

TENURE #'S OF CLAIMS #250846 #'S 251127-30 incl. #409039, 42, 53 #504858, 63 #508799 #508802, 07, 11, 99

EVENT #S 4071377 & 4073853

LOCATED

40 KM North-Northwest of Stewart, British Columbia SKEENA MINING DIVISION

56 degrees 19 minutes latitude 130 degrees 06 minutes longitude

N.T.S. 104B039 &104B40

ON BEHALF OF

Teuton Resources Corp. 509-675 W. Hastings St. Vancouver, B.C.

REPORT BY

D. Cremonese, P. Eng. 509-675 W. Hastings Vancouver, B.C.

GEOLOGICAL SURVEY BRANCH ASSESSMENT REPORT

Date: May 20, 2006



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1. INTRODUCTION

A. Location, Access and Physiography

The 4J's-Tennyson property of Teuton Resources Corp. is composed of a large block of claims located north and west of the formerly producing Scottie Gold Mine, near the northern terminus of the Granduc mining road about 40 km from Stewart, BC.

The 4-J's part of the property lies immediately south of the west-east trending Frank Mackie Glacier. The Smalles icefield covers the central portion of the 4J's, occupying the height of land. Elevations vary from about 600m in the valley of the Bowser River east of the 4-J's to 2275m on the peaks to the west. Low lying regions on the property are vegetated by mature mountain hemlock and balsam. This changes to subalpine and alpine vegetation consisting of stunted shrubs and grasses

Situated west and southwest of the 4J's, the Tennyson portion of the property is centered around a prominent red-brown stained gossan exposed by retreating ice at the head of the north arm of the Berendon Glacier. Here elevations vary from 1400 to 1700m; slopes from gentle to moderate. As the property has recently come out from under the ice, vegetation is confined to mountain grasses and low-lying shrubs. Much of this portion of the property remains under ice.

The Smalles Icefield and several smaller adjacent icefields have retreated substantially in the last 20 years due to an accelerating rate of ablation throughout the Stewart region. These zones of ablation are highly prospective for the discovery of new mineralization and have been the focus of most of recent exploration in the local ara.

The exploration season is from late June to early October, with higher elevations having a shorter span. In general, winter months are severe with heavy snowfall.

Access to the property is by helicopter either from Stewart, or in busy exploration seasons from a contract machine based near the end of the Granduc mining road. The 4J's property could, theoretically, be accessed by foot from the old East Gold mine 2 km to the southeast but no trail is in place at present.

B. Status of Property

Relevant claim information is summarized below:

<u>Name</u>	<u>Tenure Nos.</u>
Catspaw	250846
Tennyson 1-4	251127-31
Tenn 1, 4	409039, 42
John	409053
Jim-Km, Frank-Km	504858, 63



* 508799 * 508802, 07, 11, 99

* These claims have no names, just tenure #'s.

Claim locations are shown on Fig. 2a after government map N.T.S. 104B039 & 40. Figure 2b shows the location of the Aeroquest airborne survey grid in relation to claim boundaries.

C. History

a. 4J-s portion of Property

Exploration in the immediate area of the 4-J's claims began roughly in 1926 when free gold was discovered on the East Gold property (about 2.5 km southeast). The East Gold produced small quantities of very high-grade hand-cobbed ore containing electrum. Thereafter, in the early 1930's, prospecting uncovered a series of auriferous, cross-cutting quartz-sulfide veins and shear zones on ground now controlled by the Haida claim (owned by Silver Standard Mines). This latter property, called the "Portland", originally consisted of 16 claims, and probably covered portions of the present day 4-J's claims.

A buoyant market for precious metal prices revived interest in this part of the Stewart area in 1980. Many former prospects along with proximate zones of favourable geology were subjected to reconnaissance surveys by exploration companies. A summary of this recent activity is presented below.

- **1980-82** The Catspaw claim [southeast of 4J's] was staked by Elan Exploration Ltd. of Calgary and optioned to E & B Exploration. E & B undertook minor prospecting, sampling and geological mapping before returning the property to Elan. Several of the streams draining the Catspaw and Jim claims were noted to carry gold colours when panned by prospectors.
- 1983 The Catspaw claim was optioned to Teuton Resources Corp.; the property was enlarged by staking the Four-J's claims and the Gamma claim. A stratiform lead-zinc-antimony (gold-silver) occurrence and a boulder train of argentiferous quartz sulfide mineralization was discovered on the John claim. This latter work was undertaken by Billikin Resources under option (the option was relinquished the following year).
- 1984 The Four-J's claims were optioned to Canadian United Minerals Inc. An airborne EM and Mag survey disclosed two EM anomalies under ice cover proximate to the stratiform mineralization noted on the John claim.
- 1985 Noranda Exploration Company sub-optioned the Four-J's from Canadian United, in a deal that required Noranda to spend \$3,000,000 to earn a 51% interest in the







property. The Noranda crew mobilized to the property too early in the field season and could not locate the Main Zone due to snow cover. A short program consisting of prospecting, sampling and geophysical surveys was carried out on exposed portions of the property identifying several types of mineralization. Noranda returned the property to Teuton/Canadian United before the start of the second year of the option.

- 1987 Property optioned by Teuton to Wedgewood Resources. Field program supervised by Kruchkowski Consultants of Calgary concentrated on prospecting, trenching, sampling and geochemical surveys on the Four-J's and surrounding claims.
- **1988** Wedgewood carried out further rock sampling and mapping on the Four J's, Catspaw and Gamma claims before discontinuing the option.
- 1989 Maple Resource Corporation Exploration entered into an agreement with Teuton to earn a 60% interest in the Four-J's claims by spending \$1.2 million on the property. A field program was carried out by Maple concentrating on the Main, Centre, South and North Zones. The primary target areas were defined as: the sedimentary exhalative style lead-zinc-silver mineralization in the Main and North Zones and a zone of highly anomalous soil samples collected along contours northeast of the grid area.
- 1990 Maple drilled 334.06m to test a strong gold-in-soil geochem anomaly in the FM Zone (north of the Main Zone). The first two holes intersected significant gold mineralization in an argillite/siltstone unit: Hole MA-90-1 returned 0.078 oz/ton gold over 9.84m and Hole MA-90-2 returned 0.069 oz/ton gold over 7.16m. Two gold-in-soil geochem anomalies were identified elsewhere on the property.
- 1991 Maple was unable to obtain financing for further work and dropped the option on the property. Audited financial statements indicate Maple spent circa \$600,000 on the property.
- **1992** Teuton carried out a two day program of sampling and trenching in the largely overburden-covered Main Zone area. This work defined additional small outcrops of laminated sulfides such as were originally discovered in 1983.
- 1998 Teuton carried out a one day program of sampling and trenching which extended the known strike length of the laminated sulphide mineralization in the Main zone to the north under talus cover. A new exposure returned a weighted average grade of 7.4% lead, 11.7% zinc and 6.1 oz/ton silver across a width of 3.0m.

b. Tennyson portion of the property

In 1984, an exceptionally mild winter was followed by an uncommonly warm summer, causing extensive retreat of permanent ice and snowfields at many locations in the general Stewart area. This ablation exposed a prominent gossan at the head of Berendon Glacier which was then staked as the Tennyson claims by the author on behalf of Teuton Resources Corp. An airborne survey carried out over the property by Teuton Resources Corp. later that year disclosed a sharp, localized magnetic anomaly on the Tennyson 1 and 2 claims. Samples taken at that time showed copper values to 6% in the vicinity of the anomaly, and gold values to 0.35 oz gold per ton in bedded sulphides 100 m west of the anomaly.

A surface reconnaissance program carried out from August to October, 1985 defined several promising areas of gold mineralization within a large gossaned area measuring 750m by 450m. Gold values were obtained primarily in association with pyritic bands, and were accompanied, variously, by values in silver, copper, lead, zinc, and molybdenum. Limited geochemical soil sampling of the overburden covered central portion of the gossan returned values from 105 to 2,320 ppb and averaging 628 ppb in gold.

Six holes drilled in 1986 by Consolidated BRX Mining and Petroleum Ltd., at the time an optionee of the property, tested various portions of the gossan. The fourth hole of this program intersected a high-grade section featuring pervasive clay alteration and hydrothermal brecciation, and asaying 1.2 oz/ton in gold over 2.1m. Other holes produced three intersections grading from 0.08 to 0.14 oz/ton in gold over widths of 1.6m. Anomalous gold values were also recorded over wide intervals in three of the holes.

During the same period, minor surface sampling was undertaken. This work partially tested the "Camp Zone": 8 samples across 1m widths outlined 32.5m of strike averaging 0.235 oz/ton gold and 0.148 oz/ton silver. This zone appeared to be open along strike to the west, while continuity to the east was uncertain.

A further four holes were then drilled by the subsequent optionee, Westlake Resources Inc., to test the postulated southern strike extension of the Hole 86-4 high-grade mineralization. These did not encounter similar grades within the same horizon.

During 1988, Keylock Resources and Catear Resources, the next companies to option the property, conducted a rock geochemistry and diamond drill program on the property. A total of 349 rock samples were collected and analyzed for gold and silver with values ranging from 5 ppb gold up to 0.442 oz/ton gold and nil to 14.95 oz/ton silver. A total of 8 short drill holes indicated gold values in four of the holes. Values ranged from 0.029 oz/ton gold across 0.15m up to 0.406 oz/ton gold across 3.1m.

In 1990, Keylock and Catear carried out another surface program consisting of prospecting, rock sampling, trenching and geological mapping. The rock sampling program indicated values ranging from 5 ppb up to 3.601 oz/ton gold, from 0.4 ppm to 7.88 oz/ton silver and from 0.05 to

3.09% copper. Compilation of the data indicated a definite increase in pyrite veining in the northern portion of the gossan area, accompanied by elevated values in copper and gold. Trenching in the southeast portion of the gossan returned values up to 0.42% copper over 12m.

A small sampling program carried out in 2004 confirmed the extension of anomalous gold-copper values north and east of areas sampled in previous work programs.

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E. Summary of Work Done

A helicopter borne geophysical survey was carried out over the 4J's-Tennyson property by Aeroquest Limited on behalf of Teuton Resources Corp. from Feb. 18th to Feb. 27th, 2006. A total of 472 line-kms were flown over a survey grid as delineated in Fig. 2b.

The geophysical crew was stationed out of Stewart, BC and used a contract helicopter supplied by Hi-Wood Helicopters from Oakachoke, Alberta. This particular survey was part of a multi-property survey carried out by Aeroquest on behalf of Teuton Resources beginning in early January, 2006.

Full particulars of the survey are attached to this report as Appendix III, entitled "Report on a Helicopter-Borne AerotTEM II Electromagentic and Magnetic Survey", by Aeroquest Limited of Milton, Ontario.

2. TECHNICAL DATA AND INTERPRETATION

A. Geology

The Stewart area is adjacent to the east margin of the Coast Plutonic Complex. Mesozoic volcanic and sedimentary rocks are intruded by Coast granitic rocks ranging in age from early Jurassic to Tertiary and which take the form of large plutons and related dyke swarms.

Mineral deposits in the area are of several styles, and include quartz sulfide veins and replacement systems related principally to repeated Mesozoic volcanism and Tertiary granitic intrusions (Alldrick, 1985).

Oldest rocks in the area are a late Triassic-early Jurassic subaerial andesitic volcanic sequence with intercalated siltstones, equivalent to Grove's Unuk River Formation. These are overlain by epiclastic and felsic volcanic sequences (Betty Creek Formation--Grove, 1983) of early to middle Jurassic age, and by a sedimentary sequence (Salmon River Formation--Grove, 1983), part of the middle to late Jurassic Bowser assemblage.

These Mesozoic layered rocks are contained in a regional north-trending synclinal structure, modified by northeast and northwest faults.

Intrusive rocks, principally the Summit Lake granodiorite (Alldrick, 1985), are coeval with lower units of the andesitic volcanic sequence. Related to the main intrusion are feldspar porphyry dykes and sills.

Mineral deposits in the immediate vicinity of the 4-J's property include Scottie Gold massive pyrrhotite veins in andesitic rocks adjacent to the Summit Lake granodiorite pluton and quartz-carbonate veins containing base and precious metal sulfides in schistose volcanic rocks at the East Gold and Haida (Portland) prospects.

In 1989 Maple Resources carried out property wide reconaissance surveys over the 4-J's property and surrounding claims. This work isolated a number of geologically prospective areas in addition to the Main Zone (the name that Maple personnel used to describe the laminar or stratiform lead-zinc-antimony mineralization originally discovered in 1983 by Billikin Resources). Late in the 1990 field season Maple drilled 6 holes testing a coincident geochemical and geophysical anomaly in the FM zone, two of which contained auriferous intervals.

Immediately following is a geological description excerpted from Chapman, Lewis and Baillie (see References).

The Main Zone is bounded to the west by an alpine glacier and to the east by a blanket of talus debris. The westernmost unit exposed on the zone is a massive deformed black argillite containing <1% fine siltstone interbeds. The unit is exposed over 70m but may be as much as 200m thick.

Adjacent to the argillite lies the southern extension of the felsic to intermediate crystal tuff, locally up to 80m wide. It is pervasively silicified and has local fracture controlled carbonization associated with <1% pyrite. Less than 1% fracture controlled galena and trace blebby sphalerite also occur.

The crystal tuff is intruded by a 25m wide concordant hornblende-feldspar porphyry in the northern section of the Main Zone. To the south the porphyry narrows to <10m wide and changes orientation as it intrudes the rock units lying to the southeast. Only traces of pyrite were noted.

To the east is an interbedded argillite/siltstone unit with a distinct banded appearance. Bedding and foliation are parallel at 025 to 030/85 to 35W in the north, but variable in the south. Bedding is typically <5cm wide and consists of 70% argillite and 30% siltstone. The unit is moderately to strongly carbonatized and locally silicified, resulting in some cherty argillite development. Locally limonitic, it contains <1% blebby and fine grained disseminated pyrite.

The eastern third of the Main Zone contains intermediate volcanic flows intercalated with argillite and cherty argillite bands, typically less than 10cm wide. The flows are massive, bleached and locally silicified. Mesocratic siliceous bands and cherty argillite bands make up 35 to 40% of the rock and are oriented at 030/30NW in the north, but gradually shift to 004/82-75W in the south. Trace pyrite occurs throughout the unit, although scattered strongly limonitic and silicified zones occur which contain approximately 2% fracture controlled pyrite.

Locally, on the Tennyson property, a gossanous outcrop, approximately 750m by 500m in dimension, is bounded to the south, west and north by the Berendon Glacier and encircling icefield, and to the east by a steeply-dipping, NW-SE trending fault. [Author's note: the common corner of the Tennyson 1-4 claims marks the westernmost exposed portion of this gossanous outcrop, and the common border of the Tennsyon 1 & 2 claims roughly bisects the gossan in half). Country rock consists of intercalated flows and sediments. Alteration, locally, is at chlorite-lower greenschist facies. It appears that solutions have been led, to an unknown extent, by shear texture of the regional tectonism.

Rocks on the eastern side of the fault consist of an unaltered cream white weathering breccia with predominantly light-coloured fragments varying in size from less than five mm to greater than five cm. Dark green augite porphyry flows have been observed on the eastern side of the fault as well as in the southeast part of the gossanous area on the western side of the fault. Alteration in this area is restricted to minor chlorite. Fifty metres to the north, along the western side of the fault, are small outcrops and subcrops of a buff weathering, quartz carbonate altered rock with abundant randomly oriented quartz and calcite veins from less than five mm to ten cm in width. Rocks in the north central area of the gossan consist of sericite, chlorite, and pyrite altered semi-schists with localized zones of clay alteration and silicification.

Along the eastern margin and in the southwest section of the gossanous area, the level of alteration decreased to chlorite, minor sericite and pyrite. In the extreme southwest corner of this area, a sequence of unaltered tuffs, flows, cherts, siltstones and sandstones is exposed. A small outcrop of interbedded siltstones, sandstones and chert, beds to five cm thick, shows well-graded bedding,



load and flame structures. There is evidence to suggest that the beds have been overturned and that the outcrop of sediments constitutes an isolated block rotated with the volcanic flows.

Structure on the property is dominated by a northwest-southeast trending, steeply-dipping fault. The warping of foliation from and almost east-west/flat trend in the southwest portion of the property, to northeast-southwest/steep in the northeast portion, suggests possible left lateral strike turn movement into the fault. It is also likely that there is some bed-turning movement in the vertical direction.

Regional geology is shown in Fig. 3.

B. Geophysics

Geophysical data related to the 2006 helicopter-borne EM and Mag survey over the 4J's-Tennyson property is presented herein in Appendix III: "Report on a Helicopter-Borne AerotTEM II Electromagentic and Magnetic Survey", by Aeroquest Limited of Milton, Ontario.

Prior to the completion of the Aeroquest report, Aeroquest chief geophysicist Jonathan Rudd met with the author and Teuton geologist K. Mastalerz, Ph.D., in Teuton's Vancouver office to review data from previous work on the property so as to provide the proper context for interpretation of survey

C. Discussion

The author concurs with the interpretation of results by Aeroquest geophysicists Gord Smith and Jonathan Rudd as presented in their report in Appendix III.

D. Conclusions

The 2006 airborne geophysical survey was successful in outlining a number of target areas worthy of further exploration.

Principal among these is the 4J anomaly (cf. section 10.3, Appendix III), a complex EM anomaly situated under thin ice cover approximately 100-200m west of the eastern edge of the Smalles icefield. Because of the acceleration of ablation throughout the Stewart region in recent years, it is possible that a part of this anomaly may now be exposed. Abundant sulphide-rich float boulders discovered in previous work, which originate in two embayments in the icefield encroaching upon the local area of the 4J anomaly, suggest a sulphide-mineralized source for the EM conductors. Because of the potential for a VMS or Sedex deposit as evidenced by the sedex-style laminar mineralization discovered in place near the ice edge (Main zone), a comprehensive follow-up program is warranted. This would include detailed geological mapping in ablated areas between the Main zone occurrence and the 4J anomaly, along with sampling and trenching. Targets defined by this work should be followed up by diamond drilling.

At the same time, geological crews should be sent out to ground-truth other anomalous geophysical

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responses detected during the 2006 survey. Principal among these are the EM conductors detected southeast of the 4J anomaly on the Catspaw claim and the discrete, oval-shaped Mag-EM anomaly detected near the southeast corner of the gossan covered by the Tennyson 1-4 claims.

Respectfully submitted,

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D. Cremonese, P.Eng. May 20, 2006

APPENDIX I - WORK COST STATEMENT

Aeroquest Limited Geophysical Survey: Feb. 18-27, 2006 427 line-km & \$117.70/line-km	\$	50,258	
Food & Accommodation	\$	7,370	
Fuel	\$	813	
Fuel Positioning by Aeroquest	\$	1,895	
Fuel Positioning by Prism Helicopters			
Report and map preparation, compilation and research D. Cremonese, P.Eng., 1.5 days @ \$400/day Draughting	\$ \$	600 240	
Allocation:	\$	62,762	
Amount filed per Event# 4071377 on Feb. 21, 2006* Amount filed per Event# 4073853 on Mar. 9, 2006 Total	\$ <u>\$</u> \$	14,427 <u>45,105</u> 59,532	

Please adjust PAC withdrawals accordingly, applying any balance remaining to the PAC Account of Teuton Resources Corp.

*The author is satisfied that ample surveying was done between the start of the survey on Feb. 18 to date of filing on Feb. 21 to justify the \$14,427 allocation.

APPENDIX II – CERTIFICATE OF AUTHOR

I, Dino M. Cremonese, do hereby certify that:

- 1. I am a mineral property consultant with an office at Suite 509-675 W. Hastings, Vancouver, B.C.
- 2. I am a graduate of the University of British Columbia (B.A.Sc. in metallurgical engineering, 1972, and L.L.B., 1979).
- 3. I am a Professional Engineer registered with the Association of Professional Engineers of the Province of British Columbia as a resident member, #13876.
- 4. I have practiced my profession since 1979.
- 5. This report is based primarily upon the 2006 Aeroquest airborne survey over the 4J's-Tennyson property. Additional information comes from several site visits to the property between 1983 and 1998 and an extensive review of literature concerning the property.
- 6. I am a principal of Teuton Resources Corp., owner of the 4J's-Tennyson property. This report is for assessment report only and does not purport to be an independent assessment of the merits of the property.

Dated at Vancouver, B.C. this 20th day of May, 2006.

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D. Cremonese, P.Eng.

APPENDIX III

REPORT ON A HELICOPTER-BORNE AEROTEM II ELECTROMAGENETIC AND MAGNETIC SURVEY

by

Aeroquest Limited of Milton, Ontario.

March, 2006

Report on a Helicopter-Borne AeroTEM© II Electromagnetic and Magnetic Survey

Aeroquest Job # 05058 4J's Property Stewart, British Columbia NTS 104B08.

for

Teuton Resources Corporation

207-675 West Hastings Street. VANCOUVER British Columbia CANADA, V6B 1N2

by

EAEROQUEST LIMITED

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EAEROQUEST LIMITED

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1.2. Appendices

Appendix 1: Survey Block Co-ordinates Appendix 2: Description of Database Fields Appendix 3: Technical Paper: "AeroTEM Design Considerations" Appendix 4: Instrumentation Specification Sheet

1.3. Maps (1:10,000)

The report includes a set of three (3) geophysical maps plotted at a scale of 1:10,000. The survey area is covered by one (1) map plate. Three (3) geophysical data products are presented for each Plate (listed below).

- Map 1: Coloured Total Magnetic Intensity (TMI) with line contours and EM anomalies
- Map 2: Coloured Tilt Derivative of the TMI with line contours and EM anomalies
- Map 3: AeroTEM Off-Time Profiles (Z5-Z15) and EM anomalies

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2. INTRODUCTION

This report describes a helicopter-borne geophysical survey carried out on behalf of Teuton Resources Corp. on the 4J's Property, British Columbia. The principal geophysical sensor is Aeroquest's exclusive AeroTEM II time domain helicopter electromagnetic system which is employed in conjunction with a high-sensitivity cesium vapour magnetometer. Ancillary equipment includes a realtime differential GPS navigation system, radar altimeter, digital video acquisition system, and a base station magnetometer. Full-waveform streaming EM data is recorded at 38,400 samples per second. The streaming data comprise the transmitted waveform, and the X component and Z component of the resultant field at the receivers. A secondary acquisition system (RMS) records the ancillary data.

The total line kilometre flown is totaled at 473 km. The survey flying described in this report took place from February 18th to February 27th, 2006.

Bedrock EM anomalies were auto-picked from the Z-component on-time data and graded according to the 'off-time' conductance. These anomalies were then review by hand and classified for presentation on the maps. This report describes the survey logistics, the data processing, presentation, and provides a brief interpretation of the results.

3. SURVEY AREA

The 4J's property of Teuton Resources Corp. is located 2.5km north of the access road into the former East Gold mine (connecting from the northern terminus of the Granduc Mining road system), about 40km by air from Stewart, BC. Figure 2. Access to the property is available exclusively by helicopter. The helicopter was provided by Hi-Wood helicopters, Oakachoke, Alberta. The field crew were based in Stewart at the King Edward Hotel. The helicopter and geophysical equipment were staged out of Stewart Airport, Stewart, B.C.





Figure 1. Regional location map of the Property area



Figure 2. Location of the 4J's Property.

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4. REGIONAL GEOLOGY and EXPLORATION (from Teuton Resources web site)

"Teuton Resources Corp. staked the Four J's property in 1983. In the same year, stratiform mineralization (Main Zone) was discovered in sediments".

"A short program consisting of prospecting, sampling and geophysical surveys was carried out on exposed portions of the property identifying several types of mineralization".

"A field program was carried out by Maple Resopurces Corp. concentrating on the Main, Centre, South and North Zones. The primary target areas were defined as: the sedimentary exhalative style lead-zinc-silver mineralization in the Main and North Zones and a zone of highly anomalous soil samples collected along contours northeast of the grid area".

"Maple Resources Corp., drilled 334.06m to test a strong gold-in-soil geochem anomaly in the FM Zone (north of the Main Zone). The first two holes intersected significant gold mineralization in an argillite/siltstone unit: Hole MA-90-1 returned 0.078 oz/ton gold over 9.84m and Hole MA-90-2 returned 0.069 oz/ton gold over 7.16m. Two gold-in-soil geochem anomalies were identified elsewhere on the property."

"The Main Zone banded sulfide mineralization was found by happenstance in 1983 while following up a prominent train of massive to semi-massive float boulders (the source of these boulders, some of which carry high values in silver, is yet to be determined). One of the trenches put in during this work uncovered a narrow interval of high-grade lead-zinc-silver mineralization, featuring wispy bands of extremely fine-grained galena-sphalerite mineralization in argillite. This novel form of mineralization did not show any stain on weathered outcrop and was difficult to detect other than on a polished surface. Extensive talus precluded efforts to follow the zone along projected strike".

"In 1998, a one-day program successfully located an extension of the zone 10m to the west-southwest, under talus. A trench, #1998-1, was blasted out revealing the most heavily mineralized section found to date: sampling of a 3.0m interval yielded an weighted average grade of 7.4% Pb, 11.7% zinc and 6.1 oz/ton silver".

5. SURVEY SPECIFICATIONS AND PROCEDURES

5.1. Flight Specifications

The survey specifications are summarised in the following table:

Block Name Spacing Line (m)		Line direction	Survey Coverage (line-km)	Dates Flown
4J's	100	NE-SW (060)	473	February 18 th to February 27 th , 2006

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The survey coverage was calculated by adding up the along-line distance of the survey lines and control (tie) lines as presented in the final Geosoft database. The survey was flown with a line spacing of 100 m. The control (tie) lines were flown perpendicular to the survey lines with a spacing of 1 km.

The nominal EM bird terrain clearance is 30m (98 ft), but can be higher in more rugged terrain. The magnetometer sensor is mounted in a smaller bird connected to the tow rope 15 metres above the EM bird and 18.5 metres below the helicopter (Figure 4). Nominal survey speed over relatively flat terrain is 75 km/hr and is generally lower in rougher terrain. Scan rates for ancillary data acquisition is 0.1 second for the magnetometer and altimeter, and 0.2 second for the GPS determined position. The EM data is acquired as a data stream at a sampling rate of 38,400 samples per second and is processed to generate final data at 10 samples per second. The 10 samples per second translates to a geophysical reading about every 1.5 to 2.5 metres along the flight path.

5.2. Navigation

Navigation is carried out using a GPS receiver, an AGNAV2 system for navigation control, and an RMS DGR-33 data acquisition system which records the GPS coordinates. The x-y-z position of the aircraft, as reported by the GPS, is recorded at 0.2 second intervals. The system has a published accuracy of under 3 metres. A recent static ground test of the Mid-Tech WAAS GPS yielded a standard deviation in x and y of under 0.6 metres and for z under 1.5 metres over a two-hour period.

5.3. System Drift

Unlike frequency domain electromagnetic systems, the AeroTEM© II system has negligible drift due to thermal expansion. The operator is responsible for ensuring the instrument is properly warmed up prior to departure and that the instruments are operated properly throughout the flight. The operator maintains a detailed flight log during the survey noting the times of the flight and any unusual geophysical or topographic features. Each flight included at least two high elevation 'background' checks. During the high elevation checks, an internal 5 second wide calibration pulse in all EM channels was generated in order to ensure that the gain of the system remained constant and within specifications.

5.4. Field QA/QC Procedures

On return of the pilot and operator to the base, usually after each flight, the ProtoDAS streaming EM data and the RMS data are carried on removable hard drives and FlashCards, respectively and transferred to the data processing work station. At the end of each day, the base station magnetometer data on FlashCard is retrieved from the base station unit.

Data verification and quality control includes a comparison of the acquired GPS data with the flight plan; verification and conversion of the RMS data to an ASCII format XYZ data file; verification of the base station magnetometer data and conversion to ASCII format XYZ data; and loading, processing and conversion of the steaming EM data from the removable hard drive. All data is then

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merged to an ASCII XYZ format file which is then imported to an Oasis database for further QA/QC and for the production of preliminary EM, magnetic contour, and flight path maps.

Survey lines which show excessive deviation from the intended flight path are re-flown. Any line or portion of a line on which the data quality did not meet the contract specification was noted and reflown.

6. AIRCRAFT AND EQUIPMENT

6.1. Aircraft

A Eurocopter (Aerospatiale) AS350B2 "A-Star" helicopter - registration C-GPTY used as survey platform. The helicopter was owned and operated by Hi-Wood Helicopters, Oakachoke, Alberta.. Installation of the geophysical and ancillary equipment was carried out by Aeroquest Limited in Stewart and ferried to the survey area. The survey aircraft was flown at a nominal terrain clearance of 180 feet (55 m).



Figure 3. Survey Helicopter C-GPTY





Figure 4. The magnetometer bird (A) and AeroTEM II EM bird (B)

6.2. Magnetometer

The Aeroquest airborne survey system employs the Geometrics G-828 cesium vapour magnetometer sensor installed in a two metre towed bird airfoil attached to the main tow line, 15 metres below the helicopter. The sensitivity of the magnetometer is 0.001 nanoTesla at a 0.1 second sampling rate. The nominal ground clearance of the magnetometer bird is 48.5 metres (170 ft.). The magnetic data is recorded at 10Hz by the RMS DGR-33.

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6.3. Electromagnetic System

The electromagnetic system is an Aeroquest AeroTEM II time domain towed-bird system. The current AeroTEM[®] transmitter dipole moment is 38.8 kNIA. The AeroTEM[®] bird is towed 33.5 m (110 ft) below the helicopter. More technical details of the system may be found in Appendix 4.

The wave-form is triangular with a symmetric transmitter on-time pulse of approximately1.1 ms and a base frequency of 150 Hz. The current alternates polarity every on-time pulse. During every Tx on-off cycle (300 per second), 128 contiguous channels of raw x and z component (and a transmitter current monitor) of the received waveform are measured. Each channel width is 26.06 microseconds starting at the beginning of the transmitter pulse. This 128 channel data is referred to as the raw streaming data.



Figure 5. Schematic of Transmitter and Receiver waveforms

6.4. PROTODAS Acquisition System

The 128 channels of raw streaming data are recorded by the AERODAS acquisition system onto a removable hard drive. The streaming data are processed post-survey to yield 33 stacked and binned on-time and off-time channels at a 10 Hz sample rate. The timing of the final processed EM channels is described in the following table:

Channel	Width	Gate	Start(µs)	Stop(µs)	Mid(µs)	Width(µs)
1 ON	1	25	651.0	677.1	664.1	26.04
2 ON	1	26	677.1	703.1	690.1	26.04
3 ON	1	27	703.1	729.2	716.1	26.04

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4 ON	1	28	729.2	755.2	742.2	26.04
5 ON	1	29	755.2	781.3	768.2	26.04
6 ON	1	30	781.3	807.3	794.3	26.04
7 ON	1	31	807.3	833.3	820.3	26.04
8 ON	1	32	833.3	859.4	846.4	26.04
9 ON	1	33	859.4	885.4	872.4	26.04
10 ON	1	34	885.4	911.5	898.4	26.04
11 ON	1	35	911.5	937.5	924.5	26.04
12 ON	1	36	937.5	963.5	950.5	26.04
13 ON	1	37	963.5	989.6	976.6	26.04
14 ON	1	38	989.6	1015.6	1002.6	26.04
15 ON	1	39	1015.6	1041.7	1028.6	26.04
16 ON	1	40	1041.7	1067.7	1054.7	26.04
0 OFF	1	44	1145.8	1171.9	1158.9	26.04
1 OFF	1	45	1171.9	1197.9	1184.9	26.04
2 OFF	1	46	1197.9	1224.0	1210.9	26.04
3 OFF	1	47	1224.0	1250.0	1237.0	26.04
4 OFF	1	48	1250.0	1276.0	1263.0	26.04
5 OFF	1	49	1276.0	1302.1	1289.1	26.04
6 OFF	1	50	1302.1	1328.1	1315.1	26.04
7 OFF	1	51	1328.1	1354.2	1341.1	26.04
8 OFF	1	52	1354.2	1380.2	1367.2	26.04
9 OFF	1	53	1380.2	1406.3	1393.2	26.04
10 OFF	1	54	1406.3	1432.3	1419.3	26.04
11 OFF	1	55	1432.3	1458.3	1445.3	26.04
12 OFF	1	56	1458.3	1484.4	1471.4	26.04
13 OFF	4	57	1484.4	1588.5	1536.5	104.17
14 OFF	8	61	1588.5	1796.9	1692.7	208.33
15 OFF	16	69	1796.9	2213.5	2005.2	416.67
16 OFF	32	85	2213.5	3046.9	2630.2	833.33

6.5. RMS DGR-33 Acquisition System

In addition to the magnetics, altimeter and position data, six channels of real time processed off-time EM data in the Z direction and one in the X direction are recorded by the RMS DGR-33 acquisition system at 10 samples per second and plotted real-time on the analogue chart recorder. These channels are derived by a binning, stacking and filtering procedure on the raw streaming data. The primary use of the RMS EM data (Z1 to Z6, X1) is to provide for real-time QA/QC on board the aircraft.

The channel window timing of the RMS DGR-33 6 channel system is described in the table below.

RMS Channel	Start time (microsec)	End time (microsec)	Width (microsec)	Streaming Channels	Noise tolerance
Z1, X1	1269.8	1322.8	52.9	48-50	20 ppb
Z2	1322.8	1455.0	132.2	50-54	20 ppb

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Z3	1428.6	1587.3	158.7	54-59	15 ppb
Z4	1587.3	1746.0	158.7	60-65	15 ppb
Z5	1746.0	2063.5	317.5	66-77	10 ppb
Z6	2063.5	2698.4	634.9	78-101	10 ppb

6.6. Magnetometer Base Station

The base magnetometer was a Geometrics G858 magnetometer with a built in GPS receiver and external GPS antenna. Data logging and UTC time syncronistation was carried out within the magnetometer, with the GPS providing the timing signal. The data logging was configured to measure at 1.0 second intervals. Digital recording resolution was 0.001 nT. The sensor was placed on a tripod in an area of low magnetic gradient and free of cultural noise sources. A continuously updated display of the base station values was available for viewing and regularly monitored to ensure acceptable data quality and diurnal variation.

6.7. Radar Altimeter

A Terra TRA 3500/TRI-30 radar altimeter is used to record terrain clearance. The antenna was mounted on the outside of the helicopter beneath the cockpit. Therefore, the recorded data reflect the height of the helicopter above the ground. The Terra altimeter has an altitude accuracy of +/- 1.5 metres.

6.8. Video Tracking and Recording System

A high resolution digital colour 8mm video camera is used to record the helicopter ground flight path along the survey lines. The video is digitally annotated with GPS position and time and can be used to verify ground positioning information and cultural causes of anomalous geophysical responses.

6.9. GPS Navigation System

The navigation system consists of an Ag-Nav Incorporated AG-NAV2 GPS navigation system comprising a PC-based acquisition system, navigation software, a deviation indicator in front of the aircraft pilot to direct the flight, a full screen display with controls in front of the operator, a Mid-Tech RX400p WAAS-enabled GPS receiver mounted on the instrument rack and an antenna mounted on the magnetometer bird. WAAS (Wide Area Augmentation System) consists of approximately 25 ground reference stations positioned across the United States that monitor GPS satellite data. Two master stations, located on the east and west coasts, collect data from the reference stations and create a GPS correction message. This correction accounts for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere and ionosphere. The corrected differential message is then broadcast through one of two geostationary satellites, or satellites with a fixed position over the equator. The corrected position has a published accuracy of under 3 metres. A recent static ground test of the Mid-Tech WAAS GPS yielded a standard deviation in x and y of under 0.6 metres and for z under 1.5 metres over a two-hour period.

Survey co-ordinates are set up prior to the survey and the information is fed into the airborne navigation system. The co-ordinate system employed in the survey design was WGS84 [World] using

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the UTM zone 10N projection. The real-time differentially corrected GPS positional data was recorded by the RMS DGR-33 in geodetic coordinates (latitude and longitude using WGS84) at 0.2 s intervals.

6.10. Digital Acquisition System

The AeroTEM© received waveform (Figure 5) sampled during on and off-time at 128 channels per decay, 300 times per second, was logged by the proprietary AERODAS data acquisition system. The channel sampling commences at the start of the Tx cycle and the width of each channel is 26.04 microseconds. The streaming data was recorded on a removable hard-drive and was later backed-up onto DVD-ROM from the field processing computer.

The RMS Instruments DGR-33A data acquisition system (was used to collect and record the analogue data stream, i.e. the positional and secondary geophysical data, including processed 6 channel EM, magnetics, radar altimeter, GPS position, and time. The data was recorded on 128Mb capacity FlashCard. The RMS output was also directed to a thermal chart recorder for on-board real-time QA/QC.



Figure 6. The AeroTEM II Instrument Rack

7. PERSONNEL

The following Aeroquest personnel were involved in the project:

- Manager of Operations: Bert Simon
- Manager of Processing and Interpretation: Jonathan Rudd
- Field Data Processors: Sean Scrivens, Rory Kutluoglu
- Field Operators: Marcus Watson, Victor Shevchenko
- Data Interpretation and Reporting: Jonathan Rudd, Gord Smith

The survey pilot, Paul Kendal was employed directly by the helicopter operator – Hi-Wood Helicopters Ltd.

8. DELIVERABLES

The report includes a set of three (3) geophysical maps plotted at a scale of 1:10,000. The survey area is covered by one (1) map plate. Three (3) geophysical data products are presented for each Plate (listed below).

- Map 1: Coloured Total Magnetic Intensity (TMI) with line contours and EM anomalies
- Map 2: Coloured Tilt Derivative of the TMI with line contours and EM anomalies
- Map 3: AeroTEM Off-Time Profiles (Z5-Z15) and EM anomalies

All the maps show flight path trace, skeletal topography, and conductor picks represented by an anomaly symbol classified according to calculated off-time conductance. The anomaly symbol is accompanied by postings denoting the calculated off-time conductance, a thick or thin classification and an anomaly identifier label. The anomaly symbol legend is given in the margin of the maps. The magnetic field data is presented as superimposed line contours with a minimum contour interval of 5nT. Bold contour lines are separated by 250nT.

The geophysical profile data is archived digitally in a Geosoft GDB binary format database. A description of the contents of the individual channels in the database can be found in Appendix 3. A copy of this digital data is archived at the Aeroquest head office in Milton.

9. DATA PROCESSING AND PRESENTATION

All in-field and post-field data processing was carried out using Aeroquest proprietary data processing software, and Geosoft Oasis montaj software. Maps were generated using a 42-inch wide Hewlett Packard ink-jet plotter.

9.1. Base Map

The geophysical maps accompanying this report are based on positioning in the NAD83 datum. The survey geodetic GPS positions have been projected using the Universal Transverse Mercator projection in Zone 9 north. A summary of the map datum and projection specifications is given following:

- Ellipse: GRS 1980
- Ellipse major axis: 6378137m eccentricity: 0.081819191
- Datum: North American 1983 Canada Mean
- Datum Shifts (x,y,z) : 0, 0, 0 metres
- Map Projection: Universal Transverse Mercator Zone 9
- Central Scale Factor: 0.9996

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• False Easting, Northing: 500,000m, 0m

For reference, the latitude and longitude in NAD83 are also noted on the maps. The skeletal topography was derived from the Federal Government's 1: 50,000 NTS map series.

9.2. Flight Path & Terrain Clearance

The position of the survey helicopter was directed by use of the Global Positioning System (GPS). Positions were updated five times per second (5Hz) and expressed as WGS84 latitude and longitude calculated from the raw pseudo range derived from the C/A code signal. The instantaneous GPS flight path, after conversion to UTM co-ordinates, is drawn using linear interpolation between the x/y positions. The terrain clearance was maintained with reference to the radar altimeter. The raw Digital Terrain Model (DTM) was derived by taking the GPS survey elevation and subtracting the radar altimeter terrain clearance values. The calculated topography elevation values are relative and are not tied in to surveyed geodetic heights.

Each flight included at least two high elevation 'background' checks. During the high elevation checks, an internal 5 second wide calibration pulse in all EM channels was generated in order to ensure that the gain of the system remained constant and within specifications.

9.3. Electromagnetic Data

The raw streaming data, sampled at a rate of 46,080 Hz (256 channels, 180 times per second) was reprocessed using a proprietary software algorithm developed and owned by Aeroquest Limited. Processing involves the compensation of the X and Z component data for the primary field waveform. Coefficients for this compensation for the system transient are determined and applied to the stream data. The stream data are then pre-filtered, stacked, binned to the 33 on and off-time channels and checked for the effectiveness of the compensation and stacking processes. The stacked data is then filtered, leveled and split up into the individual line segments. The filtering of the stacked data is designed to remove or minimize high frequency noise that can not be sourced from the geology. Further base level adjustments may be carried out at this stage.

The final field processing step was to merge the processed EM data with the other data sets into a Geosoft GDB file. The EM fiducial is used to synchronize the two datasets. The processed channels are presented in a Geosoft "array" channel format in the final GDB (Appendix 2) and are labeled in the database as Zon, Zoff, Xon, and Xoff.

Apparent bedrock EM anomalies were interpreted with the aid of an auto-pick from positive peaks and troughs in the on-time Z channel responses correlated with X channel responses. The auto-picked anomalies were reviewed and edited by a geophysicist on a line by line basis to discriminate between bedrock and conductive overburden sources as well as to determine the source type response (thin vs. thick – discussed later). Anomaly picks locations were migrated and removed as required. This process ensures the optimal representation of the conductor centres on the maps.

At each conductor pick, estimates of the on-time and off-time conductance have been generated based on calculation of the decay constant (tau) of the EM decay curves for those data points along the line



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where the response amplitude is sufficient to yield an acceptable estimate. Only channels that had a minimum response of 15 nT/s were included in the tau calculation. A minimum of three channels responding above the 15 nT/s threshold were required to produce an acceptable tau estimate. The tau values were then windowed to exclude any values that had a correlation-coefficient less than 97%. Conductance values (in Siemens) were then directly calculated from tau values at each conductor pick. Each conductor pick was then classified according to a set of seven ranges of calculated off-time conductance values as indicated on the map legends (Figure 7). Each symbol is also given an identification letter label, unique to each flight line. Conductance value of "0.01", thus plotting as a low conductance source on the maps.



Figure 7. AeroTEM classified anomaly symbols.

9.4. Magnetic Data

Prior to any leveling the magnetic data was subjected to a lag correction of -0.1 seconds and a spike removal filter. The filtered aeromagnetic data were then corrected for diurnal variations using the magnetic base station and the intersections of the tie lines. No corrections for the regional reference field (IGRF) were applied. The corrected profile data were interpolated on to a grid using a random grid technique with a grid cell size of 20 metres. The final leveled TMI grid provided the basis for threading the presented contours which have a minimum contour interval of 5 nT.

In order to map shallow basement response a 'tilt' derivative product was calculated from the TMI grid. The Tilt Derivative (TDR) of the TMI enhances smaller wavelength magnetic features which define shallow basement structures as well as potential mineral exploration targets.

The TDR is defined as:

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 $TDR = \arctan(VDR/THDR)$

where VDR and THDR are first vertical and total horizontal derivatives, respectively, of the total magnetic intensity T.

VDR = dT/dzTHDR = sqrt ((dT/dx)²+ (dT/dy)²)

Due to the nature of the arctan trigonometric function in the filter, all amplitudes are restricted to $+\pi/2$ and $-\pi/2$ radians. This gives the Tilt derivative the added advantage of acting like an automatic gain control (AGC) filter. The calculated TDR grid is presented a colour sun-shaded image (illumination from the north-northeast). Line contours are also overlain which have a minimum contour interval of 0.5 radians.

10. Results and Interpretation

The survey was successful in mapping the magnetic and conductive properties of the geology throughout the survey area. The following is a brief summary of the results. For a detailed interpretation of the survey data please contact Aeroquest Limited.

10.1. Magnetic Response

The magnetic data provide a high resolution map of the distribution of the magnetic mineral content of the survey area. The sources for anomalous magnetic responses are thought to be predominantly magnetite because of the relative abundance and strength of response (high magnetic susceptibility) of magnetite over other magnetic minerals such as pyrrhotite.

The magnetic data ranges from lows of 56540 nT to highs of up to 56666 nT with an average background of 56610 nT. Total Magnetic Field and Tilt Derivative features are illustrated in Figures 8 (a) and (b).





Figure 8. A. Shaded TMI colour map. B. Shaded TILT derivative magnetics.

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10.2. EM Anomalies - General Comments

The EM anomalies on the maps are classified by conductance (as described earlier in the report) and also by the thickness of the source. A thin, vertically orientated source produces a double peak anomaly in the z-component response and a positive to negative crossover in the x-component response (Figure 9). For a vertically orientated thick source (say, greater than 10m), the response is a single peak in the z-component response and a negative to positive crossover in the x-component response (Figure 10). Because of these differing responses, the AeroTEM system provides discrimination of thin and thick sources and this distinction is indicated on the EM anomaly symbols (N = thin and K = thick). Where multiple, closely spaced conductive sources occur, or where the source has a shallow dip, it can be difficult to uniquely determine the type (thick vs. thin) of the source



Figure 9. AeroTEM response to a 'thin' vertical conductor.

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Figure 10. AeroTEM response for a 'thick' vertical conductor.



Figure 11. AeroTEM response over a 'thick' dipping conductor.

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(Figure 11). In these cases both possible source types may be indicated by picking both thick and thin response styles. For shallow dipping conductors the 'thin' (N) pick will be located over the top edge of the source, whereas the 'thick' (K) pick will fall over the downdip 'heart' of the anomaly.

10.3. EM Response

Discussion of the 4J anomaly by Jonathan Rudd.

Geology:

"Two possible sources of conductivity exist in the geology. The first is graphitic argillite, and the second is sulphide mineralization. Based on conductivity alone, no discrimination can be made from the geophysical data between these two types of sources. However, there are clues in the geophysical data that can promote one source over the other. For instance, graphitic argillites tend to be of greater extent than most economic sources of sulphide. So a short strike length conductive feature or a feature which exhibits significant variability in attitude, conductance or shape along strike is more likely to be a sulphide, whereas a long strike length feature with relatively homogeneous characteristics along strike is more likely to be a graphitic argillite.

The Eskay-style sulphide target can range from a non-conductive, chargeable (will respond to an IP survey, but not to an EM survey) feature to a semi-massive to massive sulphide target which would be chargeable and conductive, responding to both EM and IP surveys. Of note, the Eskay Creek deposit itself is known to be a conductive massive sulphide body. So it follows that where conductive sulphide targets exist, the priority for follow-up must be very high given the bonanza grades that these sulphides can host.

The 4J anomaly has a known occurrence of fine-grained stratiform sulphides in argillite in close proximity to the EM anomaly. The mineralogy of the sulphide is encouraging with the strong presence of bournonite, a mineral common at Eskay Creek. Graphite is also identified as a constituent mineral in this occurrence. Assays of this occurrence indicate the presence of excellent grades.

Past Geophysics:

A two-frequency helicopter-borne FEM survey was flown in the area in 1984. The survey area proper did not cover the 4J anomaly, but a single line extending west from the survey area flew over the 4J area and an anomalous response easily attributable to a bedrock conductor was identified. The positional accuracy of this FEM survey could only place the anomaly to within a 100 m radius.

The anomalous response in the FEM data is not consistent with two vertically-oriented sources as originally interpreted. Rather, the western coaxial peak suggests a shallow easterly dipping source (owing to the lack of a coplanar peak to the west of the coaxial peak), while the coincidence of the two peaks over the eastern anomaly suggests a thick source. The eastern source is of lower conductance than the western one, but both are of relatively low conductance.

Follow-up ground HLEM and VLF-EM surveys carried out over 2 NE-SW trending lines 500 m long and spaced 25 m apart confirmed the presence of the bedrock sources and allowed for better depth estimation. Both ground surveys confirm the presence of two sources. The HLEM data suggest a depth to the top of the sources of approximately 20 m. The improvement in response with the larger coil separation HLEM surveys is a function of the depth to the top of the conductor rather than an improvement in the quality of the source at depth. The 25 m coil spacing data do not detect the source because it is too deep, while the 50 m data produce a very modest response because at this spacing, a

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source at 20 m depth would only just be detectable (in general, HLEM systems see only to depths of about 50% of the coil spacing). The strongest response, as we would expect, is seen in the 100 m coil spacing data. The HLEM data suggest that, rather than 2 discrete vertical sources, the source may be more like a thick conductive zone bounded with two more conductive edges.

Follow-up large loop pulse EM surveying reportedly did not provide enough impetus to do further work on the 4J sources. This data is unavailable to the author.

2006 AeroTEM Survey

The AeroTEM survey conducted across the area with a line spacing of 100 m and a survey line azimuth of 060 identified an anomalous response over several lines. This anomalous extent indicates a strike length of at least 300 m. The highest amplitude response appears to occur in the vicinity of the originally identified anomaly based on sketches provided to the author.

The magnetic data suggest that the 4J anomaly occurs near the east-northeastern margin of a large intrusion (see image below).



When the magnetic data are reduced to the pole (which removes the bias of the Earth's magnetic field), and when the near-surface magnetic sources are enhanced, it becomes clear that the 4J anomaly occurs semi-coincident with a weak NNW trending linear magnetic feature. This magnetic feature appears to occur at or near the margin of the intrusive.

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The SE extent of the 4J anomaly occurs at a place where the magnetic source bifurcates towards the southeast and where there is a small change in the magnetic trend. These suggest that there may be structural complexities in the vicinity of the 4J anomaly.

The EM anomaly itself is complex. There appear to be two distinct anomalous features. The southern feature is dipping quite shallow towards the southwest and comes the closest to the surface (20 m on line 20260). The northwestern feature is dipping towards the north or northeast. This northern source is slightly deeper. Both of these sources are indicated in the image below on the mag derivative product. Also indicated is a broad area of elevated conductivity which encompasses the two discrete features. Note that this broad zone extends toward the NNE of the two conductors. This area is characterized by a broad conductive response of similar conductance to the anomalous zones. The low amplitude of the response and the breadth of the anomalies suggest that the source of the response across this area is deep. It may be important to note that the near surface conductivity in this area suggests that there is a nearer surface weakly conductive source through this area as well. Identification of the source of this near surface trend is also indicated on the image below as a dashed trend line.



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Drilling of this anomalous zone should start with testing of the two discrete features in the southern portion of the anomalous area. Quantitative modeling of the responses should be carried out prior to positioning of the drill".

Jonathan Rudd, P.Eng. Manager of Processing & Interpretation Aeroquest Limited

All anomalies indicated on the maps and should be reviewed in conjunction with available geological or geochemical information. The 'thick' and 'thin' response styles must also be considered when analyzing the interpreted picks and prioritizing for follow-up. The highest priority EM targets should then be subjected to quantitative modeling prior to drill testing to determine the azimuth and dip of the source. Figure 12 illustrates the Z coil response (off-time) from channels 5 through 15 for this area.







Figure 12 Off-time EM response over the survey area (Z coil, channels 5 through 15).

Respectfully submitted,

lod Lus

Gord Smith Aeroquest Limited April, 2006

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APPENDIX 1 – PROJECT CORNER COORDINATES

The 4J's Survey Block has a boundary which is defined in the following table. All geophysical data presented in this report have been windowed to this outline. Positions are in UTM Zone 9 – NAD83.

Easting (m)	Northing (m)
428735.0	6242891.9
429010.2	6242701.8
430000.0	6242700.0
431000.0	6243300.0
431400.0	6243300.0
431400.0	6240500.0
433400.0	6240500.0
433399.4	6239815.3
434045.5	6238683.1
431446.9	6237184.0
430773.9	6238323.0
429400.0	6238300.0
429399.2	6236519.0
430054.9	6235385.3
427463.3	6233885.6
426794.4	6235030.6
426400.0	6235000.0
426405.5	6241213.3
426130.3	6241403.5

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APPENDIX 2 - Description of Database Fields

The GDB file is a Geosoft binary database. In the database, the Survey lines and Tie Lines are prefixed with an "L" for "Line" and "T" for "Tie".

Database (4J's Final Client.gdb):

Column	Units	Description
Emfid		AERODAS Fiducial
utctime	hh:mm:ss.ss	UTC time
Х	m	UTM Easting (NAD83, zone 9N)
Y	m	UTM Northing (NAD83, zone 9N)
Lat_wgs84	dd.ddddd	Raw WGS84 Latitude
Long_wgs84	dd.dddddd	Raw WGS84 Longitude
bheight	m	Terrain clearance of EM bird
Galtf	m	GPS altitude (WGS 84)
Dtmf	m	Digital Terrain Model
Magf	nT	Final leveled total magnetic intensity
basemagf	nT	Base station total magnetic intensity
Pwrline		Powerline monitor
Flight		Flight number
ZOn	nT/s	Processed Streaming On-Time Z component Channels 1-15
Zoff	nT/s	Processed Streaming Off-Time Z component Channels 1-16
XOn	nT/s	Processed Streaming On-Time X component Channels 1-15
XOff	nT/s	Processed Streaming Off-Time X component Channels 1-16
Anom_ID		Thick (K) or Thin (T) identifier
Anom_labels		Letter label of conductor pick (A,B,C, etc.)
On_tau	microseconds	On-time Decay constant at conductor pick
Off_tau	microseconds	Off-time Decay constant at conductor pick
On_con	S	On-time conductance
off_con	S	Off-time conductance
Grade		Classification from 1-7 based on conductance of conductor pick



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APPENDIX 3: AeroTEM Design Considerations

Design Considerations

Helicopter-borne EM systems offer an advantage that cannot be matched from a fixed-wing platform. The ability to fly at a slower speed and collect data with high spatial resolution, and with great accuracy, means that helicopter EM systems provide more detail than any other EM configuration, airborne or ground-based. Spatial resolution is especially important in areas of complex geology and in the search for discrete conductors. With the advent of helicopter-borne high-moment time domain EM systems the fixed-wing platforms are losing their *only* advantage – depth penetration.

Advantage 1 – Spatial Resolution

The AeroTEM system is specifically designed to have a small footprint. This is accomplished through the use of concentric transmitter-receiver coils and a relatively small diameter transmitter coil (5 m). The result is a highly focused exploration footprint, which allows for more accurate "mapping" of discrete conductors. Consider the transmitter primary field images shown in Figure 1, for AeroTEM versus a fixed-wing transmitter. The footprint of AeroTEM at the earth's surface is The footprint of a fixed-wing system is roughly 150 m roughly 50 m on either side of transmitter.



Figure 1. A comparison of the footprint between AeroTEM and a fixed-wing system, highlights the greater resolution that is achievable with a transmitter located closer to the earth's surface. The AeroTEM footprint is one third that of a fixed-wing system and is symmetric, while the fixed-wing system has even lower spatial resolution along the flight line because of the separated transmitter and receiver configuration.

At first glance one may want to believe that a transmitter footprint that is distributed more evenly over a larger area is of benefit in mineral exploration. In fact, the opposite is true; by energizing a larger surface area, the ability to energize and detect discrete conductors is reduced. Consider, for example, a comparison between AeroTEM and a fixed-wing system over the Mesamax Deposit (1,450,000 tonnes of 2.1% Ni, 2.7% Cu, 5.2 g/t Pt/Pd). In a test survey over three flight lines spaced 100 m apart, AeroTEM detected the Deposit on all three flight lines. The fixed-wing system detected the Deposit on two flight lines. In exploration programs that seek to expand the flight line spacing in an effort to reduce the cost of the airborne survey, discrete conductors such as the Mesamax Deposit can go undetected. The argument often put forward in favor of using fixed-wing systems is that because of their larger footprint, the flight line spacing can indeed be widened. Many fixed-wing surveys are flown at 200 m or 400 m. Much of the survey work performed by Aeroquest has been to survey in areas that were previously flown at these wider line spacings. One of the reasons for AeroTEM's impressive discovery record has been the strategy of flying closely spaced lines and finding all the discrete near-surface conductors. These higher resolution surveys are being flown within existing mining camps, areas that improve the chances of discovery.







Figure 2. Fixed-wing (upper) and AeroTEM (lower) comparison over the eastern limit of the Mesamax Deposit, a Ni-Cu-PGE zone located in the Raglan nickel belt and owned by Canadian Royalties. Both systems detected the Deposit further to the west where it is closer to surface.

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The small footprint of AeroTEM combined with the high signal to noise ratio (S/N) makes the system more suitable to surveying in areas where local infrastructure produces electromagnetic noise, such as power lines and railways. In 2002 Aeroquest flew four exploration properties in the Sudbury Basin that were under option by FNX Mining Company Inc. from Inco Limited. One such property, the Victoria Property, contained three major power line corridors.

The resulting AeroTEM survey identified all the known zones of Ni-Cu-PGE mineralization, and detected a response between two of the major power line corridors but in an area of favorable geology. Three boreholes were drilled to test the anomaly, and all three intersected sulphide. The third borehole encountered 1.3% Ni, 6.7% Cu, and 13.3 g/t TPMs over 42.3 ft. The mineralization was subsequently named the Powerline Deposit.

The success of AeroTEM in Sudbury highlights the advantage of having a system with a small footprint, but also one with a high S/N. This latter advantage is achieved through a combination of a high-moment (high signal) transmitter and a rigid geometry (low noise). Figure 3 shows the Powerline Deposit response and the response from the power line corridor at full scale. The width of power line response is less than 75 m.



Figure 3. The Powerline Deposit is located between two major power line corridors, which make EM surveying problematic. Despite the strong response from the power line, the anomaly from the Deposit is clearly detected. Note the thin formational conductor located to the south. The only way to distinguish this response from that of two closely spaced conductors is by interpreting the X-axis coil response.

Advantage 2 – Conductance Discrimination

The AeroTEM system features full waveform recording and as such is able to measure the on-time response due to high conductance targets. Due to the processing method (primary field removal), there is attenuation of the response with increasing conductance, but the AeroTEM on-time measurement is still superior to systems that rely on lower base frequencies to detect high conductance targets, but do not measure in the on-time.

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The peak response of a conductive target to an EM system is a function of the target conductance and the EM system base frequency. For time domain EM systems that measure only in the off-time, there is a drop in the peak response of a target as the base frequency is lowered for all conductance values below the peak system response. For example, the AeroTEM peak response occurs for a 10 S conductor in the early off-time and 100 S in the late off-time for a 150 Hz base frequency. Because base frequency and conductance form a linear relationship when considering the peak response of any EM system, a drop in base frequency of 50% will double the conductance at which an EM system shows its peak response. If the base frequency were lowered from 150 Hz to 30 Hz there would be a fivefold increase in conductance at which the peak response of an EM occurred.

However, in the search for highly conductive targets, such as pyrrhotite-related Ni-Cu-PGM deposits, a fivefold increase in conductance range is a high price to pay because the signal level to lower conductance targets is reduced by the same factor of five. For this reason, EM systems that operate with low base frequencies are not suitable for general exploration unless the target conductance is more than 100 S, or the target is covered by conductive overburden.

Despite the excellent progress that has been made in modeling software over the past two decades, there has been little work done on determining the optimum form of an EM system for mineral exploration. For example, the optimum configuration in terms of geometry, base frequency and so remain unknown. Many geophysicists would argue that there is no single ideal configuration, and that each system has its advantages and disadvantages. We disagree.

When it comes to detecting and discriminating high-conductance targets, it is necessary to measure the pure inphase response of the target conductor. This measurement requires that the measured primary field from the transmitter be subtracted from the total measured response such that the secondary field from the target conductor can be determined. Because this secondary field is in-phase with the transmitter primary field, it must be made while the transmitter is turned on and the transmitter current is changing. The transmitted primary field is several orders of magnitude larger than the secondary field. AeroTEM uses a bucking coil to reduce the primary field at the receiver coils. The only practical way of removing the primary field is to maintain a rigid geometry between the transmitter, bucking and receiver coils. This is the main design consideration of the AeroTEM airframe and it is the only time domain airborne system to have this configuration.



The off-time AeroTEM response for the 16 channel configuration. The on-time response assuming 100% removal of the measured primary field.

Figure 4. The off-time and on-time response nomogram of AeroTEM for a base frequency of 150 Hz. The on-time response is much stronger for higher conductance targets and this is why on-time measurements are more important than lower frequencies when considering high conductance targets in a resistive environment.

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Advantage 3 - Multiple Receiver Coils

AeroTEM employs two receiver coil orientations. The Z-axis coil is oriented parallel to the transmitter coil and both are horizontal to the ground. This is known as a maximum coupled configuration and is optimal for detection. The X-axis coil is oriented at right angles to the transmitter coil and is oriented along the line-of-flight. This is known as a minimum coupled configuration, and provides information on conductor orientation and thickness. These two coil configurations combined provide important information on the position, orientation, depth, and thickness of a conductor that cannot be matched by the traditional geometries of the HEM or fixed-wing systems. The responses are free from a system geometric effect and can be easily compared to model type curves in most cases. In other words, AeroTEM data is very easy to interpret. Consider, for example, the following modeled profile:



Figure 5. Measured (lower) and modeled (upper) AeroTEM responses are compared for a thin steeply dipping conductor. The response is characterized by two peaks in the Z-axis coil, and a cross-over in the X-axis coil that is centered between the two Z-axis peaks. The conductor dips toward the higher amplitude Z-axis peak. Using the X-axis cross-over is the only way of differentiating the Z-axis response from being two closely spaced conductors.

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HEM versus AeroTEM

Traditional helicopter EM systems operate in the frequency domain and benefit from the fact that they use narrowband as opposed to wide-band transmitters. Thus all of the energy from the transmitter is concentrated in a few discrete frequencies. This allows the systems to achieve excellent depth penetration (up to 100 m) from a transmitter of modest power. The Aeroquest Impulse system is one implementation of this technology.

The AeroTEM system uses a wide-band transmitter and delivers more power over a wide frequency range. This frequency range is then captured into 16 time channels, the early channels containing the high frequency information and the late time channels containing the low frequency information down to the system base frequency. Because frequency domain HEM systems employ two coil configurations (coplanar and coaxial) there are only a maximum of three comparable frequencies per configuration, compared to 16 AeroTEM off-time and 12 AeroTEM on-time channels.

Figure 6 shows a comparison between the Dighem HEM system (900 Hz and 7200 Hz coplanar) and AeroTEM (Zaxis) from surveys flown in Raglan, in search of highly conductive Ni-Cu-PGM sulphide. In general, the AeroTEM peaks are sharper and better defined, in part due to the greater S/N ratio of the AeroTEM system over HEM, and also due to the modestly filtered AeroTEM data compared to HEM. The base levels are also better defined in the AeroTEM data. AeroTEM filtering is limited to spike removal and a 5-point smoothing filter. Clients are also given copies of the raw, unfiltered data.



Figure 6. Comparison between Dighem HEM (upper) and AeroTEM (lower) surveys flown in the Raglan area. The AeroTEM responses appear to be more discrete, suggesting that the data is not as heavily filtered as the HEM data. The S/N advantage of AeroTEM over HEM is about 5:1.

Aeroquest Limited is grateful to the following companies for permission to publish some of the data from their respective surveys: Wolfden Resources, FNX Mining Company Inc, Canadian Royalties, Nova West Resources, Aurogin Resources, Spectrem Air. Permission does not imply an endorsement of the AeroTEM system by these companies.

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APPENDIX 4: AeroTEM Instrumentation Specification Sheet

AEROTEM Helicopter Electromagnetic System

System Characteristics

- Transmitter: Triangular Pulse Shape Base Frequency 30 or 150 Hz
- Tx On Time 5,750 (30Hz) or 1,150 (150Hz) μs
- Tx Off Time 10,915 (30Hz) or 2,183 (150Hz) μs
- Loop Diameter 5 m
- Peak Current 250 A
- Peak Moment 38,800 NIA
- Typical Z Axis Noise at Survey Speed = 8 ppb peak
- Sling Weight: 270 Kg
- Length of Tow Cable: 40 m
- Bird Survey Height: 30 m or less nominal

Receiver

- Three Axis Receiver Coils (x, y, z) positioned at centre of transmitter loop
- Selectable Time Delay to start of first channel 21.3, 42.7, or 64.0 ms

Display & Acquisition

- PROTODAS Digital recording at 126 samples per decay curve at a maximum of 300 curves per second (26.455 µs channel width)
- RMS Channel Widths: 52.9,132.3, 158.7, 158.7, 317.5, 634.9 µs
- Recording & Display Rate = 10 readings per second.
- On-board display six channels Z-component and 1 X-component

System Considerations

Comparing a fixed-wing time domain transmitter with a typical moment of 500,000 NIA flying at an altitude of 120 m with a Helicopter TDEM at 30 m, notwithstanding the substantial moment loss in the airframe of the fixed wing, the same penetration by the lower flying helicopter system would only require a sixty-fourth of the moment. Clearly the AeroTEM system with nearly 40,000 NIA has more than sufficient moment. The airframe of the fixed wing presents a response to the towed bird, which requires dynamic compensation. This problem is non-existent for AeroTEM since transmitter and receiver positions are fixed. The AeroTEM system is completely portable, and can be assembled at the survey site within half a day.

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