DEEP-PROBE INDUCED-POLARIZATION SURVEY 2 REPORT

on the

ASHTON CU-AU MINERAL CLAIMS

NTS 92I/6W & 92I/3W
KAMLOOPS MINING DIVISION

LATITUDE:	**50°14'52" NORTH**
LONGITUDE:	**121°23'45" WEST**
OWNERS:	**J.M. ASHTON** **S.E. APCHKRUM**
OPERATORS:	**J.M. ASHTON** **J.M. ASHTON & ASSOCIATES LTD.** **S.E. APCHKRUM**
AUTHOR:	**J.M. ASHTON, P.Eng.**
GEOPHYSICIST:	**D.G. MARK, P.Geo.**
SUBMITTED:	**16 September, 2004**

Prepared by:
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for

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Suite 612
1200 West Pender Street
Vancouver, British Columbia
V6E 2S9

on behalf of the Owners

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TABLE OF CONTENTS

FIGURES ASSOCIATED with TEXT

(Follows Page 28)

FIGURES

APPENDICES

ASHTON COPPER-GOLD PROSPECT
DEEP-PROBE INDUCED -POLARIZATION SURVEY 2 REPORT

SECTION 1.0 — INTRODUCTION

The Ashton Copper-Gold Prospect is located about 12 miles (19 km) due east of the Village of Lytton, British Columbia. It has seen recorded mineral exploration over the area of interest since the discovery of a large, strong, copper-in-soils anomaly in 1969, partly associated with a significant zone of skarnification which contains copper minerals. The anomalous area was re-discovered as a result of a new multi-element soil survey conducted in 1993. Its size and strength corresponded well. The copper-in-soils anomaly covers an area about 1 mile (1.6 km) east to west by 1½ miles (2.4 km) north to south and appears to be contained within a much larger area of hydrothermal alteration.

Boyle, 1976, **in** Geological Survey of Canada Bulletin 280, p6 states *"Moving northward coarse gold was found on the* ***Nicoamen River*** *above Lytton in 1857, and by 1858 the rich bars at Yale were being worked. The news of these discoveries was followed by an extraordinary migration from the goldfields of California to those of British Columbia".* The hydrothermally altered target area on the Ashton Copper-Gold prospect is not more than 3 km upslope from both the Nicoamen River and Thompson's River and it is within the realm of possibility that the gold found in the Nicoamen and/or the Thompson River is sourced from this same hydrothermal system.

Staged exploration efforts consisting of two magnetometer surveys (1990, & 2001); a VLF-EM survey (1990); a shallow probe induced polarization survey (1993), and a seven (7) hole 650 metre percussion drilling program (1994); a two line deep-probe induced polarization survey (1999); and a magnetometer survey in 2001 to cover the area of the 1994 drilling. Drill hole logging and thin section work (1995) contributed significantly towards the geoscientific understanding of the property including the identification of intense hydrothermal alteration pervasive throughout the area. One geological fact stands out from the 1994 percussion drilling program and was one of the reasons for proceeding with the 1999 deep-probe IP survey. Geological logging of vertical drill hole RC93-3 by Gale (1994) revealed a mineralized stockworks zone consisting of quartz-carbonate, pyrite-chalcopyrite veins and veinlets at the bottom 70 feet interval.

It was the results of the two line reconnaissance, dipole-dipole, **deep-probe** induced polarization survey conducted in 1999 that identified two apparent large sulphide deposits of different styles on the property. It was also found that the 1994 drilling failed to test these newly identified sulphide bodies.

One deposit is a large disseminated sulphide body which appears to lie within 160 feet (50 metres) to 200 feet (60 metres) from the surface below an extremely anomalous copper-in-soils anomaly. The disseminated sulphide body interpreted from a large zone of anomalous induced polarization chargeability is perhaps a tabular body measuring at least 800 metres (2,600 feet) by 350 metres 1,150 feet) and goes to beyond a depth from surface of more than 420 metres (1,400 feet). There are at least two (2) strong Self-Potential (SP) anomalies along each of the two survey lines that traversed the surface of this body at right angles, east to west and south to north that show Self-Potential anomalies exceeding minus 150 millivolts that clearly indicates that oxidizing sulphides are close to the surface at the respective SP anomaly centres.

In addition the IP survey identified a large, strong, geophysical conductor interpreted, in all probability, to be a fairly large semi-massive to massive sulphide body dipping conformably at –40° with the intruded monoclinic structure. The conductor has an estimated average conductivity-thickness of 12.2 mhos (Siemens) which places it in the category of a potential massive sulphide deposit. The lithology here is believed to be a limy volcanic sedimentary succession. The conductive body is east of and within the contact aureole of the large disseminated sulphide deposit body and is enveloped by a large zone of skarnification.

The top of the conductive body is about 400 feet (120 metres) below surface and goes to depth along its dip length to beyond 420 metres (1,400 feet) vertically below the surface. Its possible strike dimension is 800 metres (2,600 feet). It could be up to 100 metres in width.

The conductive body is supported by a VLF-EM anomaly, an extremely anomalous, linear, copper-in-soils geochemical anomaly distinctly separate from the geochemical anomaly above the disseminated sulphide deposit. The strongest and largest Self-Potential response of the survey at **minus-336 millivolts** is found near the surface projection of this conductor. Accordingly two conclusions can be drawn from this extremely strong SP anomaly: 1. that this magnitude of SP response represents **substantial sulphides** at depth, Kelly (1957) and; 2. that the location of the centre of the anomaly is the location where the sulphide body actually comes closest to the surface, Burr (1982). More geophysical work is required on this structure to increase confidence of its existence and size.

The geological work concluded that the large area of interest was pervasively altered and mineralized and contained an episodically mineralized intrusive complex composed of: tonalite, diorite porphyry, albitite, quartz-diorite, diorite and gabbro. Mineralization within these structures occurs as disseminations and veins believed to be deposited along northerly trending shear structures noted in the area. Widespread alteration in the form of calcite flooding and quartz-carbonate, pyrite-chalcopyrite veining was noted in all of the holes drilled in the area of interest. These structures may play host to economic copper mineralization at depth.

Significant skarnification and marblization is found proximal to the intrusive structures in drill holes and at surface largely along the east and southeast contact zone associated with the meta-sedimentary and meta-volcanic succession. According to Meinert (1995) ***"Skarn mineralogy is mappable in the field and serves as the broader 'alteration envelope' around potential orebodies."*** Copper-rich contact metamorphic massive sulphide deposits are found within such an environment.

Petrographical work supported the broader findings of the geological work and concluded that in addition to the plutonic zones of tonalite (quartz-diorite) through to quartz-diorite, diorite and to gabbro that underlie the area of interest also includes their altered equivalents of pyroxene gabbro, pyroxenite, hornblende-diorite and horneblendite. Significant fluid-controlled metasomatic skarn alteration was also confirmed in three of the drill holes. The petrographical work also reported diorite porphyry, and albitite (albite porphyry). Alteration facies include albitization, pervasive calcification, epidotization, chloritization, hematization, sericitization, sausseritization and skarnification. The area is therefore highly prospective for both skarn type massive-sulphide mineralization as well as porphyry style disseminated-sulphide mineralization.

One target area not yet tested with a deep-probe induced-polarization survey is located approximately 300 metres (1,000 feet) north of the large disseminated sulphide body. At this location which also appears to be within the propylitic alteration zone is a total field magnetic anomaly with a maximum amplitude above background of 4,600 gammas (nanoTeslas). Its half space dimension is about 600 metres by 200 metres. The diorite in its vicinity to the southwest is intensely altered and the magnetic anomaly appears to be accompanied by a coincidental copper-in soils geochemical anomaly discovered in 1969 (Antal, 1969). In close proximity Station 1100 of south-north IP Line 100 West of the 1999 deep-probe IP survey intersected the southeast corner of the magnetic anomaly and here three anomalous geophysical features were discovered; a very strong minus-273 millivolt Self-Potential anomaly, coincidental with a 4-millisecond chargeability anomaly. The large self potential response indicates that **significant sulphides** are undergoing oxidation-reduction in the vicinity. The chargeability anomaly although of moderate response may actually be the attenuated effect of a disseminated sulphide body located nearby on either side but not actually beneath the survey line.

The heavily altered diorite is consistent with the devolatilization-path of volatiles given off from the apex zone of a crystallizing porphyry at depth during second boiling.

Accordingly this target area was selected to be the focus of **Deep-Probe Induced-Polarization Survey 2.**

SECTION 2.0 — SUMMARY & RECOMMENDATIONS

2.1 General

Two potential sulphide deposits were identified in the Deep-Probe IP Survey 1 conducted in 1999. The deposits types included a disseminated sulphide body within the altered intrusive complex and a semi-massive to massive sulphide body within an extensive zone of skarnification.

A second potential disseminated sulphide body north of and separated from the large disseminated found in 1999 within the north continuum of the altered intrusive complex may now be added to the property's potential for the discovery of an economic mineral resource as a result of this second Deep-Probe IP Survey 2 carried out in July 2004.

The disseminated sulphides discovered as a result of this IP survey appears to be made up of two zones shown in **Figure 6** as **IP Anomaly I** and **IP Anomaly II** which form concentrically (2-dimensions) or bilaterally (3-dimensions) around a strongly anomalous magnetic core zone. The magnetic core zone shown in profile also appears to dip to the west conformable to the anomalous chargeability zones. This combined geophysical configuration is not inconsistent with the classic potassically altered central core of a mineralizing porphyry intrusive system where the potassic alteration is proximal to the central intrusion and characteristically contains significant secondary biotite, **magnetite**, and K-feldspar. Although at this time the application of this model can only be treated as speculative, drill testing this combined anomalous structure will confirm or reject the idea. This integral body has a thickness near 600 metres (2,000 feet) that dips to depth to the west beyond 600 metres (2,000 feet). Its third dimension which appears to strike North is indeterminate from this single line survey but could be more than 600 metres long if the magnetic anomaly represents it core zone.

Deep-Probe Induced-Polarization Survey 2 (IP Survey 2) was completed on the Ashton Copper-Gold Prospect on the 11th and 12th of July, 2004. As for the first two-line deep-probe IP survey completed in June 1999, this second single-line survey consisted of a 6-level depth probe using an "a" spacing of 100 metres (328 feet) which would provide a pseudosectional look at the chargeability and resistivity parameters of the underlying lithology for an estimated depth of penetration of 420 metres (1,400 feet) below surface; similar to, if not identical, to the 1999 survey.

This target location was chosen because of the several coincidental anomalies found in the vicinity through previous exploration which includes: a strong magnetic anomaly associated with an altered diorite intrusive, a copper-in-soils anomaly; and a self-potential anomaly, chargeability anomaly and resistivity anomaly all discovered on Line 100 West of the 1999 IP survey. This target area is about 300 metres (1,000 feet) north of the large disseminated sulphide body found by the 1999 IP survey. This area is considered highly prospective as it is within the northern continuum of the large drill identified propylitic alteration zone to the south.

IP line 500 North was designed to cross the south-north striking long axis of a well defined and strong total field magnetic anomaly, **Figure 5**, which has a magnetic susceptibility of 4,600 Gammas maximum amplitude above background. Its half space dimension is 200 metres east-west by 600 metres north-south. This magnetic apophysis could be as cited above, a magnetite rich potassic altered core zone of a mineralizing porphyry intrusive that has intruded along a major south-north fault or shear zone. There are other possibilities but all are speculations as well.

Two distinct IP chargeability anomalies were found; **Chargeability Anomaly I** with a range of chargeabilities from 6.0 to 8.8 milliseconds, and **Chargeability Anomaly II** with a range of chargeabilities from 4.5 to 5.9 milliseconds as shown in **Figure 4**. Chargeabilities at 4.0 milliseconds and greater can represent significant disseminated sulphides, often with economic potential, at the Afton mine camp (D. Mark, 2004, personal communication) where diorite porphyry, the major mineral host, predominates and at the Ajax Mine where Sugarloaf porphyritic diorite predominates.

Chargeability Anomaly I is interpreted to be a disseminated sulphide body with an apparent thickness of 250 metres (800 feet) at its widest point. The body appears to subcrop at less than 50 metres (160 feet) from the surface and it dips or plunges for more than 500 metres (1,600 feet) westerly at about -45° to -50°. It appears to be open to depth. Its strike direction is probably northerly corresponding with the magnetic anomaly contiguous with it, It could have a length of 600 metres (2,000 feet) or more. A copper-in-soils anomaly striking north-northeast, discovered in 1969, **Figure 7**, near this location is in all probability related but its relative position cannot be guaranteed except by re-survey. The copper anomaly is more than 600 metres (2,000 feet) long and has a maximum width of 365 metres (1,200 feet) and appears to be coincidental with the magnetic anomaly.

Chargeability Anomaly II is juxtaposed with Anomaly I to the east yet is separated by what appears to be a thin low chargeability break between the two zones of chargeability. Anomaly II is a smaller disseminated body probably with less disseminated sulphides than Anomaly I. It has an apparent thickness of 140 metres (460 feet) although it widens at the top end. The body appears to subcrop 175 metres (570 feet) from the surface between Stations 700 and 800. The body dips or plunges steeply for more than 400 metres (1,300 feet) westerly at about -80°. It appears to be open to depth. Its strike direction probably conforms with Anomaly I as northerly. Its length is indeterminate but if there is a correspondence with the magnetic anomaly contiguous with it, it could have a length of 600 metres or more.

A resitivity anomaly of greater than 1,500 ohm-metres (within the greater than 1,200 ohm-metre isopleth) coincides with the highest chargeability section of Anomaly I. The higher resistivity may be indicative of disseminated sulphides associated with silicification where the silicification would have the added effect of attenuating the chargeability effect if the silica has encapsulated the disseminated sulphides precluding the IP effect to take place.

Silicification played a prominent role in the large Valley Copper deposit, Osatenko (1976); where the 10 percent secondary quartz content defined the bornite/chalcopyrite orebody in association with anomalous chargeability. Bornite is the most abundant copper mineral in the Valley Copper deposit with the bornite/chalcopyrite ratio being the highest in the central silicified section of the deposit.

Geological logging of percussion drill chips from drilling which penetrated the propylitic zone surrounding the large disseminated sulphide body to the south revealed significant albitization hence suggesting that those sections of this disseminated sulphide body which have high chargeability with coincident high resistivity could be indicative of sulphides associated with albitization because in the albitization process silica is produced. At the Ajax Mine near Afton higher grade copper and gold are associated with albitization. Hence the same albitization mechanism could be at work within IP Anomaly I where there is coincident high Resistivity.

The large volume of high chargeability of IP Anomaly I, and to a lesser extent for IP Anomaly II can in all probability be attributed to disseminated sulphides with a small contribution from fine grained disseminated magnetite. However if copper-sulphides are present the amount of copper may or may not be related to the highest chargeability; it could be a zoned feature to the sulphide concentration or it could be coincidental with it; only drilling will establish this.

Van Blaricom, p.81, 90, showed that a chargeability contrast of only 3.5 milliseconds from a nominal 7.8 milliseconds to 11.3 milliseconds at the Lornex Highland Valley porphyry copper deposit meant the difference between non-ore grade and ore grade rock, respectively.

2.6 **Recommendations**

The following recommendations are made:

1. Still a priority is geological mapping of the property including the contact zones between the intrusive complex and the volcanic-sedimentary succession to the east and south and to the contact zone between the intrusive complex and the Mount Lytton Batholith to the west.

2. As was the same recommendation made as a result of the 1999 deep-probe IP survey, cover the untested ground between Line 4,000 North and Line 6,000 North between Stations 800 East to 800 West This entire area should receive the attention of a deep-probe induced polarization survey with at least 21 contiguous deep-probe survey lines with lines 100 metres apart and stations at every 100 metres. The survey lines must be cut and surveyed. The IP budget should allow for not less than 40 km of survey which will allow for detailing with line spacings of 50 metres. The results of this survey will provide a composite, integrated, and geophysically meaningful three-dimensional pseudosection of the intrusive complex and contact aureole. Drill targets should be based upon this survey in conjunction with surface geology and alteration.

3. A multi-element soil survey should be completed in that quadrant which contains the newly discovered Chargeability Anomalies I & II; e.g., from the Baseline to 800 West between Lines 5200 North and 6000 North as this area requires coverage to understand its full geochemical signature as related to the subcropping disseminated sulphide zones.

   The plotting approximations using the 1969 copper in soils data shown in **Figure 7** is only an intelligent guess and not totally reliable. If these results show strong anomalous metals content in the soils above Anomaly I where it is projected to come closest to surface then that location should be trenched.

4. As per Gale's 1994 recommendation, diamond core drilling can only be recommended for testing the target structures in this complex geological environment.

SECTION 3.0 — LOCATION AND ACCESS

The Ashton Group of mineral claims is located approximately 19 km (11.8 miles) south of Spence's Bridge, British Columbia and south of the confluence of the Nicoamen River and Thompson's River where this river turns sharply west towards Lytton. Spence's Bridge is located approximately 170 km (110 miles) as the crow flies, northwest of Vancouver, British Columbia, on Trans-Canada Highway 1.

The Canadian Pacific Railway parallels the Trans-Canada Highway at this location on the east side of Thompson's River.

Locally, the northwest quadrant of the claim group is located about 1,000 metres south from the confluence of the Nicoamen River where it enters Thompson's River.

A good all-weather forest service road provides immediate and easy access to the central part of the claims southward off of the paved Trans-Canada Highway immediately north of the Nicoamen River and highway bridge. Several old logging roads with secondary tree growth cross the property and intersect with the main access road, thereby providing the potential for road access to a large portion of the area of interest through a minimum of rehabilitation.

SECTION 4.0 — PROPERTY AND OWNERSHIP

The Ashton Group is comprised of the following mineral claims with expiry dates as shown subject to acceptance of this report. The claims all have a common anniversary date.

Mineral Claim	Units	Tenure No.	Expiry Date
Rebecca 2	15	369944	17 July 2006
Rebecca 3	20	369945	17 July 2006
Rachel 1	1	311562	17 July 2007
Rachel 2	1	311563	17 July 2007
Rachel 3	1	311564	17 July 2007
Rachel 4	1	311565	17 July 2007
Mellisa	8	318692	17 July 2007
Total	47		

All mineral claims are held by record in the name of J. M. Ashton, of Vancouver, British Columbia.

SECTION 5.0 - EXPLORATION HISTORY

The first recorded work on the Ashton Cu-Au Prospect was directed by Alfred A. Burgoyne, M.Sc., in October 1969. His work included a single element copper in soils survey which resulted in the delineation of a large area of highly anomalous copper in soils.

Burgoyne's work was followed up by J.W. Antal, Ph.D., P.Geol. (Alberta) with a program of limited surface trenching, geological assessment and intrepretation. The trenching showed shear zone hosted copper mineralization in skarn within part of the copper anomaly. There was no mention of intrusives. Antal in his November 1969 report concluded that the prospective area had the potential for hosting a large low-grade copper deposit at depth.

In 1989-90, the former Rebecca 1 to 6, inclusive, and Sheryl mineral claims were staked. A total-field magnetometer survey and VLF-EM survey was carried out over what was believed to be the area of interest, under the direction of J.M. Ashton, P.Eng. A prominent magnetic anomaly north of Line 5200N on the baseline strikes north with a maximum amplitude response of 4,600 gammas (Nanoteslas) above background. The ½ space dimension of the anomaly is about 600 metres (2,000 feet) north-south by 200 metres (650 feet) east-west. The VLF-EM survey located a number of electromagnetic (EM) conductors with a charactersitic north-south strike. The strongest EM conductor extends from Line 5000 North at Station 400 East to Line 5400 North, Station 400 East. This anomaly coincides with the interpreted semi-massive to massive sulphide body discovered as a result of the 1999 IP survey.

A petrographical study by consulting geologist P. B. Reid, Ph.D., of a representative rock sample taken by Ashton within the area of the magnetic anomaly showed that the rock specimen was:

> *"a heavily altered fine-grained pyroxene diorite ? with the alteration assemblage consisting of calcite, chlorite, epidote, sphene, pyrrhotite, and hematite. The original rock has been nearly obliterated by alteration. The tourmaline, a major part of the alteration assemblage, indicates that hydrothermal solutions causing the alteration contained significant volatiles."*

In August 1992, consulting geologicl engineer R.E. Gale, Ph.D., P.Eng., examined the prospect and confirmed the skarnification reported by J.W. Antal, and also confirmed altered and unaltered diorite reported Ashton.

In April 1993, Kingston Resources Ltd. optioned the property from S.E. Apchkrum, the recorded owner at the time, and in June 1993 carried out a geochemical sampling and cursory geological mapping program to confirm the copper-in-soils anomalies identified by Burgoyne in 1969.

Kingston's geological mapping also confirmed that heavily altered diorite with disseminated magnetite was associated with the copper-in-soils anomaly.

A further expanded soil survey conducted by Kingston in June, 1993 showed a much larger area of anomalous copper than had been identified by their initial work.

An induced polarization survey using the pole-dipole array was conducted by Lloyd Geophysics Inc. in July 1993. A 50 metre electrode spacing was used with 4 levels surveyed. Maximum depth of penetration is estimated to be of the order of 140 metres (460 feet).

A significant chargeability anomaly of classic character was found to be co-incidental with the southwestern quadrant of the copper-in-soils anomaly and the altered diorite sporadically exposed at surface. This ellipsoidal anomaly using the 7.5 millisecond chargeability isopleth covers about 32 hectares (80 acres). Its major axis strikes about 290° azimuth.

In 1994 Kingston Resources Ltd. drilled 5 percussion drill holes into the highest amplitude portion of the chargeability anomaly and 2 percussion drill holes into anomalous geochemistry to the north-east of the chargeability anomaly. Kingston considered the drilling results disappointing and dropped their option in 1994.

In February, 1994, R. E. Gale, at the request of J. M. Ashton, completed a detailed re-logging of a representative suite of cuttings saved from the drilling. Gale identified multiple episodes of altered and mineralised intrusives in the drilled area consisting of quartz-diorite, diorite, diorite-porphyry and gabbro in the high chargeability zone and significant skarnification and marblization to the southeast. He also noted pervasive and widespread carbonatization. Copper mineralization was found in disseminations and vein systems. He discovered that the bottom 70 feet of PDH93-3 contained a stockworks zone of ***pyrite-chalcopyrite, quartz-carbonate veinlets.***

At the recommendation of Gale, Ashton engaged Reid in 1995 to complete a petrographical study of selected drill chips. Read supported Gale's logging but added that widespread intrusions also include pyroxene gabbro, pyroxenite and horneblendite and their altered equivalents. Read also identified tonalite and albitite (albite porphyry) as intrusive species along with a host of hydrothermal alteration facies.

In June 1999, Geophysicist D.G. Mark, P.Geo. with his geophysical survey crew, under the direction of J. M. Ashton, P.Eng., carried out a two-line reconnaissance deep-probe induced polarization (IP) survey designed to cross the area of geochemical and lithological interest, previously drilled by Kingston, in an east-west direction and orthogonally in a south-north direction. The survey used the dipole-dipole array with an 'a' spacing of 100 metres (328 feet). Six (6) levels were surveyed which represents a nominal 420 metres (1,400 feet) survey depth. Each survey line length was 2.2 km (6,888 feet).

The deep probe survey resulted in the identification of two separate anomaly types of potential economic interest; a large disseminated sulphide body, probably a porphyry copper deposit, and in addition what is interpreted to be a neighbouring semi-massive to massive sulphide body at depth under the surface zone of skarnification. This sulphide body is located within the contact aureole of the disseminated sulphide body and is most likely a contact metasomatic deposit related to the disseminated sulphide body itself believed to be a porphyry copper deposit. Neither of these two targets have yet been drill tested.

The spatial orientation of the large disseminated sulphide body (zone of chargeability) is such that all of the holes drilled in this complex in 1994 failed to intercept it and the shallow probe IP survey in 1993 failed to define it. Similarly with the interpreted massive sulphide body within the skarn envelope.

In 2001 D. G. Mark conducted a total field magnetometer survey in the area to the south of the 1993 magnetometer survey between lines 5000 North and 4500 North which simply extends the 1993 coverage 500 metres to the south. The results of this survey produced no significant large distinct magnetic anomaly but several small distinct linear anomalies believed to be fault and shear controlled hydrothermal magnetite associated with skarnification on the east and southeast sections of the large disseminated sulphide body. This magnetically responsive area is located at least 500 metres (1,650 feet) south from the prominent 4,600 gamma magnetic anomaly discovered in 1992.

SECTION 6.0 — PHYSIOGRAPHY AND OUTCROP

The claims cover an area of moderate to steep topographical relief. The central and western part of the claims are traversed by a multiple switchback road that climbs the east side of the Thompson River canyon rising from the canyon bottom at 700 feet (213m) elevation to a saddle between two peaks at 3,500 feet (1,070 m) elevation within a distance of 2 miles (3.2 km). This represents an average mountain slope of about 25%. Locally the relief is moderate to steep and sometimes nearly flat in the area of interest, yet relatively easily accessible by foot from the switchback road.

The area of interest is part of the Cascade Mountains which are separated from the Coast Mountains to the west by the Fraser River. Thompson's River meets Fraser's River at Lytton about 8 miles (13 km) west from the property.

The Cascade Mountains are lower and less rugged than the Coast Mountains and generally consist of rolling and rounded summits, which is the case at the higher elevations on this property.

Southern and western exposures on the property tend to be open areas and easily traversed, whereas northern and eastern slopes, and ravines, are much more heavily wooded. The area of interest on the property is a westerly-facing slope that has been logged of most of its old growth conifers. New growth is represented by denser deciduous trees and in places dense underbrush makes it difficult to traverse.

Conifer species in the area include Douglas Fir, Balsam, Spruce, and Lodgepole Pine.

Outcrop is generally lacking throughout the area of interest, so trenching is required to access the bedrock for mapping and sampling. Exposed outcrop over the entire property is estimated at not more than 10% of the surface area.

Overburden found in the percussion drill hole program of 1993 ranged from 10 feet to 130 feet.

SECTION 7.0 — REGIONAL GEOLOGY

The regional geology is more recently described in the Geological Survey of Canada: ***Geology of Hope and Ashcroft Map Areas, British Columbia*** by J.W.H. Monger and shown on Map 42-1989, Ashcroft, British Columbia, from which the salient features are shown on **Figure 3**.

As described by S.W. Smith, Geologist, in his 1993 Assessment Work Report, the property straddles the boundary between the older Upper Triassic Mount Lytton Complex on the west side and the younger Middle to Upper Cretaceous Spences Bridge Group on the east.

The oldest rocks which are part of the Mount Lytton Complex occupy the area to the west of the property and may underly the property to some extent. These are layered quartz-feldspathic orthogneisses, mafic to dioritic volcanics and metasediments. Monger (2001, Field Trip Notes) states that the Mount Lytton Complex in this area is overlain stratigraphically by, and elsewhere faulted against continental arc and intraplate volcanics of the 104 Ma Spences Bridge Group. According to Gale (1992) in a personal communication with Monger, Monger believes the limy rocks on the property are part of the Mount Lytton Complex and whether they are part of this oldest unit or are somewhat younger is still to be determined.

The Mount Lytton Complex has been interpreted by Monger to be part of the roots of the Late Triassic Nicola arc. The complex is fault bounded, on the west by the Fraser River fault system, and on the east by normal faults along the Thompson River. The Mount Lytton Pluton that is part of the complex has been age-dated at 212 ± Ma (Parrish and Monger, 1992), which is very close to some dates reported from the central Guichon Batholith, which is located about 40 km to the northeast and contains the world-class Highland Valley ore bodies. Parrish and Monger interpret the Mount Lytton Complex and Guichon Batholith bodies to be part of the Upper Triassic magmatic arc complex that characterizes Quesnellia terrane, but state that they were probably emplaced at different structural levels, as suggested by their contrasting settings.

Monger speculates that the major structures that form the Guichon Batholith and the Mount Lytton Complex are related to early Mesozoic subduction/arc activity; those in the Guichon Batholith having formed in the upper part of the upper plate and those in the Mount Lytton Complex having formed in the lower part of the upper plate.

Gale (1993) believed the most interesting feature of the Regional Geology is the pronounced east-west structural grain of the Triassic rocks east of Lytton which appears to be abruptly terminated at its eastern end by one of more north-south faults along and parallel to the Thompson River. It is at the junction of these two strong structures that the Ashton Copper-Gold Prospect is located.

Therefore as noted by Gale (1994) possibly copper-rich intrusive phases similar to those in the Guichon Batholith may also have formed in some intrusions in the Mount Lytton Complex.

Middle and Upper Cretaceous Spences Bridge Group rocks appear to unconformably overly rocks of the older Mount Lytton complex comprised of limy volcanics and limy sediments on the east side of the property. Here the Spences Bridge Group consists of an unaltered upper reddish coloured andesitic volcanic and may include locally felsic and mafic flows and pyroclastics along with sandstone, shale and conglomerate beds. A major fault passes through the Spences Bridge Group on the east central part of the property and/or may represent the boundary between the Mount Lytton Complex and the Spences Bridge Group.

However exploration work conducted on the property from 1994 through to 1999 and in 2004 indicates that the property geology, a component of the regional picture, appears to be distinctively different from its contiguous neighbours, the Mount Lytton Complex to the west and the Spences Bridge Group to the east yet similar to the rocks to the north of the property across the Thompson River which were mapped by Brown (1981) as layered quartzo-feldspathic rocks in contact with weakly foliated plutonic zones ranging from tonalite through to diorite to gabbro.

This similarity was noted by Reid (1995) as a result of his thin section studies of rock chips recovered from a drilling part of the intrusive complex on the property. Reid concluded that rock types similar to those that Brown identified north of the property also underlie the property.

Monger shows the rocks mapped by Brown to the north of the property as younger granodiorite-quartz monzonite intrusions of the Mount Lytton Batholith

Thin section work by Reid (1995) shows that the intrusive rocks on the property are similar to those identified by Brown intrusive complex may share some similarities to both the dioritic and amphibolitic intrusions in the Mount Lytton Batholith and to the tonalite intrusions found associated with the younger granodiorite-quartz monzonite intrusions to the northwest of the property across the Thompson River.

SECTION 8.0 - PROPERTY GEOLOGY & ALTERATION

Property surface geology remains to be mapped. Salient portions have been mapped only cursorily where sparse outcrop was available in the geochemical anomalous area. Logging the percussion drilling cuttings provided the first look at the complex geology in the subcrop area of interest. However, what the spatial and temporal relationships of the many intrusive phases identified is presently unknown because the percussion drilling is unable to provide this data, including the all important structural data. The most comprehensive and reliable geological data to date is that which was provided by Reid (1992), from a single thin section study; by Gale (1994), logging the percussion drill cuttings of 7 holes; and by Read (1995) from a comprehensive thin section study of the selected drill chips from Gale's hole logging.

The geology is largely unexposed on surface but from observations of limited outcrop exposure and percussion drill hole data is different from the geology which is contiguous with it to the east and to the west. Geological work by Gale and Read indicate the probable scenario that this local area was intruded by an integral tonalite and diorite parent intrusive complex and further intruded by a complex of quartz-diorite, diorite porphyry, albitite and gabbro.

This intrusive complex lies between the east edge of the Mount Lytton Batholith and a major fault structure to the east which is the west edge of the Upper Cretaceous Spences Bridge Group. The fault structure is the southern extension of a major fault that extends down the Thompson River canyon to the north projecting into the central part of the property.

Monger shows part of the Mount Lytton Complex to the west of the property as composed of layered quartz-feldspar rock, amphibolite and mylonite. Therefore the property intrusive complex appears to have distinctively different lithology.

J. W. Antal (1969) described the volcanic-sedimentary lithology as a monoclinic structure dipping 40 degrees to the east.

Geological observations reported by S.W. Smith, Geologist, in his `Assessment Report', *Geological Mapping and Geological Sampling on the Ashton Property"* of 20 September, 1993' has now been superceded by new interpretations by Gale and Read however his observations of some of the diorite outcrop and skarnification are still valid and noteworthy.

Smith described the host volcanic-sedimentary rock succession on the east and southeast side of the mineral bearing intrusive complex as:

"The limestone varies from a clean white crystalline variety with a massive appearance to a thinly bedded grey silty variety. The limestone beds were noted to be from 0.5 to 5 m thick. Interbedded with the limestone was fine to medium-grained green volcanic tuff that was much wider in width. The volcanics were commonly limy. Locally these rocks were very strongly altered and fractured, with the strongest alteration seen in the vicinity of the old trenches in the northwestern portion of the Sheryl claim". (now the Rebecca 2 claim)

Diorite found by this writer in surface outcrop at Line 5400 North, Station 2+50 West is located about 140 metres normal to IP Line 500 North between Stations 1000 West and 1100 West of the deep-probe IP survey which is the subject of this report. The diorite was dark grey to black, was intensely altered, and was found to contain significant amounts of disseminated magnetite. This sample assayed 737 ppm copper. A petrographic study of a representative sample was summarized by P.B. Read, Ph.D. (1990) as follows:

"The original rock may have been a fine-grained pyroxene ? diorite but this rock has been nearly obliterated by an alteration assemblage of tourmaline-epidote-calcite-chlorite-sphene-pyrite which is cut by a few albite-calcite veinlets. The tourmaline is a major part of the alteration assemblage and indicates the presence of significant volatiles in the solutions causing the alteration"

Therefore the volatiles were most likely copper-rich and are believed to have been exsolved from a copper-rich fluid during magma crystallization during porphyry formation.

According to Smith (1993):

"hydrothermal alteration of the volcanics to the east and southeast was seen on a wide scale causing bleaching and quartz/carbonate veining within them. Epidote is the most common alteration mineral. Locally the diorite is so strongly altered that only epidote and magnetite can be seen. Secondary chlorite and calcite are also quite prevalent throughout the complex. The propylitic alteration (epidote, chlorite ± pyrite) identified in the volcanics and diorite provides surface indication that a significant porphyry style intrusive system underlies the area."

The 1993, 7-hole percussion drilling program for each hole provided a suite of typical cuttings taken at 10-foot intervals. The cuttings were meticulously logged with the aid of a binocular microscope by Gale (1994), and this work was the first in-depth study of property geology and alteration. Gale observed that there were at least three (3) distinct types of mineralized and altered intrusives within the subcropping area of interest. The intrusives cited in his report conclusions included: quartz diorite, diorite, and gabbro. He also noted diorite porphyry in the report details.

Part of Reid's (1995) petrographical study conclusions included:

> *"the drill chips indicate that pyroxene gabbro, pyroxenite, and their altered equivalents are as widespread as horneblende diorite, horneblendite, and their altered products. Gale's identifications (1994) of marble and calcsilicate skarn are verified and mean that metasedimentary rocks are another element that must be included in the north end of the Mount Lytton Complex".*

Gale stated that mineralization occurs both as disseminated zones and mineralized vein systems, probably along the predominent northerly trend of structures noted in the area. Alteration in the form of calcite flooding and quartz and calcite veining was noted in all of the southernmost holes, RC93-1 through 93-5 and therefore is widespread throughout the latter area.

Essentially the aleration noted in the drilled area around the large disseminated sulphide target found in the 1999 deep-probe IP survey represents the propylitic zone of a probable copper bearing porphyry within the core area of the disseminated sulphide body.

The drilling also shows that marblization and skarnification found on surface on the east side of the drilled area appears to increase easterly and southeasterly and to depth within the contact aureole from the large disseminated sulphide body identified from the 1999 deep-probe IP survey.

Skarnification with significant copper mineralization is found in surface outcrop along the old logging cut east of drill hole RCA93-5 and is also found sporadically where exposed in outcrop for more than 600 metres (2,000 feet) southeasterly from the edge of the disseminated sulphide body. The geochemical survey of 1969 also indicates narrow anomalous copper-in-soils zones striking northerly within this 600 metre interval to the southeast.

Monger (1989) mapped a major normal-fault that strikes about north-south and appears to pass near Station 400 of the Deep-Probe IP survey Line 100-South. The fault extends northward to the Thompson River and coincides with it in undulating fashion with the northward extension of the river. The east side of the fault is down-thrown. No information on the fault's displacement is given.

Although speculation, a second major north-south striking normal-fault may lie between the west side of the intrusive complex and the Mount Lytton Batholith Complex in which case the property intrusive complex may be bounded on each side by major fault structures.

Recently, prospecting of surface outcrop on the west side of the property above the projected extension zone of disseminated sulphides (Anomaly I of the 1999 IP Survey, Ashton (1999)) resulted in the discovery of a large zone of intensely fractured and broken quartz-diorite (chemical analysis of the rock forming minerals) which are strongly hydrothermally altered (Reid, 2004, personal communication) with epidote and chlorite prominent, and with black vitreous crystals identified as tourmaline. This location is believed to be above the large disseminated-sulphide body found by the 1999 IP survey near its projected west extension. The stockwork fractures are filled with the low temperature zeolite mineral laumontite. This occurrence represents a significant westward extension of the known propylitic zone that overlies the disseminated sulphide zone to the east. A breccia zone cemented with hydrothermal carbonate is contiguous with the quartz-diorite to the south. The type of breccia, and fragment identification are yet to be determined.

SECTION 9.0 -- INDUCED POLARIZATION SURVEY

9.1 Introduction

In effect, the 1999 Deep-Probe IP Survey using the dipole-dipole array provided a much clearer contrasting "pseudo-sectional" view of a large and deep disseminated sulphide body than was the case with the previous 1993 shallow probe IP survey using the pole-dipole array which failed to identify this "big picture" and its relative sulphide content.

The 1999 IP Survey was successful in delineating a large disseminated sulphide body concentric with and somewhat inside and below the large shallow probe 1993 IP anomaly. Although the 1993 IP anomaly was drilled in 1994 none of these holes penetrated what is believed to be the mineralised porphyry system. The holes had simply penetrated the outer shell or propylitic zone. This large well defined IP Chargeability Anomaly I remains to be drill tested. It is interpreted to be a large disseminated sulphide body and in all probability is copper rich. As described in the introduction a semi-massive to massive sulphide body associated with the large skarn zone was also discovered by the 1999 deep-probe IP survey because it was beyond the detection range of the shallow probe IP survey

Another possible sulphide deposit target area was identified by the 1999 Deep-Probe IP Survey which given its location and other anomalous geophysical and geochemical features was deserved of a reconnaissance deep-probe IP survey test also. This target is located approximately 650 metres (2,000 feet) north from the centre of 1999 IP Anomaly I. At this location which is still within the propylitic alteration zone is a total field magnetic anomaly with a maximum amplitude of 4,600 gammas (nanoTeslas) above background. Its half space dimension is about 200 metres by 600 metres. The diorite in its vicinity to the southwest is intensely altered and the magnetic anomaly appears to be accompanied by a coincidental copper-in soils geochemical anomaly discovered in 1969. In close proximity Station 1100 of south-north IP Line 100 West of the 1999 deep-probe IP survey intersected the southeast corner of the magnetic anomaly and here three anomalous geophysical features were discovered; a very strong minus-273 millivolt Self-Potential anomaly, coincidental with a 4-millisecond chargeability anomaly. The large self potential response indicates that **significant sulphides** are undergoing oxidation-reduction in the vicinity. The chargeability anomaly although of moderate response may actually be the attenuated effect of a disseminated sulphide body located close, but not below, the 1999 survey line.

Close to the magnetic anomaly to the southwest heavily altered diorite is found in surface outcrop at Line 5400 North, Station 2+50 West. See **Figure 5**. The diorite was dark grey to black, was intensely altered, and was found to contain significant amounts of disseminated magnetite. A petrographic study of a representative sample was summarized by P.B. Read, Ph.D. (1990) and is found in Section 8.0, **Property Geology and Alteration.** The alteration significance is that it is consistent with alteration expected within the devolatilization conduit or path of volatiles given off from the apex zone of a crystallizing porphyry at depth during second boiling. This fact was another supporting feature to conduct a deep-probe IP survey to geophysically look into the ground as deep as practical. Accordingly this target area was selected to be the focus of **Deep-Probe Induced-Polarization Survey 2.** As it turned out, the altered diorite is located about 140 metres south of and normal to IP Line 500 North between Stations 1000 West and 1100 West of the deep-probe IP survey which is the subject of this report.

Prior to commencing the IP survey J. M. Ashton and Kelly Last spent two days on the property reconfirming the location of the 1990, nominal 4,000-gamma magnetic anomaly; checking the 1999 IP survey location; laying out two IP lines, 500 North and IP Line 2000 South and a general reconnaissance including taking a few lithogeochemical samples. The magnetometer used was a Scintrex MP-2 portable proton precession unit with ± 1.0 gamma sensitivity with 20,000 to 100,000 gamma range. Its gradient tolerance is 5,000 gammas per metre.

The following six personnel carried out Deep Probe Induced Polarization Survey 2:

Personnel	**Duties**
1. J.M. Ashton, P. Eng. -	Project Manager
2. D.G. Mark, P. Geo. -	Geophysicist & Receiver Operator
3. Shane Webb -	Transmitter Operator
4. Chad Barzan -	Placement of Current Electrode Cables, & Current Electrodes
5. Matt Little -	Placement of Potential Electrode Cables, & Potential Electrodes
6. Hector Diakow -	Placement of Potential Electrode Cables, & Potential Electrodes, & Survey Line Control

9.2 Survey Objective & Line Preparation

An assessment of the best plan of attack to carry out this deep probe Induced Polarization Survey exactly over the designated target area was made during a field trip to the property on June the 15^{th} and 16^{th} 2004 by J.M. Ashton, P.Eng. Consulting Engineer & Explorationist; and assisted by Kelly Last.

The first task was to locate and confirm the total field magnetic anomaly discovered in 1992 which was the target area of interest for this induced polarization survey in conjunction with the discovery of three prominent geophysical features identified on Line 100 West at Station 1100 of the 1999 deep-probe IP survey. At Station 1100 a very strong minus-273 millivolt Self-Potential anomaly, coincides with a 4-millisecond chargeability anomaly and a resistivity anomaly. All three of these geophysical features pass the southeast corner of the prominent magnetic anomaly.

This coincidental occurrence of geophysical features also coincides with a strong copper-in-soils anomaly (albeit from the 1969 single-element geochemical survey) and intensely altered diorite found in the local vicinity.

The large self potential response indicates **significant sulphides** undergoing oxidation-reduction in the vicinity. The chargeability anomaly although of moderate response may actually be the attenuated effect of a disseminated sulphide body seen beyond the body's edge or at the body's edge and the relatively moderate resistivity anomaly the effects of more resistive siliceous material associated with the disseminated sulphide body.

The heavily altered diorite is consistent with the devolatilization path of volatiles given off from the apex zone of a crystallizing porphyry at depth during second boiling. The anomalous copper indicates the probability of copper minerals associated with the porphyry. Hence this area was considered highly prospective for the discovery of economic sulphides in the vicinity and/or at depth by means of a deep-probe induced polarization survey much like the reason given for the application of the deep-probe IP technique which resulted in the discovery of the large disseminated-sulphide body within the altered area 300 metres to the south.

Deep-probe IP 2 survey line 500 North traversed a combination of logging access road at the east end, dense undergrowth in the middle section, and relatively open but steep mountain slope at the west end of the line. Line direction was controlled by compass azimuth at 290°. Declination used was 22 degrees east as defined by N.T.S. Map Sheet 94D.

The geophysical technicians completed the line layout and marked the stations because the potential electrode cable, a multiconductor composite cable provided the necessary distance measurement and survey station locations. This is facilitated because the cable is complete with electrode connection points at every consecutive 50-metre mark along its length. Because this survey used an "a" spacing of 100 metres, every second tap of this cable was used for the potential electrode connections. Once the cable was properly positioned each location that was connected to an electrode was marked with flagging and at selected stations were marked with a Tyvex tag.

Clinometer readings were taken between each electrode station to provide a ground elevation profile which was input to the computer and used as part of the data to generate the chargeability and resistivity pseudosections with a greater degree of accuracy.

During the course of the survey, the line was tied to the road, the existing property grid, and the common legal corner post of the Rebecca 2 and Rebecca 3 mineral claims.

Although about 3.5 km of line was located in two separate planned survey lines only one 1.6 km line was surveyed because it took two days to complete, and time and budget did not permit the surveying of the second line. It was planned to survey two lines in this period but that was an optimistic projection. The ambient temperatures at the time of the survey were above 30°C and did reduce working efficiency in the steep section. Also where the survey crossed the main access road extra steps had to be taken to protect the survey cables from the traffic.

9.3 Instrumentation & Data Management

The induced polarization survey equipment consisted of an engine-generator set (energy source), transmitter, electrode switching network, receiver, electrodes and special cable and conductors.

The **engine-generator set**, manufactured by Honda, is engine rated at 6.5 horsepower input and a rated generator output of 4.0 kW at 1,200 Volts ac. It provides power for the transmitter unit.

The **transmitter unit** was a Model VIP 4000 (4.0 kW maximum output) manufactured by BRGM (Bureau de Recherches Géologiques et Minières) of Paris France.

The **receiver unit** was a Model ELREC 6 manufactured by BRGM. 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 receiver system is capable of time domain and frequency domain chargeability and resistivity measurements and complex resistivity measurements using several choices of array configurations.

When preparing the survey line for IP measurements a special multi-conductor cable is layed out along the line of the survey in a suitable length according to survey design. The cable is designed so that at each electrode location there is an exposed metallic connection point which allows connection to a voltage sensing electrode implanted into the ground at that end and which leads via a conductor of the multi-conductored cable back to the receiver connection. At the receiver end a multi-electrode switching network allows the receiver operator to select any grouping of 4 electrodes as voltage inputs to the receiver. These hardware items facilitate the reading and recording of multi-level IP parameter measurements.

The data recovered was managed by a computer software program developed by Geosoft Inc. of Toronto, Ontario. The program was modified by Geotronics Surveys Inc. to suit its application requirements. This software program performs resistivity calculations, pseudosection plotting, survey plan plotting and contouring.

The apparent-chargeability values are read directly from the receiver and were stored in the receiver memory. No data processing is required prior to plotting. Whereas apparent-resistivity values which were derived from current and voltage readings taken in the field were also stored in the instrument's memory but were later, as a matter of data processing, were combined with the appropriate geometrical factor for the dipole-dipole array to compute, through an algorithm, the actual apparent-resistivity value used for each sample point.

9.4 Preparation of Results

The induced polarization apparent chargeability value for each point measured is read directly from the BRGM Model ELREC 6 receiver unit. A calculation algorithm within the unit computes the chargeability and displays the result on the receiver. Discharge current into the ground and potential difference across current electrodes is data which is manually entered into the receiver 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 is facilitated by a multi-conductor cable which connects each receiving electrode on the survey line with the receiver. Apparent resistivity is computed using discharge current into the ground, potential difference between potential electrodes and a geometric factor which essentially represents the apparent volume of rock samples within the potential dipole.

The transmitter operator reads the discharge current between 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 is automatically recorded for later data reduction and preparation of 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 computer-plotted in pseudosection format with results shown in **Figure 4**, "IP & Resistivity Pseudosections with Self Potential Profile, Line 500 North". **Figure 5** was prepared to show the location of the magnetic anomaly discovered in 1990 relative to the 2004 IP survey line, claim locations, and other relevant information. **Figure 6** was prepared to support the interpretation and include the magnetic anomaly in relative profile with the anomalous chargeability and resistivity zones.

9.5 Key Interpretation Features

9.5.1 Resistivity

The bulk resistivity of rock varies with age, permeability, porosity, the volume of conductive elements present and the salinity of contained water.

Zones of low apparent resistivity interpretation possibilities 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. Zones of very low resistivity could represent semi-massive to massive-sulphides.

According to Grant et al (1965), the presence of clay in the pores of rock has a considerable effect on its conductivity. The clay minerals and other hydrous substances such as serpentine are generally found to be rather good conductors and with the addition of a small amount of excess water will increase the conductivity significantly due to ion-exchange. Dry clay itself is usually not a good conductor.

9.5.2 Induced-Polarization Effect

The magnitude of the induced-polarization "chargeability" effect is dependent upon several variables, including:

- electrolyte medium
- porosity
- conductive mineral concentration
- apparent resistivity contrast between the country rock resistivity and resistivity of the zone of chargeability

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

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

- for a particular disseminated sulphide concentration, the IP effect decreases with *increasing rock porosity*.
- the overvoltage or IP effect varies inversely with the current density to some extent.
- the IP effect varies with the fluid content of the rock up to a maximum when 75% of the pore space is filled with water
- the IP effect decreases with increasing frequency.

IP 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 where the sulphide source is positioned relative to the electrodes.

9.5.3 Self-Potential Measurements

According to Burr (1982), who used the self-potential or spontaneous polarization (SP) prospecting method extensively for 35 years he considers it ***"the best of the electrical geophysical methods".***

Spontaneous polarization, or self-potential (SP) as it is generally known is an electro-chemical phenomenon. Several theories have been put forth to describe the electro-chemical mechanism however the simplest explanation is that during the oxidation process of a sulphide body in the ground, electrons are transported from the sulphide body at depth to the oxidizing zone near the surface which results in a negative potential at the centre of the zone of oxidation.

Smaller amplitude time-varying self potential effects are also common on the earth's surface due to telluric currents which are generated by the Magnetotelluric field between the earths surface and ionosphere.

With this IP equipment Self-potential measurements in millivolts (mV) were made at each pair of potential electrodes and nulled out before applying voltage and current to the current electrodes and recording both the induced polarization chargeability effect and resistivity effect. The SP millivolt effect must be nulled prior to taking IP chargeability readings which are also measured in millivolts otherwise the IP readings would be biased and inaccurate.

Recording the SP effect can confirm the presence of sulphides in the system in close proximity to the measured SP response and can lead to the discovery disseminated sulphides if they are electrically interconnected and in the semi-massive and massive form. Where larger magnitude anomalies are found, say greater than minus 100 millivolts it is advisable to conduct a conventional and separate SP survey to locate the maximum amplitude where the sulphides come closest to the surface. The SP survey method on its own facilitates the exact location of anomalous sulphides.

Self-potential measurements that are made in conjunction with this IP survey method are presented in "gradient profile". An SP anomaly has the form of a sinusoid characteristic with a positive characteristic followed by a negative characteristic or vice versa. The cross-over point from postive to negative, or vice versa is the centre of the location of the underlying oxidizing sulphide body where it comes closest to surface. It is in effect a plot of the first derivative of the actual self-potential response.

Telford et al (1976) p.467 show a 100 foot (30 metre) vertically thick semi-massive to massive sulphide zone with its top at about 300 feet (100 metres) below the surface causing a surface self-potential effect of minus 130 millivolts.

According to Burr (1982) oxidizing sulphides will produce a spontaneous voltage range of up to minus 350 millivolts between the most positive and most negative SP readings. Accordingly part of the interpretation exercise for the SP gradient plots shown in this survey is to add the adjoining positive and negative values on both sides of the crossover anomaly to approximate the absolute strength of the SP anomaly.

9.6 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. This survey used the time-domain method, hence this report will only deal with the IP effect in the time-domain dimension.

Time domain induced polarization measurement involves comparing the residual time varying voltage $V(t)$ at a time t after charging current is shut-off along with the initial impressed steady state voltage V_c 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 9.2**.

Because $V(t)$ is much smaller than V_c 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:

$$C = 1/V_c \int_{t1}^{t2} V(t)\,dt$$

9.7 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 9.1**, the transmitter produced a positive square wave pulse for a period of 2.0 seconds then shut off for 2.0 seconds then pulsed a negative square wave pulse for 2.0 seconds and then shut off for 2.0 seconds. This alternating cycle of square wave pulses repeated itself for each 8.0 second period.

The overvoltage value V_c 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. See **Figure 9.2**.

This survey used the dipole-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 less complex.

The dipole-dipole measurement technique has been shown to provide maximum sensitivity to the lateral variations of electrical properties in the earth hence it is the most effective technique for identifying smaller structures such as veins and narrower massive sulphide bodies.

It also provides the sharpest and largest magnitude anomaly of a spherical type conductor at depth.

The chargeability and resistivity values measured were plotted in pseudosection format which was successfully developed by P.G. Hallof, Ph.D., of Phoenix Geophysics Limited in 1963.

With this procedure, see **Figure 9.3**, 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.

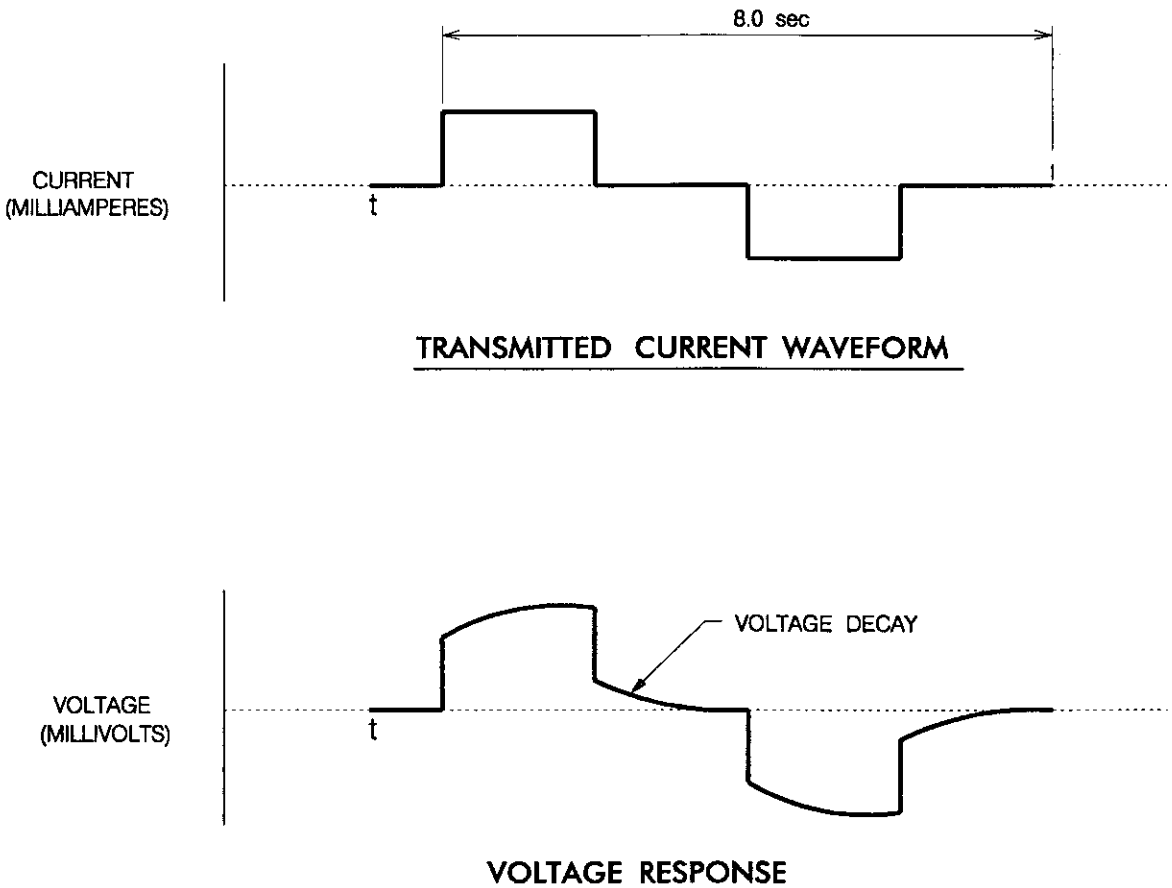
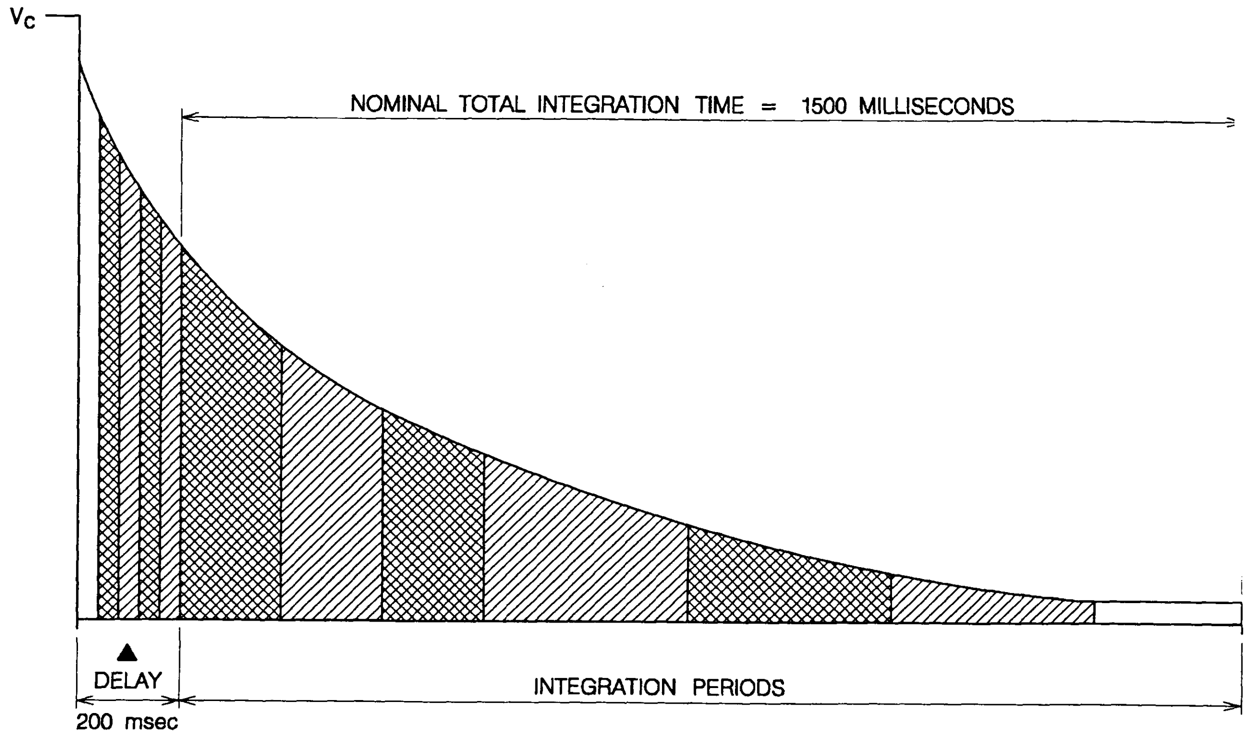
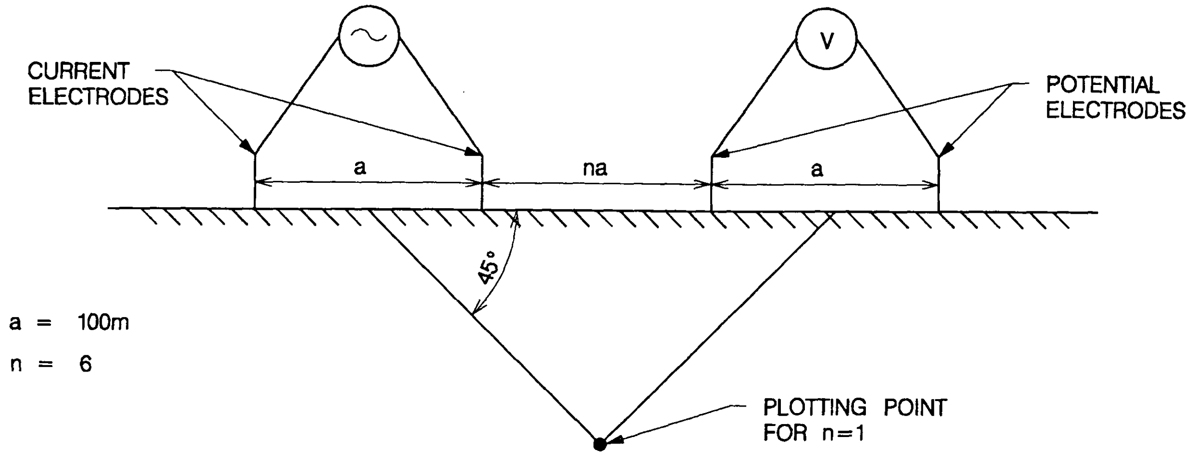

8.0 sec
CURRENT
(MILLIAMPERES)
t
TRANSMITTED CURRENT WAVEFORM
VOLTAGE DECAY
VOLTAGE
(MILLIVOLTS)
t
VOLTAGE RESPONSE

FIGURE 9.1



IP INTEGRATION CHARACTERISTIC

FIGURE 9.2



DOUBLE–DIPOLE ARRAY

FIGURE 9.3

The interpretation of the self-potential results were also made on the basis of subjective wisdom.

See **Appendix A** for "Theory, Fundamental Equations & Key Interpretation Features" to complement this section of the report.

It is important to recognize that the measured values shown on pseudosection are apparent values of chargeability and resistivity only. Pseudo-section data plots are considered to be merely a convenient method for showing all of the apparent results in a single presentation for comparative purposes. The apparent effect is influenced by many variables and includes size, depth, attitude, apparent electrical properties of the source, the electrode interval used, and in the case of chargeability the resistivity contrast between the host rock and anomalous chargeability zone. Grain size of conductive material (sulphide mineralization) and pore space and electrolyte parameters are significant. Whether mineral grains are isolated or interconnected will affect the apparent resistivity 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.

Intelligent inspection of the relative quantitative chargeability and resistivity values displayed on the pseudosections can provide diagnostic support as to the probable extent of the anomalous zones and the possible causes of the electrical phenomena observed. Results from previous geochemical, geological and geophysical data, may assist interpretation of IP results. Pattern recognition also plays a role.

The following interpretations were made on the basis of inspection of the IP data in conjunction with knowledge of the historical geology, geochemistry, and geophysics; including interpretations of the pseudosection data from Deep Probe IP Survey 1 about 500 metres south of this survey.

By inspection, and only for the purposes of interpreting the results, the following chargeability and resistivity ranges were chosen to correspond with the relative weighting of each measured effect. The values chosen and their anomalous magnitudes are similar to those chosen for the Deep-Probe IP Survey 1. Accordingly the following Tables were developed to categorize the relative weights of the variables for interpretation purposes.

Chargeability Range

Averaged measured chargeability values ranged from a low of 0.9 milliseconds to a high of 8.8 milliseconds; excluding the negative chargeability. By inspection the chargeability background is estimated at 3.0 milliseconds and less which compares to the 1999 survey.

Table 1; Chargeability Categories

Chargeability Range (milliseconds)	Category
0 to less than 3.0	Background
3.0 to less than 4.5	Anomalous Threshold
4.5 to less than 6.0	Anomalous
Equal to or greater than 6.0	Highly Anomalous

Resistivity Range

Resistivities are treated as anomalous only if they are extremely low or extremely high; otherwise resistivities are treated here as low, medium, and high and are relative only to each other. Averaged measured resistivity values ranged from a low of 65.0 ohm-metres to a high of 1,748 ohm metres. By inspection the resistivity background is estimated at about 300 ohm-metres and less.

Table 2; Resistivity Categories

Resistivity Range (ohm-metres)	Category
0 to less than 300	Background
300 to less than 600	Moderate
600 to less than 1,200	High
1,200 to less than 2,400	Very High

Because this survey used an "a" spacing of 100 metres (328 feet) a smaller average chargeability effect over the larger width sampled could represent the integral combination of a narrower higher chargeability zone coupled with a much lower chargeability envelope to provide the plotted average result. This becomes an important issue if the electrical characteristic sought after is a zone of higher chargeability.

9.8.2 Results & Interpretation; IP Line 500 North

9.8.2.1 General

Apparent chargeability and resistivity, and self-potential data measured for Line 500-North are shown in pseudosection in **Figure 4**, whereas **Figure 6** shows the interpretation and related data. The relatively positive results could have economic significance.

9.8.2.2 IP Anomaly I

Induced Polarization Survey Line 500-North pseudosection shows a zone of **highly anomalous** chargeability, i.e., greater than 6.0 milliseconds to a maximum of 8.8 milliseconds. It underlies the area between Station 900 and Station 1400 and continues to depth with the 2-dimensional form as shown in pseudosection. It is identified as **IP Anomaly I** in Figure 6. This anomaly represents a zone of disseminated sulphides that is probably 50 metres (160 feet) or less from the surface near Station 1000 and dips about minus 45° west for more than 500 metres (1,600 feet). It is about 250 metres (800 feet) thick. Width determination from this single line IP profile is not possible. If the chargeability structure is geologically related to the magnetic anomaly it could have a strike length of 500 to 600 metres.

This anomaly contains within it a zone of high resistivity; up to 1,720 ohm-metres. The combination of high-chargeability and high-resistivity could represent disseminated sulphides within a silicified zone, as was the case at Valley Copper; Osatenko (1976), where the higher copper grades were associated with silicification; which could also be the case here.

K.V. Ross et al (1995) described the Na rich nature of fresh sugarloaf diorite at the Ajax Mine next to the Afton Mine and stated that a fluid exsolved from this dioritic magma would also be sodic; and in the referred Ajax Mine paper wherein he quotes: *"The conversion of plagioclase and horneblende-bearing Sugarloaf diorite to massive albite and diopside consumes* Na^{+}, H^{+}, *and* SiO_2, *and releases* Fe^{2+}, Ca^{2+}, *and* H_2O. It is in the intermediate intensity albitization zone at Ajax that high grade copper and gold is found. The same albitization mechanism also produced the high grade copper and gold zones at the Mount Milligan copper-gold porphyry deposit.

It is worth mentioning that the propylitic zone around the large disseminated sulphide zone 500 metres to the south of this newly defined disseminated sulphide body contains significant albitization, and the disseminated sulphide zone there is also associated with high resistivities. The igneous rocks here are also sodium rich. It would not be an unreasonable speculation to forecast the possibility that both of these disseminated sulphide bodies could have a corresponding zone of silicification caused directly as a result of the albitization process. Encapsulation of sulphides in silica will however reduce the apparent chargeability effect. With intense silicification which is not the case here the IP chargeability effect can be eliminated. Without ionic-metallic interfaces there can be no IP effect.

9.8.2.3 IP Anomaly II

The pseudosection shows a second chargeability anomaly identified as Anomaly II to the east of Anomaly I. It subcrops at about 160 metres (500 feet) depth midway below Stations 700 and 800.

IP Anomaly II has a chargeability of greater than 4.5 milliseconds to a maximum of 5.9 milliseconds. It underlies the area between Station 600 and Station 900. This anomaly represents disseminated sulphides. It has a dip estimated at about minus 60° west for more than 400 metres (1,300 feet). It appears to about 150 metres (500 feet) thick and has the 2-dimensional form as shown in pseudosection. Width determination from this single line IP profile is not possible but if it is geologically related to the magnetic anomaly it could also be as much as 500metres in width or wider, as for IP Anomaly I. This anomaly occupies the transition zone from low apparent resistivity to high resistivity. It appears to be a separate geophysical feature from Anomaly I but may not be. The two anomalies may in fact be one single contiguous body with a magnetite core zone, in which case the total thickness could increase to 550 metres.

9.8.2.4 Self-Potential Measurements

The strongest self-potential (SP) response of the survey shown in "Gradient Profile" at **minus 98 millivolts** was found near Station 1000. The crossover point is where subcropping sulphides undergoing active chemical oxidation-reduction come closest to surface and this appears to fit the chargeability data where the high chargeability zone if projected to surface would appear to project to surface near this location.

A **minus 81 millivolt** SP response was measured near Station 1200. It too appears to represent sulphides undergoing oxidation-reduction near surface.

According to Kelly (1957) disseminated sulphides will yield a lower self-potential than massive sulphides and disseminations carrying less than 5 per cent total conductive sulphides are unlikely to yield interpretable reactions. However mineral deposits which contain less than 5 per cent total conductive sulphides can yield interpretable results if the sulphide particles are electrically connected. He stated that a rough correspondence often exists between the percentage of sulphide present and the maximum potential observable at the surface above a shallow sulphide body apex. A potential of 50 millivolts usually indicates about 5 per cent total sulphides. Increasing content of conductive mineralization is suggested by higher self-potentials.

Both negative SP responses are consistent with oxidation potentials expected from sulphides undergoing chemical reduction-oxidation at depth. A large disseminated sulphide body might be expected to have several complexly arrayed oxidation-reduction cells where sulphides come closest to the surface. However the best way to examine the SP effect is to conduct a proper Self-Potential Survey over the area of interest to give absolute definition to the sulphide body causing the effect because with the gradient method it is harder to detect broad low voltage anomalies. As pyrite often gives the biggest effect, target areas for copper deposits may not necessarily be associated with the highest SP responses.

9.8.2.4 Resistivity-Ratio Comparisons Between Primary Chargeability Anomalies; 1999 IP Survey, & 2004 IP Survey

Chargeability Anomaly I-1999, Ashton (1999), found in the 1999 IP Survey represents the large disseminated sulphide body found about 300 metres south of Chargeability Anomaly I-2004 found in this 2004 IP Survey.

Anomaly I-1999 chargeabilities (east-west line) ranged up to a maximum of 10.0 milliseconds. In the defined anomalous zone of 6.0 milliseconds and greater the average chargeability from 22 plot-points was 7.7 milliseconds (units). Whereas IP Survey Anomaly I–2004 (east-west) had a maximum chargeability of 8.8 milliseconds, and in the defined anomalous zone of 6.0 milliseconds and greater, the average chargeability from 16 plot-points was 7.1 milliseconds (units).

The question asked; in terms of probability has IP Anomaly I-2004 with an average chargeability of 7.1 units contain less sulphides than IP Anomaly I-1999 with an average chargeability of 7.7 units.

Referring to **Appendix A** and the effects of the relative resistivity ratio between the country rock, ρ_2 in ohm-metres and the polarizable body, ρ_1 in ohm-metres; generally speaking for the same unit of polarizable material, the smaller the ρ_2/ρ_1 ratio, the larger the apparent chargeability effect, and conversely the larger the ratio the smaller the apparent chargeability effect.

From data taken from the 1999 survey and this 2004 survey the following Table shows the comparisons.

Table of Resistivity Ratio Comparisons;

Chargeability Anomaly	ρ_2 (average) (ohm-metres)	ρ_1 (average) (ohm-metres)	ρ_2/ρ_1	Chargeability Average (milliseconds)
I-1999	583	129	4.5	7.7
I-2004	1,300	300	4.3	7.1

ρ_2 = polarizable body resistivity in ohm-metres
ρ_1 = country rock resistivity in ohm-metres

Although this is not a rigorous analysis it would appear that with nearly identical ρ_2/ρ_1 ratios the normalized chargeabilities found in these two geophysical structures may represent nearly identical total sulphide content. However the amount of mineralization will be dependent upon the sulphide species present in each case.

9.8.2.6 Magnetic Anomaly Correlation

Magnetite in polycrystalline or massive form is not a good conductor, yet when present in disseminations will exhibit a low chargeabilty effect. Magnetite can be introduced by intrusive hydrothermal action and remain in the intrusive body or added to the system through fluid separation. Also hydrothermal fluids can destroy pre-existing magnetite by chemical action.

The magnetic anomaly, discovered in 1990 but never followed up as to its cause, is plotted in **Figure 6** to show its relationship with Chargeability Anomalies I and II. The magnetic apophysis which has caused the magnetic anomaly appears to have formed in the middle between the two IP chargeability anomalies (disseminated sulphides) in which case, speculatively, it may be that the low chargeability core reflects the magnetite surrounded by concentric higher chargeabilities which are sulphides. It is possible that this central magnetic core is a potassic, or K-silicate zone, of an intrusive mass which has intruded the diorite country rock here. The potassic zone is generally proximal to the central core of an intrusion and potassic alteration often consists of **secondary** biotite, **magnetite,** and K-feldspar; hence the magnetic anomaly is positioned as it is. These features are undoubtedly genetically related. However only drilling will test the reason for these coincidental geophysical anomalies.

9.8.2.7 1969 Copper-in Soils Geochemical Anomaly Correlation

Recent (1993) soil geochemical surveys did not cover this quadrant. The areas covered were 300 metres and more to the south and from the baseline to the east. On the baseline it is at the anomalous threshold; e.g. between 100 and 200 ppm Cu from 5300 North and 5700 North. At Line 5500 North, Station 00 it is anomalous at 341 ppm Cu. Background copper values in the area over several types of lithology averages about 40 ppm copper.

Accordingly, the copper-in-soils geochemical map from the Burgoyne, 1969 geochemical report was reviewed and the copper anomalies were compared over the entire area with the copper anomalies plotted by Smith from the two soil surveys conducted in 1993. Smith's survey covered about ¾'s of the area with the only section not covered being the magnetic anomaly and the underlying disseminated sulphide body or bodies discovered by this IP survey which are in the northwest quadrant of the alteration zone.

By overlying the two maps at the same scale a fairly reasonable correspondence of the two anomalous patterns was evident. Hence, ***the most likely location*** *of the northwest copper anomaly* discovered in the 1969 survey was located and is plotted as **Figure 7** with reference to the magnetic anomaly and IP Line 500 North. There is however no guarantee that this is the exact location of the 1969 copper anomaly but it is probably reasonably close enough to have some confidence that the underlying disseminated sulphide body or bodies contain copper mineralization.

9.8.2.8 Negative IP Effects

Referring to **Appendix A** negative IP occurs when the depolarization current direction is in the opposite direction from the polarization current. This occurs when transmitter and receiver are on one side of a polarizable body and when they are on opposite sides of a polarizable body at large separations.

A relatively small negative chargeability effect occurs on the east side of IP Anomaly I at about 400 metres depth below Station 1000. This observed phenomena reinforces the fact that a significant polarizable body is located where it is shown in pseudosection.

SECTION 10.0 — EXPLORATION POTENTIAL

Monger (1997) speculates that the Mount Lytton Complex and the Guichon Batholith were formed from the same subducted section of Oceanic Crust with the Guichon Batholith, a differentiate from the upper part of the upper plate of subducted crust and the Mount Lytton Complex representing the lower part of the upper plate. This leads to the interesting speculation that this intrusive event could have concentrated copper minerals from a copper-enriched crustal element in a similar fashion, as it stoped its way up towards the surface.

Reid (1990) also described the area of alteration "as having experienced the passage of large quantities of hydrothermal fluids, containing significant volatiles, through the host rocks". Although this sample was copper bearing (approximately 750 ppm Cu) it is known that low density magmatic vapours carrying the volatiles which occur during devolatization can transport metals, the concentration which is low. Devolatilization occurs when a mineral bearing magma crystallizes producing a mineral bearing fluid phase and a volatile phase. This petrographical analysis provided the first indication of a style of alteration that is found at surface as a result of porphyry copper formation at depth.

There may also be the potential for gold mineralization in the system because the 1994 drilling encountered anomalous gold, and very anomalous gold pathfinders arsenic, and antimony, in the recovered drill chips. Two 10 foot drill intercepts assayed 0.190 and 0.165 grams/tonne gold respectively. The method of collecting chip samples was not gold friendly.

The area is also highly prospective because it is located in the Canadian Cordillera in the regional geological Terrane known as Quesnellia which has been very productive in a variety of mineral resource styles as it hosts such notable deposits as the Afton-Ajax Cu-Au mines; the giant Valley Copper, copper deposit; the Craigmont copper mine; the Similko, Copper Mountain Cu-Au mine; the Brenda Mo-Cu mine; the Mount Polley Cu-Au mine; the Mount Milligan Cu-Au prospect; and several other significant prospects within Quesnellia.

The Afton Mine

The diorites, quartz diorite, diorite-porphyry, gabbros and other igneous rocks found in the 1994 drilling at Ashton Cu-Au could also be indicative of an Afton Style mineralizing event where similar rocks hosted the copper and gold mineralization. The mined out Afton deposit contained 30 million tonnes of ore at an average of grade of 1.0% copper and 0.015 ounces/t gold. A large new zone of similar or better grades indicates that the Afton mineralizing event is a large one and extends to depth.

Carr et al (1976) described the orebody as being found at the boundary between the 2-5% propylitic sulphide zone and 5-10% sulphide zone. Disseminated sulphide content was determined by frequency-effect IP survey.

The Craigmont Mine

The Craigmont copper-skarn deposit (now mined out) which formed along the south margin of the Guichon Creek Batholith contained more than 40 million tons of 1.9% copper ore.

A time-domain IP survey was conducted over the orebody using two "a" spacings, 100 feet and 200 feet. A chargeability maximum of 7.0 milliseconds with a corresponding 20 ohm-metres low-resistivity minimum was recorded for the 100 foot "a" spacing and an offset 5.9 millisecond chargeability maximum with a 30 ohm-metre low-resistivity minimum was recorded for the 200 foot "a" spacing.

Valley Copper Mine

This giant world-class Valley Copper Mine is located 23 miles (37 km) northeasterly from the Ashton Copper-Gold Prospect. It is an integrated operation that consists of the former Lornex orebody and the Valley Copper orebody which are the faulted off sections of the same deposit. It produces an estimated 1.4 million pounds of copper in concentrate daily; when operating.

Van Blaricom p.81,90, shows how the economic-grade copper zone at Lornex was discovered by a second IP survey using a larger 800 foot (244 metre) "a" spacing. Previous drilling of an IP survey chargeability anomaly using an "a" spacing of 200 feet (60 metres) resulted only in the discovery of pyrite with small amounts of copper. The higher chargeability of the second anomaly which averaged 11.3 milliseconds identified the "economic" copper-sulphide zone whereas the non-ore grade sulphides had an average chargeability response of 7.8 milliseconds. The contrast between ore and mostly pyrite was only 3.5 milliseconds.

Ore zone resistivities averaged about 300 ohm-metres and increased to about 400 ohm-metres in the very low-grade copper-pyrite aureole.

Osatenko (1976), p.136 shows the relationship between quartz veinlet stockworks and silicic alteration with the main ore zone of Valley Copper. Higher grade copper contains abundant bornite and is associated with silicic alteration.

SECTION 11.0 — COST STATEMENT

11.1 Summary

1.	Personnel	12,450.00
2.	IP Equipment Rental	800.00
3.	Equipment & Field Expense	510.00
4.	Room & Board & Travel	1,523.23
5.	CAD Processing & Report Reproduction	326.00
	TOTAL	**$ 15,609.23**

11.2 Personnel

1. Project Evaluation & Review of Existing Data
   11, 12 June 2004
   J.M. Ashton, P.Eng.
   1 day @ $500.00 — 500.00

2. Property Examination,
   15, 16 June 2004
   Magnetometer Location Check of 1990 Survey,
   IP Line Selection, & Layout of 2-Lines
   J.M. Ashton, P.Eng,
   2 days @ $500
   & Kelly Last,
   2 days @ $230 — 1,460.00

3. IP Survey Crew
   Mobilization & Travel to Property
   from Vancouver only;
   11 July, 2004
   D. Mark, P.Geo., H. Diakow
   C. Barzen, M. Little, S. Webb
   4 Hours @ $190.00 per hour - — 760.00

4.	Travel to Lytton Base & Property from Vancouver & Return: 11 July & 13 July, 1999 J.M. Ashton, P.Eng. 8 Hours @ $60.00 per hour -	480.00
5.	IP Survey, 11th & 12th of July, 2004 J.M. Ashton, P.Eng. David G. Mark, P.Geo., Hector Diakow Chad Barzen, Matt Little, Shane Webb 18 hours @ $240.00 per hour -	4,320.00
6.	Data Preparation D.G. Mark, P.Geo. 6 hours @ $60.00	360.00
7.	Report Preparation July/August 1999 J.M. Ashton, P.Eng. 5½ days @ $500 per day -	2,750.00
8.	CAD Drawing Preparation E.B. Catapia, C.Tech 16 hours @ $50.00	800.00
9.	Word Processing, Collation and Drawing Reproduction S. Apchkrum: 18 hours @ $40.00 -	720.00
10.	Report Review D. Mark, P.Geo	300.00
	Sub-Total	**12,450.00**

11.3 Induced-Polarization Equipment Rental

1. One Honda 4.0 kW, Engine Generator
2. One BRGM Model VIP 4000, IP Transmitter
3. One BRGM Model ELREC 6, IP Receiver
4. Cable, Electrodes, Conductor, etc.
5. Generator Fuel

   2 days @ $400.00 per day - **800.00**

11.4 Equipment Expense, 11th and 12th of July; Survey Truck

1. Truck Rental @ $460.00
2. Survey Supplies @ $50.00 **510.00**

11.5 Room & Board & Travel,

11th & 12th July, 2004
IP Survey Crew; Room & Board
5 men, 1 day Room & Board @ $450.00 per day –
& 1 day Board @$150 per day 600.00

15th & 16th June, 2004; Property Examination
Property Exam & IP Survey Preparation, Ashton & Last

1. Mileage; 595 km @$0.50 - 162.83
2. Meals - 120.00
3. Accomodation - 112.70

J.M. Ashton, P.Eng.: IP Survey, 11th & 12th July
Mileage, 670 km @ $0.50/km - 335.00
Meals & Accomodation- 192.70

Sub-Total **1,523.23**

11.6 CAD Processing & Report Reproduction

1. CAD Processing, Drafts
   & Report & Drawing Reproduction **326.00**

SECTION 12.0 — CERTIFICATION OF J.M. ASHTON, P. Eng

I, J.M. Ashton, of Suite 612, 1200 West Pender Street, Vancouver, British Columbia, hereby certify that:

1. I am a Consulting Electrical Engineer and principal in J.M. Ashton & Associates Ltd., Consulting Electrical Engineers. I also provide professional services in mineral exploration.

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, as a Professional Engineer, 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, with significant work related to geophysics; and as consulting electrical engineer, since 1969.

6. This report was prepared by me.

J.M. Ashton, P.Eng.

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

Dated this 14th day of September 2004
Vancouver, British Columbia

SECTION 13.0 – CERTIFICATION OF D. G. MARK, P. Geo.

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

1. I am a consulting Geophysicist and principal of Geotronics Surveys Ltd., with offices located at 6204 - 125th Street, Surrey, British Columbia.

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

3. I am a member in good standing, as a Professional Geoscientist, in the Association of Professional Engineers and Geoscientists of British Columbia.

4. I have been practising my profession for the past 36 years and have been active in the mining industry for the past ~~30~~ 39 years.

5. The field work and data processing for the induced polarization survey described in this report was carried out by myself as Party Chief and Receiver Operator with equipment supplied by Geotronics Surveys Ltd.

6. I provided data preparation services and technical consulting services to J.M. Ashton, P.Eng., pursuant to the preparation of this report.

7. I generally concur with the contents of this report.

PROFESSIONAL
PROVINCE OF
D.G. MARK
BRITISH COLUMBIA
GEOSCIENTIST

David G. Mark, P.Geo.

Dated this 14th day of September, 2004.
Vancouver, British Columbia

SECTION 14.0 REFERENCES CITED

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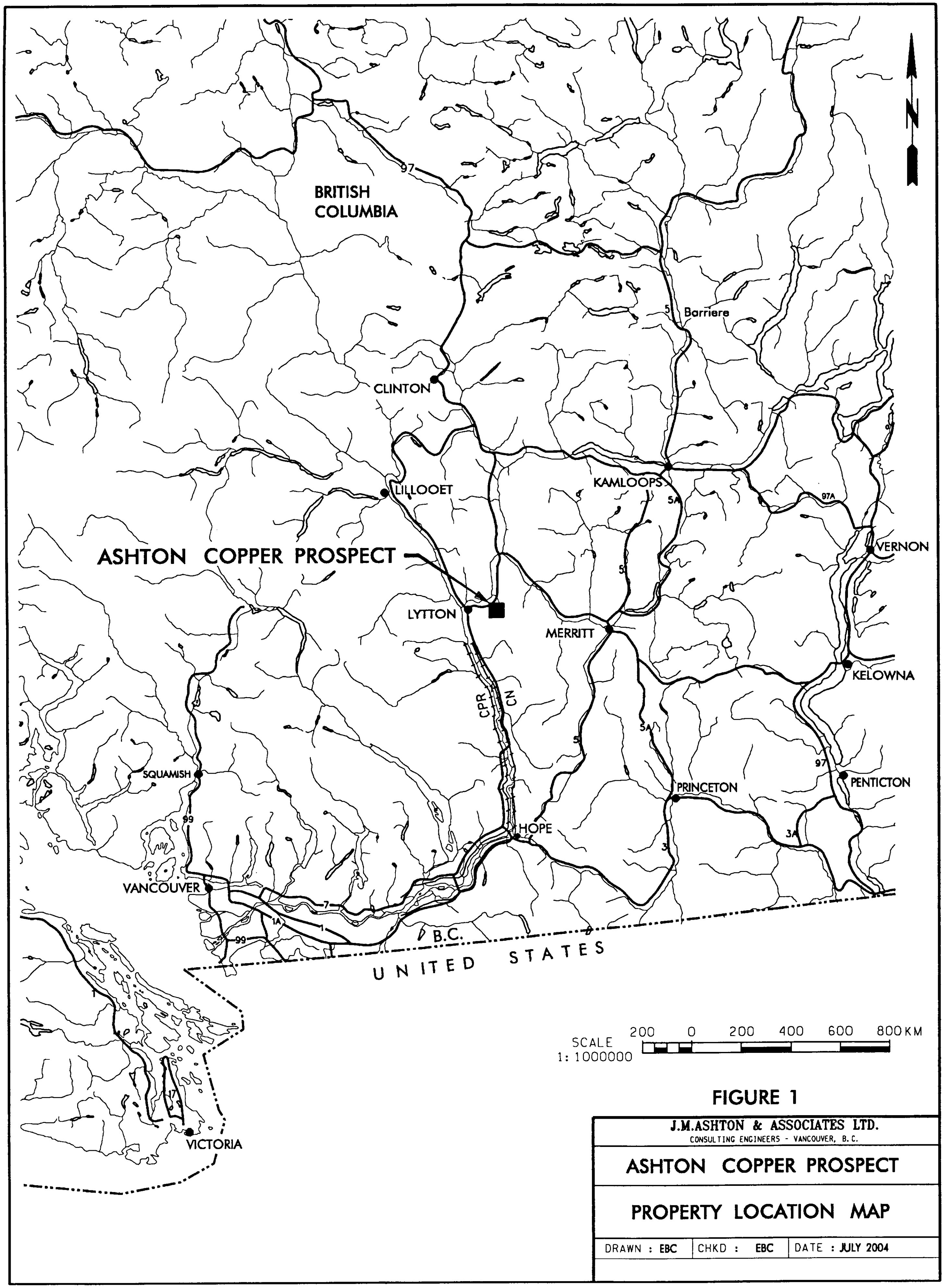


FIGURE 1

J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.

ASHTON COPPER PROSPECT

PROPERTY LOCATION MAP

DRAWN : EBC	CHKD : EBC	DATE : JULY 2004

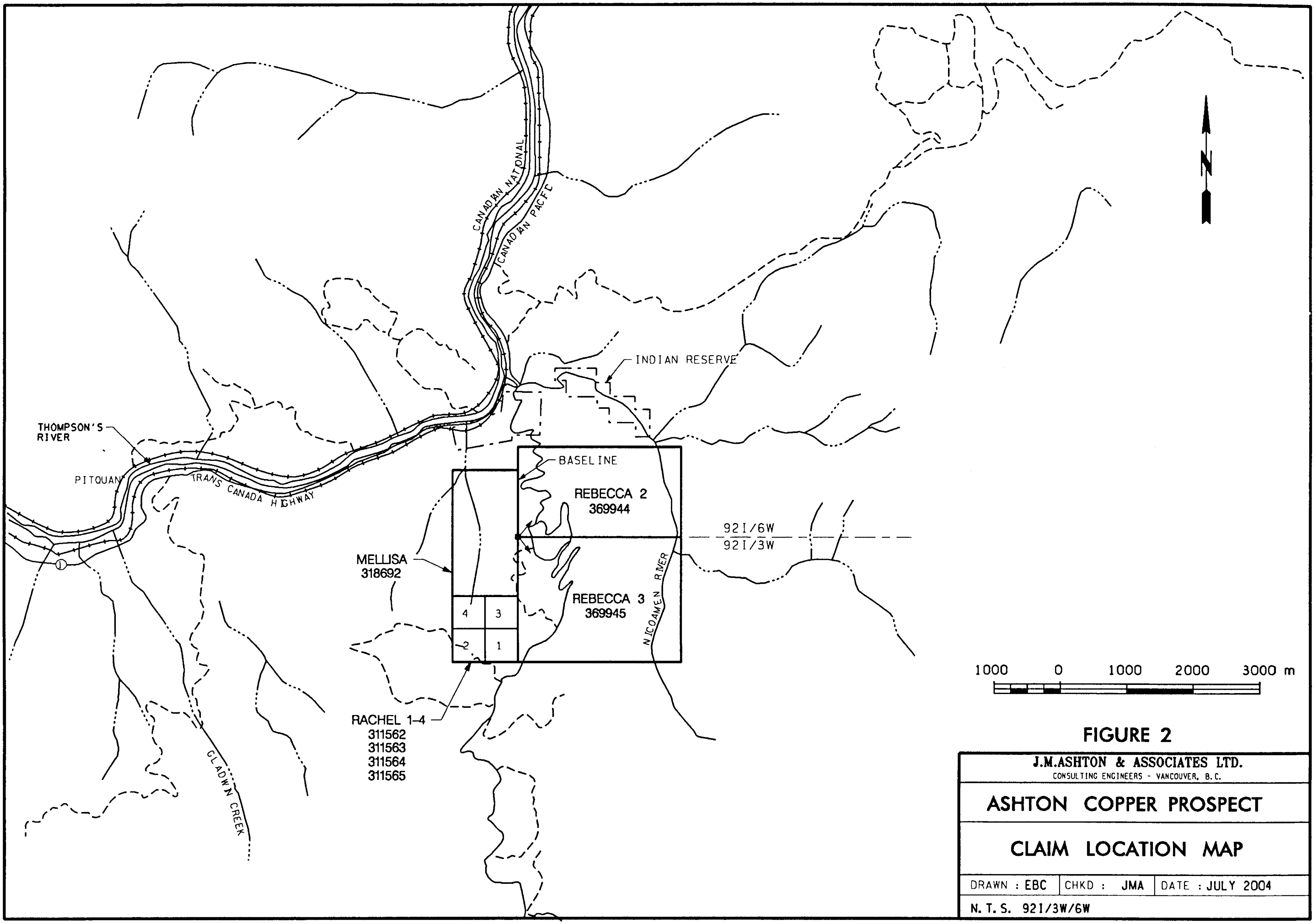


FIGURE 2

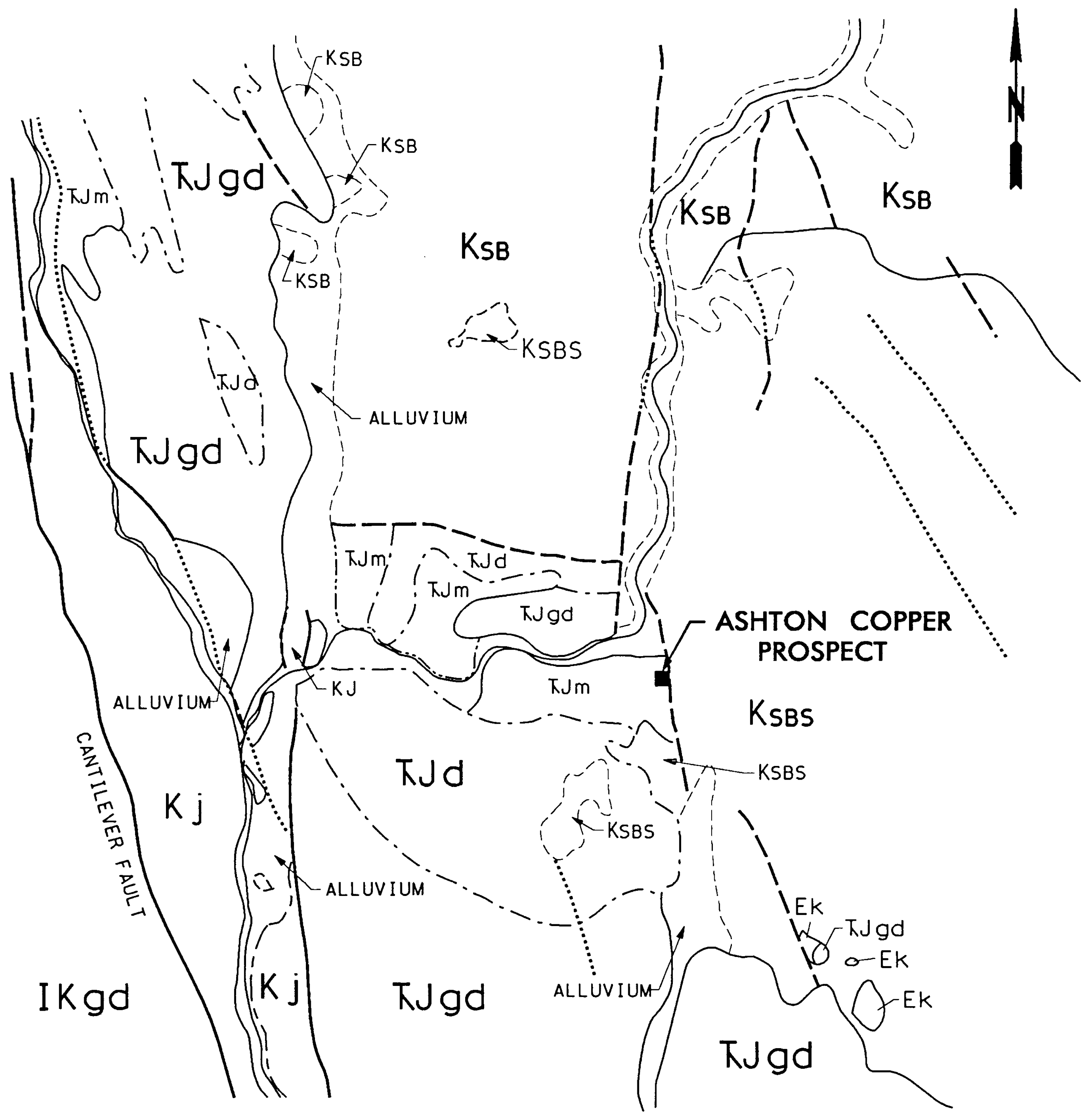
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.

ASHTON COPPER PROSPECT

CLAIM LOCATION MAP

DRAWN : EBC	CHKD : JMA	DATE : JULY 2004

N. T. S. 92I/3W/6W



LEGEND

FAULT

INFERRED FAULT

LATE CRETACEOUS

IKgd -GRANODIORITE, QUARTZ MONZONITE

SPENCES BRIDGE GROUP

KsB -FELSIC, MAFIC FLOWS AND SANDSTONE -SHALE

KsBs -MAFIC VOLCANICS -CONGLOMERATE

EARLY AND MIDDLE CRETACEOUS

JACKASS MOUNTAIN GROUP

KJ SANDSTONE, ARGILLITE, CONGLOMERATE

TRIASSIC AND/OR JURASSIC

TJd -DIORITE, AMPHIBOLITE MT. LYTTON COMPLEX

TJgd -GRANODIORITE, QUARTZ MONZONITE MT. LYTTON BATHOLITH

TJm -LAYERED OF ROCK, AMPHIBOLITE, MYLONITE MT. LYTTON BATHOLITH

SCALE 1: 200000

4 0 4 8 km

FIGURE 3

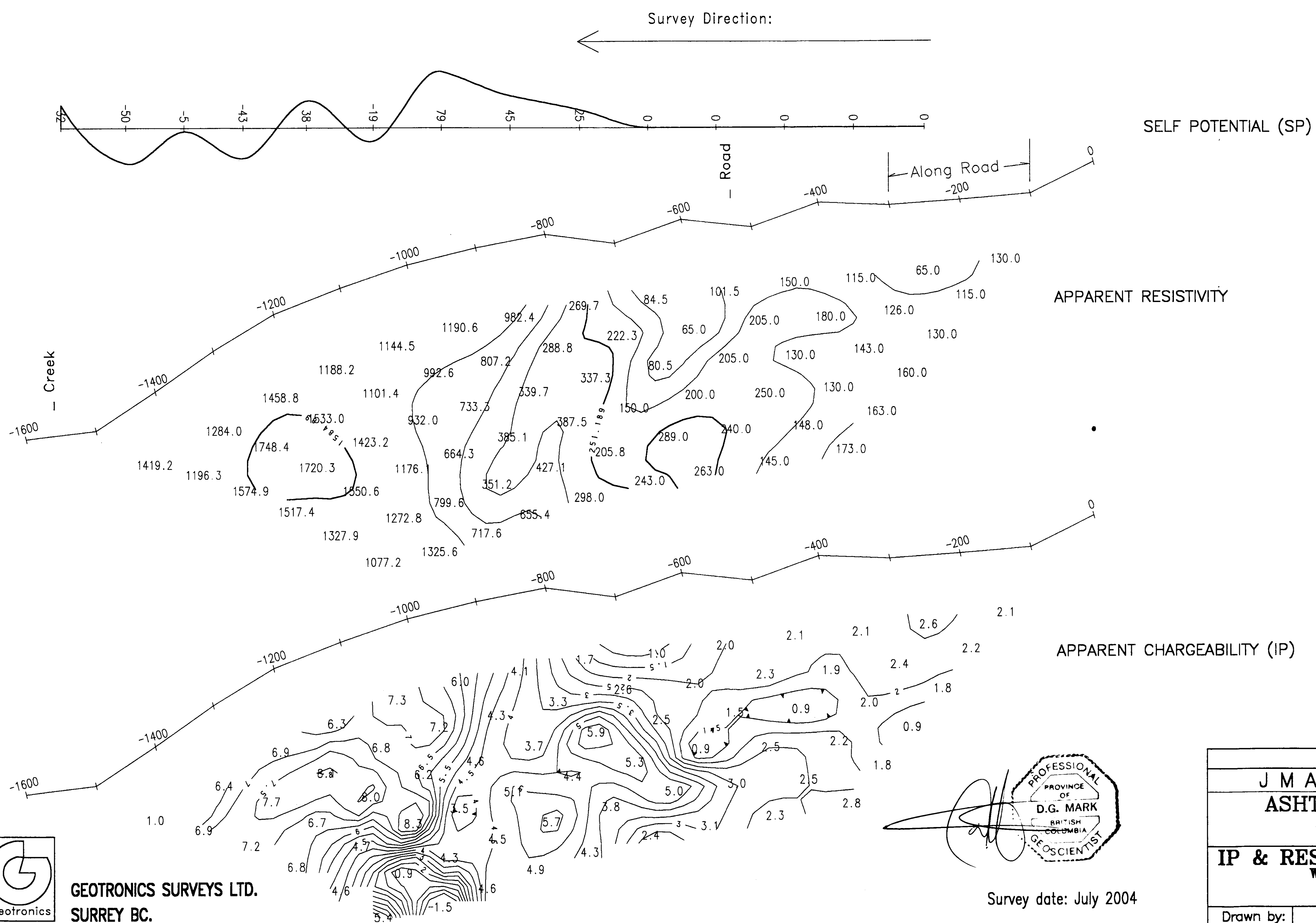
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.

ASHTON COPPER PROSPECT

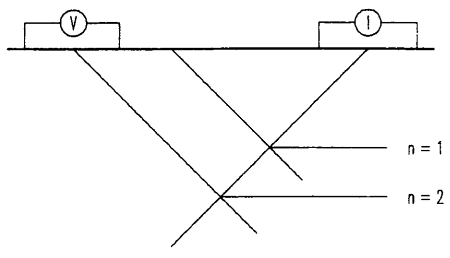
REGIONAL GEOLOGY

DRAWN : EBC	CHKD : JMA	DATE : JULY 2004

MODIFIED AFTER J.W.H.MONGER GSC MAP 42-1989



Pseudosection Plotting Method



LEGEND

CONTOUR INTERVALS

Resistivity :	log base 10 ohm-metres
Chargeability:	0.5 millisecond

INSTRUMENTATION

Receiver:	BRGM IRIS ELREC 6
Transmitter :	BRGM VIP 4000
Generator:	6.5 kWatt Honda

IP SURVEY PARAMETERS

Survey Mode:	Time Domain
Array:	Dipole-Dipole
Dipole Length:	100 meters (328 feet)
Dipole separation:	n=1 to n=6
Delay Time:	240 milliseconds
Integration Time:	1600 milliseconds
Charge Cycle:	8 second square wave

50 0 50 100 150 200 250
(metres)

250 0 250 500 750
(feet)

Survey date: July 2004

PROFESSIONAL GEOSCIENTIST — PROVINCE OF BRITISH COLUMBIA — D.G. MARK

GEOTRONICS SURVEYS LTD.
SURREY BC.

GEOTRONICS SURVEYS LTD.

J M ASHTON & ASSOCIATES LTD

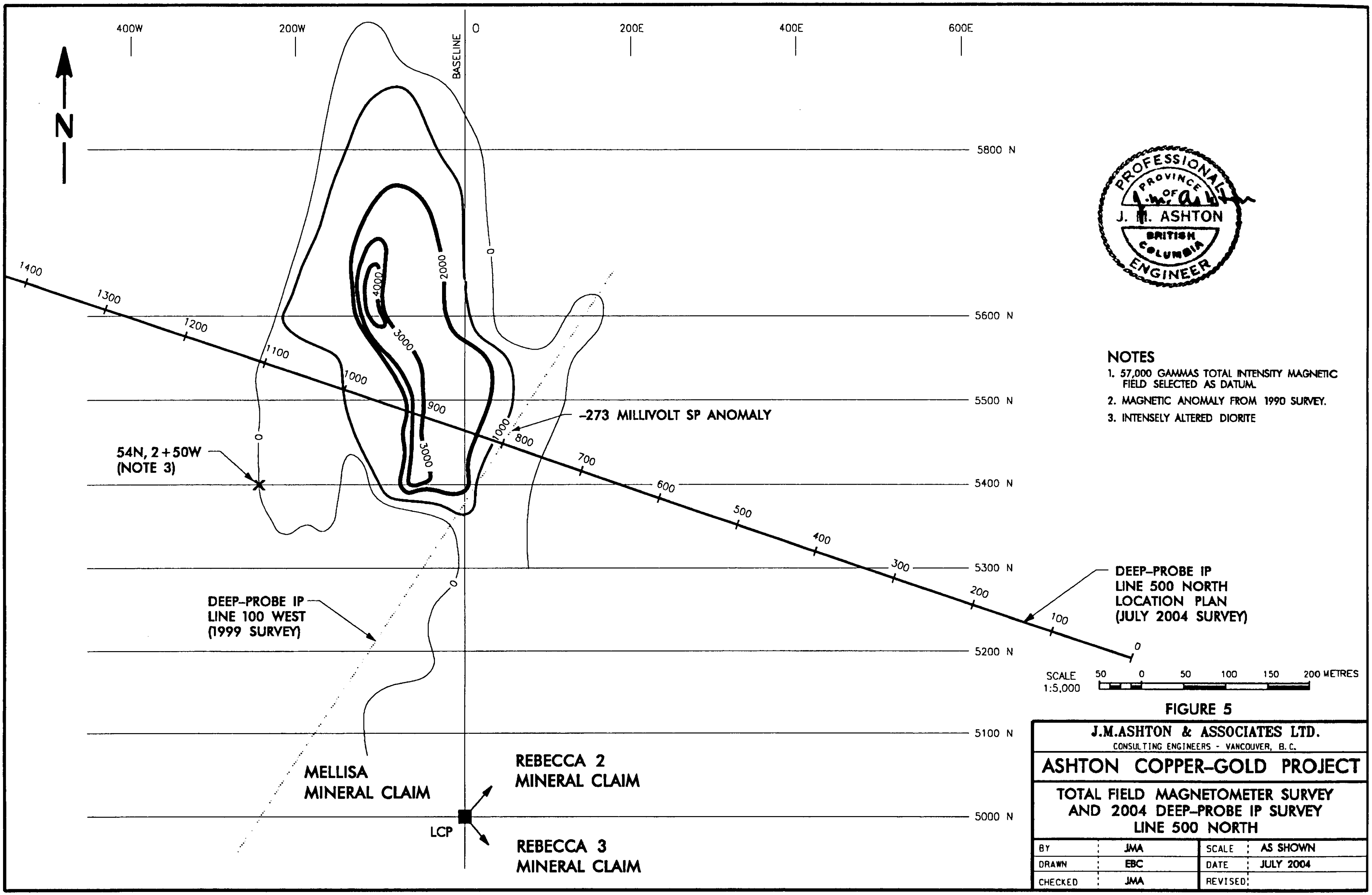
ASHTON COPPER PROSPECT

NICOAMEN RIVER, LYTTON AREA
Kamloops Mining Division, B C

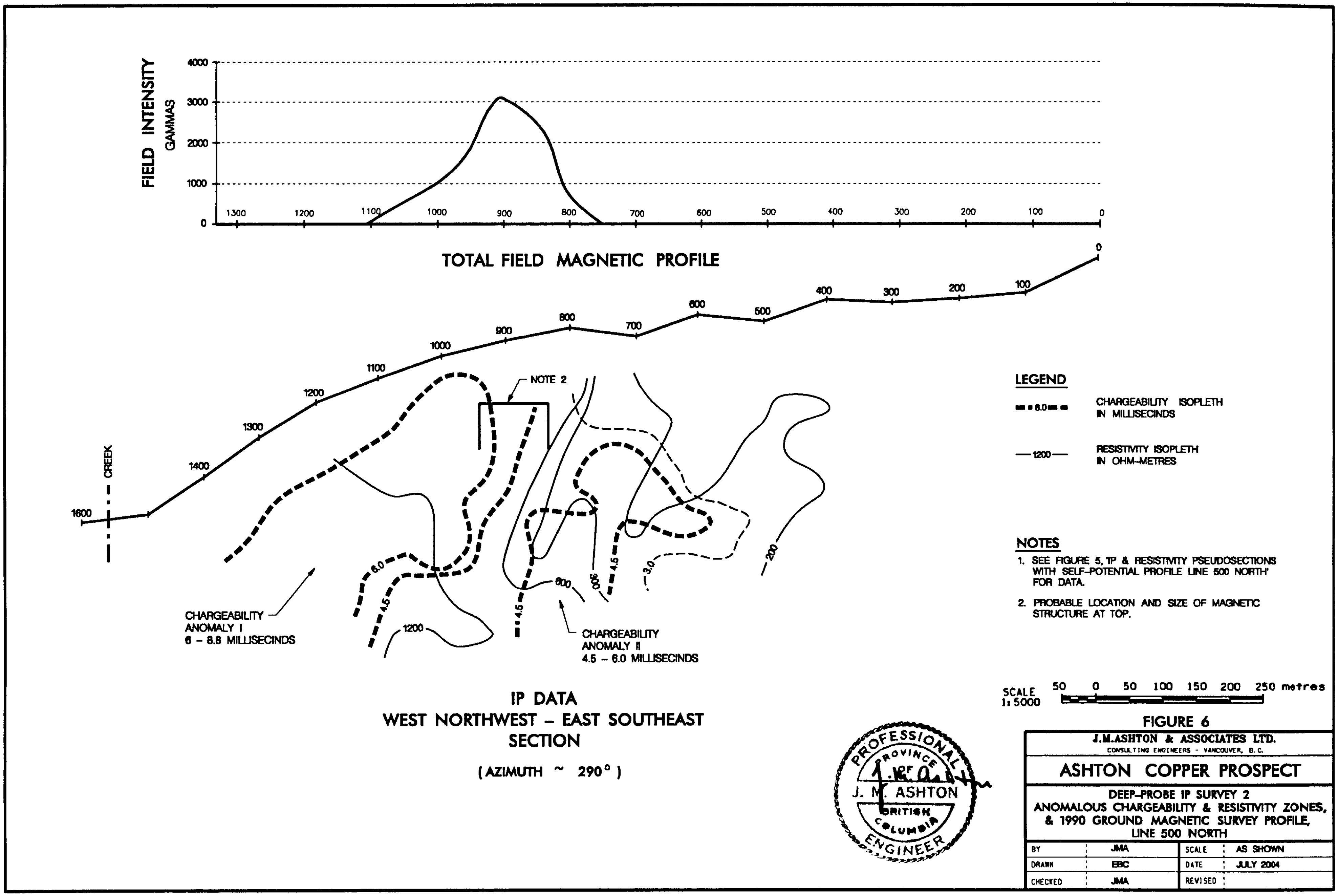
IP & RESISTIVITY PSEUDOSECTIONS
WITH SELF POTENTIAL PROFILE

LINE 500N

Drawn by:	Job No.	NTS	Date	Fig No.
DGM	04-06	92I/3W,6W	July 04	4



N
400W
200W
0
200E
400E
600E
BASELINE
5800 N
5600 N
5500 N
5400 N
5300 N
5200 N
5100 N
5000 N
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
4000
3000
2000
1000
0
-273 MILLIVOLT SP ANOMALY
54N, 2+50W
(NOTE 3)
DEEP-PROBE IP
LINE 100 WEST
(1999 SURVEY)
DEEP-PROBE IP
LINE 500 NORTH
LOCATION PLAN
(JULY 2004 SURVEY)
MELLISA
MINERAL CLAIM
REBECCA 2
MINERAL CLAIM
REBECCA 3
MINERAL CLAIM
LCP
PROFESSIONAL
PROVINCE OF
J. M. ASHTON
BRITISH COLUMBIA
ENGINEER
NOTES
1. 57,000 GAMMAS TOTAL INTENSITY MAGNETIC FIELD SELECTED AS DATUM.
2. MAGNETIC ANOMALY FROM 1990 SURVEY.
3. INTENSELY ALTERED DIORITE
SCALE
1:5,000
50 0 50 100 150 200 METRES
FIGURE 5
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.
ASHTON COPPER-GOLD PROJECT
TOTAL FIELD MAGNETOMETER SURVEY
AND 2004 DEEP-PROBE IP SURVEY
LINE 500 NORTH
BY : JMA
DRAWN : EBC
CHECKED : JMA
SCALE : AS SHOWN
DATE : JULY 2004
REVISED:


FIELD INTENSITY
GAMMAS
4000
3000
2000
1000
0
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
TOTAL FIELD MAGNETIC PROFILE
1600
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
CREEK
NOTE 2
6.0
4.5
4.5
1200
600
300
4.5
3.0
200
CHARGEABILITY
ANOMALY I
6 - 8.8 MILLISECINDS
CHARGEABILITY
ANOMALY II
4.5 - 6.0 MILLISECINDS
IP DATA
WEST NORTHWEST - EAST SOUTHEAST
SECTION
(AZIMUTH ~ 290°)
LEGEND
6.0
CHARGEABILITY ISOPLETH
IN MILLISECINDS
1200
RESISTIVITY ISOPLETH
IN OHM-METRES
NOTES
1. SEE FIGURE 5, 'IP & RESISTIVITY PSEUDOSECTIONS WITH SELF-POTENTIAL PROFILE LINE 500 NORTH' FOR DATA.
2. PROBABLE LOCATION AND SIZE OF MAGNETIC STRUCTURE AT TOP.
SCALE
1:5000
50 0 50 100 150 200 250 metres
FIGURE 6
PROFESSIONAL
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BRITISH COLUMBIA
ENGINEER
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.
ASHTON COPPER PROSPECT
DEEP-PROBE IP SURVEY 2
ANOMALOUS CHARGEABILITY & RESISTIVITY ZONES,
& 1990 GROUND MAGNETIC SURVEY PROFILE,
LINE 500 NORTH
BY JMA
SCALE AS SHOWN
DRAWN EBC
DATE JULY 2004
CHECKED JMA
REVISED

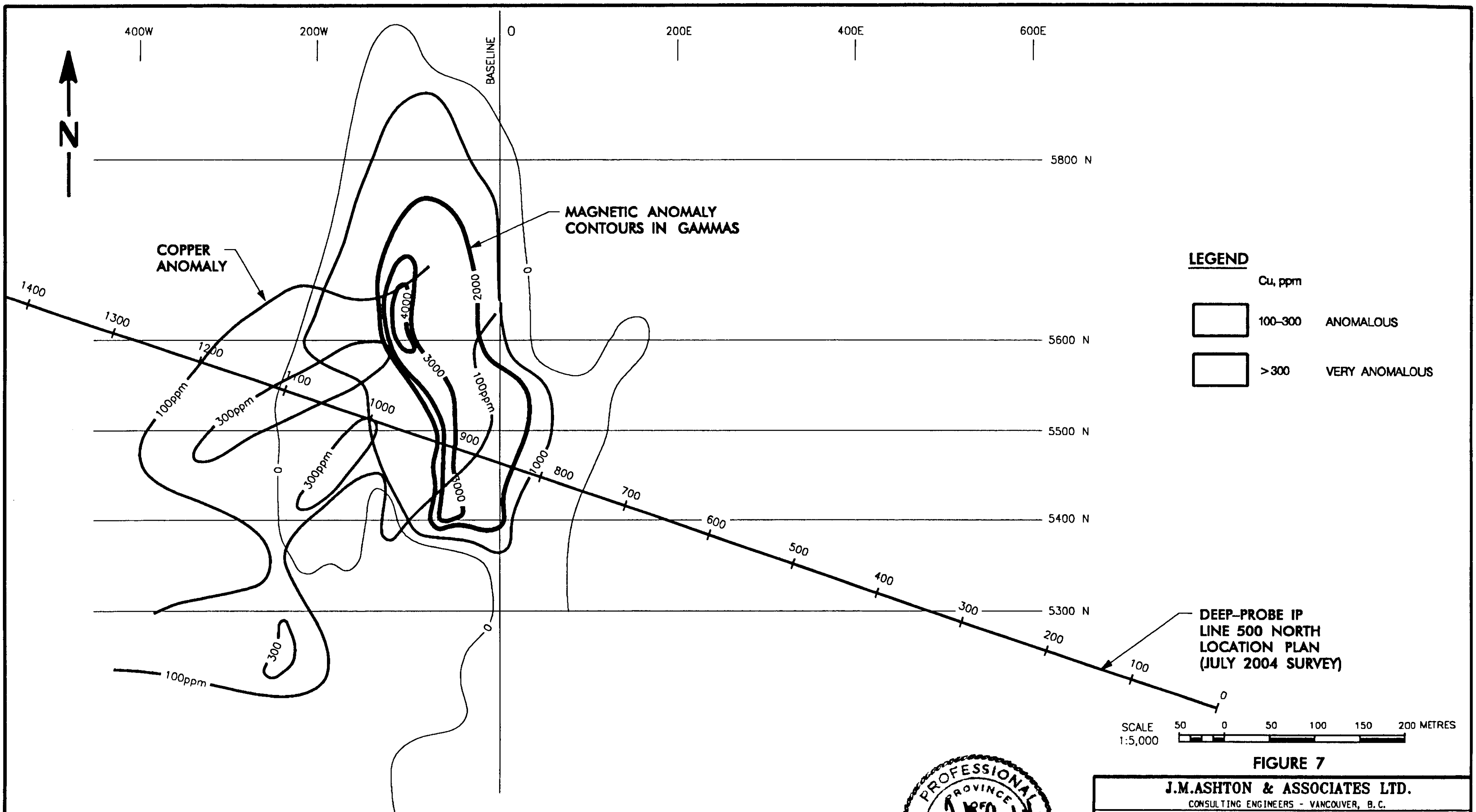

FIGURE 7

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. M. ASHTON

J.M.ASHTON & ASSOCIATES LTD.			
CONSULTING ENGINEERS - VANCOUVER, B.C.			
ASHTON COPPER–GOLD PROJECT			
PROBABLE LOCATION OF 1969 COPPER ANOMALY RELATIVE TO 1990 MAGNETIC ANOMALY & 2004 IP LINE 500 NORTH			
BY	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	JULY 2004
CHECKED	JMA	REVISED	

APPENDIX A

To Deep-Probe Induced Polarization Report 2

Ashton Copper-Gold Prospect

THEORY, FUNDAMENTAL EQUATIONS
&
KEY INTERPRETATION FEATURES

1.0 Theory of Earth Resistivity & 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 through the earth 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, $R = \rho L/A$ where: ρ = resistivity of the earth in ohm-metres; L= length of the current conducting path in metres, and A= cross sectional area of the current path in square metres.

Current flow through the earth follows the path of least resistance which is known as the low impedance path, which is mainly through the electrolyte filled capillaries within the pore spaces of the rock. However when electrically conductive minerals are present, i.e. minerals that facilitate the passage of electrons, which includes: most metallic sulphides, except sphalerite; some oxides; graphite; and metallic elements such as native copper and silver; then the electrical current will preferentially flow through these materials because they represent low impedance paths.

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 largely 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 probe on the same conductive body the voltage at both probe points would be the same; or if not, the voltage difference would be small.

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 minerals 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.

The total voltage drop across the electrolyte and conductive minerals that are normal to the current flow direction is the sum of the voltage drops across the electrolyte and the conductive mineral. 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.

2.0 Induced Polarization Technique; Fundamental Equations

G.W. Hohman (1975?) showed that the secondary potential (or Overvoltage Effect) due to a polarizable body using the IP survey method reduces to the following equation:

$$V_S = \frac{\rho_1 \cdot I \cdot P \cdot G}{2\pi}$$

Where:

G is a variable which is proportional to geometry
I = current flow
ρ_1 = host rock resistivity

P is a variable which is a function of resistivities defined by:

$$\mathbf{P} = \frac{3\cdot(1 - \rho_2/\rho_1)}{(1 + 2\cdot\rho_2/\rho_1)} + \frac{\mathbf{i}\cdot 9\cdot\varphi_2\cdot\rho_2/\rho_1}{(1 + 2\cdot\rho_2/\rho_1)^2} \qquad \textbf{Equation 1}$$

The **real terms** control apparent resistivity and the **imaginary term,** (**i**) controls the **magnitude** of the IP response.

Significance of Resistivity Contrast

The chargeability effect is governed by the imaginary term **i** of **Equation 1**, or:

$$\frac{\mathbf{i}\cdot 9\cdot\varphi_2\cdot\rho_2/\rho_1}{(1 + 2\cdot\rho_2/\rho_1)^2}$$

ρ_2 = **polarizable body resistivity**
ρ_1 = **host rock resistivity**

From the above relationship it can be seen that the IP response decreases for very resistive bodies (i.e., $\rho_2 \rightarrow \infty$ and the IP effect goes to zero);

and very conductive bodies (i.e., $\rho_2 \rightarrow 0$ and the IP effect goes to zero).

The magnitude of an IP chargeability reading will be low or high with a body having the equivalent amount of sulphides depending upon the resistivity contrast between the polarizable body and the country rock, or the ratio of the polarizable body resistivity and host rock resistivity. Knowing this relationship can aid in the interpretation.

3.0 General Perspective

The measured chargeability potential is the sum of two potentials; primary and secondary. The secondary potential consists of an In-phase and Quadrature voltage. In electrical terms, the In-phase voltage is equivalent to the real component and the Quadrature voltage is equivalent to the imaginary component, **i**.

Quadrature dipoles and in-phase dipoles for a conductive body are oriented in the same direction as the primary field. For a resistive body the In-phase dipoles are oriented in opposite directions. By convention, the IP response is positive when the quadrature (polarization) and the in-phase are in opposite directions and negative when they are in the same direction.

4.0 Depth Perspective

One of the most important parameters to determine in exploration is the depth extent of a polarizable body, yet depth extent is not easy to resolve because most of the IP response is due to the upper part of the body.

5.0 Dipole-Dipole Array Diagnostics

The pseudosectional presentation of dipole-dipole data is very diagnostic. The dipole-dipole array is the best array for detailed investigations.

5.1. The IP Response

The interpretation of an IP anomaly cannot be rigorous. There are cases where a strong IP effect represented low concentrations of sulphides and just the opposite where the IP effect was less and represented more sulphides.

In almost all situations current flow in the earth is carried in the solutions filling the pore spaces of the rocks. The current flow is actually maintained by charged ions in the solutions. **The IP effect is created when this *ionic current is converted to electronic current flow at the surface of metallic minerals* that are present and in contact with the fluids in the pore spaces.** Accordingly: *if there are no metallic minerals there is no IP effect and if there are no solutions containing ions in the pore spaces there can be no IP effect.*

6.0 Conductive Bodies

For very conductive massive sulphide bodies, or graphite bodies, most of the IP response occurs at the surface of the body where current enters and leaves rather than at the polarization dipoles throughout the body. IP response can then be much larger than would otherwise be predicted by techniques that model a polarizable volume of material.

7.0 Survey Line Position

IP response is directly dependent upon the survey line position relative to the spatial position of a highly conductive body. On a relative basis the response magnitude conforms generally with the following:

1.	Over the centre of body	IP response = 1 per unit
2.	Over the end of the body	IP response = 0.5 per unit
3.	Beyond the end of the body	IP response = 0.25 per unit

For a dipping conductive body the highest IP response occurs on the side opposite the direction of dip.

8.0 Multiple Bodies

Superposition of IP responses from two or more bodies can be confusing and requires sophisticated interpretation. Inversion techniques can provide several solutions. In this procedure the geophysicist begins with a set of field data and the forward problem solution for the geophysical data he has under investigation. The process is one of iteration until the computer has determined the parameters of the earth that give the forward problem solution that is the ***best fit*** to the field data being investigated.

One of the most useful applications is to simultaneously invert IP and resistivity field data. The results are sometimes very accurate representations when tested by drilling.

9.0 Conductive Overburden

Conductive overburden is the scourge of electrical methods of geophysics. Most of the current flows in the overburden so that there is little response from sulphides beneath.

10.0 Electrode Arrays

Pole-dipole and dipole-dipole arrays are similar in magnitude except responses from pole-dipole are asymmetric and provide a greater signal to noise ratio.

However the dipole-dipole array offers a high resolution of the subsurface, minimal wire layout, and low EM coupling, **at the expense of low receiver voltage ratios**.

11.0 Explanation of Negative IP Effect

Negative IP occurs when the depolarization current direction is in the opposite direction from the polarization current. In the normal positive IP response the depolarization and polarization current directions (vectors) are in the same direction.

G.W. Hohman p155, 156, in his studies of IP responses attributed this effect to the fact that negative IP responses do arise when both transmitter and receiver are on one side of a polarizable body, and when they are on opposite sides of a polarizable body at large separations which is the case here. A similar negative IP response is found on the eastern flank of the chargeability anomaly whereas because the end of the chargeability anomaly is still open to the west and remains to be surveyed the effect could not be observed. The effect is caused by current reversal resulting in a negative voltage in the chargeability equation.

10.0 SELF-POTENTIAL FUNDAMENTALS

Self-potential (SP) results are most subjective and may only be a guide to the fact that an oxidation-reduction reaction is occurring at depth; however economic sulphide deposits have been discovered using this cost effective tool. The SP effect has been successful in detecting economic massive-sulphides down to 150 metres (500 feet) total depth.

The subject is complex, as the low impedance paths that electrons are known to follow in the oxidation-reduction reaction are believed to be dependent upon both the geometry and concentration of sulphides and the available electrolyte paths all of which can influence the location of the conducting paths. Therefore deviations from this general rule can be expected.

According to S. V. Burr (1982) the self potential (SP) or *spontaneous polarization* prospecting method is the best of the electrical geophysical methods available for discovering sulphide deposits.

SP does not respond to subsurface valleys, wet clay, shears or faults and does not provide results which could lead to a false anomaly. The SP method responds to good conducting sulphides, both oxidizing and unoxidized bodies, graphite, and disseminated sulphides (non-conducting) if these sulphides are oxidizing.

SP has the ability to differentiate between anomalies caused by sulphides and anomalies caused by graphite. **Sulphides produce a range up to 350 millivolts between the most positive and most negative SP readings** whereas graphite has a much higher range.

A minus 200 millivolts SP response is considered to be a very good anomaly and is usually economically significant.

The SP technique is not limited to shallow depths. Semi-massive to massive-sulphides have been detected 300 to 400 feet below surface. Telford et al (1976) provides an example where a conductive sulphide body 115 feet thick whose top was found 300 feet below surface was detected by a negative 200 millivolt SP anomaly. Average sulphide content of this conductive body was more than 42 percent *in a combined mass of semi-*massive to massive-sulphides making up the deposit.

The strongest SP response along the strike of an anomaly does not occur where the sulphides are most highly concentrated but where the sulphides are closest to surface.

The strength of the potential generated depends largely on the concentration of the sulphides. However there is no formula available which can quantify the sulphide content as a function of the SP response.

Kelly (1957) described the Self Potential effect as the measurement of a primary electromotive force (EMF) field which is self generating due to a natural battery effect or galvanic cell in the earth caused by a conductive body immersed in an electrolyte. From near the apex of the sulphide body the electrical current travels down the conductive sulphide body to some point at depth at the lower terminus of the body where it passes into the wall rock. It spreads out into the country rock as it returns towards the surface, finally to converge on the sulphide apex of the sulphide body to complete the electrical circuit. Its return to the sulphide apex to complete the circuit creates a negative pole there, and produces a centre of negative polarity at the ground surface in that vicinity.

The current will flow along the lowest impedance paths available therefore the associated electrical field can be distorted by low resistivity influences and even passing through other conductive bodies if located proximally.

The deeper the overburden cover over the upper negative pole of a sulphide body the smaller is the proportion of the self potential effect observable at the surface to that of the total circuit.

Generally sulphides whose apices lie deeper than 300 feet are unlikely to give interpretable SP effects at the ground surface; yet there are many exceptions depending on the size of the sulphide body, the nature of the sulphides and the strength of the electrolytes which make up the galvanic cell.

The electrical continuity of the metallically conductive mineral deposit is a factor on the strength of the SP effect. Therefore a body of **massive sulphides** will yeld a higher potential than a body of disseminated sulphide mineralization.

Kelly found that a potential of 50 millivolts usually indicates 5 percent total conductive sulphides, or possibly less. Increasing content of conductive mineralization is suggested by higher potentials and ***"when potentials of 300 mV and higher are recorded, it may be assumed that the causative body carries heavy sulphide mineralization, of the order of 30 percent or more"***. Kelly stated that there was a third factor to consider in the strength and distribution of potentials observable at surface which is the extension in depth of the reacting body. ***"A well mineralized conductive sulphide body, extending to considerable depth will have its upper and lower ends bathed in contrasting electrolytes, and will***

generate strong potentials".

The near surface negative pole and deep lying positive pole of this natural battery will be widely separated, and the current will spread far into the country rock in its return path to surface. This will produce a broad electrical field centered more or less above the mineral apex depending on several variables that may affect current flow.