Confidential PROJECT OVERVIEW of

ASHTON COPPER-GOLD

Copper-Gold Porphyry Prospect
and:
Contact-Metasomatic Massive-Sulphide (Skarn) Prospect
or:
Volcanic Associated Massive Sulphide Prospect

July, 2003

Prepared by: J.M. Ashton, P.Eng.

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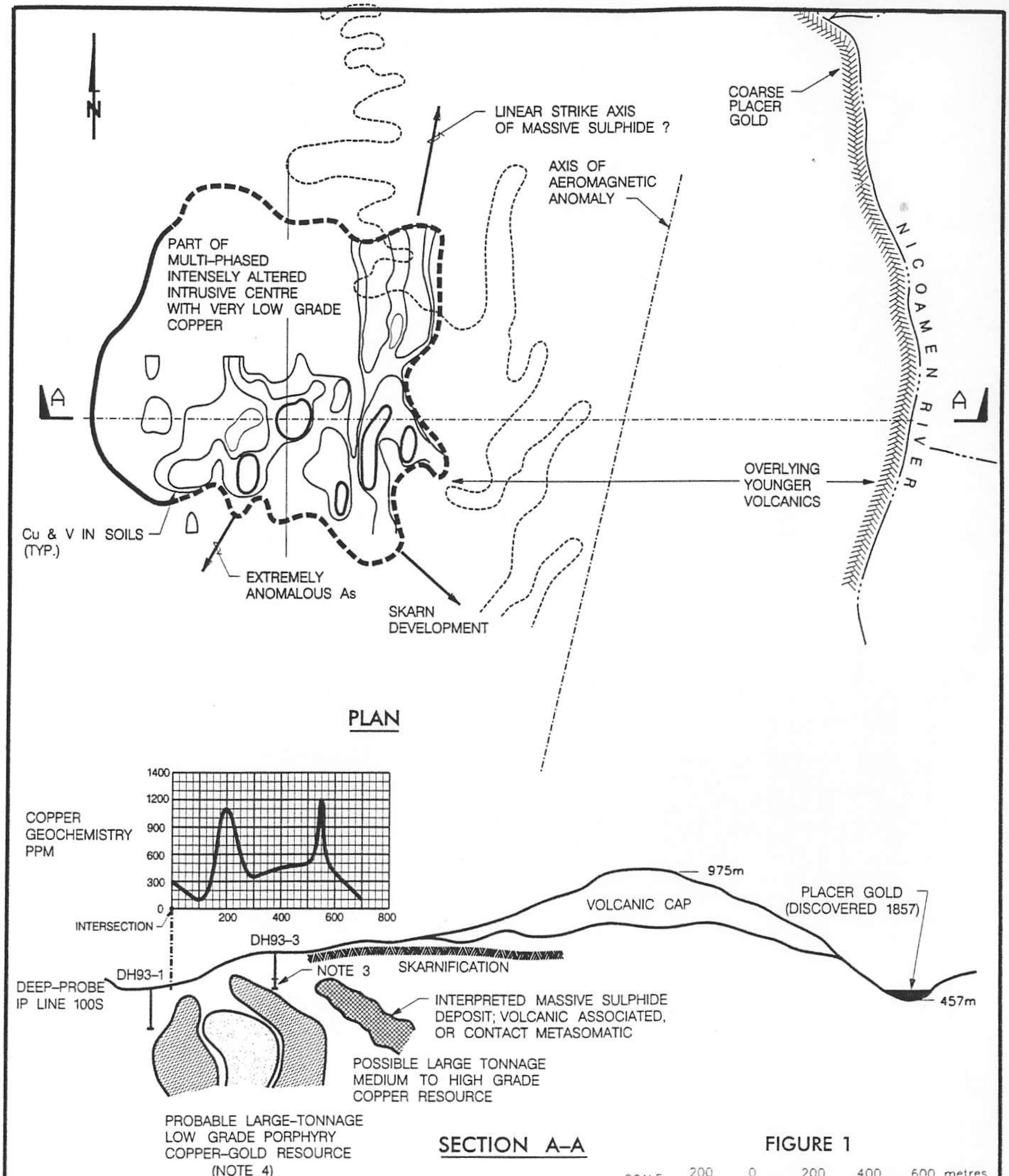

FIGURE 1

SCALE 1:20,000 — 200 0 200 400 600 metres

NOTES

1. Cu GEOCHEMISTRY TERMINATES ABRUPTLY AGAINST YOUNGER VOLCANICS.
2. MODEL IS SCALED FROM GEOLOGICAL, GEOCHEMICAL & GEOPHYSICAL DATA.
3. 100' OF QUARTZ-CARBONATE PYRITE-CHALCOPYRITE STOCKWORKS.
4. ZONES OF DISSEMINATED SULPHIDES SHOWN IDENTIFIED FROM DEEP-PROBE (420m DEPTH) IP SURVEY CHARGEABILITY & RESISTIVITY DATA.
5. DRILL HOLES PENETRATED PROPYLITIC ZONE ONLY. DRILL HOLES CONTAIN ANOMALOUS GOLD & EXTREMELY ANOMALOUS ARSENIC & ANTIMONY.

808 EXPLORATION SERVICES LTD.

ASHTON COPPER-GOLD PROSPECT

COPPER-GOLD PORPHYRY & COPPER RICH MASSIVE SULPHIDE DEPOSIT, MODEL TO SCALE

ENGINEER	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	JULY 2003
CHECKED	JMA	REVISED	

PLOTTED: 09 JUL 2003

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ASHTON COPPER-GOLD

Copper-Gold Porphyry Prospect
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Confidential Project Overview

SECTION 1.0 - Summary of Potential

With little or no doubt, the results from a two-line reconnaissance, dipole-dipole, **deep-probe induced polarization survey** have identified two large sulphide systems on the Ashton Copper-Gold property. These results along with supporting geological, geochemical, and geophysical data portends the probability of significant economic potential.

The spatial and temporal relationships of the two sulphide bodies which are in close proximity to one another are, at this time, unknown.

One deposit is a very-large disseminated sulphide body which appears to lie within 150 feet from the surface below an **extremely anomalous** copper-in-soils anomaly and which corresponds to a -300 milli-Volt Self Potential (SP) anomaly, which confirms oxidizing sulphides close to the surface specifically at that location. This clearly defined structure goes to depth, beyond the limits of the survey, which is 1,400 feet below surface. **There is room in this single structure to contain a geological mineral resource of the order of 400 million tonnes, or more.**

In addition there is a large geophysical conductor identified as a massive suphide body proximal to the eastern contact aureole of the disseminated sulphide body. The top of the massive sulphide body is about 400 feet below the surface. It conforms with the 40 degree easterly dip of the volcanic-sedimentary pile and is considered stratabound. Its top projected vertically to surface is coincident with a long, linear, **very anomalous** copper-in-soils anomaly, and a VLF-EM anomaly, itself a strong conductor. It has an estimated average conductivity-thickness of 12.2 mhos (Siemens) which places it in the category of a massive sulphide deposit.

The conductive body goes to depth along its dip length to beyond 420 metres (1,400 feet) vertically from the surface. Its possible dimensions are 800 metres (2,600 feet) in strike length by 400 metres (1,300 feet) down dip; and it could average 75 metres (250 feet), or more, in thickness; **which provides room enough to contain a geological resource of the order of 100 million tonnes, or more.** It is open to the south and to depth. **See Figure 1.**

Given the geological setting, alteration, geochemistry, and corresponding geophysical features, both structures are high priority exploration and drilling targets because each in its own right could represent an economic mineral resource of substantial value.

The two large geophysical structures are found in an intense hydrothermally altered area that has surface dimensions of at least 2 km north-south by 1.5 km east-west.

A recent review of associated anomalous gold indicator geochemistry from the percussion drilling assays in the propylitic zone, i.e., anomalous Au, As and Sb, shows anomalous, very anomalous and extremely anomalous values which indicates that in all probability the disseminated sulphide body is gold bearing.

This regional geological environment of British Columbia is known for several types of economic mineral deposits including: **copper, copper-gold, and gold deposits** each of a variety of styles. The notable copper and copper-gold deposits (5 world-class deposits) contain billions of pounds of copper. Within this group two copper-gold deposits contained 1.2 and 2.0 million ounces of gold respectively. The one outstanding gold-only deposit, Hedley, contained more than 2.5 million ounces of gold.

This large sulphide system could contain a mineral resource of commensurate value in copper or in copper-gold as those found in the region.

Albeit the deposit types within this large sulphide system require definition; the anomalous geology, geochemistry, geophysics, alteration, and large disseminated sulphide body, and large conductive body are classically representative of those fundamental features found associated with world-class mineral deposits.

The task now consists of proving that the two large mineralized structures **are not orebodies** rather than that they are orebodies. In effect this very recent geophysical work, has shifted the balance of probabilities greatly towards a successful mineral discovery outcome.

SECTION 2.0 - Discussion

The two portended mineral resources could include a large-tonnage low grade copper-gold deposit within the intensely altered and mineralized intrusive complex and a medium to large tonnage, medium to high grade copper, contact metasomatic (skarn), or volcanic associated massive sulphide copper deposit within the contact aureole of the intrusive system. At this time the interpretation and origin of the massive sulphide body is entirely speculative however the writer has experienced the discovery of massive sulphides at Red Hill, near Ashcroft, in the Permian, Cache Creek Formation, which is located about 25 miles due north.

Although speculative, this large well defined conductive body, is interpreted as a stratabound massive sulphide body and could be as a result of spatial coincidence of a volcanic associated sulphide deposit, deposited subsea in the Permian that was later overprinted, altered and re-crystallized by mineral fluids from the intrusive complex emplaced sometime between the Upper Triassic and Tertiary or: be simply a massive sulphide skarn deposit. The reason for the anomalously high conductivity has yet to be explained.

Copper skarns associated with a porphyry environment which have the same geological characteristics as this occurrence can contain several hundred million tonnes of ore grade material.

The large tonnage disseminated sulpide bearing intrusive structure in plan has a somewhat elliptical form and is clearly shown on both IP pseudo-sections by its chargeability anomaly. It is identified as **Primary IP Anomaly I** in pseudosection. It may have an unmineralized or low grade central core surrounded by an ore shell in the classic manner. At this stage however its spatial configuration can only be based upon the interpretation of limited evidence.

The large **extremely-low resistivity anomaly** identified as **Primary Resistivity Anomaly II** in pseudosection, represents an average calculated conductivity-thickness of 12.2 mhos. This high conductivity fits within the envelope of expectation of a world-class massive sulphide deposit. Supporting geophysics and geochemistry indicate that the dimensions of this body could be 75 metres in thickness by 800 metres in strike length with a down dip extension of at least 400 metres. At a specific gravity of say 3.8, characteristic for a massive sulphide deposit this structure could contain a geological mineral resource upwards to 100 million tonnes.

It is also probable that other contact-metasomatic copper deposits could occupy the contact aureole somewhat in ring fashion around the intrusive complex as there is also a second significant conductivity-thickness anomaly, calculated at 2.8 mhos, identified as **Resistivity**

Anomaly III in pseudosection. It is located on the north hanging-wall of the intrusive complex with its top at about 230 metres (750 feet) below the surface, dipping steeply to the north conforming to what appears to be the plunge direction of the sulphide body.

Economic minerals are expected to include **bornite, chalcopyrite, gold, and silver,** as all of these minerals are found in skarn outcrop. Gallium could report with the copper however this is entirely speculation. See **Appendix A.**

Bulk samples from reject cuttings from three drill holes returned gallium at an average of 14 parts per million; or 14 grams of gallium per tonne. With gallium selling at about US$375.00 per kg the gross value of the gallium in this system is US$5.25, or CAN$7.50 per tonne. However is the gallium recoverable in economic amounts and with what mineral is it associated with? At the world's first gallium mine in Utah this metal is associated with copper.

Alteration facies observed from microscopic examination of percussion drill cuttings and thin section studies of selected samples of alteration include but are not limited to: **albitization, saussuritization, carbonatization, sericitization, pyritization, silicification, tourmalinization, and skarnification.**

The **carbonatization** which is intense and widespread stands out and is reminiscent of those very large mineralizing systems that produce major mineral deposits where there has been mass transfer of enormous tonnages of chemical substances into and out of the affected rocks. The carbonatization effect having occurred as a result of mass transfer of CaO and CO_2 out of the volume of rock that has been replaced by mineralized fluids, subsequently recrystallized.

The best example of this mass transfer effect is still provided by Lindgren in his classic example on contact-metasomatic deposits. He concluded that for every cubic metre of altered and mineralized limestone the mineral fluid chemistry which caused its replacement saw 460 kg of CaO and 1,190 kg of CO_2 carried away into the alteration aureole and 1,330 kg of SiO_2 and 1,180 kg of Fe_2O_3 added along with significant mineral content; or an astonishing 1.8 tons of material were removed and 2.8 tons added per cubic metre; excluding the economic minerals. Similar mass transfer occurs during the albitization/saussuritization process which has also occurred; hence the widespread carbonatization is most likely caused by these two superimposed independent chemical mechanisms.

The extensive albitization in the propylitic zone observed in thin section may have economic significance for mineralization expected in the outer shell zone interpreted from the geophysical data of the deep-probe IP pseudosections which appears to outline a highly silicified and mineralized outer shell-zone characteristic of silicification due to albitization. It is therefore speculated that the coincident high resistivity and high chargeability zones in pseudosection could be zones of concentrated sulphides due to albitization.

According to K.V. Ross, et al in their paper "Geology, Alteration and Mineralization of the Ajax East and Ajax West Copper-Gold Alkalic Porphyry Deposits, Southern Iron Mask Batholith, Kamloops, British Columbia" pages 565 to 580 in Sehroeter, T.G., 1995, the conversion of plagioclase and **horneblende**-bearing diorite to massive albite consumes silica, Na^+, and H^+, and releases calcium, iron and water. The iron reacts with Cu and S and precipitates chalcopyrite. The hydrogen ion lowers pH and drives the albitization process further, releasing more iron and enriching the chalcopyrite.

The discovery of albitization with low-grade copper in the propylitic zone is, in all probability, indicative of a spatial relationship with intermediate and high grade albitization in the sulphide rich part of the system where the pseudosections show high chargeability (high sulphide content) in association with high resistivity (silicification). These areas of the disseminated sulphide system could contain higher-grade copper and gold mineralization in a similar manner as found at Ajax and Mount Milligan. Or alternatively, as was the case at Valley Copper silicified zones contained significantly higher copper grades.

At Ajax, a zone of intermediate intensity albitization contains significantly higher grade copper-gold mineralization (0.64% Cu and 0.40 g/t Au). Similarly at Mt. Milligan locally intense albitization is associated with the better copper and gold grades.

Widespread and intense carbonatization throughout the area indicates that enormous tonnages of chemical and mineral mass-transfer has taken place both into and out of both the disseminated sulphide complex, and the skarn zone. These signs auger well for the discovery of both a well mineralized porphyry intrusive resource and a contact metasomatic, massive sulphide, resource. Both targets stand out very clearly in the deep-probe IP survey chargeability and resistivity pseudo-sections.

SECTION 3.0 - Geological Features

Although the surface geology and alteration have yet to be mapped the following are some of the geological features learned mainly from percussion drilling of the altered and mineralized intrusive complex. More detailed geological information is contained in **Appendix B** where percussion drill chip logs, and thin section petrographical data are found.

The geological mechanisms at Ashton Copper-Gold are a very close fit to the criteria proposed by L.D. Meinert (1995), that result in the fonnation of many of the large-tonnage, high-grade copper-hearing skarn deposits throughout the world. Key elements to Meinerts thesis are found herewith in Section 4.0 and **Appendix C**.

The work of both R. E. Gale, Ph.D., P.Eng., and Peter Reid, Ph.D., found in Appendix B shows an extensive episodically emplaced, multi-phased, plutonic complex containing disseminated sulphides and oxides with pyrite and chalcopyrite veinlets within a widepread zone of alteration, including skarnification along the eastern contact aureole.

The 1999 deep-probe IP survey pseudosections found in the **Figures** section show that the 1993 reconnaissance drilling had only tested part of the low sulphide content propylitic zone and had not penetrated the main zone of disseminated sulphides. However the 1994 drill-chip logging and thin section work by Gale and Reid respectively did identify the classic epizonal propylitic alteration that forms around mineral deposits which included: pyritization, calcium enrichment (a calcium front); epidote-chlorite-actinolite alteration; quartz-sericite-pyrite alteration; quartz-carbonate, pyrite-chalcopyrite stockworks development and skarnification.

The deep-probe IP survey was encouraged from the results obtained by the proper logging of the percussion drill cuttings by Gale. These results included the bottom 70 feet of drill hole RC-93-3, to a total depth of 500 feet, which was described as containing several quartz-calcite, pyrite-chalcopyrite veinlets. This description is consistent with wbat would he found in the upper part of the roof-zone of a mineralized porphyry system. In addition, cuttings from this hole showed significant quartz-sericite-pyrite alteration and albitization, which is another positive epizonal feature.

Boron enrichment in altered rock recovered from drill holes and surface outcrop supports the roof zone concept. Boron is known to occur in the roof-zones of larger granitic plutons; Manning and Pichavant (1995); page 13.

The deep-probe IP pseudosection results integrated with the geological work of Gale and Reid, surface geochemistry, drill hole geochemistry and geophysics has enabled a meaningful correlation of all these features to enable the conclusion that there are two deposit types within this large sulphide system.

The drilled area is pervasively altered and mineralized due to an enormous passage of volatile fluids through the rock, Reid (1990); caused in all probability by the separation, or partition of an aqueous phase containing significant volatiles, including water, boron, and carbon-dioxide from a co-existing fluid/melt believed to contain economic metals; most likely copper. This exsolution of low grade mineralization with the volatiles and mineralized fluids which occurs during partitioning results in the concentration and precipitation of metals near the top of the magma chamber and/or within any chemically favourable host horizon (i.e., limy metasediments and limy metavolcanics) that the mineralized flnids are in contact with at the time.

The partitioning occurs when the fluid pressure increases to the point where it exceeds the lithostatic pressure and tensile strength of the enclosing rocks resulting in extensive fracturing of the surrounding rocks, mostly in the carapace or roof zone, which occurs generally within a shallow crustal setting.

Research has shown that volatile enriched residual grantitic melts, Manning and Pichavant, (1985), persist to low magmatic temperatures and become enriched in non-compatible elements, especially metals of economic interest. Hence the presence of volatiles is essential to maximize the scavaging and concentrating of metals from the surrounding rock as the magma intrudes the upper levels of the crust until partitioning occurs.

Monger (1995) speculates, with a high degree of confidence, that the intrusives at Ashton Copper-Gold, which are part of the Mount Lytton Complex, formed as a result of subduction zone melting, in an Island Arc setting, within the lower part of the Upper Plate compared with the Guichon Batholith in the Highland Valley which formed in a similar fashion in the upper part of the Upper Plate.

If this is the case, the evolution of the intrusive complex at Ashton Copper-Gold would have occurred over a longer period of geological time and would have passed through a greater vertical distance in the Earth's Crust with the added probability that more copper metal (and other mineral species) per unit volume were scavenged from the lithosphere; in comparison to the giant, world-class copper deposits in the nearby Highland Valley. Although speculative the copper grades at Ashton Copper-Gold might be higher and involve different species.

Gale (1994) showed that the intrusive complex at Ashton Copper-Gold included no less than three (3) and possibly four (4) episodic, mineralized, intrusive phases; gabbro, diorite, quartz-diorite (tonalite), and diorite porphyry as was evidenced by the presence of their altered equivalents. Mineralization occurs both as disseminations and as mineralized vein systems. Alteration in the form of calcite flooding and quartz-calcite veining, is widespread, indicating a large hydrothermal system.

Skarnification and marblization was found in the two easternmost drill holes, 93-4 and 93-5 and in surface outcrop located along the east side contact aureole. Skarn is also found in old surface trenches beside the east side of the main forest access road 1.5 km (5,000 feet) south south-east from drill hole 93-5 (collar elevation about 2760 feet) at about 3,500 feet elevation. Hydrothermal alteration is found in the intervening ground which has yet to be mapped.

Read (1995) in his thin section stUdy, classified the diorite as horneblende-diorite and horneblendite. He also reported marble and calc-silicate skarn in three (3) of the five holes drilled towards the outer margin of the intrusive complex.

Skarn mineralogy according to Meinert is: "**mappable in the field and serves as the broader "alteration envelope" around potential orebodies**" The interpreted massive sulphide body has skarn development above it and to the south and west of it.

The fact that the propylitic zone contains significant iron sulphides as a result of soluble iron assay, possibly 10% or better, and in comparison as the mineralized porphyry system contains chargeability magnitudes more than twice as great it can be said that the sulphide content and size of the entire system is large. Large and strong sulphide systems are known to produce large higher grade mineral deposits simply because the economic metal fraction is commensurately larger resulting in large scale metasomatic metal transfer into ideal host rock.

The intrusive complex has intruded and altered a thick pile of limy meta-sediments and meta-volcanics, previously unmapped by the Geological Survey of Canada at this location, which has produced significant skarnification containing copper minerals in the form of chalcopyrite and bornite with scattered anomalous quantities of gold and silver. This rock package is also not unlike a subsea volcanogenic extrusive complex which could have produced a volcanic associated massive sulphide deposit.

The results of early cursory geological work, from which no geological map is available, conducted in 1969 which was relegated to the volcanic-sedimentary complex to the east and southeast of the intrusive complex, was reported on by Burgoyne and Antal.

Petrography (1994) of the 1993 drill cuttings shows that the multiple intrusive phases also possess the unique geological and mineralogical identifiers that should classify them **as the mature, potentially productive, porphyry type** as defined by S.A. Williams & J.D. Forrester in their 1995 paper "Characteristics of Porphyry Copper Deposits".

The unique features which identify a productive porphyry type include intrusive compositions ranging from diorite to granodiorite; the presence of the unique mineral assemblages: **apatite** of a specific composition, **copper-bearing rutile** of a type that coexists with calcite, and the presence of **vanadium-rich sphene**. Here also, apatite, [$Ca_5(PO_4)_3(F,Cl,OH)$] and rutile, [TiO_2] are both present upon assay and, are observed in thin section.

The **vanadium** content of the soils; i.e., >751 ppm V, is anomalous; and is coincident with the copper-in-soils anomalies; whereas the vanadium content of the drill cuttings consistently exceeded 500 ppm V with highs to 1,224 V corresponding to the high copper values. In general vanadium in drill cuttings was found to be **anomalous** (401 ppm to 800 ppm) and **very anomalous** (801 ppm to 1600 ppm). **Sphene** is ubiquitous throughout the thin sections examined.

Gale's (1994) report of **red** hematite and/or **red** mica, in drill holes RC-93-2 and RC-93-3 are consistent with products of oxidation found in the classic, mature type porphyry systems.

Therefore there is substantive evidence that the intrusive complex itself is most likely the mature productive copper-porphyry type and is in proximity to a masssive sulphide skarn. Meinert provides good examples where both types of economic copper deposits, generally world-class deposits, are found proximal to one another in a porphyry environment.

Meinert cited three deposits that fit this criteria which include: Santa Rita, New Mexico, **2-billion pounds of copper**; Mines Gaspe, Quebec, **4.1 billion pounds of copper**; and Carr Fork at Bingam Canyon, Utah, **≥15 billion pounds of copper**.

Local Geological Summary

An enormous mass of intensely carbonatized, albitized, and altered rock as described in the drill hole logs and petrographical study, underlies a very strong copper geochemical anomaly covering an area at least 1 mile wide east to west, by 1½-2 miles in length south to north. The carbonate alteration is pervasive in the propylitic zone of the large disseminated sulphide system and in the zone of skarnification, which indicates that there has been a large scale metasomatic transfer from both systems.

The deep-probe IP survey results show an extensive and anomalous high-chargeability (indicates sulphides) zone close to the surface and going to more than 420 metres (1,400 feet) depth; it can be said that this subcropping polarizable rock feature represents a disseminated sulphide body of considerable tonnage.

Within the central section of the copper anomaly the strong carbonatization is associated with a strong boron overprint. Both Na and K have been almost totally depleted and the original rock textures obliterated. Both hydrothermal magnetite and very anomalous copper and vanadium mineralization are pervasive throughout the volume of rock tested by reconnaissance percussion drilling. Large sections are anomalous in arsenic and antimony as is gold which is at anomalous threshold level.

The central boron-rich zone within the large intense zone of propylitization represents the vent area through which an intense flux of volatiles were vented from an undoubtedly large subcropping porphyry type hydrothermal system as it underwent fluid phase separation while the magma crystallized causing devolatization and metal deposition.

Hydrothermal fluids bearing Fe, Ca and residual Cu, V and Ga accompanied the volatiles which included H_2O, CO_2, B_2O_3, ete.

The identification of the intense volatile component of this large hydrothermal and pervasive carbonatization alteration phase, along with other key alteration products, are all positive and supportive indicators that an economically significant mineral deposit or deposits could be found in this large sulphide bearing system.

The intrusive complex is forecast to contain copper minerals in the form of disseminations, stockworks zones and veins; and the contact metasomatic zones are forecast to contain copper minerals in the form of massive sulphides. And the system in all likelihood contains gold because the gold indicator minerals, arsenic and antimony along with weakly anomalous gold is found throughout the propylitic zone which surrounds the sulphide system. See Appendix D.

The limy metasediment and metavolcanic host rocks as intruded by horneblende rich and felsic intrusive source rocks of the multiphased intrusive complex along with other key geological, geochemical, and geophysical features including the intensive skarnification appear to be exactly those features that Meinert predicts that can produce the larger-tonnage and higher-grade world-class contact metasomatic massive sulphide copper deposits in direct association with a productive porphyry system. It is a classic case deserving drill testing.

It is also no surprise that this hydrothermal event is found along the northeast margin of the large Mount Lytton batholithic complex and close to the intersection of a major north-south and east-west structural break in the Earth's crust, as granitic related mineral deposits are commonly found in such a structural and geological setting.

Another important fact is that there appears to be a genetic relationship between the Mount Lytton Complex and the Guichon Batholith which has produced the **giant world-class copper deposits in the nearby Highland Valley. This genetic relationship portends the probability of economic success to the Ashton Copper-Gold prospect.**

SECTION 4.0 - Deep-Probe Induced-Polarization Survey

The deep-probe, time domain, dipole-dipole, 6-level, two line, induced polarization (IP) survey using an 'a' spacing of 100 metres (328 feet) was completed over the target area in late June 1999. The resulting data provided a very large east-west and south-north pseudo-sectional view of the electrical characteristics of the subcropping geology. Each sectional view, has a horizontal length of about 2,200 metres (7,216 feet) by about 420 metres (1,400 feet) total depth.

The IP transmitter produced a 2-second positive square wave pulse then shut off for 2-seconds; followed by a 2-second negative square wave pulse then shut off for 2-seconds. The alternating cycle of square wave pulses repeated itself each 8.0 second interval. The overvoltage value V_c was read across the potential electrodes during the off period, after a 200 millisecond delay following each pulse. The decay voltage V(t) was integrated over a period of 1500 milliseconds. Several integrations were made and averaged.

The deep-probe survey was implemented because the shallow probe pole-dipole survey (1994) did not adequately explain the large somewhat circular **extremely anomalous copper geochemical anomaly**, nor did it explain the reason for the **extremely anomalous VLF-EM anomaly** coincident with the **very anomalous linear copper anomaly** in the skarn zone on the east side of the large circular anomaly.

In retrospect, if Hole 93-3 had been drilled downslope from its actual location (it was conveniently drilled directly on the bush road) within the extremely anomalous copper anomaly it should have penetrated the disseminated sulphide zone.

Another factor which supported the implementation of the deep-probe survey was the logging of percussion drill chips by R.E. Gale, Ph.D., P.Eng., which identified a quartz-carbonate, pyrite-chalcopyrite, stockworks zone, in the bottom 70 feet of Drill Hole 93-3. The stockworks were interpreted by the writer as part of the roof shatter zone of a mineralized porphyry system.

The shallow penetration depth of a nominal 140 metres (460 feet) tested by the 1994 induced polarization survey failed to show the two major mineralized structures. This first IP survey did however identify the significant iron-sulphide content in the propylitic zone.

The conductive body, **Primary Resistivity Anomaly II**, does not show up on the asymmetric pseudosection of the shallow probe IP survey therefore it does not project to surface; it is clearly a blind conductor. There is neither a fault, shear, sulphides, or alteration found at the surface which could otherwise explain this conductor; which provides additional support that this conductor is a subcropping massive sulphide body.

The dipole-dipole array was used for the deep-probe survey because of its several superior features in contrast with the shallow probe pole-dipole array, which includes:

- it gives higher resolution of subsurfaee chargeability and resistivity parameters.
- it gives the sharpest and largest magnitude anomaly over a buried spherical body and comparable structures.
- it provides a generally accurate symmetrical pseudosection picture of the subsurface parameters, and if not, the pseudosection data can be transformed by computer inversion techniques to arrive at the best pseudosection representation to fit the field data being investigated.
- EM coupling is low.

The particular IP transmitter-receiver equipment used in the deep-probe survey also included the mearurement of the self-potential voltage at each survey point. This information is most valuable to have in assisting in the interpretation because it detects oxidizing sulphides.

Notwithstanding; the dipole-dipole method does however result in low receiver voltage levels which require high amplification; the consequence of which is that natural background noise voltage levels can exceed the sought after IP effect voltage signal resulting in the inability of the instrumentation to read the IP voltage. This phenomenon is believed to be the reason why the massive sulphide body, except at one sample point, failed to produce a measureable IP effeet. Of the five resistivity measurements of 7, 7, 7, 18, and 2 ohm-metres made which define this large structure, the 18 ohm-metre measurement appears to have a measured chargeability response which suggests the polarizeable voltage was large enough to exceed the noise voltage and be measured. This fact lends support to the massive sulphide interpretation.

The width of this conductor is probably closer to 100 metres as plotted, than the 75 metres given as a conservative estimate for the tonnage potential. Generally a conductive body of this very low ohm-metre magnitude at a survey "a" spacing of 100 metres when subjected to a survey with a reduced "a" spacing the apparent resistivities decrease approaching the true resistivity. The conclusion drawn here is that this conductor width as plotted is in all probability close to its true width and true resistivity as in practical terms it should not approach that of a perfect conductor because a perfect conductor does not exist in practical terms.

The average of the five resistivity measurements which define this conductor is 8.2 ohm-metres. The inverse of this variable has the dimensions mhos/metre which is conductivity; or in this case the conductivity of this anomaly is 0.12 mhos/metre.

The pseudosection results of the dipole-dipole array of the deep-probe survey do however provide excellent visual clues as to the location and size of what are considered to be two large mineralized structures. A very large disseminated sulphide body is identified by **Primary Chargeability Anomaly I**, interpreted as a porphyry style disseminated mineral deposit. And a large conductive body is identified by **Primary Resistivity Anomaly II**, interpreted as a massive sulphide mineral deposit. Another conductive body identified as **Resistivity Anomaly III** is also interpreted as a massive sulphide deposit of the contact metasomatic type as it too is within the contact aureole of the disseminated deposit.

The 1994 percussion drilling did not test any of the anomalous geophysical features discovered by the deep-probe IP survey.

The following basic data pseudosections in the **Figures** section clearly show the main mineralized structures:

> Line 100-W, Apparent Resistivity & Chargeability Pseudosections; with Self-Potential Profile (Basic data)
>
> Line 100-S, Apparent Resistivity & Chargeability Pseudosections; with Self-Potential Profile (Basic data)

And the following figures showing resistivity and chargeabilty isopleths were prepared to show the geophysical interpretations. The re-drawn isopleths are approximate only.

> **Figure 6,** IP Anomalies Line 100W; Anomalous Chargeability & Resistivity Zones
>
> **Figure 7,** IP Anomalies Line 100W; Anomalous Chargeability & Resistivity Zones

Primary IP Anomaly I is a high chargeability anomaly and is forecast to contain a significant disseminated sulphide content. In all probability this anomaly could be an economic mineral resource of world-class size and grade. One lobe of this apparent symmetric shell-like geophysical structure appears to be within 150 feet from the surface near Line 4900, Station 50E. Near this location the extremely anomalous copper-in-soils anomaly and the coincident self-potential anomaly of greater than -300 milli-Volts supports this interpretation. Oxidizing sulphides produce a self-potential (SP) voltage range of up to -350 milli-Volts between the most positive and the most negative SP readings.

This very large structure plunges to the north and is open to depth below 420 metres (1,400 feet). It is also open to the west towards the Mount Lytton Batholith Complex and to the southeast where the copper geoehemical anomaly is strongest.

The target zones represented by the integral high-chargeability (sulphides) and high-resistivity (silicification) anomalous effects appear to approach the surface at those undrilled locations within the area of the surface projection of the intrusive complex where the highest magnitude copper values were found in the 1993 and 1994 geochemical surveys.

Confirmation that the intrusive complex contains significant copper-snlphides and therefore in all probability hosts a large porphyry style copper deposit is provided by:

a) a large very anomalous copper-in-soils anomaly, greater than 400 ppm, that overlies the intrusive complex and the pervasive low-grade copper found in all five percussion drill holes that tested; unfortunately; only the lowest copper-in-soils zones of the coincident chargeability-resistivity anomaly of the 1999 IP survey had been drilled.

b) the pervasive very-low-grade copper mineralization found throughout all five reconnaissance drill holes in the propylitic zone of the intrusive complex geochemically assayed an average of about 700 ppm copper; whereas upon chemical assay these assays were shown to be low and can be upgraded about 15% to a nominal 0.08% Cu.

c) a minus 336 millivolt self-potential (SP) anomaly that occurs within the central part of the mineralization of the east-west pseudosection and a minus 266 millivolt SP anomaly near the intersection of the E-W and S-N crossover points of the two surveys; and a minus 188 millivolt self potential anomaly that occurs near the upper projection of the main axis of the mineralization located beneath the south-north pseudosection. Such high-magnitude negative self-potential responses occur only as a result of chemical oxidation processes from buried sulphides of significant quantities. The actual cross-over points represent the actual locations whre the oxidising sulphides come closest to the surface.

The second primary target is a large conductor identified as **Primary Resistivity Anomaly II** represents an IP sample thickness of close to 100 metres (330 feet) with an "a" spacing of 100 metres; and has such an extremely-low apparent resistivity, as low as 2 ohm-metres, but averages 8.2 ohm-metres and corresponds to a conductivity of 0.12 mhos/metre. Its conductivity thickness over 100 metres is the product of the two numbers and results in a conductivity thickness of 12.0 mhos which is indicative of massive sulphides, semi-massive sulphides or sulphides in which the sulphide grains are all connected. See **Table 4.1** "Typical Physical Properties of Geological Materials in the Canadian Shield (After Paterson, 1971) inserted on the page following. The table provides a guide as to the range of conductivity-thicknesses found in economically significant sulphide deposits as described above.

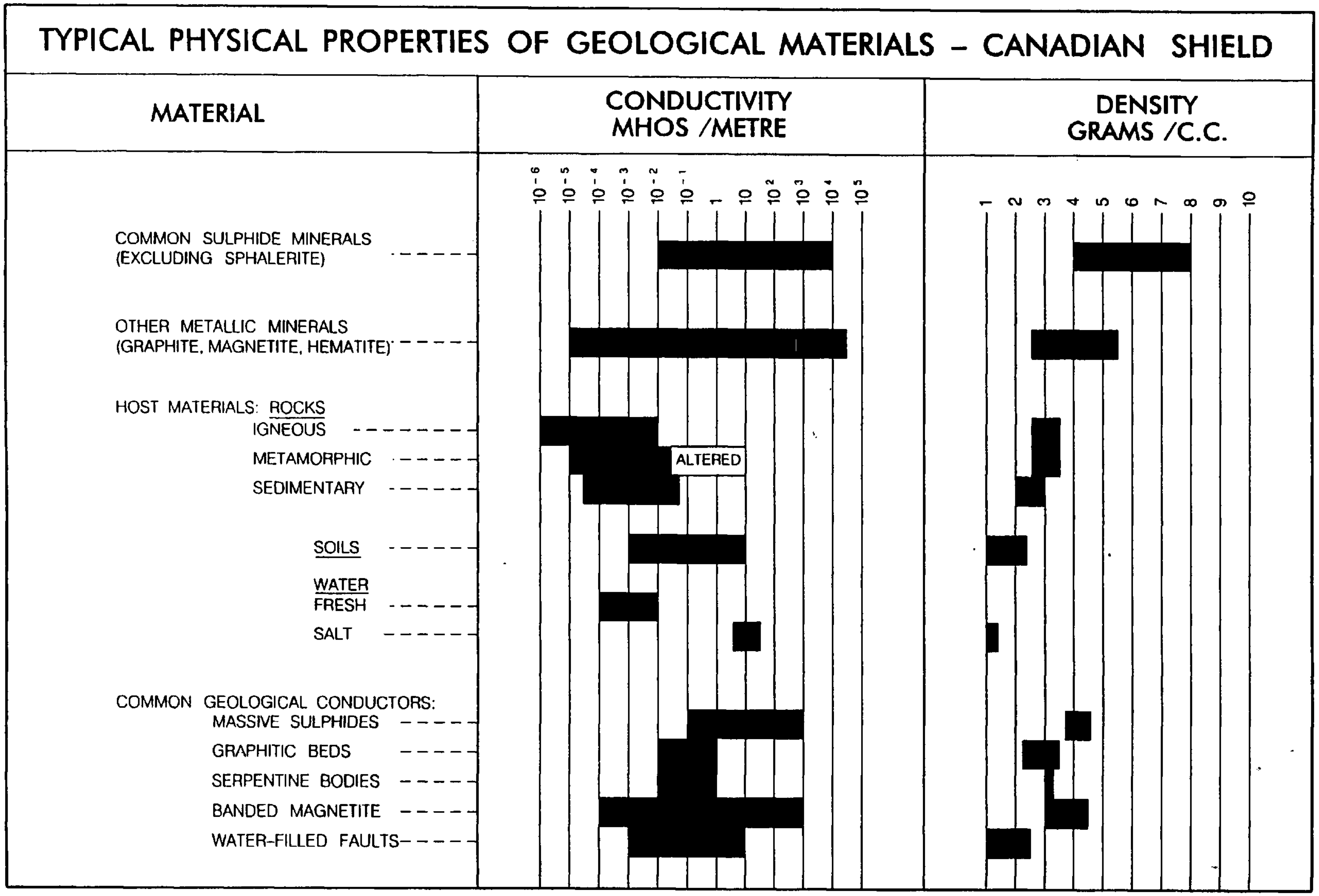

TABLE 4.1 TYPICAL PHYSICAL PROPERTIES OF GEOLOGICAL MATERIALS IN THE CANADIAN SHIELD (AFTER PATERSON, 1971).

This strong **conductor** was discovered along the east contact zone of the intrusive complex. Its top is located an estimated 120 metres (400 feet) below Station 1400 West on IP Line 100 South. This conductor's most likely approximate location (if it did exist) was predicted in 1988 because of the favourable lithology, skarn alteration and mineralization, and anomalous copper geochemistry found on surface.

The calculated conductivity-thickness places the conductor into the same category as many productive world-class massive sulphide deposits. Strangway (1966) classified some economically significant massive sulphide conductors as having conductivity-thickness values between 1 and 300 mhos (Siemens). Although good conductors can have a conductivity-thickness range of 0.1 mhos to perhaps as high as 1,000 mhos, Strangway's classification provides a higher degree of certainty for a mineral deposit of economic significance.

Primary Resistivity Anomaly II has strong geological support for its unique location. It is conformable with the interpreted northerly strike and 40 degree easterly dip of the meta-sedimentary/meta-volcanic pile. It would appear to have formed, in the classic sense, within a favourable limy host horizon. This host horizon may be Permian age having formed subsea. It is also possible that there has been some geological convergence here with a volcanic associated massive sulphide deposit having formed subsea in the Permian followed by a mineralizing overprint from mineral fluids from this later intrusive complex. The age of the intrusive complex responsible for the large body of disseminated sulphides is not yet known but it could range from Upper Triassic to Tertiary.

This conductivity-thickness anomaly is also centrally located an estimated 120 metres (400 feet) below the mineralized skarn zone found on surface and nearby drill holes, therefore it meets one of the key criteria of Meinert's thesis which emphasizes that "**Skarn mineralogy is mappable in the field and serves as the broader alteration envelope around potential orebodies**".

A Very Low Frequency-Electromagnetic (VLF-EM) survey completed over the north half of the property in 1990 with its southernmost extension located on Line 5000 North had the highest EM response of the survey. The axis of the EM anomaly is located near Station 400 East, which is only 200 metres north and on strike with the large conductive body found subcropping the skarn zone. See **Figure 8**, "Anomalies Compilation Map".

The section between the two conductors is bridged by one of the strongest copper-in-soils geochemical response on the property and forms a very strong south-north copper anomaly which is at least 1,100 metres (3,600 feet) long, with an average width of 170 metres (560 feet).

In Hallof (1980) he states "The IP method can be used to locate metallic mineralization in areas of high conductivity. However planning is necesary and special care must be taken. The low apparent resistivities will result in very-low voltage at the potential electrodes. These low voltages must be detected in the presence of what is often considerable electrical noise. High powered current sources and very stable, sensitive receiver voltmeters must be used." The dipole-dipole array configuration is particularly susceptible to this effect as the receiver voltages are low in the first instance and may not be able to read the IP effect because the IP signal is within the noise bandwidth and is unreadable.

The pseudosections show the resistivity of the host rock or country rock (p_1), and the resistivity of the polarizable body (p_2). The magnitude of the IP chargeability response is related to the resistivity ratio of the polarizable body/host rock, or: p_2/p_1 in accordance with the following imaginary term of the IP equation:

$$i \times 9 \times \phi_2 \times \frac{p_2/p_1}{(1+2\text{x } p_2/p_1)^2}$$

With a $p_2/p_1 = 25$, which is high, chargeability will be relatively small, i.e., 2-3 milliseepnds. Or if $p_2/p_1 = 1$, which is low, chargeability will be relatively large, i.e., 20-25 milliseconds.

Generally the p_2/p_1 ratio at Ashton Cu-Au is approximately in the range of 10 to 25 units thereabouts, which results in **relatively low measurements**.

The large polarizable body contains significant disseminated sulphides yet as shown in each pseudosection has **negative** IP responses on each flank. According to Hohman (1975) in his studies of IP responses he found proof that negative IP responses arise when both the 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.

Total Field Magnetometer Survey

A total field magnetometer survey was conducted over the propylitic zone in 2001. It showed linear anomalous magnetic structures with amplitudes up to 3,000 gammas above background, striking north over the disseminated sulphide zone. These magnetic anomalies were interpreted as magnetite-rich diorite dykes or apophyses. There were no magnetic responses over the conductive body or VLF-EM anomaly, nor in the skarn to the east of the contact zone; except for one small anomaly.

SECTION 5.0

Skarnification, Its Possible Significance to the Large Disseminated Sulphide Deposit

L. D. Meinert in his 1993 paper, "Igneous Petrogenesis and Skarn Deposits" describes those plutons which host porphyry copper deposits which are also responsible for producing the larger and richer skarn-type copper-sulphide deposits in association.

These plutons are strongly oxidised, and magnetite-bearing, from which hydrothermal fluids can be shown to be rich in sulphur and copper; are I-type, associated with subduction-related magmatic arcs; are emplaced at shallow levels in the Earth's crust; and tend to be porphyritic which implies fluid separation before crystallization. **All of these fundamental features appear to apply to the Ashton Copper-Gold intrusive system**. Meinert provides the following salient information in his paper:

1. Skarn mineralogy is mappable in the field and serves as the broader "**alteration envelope**" around a potential orebody. (the interpreted massive sulphide body at Ashton Cu-Au appears to be enveloped by skarnification)

2. Economically important skarn deposits result from <u>large-scale metasomatic transfer of fluids</u> creating the skarn (infiltration skarn) and related ore mineralogy.

3. Skarns related to plutons have a relationship between the corresponding metasomatism and:
   - the sequence of placement
   - crystallization
   - alteration
   - cooling

   Skarns can form adjacent to plutons, along faults and in major shear zones; within favourable carbonate host lithology, where there is interconnecting fluid contact between the magma and the host rock.

4. <u>Metamorphism</u> will likely be more extensive and higher grade around a skarn formed at relatively great crustal depths, whereas:

5. <u>Metamorphism</u> will be less extensive and lower grade around a skarn formed at shallow depths (<u>which appears to be the case at Ashton Cu-Au</u>).

6. The amount of water present in the Magma Source is an important control element affecting temperature, composition, and degree of partial melting.

   Elements contained in minor minerals that melt early; such as copper in biotite from mafic amphibolites; will exhibit maximum enrichment from a small degree of partial melting caused by low water contents.

   This suggests that tectonic settings that may cause the first melting of mantle or crustal material such as newly formed subduction zones might be associated with copper-bearing volcanic arcs. (i.e., the Nicola Volcanics, as is the case at Ashton Cu-Au)

   The plutonic rocks at Ashton Cu-Au were formed as a result of subduction activity along the continental margin and their fine-grained nature indicates that they crystallized in a shallow crustal environment.

7. Aqueous Phase

   Of particular importance to skarn formation is the segregation and release of an aqueous phase from the crystallizing melt which permits the concentration and precipitation of metals. The volatile solubility of a silicate melt is strongly pressure dependent (and only weakly temperature and composition dependent).

   Note that due to the small molecular weight of water even a moderate amount of water expressed as weight-percent is large when considered on a molar volume basis, and could possibly exceed 50% of the magma.

   The water content of most shallow granitic magmas is between 2 and 4 weight-percent with lesser but important amounts of other **volatiles** such as CO_2, F, and B.

   Most magmas will be undersaturated until they ascend to 10 km from the Earth's surface and will eventually reach saturation as they approach the Earth's surface.

   It is essential that the magma crystallizes after water saturation and exsolution of the aqueous phase so that there is an abundance of minerals still within the hydrothermal fluid phase. Crystallization consumes water.

The crystallization of biotite and horneblende is particularly important in determining the composition and abundance of magmatic hydrothermal fluids. **Horneblende is the dominant hydrous mineral in most I-type plutons** (which appears to be the case at Ashton Cu-Au). Horneblende typically contains 1-2 weight-percent H_2O and $Na_2O > K_2O$. The crystallization of these phases will consume water (and other volatiles such as fluorine, chlorine and boron) and could delay water saturation in some magmas.

However even for magmas with a relatively low initial water contents (e.g. 1.0 wt-%) a simple mass balance demonstrates that crystallization of horneblende will not prevent water saturation. Even crystallization of horneblende as the sole crystallizing phase will only serve to further enrich the residual magma in water. Even though the crystallization of hydrous minerals is unlikely to prevent separation of magmatic hydrothermal fluids, it will affect the K/Na ratio of those fluids and consequent hydrothermal alteration.

Plutons that crystallize horneblende and plagioclase feldspar (most I-type granodlorites, quartz monzonites, quartz monzodiorites and tonalites (quartz diorite)), will produce a potassium-rich hydrothermal fluid as documented in the tungsten, copper, zinc and gold skarns associated with such plutons.(Tonalite may be a significant intrusive phase at Ashton Cu-Au).

Separation of the fluid phase early in the crystallization sequence of a magma will result in relatively dilute hydrothermal fluids which may cause widespread hydrothermal alteration with relatively sparse or low grade mineralization.

However, separation of the fluid phase late in the crystallization sequence of a magma will result in relatively concentrated hydrothermal fluids that may cause intense but less widespread alteration but produces relatively high-grade mineralization. Skarnification at Ashton Cu-Au is intense where found but not so widespread as other alteration products.

8. Oxidation State

The most oxidized plutons contain hematite±, magnetite, and titanite. (which is the case at Ashton Cu-Au)

The oxidation state has a bearing on the evolution of magmatic hydrothermal fluids and associated ore deposits. In oxidized magmas most sulphur exists as SO_2 which is relatively insoluble in silicate melts. In these magmas sulphur partitions into the hydrothermal fluid and is less likely to form sulphide globules that can strip the magma of metals such as copper and gold. Thus hydrothermal fluids associated with oxidized magmas should be rich in sulphur and copper.

10. Summary Correlation of Skarns with Pluton Comparison

There are strong correlations between pluton bulk composition and type of skarn formed. Plutons associated with copper skarns associated with porphyry copper deposits are strongly oxidized magnetite-bearing I-type plutons associated with subduction related magmatic arcs. Such plutons are emplaced at shallow levels in the Earth's crust and tend to be porphyritic, implying fluid separation before the magma had crystallized to a high degree.

11. Precious Metals Component in Porphyry System & Skarn Zone

Meinert's thesis has introduced the key geological features required for producing copper-rich, world-class, skarn-type massive-sulphide deposits in association with productive porphyry copper deposits of which all, or if not most, of the geological features at Ashton Cu-Au have a close fit. Meinert's thesis has also introduced many of the key features that are described by A.D. Ettlinger and G.E. Ray in their paper "Precious Metals Enriched Skarns" that describe those skarn deposits most likely to have a precious metals component.

Ettlinger's requirements are a subset of the Meinert requirements with some variations between the two; yet without going into any detail the Ashton Cu-Au skarn zone could contain a precious metals rich phase as could the porphyry system.

There is evidence of anomalous gold and silver in the skarn zone with gold assays up to 60 ppb and silver assays up to 1.5 ppm. Within the intrusive complex, gold assays from four (4) 10 foot sections of percussion drill cuttings averaged 121 ppb with a maximum of 190 ppb and generally there are significant lengths of core that are slightly anomalous in gold at 10 ppb. Considering that no special precautions were taken in handling the percussion drill cuttings, including saving the fines, from all of the intervals assayed for gold. In addition only every other 10 foot interval was assayed for gold.
The drill holes are very anomalous in arsenic and antimony which suggests that main sulphide zone, yet untested, probably contains gold with the copper.

As the source of the coarse gold in the nearby Nicoamen River, which cuts through the Ashton Cu-Au claims still remains to be found; the source of the gold could be a component part of this large porphyry-skarn mineralizing system.

Coarse gold was found in the gravels of the Nicoamen River near its confluence with Thompson's River in 1857 (R.W. Boyle, "**The Geochemistry of Gold and Its Deposits**", Geological Survey of Canada, 1979, page 6). It was this discovery that led to the great Cariboo Gold Rush of 1858. Coarse gold in smooth nugget form can still be found in the Nicoamen River from its mouth to about 2 miles upstream where it flows through the Ashton Copper mineral claims. See Appendix A which provides reasons why gold could accompany the copper mineralization in the main disseminated sulphide deposit.

Gold particles, >10 mm in size, recovered from the Nicoamen River gravels, seen by this writer, were smooth, rounded, accretionary type nuggets. According to Boyle, accretion type nuggets are derived from very fine gold disseminations in rocks or sulphide bodies and are much smoother and more gnarled than the rough hackly nuggets mechanically liberated from gold-quartz veins and lodes in which gold is usually found in the native state. Gold from a skarn or massive sulphide deposit would be expected to behave this way.

Also according to Boyle, coarse gold >1.0 mm in size, from vein and lode sources, generally remains close to its source and migration under normal conditions is about 5,000 to 20,000 feet; whereas very coarse gold of the size found in the Nicoamen River generally does not migrate more than a few thousand feet from its source.

SECTION 6.0 - Economic Potential

This regional geological environment of British Columbia is known for several world-class mineral deposits including **copper, copper-gold, and gold deposits** each of a variety of,styles. Some notable deposits include:

5.1 The Craigmont Mine

The Craigmont copper-skarn deposit (now mined out) which formed along the south margin of the Guichon Creek Batholith in the Upper Triassic Nicola Volcanics **produced more than 2 billion pounds of copper**.

Only after the discovery of the Craigmont, copper-rich, massive sulphide, orebody was a single line time-domain IP survey conducted over a wide part of the orebody from which an apophysis extended closest to the surface. Two "a" spacings were employed; 100 feet and 200 feet. A chargeability maximum of 7.0 ms with a corresponding 20-ohm metre low-resistivity minimum was recorded for the 100 foot "a" spacing and an offset 5.9 ms chargeability maximum with a 30 ohm-metre resistivity minimum was recorded for the 200 foot "a" spacing.

5.2 The Phoenix Mine

The Phoenix copper-gold skarn deposit **produced about 0.5 billion pounds of copper, and about 1 million ounces of gold** and about 6 million ounces of silver from 27 million tons of ore.

The bulk of the ore was hosted by sharpestone conglomerate, calcareous siltstone and limestone of the Brooklyn Formation. Chalcopyrite and pyrite are the most abundant sulphides and occur as disseminations in massive garnet skarn or as vein fillings with calcite and specular hematite that crosscut the skarn. The gangue mineral is calcite; and calcite veining is pervasive around the skarn deposit which evidences the large mass transfer of chemical elements into and out of the skarn orebody during the skarnification process.

5.3 The Afton Mine

The Afton Mine including recent exploration successes **contained about 3 billion pounds of copper and 2 million ounces of gold**.

The intrusive suite responsible for this mineralization included mineral bearing diorites, gabbros, and other basic intrusives intruded into volcanic rocks. The intrusive suite at Ashton Copper-Gold has many similarities to those intrusives which were the heat and solution source which formed the Afton orebody.

Carr et al (1976) stated that the orebody was found within the 2-5% sulphide zone at its boundary where the sulphide content increased to 5-10% as determined by the IP frequency-effect. A small tongue of 5-10% sulphides bisected the orebody.

5.4 Copper Mountain

The Copper Mountain mineable mineral resource **contained more than 3 billion pounds of copper and 2 million ounces of gold**.

5.5 Lornex & Valley Copper

The giant, very large tonnage, world-class Valley Copper Mine (a combined Lornex and Valley Copper operation with some ore obtained from nearby Bethlehem Copper) which is Canada's largest copper deposit 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. The mine produces an estimated 1.4 million pounds of copper, in concentrate, daily, when operating.

Total combined production and ore reserves of this integrated operation is estimated at more than 14 billion pounds of copper.

These deposits are located in the Guichon Batholith which is genetically related to the Mount Lytton Complex in which the Ashton Copper-Gold prospect is derived from.

Van Blaricom, pages 81 & 90, shows how the economic-grade copper zone at Lornex was discovered by a deeper-probe IP survey using single level "a" spacings of 400 feet and 800 feet, respectively. The deeper penetrating IP survey, plotted in non-pseudosection form, had a higher chargeability response which indicated that the probable ore zone was west of, and deeper than, the drilled off lower chargeability anomaly discovered with an "a" spacing of 200 feet. The first target contained only pyrite with very-low grade copper. The apparent chargeability contrast between "economic" grade copper sulphides which measured an average of 11.3 ms compared with the contiguous non-ore grade sulphides which measured an average chargeability response of 7.8 ms was found to be only 3.5 ms.

Apparent resistivities within the ore zone averaged in the neighborhood of 300 ohm-metres and increased to an average of about 400 ohm metres within the surrounding very low grade copper-pyrite zone.

Of significant interest is the paper by Osatenko (1976), page 136, who shows the relationship between quartz veinlet stockworks and silicic alteration (high resistivity zone) within the main orebody of Valley Copper. The 10-percent secondary quartz isogon outlines the bornite/chalcopyrite orebody; and in areas greater than 0.50% copper, secondary quartz ranges up to about 20 percent.

Bornite is the most abundant copper mineral in the deposit with the bornite/chalcopyrite ratio being the highest in the central silicified (high resistivity zone) section of the deposit.

5.6 Gibralter Mines

A large tonnage porphyry deposit which **contained approximately 4.3 billion pounds of copper.**

5.7 Hedley Mascot Mine

The Hedley gold-skarn deposit is a small tonnage yet rich gold deposit which, including the last discovery, **contained more than 2.5 million ounces of gold.**

The large sulphide system at Ashton Cu-Au could contain a mineral resource of commensurate value as any of the above examples found within the same geological environment.

Apex Mine, Southwestern Utah

The Apex Mine is cited here because of the possible presence of gallium at the Ashton Copper-Gold deposit and its known association with copper. The Apex Mine became the world's first primary producer of gallium and germanium. **Copper, gallium**, and **germanium** mineralization occurs within a thick section of Paleozoic limestones and dolomites. The orebodies occur over significant vertical dimensions. Zones of hematite staining and calcite veining can be used as guides to ore.

Prepared by: J.M. Ashton, P.Eng.
July, 2003

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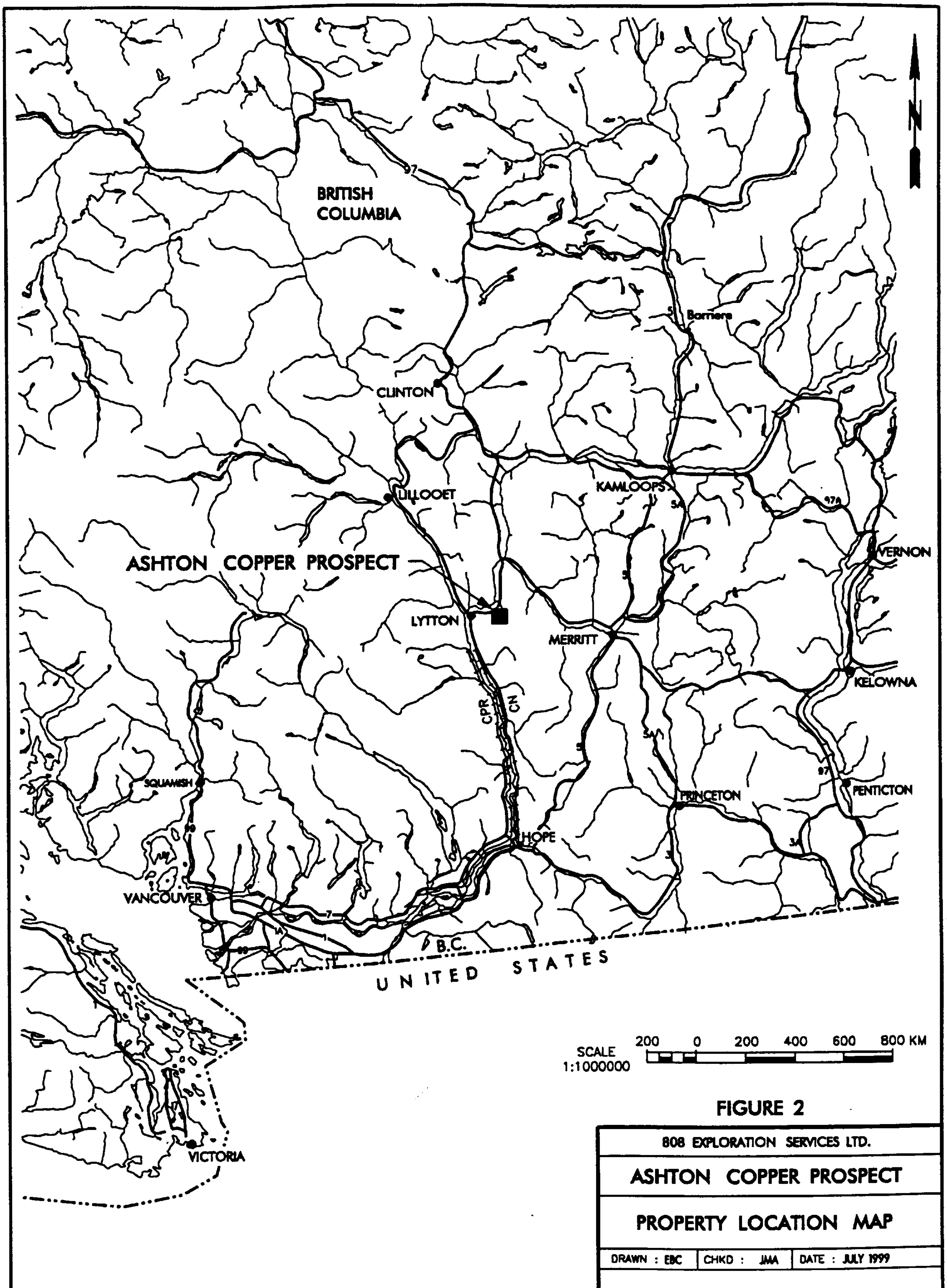


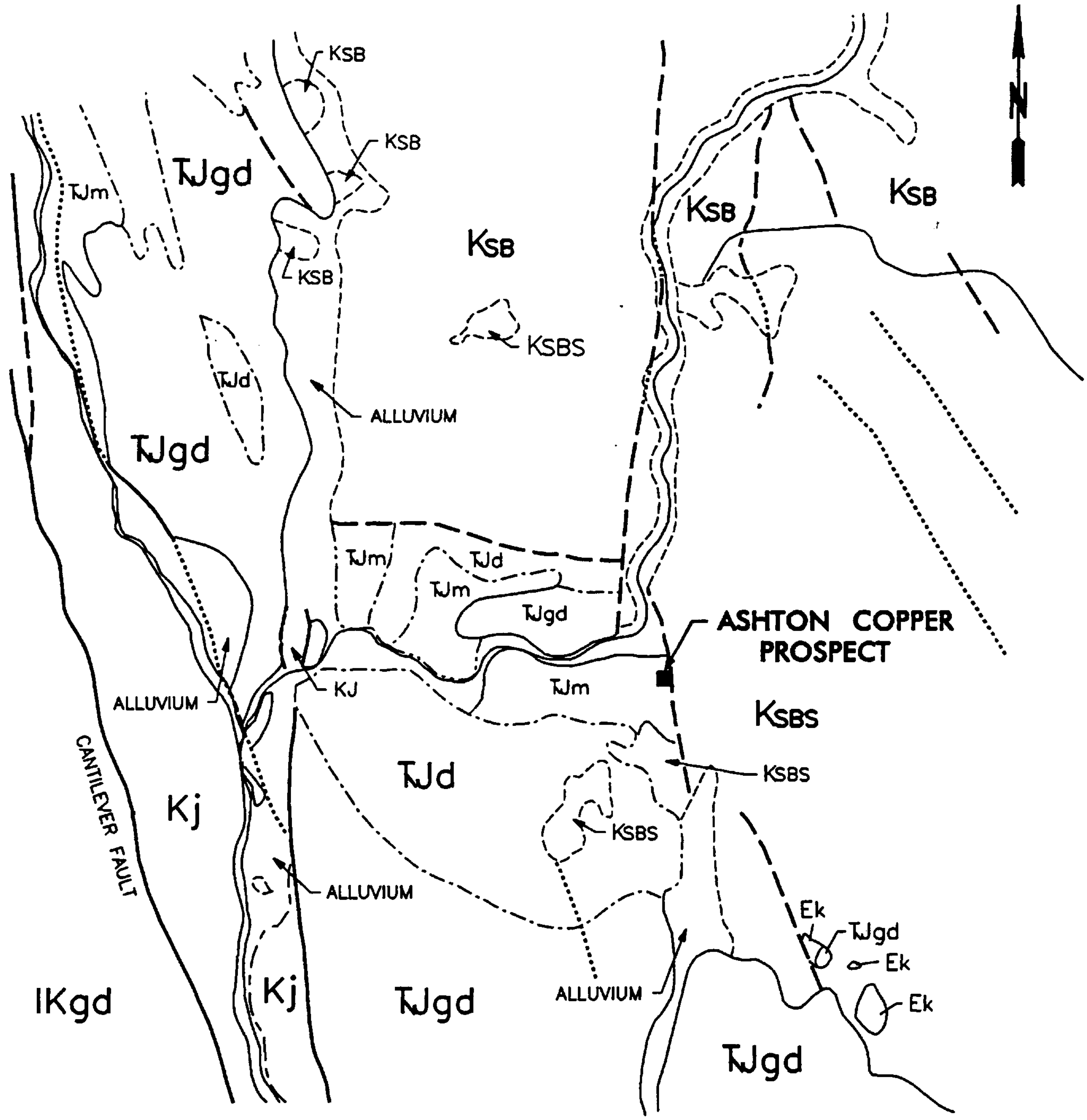
FIGURE 2

808 EXPLORATION SERVICES LTD.

ASHTON COPPER PROSPECT

PROPERTY LOCATION MAP

DRAWN : EBC | CHKD : JMA | DATE : JULY 1999



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 QF ROCK, AMPHIBOLITE, MYLONITE MT. LYTTON BATHOLITH

SCALE 1:200000

4 0 4 8 km

FIGURE 3

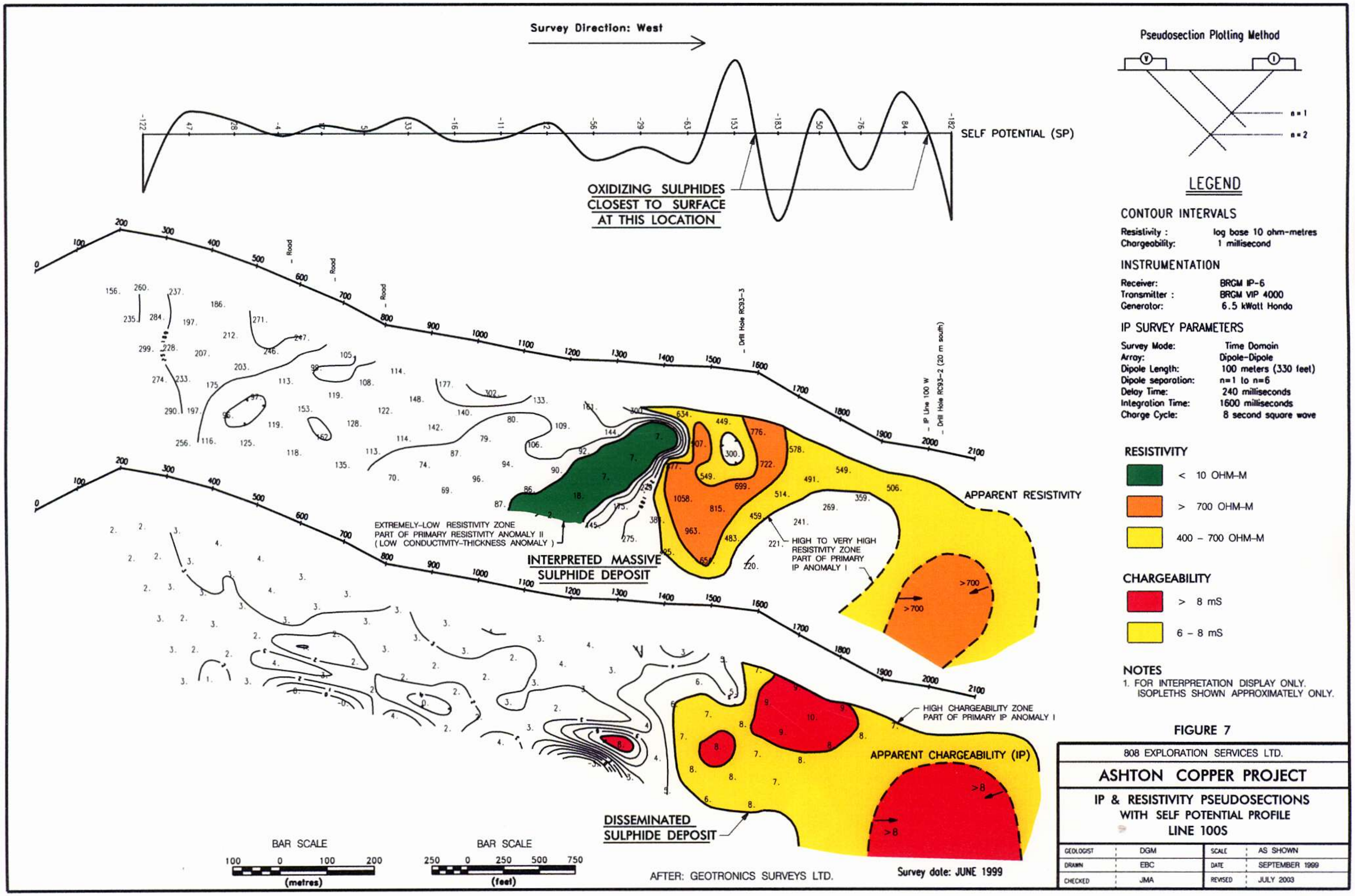
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS – VANCOUVER, B.C.

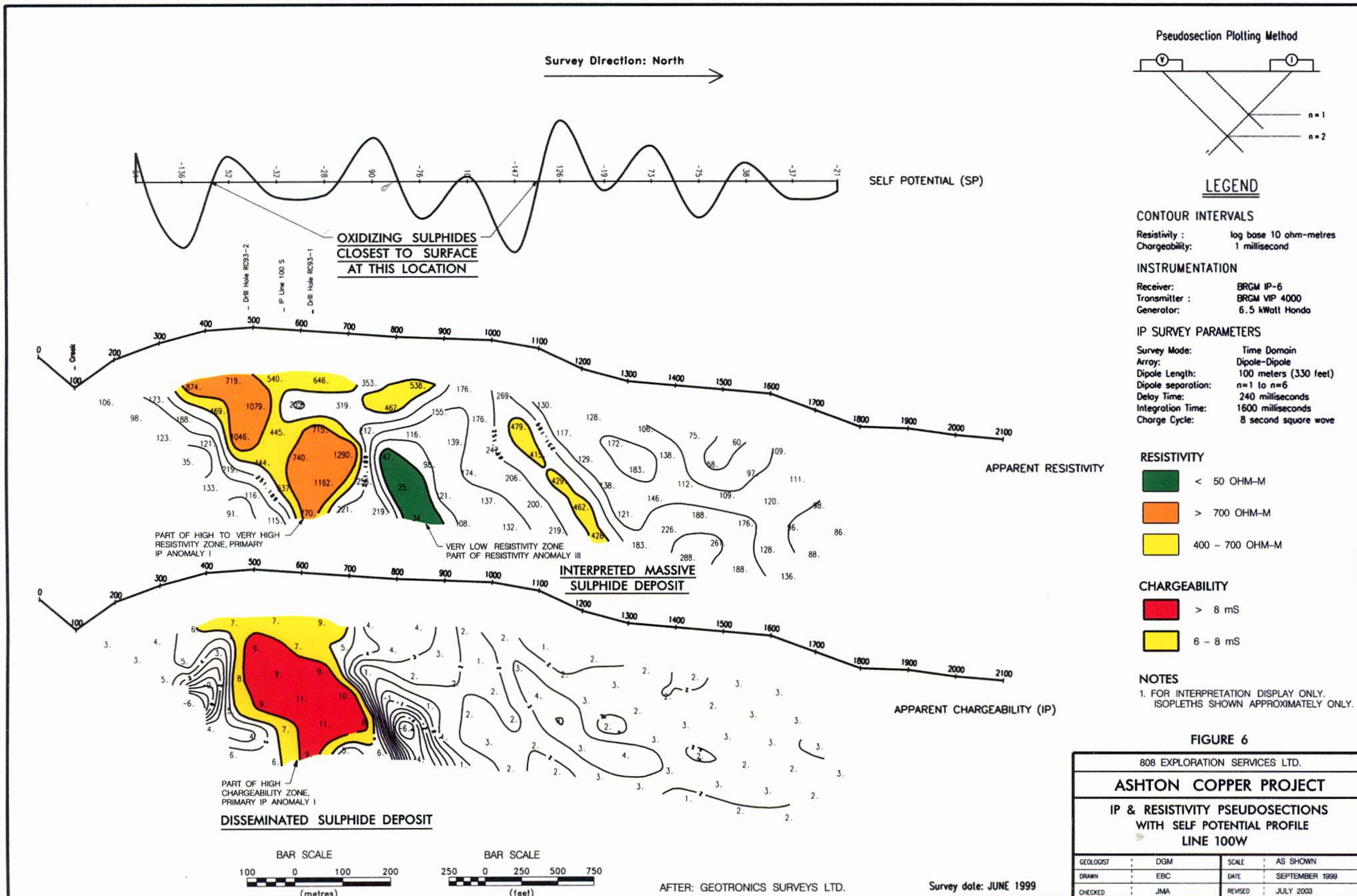
ASHTON COPPER PROSPECT

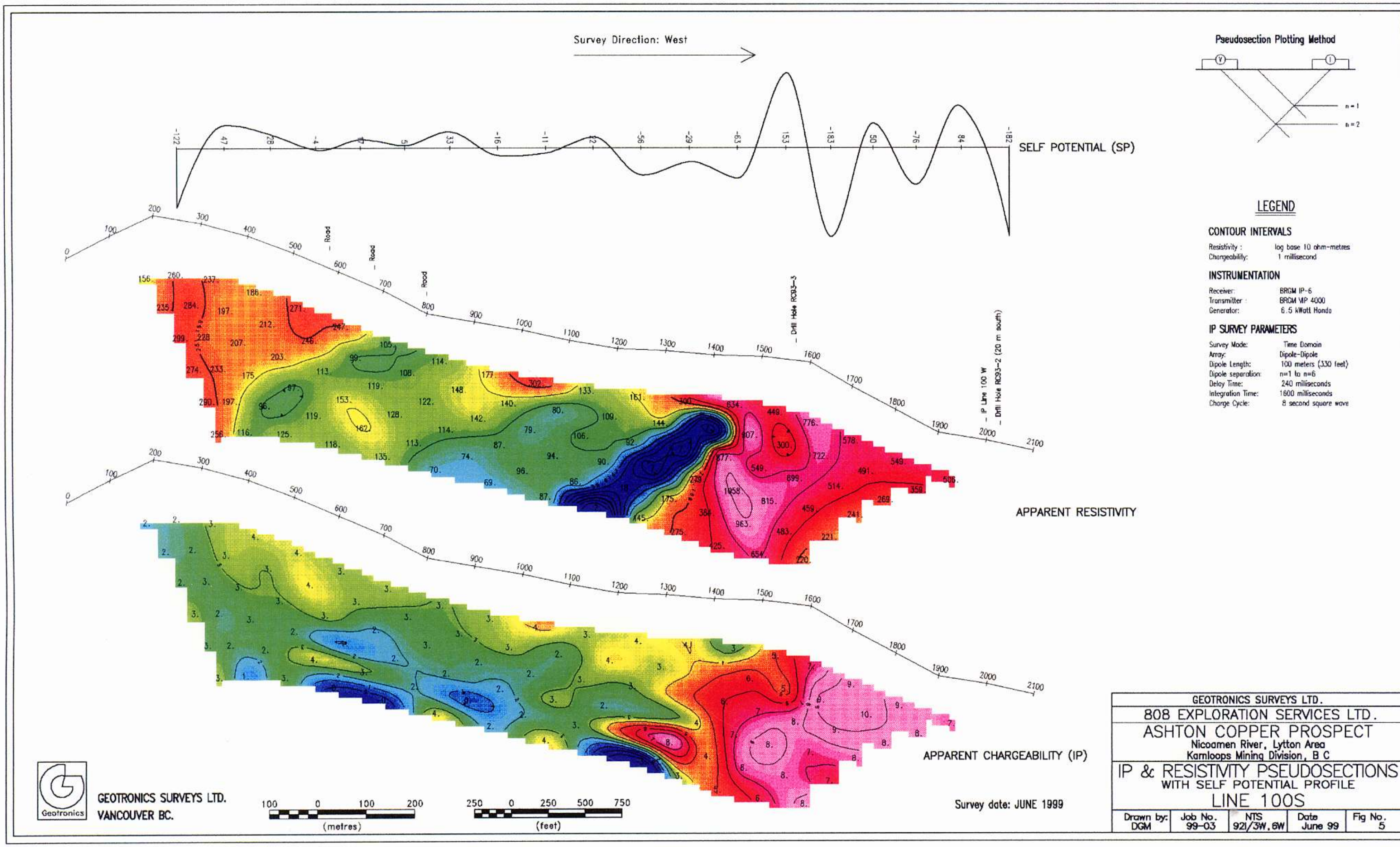
REGIONAL GEOLOGY

DRAWN : EBC	CHKD : JMA	DATE : JULY 2001

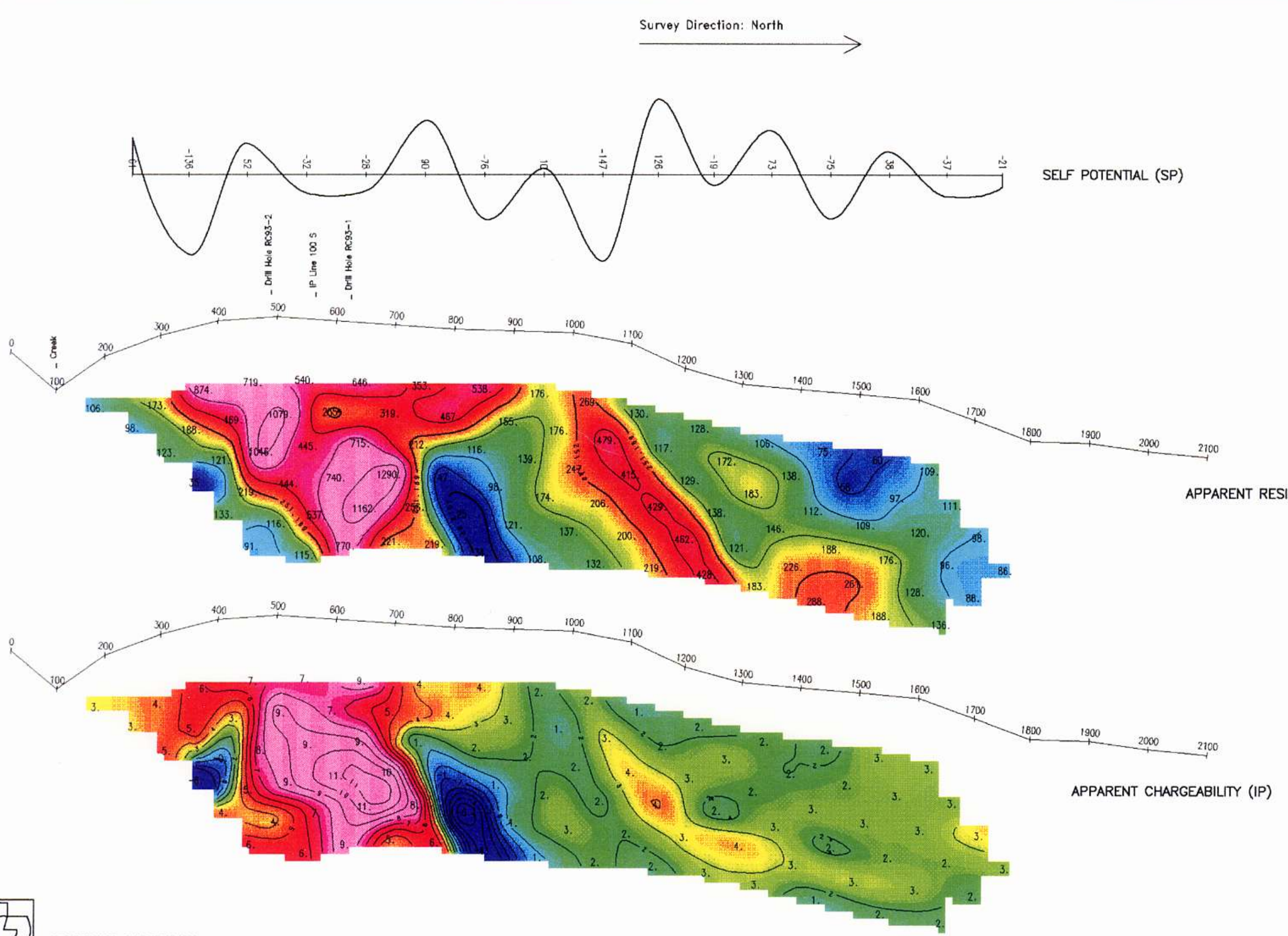
MODIFIED AFTER J.W.H.MONGER GSC MAP 42-1989


Survey Direction: West
SELF POTENTIAL (SP)
OXIDIZING SULPHIDES CLOSEST TO SURFACE AT THIS LOCATION
Road
Drill Hole RC93-3
IP Line 100 W
Drill Hole RC93-2 (20 m south)
APPARENT RESISTIVITY
EXTREMELY-LOW RESISTIVITY ZONE PART OF PRIMARY RESISTIVITY ANOMALY II (LOW CONDUCTIVITY-THICKNESS ANOMALY)
INTERPRETED MASSIVE SULPHIDE DEPOSIT
HIGH TO VERY HIGH RESISTIVITY ZONE PART OF PRIMARY IP ANOMALY I
HIGH CHARGEABILITY ZONE PART OF PRIMARY IP ANOMALY I
APPARENT CHARGEABILITY (IP)
DISSEMINATED SULPHIDE DEPOSIT
BAR SCALE
(metres)
BAR SCALE
(feet)
AFTER: GEOTRONICS SURVEYS LTD.
Survey date: JUNE 1999
Pseudosection Plotting Method
n = 1
n = 2
LEGEND
CONTOUR INTERVALS
Resistivity : log base 10 ohm-metres
Chargeability: 1 millisecond
INSTRUMENTATION
Receiver: BRGM IP-6
Transmitter : BRGM VIP 4000
Generator: 6.5 kWatt Hondo
IP SURVEY PARAMETERS
Survey Mode: Time Domain
Array: Dipole-Dipole
Dipole Length: 100 meters (330 feet)
Dipole separation: n=1 to n=6
Delay Time: 240 milliseconds
Integration Time: 1600 milliseconds
Charge Cycle: 8 second square wave
RESISTIVITY
< 10 OHM-M
> 700 OHM-M
400 - 700 OHM-M
CHARGEABILITY
> 8 mS
6 - 8 mS
NOTES
1. FOR INTERPRETATION DISPLAY ONLY. ISOPLETHS SHOWN APPROXIMATELY ONLY.
FIGURE 7
808 EXPLORATION SERVICES LTD.
ASHTON COPPER PROJECT
IP & RESISTIVITY PSEUDOSECTIONS WITH SELF POTENTIAL PROFILE LINE 100S
GEOLOGIST DGM
DRAWN EBC
CHECKED JMA
SCALE AS SHOWN
DATE SEPTEMBER 1999
REVISED JULY 2003


Survey Direction: North
SELF POTENTIAL (SP)
OXIDIZING SULPHIDES CLOSEST TO SURFACE AT THIS LOCATION
Drill Hole RC93-2
IP Line 100 S
Drill Hole RC93-1
Creek
APPARENT RESISTIVITY
PART OF HIGH TO VERY HIGH RESISTIVITY ZONE, PRIMARY IP ANOMALY I
VERY LOW RESISTIVITY ZONE PART OF RESISTIVITY ANOMALY III
INTERPRETED MASSIVE SULPHIDE DEPOSIT
APPARENT CHARGEABILITY (IP)
PART OF HIGH CHARGEABILITY ZONE, PRIMARY IP ANOMALY I
DISSEMINATED SULPHIDE DEPOSIT
BAR SCALE
100 0 100 200
(metres)
BAR SCALE
250 0 250 500 750
(feet)
AFTER: GEOTRONICS SURVEYS LTD.
Survey date: JUNE 1999
Pseudosection Plotting Method
n=1
n=2
LEGEND
CONTOUR INTERVALS
Resistivity : log base 10 ohm-metres
Chargeability: 1 millisecond
INSTRUMENTATION
Receiver: BRGM IP-6
Transmitter : BRGM VIP 4000
Generator: 6.5 kWatt Honda
IP SURVEY PARAMETERS
Survey Mode: Time Domain
Array: Dipole-Dipole
Dipole Length: 100 meters (330 feet)
Dipole separation: n=1 to n=6
Delay Time: 240 milliseconds
Integration Time: 1600 milliseconds
Charge Cycle: 8 second square wave
RESISTIVITY
< 50 OHM-M
> 700 OHM-M
400 - 700 OHM-M
CHARGEABILITY
> 8 mS
6 - 8 mS
NOTES
1. FOR INTERPRETATION DISPLAY ONLY. ISOPLETHS SHOWN APPROXIMATELY ONLY.
FIGURE 6
808 EXPLORATION SERVICES LTD.
ASHTON COPPER PROJECT
IP & RESISTIVITY PSEUDOSECTIONS WITH SELF POTENTIAL PROFILE LINE 100W
GEOLOGIST DGM
DRAWN EBC
CHECKED JMA
SCALE AS SHOWN
DATE SEPTEMBER 1999
REVISED JULY 2003



Survey Direction: West
SELF POTENTIAL (SP)
APPARENT RESISTIVITY
APPARENT CHARGEABILITY (IP)
Road
Drill Hole RC93-3
IP Line 100 W
Drill Hole RC93-2 (20 m south)
Pseudosection Plotting Method
n = 1
n = 2
LEGEND
CONTOUR INTERVALS
Resistivity : log base 10 ohm-metres
Chargeability: 1 millisecond
INSTRUMENTATION
Receiver: BRGM IP-6
Transmitter : BRGM VIP 4000
Generator: 6.5 kWatt Honda
IP SURVEY PARAMETERS
Survey Mode: Time Domain
Array: Dipole-Dipole
Dipole Length: 100 meters (330 feet)
Dipole separation: n=1 to n=6
Delay Time: 240 milliseconds
Integration Time: 1600 milliseconds
Charge Cycle: 8 second square wave
GEOTRONICS SURVEYS LTD.
VANCOUVER BC.
(metres)
(feet)
Survey date: JUNE 1999
GEOTRONICS SURVEYS LTD.
808 EXPLORATION SERVICES LTD.
ASHTON COPPER PROSPECT
Nicoamen River, Lytton Area
Kamloops Mining Division, B C
IP & RESISTIVITY PSEUDOSECTIONS
WITH SELF POTENTIAL PROFILE
LINE 100S
Drawn by: DGM
Job No. 99-03
NTS 92I/3W,6W
Date June 99
Fig No. 5



LEGEND

CONTOUR INTERVALS

Resistivity : log base 10 ohm-metres
Chargeability: 1 millisecond

INSTRUMENTATION

Receiver: BRGM IP-6
Transmitter : BRGM VIP 4000
Generator: 6.5 kWatt Honda

IP SURVEY PARAMETERS

Survey Mode: Time Domain
Array: Dipole-Dipole
Dipole Length: 100 meters (330 feet)
Dipole separation: n=1 to n=6
Delay Time: 240 milliseconds
Integration Time: 1600 milliseconds
Charge Cycle: 8 second square wave

GEOTRONICS SURVEYS LTD.
VANCOUVER BC.

100 0 100 200 (metres)

250 0 250 500 750 (feet)

Survey date: JUNE 1999

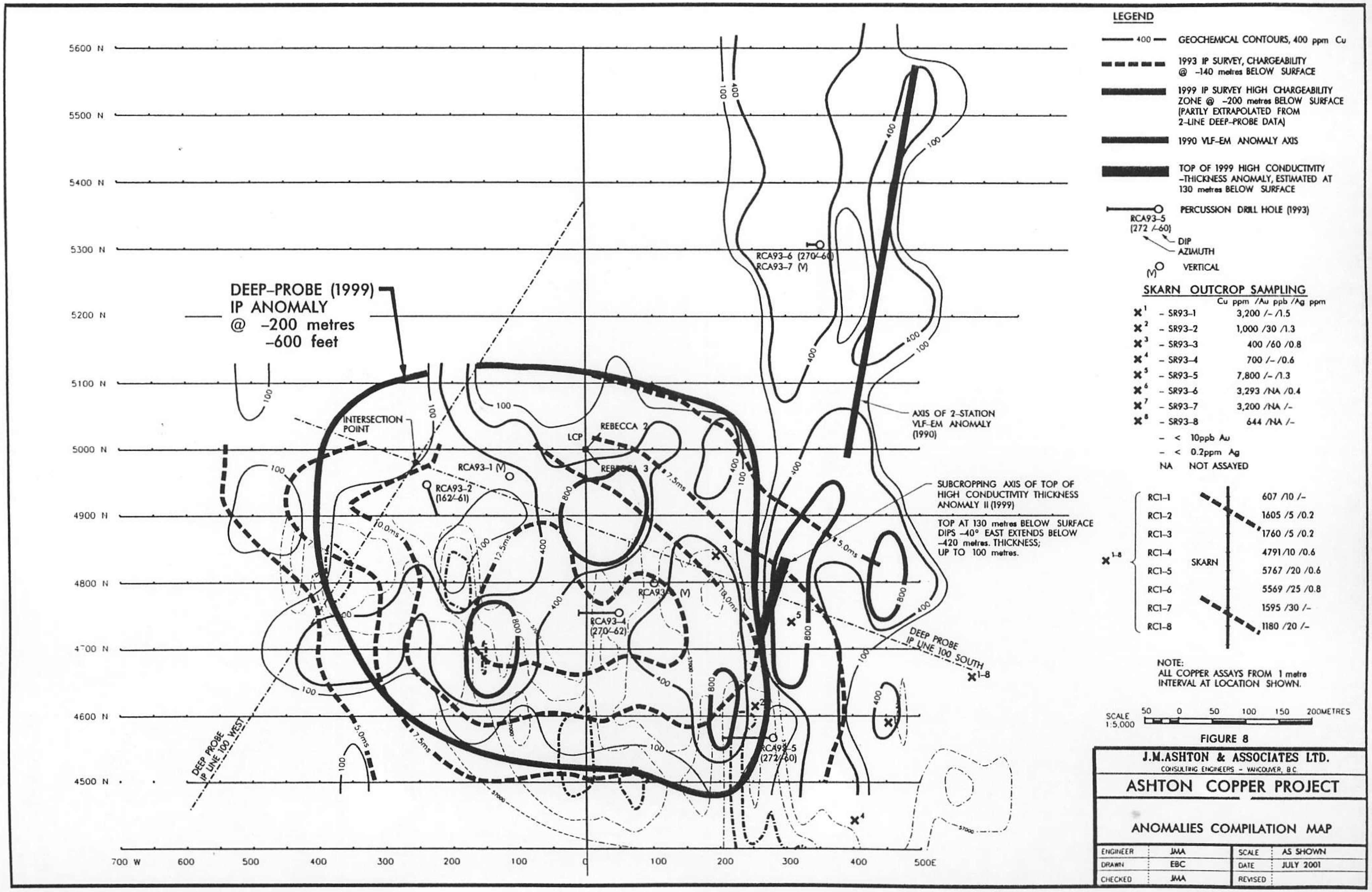
GEOTRONICS SURVEYS LTD.

808 EXPLORATION SERVICES LTD.

ASHTON COPPER PROSPECT
Nicoamen River, Lytton Area
Kamloops Mining Division, B C

IP & RESISTIVITY PSEUDOSECTIONS
WITH SELF POTENTIAL PROFILE
LINE 100W

Drawn by:	Job No.	NTS	Date	Fig No.
DGM	99-03	92I/3W,6W	June 99	4


LEGEND
400 GEOCHEMICAL CONTOURS, 400 ppm Cu
1993 IP SURVEY, CHARGEABILITY @ -140 metres BELOW SURFACE
1999 IP SURVEY HIGH CHARGEABILITY ZONE @ -200 metres BELOW SURFACE (PARTLY EXTRAPOLATED FROM 2-LINE DEEP-PROBE DATA)
1990 VLF-EM ANOMALY AXIS
TOP OF 1999 HIGH CONDUCTIVITY -THICKNESS ANOMALY, ESTIMATED AT 130 metres BELOW SURFACE
PERCUSSION DRILL HOLE (1993)
RCA93-5 (272 /-60)
DIP
AZIMUTH
(V) VERTICAL
SKARN OUTCROP SAMPLING
Cu ppm /Au ppb /Ag ppm
- SR93-1 3,200 /- /1.5
- SR93-2 1,000 /30 /1.3
- SR93-3 400 /60 /0.8
- SR93-4 700 /- /0.6
- SR93-5 7,800 /- /1.3
- SR93-6 3,293 /NA /0.4
- SR93-7 3,200 /NA /-
- SR93-8 644 /NA /-
- < 10ppb Au
- < 0.2ppm Ag
NA NOT ASSAYED
RC1-1 607 /10 /-
RC1-2 1605 /5 /0.2
RC1-3 1760 /5 /0.2
RC1-4 4791/10 /0.6
RC1-5 5767 /20 /0.6
RC1-6 5569 /25 /0.8
RC1-7 1595 /30 /-
RC1-8 1180 /20 /-
SKARN
NOTE: ALL COPPER ASSAYS FROM 1 metre INTERVAL AT LOCATION SHOWN.
SCALE 1:5,000 50 0 50 100 150 200METRES
DEEP-PROBE (1999) IP ANOMALY @ -200 metres -600 feet
INTERSECTION POINT
LCP
REBECCA 2
REBECCA 3
RCA93-1 (V)
RCA93-2 (162/-61)
RCA93-3 (V)
RCA93-4 (270/-62)
RCA93-5 (272/-60)
RCA93-6 (270/-60)
RCA93-7 (V)
AXIS OF 2-STATION VLF-EM ANOMALY (1990)
SUBCROPPING AXIS OF TOP OF HIGH CONDUCTIVITY THICKNESS ANOMALY II (1999)
TOP AT 130 metres BELOW SURFACE DIPS -40° EAST EXTENDS BELOW -420 metres. THICKNESS; UP TO 100 metres.
DEEP PROBE IP LINE 100 SOUTH
DEEP PROBE IP LINE 100 WEST
5600 N
5500 N
5400 N
5300 N
5200 N
5100 N
5000 N
4900 N
4800 N
4700 N
4600 N
4500 N
700 W 600 500 400 300 200 100 0 100 200 300 400 500E
FIGURE 8
J.M.ASHTON & ASSOCIATES LTD.
CONSULTING ENGINEERS - VANCOUVER, B.C.
ASHTON COPPER PROJECT
ANOMALIES COMPILATION MAP
ENGINEER JMA
DRAWN EBC
CHECKED JMA
SCALE AS SHOWN
DATE JULY 2001
REVISED

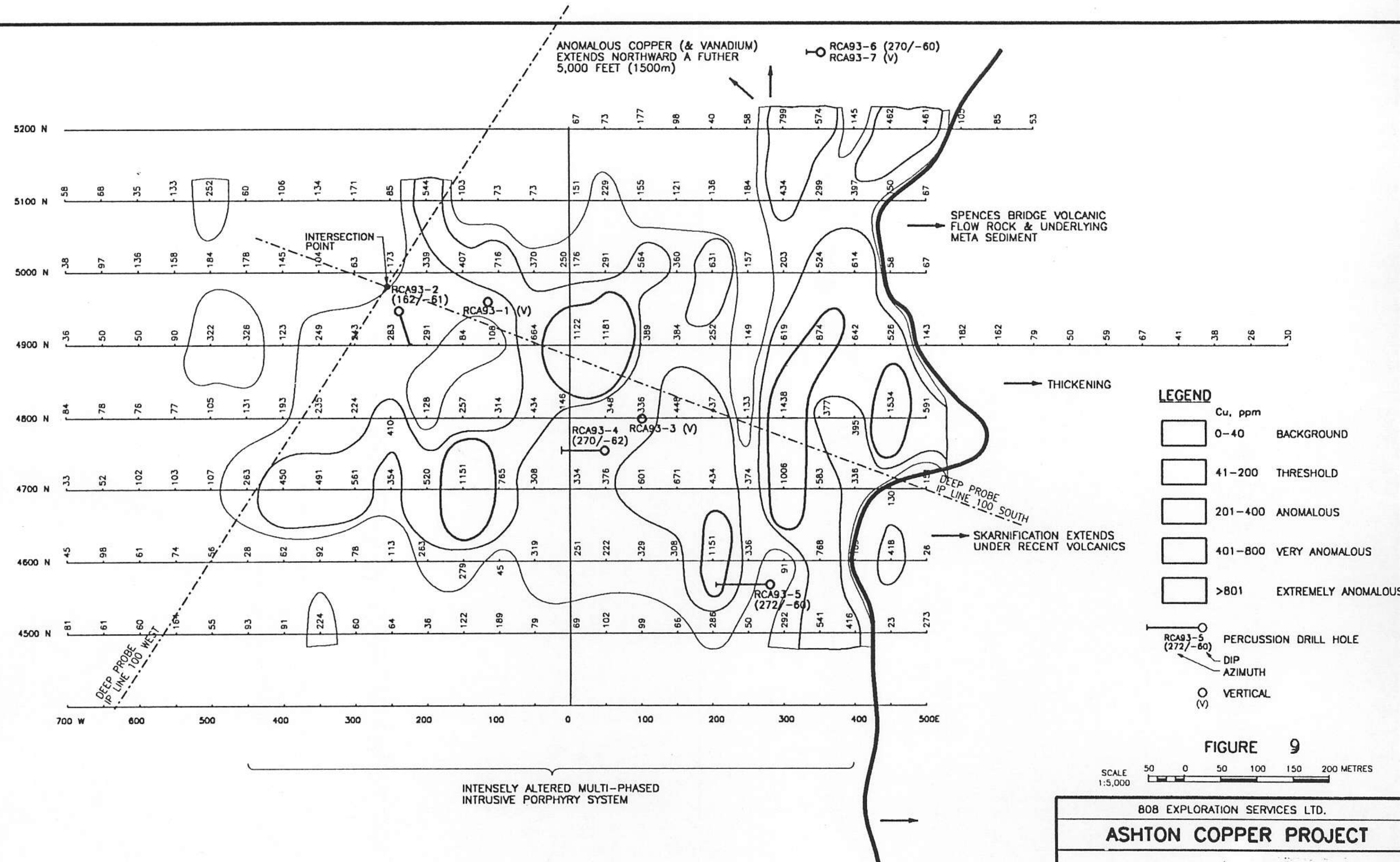


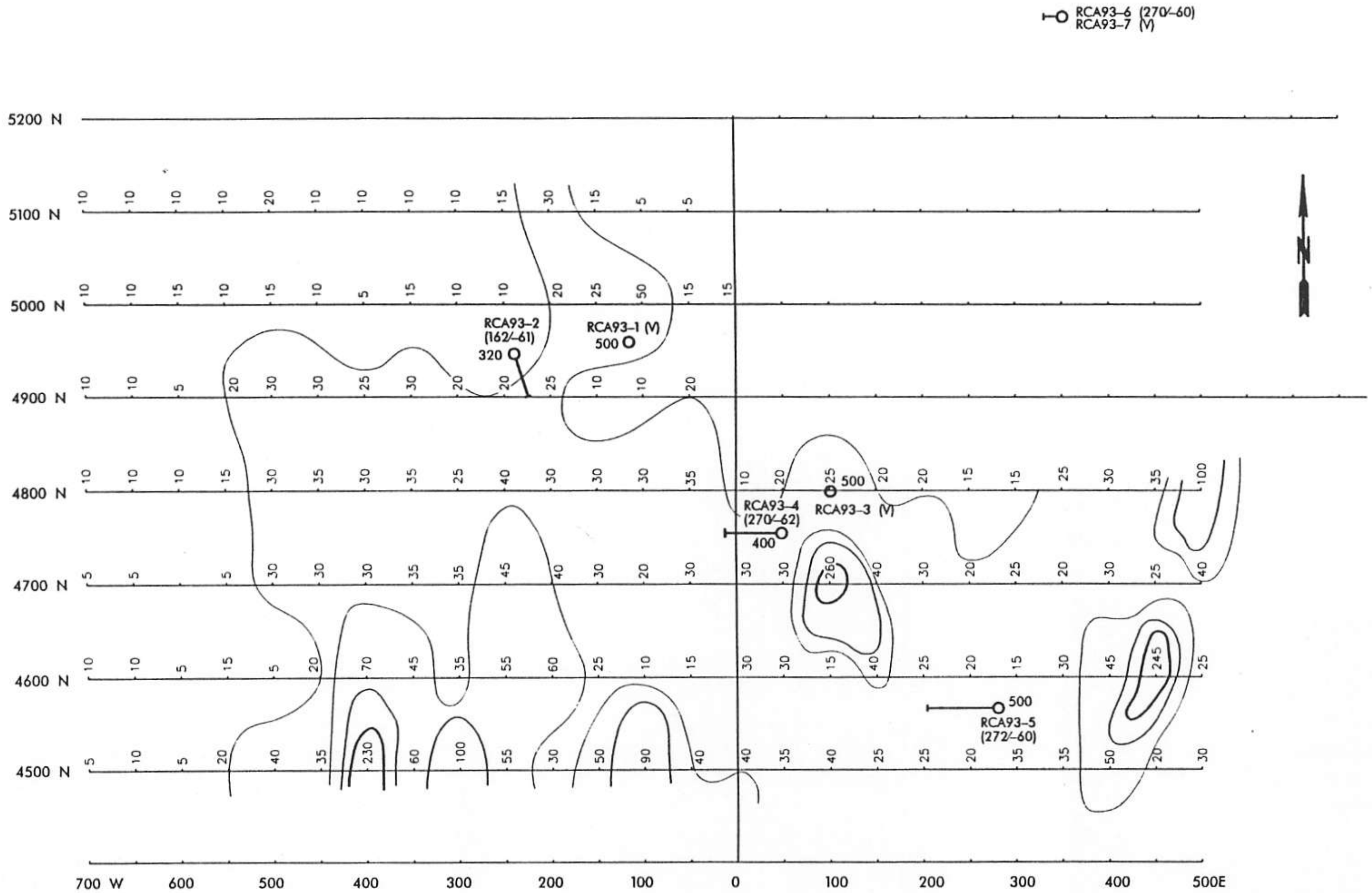
FIGURE 9

808 EXPLORATION SERVICES LTD.

ASHTON COPPER PROJECT

COPPER IN SOILS GEOCHEMISTRY

GEOLOGIST	JMA ET AL	SCALE	AS SHOWN
DRAWN	EBC	DATE	JULY 2003
CHECKED	JMA	REVISED	



ARSENIC ANOMALOUS DRILL HOLES

DRILL HOLE	INTERVAL (FEET)	AVG ARSENIC (ppm)	ANOMALOUS MAGNITUDE
RCA93-1	360-440	38	VERY
RCA93-5	390-500	46	EXTREMELY
RCA93-7	** 100-150	42	VERY

** IN OVERBURDEN

N

SOILS LEGEND

As, ppm

As, ppm	
0-20	BACKGROUND
21-40	ANOMALOUS
41-80	VERY ANOMALOUS
81-160	EXTREMELY ANOMALOUS
>161	VERY EXTREMELY ANOMALOUS

500 O RCA93-2 ← HOLE
(162/-61)
DIP
AZIMUTH
LENGTH (FEET)

NOTES

1. AVERAGE ABUNDANCE IN SOILS OF EARTH'S CRUST = 7ppm As
2. AVERAGE ABUNDANCE IN INGENOUS ROCKS = 2ppm As

SCALE 1:5,000 — 50 0 50 100 150 200 250 METRES

Figure 10

J.M.ASHTON & ASSOCIATES LTD.

CONSULTING ENGINEERS - VANCOUVER, B.C.

ASHTON COPPER-GOLD PROJECT

ARSENIC IN SOILS GEOCHEMISTRY

ENGINEER	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	JUNE 2003
CHECKED	JMA	REVISED	

ASHTON COPPER-GOLD

COPPER-GOLD PORPHYRY PROSPECT
&
CONTACT METASOMATIC MASSIVE SULPHIDE (SKARN) PROSPECT, or: VOLCANIC ASSOCIATED MASSIVE SULPHIDE PROSPECT

GOLD ZONE INDICATION, Anomalous Pathfinder Elements: Au, As, and Sb

OVERVIEW

July, 2003

1.0 Introduction

1.1 Summary & Portended Resource Magnitudes

With little or no doubt, as a result of the completion of a two-line reconnaissance, time-domain, dipole-dipole, deep-probe induced polarization survey a large sulphide system has been identified on the Ashton Copper-Gold property. These results along with other supporting geological, geochemical, and geophysical data justifies further work and drilling to define what appears to be significant economic potential. Two separate deposit types are portended but at this time their spatial and temporal relationships are unknown. One deposit is a very large disseminated sulphide body which appears to be within 200 feet from the surface at a location which shows extremely anomalous copper in the soils and a –300 milli-Volt Self Potential anomaly (which confirms oxidizing sulphides). This clearly defined structure goes to depth, beyond the limits of the survey which is 1,400 feet below surface. **There is room in this single structure to contain a geological mineral resource of 400 million tonnes, or thereabouts.**

In addition, but with less clear certainty, there appears to be another distinct deposit located on the disseminated sulphide body's eastern flank, within its contact aureole, with its top about 400 feet below the surface. This body, interpreted as a massive sulphide body, is a large geophysical conductor. It appears to be strata-bound as it is conformable to the volcanic-sedimentary lithology which strikes north and dips eastward at about minus 40 degrees. It's strike is coincidental to both a long linear very-anomalous copper anomaly on surface and to a VLF-EM anomaly which is also a strong conductor. This conductor goes to depth along its dip length to beyond 420 metres (1,400 feet) vertically from the surface. Its possible dimensions are 800 metres in strike length by 400 metres down dip, and, as a conservative estimate it could average 75 metres in thickness which **provides room enough to contain a geological resource of the order of 100 million tonnes, or thereabouts**. It is open to the south and to depth. **See Figures 1, 5 and 7.**

Given the geology, alteration, geochemistry and corresponding geophysical features, both structures are high priority exploration and drilling targets because each in its own right could represent an economic mineral resource of substantial value.

The two large geophysical structures are found within an intense hydrothermally altered area that has known surface dimensions of at least 2,000 metres north-south, by 1,500 metres east to west. A recent review of associated geochemistry, which is the subject of this overview, shows that in all probability the disseminated sulphide and massive sulphide body could also contains gold along with copper minerals.

This region of British Columbia is known for several types of economic mineral deposits including: copper, copper-gold and gold deposits each of a variety of styles. Some notable deposits include:

1. Valley Copper; a very-large-tonnage porphyry copper deposit; its mineable mineral resource contained **more than 10 billion pounds of copper**.

2. Copper Mountain; a large tonnage porphyry copper-gold deposit; its mineable mineral resource contained more than **3 billion pounds of copper and 1.2 million ounces gold**.

3. Afton Mines; a medium tonnage porphyry copper-gold deposit which including recent exploration advances, contained **3 billion pounds of copper and 2 million ounces gold**.

4. Hedley Mascot; a small tonnage rich gold-skarn deposit which including the last major discovery contained **more than 2.5 million ounces of gold**.

5. Craigmont Mines; a medium tonnage high grade copper deposit which contained approximately **2 billion pounds of copper**.

6. Gibralter Mines; a large tonnage porphyry copper deposit which contained approximately **4.3 billion pounds of copper**.

Albeit; it is yet too early to put a label on the deposit type, or types, at Ashton Copper-Gold. However the anomalous geology, geochemistry, alteration, and large disseminated sulphide body and large conductive body are classically representative of the fundamental features found associated with world-class mineral deposits.

This large disseminated sulphide system and large conductive body are virtually untested by drilling.

1.2 Accompanying Figures

See **Figures** section for:

Figure 1 - Copper-Gold Porphyry & Copper Rich Massive Sulphide Deposit, Model to Scale.
Figure 4 - IP & Resistivity Pseudosections, Line 100W
Figure 5 - IP & Resistivity Pseudosections, Line 100S

Figure 8 - Anomalies Compilation Map
Figure 9 - Copper Geochemical Survey
Figure 10 - Arsenic in Soils Geochemistry

1.3 Project Background, Alteration, & Deep-Probe IP Survey

Coarse gold was found in the gravels of Nicoamen River near its confluence with Thompson's River in 1857 (R.W. Boyle, 1979: The Geochemistry of Gold and Its Deposits, Geological Survey of Canada, (page 6).

News of this discovery, reaching California, was probably responsible for the rush of some 20,000 placer miners into the Fraser Valley the following year. Subsequently the miners reached the fabulously rich gravels of the Cariboo with the first discovery made in June 1859 which led to the great Cariboo Gold Rush.

Coarse gold of the accretionary type can still be found in the Nicoamen River from its mouth to about 2 miles upstream. The source of the gold remains to be found. The river passes through the Ashton Copper-Gold Property north and east of the large hydrothermally altered and mineralized area. And as this is a big sulphide system, it could also represent the source of the gold.

Gold particles, >10 mm in size, recovered from the Nicoamen River gravels, as observed by this writer, are smooth rounded nuggets of the accretionary type. According to Boyle these accretion type nuggets are derived from very fine gold disseminations in rocks or sulphide bodies and are much smoother and more gnarled than the rough hackly nuggets mechanically liberated from gold-quartz veins and lodes in which the gold is present in the visible native state. Disseminated gold from a massive sulphide body, a porphyry copper-gold deposit or a copper-gold skarn deposit would behave this way.

According to Boyle, course gold >1.0 mm in size, from vein and lode sources generally remains close to its source and migration under normal conditions is about 5,000 to 20,000 feet; **whereas very coarse gold of the size found in the Nicoamen River generally does not migrate more than a few thousand feet from its source.**

Boyle's observations on the behaviour of gold supports the thesis that the gold in the Nicoamen River could be derived from a disseminated gold deposit or deposits located within the claims thereby providing support that interpreted sulphide bodies on the claims in all probability include gold mineralization.

Exploratory drilling within the peripheral propylitic zone of the Ashton Copper-Gold sulphide body encountered an enormous envelope of very low grade (0.08%) copper as chalcopyrite with quartz-carbonate veins containing anomalous gold values. This zone contains a 7% soluble-iron content which includes all of those iron species other than magnetite and iron-oxides; hence the overall iron sulphide content of this zone which includes mostly FeS_2 and significantly lessor $CuFeS_2$ is believed to be somewhere in the range of 10% to 15% which represents a significant sulphide zone. The zone is also anomalous in gold, arsenic, antimony, vanadium, and boron.

Gold assays were made on only every other 10-foot drill hole sampling interval. Hence only half of each hole was sampled for gold. The anomalous threshold for gold is considered to be between 4 ppb and 10 ppb Au. Hole 93-1 contained 120 feet of anomalous gold averaging 15.4 ppb Au with a maximum of 70 ppb over 10 feet. Hole 93-2 contained 30 feet of anomalous gold averaging 71 ppb Au with a maximum of 190 ppb over 10 feet. Hole 93-3 contained 60 feet of anomalous gold averaging 45 ppb Au with a maximum of 165 ppb over 10 feet.

Unfortunately, the operator at the time failed to properly sample these intervals for gold. **The riffle splitting technique did not include recovery of the sludges or fines** from the water bearing holes. Typically percussion drilling will generate fines richer in gold grains and flakes than the average coarse bulk material consisting of the large fragments. Cuttings and fines containing gold must be given special attention because of their low concentrations of gold and high unit value. The high specific gravity gold particles will settle out into the fines. There was very little fine material collected in the sample bags.

Although the zone sampled is the propylitic zone where gold may or may not occur as a zoning feature what can be said of these results is they show that this magmatic system both produced and deposited gold which augers well for finding gold in either one or both sulphide bodies or associated as a zoning feature.

The closest drill hole to the underlying sulphide body was Hole 93-3 (drilled in 1993). The hole was geologically logged by R.E. Gale, Ph.D., P.Eng., in 1994 well after completion of the drilling and was found to contain a **quartz-carbonate, pyrite-chalcopyrite stockworks zone** in the bottom 70 feet. This zone is interpreted to be the upper part of a roof zone to a mineralized porphyry system. Consequently a deep-probe (1,400 feet of nominal depth penetration) induced polarization survey conducted in 1999 (or five years later) over this structure shows that the bottom of this hole is about 200 feet above and about 120 feet from the side of a this very large disseminated sulphide body.

According to Smith (1993) reconnaissance surface mapping of the area overlying the intrusive complex and the areas east and south of the complex found widespread hydrothermal alteration consisting of bleaching and quartz-carbonate veining with epidote being the most common alteration mineral. Locally the diorite was so strongly altered that only the epidote and magnetite remained. Secondary chlorite and calcite were ubiquitous throughout the complex. His conclusions were that 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 presence of hydrothermal gypsum/anhydrite veinlets in the volcanic-sedimentary complex that hosts the large sulphide body and the large conductor, Antal (1969) and a high iron-sulphide content in the propylitic zone indicates a sulphide system with magmatic fluids rich in SO_2. In porphyry intrusion related systems anhydrite occurs as gypsum veins near surface as a result of reaction with meteoric water to form its hydrated form, gypsum. Also gypsum is often formed as a result of the interaction of heated seawater and magmatic source hydrothermal fluids as a result of the formation of volcanogenic massive sulphide deposits. Hence the area may have been subsea during the earliest intrusive phase which could lend support to the large conductive body originating as a volcanic associated massive sulphide body.

Geological logging by Gale (1994), of the rock chips recovered from a limited percussion drilling program within the very large copper geochemical anomaly showed that there are at least 3 types of mineralized intrusive phases present in the altered and mineralized system; they include gabbro, diorite, quartz diorite (tonalite), and diorite porphyry; and their altered equivalents. Mineralization occurs both as disseminated zones and as mineralized vein systems, probably along the predominant 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 RC93-5 and **therefore is widespread throughout the latter area**.

The association of gold deposits, copper deposits and copper-gold deposits with diorite is universal.

The intense **carbonatization** in the propylitic zone is widespread and stands out; and is reminiscent of those very large magmatic-fluid mineralizing systems that produce major mineral deposits where there has been mass transfer of **enormous** tonnages of chemical substances into and out of the affected rocks. The carbonatization effect having occurred as a result of mass transfer of CaO and CO_2 out of the volume of rock that has been replaced by mineralized fluids, subsequently recrystallized. The very large propylitic zone averages 10.0% hydrothermally formed calcium carbonate indicative of 100's of millions of tonnes of chemical material transport.

Petrographical work completed by P.B. Read, Ph.D., in 1994 identified several alteration facies including but not limited to sericitization, pyritization, chloritization, albitization, saussuritzation, skarnification, and carbonatization.

Two mechanisms could account for the widespread and intense carbonatization; skarnification, and albitization/saussuritization which are pervasive. Hence the carbonatization is undoubtedly a superimposition of the two. A large zone of skarnification is found on surface and in drill holes surrounding the large sulphide body. And albite alteration is ubiquitous in all holes in which diorite, quartz diorite, diorite porphyry and gabbro, including horneblende-diorite and horneblendite are found.

For the skarn case the best example of this mass transfer effect is still provided by Lindgren in his classic example on contact metasomatic deposits. He concluded that for every cubic metre of altered and mineralized limestone the mineral fluid chemistry which caused its replacement saw 460 kg of CaO and 1,190 kg of CO_2 carried away into the alteration aureole in the form of carbonatization; and 1,330 kg of SiO_2 and 1,180 kg of Fe_2O_3 added in its place along with significant mineral content; or an astonishing 1.8 tons of material were removed and 2.8 tons added per cubic metre; excluding economic minerals.

Similar mass transfer occurs during the albitization/saussuritization process. Ross (1995) explained the mechanism which occurs in several gold-rich copper-gold porphyry deposits in British Columbia. The conversion of **plagioclase** and **horneblende**-bearing diorite to massive albite **consumes** silica, Na^+, and H^+; and **releases** calcium, iron and water which accounts for the pervasive carbonatization in the propylitic zone. The iron reacts with Cu and S, and precipitates chalcopyrite. The hydrogen iron lowers pH and drives the albitization process further releasing more iron, and further enriching the chalcopyrite. These copper bearing albitized zones are known for their rich gold content.

Accordingly because of the discovery of significant albitization/sausseritization along with observed prehnitization in association with very low grade copper in the propylitic zone it is speculated that the large areas of high chargeability (high sulphide content) in association with high resistivity (silicification after albitization) identified by the deep-probe induced polarization survey represents areas of the disseminated sulphide body which are heavily albitized and contain significant sulphides which could also include accompanying gold mineralization as occurred at Ajax and Mount Milligan, etc.

Ross clearly stipulates that with "the frequent presence of disseminated pyrite and a more intense albitization of plagioclase phenocrysts in the propylitic assemblage may be used as a guide. Intense albitization with low grade copper-gold mineralization may be spatially related to intermediate albitization with higher grade mineralization"

A petrographical examination of percussion drill chips by Reid (1995) concluded that "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 calc-silicate skarn are verified and mean that metasedimentary rocks are another element that must be included in the north end of the Mount Lytton Complex. Read also identified tonalite (quartz diorite) as one of the intrusive species within the intrusive complex. Intense albitization, saussuritization, pyritization, and sericitization amongst other characteristic alteration was noted throughout the propylitic zone.

The operator who conducted the percussion drilling beforehand completed a time-domain pole-dipole IP over the large copper in soils anomaly and identified a large somewhat circular chargeability anomaly with a nominal chargeability maximum of 12.5 milliseconds. This survey used an "a" spacing of 50 metres down to 4 levels which would allow a look to about 140 metres or about 400 feet. The only correspondence between this survey and the drilling is that the drilling confirmed pyrite with small amount of copper characteristic of the propylitic zone. The roof zone sulphides and the large conductive body were beyond the reach of this survey and could not be seen.

Consequently in 1999, J.M. Ashton, P.Eng. completed a two-line, time-domain dipole-dipole, deep-probe Induced- Polarization Survey over the area of interest because the results of the shallow probe pole-dipole IP survey did not explain several several features found in the drilling, and the skarn zone had not been adequately tested. The deep-probe survey used a dipole-dipole electrode array with an "a" spacing of 100 metres down to 6-levels which corresponds to a nominal penetration depth of about 420 metres, or about 1,400 feet, which is 3-times the depth of the original shallow penetration depth IP survey. The dipole-dipole survey with a more accurate pseudosectional view of the underlying geology and with slope correction to more accuratelt represent the surface geometry would provide much better definition of the subcrop area and reach significantly deeper into the system and hopefully into the "ore shell" of the intrusive. A contact metasomatic sulphide deposit was also forecast to underly the large skarn zone as well and a deeper look was required.

The two line deep-probe IP survey intercepted a large volume of high chargeability which represents significant sulphides subcropping the survey area. The top of this body does not outcrop but one part of it is estimated to subcrop the surface at about 150 feet below surface at about Line 4900N, Station 50W to 100E. It has a depth extent of more than 1,400 feet below surface. The body is believed to be somewhat ellipsoidal with its major axis aligned somewhat northwest to southeast and is open in both these directions. Its long axis is estimated to be about 900 metres (3,000 feet) in length and its short axis is estimated to be about 650 metres (2,000 feet

The disseminated sulphide body is chemically active and undergoing oxidation-reduction as demonstrated by a nominal minus 336 millivolt spontaneous potential anomaly which is the surface projection point of the zone of chargeability where it lies nearest to surface.

There is enough room in the high-chargeability zone to contain a geological mineral resource of the order of 400 million tonnes, or more.). However to provide better definition more deep-probe IP surveying is required over the area.

Four hundred (400) metres north of the north edge of this large sulphide body at Line 5400N, Station 2+50 West is an outcropping heavily altered fine-grained pyroxene-diorite apophysis. According to Reid (1990) the alteration is so intense that the original 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 magmatic source fluids causing the alteration.

Similarly, **very anomalous boron** is found over a 300-foot interval in Drill Hole 93-1. within which is a 50 foot interval of extremely anomalous boron.

The great abundance of carbonatization in the propylitic zone that envelopes both the sulphide body and the zone of skarnification attests to the fact that an enormous chemical replacement reaction has occurred under the target area and mobilized great quantities of $CaCO_3$.

A blind gold zone is forecast to be a zoning feature to the large disseminated sulphide body, and associated hydrothermal system. This is supported by a review of the pathfinder element data which has provided important clues as to its most likely location.

The **arsenic** geochemistry from both soils and rock-chips recovered in the peripheral percussion drill holes was reviewed and found to be anomalous.

Anomalous arsenic is a distal zoning feature to blind gold orebodies and gold zones caused by magmatic bisulphide fluid transport within the hydrothermal fluid circulatory system; the same mechanism which is responsible for transporting gold; whereas in the alternative chloride solutions similarly transport silver and base metals.

Hence an H_2S rich fluid will transport much gold and arsenic and such a system will result in vertical zonation from surface downwards with As found at shallower levels followed by Au and Ag and finally base metals. **In terms of relative mobility the element As is more mobile than gold and will travel upward and outward and have large and near surface haloes.**

2.0 Significant Gold Geochemical Pathfinder Elements

Amongst geoscientists, **arsenic** and **antimony,** and more particularly **arsenic**, are well known as a gold-indicator, or pathfinder, elements, and have led to the discovery of many economic gold deposits.

At the Ashton Copper-Gold Prospect both arsenic and antimony were found to be very anomalous and extremely anomalous in the propylitic zone.

In fact the entire suit of anomalous elements found in the propylitic zone including **gold** (albeit mostly in the highest quartile of the anomalous threshold), **arsenic** and **antimony,** are known pathfinders to blind gold deposits in association with mature porphyry copper-gold deposits.

Anomalous **boron** and **vanadium** are discussed separately as to their potential significance.

One example showing the subtle gold zoning thresholds that can occur when close to a gold zone within a large hydrothermally altered system is cited by Boyle. In a hydrothermally altered belt of rocks in Uzbekistan 1 to 2 km from a large economic gold deposit the hydrothermally belt of altered rocks averaged 3.6 ppb gold. As the mining area is approached and hydrothermal alteration intensified, the gold content rose to 9 ppb, and within 20 metres from the orebodies the gold content rose to levels of several hundred parts per billion before attaining ore grades.

What appears to be significant is that Holes 93-1 and 93-3 contain anomalous gold, i.e., 10 ppb and greater over large intervals in association with anomalous arsenic. The same can be said for Hole 93-2 but to a much lesser extent; and the sampling procedure used for gold was significantly flawed.

The following anomalous geochemical information speaks for itself.

2.1.1 Arsenic Geochemical Data

The average abundance of As in soils, **unaffected by ore forming processes**, is 7 ppm. According to Boyle consistent values of 3 times background or about 20 ppm As should receive exploration attention. Whereas the average abundance of As in the Earth's crust, unaffected by ore forming processes, is 1.8 ppm, and 2.0 ppm in igneous rocks. Consistent values of 3 to 5 times background, or 10 ppm As chosen for this case, is anomalous and should also receive exploration attention.

Hence the criteria for identifying those anomalous soils and drill hole rock chip samples as anomalous and worthy of exploration attention for the discovery of blind gold deposits and/or blind gold zones associated with sulphide bodies was developed from the following Table 1:

The results show that the anomalous arsenic zone is vectored to the south, and to depth, of the presently identified sulphide deposit. Arsenic is a zoning feature to blind gold deposits at depth.

Table 1, Anomalous Arsenic Magnitudes

Lithology	Background (ppm)	Anomalous (ppm)	Very Anomalous (ppm)	Extremely Anomalous (ppm)
Soils	7	21 – 40	41 – 80	> 81
Rock	2	11 – 20	21 – 40	> 41

2.1.2 Arsenic in Soils; Results

An **anomalous As** in soils area was found with dimensions of 1,000 metres east to west and open to the east and at least 500 metres north to south. It offsets the large copper-in-soils anomaly to the south and is open in that direction. Within this anomaly located mostly west of the base-line within an area about 400 metres east to west and 100 to 150 metres north to south As values are both **very anomalous** and **extremely anomalous**. Hence there is a strong As in soils zonation towards the south-west quadrant of the buried sulphide body.

2.1.3 Arsenic in Percussion Drill Cuttings; Results

Two drill holes contain significant intervals of **very anomalous and extremely anomalous arsenic**. And one drill hole which penetrated 150 feet of overburden carried very anomalous arsenic over a 50 foot interval immediately above its penetration point into the bedrock of the Spences Bridge Volcanics. The drill hole arsenic data is summarized in Table 2:

Table 2; Drill Hole Anomalous Arsenic Intercepts

Drill Hole	Intercept (Feet)	Average Arsenic (ppm)	Anomalous Category and Geology
93-1	200-250	60	**Extremely anomalous** in arsenic. Occurs in felsic diorite with abundant calcite
93-1	360-440	38	**Very anomalous** in arsenic. Occurs in some of above but mostly in leucodiorite and gabbro with chalcopyrite and pyrite
93-5	390-500	46	**Extremely anomalous** in arsenic. Occurs mostly in limey diorite and marble with some skarnification
93-7	100-150 (Soil)	42	**Very anomalous** in arsenic. Occurs in overburden on top of Spences Bridge Volcanics

2.1.4 Arsenic in Mineralized Skarn

On the east side of the propylitic zone above the conductive sulphide body there is a large surface zone of skarnification and subcropping skarnification and marblization in two of the drill holes closest to that area of interest.

Surface chip sampling over an 8 metre width of mineralized skarn about 50 metres south of Line 4700N, Station 600E, averaged 0.29% copper **(anomalous)**, 62 ppm arsenic **(extremely anomalous)** and 16 ppb gold **(anomalous)**. In the context of this report with the sample populations thus far sampled extremely anomalous arsenic corresponds to anomalous gold given that the average abundance of gold in rock unaffected by ore forming processes in the earth's crust is only 4 ppb gold.

2.2 Antimony and Its Significance

According to Boyle (1976) antimony exhibits a nearly universal enrichment in most types of hypogene gold deposits. Antimony is a zoning feature to blind and deeper orebodies.

Antimony is a good indicator element in the same manner as arsenic in that its relative mobility is high along with elements such as Hg, Tl, and As. Accordingly it will travel upward and outward, and have large and near surface haloes.

The entire propylitic zone is anomalous in antimony.

Table 5 Anomalous Antimony Magnitudes

Lithology	Background (ppm)	Anomalous (ppm)	Very Anomalous (ppm)	Extremely Anomalous (ppm)
Soils	0.70	3.5-7.0	7.1 – 14	> 14.1
Rock	0.20	1.1 – 2.0	2.1 – 4.0	> 4.1

2.2.1. Antimony in Percussion Drill Cuttings; Results

In the manner described by Boyle the anomalous thresholds for rock and soils were selected on the basis of 5 times the background values and anomalous categories identified on the basis of a standard geometric progression.

The propylitic zone which was penetrated by percussion drill holes 93-1 to 93-5 respectively was found to be **extremely anomalous in antimony**.

Whereas the antimony in soils were mostly all less than 5 ppm. However the assay procedure used was not sensitive to lower values which nevertheless could still be anomalous; hence no conclusion for the antimony content in soils can really drawn.

2.3 Boron and Its Significance

Four hundred (400) metres north of the north edge of the large sulphide body, at Line 5400N, Station 2+50 West, is a **heavily altered** fine-grained pyroxene diorite outcrop. According to Reid (1990) the alteration is so intense that the original 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 magmatic source fluids causing the alteration.

This outcrop is also 450 metres north of Drill Hole 93-1 in which there is a 300 foot section of anomalous boron from 150 feet to 450 feet. This indicates that this large area is part of the vapour plume pathway taken by magmatic volatiles during exsolution from a crystallizing magma at depth.

This suggests the probability that the large sulphide body that underlies Drill Holes 93-1 to 93-5 may be accompanied by another deeper mineralized structure to the north because not only is the propylitic zone defined by drilling pervasively altered and mineralized due to an enormous passage of volatiles from the identified sulphide body that goes to depth but at this juncture the same may be said to the area to the north which remains totally unexplored. The deep probe IP survey that passed to the east of this other alteration feature and intersected what appears to be the edge of another chargeability anomaly. As there is also a coincident copper anomaly above this alteration area it represents a secondary target area.

The exsolution of volatiles occurs due to the separation, or partition, of an aqueous phase containing significant volatiles, including water, boron and carbon-dioxide from a co-existing fluid-melt believed to contain economic metals; in this case copper and in all probability, gold. The exsolution process which occurs during partition results in the concentration and precipitation of metals near the top of the magma chamber or within any chemically favourable host rock contacted by the mineralized fluids.

A very positive feature related to the presence of boron is that boron is one of the key magmatic components that enables the production of orebodies. It lowers the melting temperature and viscosity of the magma which promotes its generation, migration, and the incorporation of incompatible elements (ore minerals) as the magma stopes its way upward through the Earth's crust. The other key volatile components include H_2O, CO_2, SO_2, H_2S, HF, HCl, and Li, and some dissolved salts and metals. In effect these volatiles, particularly boron, depress the solidus making the magma more efficient in its metals scavenging process and enabling the intrusive magma to penetrate to much shallower depths where structural and other controls are most favourable for ore deposition.

Table 3 Anomalous Boron Magnitudes

Lithology	Background (ppm)	Anomalous (ppm)	Very Anomalous (ppm)	Extremely Anomalous (ppm)
Soils	2-100	151 – 300	301 – 600	> 601
Rock	10	51 – 100	101 – 200	> 201

Table 4 Drill Hole; Anomalous Boron Intercepts

Drill Hole	Intercept (Feet)	Average Boron (ppm)	Anomalous Category and Geology
93-1	150-450	148	**Very anomalous** in boron. Occurs in felsic diorite with abundant calcite
93-1	350-400	472	**Extremely anomalous** in boron. Occurs in leucodiorite and gabbro with chalcopyrite and pyrite
93-5	470-500	84	**Anomalous** in boron. Occurs mostly in limey diorite and marble with some skarnification
Rock Outcrop	Not Assayed	NA	**Extremely anomalous** in boron by petrographic thin section.

2.3.1 Discussion on Boron

Boyle (1979), stated that Boron is commonly associated with gold in practically all types of its deposits with the most frequent boron mineral in auriferous deposits being tourmaline.

However in this instance what relationship boron has to gold in this system is unknown. It would appear that its significance here is its relationship with the devolatilization of the magma which produced the large sulphide body underlying the propylitic zone.

2.4 Vanadium; Its Possible Significance

According to Boyle (1976) vanadium is present in some hypogene gold deposits principally in minerals like sericite, roscoelite, pyrite, apatite, magnetitie, ilmenite and leucoxene.

He further states that gold ores rich in tellurides frequently seem to have higher than average amounts of vanadium either in pyrite or in the vanadiferrous micas. The reason for the relationship between the three elements, Te, V and Au was not explained other than there is a common association in some gold deposits. Perhaps the relationship is connected with the fact that gold and gold tellurides commonly occur in host rocks that are relatively rich in vanadium (e.g., basic to intermediate volcanics, serpentinites, etc.).

Table 6 Anomalous Vanadium Magnitudes

Lithology	Background (ppm)	Anomalous (ppm)	Very Anomalous (ppm)	Extremely Anomalous (ppm)
Soils	20-500 (250)	751 – 1500	1,501 – 3,000	> 3,001
Rock	135	401 – 800	801 – 1,600	> 1,601

2.4.1 Discussion on Vanadium

All percussion drill holes into the propylitic zone contain **anomalous vanadium** with several intercepts containing **very anomalous vanadium.**

The soils on the other hand are mostly in the threshold range between 250 ppm and 750 ppm vanadium.

Undoubtedly during the scavaging process as this porphyry system stoped its way upwards from the lower part of the upper plate it encountered lithology rich in vanadium which generally means that this element was encountered deep in the Earth's crust. The question is, does the vanadium have an intimate association with gold mineralization as it does with some the notable porphyry related gold deposits in the South Pacific.

One example where vanadium figures prominently is **Porgera**, and the nearby **Mt. Kare** gold deposit. The porphyry intrusion related gold mineralization at Porgera (contained gold > 14 M-oz) was introduced by magmatic fluids with a strong vanadium-rich fluid component. In Corbett & Leach (1996) the main gold mineralizing phase is a spatially and temporally zoned, polybasal vein and vein/breccia system containing quartz, roscoelite (**the vanadium mica, illite**), carbonate, minor sulphides, and significant gold mineralization.

The high grade **roscoelite** mineralization at Porgera, Papua & New Guinea, is very similar to that encountered at Mt Kare. And roscoelite mineralization in general is common to other porphyry related gold systems elsewhere in the southwest Pacific; notably the Emperor Mine in Fiji (≈ 4.0 M-oz); and at Cracow, Australia (1.0 M-oz).

Both Porgera and Mt Kare are on the same deep crustal suture which has allowed mafic intrusives to rise to elevated crustal levels.

2.5 Gallium

As a curiosity, in July 1999, residual drill cuttings still evident from the drilling of three holes in 1993 were re-sampled and assayed for gallium. The average assay from the three samples returned 14 ppm gallium. The average content in the earth's crust unaffected by hydrothermal alteration processes is reported at 15 ppm. What the gallium distribution is in the holes is presently unknown but it could either be homogeneously distributed throughout all of the holes in the propylitic zone, in which case it is not anomalous, or be found in anomalous amounts from any of the altered intrusive phases. Its significance at this time is unknown

At the world's first gallium mine in Utah the gallium is associated with copper mineralization.

3.0 Submarine Volcanism

3.1 General

This subject is reviewed in respect of known geological history of the area, because of the possibility that the volcanic-sedimentary monoclinical sequence into which the multiple episodic intrusives intruded may have been laid down sub-sea in the Permian period; in which case any contained mineral deposits could be of the volcanic associated massive sulphide type; and related to subsequent intrusive mineralizing events as an overprinted recrystallized metasomatic body.

The other alternative is that the large conductive body is genetically related only to the disseminated sulphide deposit having formed simply as a metasomatic massive sulphide deposit in the skarn zone.

3.2 General Regional Geological History

R.B. Campbell (Geological Survey of Canada (GSC), 1966) showed the Ashton Copper-Gold Prospect area subsea in the Upper Triassic with volcanic extrusive activity. Prior to this period the area was subsea. The area does not emerge until the Middle Jurassic.

It is now speculated that the **host rocks** into which the multiple intrusive phases of tonalite (quartz-diorite), diorite porphyry, diorite, and gabbro; and their altered equivalents intruded could possibly be part of the Cache Creek group of Permian age.

The Permian saw extensive subsea volcanic activity. The volcanism caused local thick sequences of volcanic arenite, mud, carbonate, and chert (GSC; 1969).

According to White (UBC; 1966) the region in which the Ashton Copper-Gold Prospect is found underwent a third great crustal subsidence in late Pennsylvanian and attained maximum dimensions in the Permian and may have persisted into the Middle Triassic. This seaway flooded most of British Columbia west of the Selkirk Mountains. This geosyncline structure in British Columbia is known as the Cache Creek Group and is known to host volcanic associated massive sulphide deposits (Kuteho Creek and Red Hill).

Expanding somewhat on the GSC (1969) summary of geological activity, White stated that the stratigraphic thicknesses and proportions of lithological types are highly variable. Such features point to an archipelago-type of environment somewhat like the Caribbean; with extensive volcanism, submerged platforms, and oceanic troughs.

The fourth and last great marine incursion began in the Upper Triassic, reached a maximum development in the Upper Jurassic, and persisted in modified form through much of the Lower Cretaceous". The axis of depression moved westward.

In support that gold mineralizing Tertiary intrusive events could form part of the intrusive type spectrum at Ashton Copper-Gold, Campbell (GSC, 1966) stated that Tertiary intrusive activity is probably more widespread than mapped in the area because of the lack of surface exposure. Monger (GSC, 1989) shows some Tertiary extrusives that follow the same major structural lineament on which the Ashton Copper-Gold Prospect is found and which are contiguous with the east edge of the Mount Lytton Complex. These Tertiary plugs are located about 6 miles to the south, and as isolated islands out into the Middle and Late Cretaceous volcanics of the Spences Bridge Group to the east.

Monger (GSC; 1989) speculates, with strong evidence, that the Upper Triassic/Lower Jurassic Mount Lytton Complex bounded on the north-east by the Ashton Copper-Gold intrusive complex, is related to early Mesozoic **subduction/arc activity**; with those mineralized structures in the Guichon Batholith (i.e., the stupendous Valley Copper deposit located 25 miles north north-easterly from Ashton Copper-Gold); with the Guichon having formed in the upper part of the subduction plate and the Mount Lytton Complex having formed in the lower part of the upper plate.

Structurally the Ashton Copper-Gold intrusives have intruded along a major basement fault structure that separates the Upper Triassic/Lower Jurassic Mount Lytton Complex; the root zone of the Nicola Arc, from the neighboring Quesnellia Terrane (which includes the Nicola Group) of the Intermontane Belt. This fault structure is identified by Monger. It forms the north-south lineament along which Thompson's River flows, and passes to the east of the altered and mineralized intrusive complex.

4.2 <u>Interpreted Massive Sulphide Deposit</u>

Geophysical and geological evidence suggest a subcropping strata-bound massive sulphide deposit on the east flank of the large disseminated sulphide body interpreted as a porphyry copper-gold deposit. The massive sulphide body is conformable to the volcanic-sedimentary lithological sequence which forms a monocline dipping about 40° to the east.

Here the deep-probe induced polarization survey identified a conductive body with its top buried about 120 metres (400 feet) below the surface with a conductivity thickness of that of a massive sulphide body. It has dimensions of abont 100 metres thick, a dip length of 400 metres and a strike length of 800 metres. It is coincident with a strong VLF-EM anomaly discovered in 1990. It is also coincident with a strong <u>linear copper-geochemical anomaly</u> that is clearly distinct from the large fat ellipsoidal copper-anomaly over the disseminated sulphide deposit. The conductive body is open to the south and down dip; and its northerly extent can only be surmised as being extended to the total length of VLF-EM anomaly which is about 600 metres.

This conductor has an average conductivity thickness of 12.2 mhos (Siemens) per metre and is indicative of massive sulphides. Strangway (1966) completed a conductivity data study from several massive sulphide deposits and concluded that the conductivity-thickness values of most world-class massive sulphide deposits had a small range between 1 and 300 mhos.

The IP survey showed that this conductor, throughout the five levels in which it is found had resistivities of 2, 18, 7, 7, and 7 ohm-metres consecutively from the lowest level surveyed to the top of the structure. At an estimated width of 100 metres this translates to an average conductivity thickness of 12.2 mhos per metre. Resistivities as low as 2 ohm-metres and 7 ohm-metres, which are the lowest this writer has experienced are relatively uncommon in IP surveying.

5.0 Discussion on Geochemistry

There are at least four mineral element aureoles of different sizes and form found in the propylitic zone. Carbonate alteration is intense and widespread. The geological interpretation is that there are a least three altered intrusive phases consisting of gabbro, diorite, quartz diorite (Tonalite) and diorite porphyry and their altered equivalents. It would follow that there is probably a felsic mineralizing stage as well which could be the main mineralizing stage. It also follows that there could be mineral deposit overprinting within the disseminated sulphide body itself.

Although no statistical analyses was completed in the rigorous mathematical sense, a visual inspection of the lithogeochemical data from assays of drill cuttings and surface soil geochemistry resulted in specific positive and negative correlations between the elements Cu and V, and pathfinder elements B, and, As and Sb.

Copper and vanadium correspond closely throughout the propylitic zone and appear to be a distinct population consisting of two elements.

Boron appears to be unrelated to all element species except that it may be related to copper which could have overprinted the copper-vanadium population introduced subsequently to the devolatilization of the magma. It would appear to be a distinct population.

In Hole 93-1 and generally throughout all five holes drilled in the propylitie zone over the large sulphide body arsenic and antimony have a positive correlation and are a distinct overprinting population by themselves.

Although speculative at this time, until more data becomes available about zoning features, there appears to be three distinct mineralizing stages to this system.

The boron stage along with a copper component was recognized by Read as part of the volatile component. This stage occurred characteristically when the subcropping magma partitioned into the gaseous (volatile) phase and fluid phase while crystallizing. Boron will partition into the volatile phase and bring some copper with it along with other volatile components such as CO_2, H_2O, etc.

Nairis (1979) cited the work of Owtschinnikov et al (1967) regarding aureoles of indicator elements found in steeply inclined hydrothermal ore deposits which occur as a function of mobility and develop distinct haloes accordingly. The general succession is Au, Mo, Cu, Pb, Ag, Ba, Sb, and As; from the proximity of the ore-deposit, where Au has the lowest mobility to the most distal where As has the greatest mobility; exceeded by only Hg. Although a simplification in complex systems, as this is, it is still a fundamental concept.

As the As and Sb appear to be distinct this writer interprets these strongly anomalous features as being a zoning feature to a blind gold zone in association with the underlying disseminated sulphide deposit or deposits

The bulk geochemical gold content in Drill Holes 93-1 and 93-3, with many values at 10 ppb gold and greater; up to a maximum of 190 ppb gold, are of an anomalous magnitude that supports the concept of a gold zone in association with the sulphides of this large system.

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July, 2003
Vancouver, British Columbia

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LOGS OF DRILLHOLE CUTTINGS
1993 REVERSE CIRCULATION DRILLING
ASHTON COPPER PROSPECT
Kamloops M.D. British Columbia

Report for J.M. Ashton, 808 Exploration Services Ltd.
By R.E. Gale, PhD., P.Eng
R.E. Gale and Associates Inc.
February 4, 1994

INTRODUCTION

This report is written at the request of Mr. J.M. Ashton of 808 Exploration Services Ltd.

It is the result of a 2 day binocular microscope study of cuttings collected in a 7 hole reverse circulation drilling program carried out by Kingston Resources Ltd. in September, 1993 on the Ashton copper prospect near Lytton, B.C.

LOGS OF CUTTINGS

(1)

Hole No.	Grid Coordinates	Approximate Elevation	Attitude	Total Depth	Significant Intercepts
RC93-1	49+60N 1+10W	2580 Ft.	Vertical	500 Ft.	390-430 Ft 40Ft-0.13% Cu

From	To	Int. Ft.	Description
0	10	10	Overburden
10	210	200	Dark green medium to coarse grained diorite with up to 10% magnetite. Less than 5% epidote and calcite veinlets, rare pyrite, hematite, red garnet and barren quartz veinlets.
210	390	180	Lighter colored, more felsic diorite with abundant calcite in matrix and thin veinlets. More pyrite, up to 2%, traces of chalcopyrite. Less magnetite.
390	430	40	Leucodiorite with more calcite veinlets, pyrite up to 5% and little magnetite. Some quartz-biotite diorite with calcite-quartz veinlets with chalcopyrite. From 410-430 some coarse grained gabbro with pyrite, trace chalcopyrite. The interval from 390 to 430 assayed 0.13% Cu., best grade in the hole.
430	500	70	Dark medium grained diorite with magnetite, some epidote. Bottom of hole.

(2)Hole No.	Grid Coordinates	Approximate Elevation	Attitude	Total Depth	Significant Intercepts
RC 93-2	49+45N 2+29W	2750 Ft.	-61° @ Az. 162°	320 Ft	170-220 50 Ft-0.12%Cu

From	To	Int. Ft.	Description
0	10	10	Overburden
10	170	160	Dark green to grey fine to coarse grained diorite and quartz diorite with 10-15% magnetite and up to 20% quartz. Several zones of greenish white fine grained felsic intrusive with low magnetite. Short sections of red fine grained hematite (or red mica) and epidote with quartz-magnetite veinlets.
170	220	50	Increased amounts of felsitic rock with strong red hematite or red mica coatings on fractures in gabbroic rock seotions, 200 to 210 feet, along with magnetite, pyrite, trace chalcopyrite. From 170 - 210 - 40 feet averaged 0.12% Cu., best grade interval in this hole.
220	320	100	Fine to medium grained felsitic intrusive with fairly abundant red hematite or mica and epidote. Bottom of hole.

(3)Hole No.	Grid Coordinates	Approximate Elevation	Attitude	Total Depth	Significant Intercepts
RC 93-3	48+00N 0+97E	2530 Ft.	Vertical	500 Ft.	450-490 40 Ft-0.10%Cu

From	To	Int. Ft.	Description
0	20	20	Overburden
20	300	280	Medium grained dark grey to white diorite with 5-10% magnetite, trace epidote and quartz-calcite veinlets, hematite(red mica) coatings on several fragments. From 150-170, magnetite-rich gabbro with quartz-pyrite in fractures. Calcite increases from 200-300 feet.
300	430	130	Limy, coarser grained dark green diorite with numerous veinlets of calcite. Abundant coarse grained magnetite with traces of pyrite and chalcopyrite.

430	500	70	Similar to above but with several quartz-calcite pyrite-chalcopyrite veinlets. Best grade interval in hole is 450-490, 40 feet grading 0.10% Cu. Bottom of hole-500 feet.

(4)

Hole No.	Grid Coordinates		Approximate Elevation	Attitude	Total Depth	Significant Intervals
RC 93-4	47+55N	0+45E	2880 Ft.	-62° @ Az. 270°	400 Ft	90 - 120 30 Ft-0.12%Cu

From	To	Int.-Ft.	Description
0	10	10	Overburden
10	80	70	Medium to coarse grained dark green diorite with few calcite-pyrite veinlets.
80	100	20	Fine to medium grained pink to red garnet replacing recrystallized limestone. Weak disseminated pyrite and chalcopyrite in marble remnants.
100	120	20	Green to white medium grained diorite with traces of pyrite. The best mineralized intercept in the drillhole is 90-120 feet, 30 feet - 0.12% Cu.
120 or	180	60	Diorite with little pyrite, some hematite red mica and epidote.
180	190	10	Calcite-marble with traces of yellow garnet replacing marble.
190	400	210	Dark coarse grained to lighter fine grained diorite with traces of calcite veinlets carrying pyrite-epidote. Bottom of hole.

(5)

Hole No.	Grid Coordinates		Approximate Elevation	Attitude	Total Depth	Significant Intercepts
RC 93-5	45+70N	2+70E	2530 Ft.	-60° @ Az. 272°	500 Ft	210-220 10 Ft.-0.29%Cu 480-490 10 Ft.-0.12%Cu

From	To	Int.-Ft.	Description
0	30	30	Overburden
30	120	90	Medium grained dark green diorite with up to 10% magnetite, trace pyrite,calcite and epidote. Minor fine grained hematite or

			red mica coatings on magnetite.
120	150	30	Red-green medium grained garnet rock with trace pyrite and chalcopyrite.
150	200	50	Medium grained to coarse grained diorite porphyry with abundant magnetite, moderate pyrite, traces chalcopyrite in calcite veinlets.
200	220	20	Magnetite-poor silicified to highly calcareous diorite with 2% disseminated pyrite-chalcopyrite. Few patches magnetite-pyrite-epidote in thin fractures. Best grade interval in hole here, 10 feet - 0.29% Cu.
220	240	20	Coarse grained diorite with some patches of strong pyrite but little chalcopyrite.
240	300	60	Fresh looking coarse grained diorite.
300	340	40	Pale buff to pink garnet and epidote replacing marble-limestone. Trace pyrite.
340	490	150	Mixed calcite-rich diorite and pink marble with patches of pyrite, trace chalcopyrite. Best mineralization in interval is 480 - 490 feet, 10 feet grading 0.12% Cu.
490	500	10	Mainly white marble with some coarse grained white graphic textured granite or pegmatite. Bottom of hole at 500 feet.

(6) Hole RC 93-6, drilled at same point as RC 93-7, drilled 130 feet of overburden and failed to reach bedrock-was cut off at 130 feet.

(7)

Hole No.	Grid Coordinates		Approximate Elevation	Attitude	Total Depth	Significant Intercepts
RC 93-7	53+00N	3+45E	2180 Ft.	Vertical	330 Ft	None

From	To	Int.-Ft.	Description
0	160	160	Overburden
160	220	60	Red-green andesite volcanic - probably Spences Bridge Group.
220	320	100	Barren grey green diorite and quartz diorite, intrusive texture.

COMMENTS ON GEOLOGY FROM LOGS

(1) Further drilling should utilize a diamond drill so that the all-important geological relationships between the diorite, gabbro, limestone and skarn can be interpreted properly. The complex structures and contact relationships on the property can only be solved with core drilling with a diamond drill.

(2) Fragments of the mineralized rocks which I have retained from my study should be impregnated and thin-sectioned to enable positive identification of the rocks which host the mineralization.

(3) The limy diorite and skarn-marble and their contact areas appear to be the best host rocks for copper mineralization. Further work on the property prior to diamond drilling should include detailed mapping to pin point the contacts on surface between these rocks and the other noted host rocks, gabbro and quartz diorite.

(4) It is apparent from the occurrence of at least 3 types of mineralized intrusives, diorite, gabbro and quartz diorite, that there are multiple intrusive phases present in the altered and mineralized system on the property. Mineralization occurs both as disseminated zones and as mineralized vein systems, probably along the predominant 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, RC 93-1 through RC 93-5 and therefore is widespread throughout the latter area.

PROFESSIONAL ENGINEER
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February 4, 1994

PETROGRAPHY OF DRILL CHIPS FROM HOLES RCA 93-1 TO RCA 93-7, ASHTON PROPERTY, KAMLOOPS MINING DIVISION, (92I/3W & 92I/6W)

Peter B. Read

1. INTRODUCTION

This petrographic examination of 11 thin sections was undertaken at the request of J.M. Ashton, J.M. Ashton and Associates Ltd., 201-518 Beatty Street, Vancouver, B.C. The thin sections were prepared from epoxy resin-impregnated drill chips collected in September 1993 during the drilling of 7 reverse-circulation holes on the Ashton Property.

The Ashton Property lies less than 1 kilometre west of a gravel road which leaves the Trans Canada Highway 100 metres north of the Nicoamen River bridge and climbs southward out of the Thompson River valley. The centre of the property is at approximately 700 m elevation and lies about 17 km east of Lytton.

Monger and McMillan (1989) showed that the property and adjacent area were underlain by layered quartzofeldspathic rocks, amphibolite and mylonite of the Mount Lytton Complex. Immediately north of the property, Brown's (1981) more detailed geological mapping showed west-striking belts of WNW foliated and layered quartzo-feldspathic rocks in contact with weakly foliated plutonic zones ranging from tonalite through diorite to gabbro. This thin section examination of drilling chips shows that rock types similar to those that Brown identified immediately north of the property also underlie the Ashton Property.

2. PETROGRAPHY

The drill chips indicate that pyroxene gabrro, pyroxenite and their altered equivalents are as widespread as hornblende diorite, hornblendite 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. Tonalite (quartz diorite) and felsic rocks are rare. The best copper mineralization appears spatially related to the altered pyroxene gabbro and pyroxenite.

(a) Hole RCA 93-1

1. Thin Section RC93-1 390-430'

The thin section consists of six rock chips of the following rock types:

(a) 3 chips of calcsilicate skarns

(b) 2 chips of pyroxenite or hornblende pyroxenite

(c) 1 chip of albitite

Of the three chips of calcsilicate skarns, two are epidosites consisting of 95% clinozoisite with anomalous berlin blue and lemon yellow interference tints, 2% quartz and 3% opaque minerals. The remaining chip is a calcsilicate skarn composed of 83% prehnite, 15% calcite, 1% clinozoisite and 1% opaque minerals.

The two chips of pyroxenite or hornblende pyroxenite consist of an igneous assemblage of 5% augite, 20% pleochroic blue-green to grass green elongate hornblende prisms and 4% opaque minerals overprinted by an assemblage consisting of 51% epidote/clinozoisite, 15% calcite, and 5% prehnite. The other chip consists of 68% augite and 2% opaque minerals overprinted by an alteration assemblage consisting of 20% clinozoisite with anomalous berlin blue and lemmon yellow interference tints, 10% tremolite and ½% quartz.

The albitite consists of 77% plagioclase (An_0), 10% clinozoisite with anomalous berlin blue interference tints, 8% calcite, 1% finely disseminated opaques, and 4% coarse (0.1 to 0.4 mm) shapeless grains of apatite.

Remarks: Although thin section identifications of rock chips show that three rock types are present, there may be only two major rock types with the calcsilicate skarns representing the complete alteration of former ultramafic rocks. Two of the chips are either pyroxenite or hornblende pyroxenite. Of the three chips of calcsilicate skarns, two have a mineral assemblage of essentially clinozoisite which could easily result from the total alteration of former pyroxenite. The albitite, a felsic igneous rock, is in marked contrast to the pyroxenites or calcsilicate skarns possibly derived from pyroxenites. The thin section study supports Gale's (1994) identification of basic plutonic rocks in this interval, but suggests an ultramafite, locally highly altered to calcsilicates, rather than the leucodiorite and gabbro that he suggested. Because the thin section comes from chips taken from the interval of best mineralization in this hole, the host rock appears to be a pyroxenite or an extensively calcsilicate-altered variant.

(b) Hole RCA 93-2

1. Thin Section RC93-2 200-210

The thin section consists of five chips which range in composition from hornblende diorite through pyroxene gabbro to a pyroxenite.

The three pyroxene gabbro chips consist of 70% augite, 25% subhedral laths of plagioclase which are unzoned, twinned and dusted with alteration so that no optical determination of the composition is possible, and 5% shapeless to equant opaque mineral grains sprinkled throughout.

The hornblende diorite chip has 25% medium to pale brown pleochroic prismatic grains of hornblende, 65% shapeless plagioclase grains which are so heavily sausseritized that an optical determination of their composition is not possible and 5% epidote with patchy second order interference tints. I noticed that the opaque mineralization is surrounded by an incomplete rim of pleochroic medium green to colourless chlorite which is length-slow. Where the hornblende is in contact with the opaques, a rim of grey-green to colourless hornblende exists between the opaques and the normal pleochroic medium to colourless hornblende. Are the opaque minerals part of the igneous assemblage?

The pyroxenite chip has 80% augite and 3% opaque minerals which are overprinted by an alteration assemblage consisting of 12% mats of pleochroic pale green to colourless chlorite and 5% fine shapeless grains of quartz verified by an uniaxial positive interference figure.

Remarks: The thin section rock chips support Gale's interpretation of plutonic rocks but suggest the rocks are more basic. Gale (1994) suggested felsitic diorite, but the thin sectioned rock chips suggest that pyroxene gabbro, pyroxenite and hornblende diorite are widespread. Again the best mineralized interval in this hole is associated with mafic to ultramafic rocks.

(c) Hole RCA 93-3

1. Thin Section RC93-3 150-170'

The thin section consists of three rock chips which are pyroxene gabbro and altered pyroxene gabbro.

One of the chips is a pyroxene gabbro consisting of 68% augite grains which contain small pleochroic inclusions of hornblende (1%) in shades of medium to pale brown. The subhedral plagioclase (25%) laths are too heavily sericitized to permit an optical determination of their composition. Large equant grains of opaque minerals (6%) are sprinkled throughout.

The remaining chips are altered pyroxene gabbro in which the relict igenous assemblage of augite with pleochroic brown hornblende inclusions and heavily sericitized subhedral plagioclase laths still remains but is overprinted by an assemblage of epidote, showing patchy second order interference tints, and fine medium to pale green pleochroic chlorite flakes all cut by prehnite veins.

Remarks: The thin section identifications of the rock chips as pyroxene gabbro or altered pyroxene gabbro are consistent with Gale's (1994) observations that the interval 150-170' is a magnetite-rich gabbro.

2. Thin Section RC93-3 430-500'

The thin section consists of three chips of altered hornblende diorite

The relict igneous assemblage consists of pleochroic olive green to olive brown prismatic to fibrous hornblende, heavily sericitized subhedral plagioclase laths which are too altered for an optical determination of their composition, and shapeless grains of opaque minerals up to 0.5 mm on edge. The overprinting alteration assemblage consists of epidote/clinozoisite, in which some grains have patchy second order interference tints and others have anomalous berlin blue and lemon yellow tints, calcite, pleochroic medium to pale green chlorite flakes, pleochroic pale green actinolite fibres, and a few fine sphene granules.

Remarks: The thin section identifications of the rock chips as altered hornblende diorite is consistent with Gale's (1994) report of green diorite in this interval. Note again that the best mineralization in the hole has a basic plutonic rock as host.

(d) Hole RCA 93-4

1. Thin Section RC93-4 80-100'

The thin section consists of six rock chips all of which are calcsilicate skarns. Garnetiferous skarns are most important and yield the following variants:

(a) Three chips of garnet-diopside-calcite±actinolite skarn composed of 35% grossular-andradite, 30% diopside, 34% calcite, and 1% medium to pale green pleochroic fibrous prismatic actinolite grains.

(b) A garnet-epdiote-calcite skarn comprised of 60% grossular-andradite, 5% epidote with patchy second order interference tints, and 35% calcite.

The remaining skarn chips are:

(c) A wollastonite-epidote/clinozoisite-calcite skarn composed of 35% wollastonite, 63% calcite, 2% epidote/clinozoisite and ½% medium to pale green pleochroic chlorite flakes.

(d) A vesuvianite-calcite skarn with 35% vesuvianite as stubby prismatic colourless grains having strong clove brown interference tints, 65% calcite, and ¼% of nonpleochroic reddish brown equant spinel grains which are isotropic, have a high positive relief, and are embedded within vesuvianite.

Remarks: The mineral assemblages of the thin-sectioned rock chips are consistent with Gale's (1994) assignment of this interval to recrystallized limestone.

(e) Hole RCA 93-5

1. Thin Section RC93-5 120-150'

The thin section contains two rock chips which are both skarns.

(a) The epidosite consists of 90% epidote with patchy second order interference tints, 5% sphene as large grains with extreme positive relief and birefringence, and 1% quartz.

(b) A tremolite-epidote composed of 90% colourless tremolite as fibrous prismatic grains showing two cleavages at 56°, and 10% epidote with patchy second order interference tints.

Remarks: The thin-sectioned rock chips indicate that the rock of this interval is a skarn. This rock type is consistent with Gale's (1994) observation of garnet in this interval.

2. Thin Section RC93-5 170-200'

The thin section contains four rock chips of altered hornblendite and hornblende diorite with the following characteristics:

(a) Two chips of hornblendite contain 80-85% stubby pale green to colourless pleochroic prismatic actinolite grains, 12% calcite or 15% epidote, and 6% finely disseminated opaquae minerals.

(b) A single chip of hornblendite? has only 20% pleochroic pale brown to colourless prismatic hornblende, 24% colourless fibrous tremolite, 50% colourless serpentine flakes with parallel extinction, length-slow and refractive indices in the range of 1.56, and 6% opaque minerals.

(c) A single chip of hornblende diorite contains 35% epidote/clinozoisite in grains showing both anomalous lemon yellow and berlin blue interference tints as well as patchy second order colours, 50% squat colourless prismatic grains of actinolite, 13% plagioclase in grains which are so heavily sausseritized that a composition determination is impossible, 2% calcite and ½% opaque minerals.

Remarks: The thin-sectioned rock types are more mafic-rich than those reported for this interval by Gale (1994) who correctly reported the presence of a diorite porphyry.

3. Thin Section 93-5 200-220'

The thin section has eight rock chips which represent the following variations in rock types:

(a) three chips of hornblende diorite with mineral assemblages consisting of the following minerals listed in order of decreasing abundance:

1. Plagioclase as shapeless to subhedral laths, unzoned, typically sericitized and sausseritized and locally twinned which yield one plagioclase composition determination of An_5.

2. Actinolite present as pale green to colourless stubby to fibrous prismatic grains.

3. Epidote as pleochroic pale yellow to colourless granules and prismatic grains sprinkled through and replacing plagioclase.

4. Chlorite flakes with a pale green to colourless pleochroism.

5. Opaque minerals (1-5%) as equant grains sprinkled throughout.

6. Sphene as a few granules of extreme positive relief and birefringence.

(b) a chip of hornblendite with the following minerals listed in decreasing order of abundance:

1. Hornblende showing patchy colorless, shades of green or shades of medium brown pleochroic schemes in stubby prismatic grains probably completely pseudomorphing original pyroxenes.

alteration of the garnet to an epidote-rich skarn with 60% epidote with patchy second order interference colours, calcite (35%), spinel (¼%) as medium brown nonpleochroic, isotropic equant grains, and 4% opaque minerals.

(b) One chip is an albitite composed of 65% plagiociase yielding a composition determination of An_6 which is cut by calcite (33%) veins and 2% opaque minerals. The second chip is composed mainly of very fine (less than 0.05 mm) quartz (70%), calcite (37%) and opaque minerals (3%).

Remarks: The thin-sectioned rock chips of calcsilicate skarns support Gale's (1994) marble determination for this interval, but the presence of thin-sectioned felsic chips do not support Gale's proposed diorite in this interval.

(f) Hole RCA 93-7

1. Thin Section RC93-7 350'

The thin section contains only one rock chip which is tonalite with 40% quartz as unaltered, shapeless fine (0.4-0.6 mm diameter) grains showing strong undulatory extinction, 47% albite-twinned subhedral laths which are heavily sausseritized and sericitized but nevertheless yield a composition determination of An_9 which have been overprinted by an alteration assemblage consisting of 5% clinozoisite/epidote, 5% chlorite, 2% calcite, 1% opaque minerals and ½% sphene.

Remarks: (Note that the footage of 350' is not possible for this hole which is only 330' long.) From 220 to 320' Gale (1994) noted barren diorite was present, the minerals present in the thin-sectioned rock chip show that the rock is a quartz diorite or tonalite.

9. CONCLUSIONS

1. The thin-sectioned rock chips generally support Gale's (1994) logging of the reverse-circulation drill holes but carry the implication that the widespread intrusions include pyroxene gabbro, pyroxenite and hornblendite in addition to the hornblende diorite which Gale (1994) noted.

2. Epidote grains with patchy second order interference tints.

3. Plagioclase which exists as heavily dusted, shapeless twinned grains.

4. Opaques (10%) as equant grains disseminated throughout.

5. Sphene as a few grains up to 0.4 mm on edge.

(c) Three opaque-rich chips in which the most opaque-rich consists of 70% opaque minerals with inclusions of 26% fine, shapeless grains of quartz and 4% fine muscovite and chlorite flakes. The remaining chips have about 50% finely disseminated bladed and equant grains in a matrix of very fine (0.05 mm) calcite and quartz with a few per cent epidote.

Remarks: The rock chips support Gale's (1994) description of this section as a diorite and the concentration of opaque-rich chips add credence to the assay results which show that this interval as the most copper-rich intersected during the drilling program.

4. Thin Section 93-5 350'

The thin section consists of a single rock chip of a fine-grained chloritized diorite with a mineral assemlbage comprised of 73 % of fine (0.4 mm) shapeless, unzoned, rarely twinned and heavily sericitized grains of plagioclase, 25% chlorite as mats of fine pleochroic pale green to colourless flakes with anomalous clove brown and berlin blue interference tints, ½% calcite, and 1% finely disseminated opaque minerals.

Remarks: The lithology of the thin-sectioned rock chip supports Gale's (1994) identification of diorite at this depth in the hole.

5. Thin Section 93-5 340-400'

The thin section contains five rock chips of which three are calcsilicate skarns and two chips are felsites.

(a) The three calcsilicate skarn chips have a wide variation in mineralogy ranging from andradite-grossular (65%), calcite (25%), plagioclase (10%) as fine unaltered, twinned grains yielding a composition determination of An_{38} through a garnet (5%), epidote/clinozoisite (15%) calcite (65%), opaque minerals (10%) skarn with 5% chlorite

2. Gale recommended (1994), and I strongly concur, that prior to any further drilling on the property, the surface requires geological mapping. The small expenditure on surface geology, relative to drilling, permits a three-dimensional understanding of the distribution of mineralization and rock units.

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PETROGRAPHY OF SAMPLE 54N 2+50W

J.M. Ashton of J.M. Ashton & Associates Ltd., 1451-409 Granville St., Vancouver, B.C. submitted sample 54N 2+50W to Coots Petrographic Services Ltd for a thin section and petrographic analysis.

SAMPLE 54N 2+50W:

A fine-grained (1mm) pyroxene(?) diorite heavily altered by an assemblage which consists of tourmaline-calcite-chlorite-epidote-sphene-pyrrhotite-hematite.

Thin Section:

The rocks consists of the following minerals in amounts given by a visually estimated mode:

A. Original Rock (about 25%):

A small portion of the thin section consists of the following minerals which apparently have a relict fine-grained igneous texture.

1. Tremolite-actinolite (35%):

Colourless to very pale green stubby prismatic grains with two cleavages at 56°. The stubby shape of the grains suggests that the grains were originally pyroxene grains which are now totally pseudomorphed by tremolite-actinolite.

2. Chlorite (35%):

Medium to pale green clots up to 1 mm diameter composed of flakes which show anomalous clove brown-purple interference tints. These clots represent former mafic minerals.

3. Plagioclase (30%):

A few shapeless grains up to 1.5 mm in diameter which show some polysynthetic twinning and are heavily altered by chlorite and tourmaline. In spite of the alteration, these grains are probably part of the original mineral assemblage of the rock. Although the composition of the plagioclase cannot be determined, it has undoubtedly become more albitic due to alteration.

B. Alteration (about 75%):

Usually the alteration is so heavy that it obliterates the original texture of the rock.

1. Tourmaline (20%):

Euhedral dark green-brown to pale brown pleochroic primatic grains to 1.5 mm in length. The prismatic grains have a triangular cross-section (ditrigonal) and show a colour zoning from light bluish green in the core to dark green-brown on the margin. The mineral is uniaxial negative. Although the alteration mineral assemblage is Ca-rich as shown by the presence of calcite, tremolite, sphene, and epidote, the Ca-borosilicate, axinite was looked for and is absent.

2. Carbonate - calcite (10%):

Anhedral, colourless grains 0.5 to 3 mm in diameter which show rhombohedral twin lamellae which have the high refractive index of the mineral parallel to the long diagonal of the rhomb.

3. Epidote (30%):

Pleochroic golden yellow to colourless prismatic grains 0.5 mm long and locally present as radiating sheaves up to 1 mnm in length.

4. Sphene (2%):

Subhedral diamond-shaped grains up to 0.4 mm on edge with extremely high birefringence and positive relief.

5. Opaques (5%):

Equant, inclusion-filled grains, 0.4 to 0.6 mm on edge. In hand specimen, some of them are pale brass and slightly magnetic - pyrrhotite, and the remainder are metallic grey with a red-brown streak - hematite.

6. Chlorite (9%):

Medium to pale green pleochroic flakes in clots to 0.8 mm in diameter which have anomalous clove brown to purple interference tints.

7. Oxychlorite (25%):

Orange-brown nonpleochroic flakes in clots to 1.5 mm in diameter which locally have unoxidized chlorite flakes.

c. Veins (less than ½%):

A thin (0.2 mm) vein composed of albite and calcite which cuts across the heavily altered rock.

1. Albite (85%):

Shapeless grains 0.1 to 0.4 mm in diameter dusted with fine grained carbonate alteration and locally rare polysynthetic twinning. A single flat-stage plagioclase composition determination yields An_5.

2. Calcite (15%):

Fine, colourless, untwinned grains with varaible negative to positive relief against albite.

Remarks: The original rock may have been a fine grained (1 mm) 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 veinlet. The tourmaline is a major part of the alteration assemblage and indicates the presence of significant volatiles in the solutions causing the alteration.

ASHTON Copper-Gold

COPPER-GOLD PORPHYRY PROSPECT, and: VOLCANIC ASSOCIATED MASSIVE SULPHIDE PROSPECT

February 2004

Project Fundamentals

Privileged and Confidential

Part of a large **extremely anomalous copper-in-soils anomaly** within an alteration zone at least 2.0 miles north-south, by 1.4 miles east-west was probed by a reconnaissance two-line dipole-dipole, **deep-probe induced-polarization (IP) survey** in 1999. Each survey line, more than 1 mile in length, crossed the anomaly at right angles with a penetration depth estimated at 1,400 feet below surface. The survey was successful in defining a **large disseminated suphide** body that extends to more than 1,400 feet depth with its top located less than 200 feet below surface. A wide, high amplitude, 300 milli-Volt (negative), Self Potential (SP) anomaly coincident with the surface projection of the disseminated sulphide body **confirms the presence of a strong concentration of subcropping sulphides** in the vicinity of the SP anomaly.

There appears to be room in this single geophysical structure, as presently identified, **to contain a geological mineral resource of 400 million tonnes of disseminated sulphides;** yet this anomaly is still open into the large alteration zone extensions to the northwest and southeast. See **Figure 1 for "Model to Scale".**

Along the eastern contact zone of the disseminated sulphide body at about 400 feet below surface is a large zone of extremely low resistivity, or conductivity-thickness, which represents a **large conductive body** interpreted to be **massive sulphides**. This body is stratabound as it dips conformably at -40° east within an altered sedimentary-volcanic monoclinic structure. As a speculation only this body could be distinct and separate metallogenic event unrelated to the disseminated sulphide body, possibly a volcanic associated massive sulphide deposit having formed subsea in mid-Permian or alternatively formed as a zoned replacement deposit (skarn?) to the disseminated sulphide body. It could also have originated as a volcanogenic massive sulphide deposit which was later overprinted by metal bearing fluids from the porphyry which could have led to recrystallization of the deposit resulting in the extremely low resistivities measured in the deep-probe IP survey. Often extremely low resistivity sulphide structures as this is do not respond to the IP chargeability effect. This region of British Columbia is known for its many mineralizing episodes from mid-Permian to Tertiary.

The large **conductive body** has a dip length of more than 1,100 feet and is open to depth beyond 1,400 feet below surface. It has an interpreted strike length of about 2,400 feet and is open to the south. It is estimated to be about 250 feet thick. It coincides along strike with an extremely anomalous copper-in-soils anomaly which is a distinctly separate anomaly from the copper anomaly above the disseminated sulphides. It also coincides with a strong VLF-EM geophysical conductor. It has an estimated conductivity-thickness of 12.2 mhos which in all probability represents highly conductive massive sulphides. Based upon the present data there appears to be **room enough in this geophysical structure to contain a geological mineral resource of more than 100 million tonnes of massive sulphides.**

Geological logging by R. E. Gale, Ph.D., P.Eng., consulting geological engineer, and petrological examination by P. B. Read, Ph.D., consulting geologist, of drill chips from the percussion drilling program within the propylitic zone that envelopes the disseminated sulphide body shows the likelihood that these disseminated sulphides were deposited from a buried porphyry phase of this episodic composite intrusive stock.

A small drilling program in 1994 followed a shallow-probe induced polarization survey over the large copper-in-soils anomaly. Unfortunately the drilling sampled only a small part of the propylitic zone and did not penetrate the main disseminated sulphide body. The igneous rocks hosting the main mineralized porphyry consists of altered and mineralized gabbro, diorite, quartz-diorite, tonalite, quartz-diorite porphyry and albitite (albite porphyry). This composite stock may be principally tonalite. It is a large system and is ideally situated from a large mineral deposit perspective because the local region is highly prospective for large copper and gold deposits of the porphyritic style and related types. The modal composition appears to fall into the general compositional field of rocks associated with other copper and copper-gold porphyry deposits throughout the world.

Gale summarized the geological logging of the percussion drill chips as follows:

> *" It is apparent from the occurrence of at least 3-types of mineralized intrusives, diorite, gabbro and quartz-diorite that there are multiple intrusive phases present in the altered and mineralized system on the property. Mineralization occurs both as disseminated zones and as mineralized vein systems, probably along the predominant northerly trend of structure noted in the area. Alteration in the form of calcite flooding and quartz and calcite veining was noted in all of the southernmost holes, RC 93-1 through RC 93-5 and therefore is widespread throughout the latter area. "*

Perhaps one of Gale's most important observations made was in logging the bottom of hole RC 93-3 following the abandonment of the property by the previous Optionor who unfortunately did not log the holes drilled. Gale observed that the bottom 70 feet, between 430 feet and 500 feet depth of hole RC 93-3 contained:

> ***" several quartz-calcite pyrite- chalcopyrite veinlets. "***

Essentially this section of drilling represents a network of stockwork veins which is part of the roof-shatter zone which forms around the outer margins of a porphyry deposit. The shattering occurs at the time of formation of a porphyry copper-gold deposit characteristically as a result of the explosive exsolution of mineral rich volatiles and fluids at the time of crystallization which results in catastrophic overpressuring and shattering of the carapace or roof and side zones. These enormous forces result in extensive stockwork development which also controls the depositing of copper and gold mineralization and the zoned alteration features. The stockworks merge with increasing metal content towards the crystallized magma chamber which is now the mineral bearing host porphyry.

It was this "stockworks zone" discovery by Gale that motivated the deep-probe IP survey which resulted in the discovery of the large disseminated sulphide deposit which in all probability could be a large copper or copper-gold orebody.

Hydrothermal alteration in the intrusive suite to the west and north and in the volcanic-sedimentary succession to the east and south is widespread. This indicates that a significant porphyry style mineralized intrusive system underlies the area. J. W. Antal, Ph.D., consulting geologist, after examining the property following the discovery of the large copper-in-soils anomaly in 1969 concluded that ***"the claim area had the potential for hosting a large low-grade copper deposit."***

About 1,000 feet north of the large disseminated sulphide body is an intensely altered diorite which was described petrographically by P. B. Read, Ph.D.:

> ***"The original rock may have been a fine grained (1 mm) pyroxence diorite but this rock has been nearly obliterated by an alteration assemblage of tourmaline-epidote-calcite-sphene-pyrite which is cut by a few albite-calcite veinlets. The tourmaline is major part of the alteration assemblage and indicates the presence of significant volatiles in the solutions causing the alteration"***

Read's observation provides additionally substantive evidence of the scope of this large system.

About 2,000 feet east of this intensely altered diorite, Hole RC 97-7 entered a hydrothermally altered **tonalite** (quartz diorite) buried below a succession of overburden and recent (Kingsvale?) volcanics overlying the tonalite. The tonalite sample studied consists of about 40% quartz, and 47% albite which is heavily sericitized and saussuritized and contains disseminated pyrite. The tonalite is overprinted with epidote, chlorite, calcite and opaque minerals, and is geochemically anomalous in copper (106 ppm), and arsenic (12 ppm), and extremely anomalous in antimony (16 ppm) and bismuth (7 ppm). The **anomalous As-Sb-Bi** combination is of great interest here as it suggests a low temperature zoning feature of a precious metals phase of mineralization within this large hydrothermal system.

Geologically the mineralized intrusive complex zone is located at the northeast edge of the Mount Lytton Batholithic Complex close to the intersection of two major basement fault structures. The north-south fault structures separate the Upper Triassic/Lower Jurassic Mount Lytton Complex (granodiorite, quartz diorite, and diorite), the root zone of the Nicola Volcanic Arc, from the neighboring Quesnellia Terrane. J.W. Monger, Ph.D., Emeritus Geoscientist (Geological Survey of Canada, 1989) has postulated that the Mount Lytton Complex, originated in the same subducted upper plate that produced the Guichon Batholith and the giant copper deposits of the Highland Valley found within it.

It is speculated that the disseminated mineralization at Ashton Copper-Gold is the main stage mineralizing event and is associated with either a quartz-diorite porphyry or a porphyritc tonalite phasc of Jurassic age cither of which could be the **"ore bringer".**

Core drilling is required to determine the geometry of the multi-phased intrusives, including the structural, alteration, and mineralogical features and other relationships.

Similar lithologies are responsible for many of the large copper, and copper-gold porphyry deposits found in the Chilean Cordillera. There, plutonic intrusives of Jurassic age consisting of gabbros, gabbro-diorite, diorite, diorite porphyry, tonalite, tonalite porphyry, and granodiorite where the felsic stages are the "**ore-bringers**".

One notable **world-giant copper deposit** formed in **tonalite** lithology, yet is "recent in age" is **Los Pelambres** in Chile. It is located in a composite stock which intruded andesitic flows and an older un-mineralized quartz-feldspar porphyry. The composite stock consists principally of tonalite and porphyritic tonalite with smaller dykes of quartz diorite porphyry, quartz monzodiorite porphyry, and quartz monzonite porphyry. This deposit contains in excess of 3.3 billion tonnes of 0.63 weight-percent copper which translates to a copper content of 45 billion pounds.

Although the **tonalite** at Ashton Copper-Gold may have similar comparative significance to the Los Pelambres deposit, It also has similar quartz-diorite porphyry lithology to the Afton Mine copper-gold porphyry deposit. In further support of a large copper and/or copper-gold mineralized porphyry system underlying the Ashton Copper-Gold property is the genetic relationship with the world-giant Valley Copper copper deposit located 25 miles to the north-northeast which originally contained a copper inventory of close to 12 billion pounds.

The shallow penetrating pole-dipole IP survey conducted over the large copper-in-soils geochemieal anomaly in 1993 formed the basis for the relatively unsuccessful percussion drilling program in 1994 which in retrospect penetrated only the propylitic zone. The large disseminated sulphide body was missed by both survey and drilling as also was the large massive-sulphide body. It was the results of the detailed logging and petrological examination of the percussion drill chips in 1997 by Gale and Read respectively, that led to the design and completion of the subsequent deep-probe IP survey. The deep-probe survey explained why the shallow probe survey and percussion drilling were unsuccessful.

These two large geophysical structures and their probable extensions are located within an intensely hydrothermally altered area that measures at 2.0 miles south-north, by 1.4 miles east-west which has been intruded by a mineralized and altered complex stock. The host rocks include a meta-volcanic and meta-sedimentary pile in which there is considerable skarnification and which may be mid-Permian in age. The complex stock includes gabbro, diorite, diorite porphyry, quartz diorite and tonalite. Leucocratic felsic rocks and albitite (albite porphyry) are observed in thin section from selected drill chips.

The main intrusive member could be the altered **tonalite** with both quartz-diorite porphyry and porphyritic tonalite phases which are significant in the production of copper and copper-gold mineral deposits.

Alteration identified through thin section petrography includes but is not limited to albitization, saussuritization, carbonatization, sericitization, pyritization, silicification. tourmalinization and skarnification. Alteration also includes significant hematite and magnetite. **Carbonitization is intensive and widespread and represents catastrophic removal of calcium** due to chemical replacement reactions having occurred at depth during the mineral depositing stagc. Both sodic and sodic-calcic alteration are common features in alkaline Cu-Au deposits peripheral to the central core of potassic alteration (Jensen & Barton, 2000)

The albitizatlon with low-grade copper in the propylitic zone could be indicative of a spatial relationship with intermediate and high grade albitization in the intrusive phase hosting the disseminated sulphide body where the IP pseudosections show high-chargeability (disseminated sulphides) in direct association with high resistivity (silicification). Albitization zones at Ajax-Afton, and Mount Milligan contained high-grade copper and gold mineralization.

Assays from drill chips from Holes RC 93-1 to RC 93-5 in the propylitic zone, in addition to containing both very and extremely-anomalous copper, show abundant **anomalous gold palhfinder elements. Au** is slightly above threshold to very anomalous. **As** is very anomalous to extremely anomalous. **Sb** is extremely anomalous. The system also contains very anomalous **V** and extremely anomalous **B**. In all probability the disseminated sulphide body has an associated gold resource. However in the collection of drill chips for assay the sludges were not collected which makes the gold assay results incomplete.

According to Hodgson, C.J. (1993) qnoting Burrows and Spooner (1987), gold bearing magmatic fluids responsible for mesothermal lode gold deposits have been linked to large **tonalite**-trondhjemite-granodiorite complexes that surround and intrude greenstone belts. Hence the same mineralizing mechanism with the felsic tonalites acting as the "gold bringers" could also be at work here in combination with a copper-gold producing magma. In that seetion of stream which passes through the claims the source of coarse placer gold, discovered in 1857, has yet to be found.

To the northeast, east, and southeast, there is intense skarnification and **marhleization** development probably to a great depth along the contact zone within the sedimentary-volcanic succession which hosts the complex intrusive system. This marbleization adds another dimension to the possibilities for ore body formation in this system. Notwithstandlng the interpreted volcanic associated massive sulphide body, the disseminated sulphide bearing porphyritic system along the contact zone has been emplaced into rocks that probably have low permeabilities especially the marbleized-limestone. **According to R. Sillitoe (2000) this part of the intrusive environment is a particularly favourable target area for a high-grade gold-rich porphyry deposit** because of thc impermeable marbleized limestone's capacity (located east and south of the intrusive stock) to prevent lateral and in some cases also vertical dissipation of metalliferous fluid. Gold and copper grades also seem likely to be higher in deposits generated beneath rather than within volcanic edifices because of more efficient retention of mineralized magmatic fluid. Therefore this concept could also be responsible as an alternative mineralizing mechanism for producing the massive sulphides.

The property consists of 7 mineral claims of about 3,000 acres. It is located 25 miles south-southwest from the world-giant Valley Copper deposit close to Trans-Canada Highway 1 and the Canadian Pacific Railroad. The claims are easily accessed by good grade logging road. More than $180,000 has been spent on exploration in the last decade resulting in the definition of 2 major mineral deposit targets which are virtually unexplored.

This property is at that stage which offers the **greatest reward to risk ratio** for the exploration money spent where at least one portended mineral resource has been identified with the possibility of a second mineral resource also being present. In relative "orebody finding" exploration terms only a nominal amount of additional geoscientific work and drilling is required to make a major discovery. The odds here have now shifted such that the task at hand is to prove that a major deposit is **not** there.

J. M. Ashton, P.Eng.

February, 2004
Vancouver, British Columbia

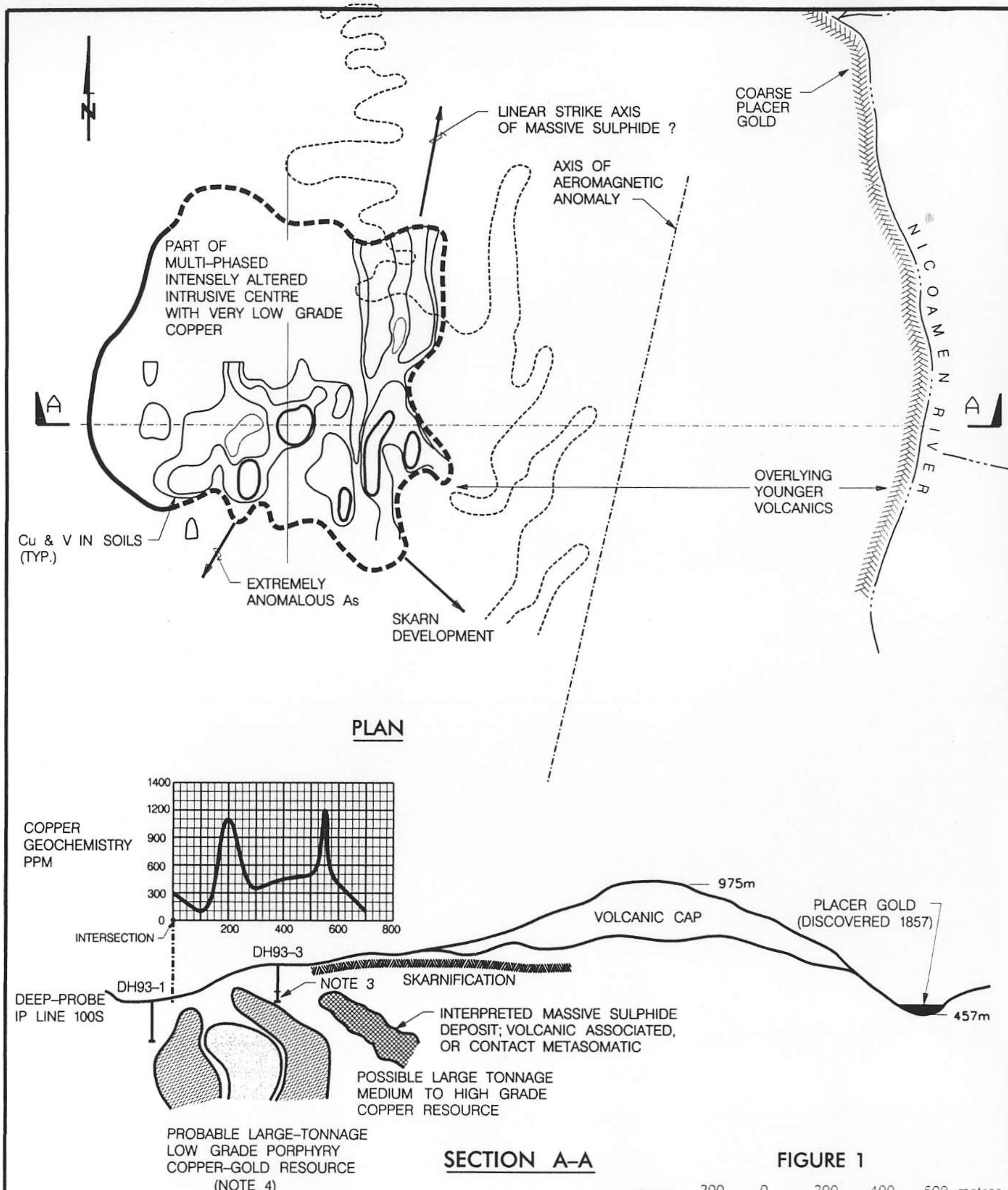


FIGURE 1

SCALE 1:20,000 — 200 0 200 400 600 metres

NOTES

1. Cu GEOCHEMISTRY TERMINATES ABRUPTLY AGAINST YOUNGER VOLCANICS.
2. MODEL IS SCALED FROM GEOLOGICAL, GEOCHEMICAL & GEOPHYSICAL DATA.
3. 100' OF QUARTZ-CARBONATE PYRITE-CHALCOPYRITE STOCKWORKS.
4. ZONES OF DISSEMINATED SULPHIDES SHOWN IDENTIFIED FROM DEEP-PROBE (420m DEPTH) IP SURVEY CHARGEABILITY & RESISTIVITY DATA.
5. DRILL HOLES PENETRATED PROPYLITIC ZONE ONLY. DRILL HOLES CONTAIN ANOMALOUS GOLD & EXTREMELY ANOMALOUS ARSENIC & ANTIMONY.

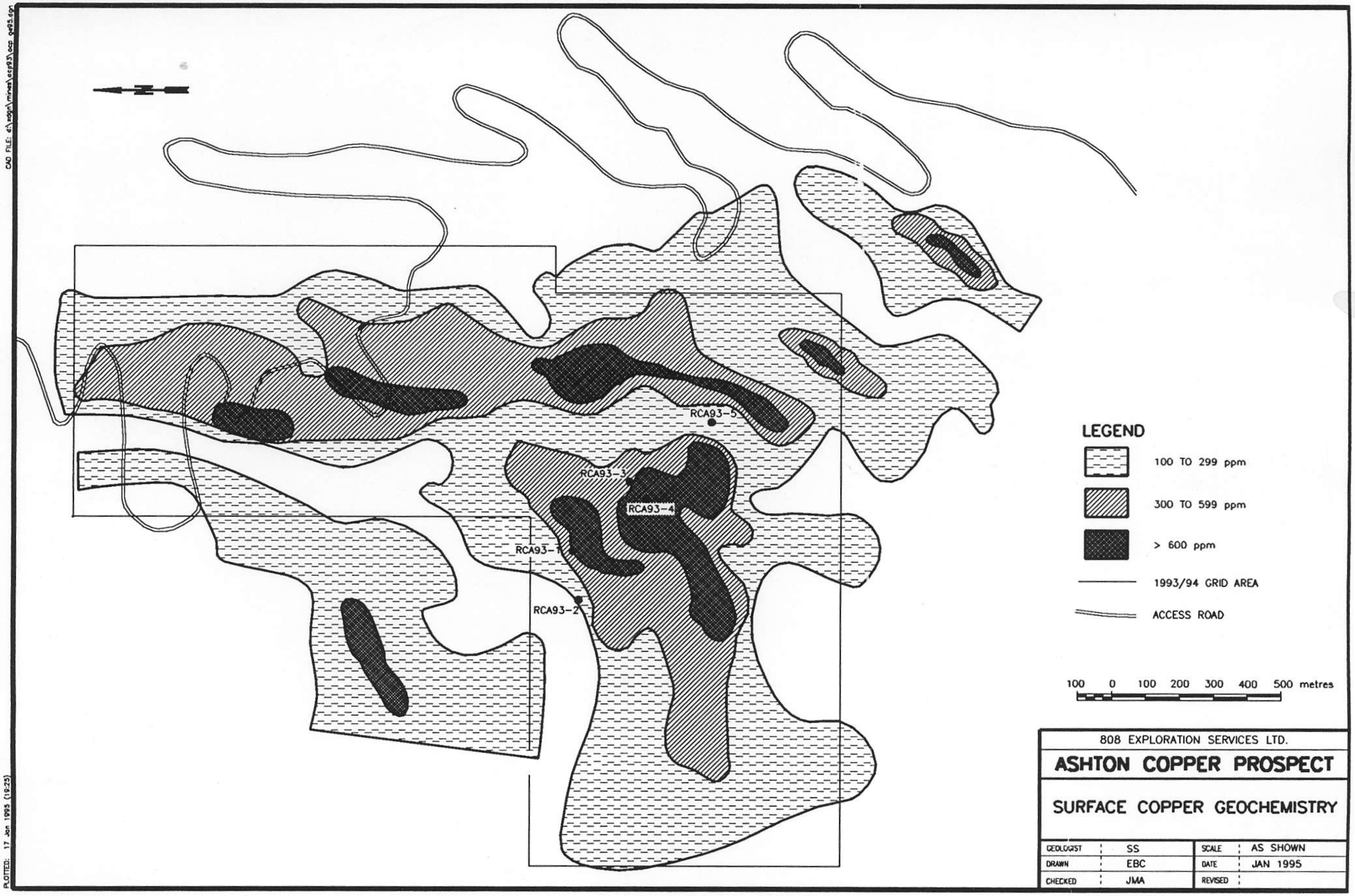
PLOTTED: 09 JUL 2003

808 EXPLORATION SERVICES LTD.

ASHTON COPPER-GOLD PROSPECT

COPPER-GOLD PORPHYRY & COPPER RICH MASSIVE SULPHIDE DEPOSIT, MODEL TO SCALE

ENGINEER	JMA	SCALE	AS SHOWN
DRAWN	EBC	DATE	JULY 2003
CHECKED	JMA	REVISED	


CAD FILE: d:\adgn\mines\acp93\acp ge95.dgn
N
RCA93-5
RCA93-3
RCA93-4
RCA93-1
RCA93-2
LEGEND
100 TO 299 ppm
300 TO 599 ppm
> 600 ppm
1993/94 GRID AREA
ACCESS ROAD
100 0 100 200 300 400 500 metres
808 EXPLORATION SERVICES LTD.
ASHTON COPPER PROSPECT
SURFACE COPPER GEOCHEMISTRY
GEOLOGIST : SS
SCALE : AS SHOWN
DRAWN : EBC
DATE : JAN 1995
CHECKED : JMA
REVISED :
PLOTTED: 17 Jan 1995 (19:23)