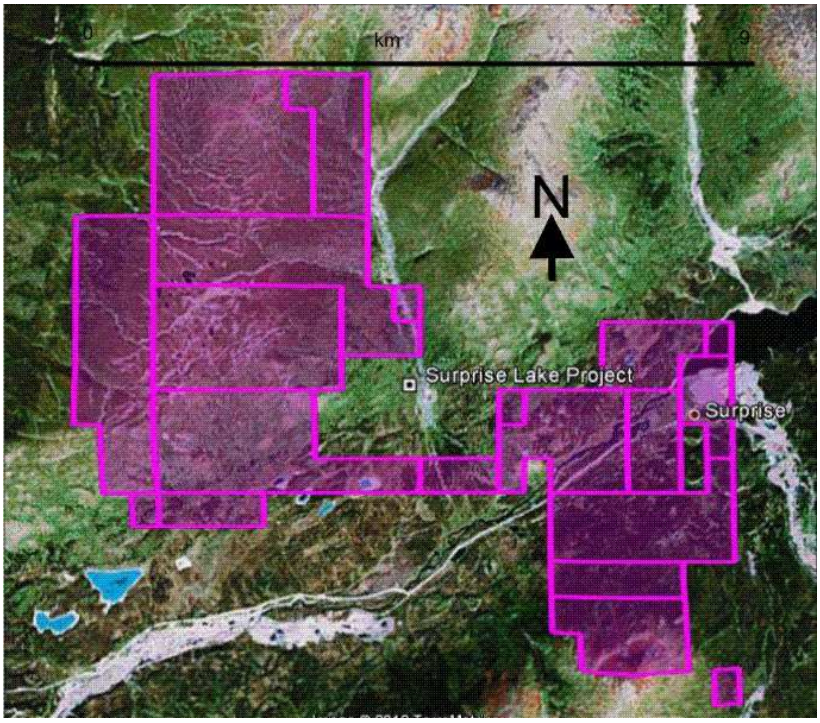
GEOPHYSICAL REPORT
ON A
Helicopter-borne Electromagnetic and Magnetic SURVEY
OVER THE
SURPRISE LAKE PROPERTY, ATLIN AREA
ATLIN MINING DIVISION, BRITISH COLUMBIA



PROPERTY LOCATION:
Surprise Lake, British Columbia
59° 38' N Latitude, 133° 28' W Longitude
Mineral Titles Maps: M104N053, '54, '63, '64
N.T.S. - 104N/11

FOR: DOUBLE CROWN VENTURES LTD.
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SUMMARY

This report covers the interpretation and reprocessing of a helicopter-borne geophysical survey over the Surprise Lake Project of Double Crown Ventures Ltd. The Fugro (Dighem) Electromagnetic and Magnetic surveys were carried out on the Double Crown Ventures claims blocks within the Atlin Mining Division of B.C. This property is located on Pine Creek at the west end of the Surprise Lake. A large part of this report is taken verbatim from the survey logistics report provided with the digital survey data by Fugro Airborne Surveys Corp. The purpose of the survey was to locate auriferous mineralization associated with listwanite, similar to the nearby Yellowjacket Prospect , to determine the geophysical signatures over any known zones of mineralization and to provide information that could be used to map the geology and structure of the property. The Yellowjack deposit of gold/silver mineralization, is a bonanza-type gold occurs within listwanite and with associated sulphides. The deposit was previously explored by Prize Mining and is now owned by Yellowjacket Resources.

Data were acquired using an electromagnetic system, supplemented by a high-sensitivity cesium magnetometer. The survey was flown between August 13th and August 17th, 2011. The information from these sensors was processed to produce maps and images that display the magnetic and conductive properties of the survey area. The surveys were carried out using a Dighem multi-frequency system operating at 56,000 Hz, 7200 Hz and 900 Hz and a cesium vapour magnetometer. Survey lines were set 100 meters apart.

The survey covered twenty individual claims, numbered:
902310,902329,902349,902509,902549,902569,902609,902709,902769,902789,902809,902849,
902869,902889,902909,902929,902989,903169,929242, and 930100.
The claims form a contiguous block that straddles the Pine Creek valley and the adjoining highlands of Spruce Mountain and Birch Creek.

CONCLUSIONS

1. The airborne survey revealed four resistivity lows that have been labeled by the upper case letters A to D.
2. Anomaly A is the main high and occurs along the western boundary of the main magnetic high with a magnetic low to its west, the low being a reflection of the main band of listwanite. It also correlates with the boundary of a resistivity high and a resistivity low. Therefore, anomaly A is probably reflecting sulphides occurring within a contact zone between an ultramafic rock type and the listwanite. The MMI results from the 2007 sampling support this since a gold/copper/silver anomaly correlates directly with Anomaly A. The survey work done in 2010 showed that anomaly A extends northerly for a strike distance of at least 1000 meters.
3. Anomaly B, also probably reflecting sulphides, occurs to the immediate west of the eastern magnetic high and correlates with a resistivity low.
4. Anomaly C correlates directly with the weaker magnetic anomaly as well as a resistivity high. This suggests that the causative source is sulphides within a mafic or ultramafic intrusive
5. Anomaly D occurs to the south of anomaly A as well as correlates directly with the listwanite suggesting the listwanite at this location contains sulphides.

RECOMMENDATIONS

Zone A

1. Anomaly A in the centre of Zone A circled on the anomaly map should be followed up with an MMI soil sampling survey. MMI soil sampling should be carried out wherever possible over the grid area. The sampling should be done every 25 meters preferably on the 50-meters lines. If the budget is limited, then the line spacing should be no more than 100 meters.
2. A magnetic survey taking a reading every 12.5 meters on lines 50 meters apart is recommended. The magnetic survey to date has been particularly adept at mapping the ultramafic rock types that are related to any possible mineralization.
3. The IP survey should also be continued to the north, east, and west, but on lines 100 meters apart. At this point the IP survey has produced drill targets, but the IP survey should be filled in and extended in order to optimize the drill targets.
4. The surrounding area should also be geologically mapped.
5. Targets resulting from the above work, especially the IP and MMI sampling, should then be diamond drilled.

Zone B

1. As Zone B is an extensive anomalous zone, reconnaissance mapping is recommended.
2. An MMI sampling lines over the strongest anomalies, one in the north centre of zone B and the group of anomalies at the southern end of the anomalous zone will help to resolve individual targets for more detailed follow-up. With positive results from this work a program as outlined for zone A should be undertaken.

Zone C

1. The anomaly axes match well with the previously identified IP anomalies and known listwanite. Therefore, even though the anomalies are relatively weak EM responses follow-up is recommended on anomalies10660 A and B, 10670A, 10690B and 10700A.
2. Targets already identified should be diamond drilled.

Zone D

1. The wide zone of anomalies are difficult to separate in specific targets, however, MMI sampling over anomaly 10680E would indicate if this anomaly is a viable drill target.

INTRODUCTION

The Surprise Lake Property is located in the northwestern corner of British Columbia (Figure 1), 8 kilometers to the east of Atlin village, which is on the eastern shore of Atlin Lake. The Property is located within the Atlin Mining Division in northwestern British Columbia. The non-surveyed claims cover an area of 2292.307 hectares centred at latitude 59° 38' N and longitude 133° 28' W within NTS map sheets 104N 053, 054, 063 and 064. The Property boundaries are within UTM NAD 83 Zone 8, co-ordinates 243,000 and 251600 Easting; and 6621400 and 6620500 Northing. Double Crown Ventures Ltd. ("Double Crown") owns a 100% interest in the twenty claim block that comprise the Surprise Lake Property. Access is by the Surprise Lake road as well as many logging and placer trails that branch out from this main road. Pine Creek flows through the centre of the property and is characterized by a wide flat valley flanked by rounded mountains to the north and south.

The Surprise Lake Property is predominantly underlain by the Atlin Ophiolitic Assemblage, which is composed of a sequence of mid Jurassic, relatively flat-lying, coherent thrust slices of oceanic crustal and upper mantle rocks. The most dominant lithological unit is metabasalt. Ultramafic peridotite occurs in an arcuate thrust slice in the northwestern part of the property and as small lenses in the southeast. The prospective ophiolite assemblage and the adjacent carbonatized ultramafic rocks underlie large parts of the Surprise Lake property. Listwanites have also been identified at the Surprise showing. These favourable geological settings indicate that the property has the potential to host gold deposits of the listwanite association. The best target is considered to be within a belt enveloping the contact zone between the ultramafic and ophiolitic assemblages.

Placer gold deposits in the Atlin camp are situated in stream valleys occurring within erosional windows through the carbonatized, relatively flat lying thrust faults within the ophiolitic assemblage. The placers are considered to be derived from auriferous quartz lodes originally hosted by the ophiolitic crustal rocks. Large parts of the Surprise Lake property are situated within

the drainage basins of several prolific gold placer streams such as Pine Creek and Spruce Creek. It can be concluded that some of the placer gold was likely derived from the bedrock on the property.

Gold quartz veins in the Atlin area are poorly and erratically developed within the ultramafic rocks and more commonly occur as random fracture fillings. Wider, more continuous tabular fissure veins have only been identified in the mafic igneous crustal components (andesite, gabbro, diabase) of the Atlin ophiolite assemblage. Gold-quartz vein deposits and their derived placers are commonly associated with carbonate+/-sericite+/-pyrite altered ophiolitic and ultramafic rocks known as "listwanites". Provincial examples of gold camps with spatially associated ultramafic rocks include the Bridge River, Cassiar and Rossland lode gold and the Atlin and Dease Lake placer camps.

Diamond drilling and bulk sampling is currently being carried out on the nearby Yellowjacket gold showing. Many high grade gold intersections have been reported by Prize Mining Ltd. from this "listwanite – hosted" showing. A feasibility study is being carried out on the Ruby Creek molybdenum prospect, which adjoins the Surprise Lake property to the northeast. Adanac Molybdenum Corporation Ltd. is reporting a resource of 213 million tonnes with a grade of 0.063% of Molybdenum from this prospect.

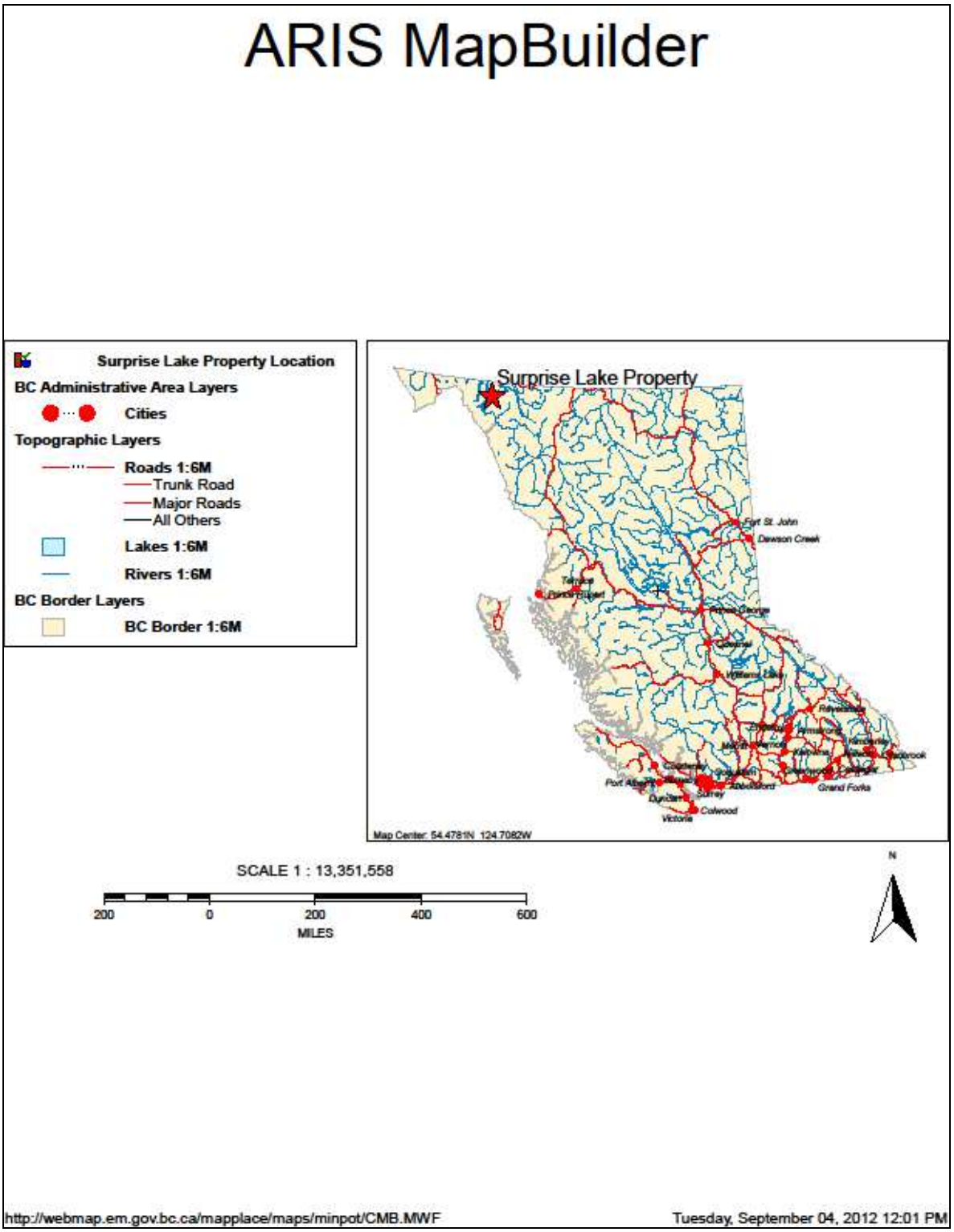

FIGURE 1 SURPRISE LAKE PROPERTY LOCATION MAP

During 2006 and 2007, Double Crown Ventures Ltd. carried out geophysical and geochemical surveys as well as prospecting over parts of the property. Several rock samples returned elevated

gold values. This work delineated a number of anomalies over a belt of listwanites on the Surprise prospect. It is the opinion of the author that the favorable geological setting and results of the work done to date show that the Surprise Lake property has the potential to host economically feasible mineral deposits. Because the property has not been intensively explored and is characterized by minimal rock exposure, considerable potential exists and a substantial amount of exploration work is warranted. A two-phase exploration program is recommended for the property. The first phase would comprise a program of property-wide reconnaissance exploration as well as detailed work on the Surprise Showing. The second phase would consist of diamond drilling of targets developed during the initial phase. The second phase would be contingent on receipt of favourable results from the first phase.

In 2010 the property was optioned to Bastion Resources Ltd. Double Crown Ventures Ltd. agreed to option a 50% interest in the Surprise Lake Property for a purchase price of $120,000, 300,000 shares and exploration expenditures of $1,200,000 and a 2.5% net smelter return attached to the Surprise Lake Property Claims, payable to Decoors Mining Corporation "Decoors") pursuant to an agreement dated April 19, 2005 between Decoors and Terry D. Severs. The agreement also stated, regarding Assessment Work; that the "optionee shall file, where necessary, in whole or in part, evidence of assessment work as the same may become available from exploration and other operations conducted on the Property (as reduced or increased pursuant to this Agreement) during the Option Period."

Bastion Resources Ltd. contracted Fugro Airborne Surveys Corp. to conduct a helicopter-borne geophysical survey over the Surprise Lake property as part of their work commitment to Double Crown Resources. The airborne survey data was delivered to Double Crown as part of the option agreement.

Bastion completed the airborne survey that is the subject of this report, however, they failed to file the work done and subsequently the claims expired requiring re-staking by Double Crown the same day as the forfeiture. However, as the initial airborne work was done on claims that subsequently expired and were re-staked, the airborne survey was not applicable to the assessment work requirement. With the termination of the option agreement and subsequent re-staking of the property, Double Crown is the current and 100% owner of the Surprise Lake project.

ACCESSIBILTY, CLIMATE, INFRASTRUCTURE AND PHYSIOGRAPHY

Access to the Surprise Lake Property is via the Surprise Lake Road, east from Atlin for approximately ten kilometres (Figures 1 & 2). Currently, the road is located near the centre of the Property. The Surprise Showing can be reached in summer by four wheel-drive vehicle traveling south along the Otter Creek placer road near Surprise Lake, then four kilometres west along a drill access road to within 200 metres of the Showing. The western part of the Property can be reached by traveling along the Spruce Creek road. The climate is typical of northern British Columbia with winter temperatures averaging -15°C in January as well as moderate snowfall. Winter conditions can be expected from October to April. A pleasant summer climate is characterized by average temperatures of 20°C and little precipitation. Total average annual precipitation in Atlin is measured at 279.4 millimetres.

Power lines follow the Surprise Lake Road to within three kilometres of the Surprise Lake Property. Abundant water is available for exploration and mining from Pine Creek and its tributaries. Crew lodgings are available in Atlin. A skilled labour force and equipment for mining and exploration is available in Atlin or Whitehorse, Yukon, a 2-hour drive to the north.

Whitehorse is the major service and supply centre for resource companies working in northwestern British Columbia and Yukon.

Pine Creek flows in a broad valley through the centre of the Property and is flanked by rounded mountains with moderate relief. In the far southwestern boundary of the Property, the elevation reaches a maximum of 1640 metres on Spruce Mountain. Outcrop is very limited in the stream bottoms but relatively common in creek valleys, road cuts and on some of the steeper slopes. Above the tree line, felsenmeer is common and is likely representative of the underlying bedrock. Glaciers occupied the Teslin Plateau and, thus, much of the Property is covered byglacial drift. Generally, the overburden is thin, but can be quite thick in the valley floors.
The tree line occurs at approximately 1400 metres a.s.l. on north facing slopes and 1500 metres a.s.l. on south facing slopes. Below the tree line, the valleys are forested with lodge pole pine, black spruce, aspen and scrub birch. Alder and willow grow near streams and stunted buck brush covers the hills above the tree line.

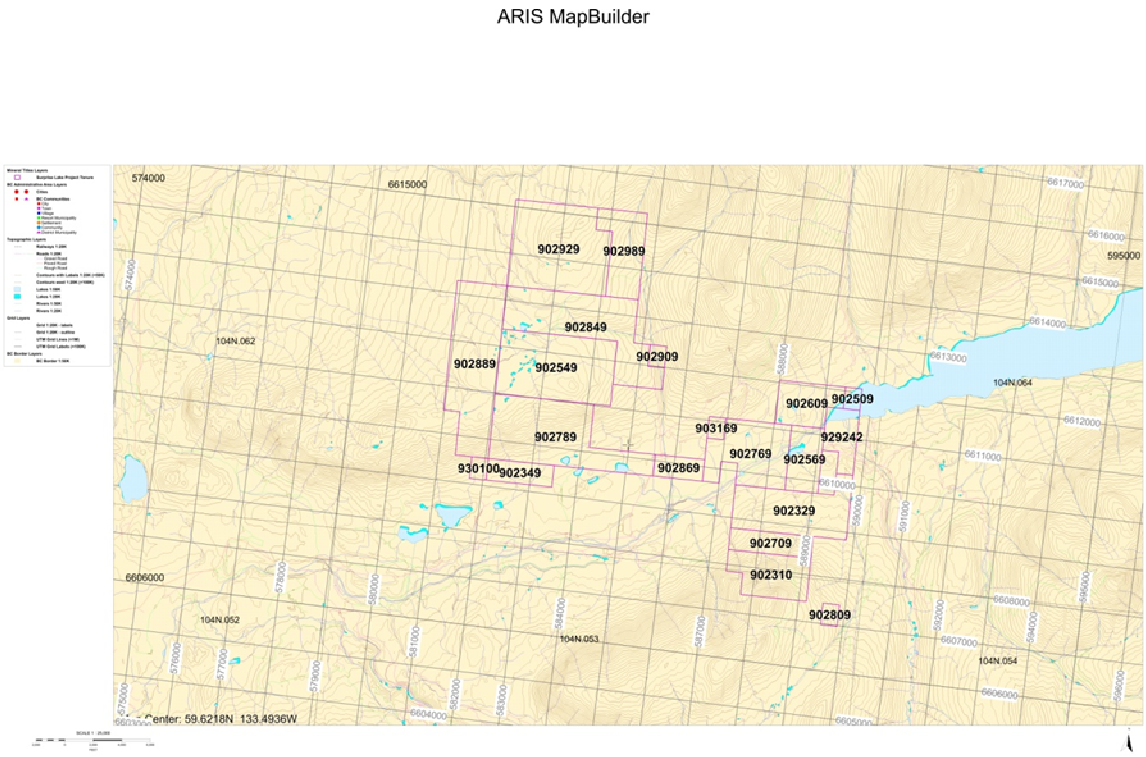

FIGURE 2 SURPRISE LAKE CLAIM BLOCK

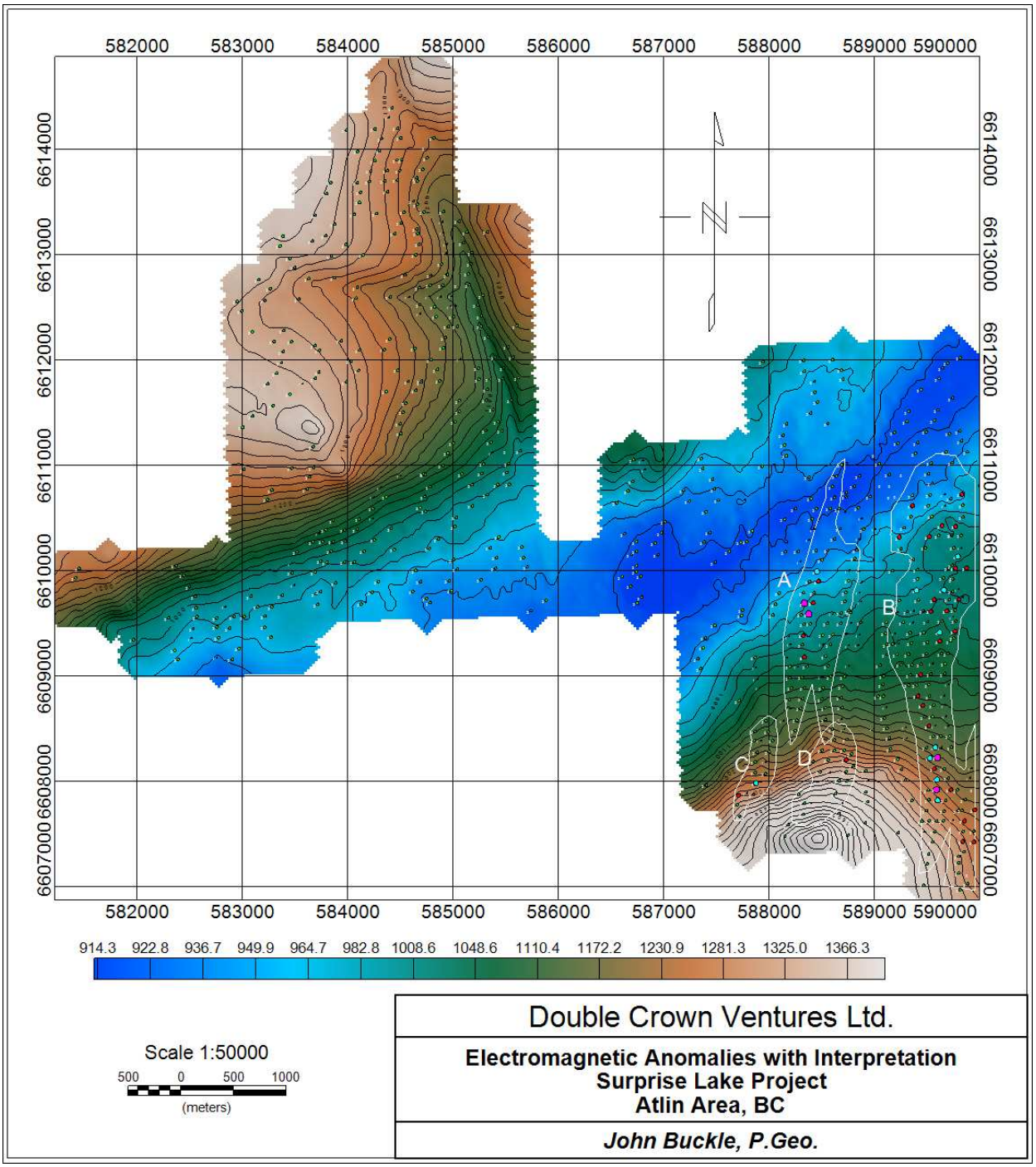

FIGURE 3 COLOUR SHADOW IMAGE OF TOPOGRAPHY

HISTORY OF EXPLORATION IN THE SURPRISE LAKE AREA

(This section is quoted from NI 43101 report by David Dupre on the property)

The Atlin placer gold camp, located in northwestern British Columbia on the eastern shore of Atlin Lake ranks as the second largest producer of placer gold in the province. For most of its history, mining has been the economic mainstay for the town of Atlin since the discovery of gold

on Pine Creek in 1897 (Mandy, 1936). Gold was first discovered in the Atlin area in 1897 by Fritz Miller while en-route to Dawson City, Yukon. Multiple workings were on Pine Creek and by the end of 1898, more than 3000 people were camped in the Atlin area. Placer mining has been, for most of its history, the economic mainstay for the town of Atlin. Reported placer gold production between 1898 and 1946 (the last year for which records were kept) from the Atlin area totalled 634,147 ounces (Holland, 1950). A number of the larger placer deposits, including those on Otter, Spruce and Pine Creeks, continued to produce significant quantities of gold into the late 1980s. Although the total placer gold production from the area to date is not readily available, it probably exceeds 1,000,000 ounces of gold (Ash, 2001). Small-scale placer mining still takes place in the area. The author has been unable to independently verify some information and the showings in the Surprise Lake Area may not be indicative of mineralization on the property subject of this technical report. The information is purely present here as historical information and the reflects the scientific thinking at the time.

The numerous gold-bearing quartz veins that occur in the immediate area of the gold placer deposits are considered to be a gold source (Aitken, 1959; Ballantyne and MacKinnon, 1986; Lefebvre and Gunning, 1988; Rees, 1989; Ash and Arksey, 1990a, b) for at least a portion of the placer deposits.

The first systematic geological mapping of the Atlin area was that of Aitken (1959). Monger (1975; 1977a) mapped ten specific areas of the northern Cache Creek (Atlin) Terrane and provided the first regional overview and tectonic synthesis. Bloodgood et al. (1989a, b) conducted 1:50,000-scale geological mapping of the Surprise Lake (104N/11W) and Atlin (104N/12E) map areas. Bloodgood and Bellefontaine (1990) mapped the Dixie Lake (104N/6) and Teresa Island (104N15) sheets at a similar scale. Lefebure and Gunning (1989) compiled a 1:20,000 geological map of the Atlin mining camp using information obtained chiefly from exploration assessment reports.

Studies of lode-gold mineralization in the Atlin camp have been made by a number of researchers. Newton (1985) studied the mineralogical and geochemical character of listwanitic alteration assemblages from four lode gold properties in the area. A comparative study of the mineralogical and chemical characteristics of both the placer and lode gold was conducted by MacKinnon (1986). Bozek (1989) investigated trace element signatures related to listwanitic alteration halos on the Yellowjacket and Pictou properties, and identified potential pathfinder elements indicative of gold mineralization. Lefebure and Gunning (1988) and Rees (1989) published Property descriptions of the Yellowjacket and Pictou lode gold prospects, respectively. Ash (2004) published the most up-to-date and comprehensive study of the geology of the Atlin area.

Studies of the surficial geology of the camp include those of Black (1953), Proudlock and Proudlock (1976), Levson (1992) and Levson and Kerr (1992). In addition to these publications, results of a large volume of exploration work conducted in the immediate area are documented in assessment reports filed with the provincial government by mining and exploration companies. These reports include details of trenching, drilling and sampling programs as well as mapping and geophysical surveys.

Because of the long gold mining history of the Atlin “Camp”, it can be assumed that almost all of the area (including the Surprise Lake Property) has been subjected to intense prospecting activity. The two Showings on the Property, the Surprise Showing and the Cabin Silver occurrence, both have a recorded work history that is described below.

SURPRISE SHOWING

The Surprise Showing was examined by the author on several occasions between 2007 and 2011. The Surprise Showing (B.C. Government Minfile 104N076) is located on the northeastern flank of Spruce Mountain–one kilometre northeast of the summit. The area is underlain by basalts of the Lower Mississippian to Lower Pennsylvanian Nakina Formation, Mississippian to Triassic Cache Creek Group (Complex?) and Pennsylvanian to Permian ultramafics of the Atlin Ultramafic Allochthon. The ultramafics are spatially related to these Cache Creek rocks and Monger (1974) believes they may be genetically related as well. The contact with the Late Cretaceous Surprise Lake Batholith occurs several kilometres to the northeast. The occurrence is described as a series of steeply dipping quartz veins approximately 3.5 kilometres long, hosted by carbonatized metabasaltic rocks (listwanite) near a faulted contact with intensely carbonatized ultramafic rocks. Ultramafic rocks form a north-northeast trending lens with a width of approximately 150 metres at the Showing and appears to significantly thin to the east, see figure 5 for location. The author examined the listwanite band over a strike length of 400 metres representing the portion that outcrops on the Surprise Lake Property. It was observed to continue to the north and south of the portion that was examined. The listwanite varies in thickness from 3 metres to 25 metres. It is buff-white to dull grey and weathers to a distinctive orange-brown colour. The degree of carbonate alteration is variable and is probably related to faulting parallel to the contacts of the listwanite. Quartz veins and stringers are irregularly distributed throughout the listwanite and very in width from less that 1 cm to more than 3.6 metres at the adit. Fuchsite is common and its abundance is generally related to the intensity of quartz veining. The quartz veins are banded in places – suggesting repetitive emplacement. Pyrite is the most common sulphide minerals but is not very abundant.

The author observed minor amounts of galena, pyrite, chalcopyrite and siderite within the quartz vein exposed in an old adit. Sampling of this Showing in 1982 returned values of 0.042 ounces of gold per ton and 1.20 ounces of silver per ton. A series of 1980 bulldozer trenches located north of the adit exposes a carbonatized serpentinite containing numerous small quartz veins, pyrite and pervasive mariposite. Chip samples collected from the trenches assay as high as 0.018 ounces of gold per ton. No widths are given in the assessment report for these “chip” samples.

PREVIOUS WORK ON THE SURPRISE SHOWING

Prior to 1925 exploration on this quartz vein, via an adit, revealed minor amounts of argentiferous galena, pyrite, chalcopyrite and siderite mineralization. Sampling in 1982 of this Showing by Standard Gold Mines Ltd. (Assessment Report #11,138) returned values of 0.042 ounces per ton (1.27 g/t) of gold and 1.20 ounces per ton (36.58 g/t) of silver. A series of bulldozer trenches exposes a carbonatized serpentinite (Listwanite) containing pyrite and pervasive mariposite. As part of a larger exploration program (including two short lines of VLF-EM and a limited contour soil-sampling program) carried out by Standard Gold Mines Ltd. (“Standard Gold”), ten rock “chip” samples were collected for assay at the Surprise Showing. Most of these were collected on ground now covered by the Surprise Lake Property. Typically, the samples consisted of two or three fist-sized representative specimens although areas of mineralization and geological interest were systematically “chip” sampled, although no sample dimensions were reported. The samples were shipped to Chemex Labs Ltd. in North Vancouver where they were then crushed to a -100 mesh and fire assayed for gold. The rock descriptions and results of this sampling program are tabulated below in Table 1.

TABLE 1 HISTORICAL (STANDRD GOLD) SAMPLING RESULTS - SURPRISE SHOWING

Assay#.	Sample No.	Au (oz/ton)	Au (g/t)	Description
38325	SH206	0.042	1.440	Surprise Showing, chip sample across a quartz vein
38330	SP001	0.010	0.343	Carbonatized ultramafic from trench
38331	SP002	<0.003	<0.103	Silicified, carbonatized serpentinite from trench
38332	SP003	<0.003	<0.103	Carbonatized serpentinite with mariposite
38333	SP004	0.004	0.137	Carbonatized serpentinite with mariposite
38334	SP005	0.003	0.103	Carbonatized ultramafic gouge from trench
38335	SP007	0.004	0.137	Silicified carbonatized serpentinite with mariposite from trench
38336	SP008	0.018	0.617	Carbonatized ultramafic with mariposite from trench
38337	SP006	0.004	0.137	Quartz veinlets with mariposite stained carbonatized ultramafic
38338	Sp010	0.003	0.103	Carbonatized serpentinite from trench

Standard Gold Mines also did two short lines of VLF-EM and a limited contour soil-sampling program over a small

CABIN SILVER SHOWING

The Cabin Silver occurrence is located approximately half way along Birch Creek northwest of the west end of Surprise Lake; it is about 15 kilometres northeast of Atlin. The mineral occurrence was discovered in 1984 during a surface exploration program but no reported subsequent work has been carried out on it. The Showing occurs within mafic volcanic and ultramafic rocks of the Mississippian to Triassic Cache Creek Group (Complex?). Massive, dark green andesitic to basaltic flows of the Lower Mississippian to Middle Pennsylvanian Nakina Formation occur with narrow bodies of variable altered ultramafic rocks of the Atlin Ultramafic Allochthon. This may represent sill-like bodies that are coeval with the mafic flows. The occurrence is very near the southern margin of the Early Cretaceous Fourth of July Creek Batholith. The Showing comprises three quartz-calcite veins, which are around 50 centimetres wide and have varying attitudes. One of the veins contains visible galena, chalcopyrite, pyrite, arsenopyrite, and sphalerite. One sample contained 583 grams per tonne silver, 0.96% lead, 0.14% zinc, and 0.07 grams per tonne gold. A 20-centimetre vein sample contained 1.37 grams per tonne gold (Assessment Report #13643). The veins are exposed in the bank of Birch Creek. see figure 5 for location

PREVIOUS WORK ON THE CABIN SILVER SHOWING

In 1985 Daiwan Engineering (Assessment Report #13643) carried out a large program of soil sampling (538 samples), grid establishment, prospecting and geological mapping over an area to the north of Pine Creek and west of Birch Creek. The Cabin Silver Showing was discovered at this time and was sampled. The results of this sampling are tabulated below. The Showing comprises three quartz-calcite veins, which are around 50 centimetres wide and have varying attitudes. One of

the veins contains visible galena, chalcopyrite, pyrite, arsenopyrite, and sphalerite. One grab sample (#8400502) contained 583 grams per tonne silver, 0.96 per cent lead, 0.14 per cent zinc, and 0.07 grams per tonne gold. A 20-centimetre vein sample contained 1.37 grams per tonne gold (Assessment Report #13643). The veins are exposed in the bank of Birch Creek.

In 1985, the Surprise Lake Exploration Syndicate carried out a seven line-kilometre ground magnetometer and VLF survey to investigate anomalies detected by a Dighem Survey in 1984. Strong magnetic responses typical of unaltered ultramafic or volcanic rock were delineated. Several discontinuous VLF anomalies were also outlined. This Showing is located just to the north of the Cabin Silver occurrence – outside the Surprise Lake Property.

TABLE 2 CABIN SILVER SHOWING SAMPLING RESULTS

Vein No.	Sample No.	Ag (oz/t)	Au (oz/t)	Cu (%)	Pb (%)	Zn (%)	Sample Length	Remarks
1	8400502	13.70	0.002	0.01	0.96	0.14	Grab	Vein
1	8400503	8.98	0.002	0.01	0.96	0.14	40 cm	Vein
1	8400504	1.56	0.001	0.03	0.10	0.09	40 cm	Footwall
1	8400505	2.03	0.01	0.00	0.08	0.01	20 cm	Vein
1	8400506	5.32	0.001	0.02	0.34	0.39	75 cm	Vein
1	8400507	1.10	0.01	0.02	0.08	0.11	50 cm	Footwall
1	8400508	0.07	0.01	0.01	0.01	0.04	50 cm	Hangingwall
1	8400509	1.11	0.01	0.03	0.11	0.10	10 cm	Fault zone
2	8400510	0.23	0.04	0.02	0.02	0.02	20 cm	Vein
3	8400511	1.06	0.001	0.01	0.02	0.01	Grab	Vein

GEOLOGICAL SETTING

(This section is quoted from David Dupre's Summary within his report on the property.)

REGIONAL GEOLOGY

(reproduced from Ash, 2001)

The Atlin region is located in the northwestern corner of the northern Cache Creek (Atlin) Terrane. It contains a fault-bounded package of late Palaeozoic and early Mesozoic dismembered oceanic lithosphere, intruded by post-collisional Middle Jurassic, Cretaceous and Tertiary felsic plutonic rocks. Mixed graphitic argillite and pelagic sedimentary rocks that contain minor pods and slivers of metabasalt and limestone dominate the terrane. Remnants of oceanic crust and upper mantle lithologies are concentrated along the western margin. Dismembered ophiolitic assemblages have been described at three localities along this margin, from north to south they are: the Atlin, Nahlin and the King Mountain assemblages. Each area contains imbricated mantle harzburgite, crustal plutonic ultramafic cumulates gabbros and diorite, together with hypabyssal and extrusive basaltic volcanic rocks. Thick sections of late Palaeozoic shallow-water limestone dominate the western margin of the terrane and are associated with alkali basalts. These are interpreted to be carbonate banks constructed on ancient oceanic islands within the former Cache Creek ocean basin.

The Middle Jurassic timing of emplacement of the northern Cache Creek Terrane over Late Triassic to Lower Jurassic Whitehorse Trough sediments along the Nahlin fault is well constrained by combined stratigraphic and plutonic evidence. The youngest sediments affected by deformation

related to the King Salmon Fault are Bajocian rocks that are immediately underlain by organic-rich sediments of Aalenian age. They are interpreted to reflect loading along the western margin of Stikinia by the Cache Creek during its initial emplacement. The oldest post-collisional plutons that pierce the Cache Creek Terrane to the west of Dease Lake are dated at 173 ±Ma by K-Ar methods and in the Atlin area they are dated at 172 ±Ma by U-Pb zircon analyses. Considering the age of these plutons relative to the orogenic event, the descriptive term of late syn-collisional is preferable.

The Northern Cache Creek Terrane to the east is bordered mainly by the Thibert Fault, which continues northward along the Teslin lineament. Discontinuous exposures of altered ultramafic rocks along the fault suggest that it has previously undergone significant reverse motion and may be a reactivated thrust or transpressional fault zone. The latest movement on this fault is thought to be dextral strike-slip, of pre-Late Cretaceous age. Sub-greenschist, prehnite-pumpellyite facies rocks dominate the terrane; however, local greenschist and blueschist metamorphism are recorded. A northwesterly-trending grain characterizes the terrane; however, in the Atlin-Sentinel Mountain area there is a marked deviation from this regional orientation with a dominant northeasterly trend. Reasons for this divergence in structural grain are poorly understood.

LOCAL GEOLOGY

(After Ash, 2001)

The geology of the Atlin area is divisible into two distinct lithotectonic elements. A structurally higher, imbricated sequence of oceanic crustal and upper mantle lithologies termed the “Atlin Ophiolitic Assemblage”, is tectonically superimposed over a lower and lithologically diverse sequence of steeply to moderately dipping, tectonically intercalated slices of pelagic metasedimentary rocks with tectonized pods and slivers of metabasalt, limestone and greywacke termed the “Atlin Accretionary Complex”. Locally these elements are intruded by the Middle Jurassic calc-alkaline Fourth of July batholiths, related quartz-feldspar porphyritic, and melanocratic dyke rocks.

The Atlin Ophiolitic Assemblage comprises an imbricated sequence of relatively flat-lying, coherent thrust slices of obducted oceanic crustal and upper mantle rocks. Mantle lithologies are dominated by harzburgite tectonite containing subordinate dunite and lesser pyroxenite dykes. The unit forms an isolated klippe that underlies the town of Atlin and the area of Monarch Mountain, that is located four kilometres southeast of the town. The harzburgite is also exposed on the northern and southern slopes of Union Mountain, ten kilometres south of Atlin.

Oceanic crustal lithologies in the Atlin map area, in decreasing order of abundance, include metamorphosed basalt, ultramafic cumulates, diabase and gabbro. The metabasalts are generally massive, fine grained to aphanitic and weather a characteristic dull green-grey colour. Locally, the unit grades into medium-grained varieties or diabase. Primary textures locally identified in the metabasalt include flow banding, autobrecciation and rare pillow structures. Although rarely exposed, basalt contacts are commonly sheared or brecciated zones, intensely carbonatized in places. Petrochemical investigations of these basaltic rocks indicate they are similar in composition to basalts of normal mid ocean-ridge settings and their chemistry suggests a genetic relationship to the metamorphosed (mantle) ultramafic rocks. Serpentinized peridotite forms an isolated thrust sheet that outcrops discontinuously along an east-trending belt 1 to 3 kilometres wide on the south-facing slope of Mount Monroe, located four kilometres northeast of Atlin. Extensive

exploration drilling long the base of Mount Monroe at the Yellowjacket Prospect (by Prize Mining Ltd.) suggests that the serpentinized body is highly prospective. This serpentinized body extends onto the western part of the Surprise Lake Property. Carbonatized and serpentinized ultramafic rocks are found outcropping on the southern part of the Surprise Lake Property near the summit of Spruce Mountain. Prospect indicates that the serpentinized body is in structural contact with metabasaltic rocks along a gently northwest-dipping thrust. This serpentinized body extends onto the western part of the Surprise Lake Property. Carbonatized and serpentinized ("listwanitic") ultramafic rocks outcropping on the southern part of the Surprise Lake Property near the summit of Spruce Mountain represent a remnant above an extension of the same tectonized and altered basal contact. The Atlin Accretionary Complex comprises a series of steeply to moderately dipping lenses and slices of intercalated metasedimentary and metavolcanic rocks that underlie the southern half and northwest corner of the Atlin region. Metasedimentary rocks dominate the unit and consist of argillites, cherty argillites, argillaceous cherts and cherts with lesser limestone and greywacke. They range from highly mixed zones with well-developed flattening fabric indicative of tectonic mélange to relatively coherent tectonic slices. Individual slices range from metres to several hundreds of metres in width. Indications of internal deformation are moderate or lacking; in a few slices original stratigraphy that is well preserved. Contact relationships between many of the individual units of the complex have not been established due to a lack of exposure; however, most are inferred to be tectonic.

A common feature throughout the Accretionary Complex, particularly in areas of moderate overburden, is closely spaced outcroppings of different lithologies with no clearly defined contacts. Such relationships are interpreted to represent areas of mélange in which the exposed lithologies that commonly include chert, limestone and basalt are more competent than the intervening, recessive fissile and argillaceous matrix. Such relationships are confirmed where sections are exposed along roads cuts and trenches.

SURPRISE LAKE PROPERTY GEOLOGY

The Surprise Lake Property is underlain by the Atlin Ophiolitic Assemblage, as described previously; a package of oceanic crustal and upper mantle rocks. The most dominant lithological unit is metabasalts, with ultramafic peridotite occurs in an arcuate slice in the northwestern part of the Property and as small lenses in the southeast area of the Property. Outcrop exposures on the Property are restricted to incised river and creek drainages as well as areas above the tree line. Felsenmeer is also common above the tree line.

METABASALT

The metabasalts are generally massive, fine grained to aphanitic and weather a characteristic dull green-grey colour. Locally, the unit grades into medium-grained varieties or diabase. Primary textures locally identified in the metabasalt include: flow-banding, autobrecciation and rare pillow structures. Although rarely exposed, basalt contacts are commonly sheared or brecciated and are intensely carbonatized in places. Cherts and limestones are locally interlayered with the basalt. Petrochemical investigations of these basaltic rocks indicate they are similar in composition to basalts of normal mid ocean-ridge settings and the chemistry also suggests a genetic relationship to the associated depleted metamorphic mantle ultramafic rocks.

PERIDOTITE

Serpentinized peridotite displaying ghost cumulate textures and sporadically preserved relict poikilitic textures is suspected to originally been wehrlite. The unit is characteristically serpentinized and weathers a dull to dark grey colour. On well-washed surfaces, altered intercumulate pyroxene (clinopyroxene?) weathers a darker colour than the lighter grey cumulate olivine and displays ghost phenocrysts that range from one to 3 centimetres in diameter. Extensive exploration drilling along the base of Mount Monroe at the Yellowjacket Prospect indicates that the serpentinized body is in structural contact with metabasaltic rocks along a gently northwest-dipping thrust. This serpentinized body extends onto the western part of the Surprise Lake property. Carbonatized and serpentinized ultramafic rocks outcropping on the southern part of the Surprise Lake property near the summit of Spruce Mountain represent a remnant above an extension of the same tectonized and altered basal contact.

THEORETICAL MODEL FOR THE SURPRISE SHOWING

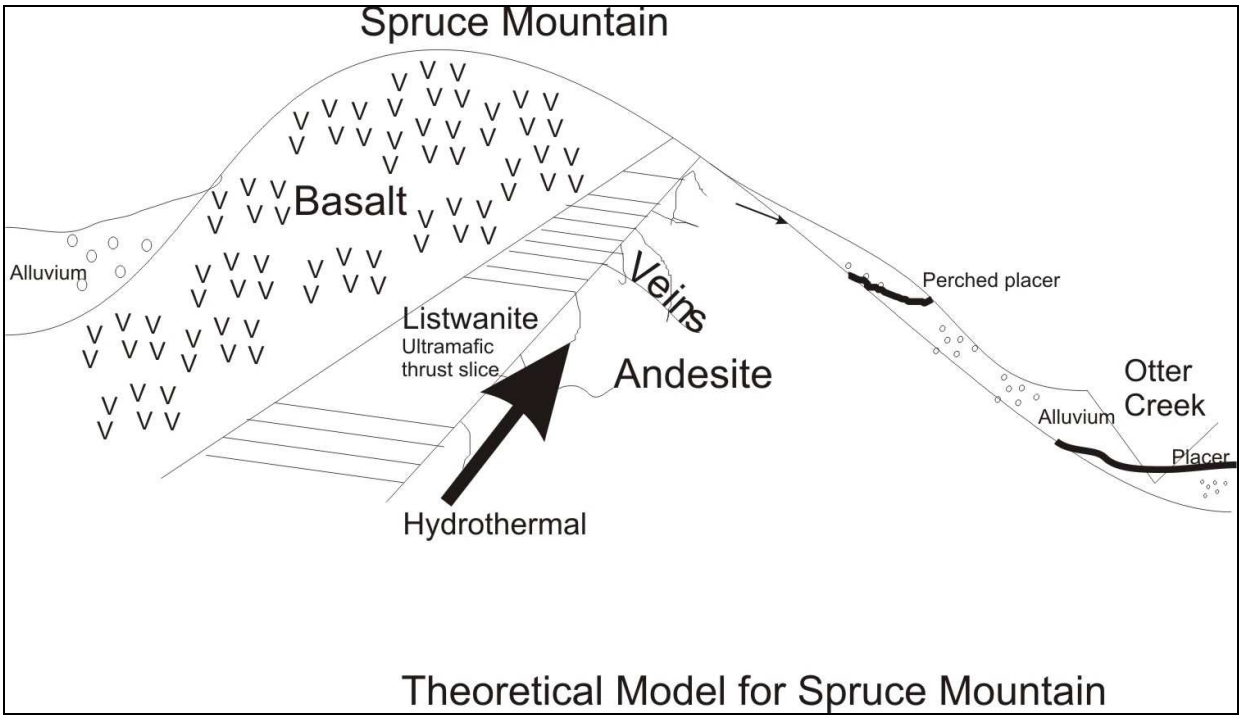

FIGURE 4 THEORETICAL MODEL FOR SPRUCE MOUNTAIN OCCURRENCE (BUCKLE, 2010)

GEOPHYSICAL SURVEY

An airborne geophysical survey was conducted over the Surprise Lake project claim block in 2010 by Fugro Airborne Surveys Corp. Mississauga, Ontario November 22, 2011 for BASTION RESOURCES LTD. (Fugro Airborne Surveys Corp., 2505 Meadowvale Boulevard, Mississauga, Ontario, Canada, L5N 5S2) The DIGHEM V SURVEY coverage of the survey block amounted to 263 km. including tie lines. Flight lines were flown east-west (90°/270°) with a line separation of 100 metres. Tie lines were flown orthogonal to the traverse lines (N-S) with a line separation of 1000 metres. The survey employed the DIGHEM V electromagnetic system. Ancillary equipment consisted of an optically pumped, high-sensitivity cesium magnetometer, radar and barometric altimeters, a video camera, digital recorders, and an electronic navigation system. The

instrumentation was installed in an AS350-B2 turbine helicopter (Registration C-GJIX) that was provided by Questral Helicopters Ltd. The helicopter flew at an average airspeed of 100 km/h with an EM sensor height of approximately 35 metres.

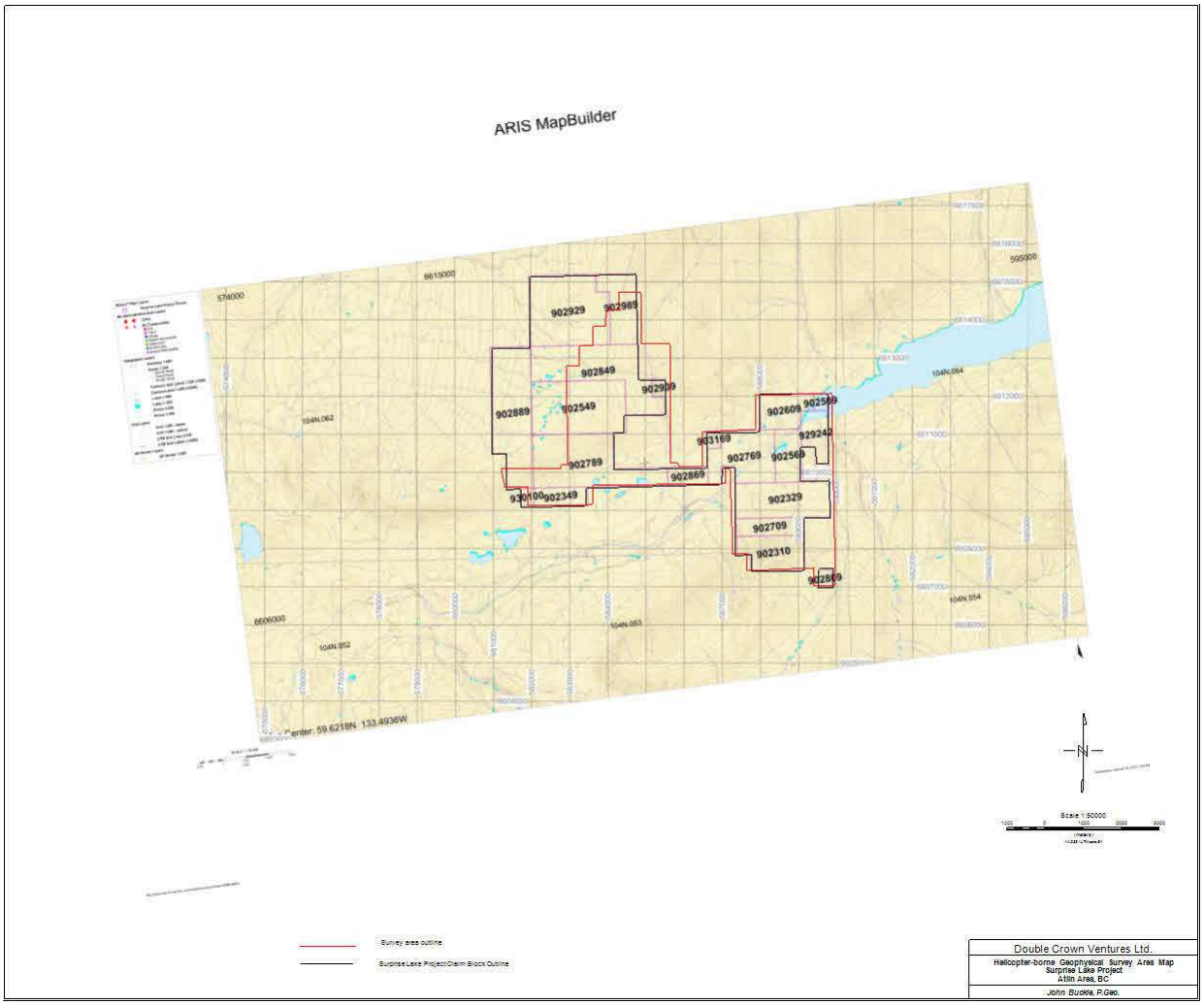

FIGURE 5 PROPERTY LOCATION AND GRID OUTLINE

A GPS electronic navigation system ensured accurate positioning of the geophysical data with respect to the base map coordinates. The base of operations for the survey was established at Atlin. Table 3 lists the corner coordinates of the survey area in NAD83, UTM Zone 8N, central meridian 135°W.

SURVEY PARAMETERS

TABLE 3 SURVEY BLOCK CORNER COORDINATES

Block	Corners	X-UTM (E)	Y-UTM (N)
Surprise Lake	1	581344.3	6610036.5
11063	2	583106.8	6610075.5
	3	583045.1	6612859.5
	4	583397.4	6612867.0
	5	583387.1	6613331.0

	6	583739.3	6613339.0
	7	583728.9	6613803.0
	8	584081.1	6613811.0
	9	584070.7	6614275.0
	10	584422.8	6614283.0
	11	584412.3	6614747.0
	12	584764.4	6614755.0
	13	584795.9	6613363.0
	14	585500.4	6613379.0
	15	585574.4	6610131.0
	16	586632.1	6610155.5
	17	586610.6	6611083.5
	18	588020.4	6611116.5
	19	587998.6	6612044.5
	20	589760.4	6612086.5
	21	589882.8	6606982.5
	22	589529.9	6606974.0
	23	589518.9	6607438.0
	24	587754.8	6607396.5
	25	587743.9	6607860.5
	26	587391.2	6607852.0
	27	587337.1	6610172.0
	28	586984.6	6610163.5
	29	586995.4	6609700.0
	30	583469.6	6609619.5
	31	583479.9	6609155.5
	32	582069.6	6609124.0
	33	582059.4	6609588.0
	34	581354.3	6609573.0
	35	581344.3	6610036.5

TABLE 4 SURVEY FLIGHT PARAMETERS

Parameter Specifications	
Traverse line spacing	100 m
Traverse line direction	E-W (90°)
Tie line direction	N-S (360°)
Tie line spacing	1000 m
Sample interval	10 Hz, 2.75 m @ 100 km/h
Aircraft mean terrain clearance	65 m
Average speed	100 km/h
Post-survey flight path	±2 m, Differential GPS
EM & mag sensors mean terrain clearance	35m
Navigation (guidance)	±5 m, Real-time GPS

INSTRUMENTATION

This section provides a brief description of the geophysical instruments used to acquire the survey data and the calibration procedures employed. The geophysical equipment was installed in an AS350-B2 helicopter. This aircraft provides a safe and efficient platform for surveys of this type.

ELECTROMAGNETIC SYSTEM

Model: DIGHEM V-BKS 52
Type: Towed bird, symmetric dipole configuration operated at a nominal survey altitude of 30 metres. Coil separation is 8 metres for 900 Hz, 1000 Hz, 5500 Hz and 7200 Hz, and 6.3 metres for the 56,000 Hz coilpair. Coil orientations, frequencies Atm^2 orientation nominal actual and dipole moments

TABLE 5 MEASUREMENT SPECIFICATIONS

Atm^2	**Orientation**	**Nominal**	**Actual**
211	coaxial	/1000 Hz	1114 Hz
211	coplanar	/900 Hz	924 Hz
67	coaxial	/5500 Hz	5495 Hz
56	coplanar	/7200 Hz	7095 Hz
15	coplanar	/56,000Hz	55630 Hz

Channels recorded:
5 in-phase channels
5 Quadrature channels
2 monitor channels

Sensitivity:			
0.06	ppm	at	1000 Hz Cx
0.12	ppm	at	900 Hz Cp
0.12	ppm	at	5,500 Hz Cx
0.24	ppm	at	7,200 Hz Cp
0.60	ppm	at	56,000 Hz Cp

Sample rate:	10 per second, equivalent to 1 sample every 2.75 m, at a survey speed of 100 km/h.

The electromagnetic system utilizes a multi-coil coaxial/coplanar technique to energize conductors in different directions. The coaxial coils are vertical with their axes in the flight direction. The coplanar coils are horizontal. The secondary fields are sensed simultaneously by means of receiver coils that are maximum-coupled to their respective transmitter coils. The system yields an in-phase and a quadrature channel from each transmitter-receiver coil-pair.

In-Flight EM System Calibration
Calibration of the system during the survey uses the Fugro AutoCal automatic, internal calibration process. At the beginning and end of each flight, and at intervals during the flight, the system is flown up to high altitude to remove it from any "ground effect"(response from the earth). Any remaining signal from the receiver coils (base level) is measured as the zero level, and is removed from the data collected until the time of the next calibration. Following the zero level setting, internal calibration coils, for which the response phase and amplitude have been determined at the factory, are automatically triggered – one for each frequency. The on-time of the coils is sufficient to determine an accurate response through any ambient noise. The receiver response to each calibration coil "event" is compared to the expected response (from the factory calibration) for both

phase angle and amplitude, and any phase and gain corrections are automatically applied to bring the data to the correct value.

In addition, the outputs of the transmitter coils are continuously monitored during the survey, and the gains are adjusted to correct for any change in transmitter output. Because the internal calibration coils are calibrated at the factory (on a resistive halfspace) ground calibrations using external calibration coils on-site are not necessary for system calibration. A check calibration may be carried out on-site to ensure all systems are working correctly. All system calibrations will be carried out in the air, at sufficient altitude that there will be no measurable response from the ground. The internal calibration coils are rigidly positioned and mounted in the system relative to the transmitter and receiver coils. In addition, when the internal calibration coils are calibrated at the factory, a rigid jig is employed to ensure accurate response from the external coils.

Using real time Fast Fourier Transforms and the calibration procedures outlined above, the data are processed in real time, from measured total field at a high sampling rate, to in-phase and quadrature values at 10 samples per second.

MAGNETOMETER

Model: Scintrex CS-3 sensor with a Fugro D1344 counter.
Type: Optically pumped cesium vapour
Sensitivity: 0.01 nT
Sample rate: 10 per second
The magnetometer sensor is housed in the HEM bird, which is flown 28 m below the helicopter.

MAGNETIC BASE STATION

PRIMARY

Model: Fugro CF1 base station with timing provided by integrated GPS
Sensor type: Scintrex CS-3
Counter specifications: Accuracy: ±0.1 nT
Resolution: 0.01 nT
Sample rate 1 Hz
GPS specifications: Model: Marconi Allstar
Type: Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz
Sensitivity: -90 dBm, 1.0 second update
Accuracy: Manufacturer's stated accuracy for differential corrected GPS is 2 metres

ENVIRONMENTAL MONITOR SPECIFICATIONS:

Temperature:
· Accuracy: ±1.5ºC max
· Resolution: 0.0305ºC
· Sample rate: 1 Hz
· Range: -40ºC to +75ºC
Barometric pressure:
· Model: Motorola MPXA4115AP
· Accuracy: ±3.0º kPa max (-20ºC to 105ºC temp. ranges)
· Resolution: 0.013 kPa

· Sample rate: 1 Hz
· Range: 55 kPa to 108 kPa

Backup

Model: GEM Systems GSM-19T
Type: Digital recording proton precession
Sensitivity: 0.10 nT
Sample rate: 3 second intervals
A digital recorder is operated in conjunction with the base station magnetometer to record the diurnal variations of the earth's magnetic field. The clock of the base station is synchronized with that of the airborne system, using GPS time, to permit subsequent removal of diurnal drift. The Fugro CF1 was the primary magnetic base station

MAGNETIC BASE STATION LOCATIONS

Status Location Name
WGS84 Latitude (deg-minsec) Primary Atlin 59° 34' 07.955" N 133° 41' 09.656" W

WGS84 Longitude (degmin-sec) Secondary Atlin 59° 34' 07.955" N 133° 41' 09.656" W

Navigation (Global Positioning System)

Airborne Receiver for Real-time Navigation & Guidance
Model: NovAtel OEM4.
Type: Code and carrier tracking of L1-C/A code at 1575.42 MHz and L2-P code at 1227.0 MHz. Dual frequency, 24-channel.
WAAS enabled.
Sensitivity: -132 dBm, 10 Hz update.
Accuracy: Manufacturer's stated accuracy is better than 2 metres, real time.
Antenna: Aero AT1675; Mounted on tail of aircraft.
Primary Base Station for Post-Survey Differential Correction
Model: NovAtel OEM4
Type: Code and carrier tracking of L1-C/A code at 1575.42 MHz and L2-P code at 1227.0 MHz. Dual frequency, 24-channel.
Sample rate: 10 Hz update.
Accuracy: Better than 1 metre in differential mode.
Secondary GPS Base Station
Model: Marconi Allstar, CMT-1200
Type: Code and carrier tracking of L1 band, 12-channel, C/A code at 1575.42 MHz
Sensitivity: -90 dBm, 1.0 second update
Accuracy: Manufacturer's stated accuracy for differential corrected GPS is better than 2 metres.
The Wide Area Augmentation System (WAAS enabled) NovAtel OEM4 is a line of sight, satellite navigation system that utilizes time-coded signals from at least four of forty-eight available satellites. Both GLONASS and NAVSTAR satellite constellations are used to calculate the position and to provide real time guidance to the helicopter. For flight path processing, a similar NovAtel system was used as the primary base station receiver. The mobile and base station raw XYZ data were recorded, thereby permitting post-survey differential corrections for theoretical accuracies of better than 2 metres. A Marconi Allstar GPS unit, part of the CF-1, was used as a secondary (back-up) base station.
Each base station receiver is able to calculate its own latitude and longitude. For this survey, the primary GPS station was located at Atlin, at latitude 59° 34' 07.845" N , longitude 133° 41' 09.871"

W , at an elevation of 700.190 metres above mean sea level. The secondary GPS unit was located at latitude 59° 34' 07.955" N , longitude 133° 41' 09.656" W , at an elevation of 696.987 metres.

Status Location Name WGS84 Latitude (deg-min-sec) WGS84 Longitude (deg-min-sec) Orthometric Height (m)
Primary Atlin 59° 34' 07.845" N 133° 41' 09.871" W 700.190
Secondary Atlin 59° 34' 07.955" N 133° 41' 09.656" W 696.987
The GPS records data relative to the WGS84 ellipsoid, which is the basis of the revised North American Datum (NAD83). Conversion software is used to transform the WGS84 Lat/Lon coordinates to the UTM Zone 8N system displayed on the maps.

Radar Altimeter
Manufacturer: Honeywell/Sperry
Model: RT300
Type: Short pulse modulation, 4.3 GHz
Sensitivity: 0.3 m
Sample rate: 10 per second
The radar altimeter measures the vertical distance between the helicopter and the ground except in areas of dense tree cover. This information is used in the processing algorithm that determines conductor depth.

Laser Altimeter
Manufacturer: Optec
Model: G-150
Type: Fixed pulse
Sensitivity: ±5 cm
Sample rate: 1 per second

Barometric Pressure and Temperature Sensors
Model: DIGHEM D 1300
Type: Motorola MPX4115AP analog pressure sensor
AD592AN high-impedance remote temperature sensors
Sensitivity: Pressure: 150 mV/kPa
Temperature: 100 mV/°C or 10 mV/°C (selectable)
Sample rate: 10 per second
The D1300 circuit is used in conjunction with one barometric sensor and up to three temperature sensors. Two sensors (baro and temp) are installed in the EM console in the aircraft, to monitor pressure (KPA) and internal operating temperatures (TEMP_INT).

Digital Data Acquisition System
Manufacturer: Fugro
Model: HeliDAS – Integrated Data Acquisition System
Recorder: SanDisk compact flash card (PCMCIA)
The stored data are downloaded to the field workstation PC at the survey base, for verification, backup and preparation of in-field products.

Video Flight Path Recording System
Type: Panasonic WVCD/32 Camera
Recorder: Axis 241S Video Server and Tablet Computer
Format: BIN/BDX
Fiducial numbers are recorded continuously and are displayed on the margin of each image. This procedure ensures accurate correlation of data with respect to visible features on the ground.

QUALITY CONTROL AND IN-FIELD PROCESSING

Digital data for each flight were transferred to the field workstation, in order to verify data quality and completeness. A database was created and updated using Geosoft Oasis Montaj and proprietary Fugro Atlas software. This allowed the field personnel to calculate, display and verify both the positional (flight path) and geophysical data on a screen or printer. Records were examined as a preliminary assessment of the data acquired for each flight.

In-field processing of Fugro survey data consists of differential corrections to the airborne GPS data, verification of the flight path, verification of EM calibrations, drift correction of the raw airborne EM data, spike rejection and filtering of all geophysical and ancillary data, verification of the flight videos, calculation of preliminary resistivity data, diurnal correction, and preliminary leveling of magnetic data.

All data, including base station records, were checked on a daily basis, to ensure compliance with the survey contract specifications. Reflights were required if any of the following specifications were not met.

Navigation - Positional (x,y) accuracy of better than 10 m, with a CEP (circular error of probability) of 95%. Flight Path - No lines to exceed ±25 % departure from nominal line spacing over a continuous distance of more than 1 km, except for reasons of safety. Clearance - Mean terrain sensor clearance of 35 m, ±10 m, except where precluded by safety considerations, e.g., restricted or populated areas, severe topography, obstructions, tree canopy, aerodynamic limitations, etc. Airborne Mag - Aerodynamic magnetometer noise envelope not to exceed 0.5 nT over a distance of more than 1 km. The non-normalized 4th difference not to exceed 1.6 nT over a continuous distance of 1 kilometre excluding areas where this specification is exceeded due to natural anomalies. Base Mag - Diurnal variations not to exceed 10 nT over a straight-line time chord of 1 minute. EM - Spheric pulses may occur having strong peaks but narrow widths. The EM data area considered acceptable when their occurrence is less than 10 spheric events exceeding the stated noise specification for a given frequency per 100 samples continuously over a distance of 2,000 metres.

Frequency	**Coil Orientation**	**Peak to Peak Noise Envelope (ppm)**
1000Hz	vertical coaxial	5.0
900 Hz	horizontal coplanar	10.0
5500 Hz	vertical coaxial	10.0
7200 Hz	horizontal coplanar	20.0
56,000 Hz	horizontal coplanar	40.0

DATA PROCESSING

FLIGHT PATH RECOVERY

The quality of the GPS navigation was controlled on a daily basis by recovering the flight path of the aircraft. The correction procedure used the raw ranges from the base station to create improved models of clock error, atmospheric error, satellite orbit, and selective availability. These models were used to improve the conversion of aircraft raw ranges to differentially corrected aircraft position. The raw range data from at least four satellites are simultaneously recorded by both the base and mobile GPS units. The geographic positions of both units, relative to the model ellipsoid, are calculated from this information. Differential corrections, which are obtained from the base station, are applied to the mobile unit data to provide a postflight track of the aircraft, accurate to within 2 m. To check the quality of the positional data, the speed of the bird was calculated using the differentially corrected x, y and z data. Any sharp changes in the speed were used to flag possible problems with the positional data. If speed jumps were evident, the data were inspected to determine the source of the error. The erroneous data were deleted and splined if less than two seconds in length. If the error was greater than two seconds the raw data were examined and, if acceptable, could be used to replace the bad data.

The GPS-Z component is the most common source of error. When it shows problems that cannot be corrected by recalculating the differential correction, the barometric altimeter is used as a guide to assist in making the appropriate correction.

The corrected WGS84 latitude/longitude coordinates are transformed to the UTM coordinate system used on the final maps. Images or plots are then created to provide a visual check of the flight path.

ELECTROMAGNETIC DATA

EM data are processed at the recorded sample rate of 10 samples/second. Spheric rejection median and Hanning filters are then applied to reduce noise to acceptable levels. EM test profiles are then created to allow the interpreter to select the most appropriate EM anomaly picking controls for a given survey area. The EM picking parameters depend on several factors but are primarily based on the dynamic range of the resistivities within the survey area, and the types and expected geophysical responses of the targets being sought.

The interpretation geophysicist determines initial anomaly picking parameters and thresholds. Anomalous electromagnetic responses that meet the specific criteria are then automatically selected and analysed by computer to provide a preliminary electromagnetic anomaly map. The automatic selection algorithm is intentionally oversensitive to assure that no meaningful responses are missed. Using the preliminary maps in conjunction with the multi-parameter stacked profiles, the interpreter then classifies the anomalies according to their source and eliminates those that are not substantiated by the data. The final interpreted EM anomaly map will include bedrock, surficial and cultural conductors. A map containing only bedrock conductors can be generated, if desired.

ALTITUDE DATA

Radar altimeter data were despiked by applying a 1.5 second median filter and smoothed using a 1.5 second Hanning filter. The radar altimeter data were then subtracted from the GPS elevation to create a digital elevation grid, that was used in conjunction with profiles of the radar altimeter and flight path video, to detect any spurious values.

The Laser altimeter information was also despiked and filtered, and used with the GPS elevation to create a digital elevation model, which was then examined in grid format for spurious values. The laser usually does a better job than the radar altimeter in penetrating the tree canopy, and is normally used in the resistivity (depth) calculation.

BASE STATION DIURNAL CORRECTION

The raw diurnal data were sampled at 1 Hz and imported into a database. The data were filtered with a 51-point median filter and then a 51-point Hanning filter to remove spikes and smooth short wavelength variations. A non linear variation was then calculated and a flag channel was created to indicate any areas where the variation might have exceeded the survey tolerance. Acceptable diurnal data were interpolated to a 10 Hz sample rate and the local regional field value, calculated from the average of
the first day's diurnal data, was removed to leave the diurnal variation. This diurnal variation was then used in the processing of the airborne magnetic data.

APPARENT RESISTIVITY

The apparent resistivities in ohm-m are generated from the in-phase and quadrature EM components for all of the coplanar frequencies, using a pseudo-layer half-space model. The inputs to the resistivity algorithm are the in-phase and quadrature amplitudes of the secondary field. The algorithm calculates the apparent resistivity in ohm-m, and the apparent height of the bird above the conductive source. Any difference between the apparent height and the true height, as measured by the radar altimeter, is called the pseudo-layer and reflects the difference between the real geology and a homogeneous half-space. This difference is often attributed to the presence of a highly resistive upper layer. Any errors in the altimeter reading, caused by heavy tree cover, are included in the pseudo-layer and do not affect the resistivity calculation. The apparent depth estimates, however, will reflect the altimeter errors. Apparent resistivities calculated in this manner may differ from those calculated using other models. In any areas where the effects of magnetic permeability or dielectric permittivity have suppressed the in-phase responses, the calculated resistivities will be erroneously high.

Various algorithms and inversion techniques can be used to partially correct for the effects of permeability and permittivity. Apparent resistivity maps portray all of the information for a given frequency over the entire survey area. This full coverage contrasts with the electromagnetic anomaly map, which provides information only over interpreted conductors. The large dynamic range afforded by the multiple frequencies makes the apparent resistivity parameter an excellent mapping tool.

The preliminary apparent resistivity maps and images are carefully inspected to identify any lines or line segments that might require base level adjustments. Subtle changes between in-flight calibrations of the system can result in line-to-line differences that are more recognizable in resistive (low signal amplitude) areas. If required, manual level adjustments are carried out to eliminate or minimize resistivity differences that can be attributed, in part, to changes in operating temperatures. These leveling adjustments are usually very subtle, and do not result in the degradation of discrete anomalies.

After the manual leveling process is complete, revised resistivity grids are created. The resulting grids can be subjected to a microleveling technique in order to smooth the data for contouring. The coplanar resistivity parameter has a broad 'footprint' that requires very little filtering. The calculated resistivities for the 900 Hz, 7200 Hz and 56kHz coplanar frequencies are included in the XYZ and grid archives. Apparent Resistivity maps have been created from the 7200 Hz and 56 kHz data. Values are in ohm-metres on all final products.

RESIDUAL MAGNETIC INTENSITY

The residual magnetic intensity (RMI) is derived from the total magnetic field (TMF) channels, the diurnal, and the regional magnetic field. The total magnetic intensity is recorded in the aircraft, the diurnal is measured from the ground base station, and the regional magnetic field is calculated from the updated IGRF (International Geomagnetic Reference Field).

A fourth difference editing routine is applied to the magnetic data to remove any spikes. The result is then corrected for diurnal variation using the magnetic base station data. The results can then be leveled using tie and traverse line intercepts. Manual adjustments are applied to any lines that require leveling, as indicated by shadowed images of the gridded magnetic data.

The IGRF calculated for the specific survey location and the time of the survey, is then removed from the leveled magnetic data to yield the residual magnetic intensity (RMI). The leveled data are then subjected to a microleveling filter for gridding and contouring.

CALCULATED VERTICAL MAGNETIC GRADIENT

The diurnally-corrected residual magnetic field data are subjected to a processing algorithm that enhances the response of magnetic bodies in the upper 500 m and attenuates the response of deeper bodies. The resulting vertical gradient map provides better definition and resolution of near-surface magnetic units. It also identifies weak magnetic features that may not be evident on the total field or residual magnetic maps. However, regional magnetic variations and changes in lithology may be better defined on the total magnetic field or residual magnetic intensity maps.

CONTOUR, COLOUR AND SHADOW MAP DISPLAYS

The geophysical data are interpolated onto a regular grid using a modified Akima spline technique. The resulting grid is suitable for image processing and generation of contour maps. The grid cell size is 20% of the line interval (25 metres). Colour maps or images are produced by interpolating the grid down to the pixel size. The parameter is then incremented with respect to specific amplitude ranges to provide colour "contour" maps. Monochromatic shadow maps or images can be generated by employing an artificial sun to cast shadows on a surface defined by the geophysical grid. There are many variations in the shadowing technique. These techniques can be applied to total field or enhanced magnetic data, magnetic derivatives, resistivity, etc. The shadowing technique is also used as a quality control method to detect subtle changes between lines.

FINAL MAPS

This section lists the final maps and products that are provided with this report. Most parameters are displayed as colour contour maps as digital images in PDF. Databases are provided in Geosoft .gdb, Geosoft .grd grid files and as .xyz archive.

BASE MAPS

Base maps of the survey area are produced by downloading topographic maps to a bitmap (.pdf) format from ARIS Mapbuilder website. The images were then imported into MapInfo 10 for UTM coordinate registration. This process provides a relatively accurate, distortion-free base that facilitates correlation of the navigation data to the map coordinate system. It should be noted that the topographic map shows UTM coordinate lines in the NAD 83 system. The NAD 83 geophysical

data are properly positioned relative to the topography. All maps were created using the following parameters:

Projection Description:

Datum: NAD 83
Ellipsoid: WGS 84; GRS 1980
Projection: UTM (Zone: 8N)
Central Meridian: 135° W
False Northing: 0
False Easting: 500000
Scale Factor: 0.9996
WGS84 to Local Conversion: Molodensky
Datum Shifts: DX: 0 DY: 0 DZ: 0

SURVEY RESULTS

The airborne data was imported into a Geosoft database for preparation of interpretation maps. Electromagnetic anomaly data was interpreted based on the electromagnetic responses and the anomalies plotted on various data map backgrounds for interpretation purposes. The electromagnetic anomalies were grouped in response zones based on the electromagnetic characteristics. The resistivity and magnetic plan maps were used primarily for interpretation of local geology and to assist in the interpretation of anomalous electromagnetic responses. Traditional and non-traditional interpretation aids and presentations were generated to assist with the interpretation of the data for the purposes of this report. Some these data presentations are visual representations only and are not intended to be relied upon for accuracy with respect to depth.

INTERPRETATION

The survey property hosts numerous anomalous features, some of which are considered to be of moderate priority as exploration targets. Although auriferous targets in this area might be associated with carbonate altered resistive units, rather than conductive units, there are several inferred bedrock conductors that may warrant further investigation using appropriate surface exploration techniques. Areas of interest may be assigned priorities on the basis of supporting geophysical, geochemical and/or geological information. After initial investigations have been carried out, it may be necessary to re-evaluate the remaining anomalous responses based on information acquired from the follow-up program. This report provides a very brief description of the survey results and describes the equipment, data processing procedures and logistics of the airborne survey over the Surprise project area, near Atlin, B.C. The various products accompanying this report display the magnetic and conductive properties of the survey area. The magnetic results have provided valuable structural information that can be used to help locate the more favourable areas for structurally-controlled gold deposition on the property. In addition to locating several linear faults and shears, the vertical gradient data have outlined the contacts of both magnetic and non-magnetic units. The latter could reflect alteration zones or reducing environments that could host auriferous mineralization. The resistivity parameters have outlined both conductive and resistive units. The former are generally attributed to conductive rock units or overburden, possible alteration zones, or increases in sulphide content. The non-magnetic plug-like resistivity highs

could be due to resistive intrusions, while some of the magnetic resistive zones are obviously due to rock units containing higher concentrations of magnetite.

There were more than 720 anomalous EM responses detected in the survey block, about 33% of which have been interpreted as possible or probable discrete bedrock conductors. Some of these have been attributed to increases in conductive sulphide content or clay-altered shears. Most responses are of moderate to low amplitude, but quite well defined, yielding moderately low conductance values of less than 5 Siemens The most conductive zones occur as parallel. south-trending, multi-conductor zones in the southeastern portion of the property. Gold mineralization and mapped listwanite units reportedly occur in the area just north and east of Spruce Mountain. No distinctive geophysical signature could be ascribed to the known gold mineralization, but the locations may not be accurate.

Resistivities of less than 10 ohm-m are evident at depth on the 900Hz frequency in Zones A and B. These "broad" zones are often due to two or more closely-spaced thin conductors, rather than a single thick source. Other anomalous EM responses coincide with magnetic linears that reflect contacts, faults, or shears. These inferred contacts and structural breaks are considered to be of particular interest as they may have influenced or controlled mineral deposition within the survey area. The anomalous targets and interpreted bedrock conductors defined by the survey should be subjected to further investigation, using appropriate surface exploration techniques. Anomalies that are currently considered to be of moderately low priority may require upgrading if follow-up results are favourable. A detailed analysis of existing geophysical data is recommended, in conjunction with all available geological and geochemical data, in order to extract the maximum amount of information from the survey results. Current software and imaging techniques can often provide valuable information on structure and lithology, which may not be clearly evident on the colour maps and images provided with this report. These techniques can yield images that define subtle, but significant, structural details.

GENERAL DISCUSSION

Table 6 summarizes the EM responses in the survey area, with respect to conductance grade and interpretation. For "discrete" conductors (B, D, or T), the apparent conductance and depth values shown in the EM Anomaly list appended to this report have been calculated from "local" in-phase and quadrature amplitudes of the Coaxial 5500 Hz frequency, using a near-vertical, half plane model. Conductance values for the broader (S, H, or E) types have been calculated from absolute amplitudes using a horizontal halfspace model.

Wide bedrock conductors or flat-lying conductive units, (S, H, or E) whether from surficial or bedrock sources, may give rise to very broad anomalous responses on the EM profiles. These may not appear on the electromagnetic anomaly map if they have a regional character rather than a locally anomalous character. These broad conductors, which more closely approximate a half-space model, will be maximum coupled to the horizontal (coplanar) coil-pair and should be more evident on the resistivity parameters. Resistivity maps, therefore, may be more valuable than the electromagnetic anomaly maps, in areas where broad or flat-lying conductors are considered to be of importance. All three coplanar resistivity grids are included on the final data archive. The picking and interpretation procedure relies on several parameters and calculated functions. For this survey, the Coaxial 5500 Hz responses and the mid-frequency difference channels were used as two of the main picking criteria. The 7200 Hz coplanar results were also weighted to provide picks over wider

or flat-dipping sources. The quadrature channels provided picks in any areas where the in-phase responses might have been suppressed by magnetite.

Excellent resolution and discrimination of conductors was accomplished by using a fast sampling rate of 0.1 sec and by employing a "common" frequency (5500Hz / 7200Hz) on two orthogonal coil-pairs (coaxial and coplanar). The resulting difference channel parameters often permit differentiation of bedrock and surficial conductors, even though they may exhibit similar conductance values. Because of the poorly conductive nature of the expected mineralization in the area, the difference calculations were based on the mid frequencies rather than the low frequencies. The lower frequencies tend to "see deeper" in conductive environments, but the higher frequencies respond better to weaker conductors and resistive units, and are probably better suited to this specific target.

MAGNETIC DATA

A Fugro CF-1 cesium vapour magnetometer was operated at the survey base to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to permit subsequent removal of diurnal drift. A GEM Systems GSM-19T proton precession magnetometer was also operated as a backup unit.

The residual magnetic field data (IGRF removed) have been presented as contours on the base maps using a contour interval of 10 nT where gradients permit. The maps show the magnetic properties of the rock units underlying the survey area. The residual magnetic field data were also subjected to a processing algorithm to produce maps of the calculated vertical gradient. This procedure enhances near-surface magnetic units and suppresses regional gradients. It also provides better definition and resolution of magnetic boundaries and displays weak magnetic features that may not be clearly evident
on the residual intensity maps.

Magnetic relief is moderate, yielding a dynamic range of more than 2100 nT. Strikes are variable, but generally appear to be between NNW (345°±10 °) to NE (40°±10°), with at least two obvious contacts that that strike N-S and ESE (107°). The magnetic patterns in the western portion of the property correlate moderately well with NNW and NE-trending resistivity patterns, which suggests that the two parameters are responding to similar (bedrock) causative sources in at least some areas. The inferred magnetic contacts in the eastern portion, however, generally show a looser correlation, suggesting that resistivity may be responding more to the to the near-surface cover, while the magnetic parameter is more strongly influenced by the deeper, bedrock features. The eastern portion of the property is much more conductive than the western part, with the stronger conductive units striking N-S. The contacts inferred from the magnetic data often differ from the mapped units shown on the B.C. Geology Map 2004-4, viewed on the Internet. These differences may be due to a lack of outcrop, a lack of magnetic contrast between the near-surface units, gradational changes in susceptibility due to metamorphism or alteration, or the presence of overlapping, flat-dipping layers that tend to yield averaged values. The magnetic parameter could also be reflecting deeper basement units that may not be exposed at surface. There is strong evidence on the magnetic maps, particularly the calculated vertical gradient, which shows that the survey area hosts several distinct units, some of which have been subjected to deformation and/or alteration. These structural complexities are evident on the colour contour maps as variations in magnetic intensity, irregular patterns, and as offsets or changes in strike direction.

If a specific magnetic intensity can be assigned to the rock type (listwanite) that is believed to host the auriferous mineralization, it may be possible to select areas of higher priority on the basis of the magnetic data. This is based on the assumption that the magnetite content of the listwanite host rocks will give rise to a limited range of contour values that will permit differentiation of the various lithological units. The magnetic results have provided valuable information that can be used in conjunction with the other geophysical parameters, to help map the geology and structure in the survey area.

APPARENT RESISTIVITY

Apparent resistivity grids, which display the conductive properties of the survey area, were produced from the 900 Hz, 7200 Hz, and 56000 Hz coplanar data. The maximum resistivity values, which are calculated for each frequency, are 1080, 8,010 and 30,000 ohm-m respectively. These cut-offs eliminate the erratic higher resistivities that could result from unstable ratios of very small EM amplitudes. All coplanar resistivity data are included on the final data archive. Both resistive and weakly conductive trends are evident on the near-surface 56 kHz maps.

It is interesting to note that some of the well-defined magnetic lows are conductive, while other lows are resistive. Note, for example, the weakly conductive zone at 10425C is magnetic, while the non-magnetic unit near fiducial 4633 on its western flank is resistive. On the eastern end of the same line, the moderately strong anomalies at 10425 J and M, are both in subtle magnetic troughs. Several weak quadrature responses on the property are associated with relative resistivity highs. The magnetite-hosted response on line10430 at fiducial 5905 is a classic example of high apparent resistivity that has been caused by magnetite suppression. Conversely, the thin conductor at 10385A is associated with a sharp magnetic low at the southeast contact of a strong magnetic unit. This SSW-trending magnetic low correlates with a very weak resistivity low seen on the 56kHz map. This subtle feature may be important, as it is located in close proximity to a mapped fault near the SE contact of a mapped listwanite. Although its exact location is uncertain, the carbonate altered zone appears to be very weakly conductive and non-magnetic These response characteristics might be helpful in locating similar zones on the property, if it can be confirmed that this signature can be attributed to the listwanite.

There are at least four main zones of lower resistivity on the property. The first is a large wedge-shaped unit that dominates the NW quadrant of the property. The eastern edge of this “V”-shaped zone correlates closely with a well defined SSE-trending magnetic contact and hosts several EM anomalies of possible bedrock origin, Anomalies including 10150C, through 10220I to 10370B, all appear to lie in close proximity to this contact. The 500m-wide magnetic low on Line 10220, correlates with a resistivity low that hosts three probable bedrock conductors. A probable (faulted?) contact, inferred from the CVG map, intersects the broad resistivity low, striking 107° from 10170A through 10220F. A second probable break, trends 145° from 10260C, while a third contact stri kes NE (51°) through 10260D. The weak resistivity low that strikes SW (230°) from the base of the main conductive zone, also follows another inferred contact near 10310A. This weakly conductive trend is also considered to be of interest, although the anomalous responses have generally been attributed to conductive material at surface. It is interesting to note that this weakly conductive trend actually crosses a topographic high.

The second main resistivity low is a SW-trending feature that is associated with a well defined magnetic contact. The magnetic gradient probably maps the contact between the peridotites to the SE and the less magnetic metabasalts to the NW. A moderately conductive part of this trend is near anomaly 10450D, but even the weaker responses associated with this horizon could be of interest.

Anomaly 10520E, which indicates a thin source, is about 150m NW of the inferred contact. The third resistivity low is a wide zone that strikes ENE (81°) from a small lake at 10501G, and then NE (50°) through 10345A. The smal l lake at 10501G overlies a strong magnetite-rich zone containing more than 6% magnetite. This broad conductive zone is situated along the north side of the creek valley, and could be influenced by conductive till. The most conductive portions are near 10365A and 10455B, both of which have been attributed to surficial sources. Magnetic patterns show a general NE trend correlation, with the CVG suggesting the presence of a NE-trending fault or contact near 10365B , and two intersecting cross faults which strike NNW (349° and 352°) through a nomalies 10435A and 10415C, respectively. These inferred structural breaks may be of interest.

The fourth major conductive area on the property actually comprises at least four subparallel, N-trending bands that dominate the SW quadrant. Roughly 90% of the stronger bedrock conductors in the area are associated with these multi-conductor zones. At least nine distinct conductors are indicated on line 10650 and 10660 in the vicinity of a gold occurrence near fiducial 3707 on line 10680. Although the gold showing is associated with a prominent N-striking resistivity high, it is flanked by strong, thin conductors immediately to the west.

Three or more narrow listwanite units are indicated on the geology map, just south of the lode gold symbol. Assuming that the site location and grid registration are both correct, it suggests that anomalies 10700 E and 10710 E both occur near the western contact of the larger central unit.. Anomaly 10710E is close enough to the peak of the magnetite source, that it yields magnetic correlation. A third listwanite unit indicates a moderate resistivity low at 10690E, while a fourth zone to the SE also resides in a subtle magnetic trough. The variations in conductivity and magnetic correlation make it extremely difficult to determine if a single geophysical signature can be used to locate similar mineralized zones on the property. The video records might also help to locate some altered zones at surface. Note, for example, the change in coloration (gossan?) at 10680 at fiducial 3705, and near 10700D and 10700E.

The other non-magnetic, weakly conductive zones on the property are also considered to be of potential interest, even if they are essentially “non-anomalous”. These zones are most evident on the 56kHz map, which measures a much larger dynamic range of resistivities. These should be checked, in order to determine if they are due to increased alteration or porosity associated with faulted or sheared contacts. As most of the listwanites are likely to be associated with the contacts of ultramafic rocks, those that yield flanking or direct magnetic correlation will probably be of greater significance. As there is no consistent resistivity/magnetic correlation on the survey block, this indicates that the magnetic and resistivity parameters are sometimes responding to different causative sources; i.e., the EM-derived resistivity is responding to changes in the overburden and near-surface layers, while the magnetic data are reflecting changes in the deeper underlying basement units.

In any areas where the targets are highly silicified and non-porous, these should show as narrow resistive units. These non-magnetic, non-conductive linear trends may prove to be the more attractive targets in the search for quartz-vein type mineralization. Conversely, increased porosity, clay alteration, or an increase in sulphide content associated with some shears or faults, could show as more conductive trends. Any plug-like intrusive features, either resistive or conductive, are also considered to be of interest. Any weak EM responses that are associated with the margins of these inferred intrusive units may also warrant further investigation.

There are other resistivity lows and highs in the area that might also be of interest. Some of these are quite extensive and appear to reflect "formational" conductors or layers that

could be of minor interest as direct exploration targets. However, attention may be focused on areas where these zones appear to be faulted or folded or where anomaly characteristics differ along strike. The broad low resistivity zones that dominate the SE corner of the block often indicate thick, buried conductors or increases in conductivity at depth. Anomalies 10700C and 10700G are two typical examples.

Other conductive zones are quite subtle, and could be due to changes in overburden thickness, rather than changes in rock type. However, those that are associated with linear magnetic breaks, contacts, or decreases in magnetite, are considered to be of slightly higher priority. Other conductors occur near camps (e.g.,Line10335 at fiducial 7425 and anomaly 10210E), mine workings (10210F), or mine waste (east of 10355E). Others are obviously due to culture, such as the bridge at 10385D and the building at10425I.

ELECTROMAGNETIC ANOMALIES

The following section was reproduced from Fugro Airborne Surveys analysis of the geophysical data. The selection of anomalies and description of the responses was analyzed by the author and independently verified.

Although the targets of interest in this area may be resistive, rather than conductive, discrete EM anomalies were picked, in order to locate possible sulphide zones and to detect zones of alteration or clay-rich shears. As such zones are likely to be poorly conductive, anomaly picks were based primarily on the mid-frequency (5500 Hz) coaxial channel which responds better to weaker conductors than the lower 1000 Hz. The EM anomalies resulting from this survey appear to fall within one of four general categories. The first type consists of discrete, well-defined anomalies that yield marked inflections on the difference channels. These anomalies are usually attributed to conductive sulphides or graphite, and are generally given a "B" or "D" interpretive symbol, denoting a bedrock source.

The second class of anomalies comprises moderately broad responses that exhibit the characteristics of a half-space and do not yield well-defined inflections on the difference channels. Anomalies in this category are usually given an "S" (at, or near surface) or "H" (buried half-space) interpretive symbol. The lack of a difference channel response usually implies a broad or flat-lying conductive source. Some of these anomalies could reflect buried flat-dipping conductive rock units, zones of alteration or deep weathering, increased overburden thickness, or mine waste, all of which can yield “non-discrete” signatures.

Nearly 60% of the anomalies on the property fall into this category, and are generally considered to be of minor interest unless they occur in areas of favourable geology. The effects of conductive overburden are evident over most the survey area. Although the difference channels (DIFI and DIFQ) are extremely valuable in detecting bedrock conductors that are partially masked by conductive overburden, sharp undulations in the bedrock/overburden interface can yield anomalies in the difference channels which may be interpreted as possible bedrock conductors. Such anomalies usually fall into the "S?" or "B?" classification but may also be given an "E" interpretive symbol, denoting a resistivity contrast at the edge of a conductive unit.

The "?" symbol does not question the validity of an anomaly, but instead indicates some degree of uncertainty as to which is the most appropriate EM source model. This ambiguity results from the combination of effects from two or more conductive sources, such as overburden and bedrock,

gradational changes, or moderately shallow dips. The presence of a conductive upper layer has a tendency to mask or alter the characteristics of bedrock conductors, making interpretation difficult. This problem is further exacerbated in the presence of magnetite.

The third anomaly category includes responses that are associated with magnetite. Magnetite can cause suppression or polarity reversals of the in-phase components, particularly at the lower frequencies in resistive areas. Conductive overburden tends to mask many of these negative excursions, particularly at the higher frequencies, but the effects of magnetite-rich rock units are occasionally evident on the EM profiles as suppressions or negative excursions of the lower frequency in-phase channels. Poorly conductive magnetic features can give rise to resistivity anomalies that are only slightly below or slightly above background. If it is expected that poorly conductive economic mineralization could be associated with magnetite-rich units, most of these weakly anomalous features will also be of interest. In areas where magnetite causes the in-phase components to become negative, the apparent conductance and depth of EM anomalies will be unreliable. Magnetite effects usually give rise to overstated (higher) resistivity values and understated (too shallow) depth calculations. The fourth anomaly category includes that are due to cultural sources. The L or L? types are commonly associated with lines, pipes, culverts, bridges, buildings, vehicles, or mining equipment.

POTENTIAL BEDROCK CONDUCTORS

As potential targets within the area can be associated faults, alteration zones, or very weakly disseminated sulphides, which may be hosted by non-magnetic quartz-rich units, and which can be overlain by conductive overburden, it is impractical to assess the relative merits of EM anomalies on the basis of conductance. It is recommended that an attempt be made to compile a suite of geophysical "signatures" over any known areas of interest.

Broad zones of carbonate alteration, or quartz-vein type auriferous mineralization would not normally give rise to discrete EM conductors, unless it was associated with conductive clay material or semi-massive to massive sulphides. However, electromagnetic anomalies have been picked for this survey area in order to locate any possible conductive sulphide concentrations and any conductive faults or shears that could serve as conduits or host units for auriferous mineralization. The electromagnetic anomaly maps show the anomaly locations with the interpreted conductor type, dip, and conductance being indicated by symbols. Direct magnetic correlation is also shown, if it exists. Table 6 shows that nearly 60% of the anomalous responses have been attributed to conductive overburden or flat-lying bedrock units, while only about 35% represent possible discrete bedrock sources. The 721 anomalous EM responses detected by the survey have been assigned a simple colour code on the EM Anomaly map, in order to facilitate source recognition.

Conductor axes have not been shown because there are very few anomalies that can be correlated from line to line with a reasonable degree of confidence. Most of the anomalous responses are of moderate to strong signal amplitude but they generally yield low conductance values of less than 5 Siemens (mhos). The conductance is based on the mid-frequency coaxial responses, so there could be higher conductance values than those shown on the map, particularly in the southeast, where several anomalies suggest an increase in conductivity at depth, as evidenced by the more conductive 900 Hz responses. Some anomalies suggest a buried flat-dipping layer of clay or conductive bedrock at depth, beneath more resistive cover.

TABLE 6 SUMMARY ON EM ANOMALIES

SURPRISE PROJECT AREA ANOMALY SUMMARY		
CONDUCTOR GRADE	CONDUCTANCE SIEMENS	RANGE (MHOS)
7	>100	0
6	50 - 100	0
5	20 - 50	4
4	10 -20	10
3	5 - 10	30
2	1 - 5	568
1	<1	95
*	INDETERMINATE	14
TOTAL		721
CONDUCTOR MODEL	MOST LIKELY RESPONSES	
D	THIN BEDROCK CONDUTOR	168
B	DISCRETE BEDROCK CONDUCTOR	125
S	CONDUCTIVE COVER	330
H	ROCK UNIT OR THICK COVER	27
E	EDGE OF WIDE CONDUCTOR	64
L	CULTURE	7
TOTAL		721

Many of the interpreted discrete bedrock responses are associated with moderately broad zones of low resistivity in the southeast quadrant. These broad conductive zones may be of exploration interest, because of their proximity to known listwanites and gold mineralization. However, most of the mapped listwanites in the southeast appear to be hosted by a relatively resistive, N-trending unit, with an approximate width of about 270m. However, this "resistive" unit hosts several thin poorly-conductive sources, many of which are associated with inferred (magnetic) contacts. It is beyond the scope of this report to attempt to describe the 721 anomalous responses detected by the survey. Most of the "sulphide-type" responses that have been attributed to possible or probable bedrock sources are shown on the EM Anomaly map in red or blue colours. The following text very briefly describes only a few of the more attractive geophysical responses, based on favourable structure, magnetic association, conductance, length, width, or depth extent. Some of these are quite weak or poorly defined.

Although many of these could reflect sulphide-type targets, they do not necessarily represent the more economically attractive areas on the property, given the nonconductive nature of the expected (auriferous) target mineralization associated with the carbonate alteration zones.

Anomaly	Type	Mag	Comments
10050A	B?	-	Anomaly 10050A occurs in a non-magnetic unit, on the

			eastern edge of a moderately strong SSE-trending resistivity low. The conductive zone extends south through anomaly 10180E, a distance of more than 1.8 km.
10170D	B?	-	Anomaly 10170D suggests a slightly thicker source, but is much closer to the contact of the strong magnetic unit to the east.
10080C	B?	605	This isolated magnetite-hosted conductor is located near the contact of small magnetic high that is associated with a major SSW-trending magnetic unit. It suggests a moderately thin source with a possible dip to the west.

Anomaly	Type	Mag	Comments
10220F	B?	567	These poorly defined conductors straddle a magnetic/conductive contact. The two (magnetic) western responses are associated with a double-lobed, S-trending magnetic unit, while the two eastern responses are contained within a small resistivity low that is located on the eastern flank of the magnetic unit. A camp is located in this general area, but the EM responses do not appear to be related to culture, except for anomalies10210E and 10210F, where stripping activity is indicated. At least one of these conductors continues south, as evidenced by the poorly defined response at 10250D.
10220G	B?	78	
10220H	B?	-	
10220I	B?	-	
10300B	B?	-	This response is located near the northwestern contact of a SW-trending magnetic unit and yields a subtle resistivity low on the 56kHz resistivity parameter. The adjacent resistivity high to the NW has been attributed, in part, to magnetite suppression. This weak, but interesting conductor appears to be contact-related.
10310B	E	270	Anomaly 10170C is a very weak and poorly defined response, with a 270nT magnetic correlation. It is located on the western edge of a moderate resistivity low, and is associated with a probable SE-trending break (145°) that can be inferred from the CVG map. The apparent structural break tends to enhance the significance of this weak edge effect.
10390B	B?	105	These weak responses all appear to be more conductive at surface, but this could be partially due to magnetite suppression, rather than overburden. However, they all occur in close proximity to the NW contact of a sinusoidal SW-trending magnetic high. This unit is shown on the geology map as a peridotite, with the metabasalts to the north exhibiting lower magnetic susceptibility. Anomalies 10540B and 10560A are also associated with this same major contact, but they are located near an inferred SE trending break. Most responses yield weak to moderate resistivity lows on the 56kHz. Although most have been attributed to possible surficial sources, they are all considered to be of interest because of their proximity to the metabasalt/peridotite contact and the inferred cross-cutting fractures.
10390C	S?	-	
10390E	D	637	
10471E	S	241	
10530C	S?	82	
10540B	B?	75	
10540C	S?	-	
10540D	S?	498	
10560A	S?	118	
T19020A	B?	397	

10520C	D	-	In the non-magnetic unit (metabasalt?) NW of the previously described contact, there are three moderately strong responses on line 10520. All three have been attributed to Anomaly Type Mag Comments thin, non-magnetic, bedrock conductors. They appear to be associated with an ultramafic unit shown on the geology map. Sulphides are considered to be a likely cause, although the responses do not show any direct magnetic correlation.
10520D	D	-	
10520E	D	-	

Anomaly	Type	Mag	Comments
10415A	S?	-	These two weak responses occur near the NE and SW limits of a listwanite zone shown on the geology map. These are weak, poorly defined geophysical responses, although both give rise to subtle (56kHz) resistivity lows, and both occur at or near obvious magnetic contacts. Based on the characteristics of these weak "surficial" anomalies, it is possible that similar, poorly defined responses could reflect similar contact-'related features.
10501G	S?	-	
10385A	D		This attractive response, at the western end of line 10385, suggests a thin west-dipping source that is located near a mapped fault just NE of the main listwanite zone. It correlates with a sharp magnetic low, at the eastern contact of a magnetite-rich unit. Further work is recommended to check its causative source.
10555B	D	5	These anomalies are located near the centre of Zone A. a multi-conductor zone in the SE quadrant of the property that strikes N-S over an approximate distance of 1'8 km (2.7 km if Zone D is also included). These anomalies are not unique, but they are typical of the numerous responses that combine to form the four conductive zones A - D, shown on the EM Anomaly map. Most of the anomalies comprising these multiconductor zones are non-magnetic, but are often located close to subtle magnetic contacts. Several reflect thin bedrock sources. Dips, where indicated, are generally towards the west. Line 10555, which crosses near the centre of Zone A, shows six thin sources in Zone A and another five or more in Zone B to the east. These two conductive zones are separated by a relatively resistive unit that strikes N-S, but which also hosts weak conductors along its perimeter. In the absence of any supporting geology, it would be extremely difficult to prioritize the geophysical responses within this very interesting area. Some, such as 10555 C, are very strong, while others, such as 10555F are very weak and poorly defined. However, any responses that are close to inferred faults or contacts probably warrant a higher priority as they could reflect contact-related mineralization. Additional work is warranted in this area.
10555C	D	-	
10555D	D	-	
10555E	D	23	
10555F	D	11	
10555G	D	-	
10491A	D	-	These two anomalies represent two of the more conductive portions of Zone A, with 10525B and the adjacent 10525C, combining to yield yielding a resistivity low of less than 3 ohm-m on the low frequency. Anomaly 10525B and C are associated with an inferred fault (153°) near a S-t rending magnetic contact. The dips of these two thin sources cannot be determined because of their close proximity to each other.
10525B	D	48	

Anomaly	Type	Mag	Comments

10445I	D	14	The anomalies in this group represent the more conductive portions of Zone B, a parallel multi-conductor zone with a strike extent of more than 3km. Anomaly characteristics are very similar to those observed in Zone A. Anomaly 10455I suggests a probable E-dipping thin source that is very close to a more subtle response to the west, although the latter yields a weak 14nT magnetic correlation. Anomaly 10480O, near the eastern property boundary, yields a resistivity low of less than 15 ohm-m, while 10511G reflects a thicker source of less than 7 ohm-m. Anomaly 10720E, near the south end of Zone B, also suggests a thicker, highly-conductive, nonmagnetic source. These low resistivities could actually be due to two or more closely-spaced thin sources, rather than one thick source.
10480O	D	-	
10511G	D	-	
10720E	B	-	

Anomaly	Type	Mag	Comments
10660A	D	6	These anomalies form parts of conductive Zone C. Anomaly 10660B is due to a thin source close to an inferred NE trending fault along the northern flank of a moderately weak magnetic unit. Anomalies 10670A and B are also loosely associated with the same structural break. Anomaly 10660A is of particular interest because it is the first anomaly in the SE quadrant that suggests a probable dip to the east, rather than west. Anomalies to the south, to 10700A, also suggest east dips. Possible NNW breaks near 10690B and 10700B tend to enhance the significance of these two weak responses.
10660B	D	-	
10670A	D	-	
10690B	B	5	
10700A	D	10	

Anomaly	Type	Mag	Comment
10680E	D	23	The moderate resistivity low shown on the EM map as Zone D hosts a gold showing near 10680D. Immediately south of this location, on the north and east slopes of Spruce Mtn., the geology map shows three or more mapped listwanite units. As previously mentioned, although there is no definite correlation between the surface expression of these units and the conductive or magnetic zones, there are several weakly conductive responses near the mapped contacts of these units. Nearly all anomalies are non-magnetic, with the exception of 10680E and 10710E. The latter yields a moderately strong 475 nT correlation over a S-trending pod containing at least 3% magnetite. This magnetic unit extends south, beyond the property boundary. Additional detailed work is recommended for this general area, in order to determine the geophysical signature(s) over the mineralized zone, and to map the extensions of the listwanite contacts.
10710E	D	475	
10580H	S?	19	Thin conductors are associated with the eastern edge of the resistive unit that separates Zone B from Zones A and D. These "formational" trends may also be important, particularly where possible faults can be inferred from the CVG data. Anomaly 10580H is a weak, poorly defined response that has been attributes to conductive cover, but it correlates with a weak magnetic anomaly, and marks the north end of a weak, S-trending resistivity low. This weakly conductive zone extends south through the contact-related thin source at 10610F to 10670F. There is a small but interesting magnetic trough just west of anomaly 10660E at fiducial 3352. There is no visible culture associated with this magnetic low. The
10610F	D	-	
10670F	D	-	

			amplitude and dimensions of this feature are too subtle to be clearly defined on the magnetic grids, but it is evident on the magnetic profile.

The foregoing text describes only a few of the possible sulphide-type responses on the property. In the search for carbonate-hosted auriferous mineralization, the value of EM conductors may be of little importance, unless the gold is known to be associated with conductive material such as sulphides, conductive shears or faults, alteration products, or magnetite. As mentioned previously, resistive zones can often be of greater exploration interest, particularly if the host rocks are siliceous or magnetite-rich.

The magnetic parameter appears to have been more effective than the resistivity in delineating rock units and areas of structural deformation that may have influenced local mineral deposition. The resistivity parameter, however, has outlined several conductive zones as well as resistive units. The two parameters are complementary, and when used together, should help to locate the more favourable areas for mineral deposition.

GEOLOGICAL SOLUTIONS INTERPRETATION

When the electromagnetic anomalies are plotted on the geology and topographic map, (figure 4) a north-south orientation of the conductor axes trends is apparent. The majority of the anomalies fall into the weakly conducting category. Many are near or coincident with streams and can be attributed to weakly conductive wet sediment. Others appear to be coincident with the mapped geological contacts. Therefore anomalies of amplitude grade 2 are not considered to be of interest at this time. Anomalies of grade 3 are only included in zones of interest if they are adjacent to stronger anomalies. There are three areas where the anomalies are grouped into zones of interest labeled zones A,B,C and D on figure 6.

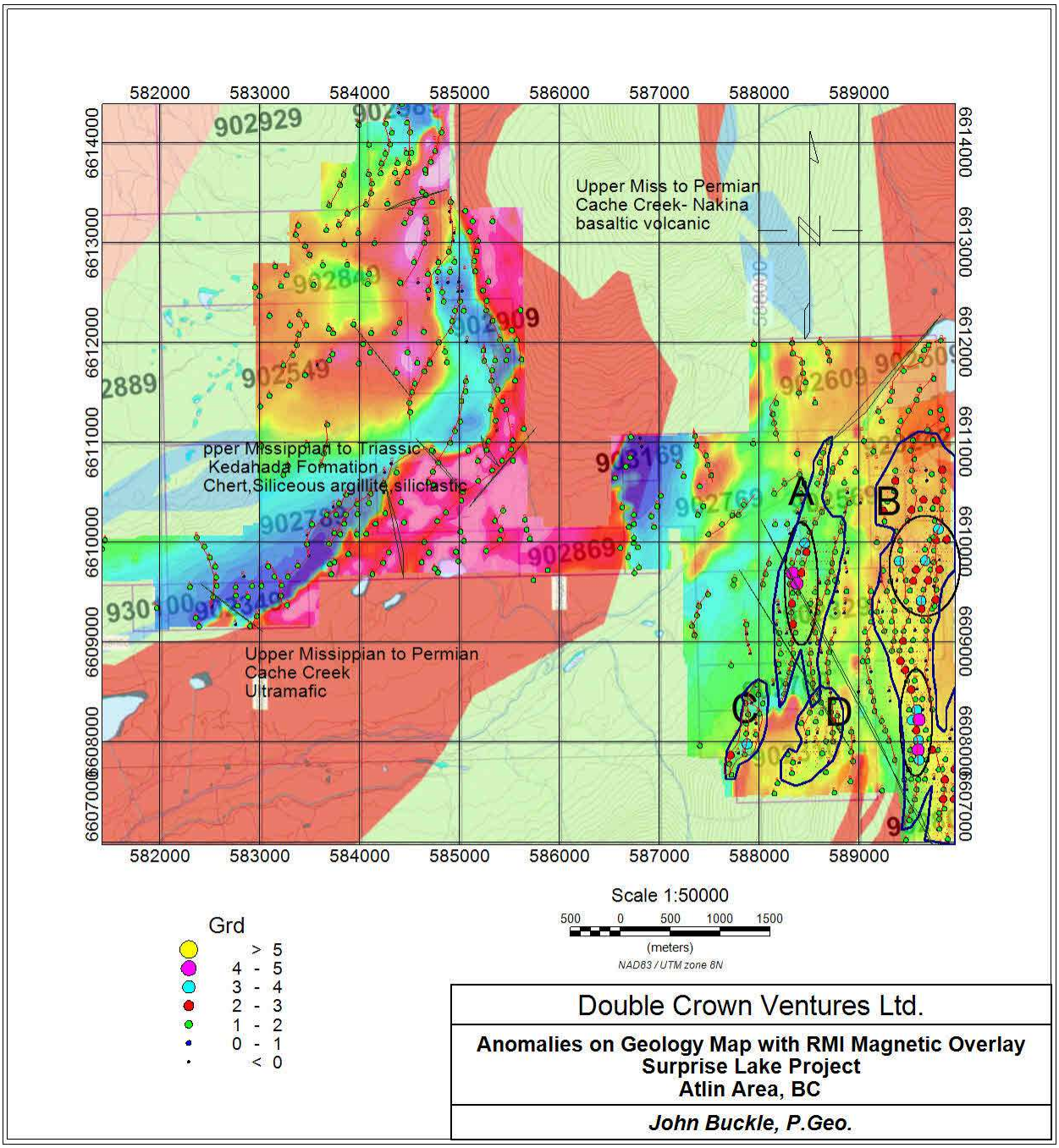

FIGURE 6 ANOMALIES ON GEOLOGY

ZONE A ANOMALIES

The group of anomalies that make up zone A are in the range of 2 to 5 or moderate conductivity. The grouping has a dominant north-south orientation and the zone of high values is one kilometer within a two kilometer trend. The anomaly is on the north facing slope of Spruce Mountain and is approximately the same strike as the known Spruce Mountain showing and quartz veins. This grouping is of interest for follow-up as it appears to be a legitimate bedrock conductor in a favourable geological area.

ZONE B ANOMALIES

Zone B is located in the upper Otter Creek valley. The conductive trend is coincident with a fault interpreted from satellite imagery and magnetic data. The lower Otter Creek valley hosts extensive placer operations. This anomaly is located outside the Double Crown claim block however the extension of the anomalous trend is on Double Crown property to the north and to the south.

ZONE C ANOMALIES

Zone C is a broad zone of multiple conductors of moderate conductivity. Although the anomaly is not sharply defined it lays in the favourable zone of known listwanite occurrence. It may be result of accumulation of conductive sediment on the side of Spruce Mountain however the conductance values and anomaly shape suggest a bedrock source. The anomaly axes match well with the previously identified IP anomalies and known listwanite. Therefore, even though the anomalies are relatively weak EM responses follow-up is recommended.

ZONE D ANOMALIES

Zone D is a relatively small grouping of anomalies selected partly upon their relative location to the known Surprise showing. This zone is possibly an extension of the zone A. It has an associated resistivity low zone that strikes northward. This anomaly group is relatively close to a mapped longue of ultramafic rocks and is likely associated with them. An interpreted fault cuts this zone from northwest to southeast.

RESISTIVITY INTERPRETATION

The following image is a representation of the resistivity data, draped on topography and projected in a 3 dimensional block. The resistivity plan maps are draped on topography then set to 3D block presentation looking north-east. Each of the plan maps is presented offset on the same projection. Both topography and depth have been exaggerated. This method is not an exact representation of the true depth however, it is a reasonable visualization of the depth plan views as a function of frequency. In this view it is apparent that the resistivity on the left one third of the image is lower and somewhat continuous with depth, suggesting a single geological unit of more conductive rocks. On the north (right) the dark blue area indicates conductive surface material overlying more resistive rocks. The interpreted fault is evident on the east side of the image.

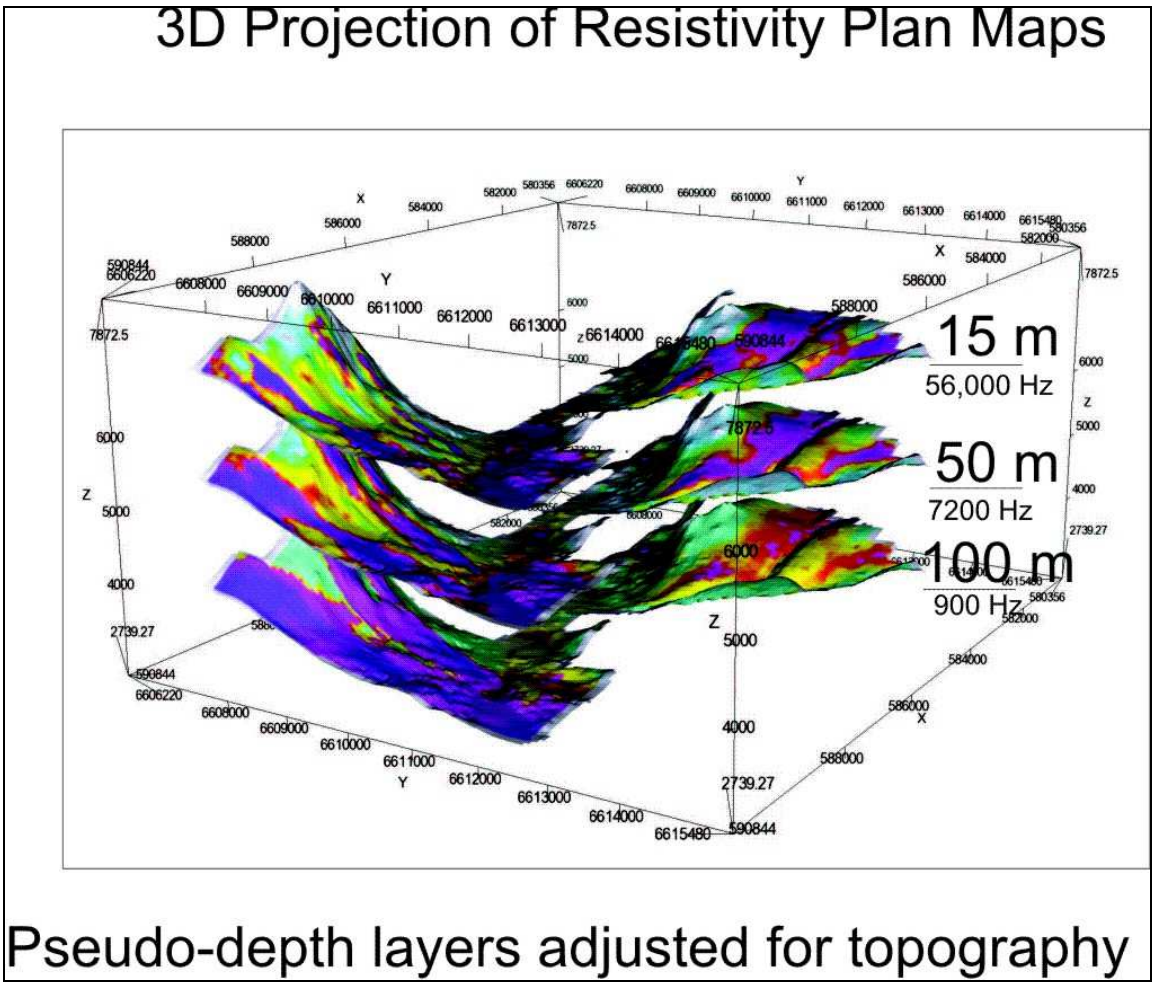

FIGURE 7 VISUAL REPRESENTATION OF RESISTIVITY DEPTH WITH FREQUENCY (BUCKLE, 2012 THIS REPORT)

Of note is the area on the south side, near surface, that corresponds with the area of known listwanite at the Surprise showing. The image indicates that this unit strikes north-south as a narrow moderately low resistivity (red) noted earlier as zone D.

The resistive overlying basalts appear as white on both the east and west sides of the survey area whereas the Pine Creek valley appears as a low resistivity area likely a reflection of conductive sediment in the valley.

The airborne survey has identified new targets for follow-up and enhanced the understanding of the geology of the project area.

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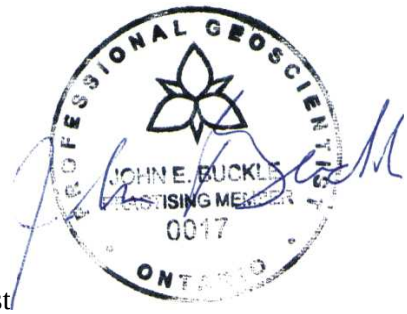
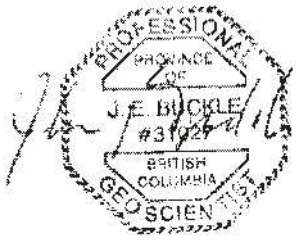
CERTIFICATE OF AUTHOR

GEOPHYSICIST'S CERTIFICATE

I, JOHN E. BUCKLE, of the City of Vancouver, in the Province of British Columbia, do hereby certify that: I am registered as a Professional Geoscientist with the Association of Professional Engineers and Geoscientists of the Province of British Columbia #31027 (Geophysics) . I am registered as a Professional Geoscientist with the Association of Profession Geoscientists of Ontario #0017.
I am a Consulting Geophysicist of Geological Solutions, with offices at 1116-1450 Chestnut Street, Vancouver, British Columbia. V6J 3K3
I further certify that:
1. I am a graduate of the York University (1980) and hold a B.Sc. degree in Earth Science.
2. I have been practicing my profession for the past 32 years, and have been active in the mining industry for the past 40 years.
3. This report is compiled from data obtained from Dighem V Helicopter-borne Electromagnetic and Magnetic data carried out by a crew of Furgo Airborne Surveys over the Surprise Property. The Surprise Lake Property is located on and to the west of Surprise Lake within the Atlin Mining Division of British Columbia. The work of examination, reprocessing, and interpretation of this data was done during the period of August 28 to September 8th, 2013.
4. I am a director of Double Crown Ventures Ltd, a private company registered in British Colombia.

John E. Buckle, P.Geo. September 8, 2013





Geophysicist

AFFIDAVIT OF EXPENSES

Under contract to Double Crown Ventures Ltd., Geological Solutions undertook to evaluate, reprocess and interpret airborne geophysical data provided by Double Crown. Data reprocessing, research, generation of interpretation maps, archives and interpretation report was completed in 12 days:

August 28 to September 8, 2013

12 days at $700 per day
$8400.00 without HST

Respectfully submitted,
Geological Solutions
John E Buckle, P.Geo,
Geophysicist

September 8, 2013

APPENDICES

A. List of Personnel

B. Data Processing Flowcharts

C. Background Information

D. Data Archive Description

E. Interpretation Maps

APPENDIX A

LIST OF PERSONNEL

The following personnel were involved in the acquisition, processing, interpretation and presentation of data, relating to a DIGHEM airborne geophysical survey carried out over the Surprise project area, for Bastion Resources Ltd., near Atlin, B.C.

Lesley Minty: Project Manager
Terry lacey: Equipment Operator
Mike Neilly: Equipment Operator
Sarah Underhay: Data Processor/Crew Leader
Richardo White: Data Processor (Office)
Tayebe Hamzeh: Data Processor (Office)
Lyn Vanderstarren: Drafting Supervisor
Guy Lajoie: Pilot (Questral Helicopters Ltd.)

APPENDIX B

DATA PROCESSING

Fugro Airborne Surveys

Processing Flow Chart - Magnetic Data

1. Load Magnetic Airborne Flight Data into Oasis database
2. Magnetic System Lag Test Data
3. Apply lag
4. Edit base station data

   a. spike removal
   b. low pass filter base station data
5. Magnetic Base Station Data correction
6. Edit airborne magnetic data:
   a. manual spike removal,
   b. fourth difference spike removal
7. Level magnetic data:
   a. base station subtraction
   b. magnetic leveling network/tie line intersections
   c. manual level adjustments
   d. microlevelling routines
8. IGRF or local trend removal
9. Grids and database of corrected and calculated values

Electromagnetic Data Processing Flow

1. Load Airborne Flight EM Data into Oasis database
2. Apply base level corrections
3. EM Base Level Picks From Flights to Height
4. EM System Lag Test Data
5. Apply lag correction
6. Edit EM data:
   a. manual spike removal,
   b. spheric removal filter
7. Calculate
8. Resistivity, Level EM and do Quality Control:
   a. manual level adjustments
   b. check phase and gain
   c. microlevelling routines (optional)
9. Grids, Colour Maps, Contour Maps

Geological Solutions Interpretation

1. Database created from xyz data
2. Check data quality and/or errors
3. Grids created or imported
4. Review existing background data from geological maps, reports and previous work
5. Acquire ancillary digital data, register coordinates in UTM coordinates of airborne data
6. Create maps, grids and profiles where necessary for interpretation
7. Cross correlate electromagnetic, resistivity and magnetic data with geology
8. Geophysicist selects, interprets, and classifies EM anomalies EM Anomaly Maps, and Digital Lists
9. Create maps with interpretation annotations
10. Report

APPENDIX C

BACKGROUND INFORMATION

(unedited from Fugro Airborne Surveys report)

Electromagnetics

Fugro electromagnetic responses fall into two general classes, discrete and broad. The discrete class consists of sharp, well-defined anomalies from discrete conductors such as sulphide lenses and steeply dipping sheets of graphite and sulphides. The broad class consists of wide anomalies from conductors having a large horizontal surface such as flatly dipping graphite or sulphide sheets, saline water-saturated sedimentary formations, conductive overburden and rock, kimberlite pipes and geothermal zones. A vertical conductive slab with a width of 200 m would straddle these two classes. The vertical sheet (half plane) is the most common model used for the analysis of discrete conductors. The B, D and T type are analyzed according to this model, with the conductance being calculated from the local amplitudes of the coaxial data.. The following section entitled **Discrete Conductor Analysis** describes this model in detail.

The conductive earth (half-space) model is more suitable for broad conductors that carry an S, H, or E type interpretation symbol. Conductance values for these anomalous responses are based on the absolute amplitudes of the selected coplanar channels. Resistivity maps result from the use of this model. A later section entitled **Resistivity Mapping** describes the method further.

Discrete Conductor Analysis

The EM anomalies appearing on the electromagnetic map are analyzed by computer to give the conductance (i.e., conductivity-thickness product) in siemens (mhos). The B, D, and T type calculations are based on a vertical sheet model. This is not an unreasonable procedure, because the computed conductance increases as the electrical quality of the conductor increases, regardless of its true shape. HEM anomalies are divided into seven grades of conductance, as shown in Table 7.

The conductance value is a geological parameter because it is a characteristic of the conductor alone. It generally is independent of frequency, flying height or depth of burial, apart from the averaging over a greater portion of the conductor as height increases.
Small anomalies from deeply buried strong conductors are not confused with small anomalies from shallow weak conductors because the former will have larger conductance values.

TABLE 7 EM ANOMALY GRADES

Anomaly Grade	Siemens
7	>100
6	50-100
5	20-50
4	10-20
3	5-10
2	1-5
1	<1

Conductive overburden generally produces broad EM responses which may not be shown as anomalies on the geophysical maps. However, patchy conductive overburden in otherwise resistive areas can yield discrete anomalies with a conductance grade (Table 7) of 1, 2 or even 3 for conducting clays that have resistivities as low as 50 ohm-m. In areas where ground resistivities are less than 10 ohm-m, anomalies caused by weathering variations and similar causes can have any conductance grade. The anomaly shapes from the multiple coils often allow such conductors to be recognized, and these are indicated by the letters S, H, and sometimes E on the geophysical maps (see EM legend on maps).

For bedrock conductors, the higher anomaly grades indicate increasingly higher conductances. Examples: the New Insco copper discovery (Noranda, Canada) yielded a grade 5 anomaly, as did the neighbouring copper-zinc Magusi River ore body; Mattabi (copper-zinc, Sturgeon Lake, Canada) and Whistle (nickel, Sudbury, Canada) gave grade 6; and the Montcalm nickel-copper discovery (Timmins, Canada) yielded a grade 7 anomaly. Graphite and sulphides can span all grades but, in any particular survey area, field work may show that the different grades indicate different types of conductors.

Strong conductors (i.e., grades 6 and 7) are characteristic of massive sulphides or graphite. Moderate conductors (grades 4 and 5) typically reflect graphite or sulphides of a less massive character, while weak bedrock conductors (grades 1 to 3) can signify poorly connected graphite or heavily disseminated sulphides. Grades 1 and 2 conductors may not respond to ground EM equipment using frequencies less than 2000 Hz. The presence of sphalerite or gangue can result in ore deposits having weak to moderate conductances. As an example, the three million ton lead-zinc deposit of Restigouche Mining Corporation near Bathurst, Canada, yielded a well-defined grade 2 conductor. The 10 percent by volume of sphalerite occurs as a coating around the fine-grained massive pyrite, thereby inhibiting electrical conduction. Faults, fractures and shear zones may produce anomalies that typically have low conductances (e.g., grades 1 to 3). Conductive rock formations can yield anomalies of any conductance grade. The conductive materials in such rock formations can be salt water, weathered products such as clays, original depositional clays, and carbonaceous material.

For each interpreted electromagnetic anomaly on the geophysical maps, a letter identifier and an interpretive symbol are plotted beside the EM grade symbol. In areas where anomalies are crowded, the letter identifiers and interpretive symbols may be obliterated. The EM grade symbols, however, will always be discernible, and any obliterated information can be obtained from the anomaly listing appended to this report. The conductance measurement is considered more reliable than the depth estimate. There are a number of factors that can produce an error in the depth estimate, including the averaging of topographic variations by the altimeter, overlying conductive overburden, and the location and attitude of the conductor relative to the flight line. Conductor location and attitude can provide an erroneous depth estimate because the stronger part of the conductor may be deeper or to one side of the flight line, or because it has a shallow dip. A heavy tree cover can also produce errors in depth estimates. This is because the depth estimate is computed as the distance of the bird from the conductor, minus the altimeter reading. The altimeter can lock onto the top of a dense forest canopy. This situation yields an erroneously large depth estimate but does not affect the conductance estimate. Dip symbols are used to indicate the direction of dip of conductors. These symbols are used only when the anomaly shapes are unambiguous, which usually requires a fairly resistive environment.

A further interpretation is often presented on the EM map by means of the line-to-line correlation of bedrock anomalies, which is based on a comparison of anomaly shapes on adjacent lines. This provides conductor axes that may define the geological structure over portions of the survey area. The absence of conductor axes in an area implies that anomalies could not be correlated from line to line with reasonable confidence. The electromagnetic anomalies are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a follow-up program. The actual conductance values are printed in the attached anomaly list for those who wish quantitative data. The map provides an interpretation of conductors in terms of length, strike and dip, geometric shape, conductance, and thickness. The accuracy is comparable to an interpretation from a high

quality ground EM survey having the same line spacing. The appended EM anomaly list provides a tabulation of anomalies in ppm, conductance, and depth for the vertical sheet or horizontal sheet models. The vertical sheet model (B, D, and T types) uses the local coaxial amplitudes for the calculation. Values for the horizontal sheet model (S, H, and E types) are calculated from the absolute amplitudes of the selected coplanar channels. No conductance or depth estimates are shown for weak anomalous responses that are not of sufficient amplitude to yield reliable calculations, or where magnetite effects have caused negative in-phase responses.

Questionable Anomalies

The EM maps may contain anomalous responses that are displayed as asterisks (*). These responses denote weak anomalies of indeterminate conductance, which may reflect one of the following: a weak conductor near the surface, a strong conductor at depth (e.g., 100 to 120 m below surface) or to one side of the flight line, or aerodynamic noise. Those responses that have the appearance of valid bedrock anomalies on the flight profiles are indicated by appropriate interpretive symbols (see EM legend on maps). The others probably do not warrant further investigation unless their locations are of considerable geological interest.

The Thickness Parameter

A comparison of coaxial and coplanar shapes can provide an indication of the thickness of a steeply dipping conductor. The amplitude of the coplanar anomaly (e.g., CPI channel) increases relative to the coaxial anomaly (e.g., CXI) as the apparent thickness increases, i.e., the thickness in the horizontal plane. (The thickness is equal to the conductor width if the conductor dips at 90 degrees and strikes at right angles to the flight line.) This report refers to a conductor as thin when the thickness is likely to be less than 5 m, and thick when in excess of 10 m. Thick conductors are indicated on the EM map by parentheses "( )". For base metal exploration in steeply dipping geology, thick conductors can be high priority targets because many massive sulphide ore bodies are thick. The system cannot sense the thickness when the strike of the conductor is subparallel to the flight line, when the conductor has a shallow dip, when the anomaly amplitudes are small, or when the resistivity of the environment is less than 100 ohm-m.

Resistivity Mapping

Resistivity mapping is useful in areas where broad or flat lying conductive units are of interest. One example of this is the clay alteration that is associated with Carlin-type deposits in the southwest United States. The resistivity parameter was able to identify the clay alteration zone over the Cove deposit. The alteration zone appeared as a strong resistivity low on the 900 Hz resistivity parameter. The 7,200 Hz and 56,000 Hz resistivities showed more detail in the covering sediments, and delineated a range front fault. This is typical in many areas of the southwest United States, where conductive near surface sediments, which may sometimes be alkalic, attenuate the higher frequencies. Resistivity mapping has proven successful for locating diatremes in diamond exploration. Weathering products from relatively soft kimberlite pipes produce a resistivity contrast with the unaltered host rock. In many cases weathered kimberlite pipes were associated with thick conductive layers that contrasted with overlying or adjacent relatively thin layers of lake bottom sediments or overburden.

Areas of widespread conductivity are commonly encountered during surveys. These conductive zones may reflect alteration zones, shallow-dipping sulphide or graphite-rich units, saline ground water, or conductive overburden. In such areas, EM amplitude changes can be generated by

decreases of only 5 m in survey altitude, as well as by increases in conductivity. The typical flight record in conductive areas is characterized by in-phase and quadrature channels that are continuously active. Local EM peaks reflect either increases in conductivity of the earth or decreases in survey altitude. For such conductive areas, apparent resistivity profiles and contour maps are necessary for the correct interpretation of the airborne data. The advantage of the resistivity parameter is that anomalies caused by altitude changes are virtually eliminated, so the resistivity data reflect only those anomalies caused by conductivity changes. The resistivity analysis also helps the interpreter to differentiate between conductive bedrock and conductive overburden. For example, discrete conductors will generally appear as narrow lows on the contour map and broad conductors (e.g., overburden) will appear as wide lows. The apparent resistivity is calculated using the pseudo-layer (or buried) half-space model defined by Fraser (1978)5. This model consists of a resistive layer overlying a conductive half-space. The depth channels give the apparent depth below surface of the conductive material. The apparent depth is simply the apparent thickness of the overlying resistive layer. The apparent depth (or thickness) parameter will be positive when the upper layer is more resistive than the underlying material, in which case the apparent depth may be quite close to the true depth.

The apparent depth will be negative when the upper layer is more conductive than the underlying material, and will be zero when a homogeneous half-space exists. The apparent depth parameter must be interpreted cautiously because it will contain any errors that might exist in the measured altitude of the EM bird (e.g., as caused by a dense tree cover). The inputs to the resistivity algorithm are the in-phase and quadrature components of the coplanar coil-pair. The outputs are the apparent resistivity of the conductive half-space (the source) and the sensor-source distance. The flying height is not an input variable, and the output resistivity and sensor-source distance are independent of the flying height when the conductivity of the measured material is sufficient to yield significant in-phase as well as quadrature responses. The apparent depth, discussed above, is simply the sensor-source distance minus the measured altitude or flying height. Consequently, errors in the measured altitude will affect the apparent depth parameter but not the apparent resistivity parameter.

The apparent depth parameter is a useful indicator of simple layering in areas lacking a heavy tree cover. Depth information has been used for permafrost mapping, where positive apparent depths were used as a measure of permafrost thickness. However, little quantitative use has been made of negative apparent depths because the absolute value of the negative depth is not a measure of the thickness of the conductive upper layer and, 5 Resistivity mapping with an airborne multicoil electromagnetic system: Geophysics, v. 43, p.144-172 therefore, is not meaningful physically. Qualitatively, a negative apparent depth estimate usually shows that the EM anomaly is caused by conductive overburden. Consequently, the apparent depth channel can be of significant help in distinguishing between overburden and bedrock conductors.

Interpretation in Conductive Environments

Environments having low background resistivities (e.g., below 30 ohm-m for a 900 Hz system) yield very large responses from the conductive ground. This usually prohibits the recognition of discrete bedrock conductors. However, Fugro data processing techniques produce three parameters that contribute significantly to the recognition of bedrock conductors in conductive environments. These are the in-phase and quadrature difference channels (DIFI and DIFQ, which are available only on systems with “common” frequencies on orthogonal coil pairs), and the resistivity and depth channels (RES and DEP) for each coplanar frequency. The EM difference channels (DIFI and DIFQ) eliminate most of the responses from conductive ground, leaving responses from bedrock conductors, cultural features (e.g., telephone lines, fences, etc.) and edge effects. Edge effects often

occur near the perimeter of broad conductive zones. This can be a source of geologic noise. While edge effects yield anomalies on the EM difference channels, they do not produce resistivity anomalies. Consequently, the resistivity channel aids in eliminating anomalies due to edge effects. On the other hand, resistivity anomalies will coincide with the most highly conductive sections of conductive ground, and this is another source of geologic noise. The recognition of a bedrock conductor in a conductive environment therefore is based on the anomalous responses of the two difference channels (DIFI and DIFQ) and the resistivity channels (RES). The most favourable situation is where anomalies coincide on all channels.

The DEP channels, which give the apparent depth to the conductive material, also help to determine whether a conductive response arises from surficial material or from a conductive zone in the bedrock. When these channels ride above the zero level on the depth profiles (i.e., depth is negative), it implies that the EM and resistivity profiles are responding primarily to a conductive upper layer, i.e., conductive overburden. If the DEP channels are below the zero level, it indicates that a resistive upper layer exists, and this usually implies the existence of a bedrock conductor. If the low frequency DEP channel is below the zero level and the high frequency DEP is above, this suggests that a bedrock conductor occurs beneath conductive cover.

Reduction of Geologic Noise

Geologic noise refers to unwanted geophysical responses. For purposes of airborne EM surveying, geologic noise refers to EM responses caused by conductive overburden and magnetic permeability. It was mentioned previously that the EM difference channels (i.e., channel DIFI for in-phase and DIFQ for quadrature) tend to eliminate the response of conductive overburden.

Magnetite produces a form of geological noise on the in-phase channels. Rocks containing less than 1% magnetite can yield negative in-phase anomalies caused by magnetic permeability. When magnetite is widely distributed throughout a survey area, the in-phase EM channels may continuously rise and fall, reflecting variations in the magnetite percentage, flying height, and overburden thickness. This can lead to difficulties in recognizing deeply buried bedrock conductors, particularly if conductive overburden also exists. However, the response of broadly distributed magnetite generally vanishes on the in-phase difference channel DIFI. This feature can be a significant aid in the recognition of conductors that occur in rocks containing accessory magnetite.

The Susceptibility Effect

When the host rock is conductive, the positive conductivity response will usually dominate the secondary field, and the susceptibility effect will appear as a reduction in the in-phase, rather than as a negative value. The in-phase response will be lower than would be predicted by a model using zero susceptibility. At higher frequencies the inphase conductivity response also gets larger, so a negative magnetite effect observed on the low frequency might not be observable on the higher frequencies, over the same body. The susceptibility effect is most obvious over discrete magnetite-rich zones, but also occurs over uniform geology such as a homogeneous half-space. High magnetic susceptibility will affect the calculated apparent resistivity, if only conductivity is considered. Standard apparent resistivity algorithms use a homogeneous half-space model, with zero susceptibility. For these algorithms, the reduced in-phase response will, in most cases, make the apparent resistivity higher than it should be. It is important to note that there is nothing wrong with the data, nor is there anything wrong with the processing algorithms. The apparent difference results from the fact that the simple geological model used in processing does not match the complex geology.

Apparent Resistivity Calculations

Effects of Permittivity on In-phase/Quadrature/Resistivity

Freq(Hz)	Coil	sep (m)	Thres (ppm)	Alt (m)	In Phase	Quad Phase	App Res	App Depth(m)	Permittivity
56,000	CP	6.3	0.1	30	7.3	35.3	10118	-1.0	1 Air
56,000	CP	6.3	0.1	30	3.6	36.6	19838	-13.2	5 Quartz
56,000	CP	6.3	0.1	30	-1.1	38.3	81832	-25.7	10 Epidote
56,000	CP	6.3	0.1	30	-10.4	42.3	76620	-25.8	20 Granite
56,000	CP	6.3	0.1	30	-19.7	46.9	71550	-26.0	30 Diabase
56,000	CP	6.3	0.1	30	-28.7	52.0	66787	-26.1	40 Gabbro

Magnetic Responses

The measured total magnetic field provides information on the magnetic properties of the earth materials in the survey area. This information can be used to locate magnetic bodies of direct interest for exploration, and for structural and lithological mapping. The total magnetic field response reflects the abundance of magnetic material in the source. Magnetite is the most common magnetic mineral. Other minerals such as ilmenite, pyrrhotite, franklinite, chromite, hematite, arsenopyrite, limonite and pyrite are also magnetic, but to a lesser extent than magnetite on average. Changes in magnetic susceptibility often allow rock units to be differentiated based on the total magnetic field. Geophysical classifications may differ from geological classifications if various magnetite levels exist within one general geological classification. Geometric considerations of the source such as shape, dip and depth, inclination of the earth's field and remanent magnetization will complicate such an analysis.

In general, mafic lithologies contain more magnetite and are therefore more magnetic than many sediments which tend to be weakly magnetic. Metamorphism and alteration can also increase or decrease the magnetization of a rock unit. Textural differences on a total field magnetic contour, colour or shadow map due to the frequency of activity of the magnetic parameter resulting from inhomogeneities in the distribution of magnetite within the rock, may define certain lithologies. For example, near surface volcanics may display highly complex contour patterns with little line-to-line correlation. Rock units may be differentiated based on the plan shapes of their total or residual magnetic field responses. Mafic intrusive plugs can appear as isolated "bulls-eye" anomalies. Granitic intrusives appear as sub-circular zones, and may have contrasting rings due to contact metamorphism. Generally, granitic terrain will lack a pronounced strike direction, although granite gneiss may display strike.

Linear north-south units are theoretically not well defined on total magnetic field maps in equatorial regions, due to the low inclination of the earth's magnetic field. However, most stratigraphic units will have variations in composition along strike that will cause the units to appear as a series of alternating magnetic highs and lows. Faults and shear zones may be characterized by alteration that causes destruction of magnetite (e.g., weathering) that produces a contrast with surrounding rock. Structural breaks may be filled by magnetite-rich, fracture filling material, as is the case with diabase dikes, or by non-magnetic felsic material. Faulting can also be

identified by patterns in the magnetic contours or colours. Faults and dikes tend to appear as lineaments and often have strike lengths of several kilometres. Offsets in narrow, magnetic, stratigraphic trends also delineate structure. Sharp contrasts in magnetic lithologies may arise due to large displacements along strike-slip or dip-slip faults.

APPENDIX D

DATA ARCHIVE DESCRIPTION

Reference: CDVD00864

Archive Date: November 22, 2011

This archive contains FINAL data and grids of an airborne DighemV electromagnetic and magnetic geophysical survey over the Surprise Property, near Atlin, B.C., conducted by FUGRO AIRBORNE SURVEYS CORP. on behalf of Bastion Resources Ltd., flown from August 13 to August 17, 2011

Job # 11063

\GRIDS Grids in Geosoft format
CVG.GRD - Calculated Vertical Magnetic Gradient nT/m
RMI.GRD - Residual Magnetic Intensity nT
RES900.GRD - Apparent Resistivity 900 Hz ohm·m
RES7200.GRD - Apparent Resistivity 7200 Hz ohm·m
RES56K.GRD - Apparent Resistivity 56k Hz ohm·m
\LINEDATA
GDB - Data archive in Geosoft GDB format
XYZ - Data archive in Geosoft ASCII format
Anom_.XYZ - Anomaly archive in ASCII format
\MAPS Final colour maps in Geosoft MAP and PDF format: (Anomaly in DXF format)
Anomaly - Electromagnetic Anomalies with Interpretation sheet *
CVG - Calculated Vertical Magnetic Gradient nT/m sheet *
RMI - Residual Magnetic Intensity nT sheet *
RES7200 - Apparent Resistivity 720 Hz ohm·m sheet *
RES56kHz - Apparent Resistivity 56000 Hz ohm·m sheet *
RES900 - Apparent Resistivity 900 Hz ohm·m
\REPORT
11063_Report.PDF - Survey Report
\Videos
Appendix

GEOSOFT GDB AND XYZ ARCHIVE SUMMARY

Channel	Name	Time	Units	Description
1	x	0.1	m	Eastings NAD83 (Zone 8N)
2	y	0.1	m	Northings NAD83 (Zone8N)
3	fid	0.1	synchronization	counter
4	lon	0.1	degrees	Longitude NAD83
5	lat	0.1	degrees	Latitude NAD83

6	flight	0.1	flight	number
7	date	0.1	flight	Date (yyyy/mm/dd)
8	altrad	0.1	m	Calculated Bird height above ground from radar altimeter
9	altlas	0.1	m	Measured Bird height above ground from laser altimeter
10	gpsz	0.1	m	Survey Height above spheroid
11	dtm	0.1	m	Terrain With respect to ellipsoid
12	diurnal_filt	0.1	nT	Ground Magnetic intensity
13	diurnal_cor	0.1	nT	Diurnal Correction – base removed
14	mag_raw	0.1	nT	Total Magnetic field – spike rejected
15	mag_lag	0.1	nT	Total Magnetic field – corrected for lag
16	mag_diu	0.1	nT	Total Magnetic field- diurnalvariation removed
17	igrf	0.1	nT	International geomagnetic reference field
18	rmi	0.1	nT	Residual magnetic intensity-final
19	cpi900_filt	0.1	ppm	Coplanar inphase 900 Hz-unlevelled
20	cpq900_filt	0.1	ppm	Coplanar quadrature 900 Hz-unlevelled
21	cxi1000_filt	0.1	ppm	Coaxial inphase 1000 Hz-unlevelled
22	cxq1000_filt	0.1	ppm	Coaxial quadrature 1000 Hz-unlevelled
23	cxi5500_filt	0.1	ppm	Coaxial inphase 5500 Hz-unlevelled
24	cxq5500_filt	0.1	ppm	Coaxial quadrature 5500 Hz-unlevelled
25	cpi7200_filt	0.1	ppm	Coplanar inphase 7200Hz-unlevelled
26	cpq7200_filt	0.1	ppm	Coplanar quadrature 7200Hz-unlevelled
27	cpi56k_filt	0.1	ppm	Coplanar inphase 56kHz-unlevelled
28	cpq56k_filt	0.1	ppm	Coplanar quadrature 56kHz-unlevelled
29	cpi900	0.1	ppm	Coplanar inphase 900Hz
30	cpq900	0.1	ppm	Coplanar quadrature 900Hz
31	cxi1000	0.1	ppm	Coaxial inphase 1000Hz
32	cxq1000	0.1	ppm	Coaxial quadrature 1000Hz
33	cxi5500	0.1	ppm	Coaxial inphase 5500Hz
34	cxq5500	0.1	ppm	Coaxial quadrature 5500Hz
35	cpi7200	0.1	ppm	Coplanar inphase 7200Hz
36	cpq7200	0.1	ppm	Coplanar quadrature 7200Hz
37	cpi56k	0.1	ppm	Coplanar inphase 56kHz
38	cpq56k	0.1	ppm	Coplanar quadrature 56kHz
39	res900	0.1	ohm·m	Apparent resistivity-900Hz
40	res7200	0.1	ohm·m	Apparent resistivity-7200Hz
41	res56k	0.1	ohm·m	Apparent resistivity-56kHz
42	dep900	0.1	m	Apparent depth-900Hz
43	dep7200	0.1	m	Apparent depth-7200Hz
44	dep56k	0.1	m	Apparent depth-56kHz
45	difi	0.1	difference	Channel based on cxi5500/cpi7200
46	difq	0.1	difference	Channel Based on cxq5500/cpq7200
47	cppl	0.1	coplanar	Powerline monitor
48	cxsp	0.1	coaxial	Spherics monitor
49	cpsp	0.1	coplanar	Spherics monitor

APPENDIX E

INTERPRETATION MAPS

Colour Shadow Resistivity Map

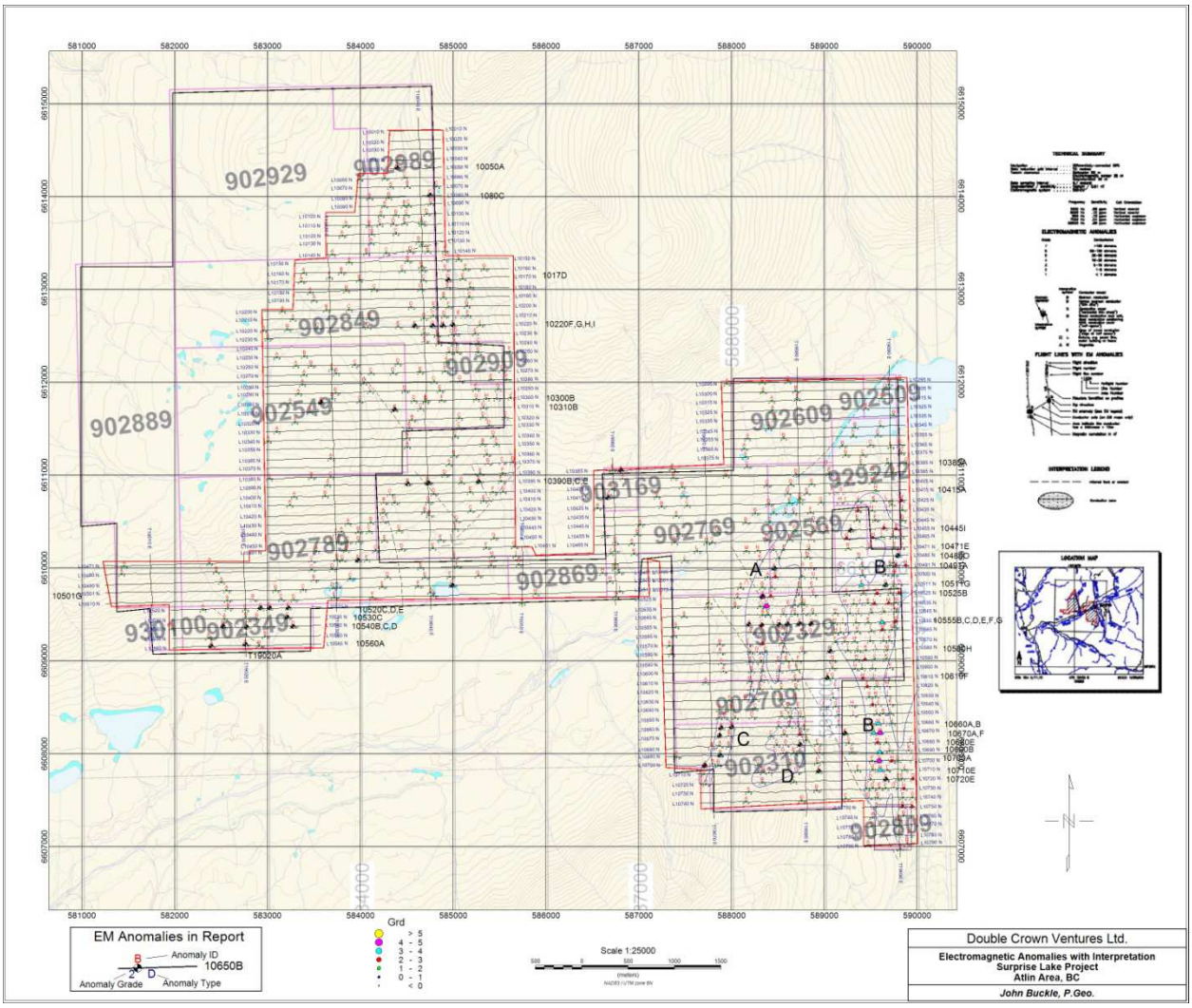


FIGURE 8 ELECTROMAGNETIC ANOMALY MAP WITH INTERPRETATION

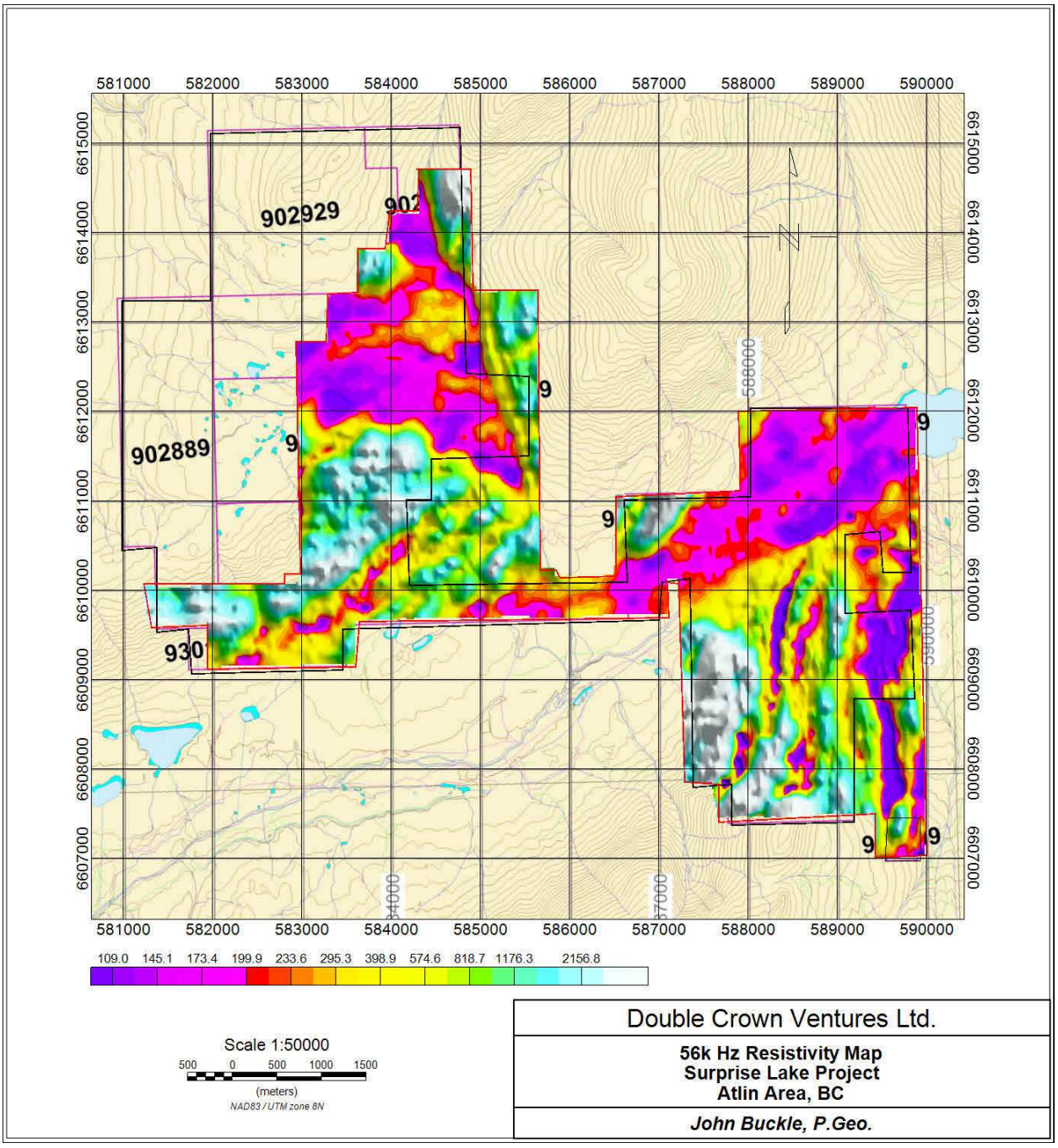


FIGURE 9 COLOUR SHADOW 56K HZ RESISTIVITY MAP

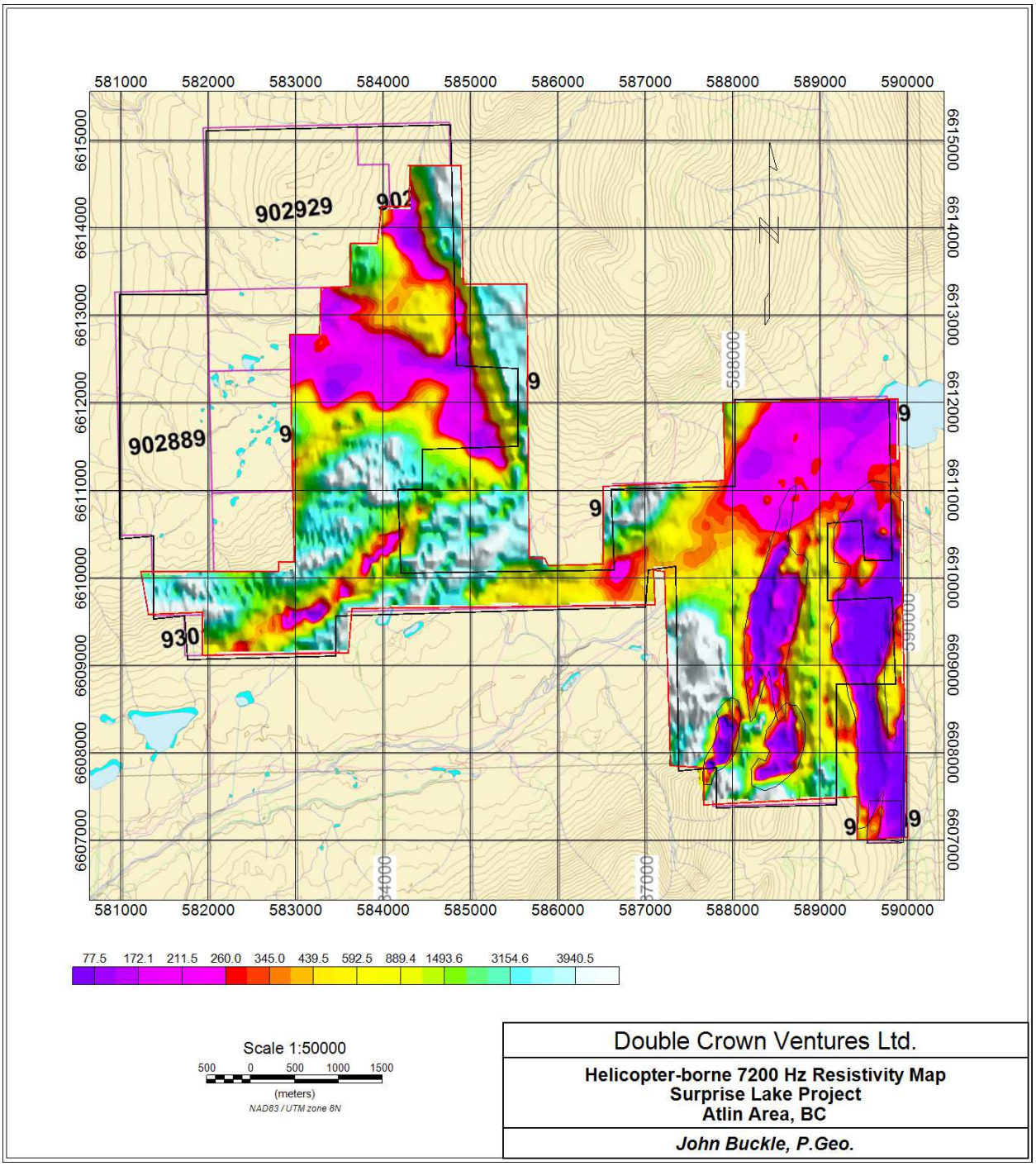


FIGURE 10 COLOUR SHADOW 7200 HZ RESISTIVITY MAP

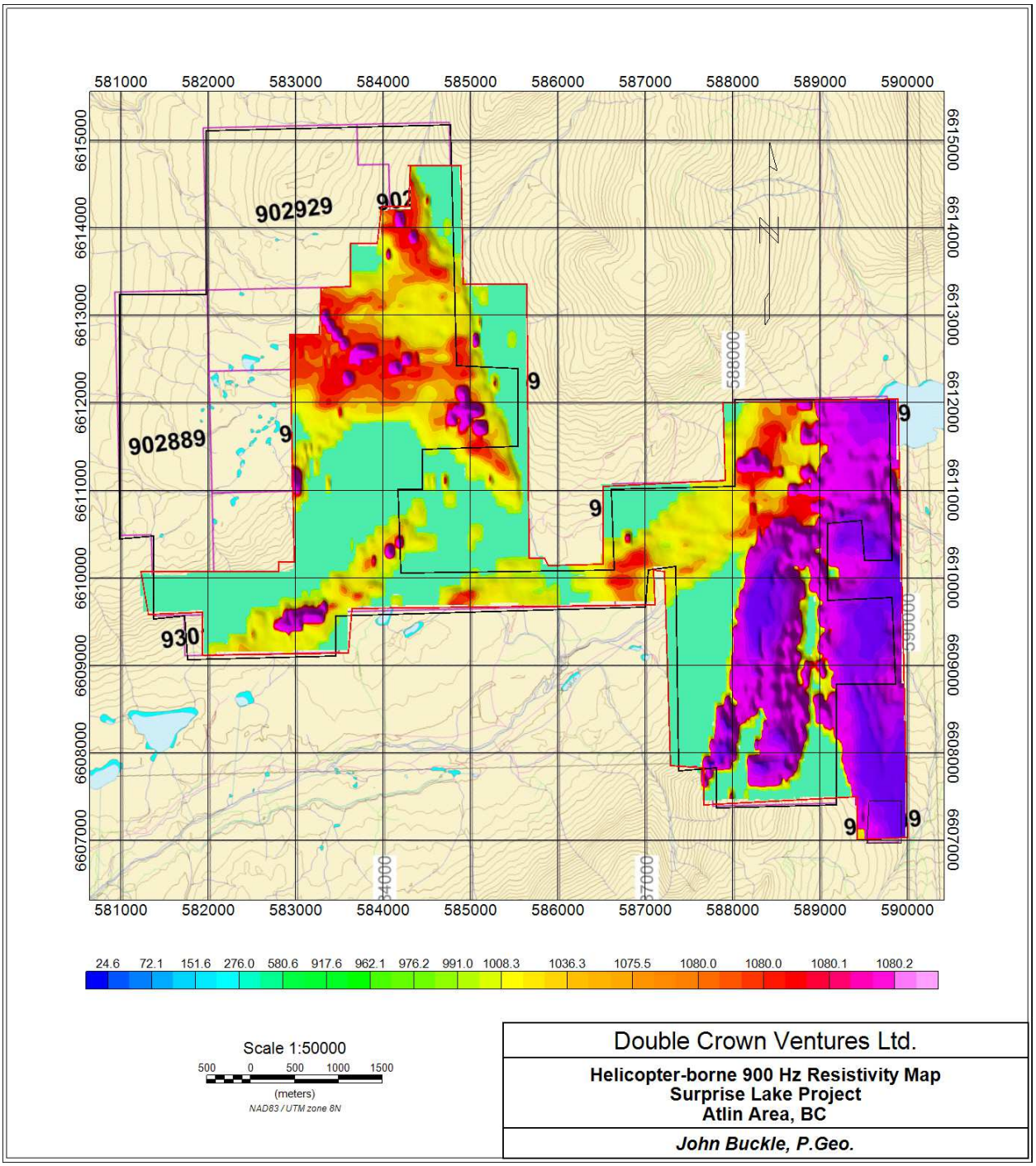


FIGURE 11 COLOUR SHADOW 900 HZ RESISTIVITY MAP

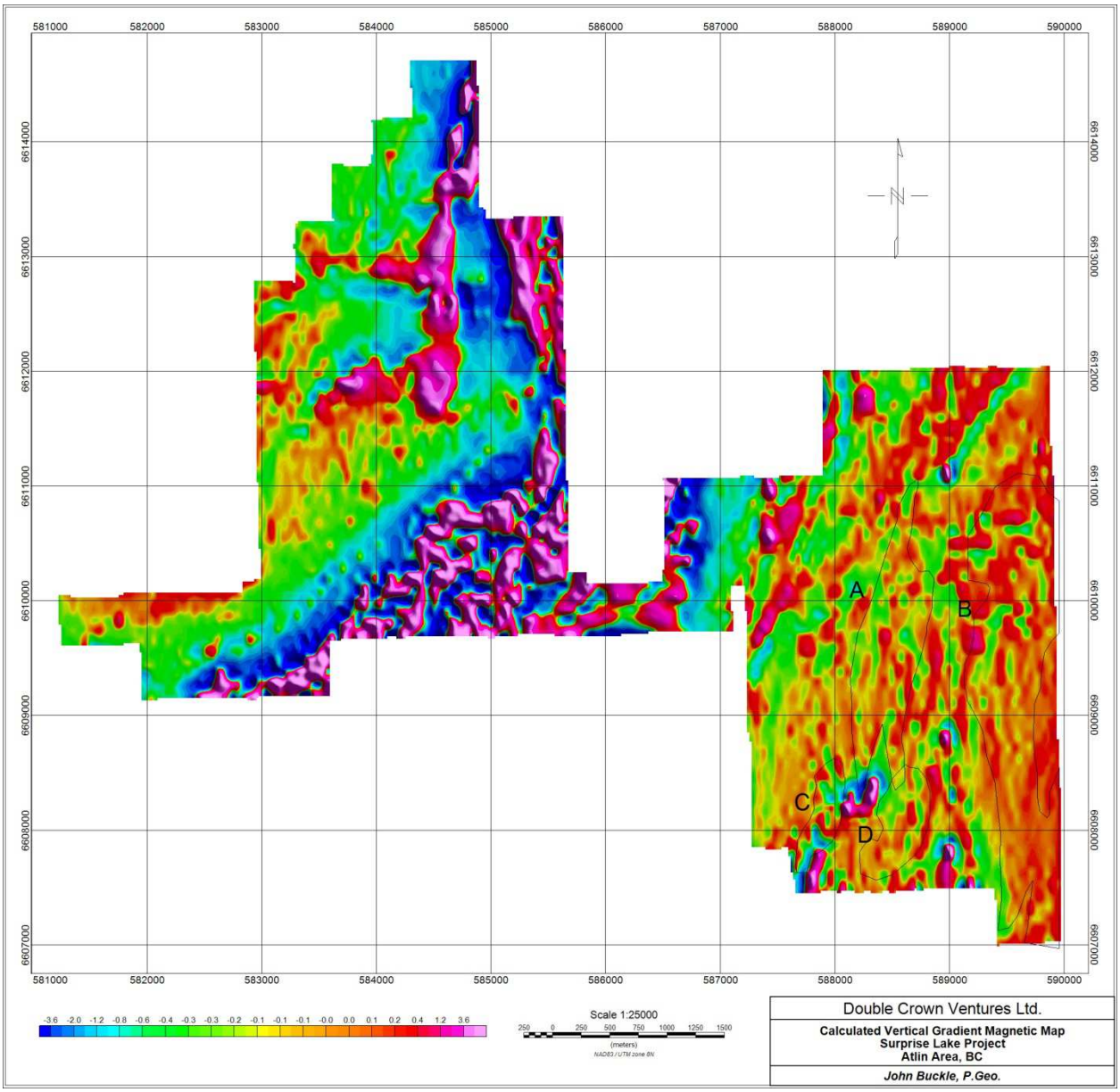


FIGURE 12 CALCULATED VERTICAL GRADIENT MAGNETIC MAP

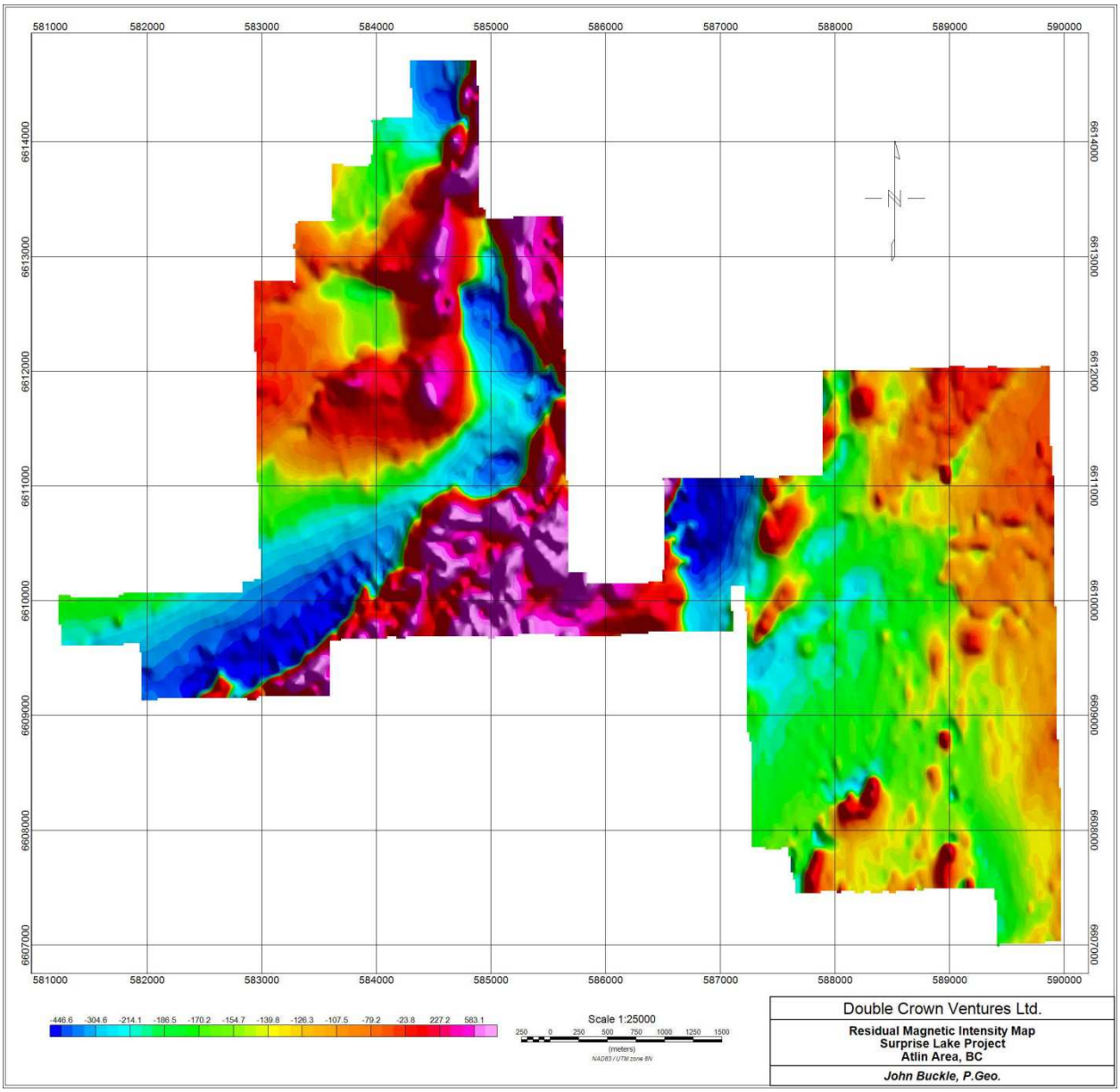


FIGURE 13 RESIDUAL MAGNETIC INTENSITY MAP