with software-controlled algorithms and functions and is fully programmable through a keyboard on the front panel. Survey data is easily read by means of a digital readout on the front panel. The Mark IV system is capable of time domain and frequency domain chargeability and resistivity measurements and complex resistivity measurements.

8.4 Theory of Earth Resistivity and Induced Polarization

In general, earth resistivity is the resistance of rock to the passage of electric current. By applying a potential difference or voltage from a current source across two electrodes separated by distance and connected electrically with the earth, an electrical current will flow. The amount of current that will flow is in accordance with Ohms Law, e.g. $I= E/R$ where $I=$ current in amperes, $E=$ voltage in volts and $R=$ resistance in ohms. R is calculated in accordance with the expression, $R= eL/A$ where $e=$ resistivity of the earth in ohm-metres; $L=$ length of conducting path in metres, and $A=$ cross-sectional area of the path in square metres.

Current flow through the ground follows the path of least resistance, which is mainly through the electrolyte-filled capillaries within the pore spaces of the rock. However, when electrically conductive minerals are present, e.g. minerals that facilitate the passage of electrons which includes most metallic sulphides; some oxides; graphite;

and metallic elements such as native copper and silver; then the electrical current will preferentially flow through these materials. Where, for example, a bulk quantity of interconnecting sulphides is found either in the disseminated form or semi-massive to massive form then the electrical current will preferentially flow through this zone of low resistivity or high conductivity. A voltage probe placed anywhere on such a conductive body would find that, relative to any remote earth point, the voltage at the probe would be the same.

The induced-polarization effect is a very complex electro-chemical phenomenon that occurs when current flow in rock is dependent upon the electro-chemical effects of the solutions of electrolyte that fill the pore spaces of the rock adjacent to clusters of metallic mineral or other electronic conductors. Current flow in this instance is maintained by charged ions in the solutions.

The induced-polarization (IP) effect occurs where the method of electron transport is changed from ionic conduction to electronic conduction at the interface between the electrolyte in the pore space and the metallic conductor particle. The effect at the interface is one of induced-polarization whereby a micro-voltage probe across it will detect a step voltage when electrons (current flow) are moving across it.

This voltage drop is additive to the voltage differentials that develop across the electrolyte and conductive minerals that are normal to the current flow direction. An ion capable of transporting an electron that approaches this interface during current flow that does not have sufficient energy to overcome the over-voltage cannot accept an electron from the conductive mineral's crystal lattice, in which case the charged ion will remain at the surface. This mechanism effectively reduces the current flow across the interface. With time, additional ions incapable of accepting electrons because they cannot cross the barrier will pile up at the interface and reduce the flow of electrons even further through increase of the apparent resistance. Rapid cyclic reversal of voltage, or current flow, will decrease this apparent resistance.

In addition to the induced-polarization effect there is an electrolytic (membrane) polarization effect caused by the passage of electrons through the electrolyte-filled pore spaces that occupy portions of the rock space that do not include conductive minerals.

The electrolyte conduction mechanism is limited by the fact that most rock-forming minerals have a net negative charge at their interfaces with contained pore fluids which causes attraction of positive ions at the interface and repulsion of negative ions. This results in a polarized distribution of ions with a limited number of current-carrying positive ions available, thereby limiting the current flow capability.

This effect is greatest in the presence of clay minerals when extremely small passage ways between clay sheets may permit no movement of ubiquitous negative ions, thereby blocking the passageways to potential current-carrying positive ions. Of the two effects, induced polarization which requires the presence of conductive minerals has the largest magnitude.

The induced-polarization measurement technique is a procedure which measures the transient flow of charged ions as a voltage following the abrupt termination of the externally applied voltage and, as a result, the current flow. The transient voltage waveform that is measured decays to zero within a short period following interruption of current flow.

8.5 Preparation of Results

The induced-polarization apparent chargeability value for each point measured is read directly from the Huntec Model IV receiver unit. A calculation algorithm within the unit computes the chargeability and displays the result on the receiver. Discharge current into the ground are data which are manually entered into the computer, whereas voltage values from each sensing dipole are automatically entered into the receiver unit to enable apparent chargeability calculation. Voltage value inputs from each receiving dipole into the receiver are facilitated by a multi-conductor cable which connects each receiving pot on the survey line with the receiver. Apparent resistivity is manually calculated using discharge current into the ground, voltage values input from each sensing dipole, and a geometrical factor which essentially represents the apparent volume of rock sampled with the current dipole.

The transmitter operator reads the discharge current and potential difference across the current electrodes for each group of measurements made pursuant to a specific dipole location and radio transmits this data to the receiver operator for his use in the required calculations.

Chargeability and resistivity data are recorded manually for later use in preparing pseudosections with the aid of a computer and plotter.

The software program used for plotting pseudosections of chargeability and resistivity is one developed by Geosoft Inc. of Toronto and modified by Geotronics Surveys Ltd.

Chargeability and resistivity data were each computer-plotted in pseudosection format for each induced-polarization line surveyed with results shown in Figure 3, Apparent Resistivity and IP Pseudosection, Line 1; and Figure 4, Apparent Resistivity and IP Pseudosection, Line 2. Figures 5 and 6 were prepared for display of key interpretation features.

8.6 Salient Interpretation Features

Resistivity

Interpretation possibilities for zones of low apparent resistivity include fault zones, shear zones, zones of alteration, rock units that are relatively more porous than their confining rock units, and conductive sulphides that could represent ore.

Induced-Polarization

The magnitude of the induced-polarization effect is dependent upon several variables:

- electrolyte medium
- porosity
- conductive mineral concentration

It is of greater magnitude when conductive minerals are disseminated through the rock, hence observation of the effect within a volume of rock is very useful in determining whether sulphides are present and their relative abundance. Some simple rules of the IP or overvoltage effect include:

- for a fixed concentration of conducting particles, the IP effect decreases with increasing rock porosity;

- a larger IP effect occurs in a disseminated sulphide deposit within dense igneous rock than in more porous rock;

- the overvoltage or IP effect varies inversely with the current density;

- the IP effect decreases with increasing frequency.

Induced-polarization chargeability measurement involves measuring the bulk chargeability of the volume of rock between the receiving or voltage-sensing electrodes. Should the electrode interval chosen be much wider than the zone of sulphide mineralization then the chargeability value measured will be much smaller over the larger distance than it would otherwise be measured over the shorter electrode spacing because included in the measurement will be the effect of the non-sulphide portion of the zone. In the limit as the electrode spacing is reduced to the size of the sulphide body only then will a true measurement of the body's chargeability be made. However, the anomalous pattern and IP magnitude will be much the same regardless of where the sulphide source is positioned relative to the electrodes.

Induced-Polarization Measurements

The induced-polarization effect is measured either in the time domain or the frequency domain. As a direct consequence of generating these variables, rock resistivities can be calculated.

Time domain induced-polarization measurement involves comparing the residual time-varying voltage V(t) at some time t after charging current is shut off along with the initial impressed steady state voltage Vc, which causes current flow. The residual voltage V(t) is measured after a brief interval, yet before it decays to noise level following current cut-off to preclude false readings which occur due to transients immediately following current interruption. See Figure 8.2.

Because V(t) is much smaller than Vc, the ratio units are millivolts/Volt and upon integration with time the measured induced-polarization units become millivolt-seconds/Volt. By definition, "chargeability" is the following integral; with integration between t_1 and t_2:

$$C = \frac{1}{Vc} \int V(t)\ dt$$

Frequency domain induced-polarization measurement involves measuring the apparent resistivity (ρ) under direct current input into the ground and the apparent resistivity under higher, yet very low frequency, current input into the ground, usually at two frequencies in the range between 0.10 Hertz and 10 Hertz and is defined by the equation:

PFE = Percent Frequency Effect

$$PFE = 100\ (\rho dc - \rho ac/\rho ac)$$

The resistance produced at the electrolyte (rock particle or conductive particle) interface decreases with increasing frequency.

Mineralogy

Several vein structures occur near the creek at both locations where IP lines 1 and 2 cross. Representative samples were taken by the writer and sent for assay and specific specimens were kept for macroscopic examination and elementary electrical testing.

Five of the six samples contained high-grade copper (up to 9.75% Cu) and significant gold (up to 0.394 ounces Au per ton). See Appendix I.

From microscopic examination of thin sections of similar nearby vein structure specimens, Hartley (1986) reported that the gold (in hematite veins) occurs as free gold in quartz with no preference given for association with pyrite or chalcopyrite.

Vein mineralogy generally consists of chalcopyrite, pyrite, specularite, occasional bornite, malachite and azurite within a gangue of quartz and calcite.

Some of the several styles of occurrence include:

- interconnecting masses and blebs of semi-massive chalcopyrite within a solid siliceous matrix;
- massive interconnecting crystal growths of chalcopyrite within specularite within a quartz-carbonate gangue;
- separate chalcopyrite and specularite masses as open space fillings within a gangue of quartz and carbonate.

Products of oxidation, mostly earthy brown hematite and some limonite with malachite staining, surrounds and encapsulates specularite masses and chalcopyrite crystals, blebs and masses.

Hamilton (1968) reported copper mineralization consisting of irregular blebs and stringers of chalcopyrite in a gangue composed principally of specular hematite (specularite) with quartz and locally, calcite. Close examination showed that chalcopyrite patches contained many hairline fractures filled with a rusty material believed to be limonite. Hamilton tested samples containing the chalcopyrite mineralization with an ohmmeter and found that in several instances electrical continuity throughout the chalcopyrite could not be demonstrated and concluded that the limonite, which is an insulator to the flow of electrical current, was the cause.

Some chalcopyrite mineral specimens when tested with an ohmmeter by this writer showed their characteristic good conductivities and, where interconnecting crystal growths are found, the chalcopyrite was found to conduct to the extent it is interconnected including when found in solid solution with a siliceous encapsulating matrix.

Chalcopyrite is known as a good conductor and has a published resistivity range of between 3.0×10^{-5} and 2.0×10^{-1} ohm-meters. Other specimens, when tested, showed electrical discontinuity between chalcopyrite masses and disseminations.

The other abundant mineral present, specularite, was found to be a non-conductor when tested with an ohmmeter by this writer. The gangue minerals, silica (and quartz) and calcite behave essentially as insulators and are non-conducting.

According to Brant (1966) iron and manganese oxide in the form FeO_2 and MnO_2; e.g. magnetite and pyrolusite; respond to the IP effect. Otherwise, oxides do not produce an IP response. An oxide coating of a conductive sulphide particle will insulate the sulphide from current flow, hence the IP effect cannot occur. A limonite or hematite (specularite) coating of chalcopyrite, as has been observed here, will exclude this aggregate of chalcopyrite from contributing to the overall IP effect of the volume measured.

Limonite, hematite and specularite are considered electrical insulators.

Geological mapping of the area of the induced-polarization survey and its associated geochemically anomalous area is lacking. Detailed lithology of the volcanics including knowledge of alteration facies, including pyritization, is also unknown. Lord (1948) shows volcanic units variably dipping from 30 degrees to 65 degrees to the east or northeast in this general area.

Mackie (1992) has provided the writer with a sketch showing a large area of well altered and bleached felsic volcanics in the form of a pyritized, sericitized, silicified schist estimated to be about 15 metres thick. The sericite schist is underlain by a well altered andesite which is also variably silicified and pyritized. The schist contains pyrite with local concentrations ranging from 3% to 10%. The andesite contains pyrite with local concentrations of between 2% and 3%.

This zone of alteration is shown on Figure 8, Geophysical Anomalies, Compilation Map.

8.7 Survey Procedure

For this survey, the induced-polarization apparent chargeability and apparent resistivity measurements were made in the "Time Domain" mode. In this mode

(Figure 8.1), the transmitter produces a positive square wave pulse for a period of 2.0 seconds and is then shut off for 2.0 seconds and then pulsed as a negative square wave pulse for 2.0 seconds and is then shut off for 2.0 seconds. This alternating cycle of square wave pulses repeats itself for each 8.0 second period.

The overvoltage value Vc was read across the potential electrodes during the duration of each square wave pulse at the receiver. At the termination of each square wave pulse, a 200-millisecond time delay was maintained, after which the decay voltage V(t) was integrated over a series of 10 time periods for a total integration time of 1500 milliseconds (Figure 8.2).

This survey used the double-dipole electrode array. This configuration was chosen because of its efficiency and practicality. It takes less time to lay out and recover the current and potential electrodes than other electrode arrays and the operating procedures are generally less complex.

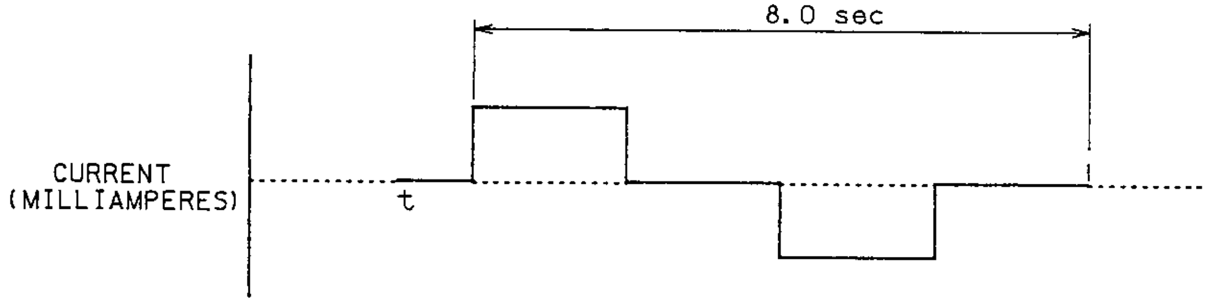
The double-dipole measurement technique has been shown to provide maximum sensitivity to the lateral variations of electrical properties in the earth, hence it is a good technique for identifying vein-like structures. It also provides the sharpest and largest magnitude anomaly of a spherical type conductor at depth.

The pseudosection method of plotting the results was successfully developed by P.G. Hallof, Ph.D., of Phoenix Geophysics Limited in 1963.

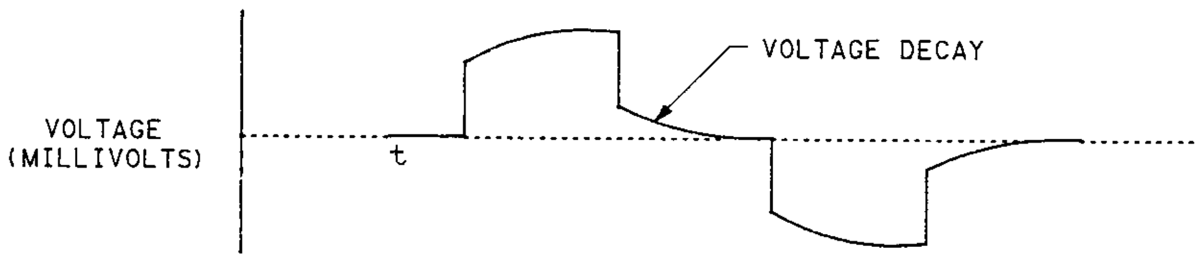
With this procedure (Figure 8.3), current is applied by the transmitter across the two current electrodes a distance 'a' apart.

The receiver measures the potential across the two potential electrodes, also spaced a distance 'a' apart. The distance n x a (n is a whole integer) is the electrode spread distance and represents the distance between the closest or innermost current and potential electrodes.

The plotting point, as shown on the "Pseudosections" (Figures 3 and 4) is the mid-point between current and potential electrodes or at an angle of 45 degrees from the centre of each electrode group.

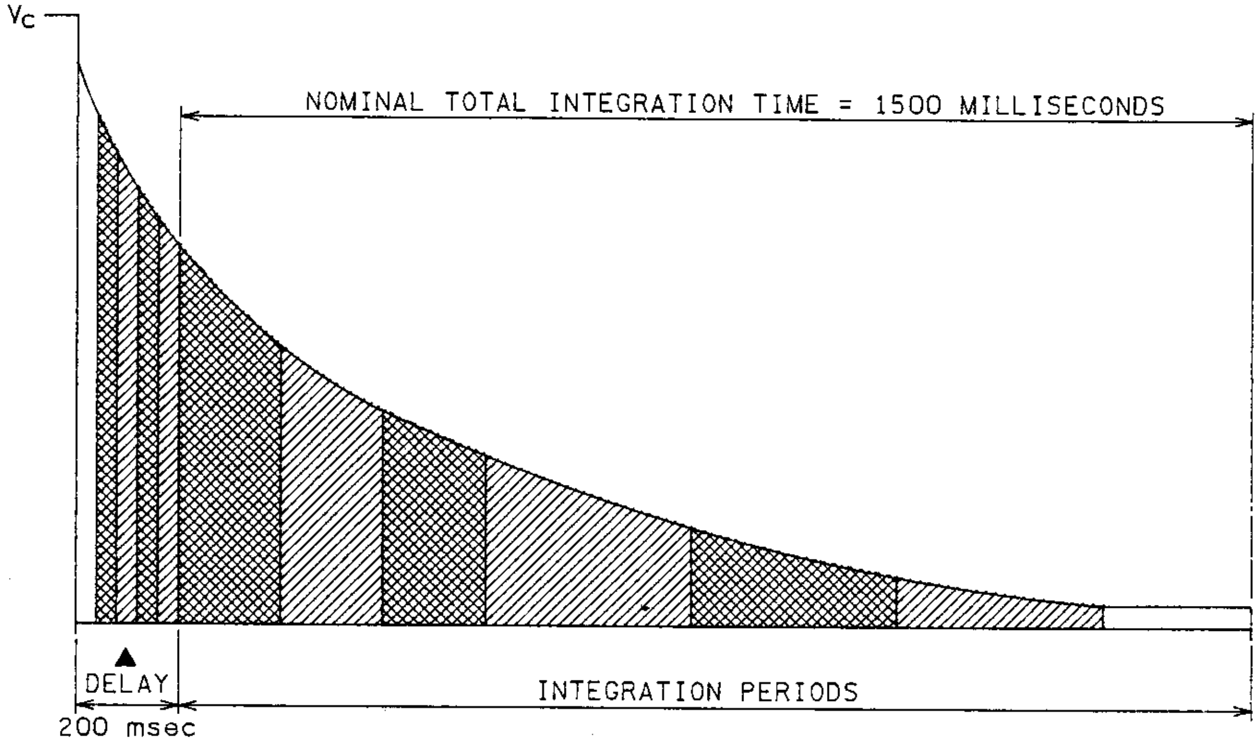


TRANSMITTED CURRENT WAVEFORM



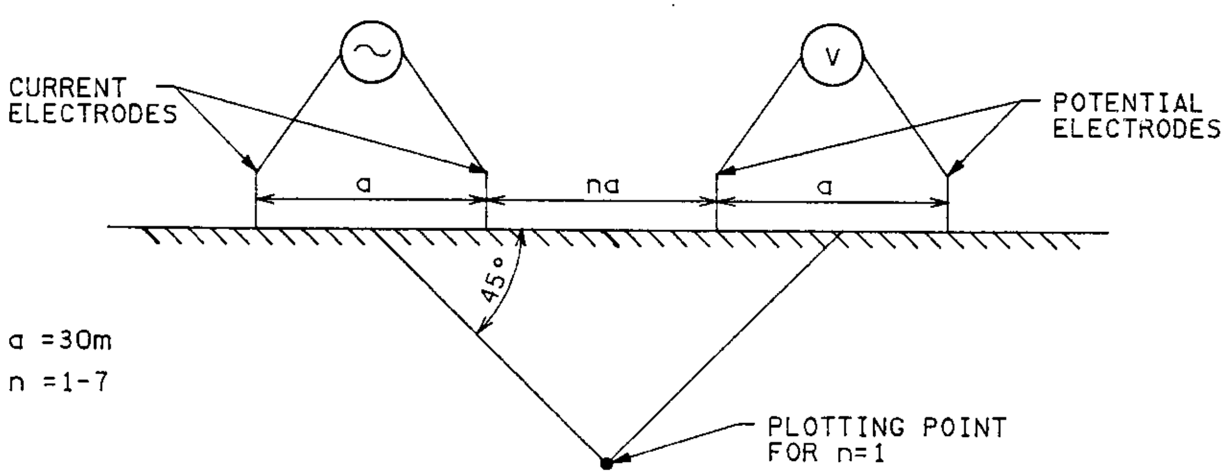
VOLTAGE RESPONSE

FIGURE 8.1



IP INTEGRATION CHARACTERISTIC

FIGURE 8.2



DOUBLE-DIPOLE ARRAY

FIGURE 8.3

This plot-point location as shown is entirely arbitrary. However, in practice, it generally provides the best fit. The maximum spread measured was n=7, which enables the development of a pseudosection plot to a theoretical depth of 120 metres.

Current electrodes used were made up of groups of three stainless steel rods which were hammered into the ground with a sledge hammer to provide good electrical contact. Potential electrodes were porous, unglazed porcelain pots containing a central copper electrode placed in a bath of highly conductive copper sulphate electrolyte solution. Prior to placement of the potential electrodes in a well-dug hole, an amount of copper sulphate solution was poured into the bottom of the hole to provide good electrical contact between the pot electrode and earth.

Conductors providing power to the current electrodes from the transmitter were made up of single-conductor flexible copper wire with pvc insulation.

A specially designed multi-conductor cable which permits connection of all potential electrodes simultaneously to the receiver was used.

8.8 Results and Interpretation

General

Interpretation of the induced-polarization chargeability and resistivity results as plotted in pseudosection format (Figures 3 and 4) for the two-line reconnaissance survey is a complex subject, particularly when there are no data available on the true electrical values of the subcropping lithology. Therefore quantification of the results is not be attempted.

It is important to recognize that the measured values shown on pseudosection are apparent values of chargeability and resistivity only. The apparent effect is influenced by many variables and includes size, depth, attitude and electrical properties of the source and the electrode interval used. Grain size of conductive material (sulphide mineralization) and whether there is continuous or discontinuous interconnection of the grains will affect the apparent chargeability values. Hence, the interpretation of apparent chargeability and apparent resistivity cannot be too detailed because of the complex interaction of many dependent and independent variables.

However, inspection of the relative quantitative chargeability and resistivity values displayed on the pseudosections can provide diagnostic support as to its cause and extent, given an understanding of the local geology, geochemistry and mineralogy.

The interpretations that follow are made on the basis of inspection in conjunction with knowledge of the local geology, geochemistry and mineralogy and an understanding of the chargeability and resistivity patterns that present themselves by various geometrical configurations of probable causative sources. The judgements made are however subjective.

Because of the limited extent of the IP survey, background values for both chargeability and resistivity cannot be confidently stated.

To assist in the interpretation, the following anomalous ranges and relative **classifications** were chosen by inspection using the principle of geometrical progression:

Chargeability Range (milliseconds)	Classification
less than 10	**Low**
greater than 10, less than 20	**Medium**
greater than 20, less than 40	**High**
greater than 40, less than 80	**Very High**
greater than 80	**Extremely High**

Resistivity Range (ohm-metres)	Classification
less than 500	**Low**
greater than 500, less than 1,000	**Medium**
greater than 1,000, less than 2,000	**High**
greater than 2,000, less than 4,000	**Very High**
greater than 4,000	**Extremely High**

Line 1 Results and Interpretation

Apparent chargeability and apparent resistivity values measured are shown in pseudosection in Figure 3. Figure 5 is provided to show the approximate zonation of induced-polarization variables measured along with associated geochemical and geological information to assist in understanding the interpretation.

Vertical depth penetrated is estimated at about 120 metres (390 feet) below the surface topography.

The most prominent resistivity feature found on this line is a well defined low located immediately east of Station 480 and extending to about Station 570. This feature outcrops under the talus which covers this mountain-side area. This pseudosection profile indicates that the **resistivity low** is closed to the east; however, may or may not be closed at depth. In its present configuration, its dip length is at least 150 metres (500 feet). This low-resistivity feature has the lowest apparent resistivity response measured of the survey at 405 ohm-metres, but averages about 888 ohm-metres.

Juxtaposed on both hanging wall and footwall of the **low resistivity** feature are zones of **high chargeability** that coalesce with it.

Within the zone of hanging wall chargeability are two of the highest responses of the survey at 81.0 milliseconds and 68.0 milliseconds respectively. The footwall chargeability maximum is 35.0 milliseconds.

Corresponding to the central part of the **low resistivity** feature is a zone of chargeabilities which averages about 16 milliseconds from 11 pseudo points. However, this zone of chargeability projects into a zone of negative chargeability, which is considered to be a zone of zero chargeability. Negative chargeability values are obtained through the chargeability calculation algorithm of the computer program and occur if the apparent resistivity is extremely high compared to a very low chargeability reading. In effect, it represents a zone of such high impedance compared with the surrounding rock such that it does not allow the passage of sufficient electrical current to allow the induced-polarization effect to be measured.

The 1985 geochemical soil survey by Hartley et al shows a copper anomaly extending over the area between IP Station 150 and Station 270 where the high chargeability zone appears to extend to the underlying bedrock surface.

Near Station 570, the copper content of the soil was found to be 990 ppm; the highest value of the geochemical survey line which is proximal to IP Line 1. Similarly, Hartley's VLF-EM Survey showed a weak conductor that is co-incident with both the low resistivity zone and high magnitude copper in soils value. The apparent dip of this zone is concordant with the major shear dip of between 50 degrees and 70 degrees southwest. All shear structures thus far sampled on the property appear to carry significant copper and gold mineralization.

From inspection of Hartley's magnetometer data, there may be a small anomalous magnetic feature associated with the anomalous IP feature. One interpretation of this zone is that it represents one of the larger mineralized shear structures on the property and could represent a main feeder conduit bringing mineralized solution into the host lithology from either underlying or nearby Tertiary intrusions which are believed to be the heat and solution source for the well mineralized vein structures thus far found throughout the property.

The low resistivity feature could represent a mineralized zone containing metallic conductors with both the hanging wall and footwall containing, in all likelihood, significant concentrations of disseminated sulphides. The central or core zone could represent a more massive or semi-massive sulphide zone with its comparatively lower chargeability response, as semi-massive and massive sulphides will provide a chargeability response but generally of much lower magnitude as compared with a high concentration of well disseminated conducting sulphides. A semi-massive or massive sulphide deposit will generally exhibit low resistivity.

No explanation for the negative chargeability zone can be given at this time.

Within the central portion of the pseudosection and interconnected with the **very high chargeability** of the **low resistivity** hanging wall feature is a large area of **high chargeability** with corresponding **very high resistivity**. This zone is interpreted to contain significant disseminated sulphides within a silicified host. The copper and zinc soils geochemistry is anomalous above the area where the high chargeability response appears to underlie the surface. There are also some spotty gold in soils anomalous values within the vicinity. The **high chargeability** features could therefore represent significant chalcopyrite mineralization. At the creek, the lowest point of the survey traverse, there are a number of exposed mineralized vein structures which dip steeply to the west into the zone of **high chargeability** and **very high resistivity**.

Copper and gold assay results from samples taken by the writer from three of these veins returned the following assays:

		Gold	
Sample	Copper (ppm)	oz/ton	ppb
4	12,362	0.046	3,000
5	97,527	0.394	11,000
6	51,062	0.217	4,000

Line 2, Results and Interpretation

Apparent chargeability and apparent resistivity values measured are shown in pseudosection in Figure 4. Figure 6 is provided to show the approximate zonation of induced-polarization variables measured along with associated geochemical and geological information to assist in understanding the interpretation. Depth penetration is estimated at 120 metres.

The most prominent resistivity feature found on this line is a well defined zone of **high resistivity** located east of Station 390 and extending to about Station 450. It appears to be narrow. This feature outcrops under the talus. It appears to be closed to the east and it is open to depth. Its dip length is estimated at 150 metres (500 feet).

This **high resistivity** feature has the lowest relative resistivity of this pseudosection and averages about 1,760 ohm-metres.

Coincident with the zone of **high resistivity** (which is low relative to the pseudosection) is a zone of **high chargeability** which becomes attenuated on the hanging wall side, but appears to be open on the foot-wall side to the east. This zone of **high chargeability** extends throughout the lower third of the pseudosection and appears to surface in the interval between Station 90 and Station 150 on the west side of the creek. It is open to depth in the central part of the section. The large zone of **high chargeability** has associated with it a zone of **extremely high resistivity**.

Hartley's geochemical soil survey shows anomalous copper between IP Station 90 and Station 150 about where the **high chargeability** zone in association with the **extremely high resistivity** zone appears to extend to the bedrock surface.

Near Station 480, the vicinity of the coincident **high chargeability** anomaly in association with the **high resistivity** zone, the copper content of the soil was found to be 533 ppm; the highest value of the soils survey line which is proximal to IP Line 2. Also at this location is the axis of a weak VLF-EM anomaly found by Hartley. The apparent dip of this zone is about 60 degrees, which is concordant with the major shear dip direction. The zone in the vicinity of Line 2, Station 420 is in all likelihood an extension of the same zone located near Station 570 of Line 1, and appears to be mineralized with disseminated sulphides, although with the higher resistivities encountered could be more silicified than its neighbouring line; however, the core section is more conductive than either the hanging wall or footwall sections which show higher resistivities.

The interpreted sulphide zone within the central lower part of the pseudosection is interconnected to the zone that surfaces at bedrock near Station 420 and the zone that similarly surfaces in the vicinity of Station 120.

Both locations being anomalous in copper suggest, as for Line 1, that the high chargeability features could represent significant chalcopyrite mineralization.

Both in and near the creek where IP Line 2 crossed, there is one 0.75-metre-wide quartz-carbonate vein and several smaller ones along with several multi-directional small vein swarms of similar composition. The larger of the vein structures dips between 70 degrees and 80 degrees westerly and southwesterly into the large zone of **high chargeability** and **extremely high resistivity**. Copper and gold assay results from samples taken by this writer returned the following assays:

Sample	Copper (ppm)	Gold oz/ton	Gold ppb
1	87,397	0.063	6,000
2	461	0.002	-
3	28,573	0.024	2,000

Discussion

The most interesting induced-polarization feature found is the **low resistivity** anomaly in association with **high chargeability** anomalies as found near stations 540 and 450 of Lines 1 and 2, respectively. This feature, which appears to underlie the talus-strewn surface, is in all probability a continuous one. It has a strike direction of about 150 degrees azimuth and dips about 60 degrees to the southwest. It is at least 275 metres (900 feet) in length. It has in association with it a highly anomalous copper in soils anomaly (Hartley, 1986) within a larger zone of anomalous copper. By projecting this anomalous induced-polarization feature on strike to the southwest for an estimated 1,200 metres (4,000 feet), a linear feature of extremely anomalous copper in soils at 1,080 ppm Cu and 2,870 ppm Cu over a width of at least 50 metres is found. Three weak VLF-EM anomalies (Hartley, 1986) are for the most part superimposed over this 1,100-metre strike zone with the most northern of the VLF-EM anomalies corresponding directly with this anomalous induced-polarization feature. This zone could therefore be continuous for 1,200 metres.

Examination of this induced-polarization anomalous feature and corresponding VLF-EM anomalies and anomalous copper and zinc profiles along the strike of this zone suggests that the zone of interest is narrower at the north end and wider at the south end; possibly as much as 50 metres at the north end and 90 metres at the south end. However, evaluation of its actual cause will only be determined by drilling or possibly trenching.

An examination of the VLF-EM in-phase and quadrature profiles of Hartley's survey conducted over the area of interest shows a crossover locus as shown on Figure 7. Here the positive in-phase (real) component profile goes from a high amplitude positive wave-form on the west side of the crossover point to a moderate amplitude negative in-phase component profile on the east side of the crossover point. The quadrature component generally follows the in-phase component and is in phase with it but at much lower amplitude. This feature could represent a major shear and/or fault zone dipping to the west with moderate to strong electronic conducting material in association with it. The major VLF-EM crossover locus was plotted on Figures 7 and 8 to see what relationship it has to the chargeability and resistivity anomalous zones.

If this locus does represent a mineralized fault zone, it is probably displaced somewhat further to the west than where plotted, possibly in the vicinity of or west of the creek.

The zone of **high chargeability** appears to be open to depth at two locations on IP Line 1, one of which is immediately below the creek and the other which is west of the creek. Similarly, there are two zones of **high chargeability** on IP Line 2 on both sides of the creek, which appear to be open to depth.

SECTION 9.0 SUMMARY AND RECOMMENDATIONS

The reconnaissance induced-polarization survey results are interesting and positive. They show the likelihood of a continuous mineralized structure striking about 150 degrees azimuth and dipping about 60 degrees to the southwest and passing through the vicinity of IP Line 1, Station 420; and IP Line 2, Station 435. The structure appears to be open on strike. It is definitely open to depth on Line 2; however, on Line 1 whether it is open to depth is not presently clear.

Lending additional geophysical support to the induced-polarization chargeability and low resistivity anomalous features found along this zone is a nearby co-incident VLF-EM anomaly. Geochemical support is provided by the fact that both survey lines are located within a defined soils geochemical anomaly of copper and zinc along with apparently isolated areas of anomalous gold in soils; and within the vicinity of the anomalous induced-polarization features both copper and zinc in soils geochemistry becomes extremely anomalous.

Zones of chargeability (and resistivity) for the purposes of this report are classified as **low, medium, high, very high**, and **extremely high**. For summarization purposes, "high chargeability" relates to those values greater than 20 milliseconds or greater than **high chargeability** in the classification index.

Chargeability response amplitudes are interpreted to correlate directly with the conductive sulphide content of the underlying lithology, yet may exclude those sulphides that are insulated or encapsulated by non-conductive material such as limonite and specularite, as appears to be the case here.

IP Survey Line 1 and Line 2 pseudosections each show relatively large areas of "high chargeability" that appear to have two directional senses, the most prominent of which dips about 60 degrees westerly and is concordant with the observed major shear (and fault?) vector. The other direction, which is speculative, is concordant with the dip of the volcanics; e.g. about 25 to 30 degrees easterly. The zone of "high chargeability" on both lines appears to be variably open to depth at three locations in the direction of the major shear vector. Hence, the shear structures (and fault?) may be the conduits for the mineral solutions which introduced the sulphides. Lord (1948) shows the volcanic lithology dipping between 30 degrees and 55 degrees to the northeast. What is also known is that the volcanic assemblage contains tuff beds, andesite flows, volcanic flow breccias and other units, any of which could represent a permeable host horizon for mineralization hydrothermally introduced. What is not known is the indigenous pyrite or other sulphide content of the volcanic units, and how much hydrothermal overprinting of sulphides has occurred.

Both the mineralized vein structures found locally and the zone of intensely altered felsic volcanics immediately to the south of the IP survey area are indicative of an underlying or nearby heat and mineral solution source responsible for the copper sulphide and gold mineralization of potential economic tenor found in the vein structures.

One hypothesis is that the large zone of high chargeability could be indicative of hydrothermally introduced sulphides within a favourable volcanic host horizon. The is exemplified by the Geological Model of Figure 9, which was constructed by using the 25 millisecond chargeability isopleth as the postulated "ore" zone. The model is conformable to known geological features on the property.

Recommendations include:

1. Detailed geological mapping of the large geochemically anomalous area on the Chaco Bear 3 and Chaco Bear 4 mineral claims with particular attention paid to alteration facies. The zone of intensely altered felsic volcanics found in the central portion of this area and the proliferation of copper and gold bearing veins is indicative of a large and intensive hydrothermal mineralizing system nearby.

2. Expand the induced-polarization survey area to include the entire alteration zone found as a consequence of the work related to this report. The survey area should extend at least 400 metres beyond the defined alteration zone as may be practical considering the extreme topography in places. This survey must necessarily include the strike extension of IP Anomalous Feature I.

3. Diamond drill IP Anomalous Feature I as a priority because its strong anomalous geochemical association implies it is a mineralized structure containing copper and zinc with a possibility for gold in association with the copper. A minimum first-stage drilling program of 2,000 metres is recommended to test this structure near surface and at depth at five locations along its strike.

4. Independent of recommendation 3, diamond-drill at least two vertical holes on each IP pseudosection to test the central part of each chargeability anomaly. Ideal locations include the intersection locus of the postulated fault zone with the chargeability

anomaly and intersection locus of the mineralized vein structures with the underlying chargeability anomaly.

5. Ideally, it would be preferable to trench the projected extension to surface of IP Anomalous Feature I along several sections of its strike and strike extensions; however, the logistics of bringing the necessary heavy equipment on to the site makes this type of work impractical at this time.

SECTION 10.0 COST STATEMENT

10. Summary

			$
1.	Personnel		12,676.20
2.	Helicopter Support		5,541.14
3.	IP Equipment Rental		1,200.00
4.	Field Expense		1,413.45
5.	Assay Cost		155.15
6.	Travel Expense		2,648.79
7.	Data Processing and Report Reproduction		740.65
		TOTAL	**$24,375.38**

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J. M. ASHTON

10.2 Personnel

1.	Trip Preparation	
	29, 30, 31 July, 1 August 1992	
	J.M. Ashton, P.Eng.	
	2 days @ $500.00	1,000.00
2.	Travel to Property	
	3, 4 August 1992	
	J.M. Ashton, P.Eng.	500.00
	A. Charest	324.60
	G. Dion	231.86
	A. von Kursell	231.86
		1,288.32
3.	Claim Staking	
	5, 6 August 1992	
	J.M. Ashton, P.Eng.	
	A. von Kursell	n/a
4.	Camp Set-up & IP Equipment Preparation	
	5, 6 August 1992	
	A. Charest	659.20
	G. Dion	463.72
		1,122.92

5.	IP Survey, 7, 8 August 1992		
	J.M. Ashton, P.Eng.	1,000.00	
	A. Charest	649.20	
	G. Dion	463.72	
	A. von Kursell	463.72	
		2,576.64	
6.	Travel from Property 9 & 10 August 1992		
	J.M. Ashton, P.Eng.	500.00	
	A. Charest	324.60	
	G. Dion	231.86	
	A. von Kursell	231.86	
		1,288.32	
7.	Report Preparation September/October 1992 J.M. Ashton, P.Eng. 6 days	3,000.00	
8.	CAD Drawing Preparation E.B. Catapia, C.Tech 24 hours @ $50.00	1,200.00	
9.	Report Typing, Collation and Drawing Reproduction S. Apchkrum 20 hours @ $30.00	600.00	
10.	Report Review		
	D. Mark, B.Sc., Geophysicist	300.00	
	B.G. Richards, P.Eng.	300.00	
		600.00	
		TOTAL	**$12,676.20**

10.3 Helicopter Support

1.	5 August 1992 Northern Mountain Helicopters Inc. (Discount Claim Staking Portion) 3.9 hours	3,049.53

2.	8 August 1992 Northern Mountain Helicopters Inc. 2.9 hours	2,491.61	
		TOTAL	**$ 5,541.14**

10.4 Induced-Polarization Equipment Rental

Includes:

a)	One Phoenix Geophysics Model MG-2 Engine-Generator		
b)	One Phoenix Geophysics Model IPT-1 Transmitter		
c)	One Huntec Model IV Receiver		
d)	Miscellaneous Cable, Receiving Pots, etc.	1,200.00	
		TOTAL	**$ 1,200.00**

10.5 Field Expense

1.	VHF Radio Rental	170.00	
2.	HF SSB Radio Rental	250.00	
3.	Camp Equipment, Fuel, Tents, etc.	360.00	
4.	Groceries	536.00	
5.	Flagging, Tyvex Tags, Sample Bags, Salt, etc.	47.45	
6.	Miscellaneous	50.00	
		TOTAL	**$ 1,413.45**

10.6 Assay Cost

1.	6 samples, 30 Element ICP, Hg Analysis, Ag & Au Fire Assay Sample Preparation	155.00	
		TOTAL	**$ 155.00**

10.7 Travel Expense

Travel to Driftwood Camp near
Takla Lake from Vancouver &
Return, 4 men & Equipment
3, 4, 8, 9, 10 August 1992

1.	4x4 Vehicle Rental	888.00
2.	Gasoline & Oil	427.91
3.	Trailer Rental	373.20
4.	Accommodation	375.28
5.	Meals	374.40
6.	Miscellaneous, Tips	60.00
7.	Vehicle Repairs	150.00

TOTAL $ 2,648.79

10.8 Data Processing & Report Reproduction

1.	Data Processing IP Pseudosections	360.00
2.	Photocopying Supporting Assessment Work Reports	111.75
3.	Drawing Reproduction	52.90
4.	Report Reproduction	216.00

TOTAL $ 740.65

SECTION 11.0 CERTIFICATION OF J.M. ASHTON, P.ENG.

I, J.M. Ashton, of Suite 201 – 518 Beatty Street, Vancouver, British Columbia, hereby certify that:

1. I am a Consulting Engineer and work on occasion with the Company, 808 Exploration Services Limited.

2. I am a graduate of the University of British Columbia with a B.A.Sc. in Electrical Engineering (1966).

3. I am a member in good standing in the Association of Professional Engineers and GeoScientists of the Province of British Columbia.

4. I am a member of the Canadian Institute of Mining and Metallurgy.

5. I have practised as a mineral explorationist and consulting engineer since 1969.

6. This report was prepared by me. Some technical assistance was provided by Mr. D.G. Mark, B.Sc., Geophysicist. I requested Mr. Brian Richards, P.Eng. review the contents herein and certify the same if in concurrence.

J.M. Ashton, P.Eng.

Dated this 5th day of July 1993
VANCOUVER, BRITISH COLUMBIA

SECTION 12.0 CERTIFICATION OF D.G. MARK, B.SC., GEOPHYSICIST

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

1. I am a consulting Geophysicist of Geotronics Surveys Ltd., with offices located at 405 - 535 Howe Street, Vancouver, British Columbia.

2. I am a graduate of the University of British Columbia with a Bachelor of Science in Geophysics (1968).

3. I have been practising my profession for the past 22 years and have been active in the mining industry for the past 25 years.

4. The induced-polarization survey described in this report was carried out by party chief Alain Charest, geophysical technician, under my direction, and with equipment supplied by Geotronics Surveys Ltd.

5. I provided technical consulting services to J.M. Ashton pursuant to the preparation of this report.

David G. Mark

Dated this 5th day of July, 1993.
VANCOUVER, BRITISH COLUMBIA

SECTION 13.0 CERTIFICATION OF B.G. RICHARDS, P.ENG.

I, Brian George Richards, of 2342 Queens Avenue, West Vancouver, British Columbia, hereby certify that:

1. I am a consulting Mining and Mineral Processing Engineer with offices at 2342 Queens Avenue, West Vancouver, B.C.

2. I am a graduate of the University of British Columbia with a Bachelor of Applied Science in Mining and Mineral Processing Engineering (1985).

3. I have practised my profession continuously since graduation.

4. I am a member in good standing of the Association of Professional Engineers and GeoScientists of British Columbia.

5. I agree with and endorse the contents of this report.

B.G. Richards, P. Eng.

Dated this 5th day of July, 1993
VANCOUVER, BRITISH COLUMBIA

SECTION 14.0 REFERENCES

Boyle, R.W., (1980): Gold Deposits: A Review of Their Geological and Geochemical Setting: Geology of Canadian Gold Deposits, Special Volume 24, The Canadian Institute of Mining and Metallurgy.

Brant, A.A. et.al., (1966): Examples of Induced-Polarization Field Results in the Time Domain: Mining Geophysics, Society of Exploration Geophysicists, Volume 1, Case Histories, Pages 288 – 316.

Donnelly, T., (1984): Geochemical and Prospecting Report on the Peteka 1 to 4 Inclusive, Claims, Omineca Mining Division, for Suncor Inc., Assessment Report 14, 678.

Hamilton, J.M., Richardson, J., (1968): Geophysical Survey Report on the Dave Group of Claims, Driftwood Creek, Omineca Mining Division, on behalf of Cominco Ltd., Assessment Report 1,616.

Hartley, C., (1986): Geological, Geochemical, Geophysical and Prospecting Report; Peteka 1 to 4 Claims, Omineca Mining Division, for Suncor Inc., Assessment Report 14,424.

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Lord, C.S., (1948): McConnell Creek Map Area, Cassiar District, British Columbia, Memoir 251, Geological Survey of Canada.

MacFarlane-Little, J., (1918): The Geology and Metal Deposits of Chile: The Branwell Company.

Mackie, B., September, 1992. Personal Communication.

Wilton, D.H. and Sinclair, A.J., (1978): Origin of the Sustut copper deposit, central British Columbia (abs.): Canadian Institute of Mining and Metallurgy Bulletin, v71, p. 129.

FIGURES

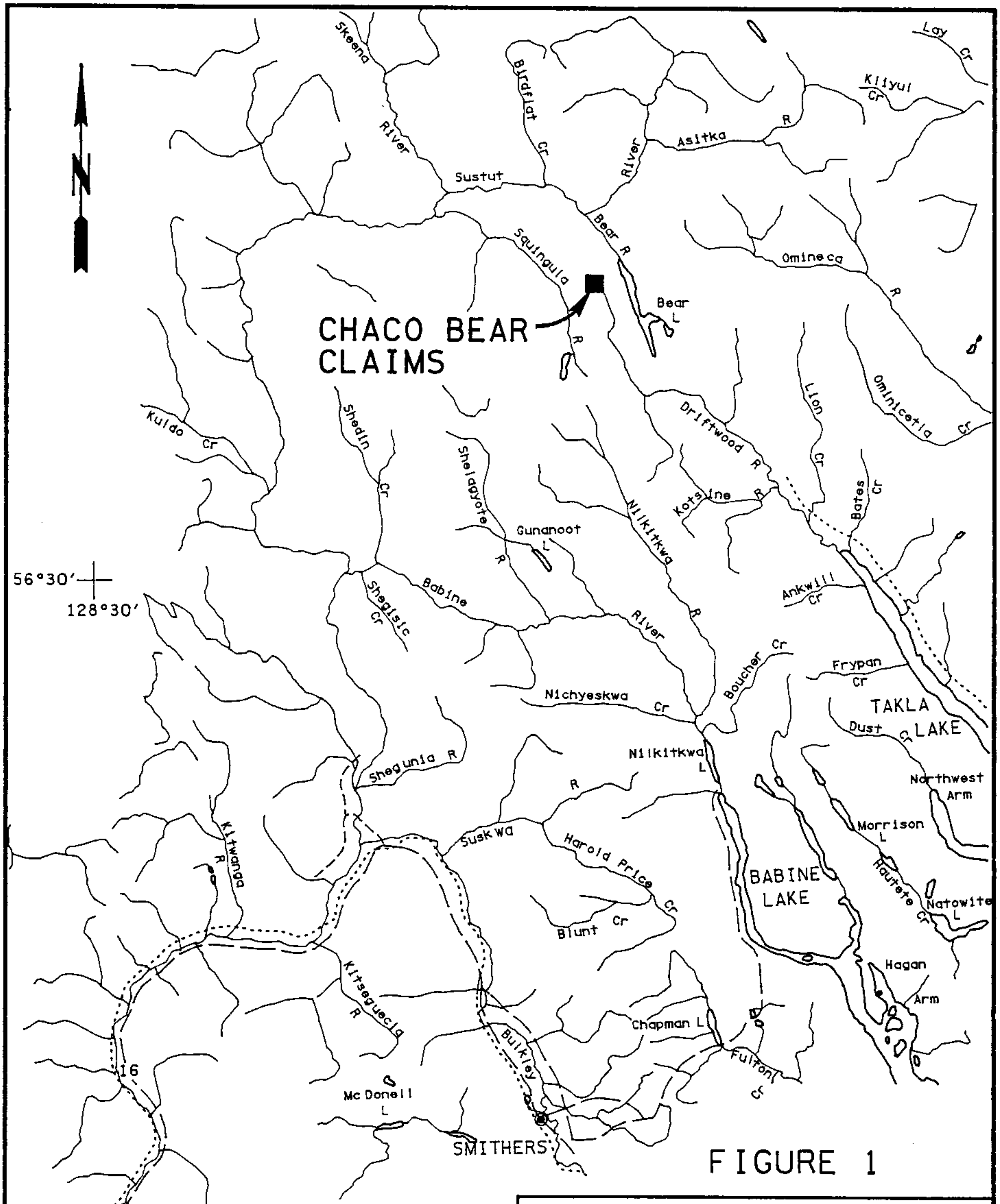


FIGURE 1

808 EXPLORATION SERVICES LTD.			
CHACO BEAR PROJECT			
PROPERTY LOCATION MAP			
BY :		SCALE :	AS SHOWN
DRAWN :	EBC	DATE :	AUGUST 1992
CHECKED :	JMA	MAP 1	

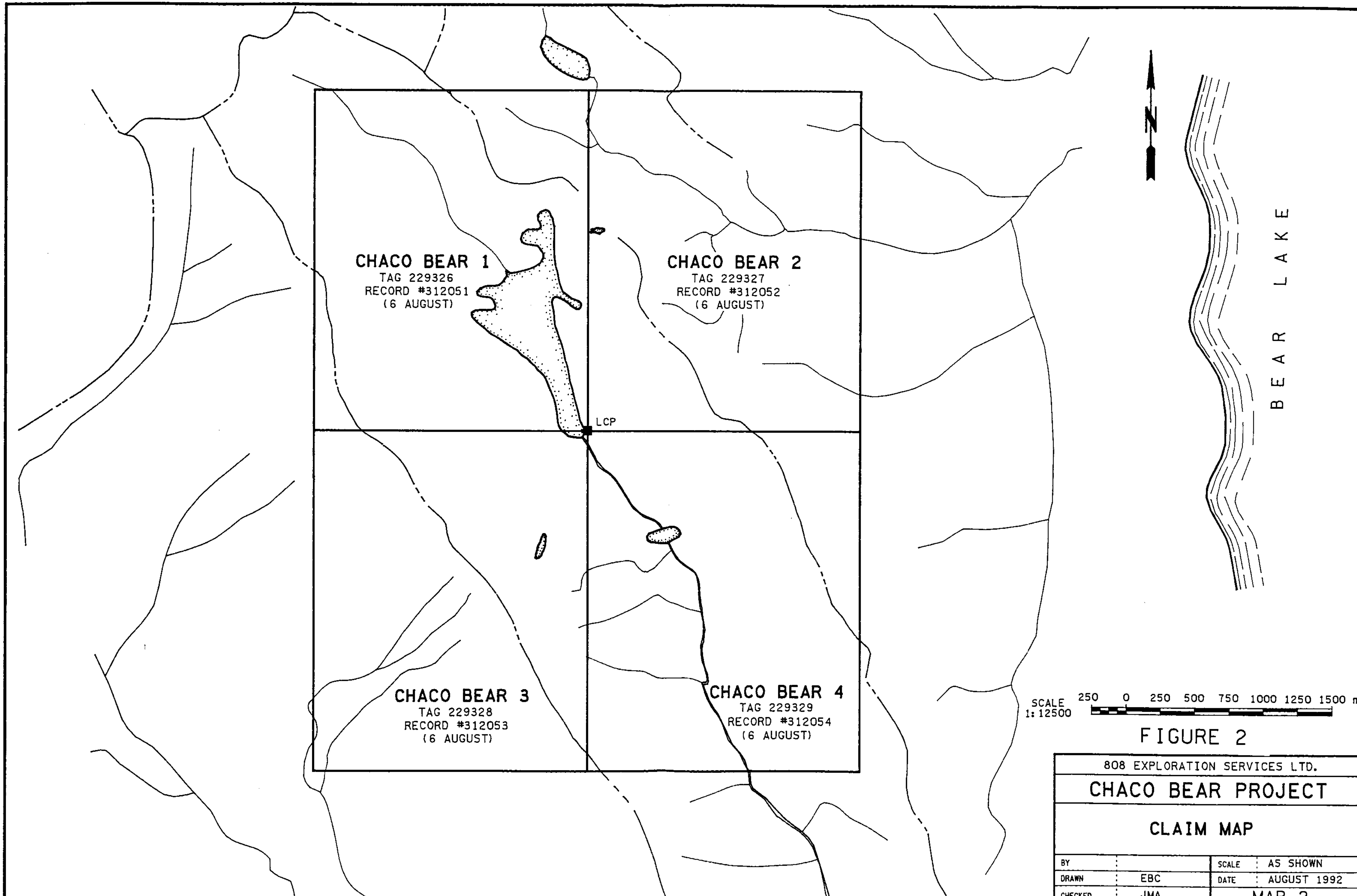


FIGURE 2

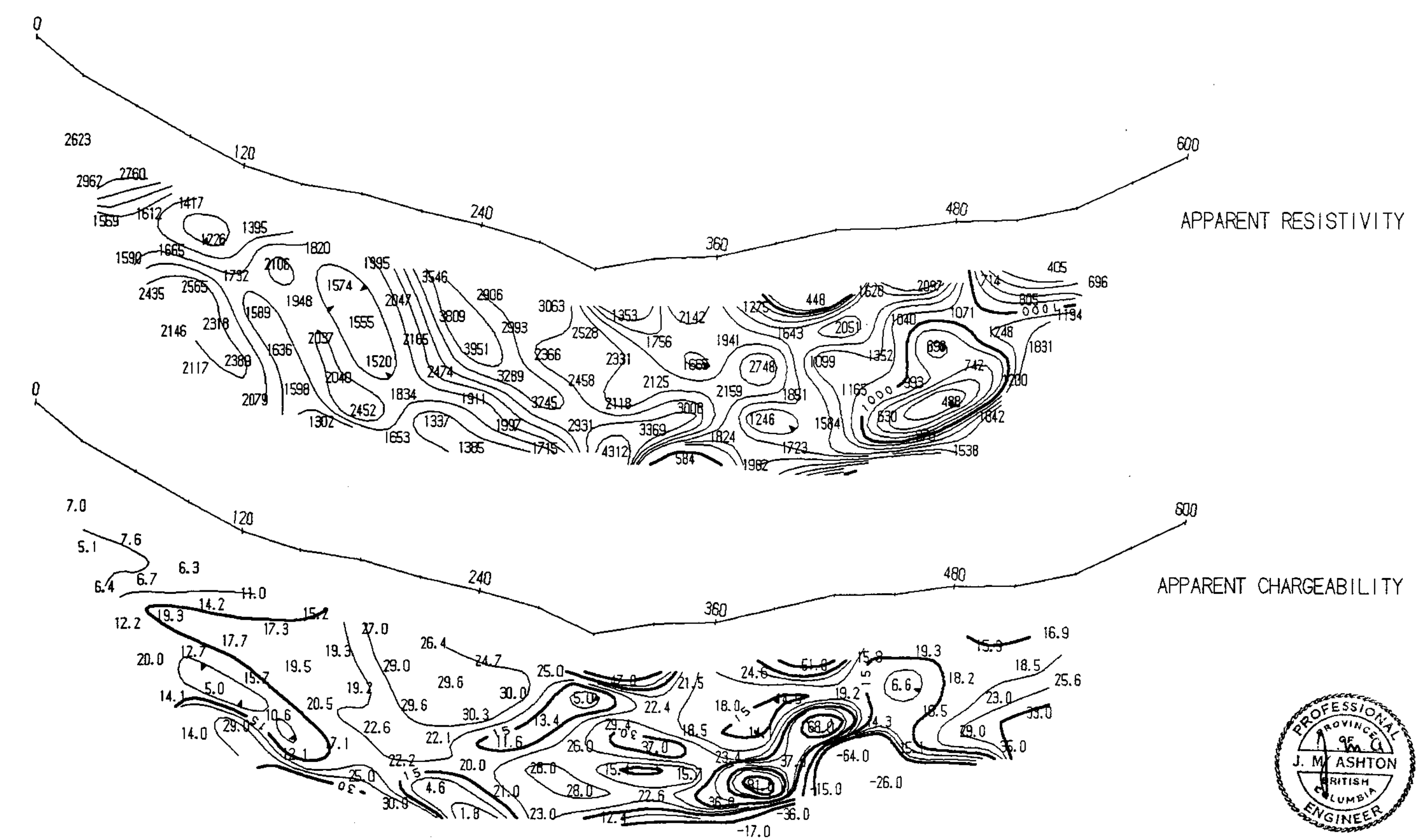
808 EXPLORATION SERVICES LTD.

CHACO BEAR PROJECT

CLAIM MAP

BY		SCALE	AS SHOWN
DRAWN	EBC	DATE	AUGUST 1992
CHECKED	JMA	MAP 2	

Survey Direction: 071 degrees

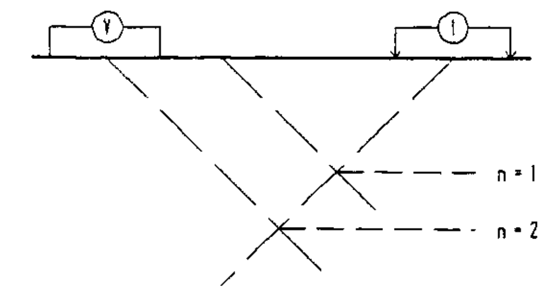


Scale 1:2500

25 0 25 50 75 100 125
(metres)

Surveyed by GEOTRONICS SURVEYS LTD.
August 1992

Pseudosection Plotting Method



LEGEND

Contour Intervals:
Resistivity : log base 10 ohm-metres
Chargeability: 5 milliseconds

INSTRUMENTATION

I.P. Receiver: Huntec Model MK IV
I.P. Transmitter/Generator: Phoenix Model 2
2.5 kWatt Honda generator

SURVEY PARAMETERS

Survey Mode: Time Domain
Array: Double-Dipole
Dipole Length: 100 feet(30 metres)
Dipole separation: n=1 to 7
Delay Time: 200 milliseconds
Integration Time: 1500 milliseconds
Charge Cycle: 8 second square wave

FIGURE 3

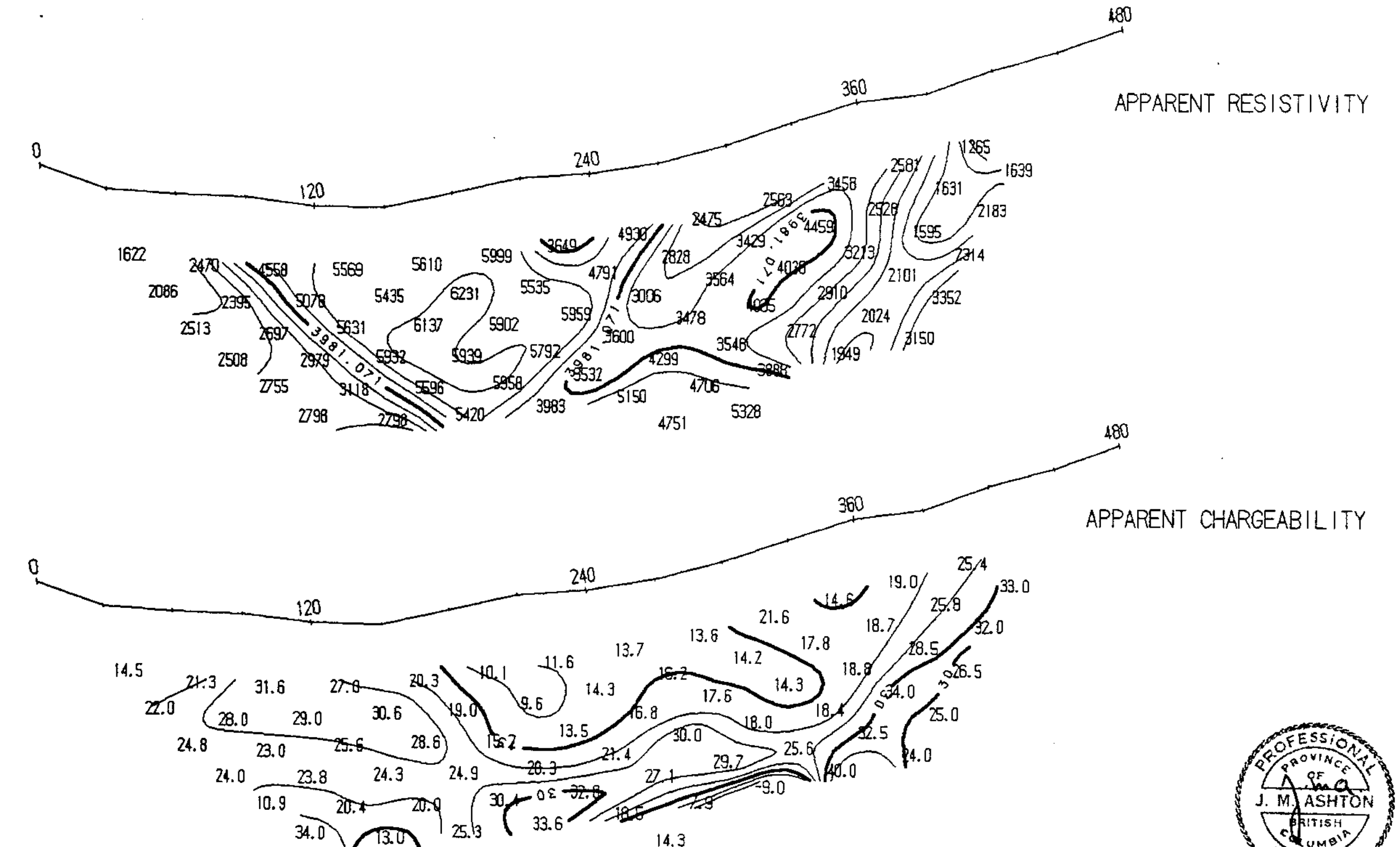
GEOTRONICS SURVEYS LTD.

THE BEAR SYNDICATE
CHACO BEAR PROJECT

APPARENT RESISTIVITY AND
IP PSEUDOSECTIONS
LINE #1

Drawn by:	Job No.	NTS	Scale	Date	Map No.
A.C.	92-05		1:2500	Aug/92	

Survey Direction: 051 degrees



Scale 1:2500

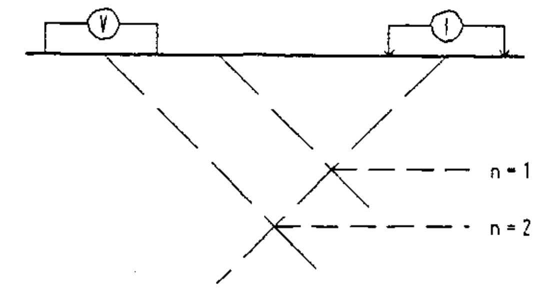
25 0 25 50 75 100 125

(metres)

Surveyed by GEOTRONICS SURVEYS LTD.
August 1992

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. M. ASHTON

Pseudosection Plotting Method



LEGEND

Contour Intervals:
Resistivity : log base 10 ohm-metres
Chargeability: 5 milliseconds

INSTRUMENTATION

I.P. Receiver:	Huntec Model MK IV
I.P. Transmitter/Generator:	Phoenix Model 2 2.5 kWatt Honda generator

SURVEY PARAMETERS

Survey Mode:	Time Domain
Array:	Double-Dipole
Dipole Length:	100 feet (30 metres)
Dipole separation:	n=1 to 7
Delay Time:	200 milliseconds
Integration Time:	1500 milliseconds
Charge Cycle:	8 second square wave

FIGURE 4

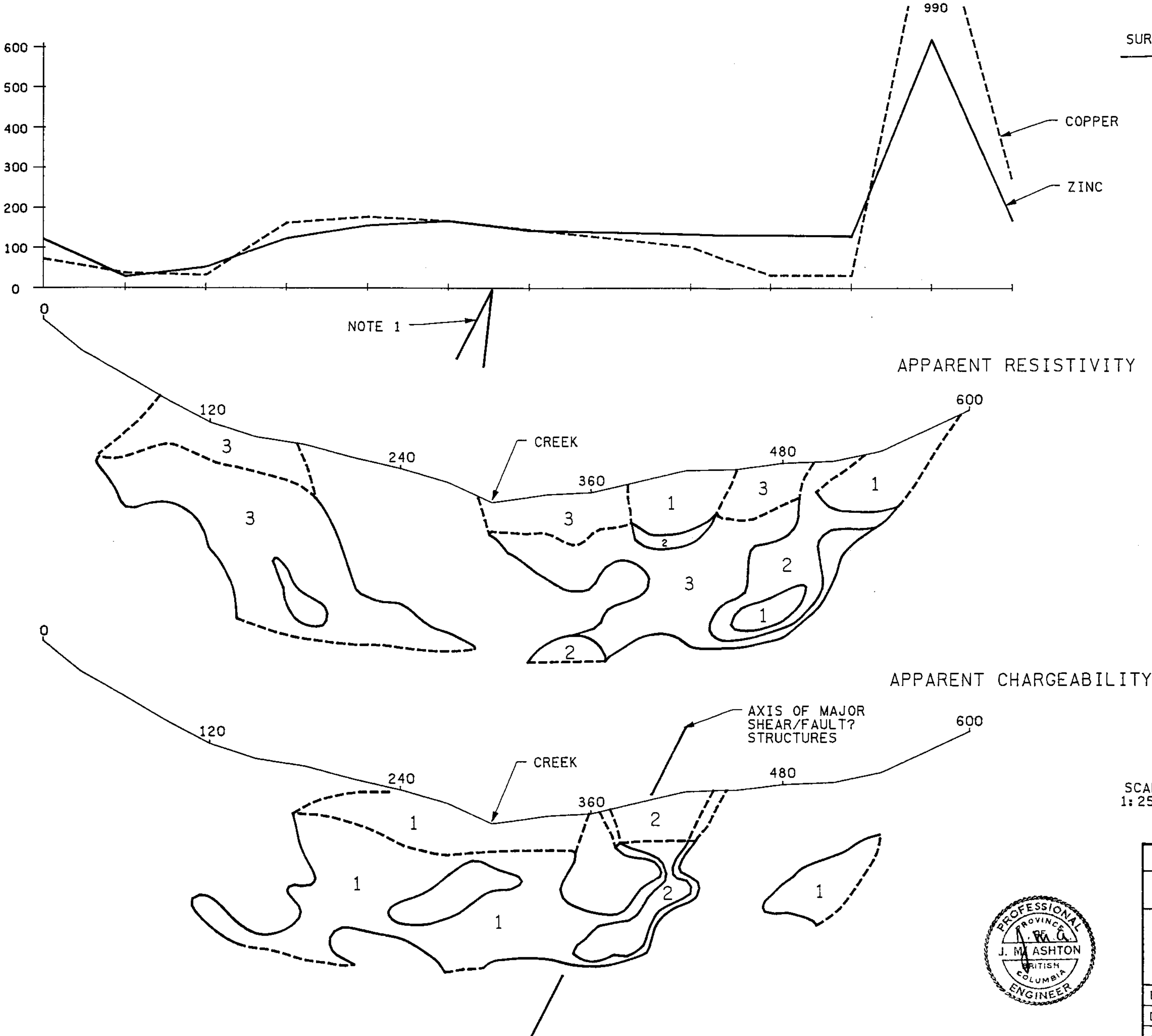
GEOTRONICS SURVEYS LTD.

THE BEAR SYNDICATE

CHACO BEAR PROJECT

APPARENT RESISTIVITY AND
IP PSEUDOSECTIONS
LINE #2

Drawn by:	Job No:	NTS	Scale	Date	Map No.
A.C.	92-05		1:2500	Aug/92	



NOTES

1. VEIN STRUCTURES ASSAY RESULTS

SAMPLE	Cu (ppm)	Au (oz/ton)
4	12,362	0.046
5	97,527	0.394
6	51,062	0.217

LEGEND

RESISTIVITY

- 1 — ZONE OF LOW RESISTIVITY LESS THAN 500 OHM-M
- 2 — ZONE OF MEDIUM RESISTIVITY LESS THAN 1,000 OHM-M GREATER THAN 500 OHM-M
- 3 — ZONE OF HIGH RESISTIVITY LESS THAN 2,000 OHM-M GREATER THAN 1,000 OHM-M

CHARGEABILITY

- 1 — ZONE OF HIGH CHARGEABILITY 20-40 MILLISECONDS
- 2 — ZONE OF VERY HIGH CHARGEABILITY 40-80 MILLISECONDS

SCALE 1:2500 — 50 0 50 100 150 m

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. M. ASHTON

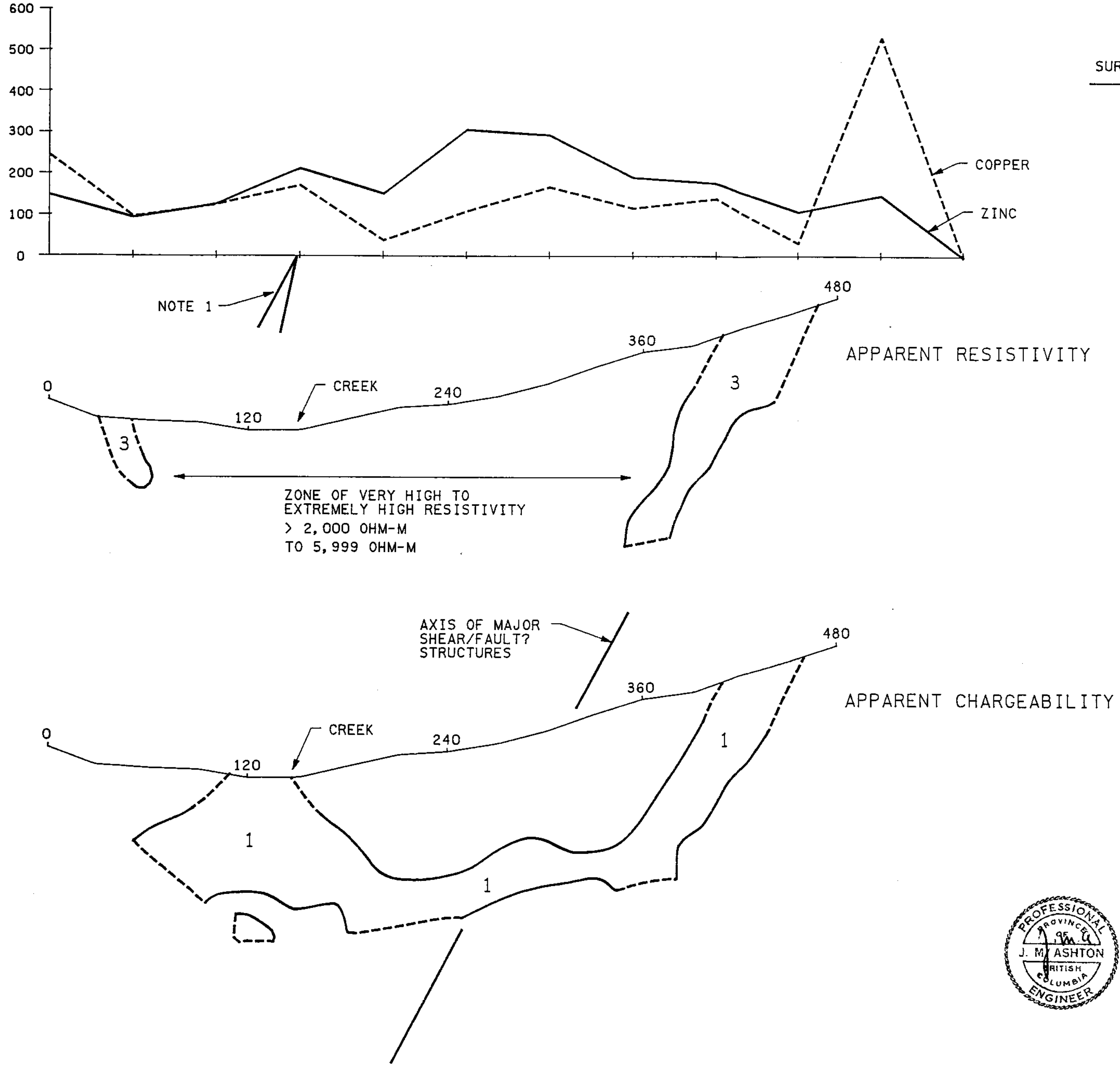
FIGURE 5

808 EXPLORATION SERVICES LTD.

CHACO BEAR PROJECT

ANOMALOUS CHARGEABILITY & LOW RESISTIVITY ZONES, IP LINE 1

BY	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	SEPTEMBER 1992
CHECKED	JMA		MAP



SURVEY DIRECTION: 051 DEGREES

NOTES

1. VEIN STRUCTURES ASSAY RESULTS

SAMPLE	Cu (ppm)	Au (oz/ton)
1	87,397	0.063
2	461	0.002
3	28,573	0.024

LEGEND

3 — ZONE OF HIGH RESISTIVITY LESS THAN 2,000 OHM-M GREATER THAN 1,000 OHM-M

1 — ZONE OF HIGH CHARGEABILITY 20-40 MILLISECONDS

SCALE 1:2500

50 0 50 100 150 m

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. M. ASHTON

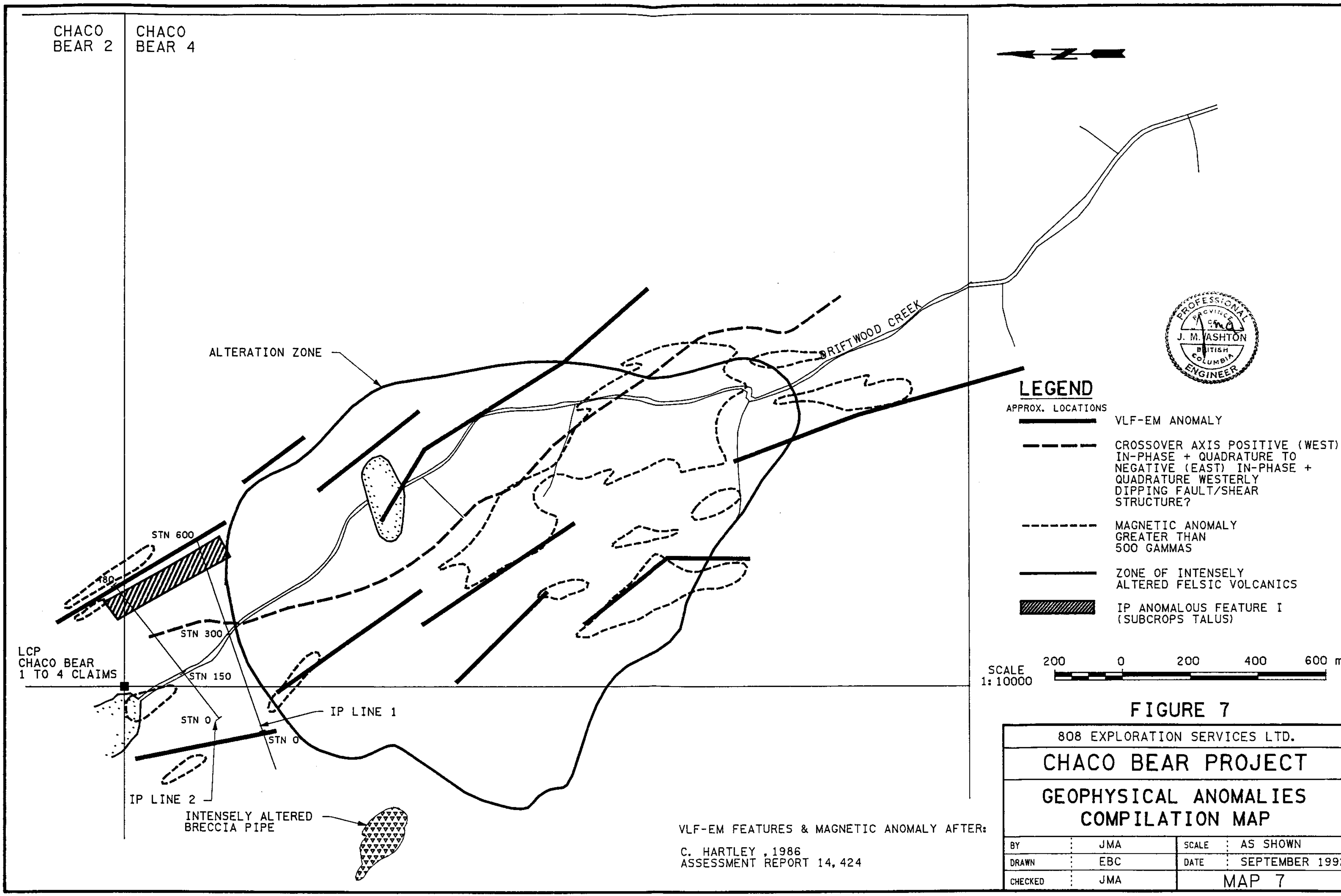
FIGURE 6

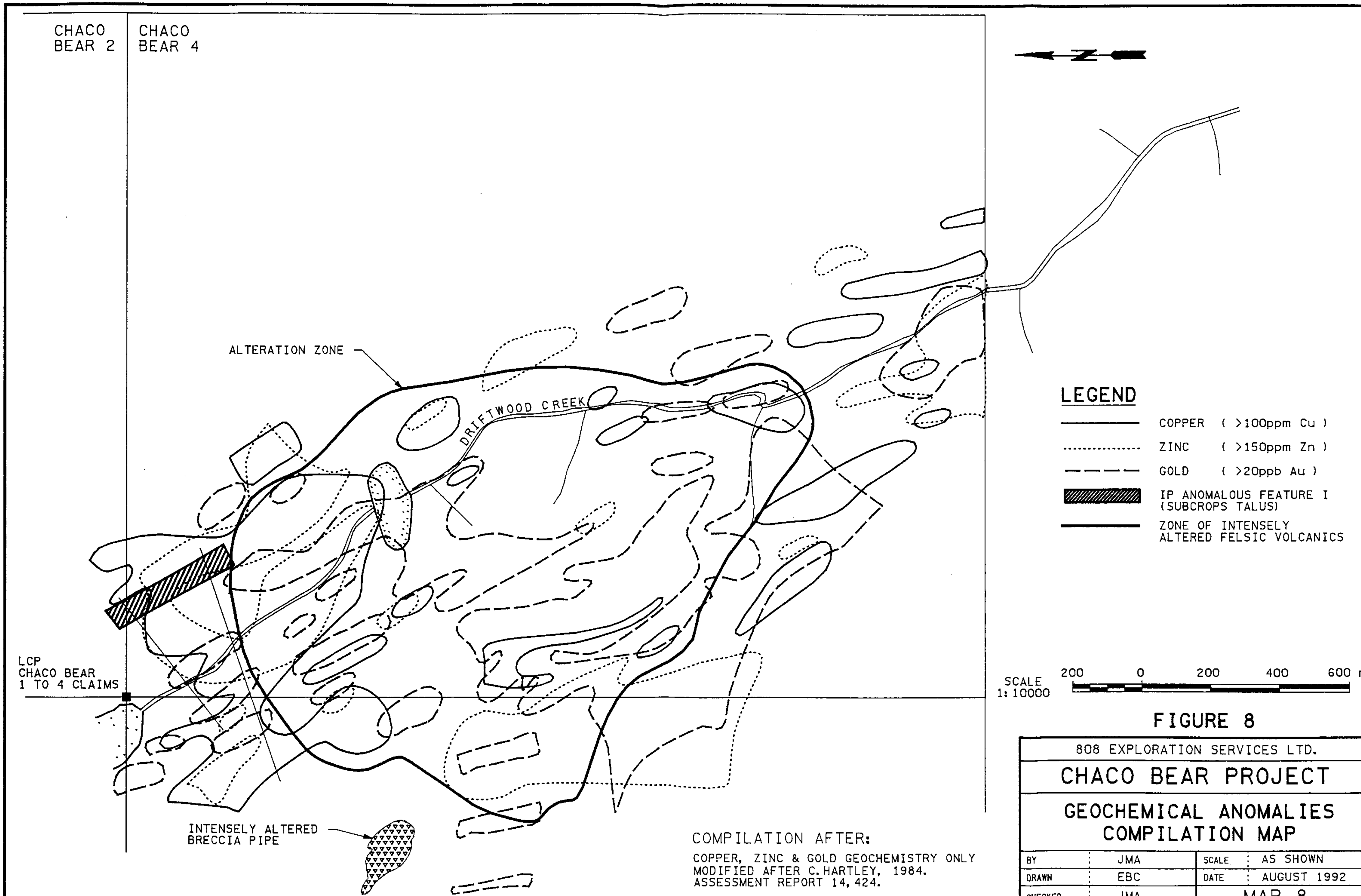
808 EXPLORATION SERVICES LTD.

CHACO BEAR PROJECT

ANOMALOUS CHARGEABILITY & LOW RESISTIVITY ZONES, IP LINE 2

BY	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	SEPTEMBER 1992
CHECKED	JMA	MAP	


CHACO BEAR 2
CHACO BEAR 4
ALTERATION ZONE
DRIFTWOOD CREEK
STN 600
STN 300
STN 150
STN 0
STN 0
180
LCP CHACO BEAR 1 TO 4 CLAIMS
IP LINE 1
IP LINE 2
INTENSELY ALTERED BRECCIA PIPE
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. M. ASHTON
LEGEND
APPROX. LOCATIONS
VLF-EM ANOMALY
CROSSOVER AXIS POSITIVE (WEST) IN-PHASE + QUADRATURE TO NEGATIVE (EAST) IN-PHASE + QUADRATURE WESTERLY DIPPING FAULT/SHEAR STRUCTURE?
MAGNETIC ANOMALY GREATER THAN 500 GAMMAS
ZONE OF INTENSELY ALTERED FELSIC VOLCANICS
IP ANOMALOUS FEATURE I (SUBCROPS TALUS)
SCALE 1:10000
200 0 200 400 600 m
VLF-EM FEATURES & MAGNETIC ANOMALY AFTER:
C. HARTLEY, 1986
ASSESSMENT REPORT 14,424
FIGURE 7
808 EXPLORATION SERVICES LTD.
CHACO BEAR PROJECT
GEOPHYSICAL ANOMALIES COMPILATION MAP
BY : JMA
DRAWN : EBC
CHECKED : JMA
SCALE : AS SHOWN
DATE : SEPTEMBER 1992
MAP 7



COMPILATION AFTER:

COPPER, ZINC & GOLD GEOCHEMISTRY ONLY
MODIFIED AFTER C. HARTLEY, 1984.
ASSESSMENT REPORT 14, 424.

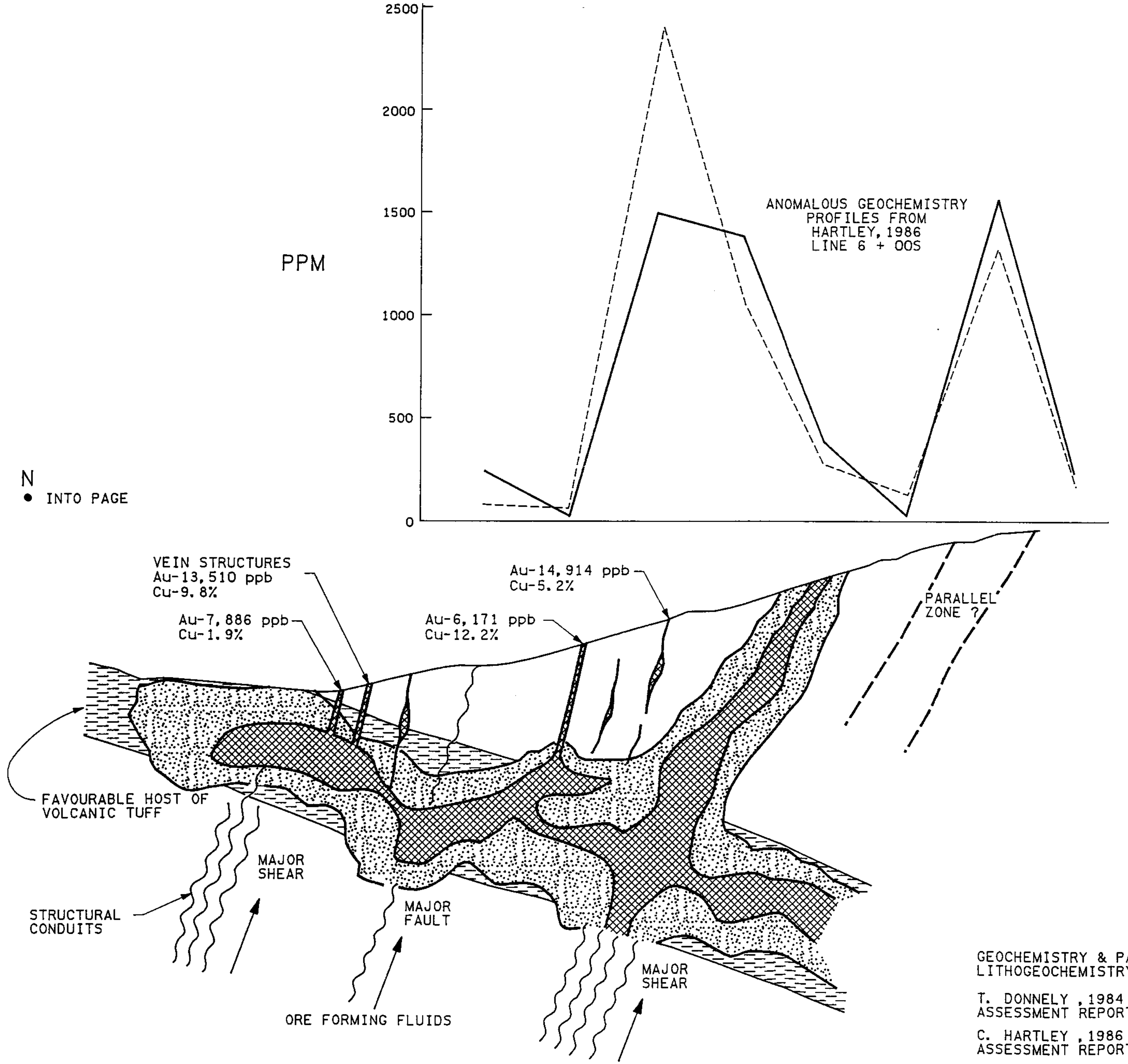
FIGURE 8

808 EXPLORATION SERVICES LTD.

CHACO BEAR PROJECT

GEOCHEMICAL ANOMALIES COMPILATION MAP

BY	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	AUGUST 1992
CHECKED	JMA		MAP 8



NOTES

1. POSTULATED ORE ZONES SHOWN CONFORM TO DEFINED IP SURVEY RESISTIVITY LOWS & CHARGEABILITY HIGHS. SEE IP LINE 2 PSEUDOSECTION
2. VEIN STRUCTURES CONTAIN CHALCOPYRITE, BORNITE MALACHITE, SPECULARITE PYRITE, SPHALERITE; POSSIBLY TETRAHEDRITE, & GOLD IN SILICEOUS & CARBONATE GANGUE.
3. PRINCIPAL HOST IS THE JURASSIC TAKLA VOLCANIC GROUP OF TUFFS, AGGLOMERATES & LAVAS. LOCALLY THE TERTIARY KASTBERG INTRUSIONS OF FELDSPAR, FELDSPAR-QUARTZ PORPHYRY, PORPHYRITIC GRANODIORITE & QUARTZ DIORITE INTRUDE THE VOLCANICS.
4. MAJOR SHEAR & JOINT DIRECTIONS 320° & 330° AZIMUTH, DIPS 50°-60° SOUTHWEST.
5. VOLCANIC FLOWS STRIKE 320° TO 330° AZIMUTH & DIP 40°-60° NORTHEAST.
6. BEST SOIL GEOCHEMISTRY & LITHOGEOCHEMISTRY PROJECTED ONTO THIS MODEL SECTION FROM SOURCES ON STRIKE TO SOUTH.

LEGEND

- POSTULATED ORE ZONES
- PYRITIC ENVELOPE
- FAVOURABLE HOST LITHOLOGY. VOLCANIC TUFF WITH PERMEABILITY & POROSITY
- COPPER GEOCHEMISTRY, ppm Cu
- ZINC GEOCHEMISTRY, ppm Zn

SCALE 1:2500 — 25 0 25 50 75 100 125 metres

GEOCHEMISTRY & PART OF LITHOGEOCHEMISTRY FROM:

T. DONNELY, 1984 ASSESSMENT REPORT 14,678

C. HARTLEY, 1986 ASSESSMENT REPORT 14,424

FIGURE 9

808 EXPLORATION SERVICES LTD.

CHACO BEAR PROJECT

GEOLOGICAL MODEL

BY	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	AUGUST 1992
CHECKED	JMA	MAP 9	

APPENDICES

APPENDIX I GEOCHEMICAL ASSAY CERTIFICATE

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6 PHONE(604)253-3158 FAX(604)253-1716

GEOCHEMICAL/ASSAY CERTIFICATE

808 Exploration Services Ltd. File # 92-2701

201 - 518 Beatty St., Vancouver BC V6B 2L3 Submitted by: J.M. ASHTON

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Hg ppb	Ag** oz/t	Au** oz/t
SAMPLE 1	1	87397	31	48	8.0	21	623	2	11.00	847	5	6	1	1	.2	6	225	1	.01	.001	2	1	.01	1	.01	2	.01	.01	.01	1	100	.20	.063
SAMPLE 2	1	461	6	43	.1	4	10	529	12.41	7	5	ND	1	5	2.1	2	2	11	.66	.006	2	4	.02	7	.01	6	.18	.01	.04	10	5	.01	.002
SAMPLE 3	7	28573	71	28	1.8	4	5	658	7.55	98	5	2	1	6	2.1	2	25	13	3.17	.001	5	19	.02	5	.01	2	.10	.01	.01	9	25	.07	.024
SAMPLE 4	1	12362	299	493	.6	3	9	340	6.76	2	5	3	1	2	14.8	2	9	19	.22	.030	2	1	.09	15	.02	2	.37	.01	.17	3	90	.01	.046
SAMPLE 5	1	97527	1793	7007	7.8	1	13	2	11.79	2	5	11	1	1	278.0	2	11	1	.01	.001	2	1	.01	27	.01	2	.09	.01	.10	1	670	.22	.394
SAMPLE 6	2	51062	44	136	8.3	5	13	64	12.91	4	5	4	2	1	3.4	2	157	5	.05	.001	2	1	.01	9	.01	9	.05	.01	.03	1	30	.29	.217
STANDARD C/AG-1/AU-1	19	64	41	137	7.3	73	32	1082	3.96	39	20	7	40	54	18.7	15	20	61	.50	.086	39	62	.95	186	.09	37	1.94	.07	.14	10	1600	.99	.098

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG.C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
ASSAY RECOMMENDED FOR ROCK AND CORE SAMPLES IF CU PB ZN AS > 1%, AG > 30 PPM & AU > 1000 PPB
- SAMPLE TYPE: ROCK HG ANALYSIS BY FLAMELESS AA. AG** + AU** BY FIRE ASSAY FROM 1 A.T. SAMPLE.

DATE RECEIVED: AUG 24 1992 **DATE REPORT MAILED:** Aug 31/92 **SIGNED BY**.......... D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS