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Ministry of Energy and Mines
BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Analyses of VLF Geophysical Data:Bird Property **TOTAL COST:** $10,325.00

AUTHOR(S): Frederick A. Cook and Brian A. Belton **SIGNATURE(S):**

Digitally signed by Fred Cook
DN: cn=Fred Cook, o=Salt Spring Imaging, Ltd., ou, email=fcook@ucalgary.ca, c=CA
Date: 2014.03.17 10:22:56 -07'00'

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): **YEAR OF WORK:** 2013

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): Event 5481980; July 11-13, 2013; August 14-18, 2013

PROPERTY NAME: Bird Property

CLAIM NAME(S) (on which the work was done): 6727663, Bird 1; 672683, Bird 2; 751282, Bird 3; 845105, Bird 4

COMMODITIES SOUGHT: Precious metals

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Omineca **NTS/BCGS:** 093F

LATITUDE: 53 ° 37 ' 33 " **LONGITUDE:** 125 ° 07 ' 28 " **(at centre of work)**

OWNER(S):

1) Kootenay Silver, Inc 2)

MAILING ADDRESS:

Suite 1820 - 1055 W. Hastings St.
Vancouver, BC V6E2E8

OPERATOR(S) [who paid for the work]:

1) Kootenay Silver, Inc. 2)

MAILING ADDRESS:

Suite 1820 - 1055 W. Hastings St.
Vancouver, BC V6E2E8

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
volcanic calderas; silica veins; Eocene

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: AR30364

Next Page

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic	6.8 km	Bird2, Bird3	$4,725.00
Induced Polarization			
Radiometric			
Seismic			
Other	Data Processing	Bird2, Bird3	$3,200.00
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other	Report		$2,400.00
		TOTAL COST:	$10,325.00

Assessment Report:

Analyses of VLF Geophysical Data:

Bird Property,

Nechako Basin, central British Columbia

MTO event 5481980

North 53° 37' 33"; West 125° 07' 28"

UTM Zone 10 359500E, 5944000N

NTS map sheet 093F

Omineca Mining Division

by

F. A. Cook, Ph.D., P.Geo.
Salt Spring Imaging, Ltd.
128 Trincomali Heights
Salt Spring Island, B.C. V8K1M8

and

Brian A. Belton, B.A.
Box 2061
Rossland, B.C., V0G 1Y0

For

Property Operator: **Kootenay Silver Inc.**
Suite 1820-1055 W. Hastings St.
Vancouver, B.C. V6E 2E8

Property Owner: **Kootenay Silver, Inc.**
Suite 1820-1055 W. Hastings St.
Vancouver, B.C. V6E 2E8

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Figures

Table

1.0 Summary

Acquisition and processing of a Very Low Frequency (VLF-EM) geophysical data set across part of the Bird property in central British Columbia has allowed quasi three-dimensional imaging of subsurface electrical conductors to approximately 150 m depth. The data were acquired in a series of six (6) north-south lines in a 1.25 x 0.5 km grid near the centre of the property and the lines were processed using two-dimensional finite element inversion. The results from each of the inverted profiles were plotted to provide cross sections of the near-surface conductivity structures.

2.0 Introduction

Salt Spring Imaging Ltd. was retained by Kootenay Silver Inc., a British Columbia company, to analyse VLF-EM data on the Bird property in the Nechako Basin of central British Columbia (Figure 1). The objective of the work was to evaluate information bearing on the subsurface physical properties, in this case the electrical conductivity, and to evaluate its usefulness as an exploration tool for this property. The approach includes application of two-dimensional finite element inversion, and comparison of the results to previously obtained images of electrical structures. This report provides a brief description of the setting, a description of the field procedures, the data processing and the interpretation.

The lead author is familiar with the geology and geophysics of the region, having been responsible for acquiring geophysical data in British Columbia since 1983, as the transect leader for the Lithoprobe Southern Canadian Cordillera transect from 1985-1995 and Transect co-leader for the Lithoprobe Slave-Northern Cordillera transect from 1995-2005.

Metric units are used throughout the report.

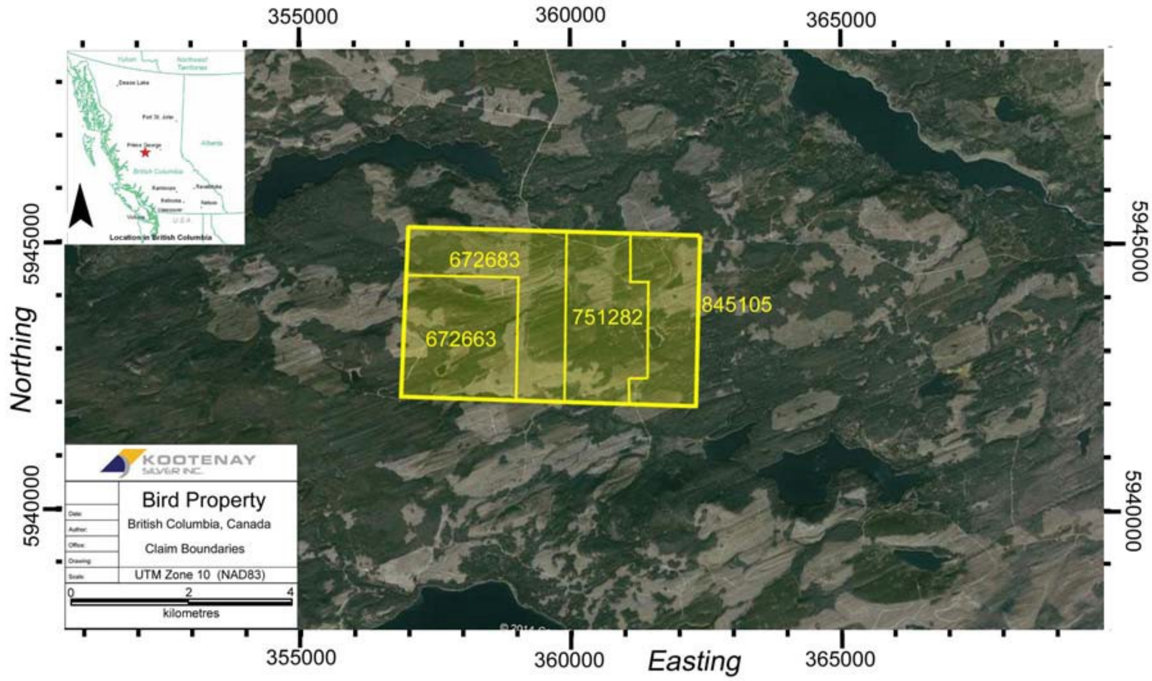

Figure 1. Digital satellite map with the Bird property indicated in yellow.

3.0 Property Description and Location

The Bird Property is a collection of claims that are located in central British Columbia (Figure 1) in the Nechako Basin. The approximate geographical limits of the property are the following: (degrees latitude, degrees longitude; UTM easting, UTM northing**):** northwest (53° 38’ 14”, 125° 09’ 51”; 356925, 5945338); northeast (53° 38’ 15”, 125° 04’ 58”; 362296, 5945197); southeast (53° 36’ 30”, 125° 04’ 58”; 362201, 5941953); southwest (53° 36’ 30”, 125° 09’ 51”; 356826, 5942113)**.**

The Bird property comprises four (4) mineral tenures containing approximately 1745 hectares (Table I). The mineral cell titles were acquired online and as such there are no posts or lines marking the location of the property on the ground.

Tenure Number	Claim Name/Property	Issue Date	Good To Date	New Good To Date	# of Days For-ward	Area in Ha	Applied Work Value	Sub-mission Fee
672663	BIRD 1	2009/nov/23	2014/aug/15	2015/Jun/19	308	479.52	$ 4046.35	$ 0.00
672683	BIRD 2	2009/nov/23	2014/aug/15	2015/Jun/19	308	460.25	$ 3883.72	$ 0.00
751282	BIRD 3	2010/apr/17	2014/aug/15	2015/Jun/19	308	479.48	$ 4045.99	$ 0.00
845105	BIRD 4	2011/jan/31	2014/aug/15	2015/Jun/19	308	326.04	$ 2751.23	$ 0.00

Table 1. Description of Bird property mineral titles.

4.0 Geological Setting

The property is situated in the northern portion of the Nechako basin in central British Columbia where the topography is characterized by gentle, undulatory hills with lakes in the low-lying regions (Figure 2). The area was glaciated such that the topography exhibits a northeast `grain` (Figure 1).

In this part of the basin, surface exposures are poor, and are dominated by glacial deposits and scattered outcrops of late (Eocene) basalts of the Ootsa Lake and Endako groups. The area may be part of a larger caldera complex (Cheslatta complex) as described in Raven and Smith (2008).

Mineralization with anomalous gold, silver, arsenic and antimony concentrations is found in scattered outcrops of silica-rich veins with steep dips as well as silicified conglomerates that are interlayered with the volcanic rocks. In descriptions of the drill holes (Raven and Smith, 2008), the conglomerates are often mineralized, micro-fractured and exhibit vein fillings of silica and carbonate. Taken together with the clay alteration and sulphide mineralization, the silicification may be interpreted to be associated with a hydrothermal or epithermal system.

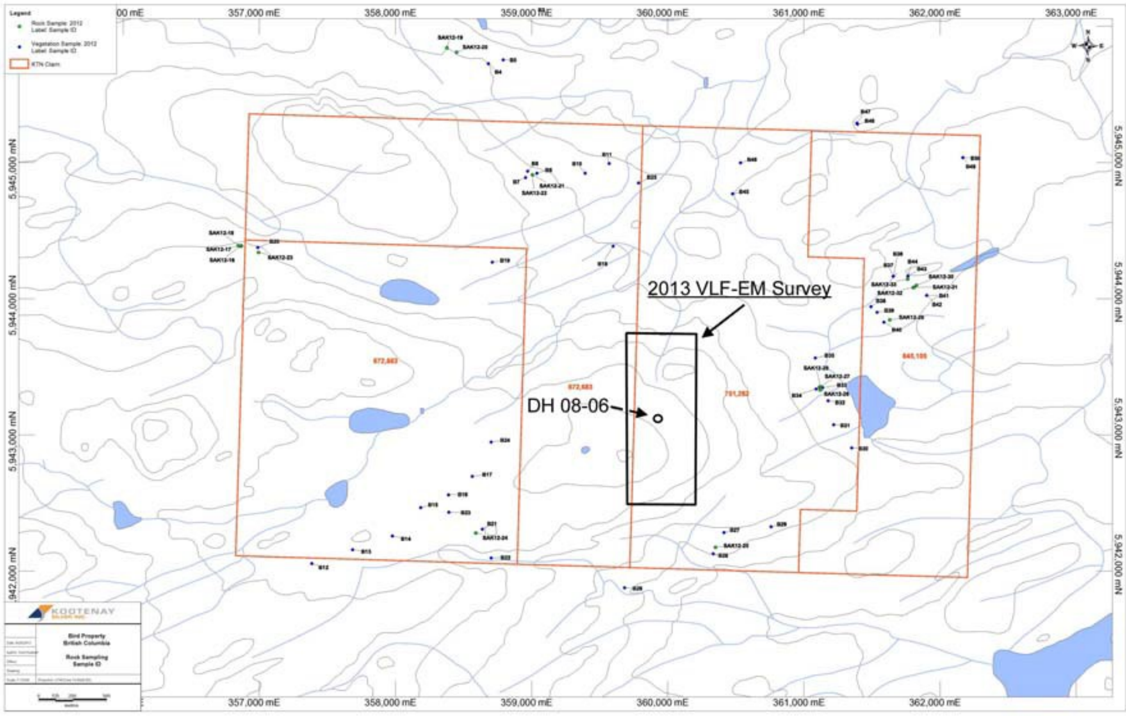

Figure 2. Topographic map of the Bird property and surrounding area with the claims indicated in red. The VLF survey area is located within the small, black rectangle. Also shown are sample locations (small dots with numbers) and the position of drill hole DH 08-06 as described in Raven and Smith (2008).

5.0 VLF Geophysical Data

5.1 *Data Acquisition*

The VLF data set was recorded with a GEM Systems GSM-19 magnetometer/VLF in a series of eight north-south parallel lines (Figure 3). Lines were spaced 100 m apart, with station spacing along each line of 12.5 m. GPS location and elevation readings were made every 100 m, and intervening GPS values were calculated during processing. Total field magnetic data were recorded along with the VLF data. A stationary base station provided a drift correction for each of the magnetometer readings. The GPS, VLF and magnetic data were uploaded as text files for data processing.

Readings were taken for two VLF stations simultaneously at each station. For the whole survey, the readings were for Cutler, Maine (24.0 kHz, NAA), and LaMoure, North Dakota (25.2 kHz, NML). The azimuths for these stations are shown in Figure 3.

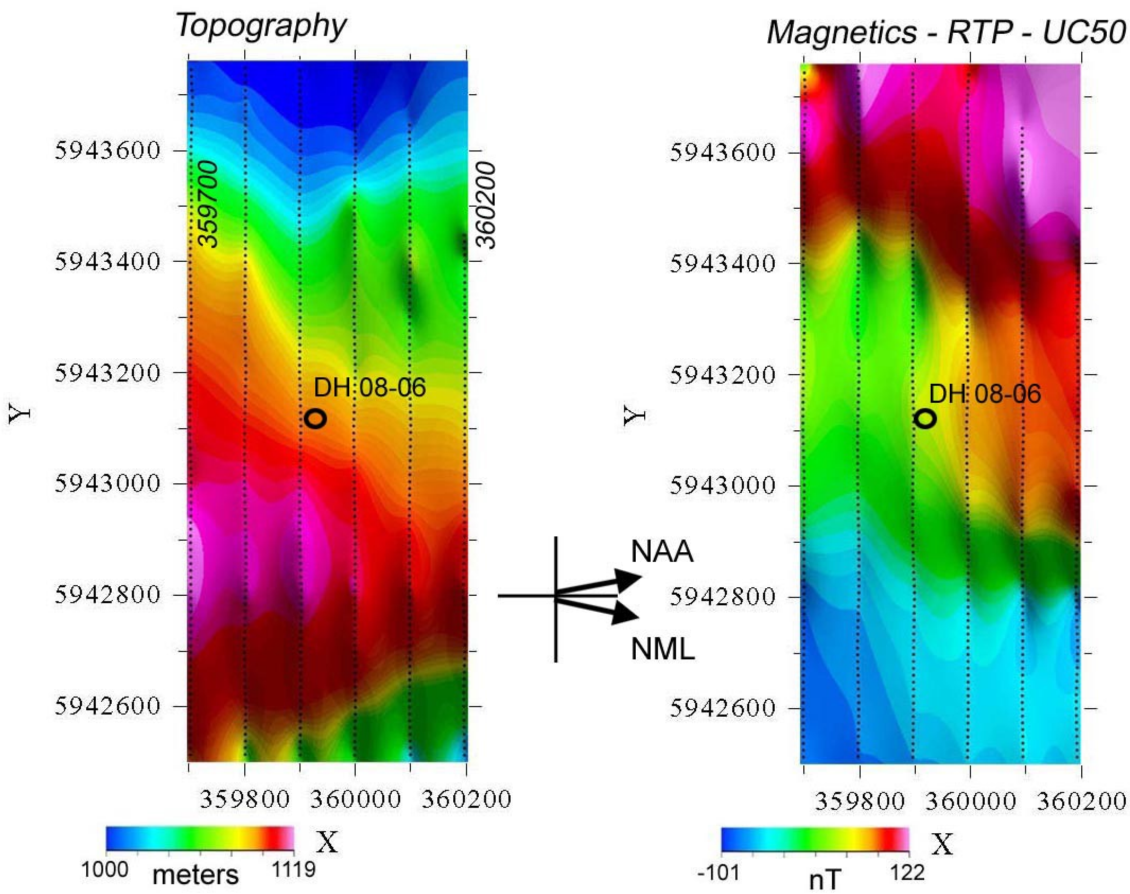

Figure 3. Topography data (left) and magnetic anomalies (right) calculated from data acquired during the Bird VLF survey. In the lower centre of the diagram, the azimuths of the two transmitters (Cutler, Maine = NAA, azimuth 79.5^{o}; LaMoure, North Dakota = NML, azimuth 102.1^{o}) that were used for the survey are shown. Reduction of the magnetic data was made by calculating the IGRF at a single central location and applying the result to the entire survey. The data were then reduced to the pole and upward continued 50 m for smoothing. 'X' and 'Y' are easting and northing coordinates (UTM zone 10N, NAD83), respectively. Two VLF lines, 359700 and 360200 (lines 9700 and 0200, respectively) are labelled on the topographic map. The corrugated effect in both maps is due to small scale station to station variations.

5.2 *Data Processing*

The data were processed in the following manner. First the 100 m GPS measurements were converted to UTM (zone 10, NAD83) coordinates. UTM values and elevations were then calculated for each of the 12.5 m stations. Following this, the magnetic data were reduced using calculated values of the International Geomagnetic Reference Field (IGRF) for the dates and location (e.g., centre point) of the grid. For the data acquisition time (3 days) and limited size of the grid, the values of the IGRF varied by a small amount, less than 1.0-2.0 nT over the grid, whereas the magnetic anomalies varied by more than 200 nT (Figure 3). The magnetic data were then reduced to the pole using the declination and inclination for the centre point. Results from the elevation and magnetic calculations were plotted with the station locations for quality control (Figure 3) and if any errors were found, they were remedied. The results (Figure 3) exhibit a strong magnetic high in the northern region of the survey area and a general decrease in magnetic anomaly values to the southwest.

Data processing methods for the VLF data included examining the Karous-Hjelt transform and taking appropriate action to minimize noise when present. An example is shown in Figure 4. The unfiltered in-phase and quadrature data from Line 9900 (transmitter NAA) are shown in the upper part of Figure 4a. The data curves indicate significant station-to-station variations that are either noise or very local variations.

The lower diagram in Figure 4a illustrates a filtered version of the same data. The filtering was accomplished by applying Empirical Mode Decomposition (EMD; Jeng et al. 2007). The justification for applying the filtering is to minimize the short wavelength (e.g., station to station) variations in the signal. Examination of the filtered version (Figure 4a) shows that the general shape of the curves is maintained while the short wavelength variations are minimized.

The effect of the filtering on the inversions is shown in Figures 4b and 4c. Figure 4b is a plot of the Karous-Hjelt transform of the raw (unfiltered) data (real component in the upper diagram, quadrature in the lower diagram) to show concentrations of current density. Although it appears that there are concentrations of high current density near the centre of the section on both the real and imaginary components, the results are affected by prominent, angular, linear trends that are caused by the short wavelength variations in the recorded signal. Figure 4c illustrates the Karous-Hjelt transform of the data after application of an empirical mode decomposition filter (Jeng et al, 2007). Here, the high current density zones are much more prominent.

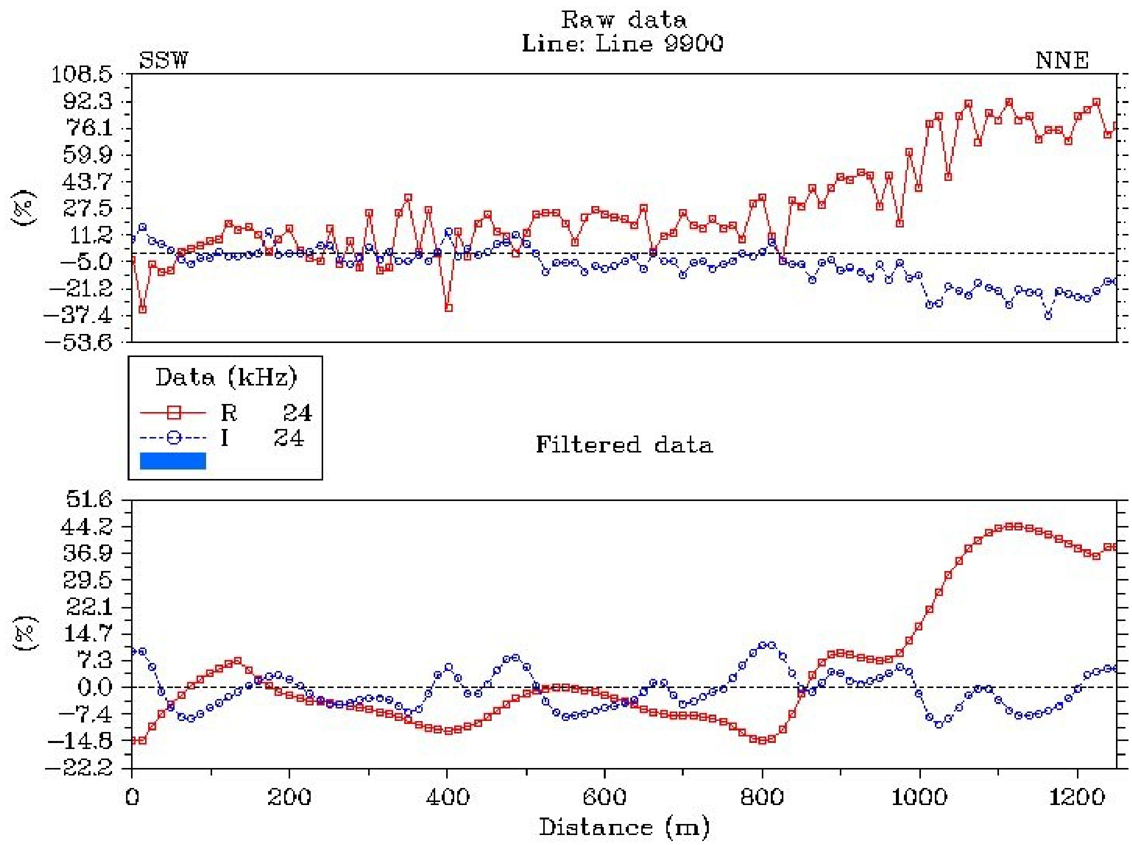

Figure 4a. Recorded data (top) and EMD filtered data (bottom) for Line 9900 (transmitter = Cutler, Maine). Note that short wavelength variations that are evident in the recorded data are attenuated in the filtered version. Red lines are for the in-phase (real) component and blue lines are for the quadrature (imaginary) component.

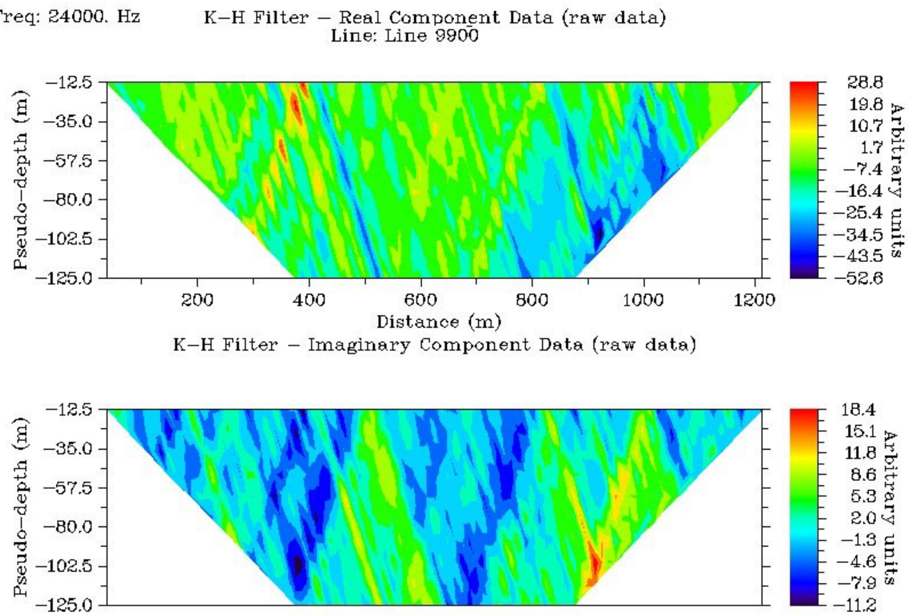

Figure 4b. Karous-Hjelt (K-H) transforms of the recorded data along Line 9900. The images are K-H transforms for the recorded data (real component at the top and the imaginary component in the lower) with no filtering. The angular patterns are likely primarily due to the short wavelength variations seen in the recorded signal.

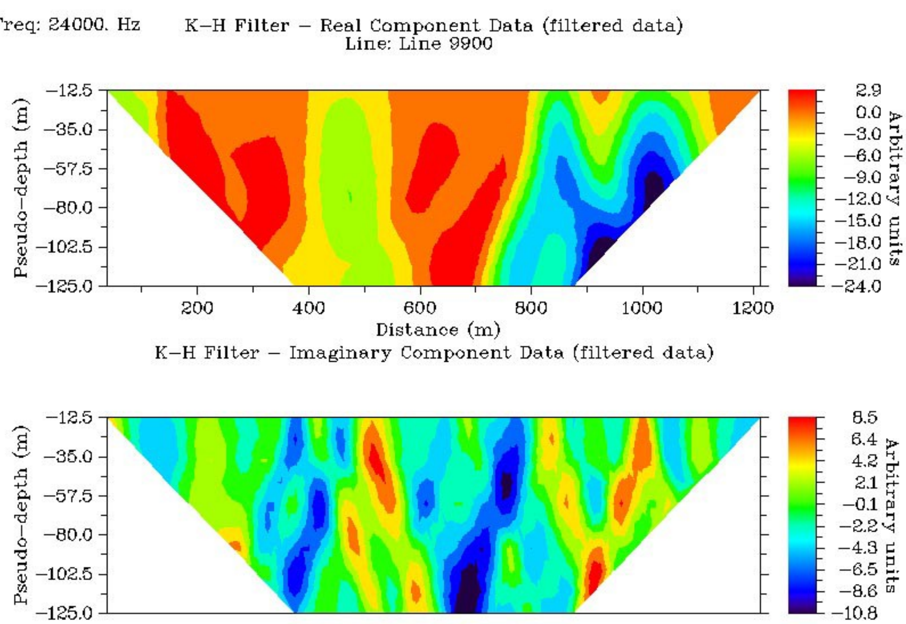

Figure 4c. Karous-Hjelt (K-H) transforms of the EMD-filtered data along Line 9900. The prominent angular patterns in Figure 4b are significantly attenuated.

The data for each profile were then inverted using a finite element program based on Monteiro-Santos et al. (2006). The program has recently been modified by Monteiro-Santos (personal communication, 2013) to include elevation variations. For each inversion calculation, the background resistivity is assumed to be 500 Ohm-m. Following inversion, each calculated result was converted to conductivity values and plotted. The results of the inversion were a series of parallel two-dimensional sections so that it is relatively easy to follow zones of anomalous conductivity from one profile to another.

5.3 *Inversion results*

Inversions of the data were accomplished on a line-by-line basis and are two-dimensional calculations. They are displayed in Figure 5 as a series of sequential profiles in two columns. They are grouped according to the azimuth of the transmitter. Thus, in the left column are the lines for which the NAA (Cutler, Maine) transmitter was used, and in the right column are profiles that used the transmitter at LaMoure, North Dakota (NML).
Each of the lines displays some zones of high conductivity, but they are almost all restricted to less than 100 m from the surface.

In general, zones of high conductivity are only visible to about 150 m depth. Whether this is a result of lack of signal penetration, or whether it is due to a paucity of conductors at greater depth is unclear. However, as the skin depth for these frequencies and background resistivity (about 500 Ohm-m) is approximately 70 m, and as a previous controlled source EM survey indicated some low resistivity anomalies at greater depths (Raven and Smith, 2008), it is likely that the limited signal penetration is a major factor.

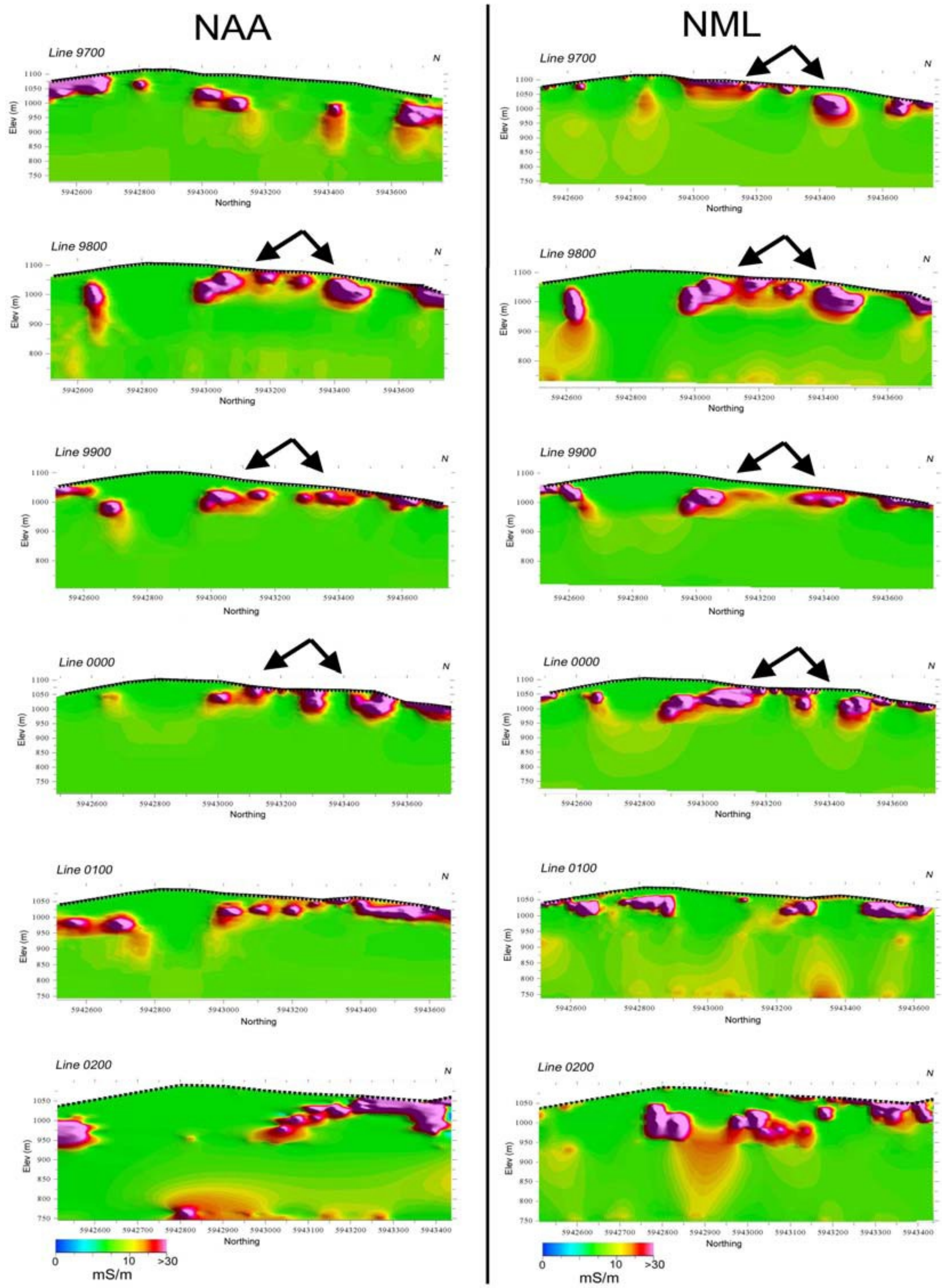

Figure 5. Display of Lines 9700 to 0200 after inversion. Results are shown for each transmitter, with the Cutler, Maine (NAA) transmitter results in the left column and the LaMoure, North Dakota transmitter results shown in the right column. The westernmost line (9700) is in the uppermost row. North is on the right in all images.

5.4 *Comparison with previous EM work and drilling*

The VLF data display prominent conductivity highs in the subsurface between 50 and 100m below the topography in regions where the previous controlled source) resistivity data also showed resistivity lows (conductivity highs). This is particularly noticeable along Lines 9700, 9800, 9900, and 0000 (arrows in Figure 5) and at the southern end of most of the lines at about 50 m below the surface. All of these appear to coincide with regions of high conductivity (low resistivity; blue on Figure 6). However, because it is not possible with the VLF data to detect anomalous zones much deeper than 100-150 m, the results can not be compared to the information below 100 m described in Raven and Smith (2008).

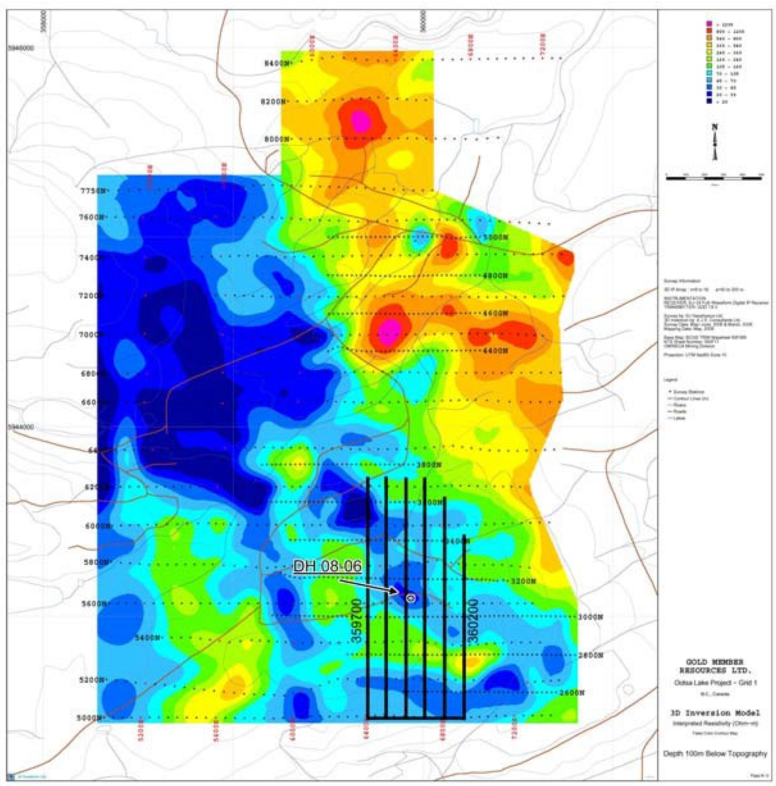

Figure 6. Comparison of the VLF survey with resistivity at 100 m depth calculated from a resistivity survey described in Raven and Smith (2008). Note that the 08-06 drill hole was located to intersect a zone of low resistivity (blue, high electrical conductivity).

Drill hole DH 08-06 is located at 359924E, 5943121N and is thus 24 m east of line 9900 (Figure 6). It was drilled along an azimuth of 180^{o} at an angle of 75^{o} from horizontal and for a distance of 411.23 m (Raven and Smith, 2008); thus it reached a depth of 397.2 m. The position of the hole is shown on Figure 7 as it would project into Line 9900 (LaMoure, ND transmitter). According to Raven and Smith (2008), the hole intersected a number of volcanic layers with interlayered silicified conglomerates. Although there were metallic minerals interspersed throughout the hole, the highest concentrations of gold and silver were observed between about 59 and 128 m. This zone, marked in red on Figure 7, is adjacent to one of the most prominent high conductivity anomalies on the line.

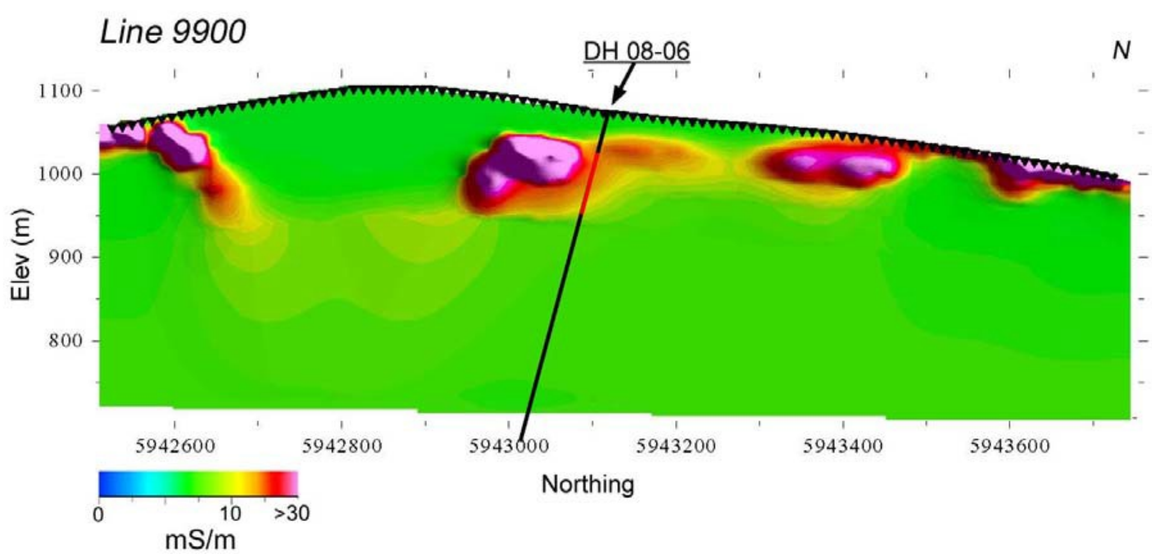

Figure 7. Enlargement of Line 9900 for the data from the LaMoure, North Dakota (NML) transmitter with the DH 08-06 drill hole indicated. The DH 08-06 drill hole is located about 24 m east of the line and is thus projected by that amount into the line. The hole was drilled a length of 411.23 m along a due south azimuth and at a dip of 75^{o} (Raven and Smith, 2008). The red portion of the drill hole is where some of the highest values of Au and Ag were recovered between 59 and 128 m.

6.0 Interpretations

It is encouraging that zones of elevated electrical conductivity in the subsurface occur in the vicinity of anomalous concentrations of metals both at the surface and in the DH 08-06 drill hole. However, as with most remote sensing geophysical techniques, there are several possible interpretations for the cause(s) of the anomalies. Nevertheless, given the spatial correlation of a high conductivity anomaly with silicified conglomerate that has open spaces and metals, in the drill hole, it appears that the VLF data may be helpful for identifying near-surface targets. Although elevated conductivity may occur for any one of, or combination of, causes, it seems likely that fluids (or fluid-rich clays), and/or metals are the likely sources for many of the anomalies seen here.

7.0 Conclusions

Application of the VLF electromagnetic method for mapping subsurface variations of electrical properties in the Bird property of central British Columbia has produced evidence of significant zones of high electrical conductivity. The data were processed using recently developed inversion and mapping techniques, and the results were combined with 3D graphics to provide some quasi - three-dimensional information of conductivity variations within the grid area. Although VLF has been a popular geophysical tool for many years, the ability to enhance the results with images of high conductivity zones at depth makes it an attractive tool for reconnaissance exploration.

8.0 Recommendations

As with most geophysical data, the interpretations of the VLF sections are enhanced by detailed knowledge of the geology. For rocks such as these, elevated conductivity may be caused by fluids, carbon (e.g., graphite, coal) or metals. Although carbon seems unlikely to be the cause of many of the anomalies seen here, the origin(s) of these conductive zones will not likely be known until tested further by drilling.

9.0 References

Craven, W. and Smith, K. C. 2008. Geophysical and diamond drilling assessment report on the Nechako Property, BC Ministry of Energy and Mines, Assessment report 30364, 184 pp.

Jeng, Y., Lin, M. J., Chen, C. S., and Wang, Y. H. 2007. Noise reduction and data recovery for a VLF-EM survey using a non-linear decomposition method. Geophysics, v. 72, 223-235.

Monteiro Santos, F.A., Mateus, A. Figueiras, J., and Gonçalves, M. A. 2006. Mapping groundwater contamination around a landfill facility using the VLF-EM method – a case study. Journal of Applied Geophysics, 60, 115-125.

10.0 Statement of Costs

Property:	Bird	
Event #	**541980**	
Start - End Date:	July 11-13, 2013 - Fieldwork August 14-18, 2013 - Processing	
Tenure work done on:	751282, 672683	
Type of work done:	Geophysical	
Mike Kennedy	July 11-13, 2013	
VLF/Mag survey	3 Man days @ 350	$ 1,050.00
	3 Truck days@ 150	450.00
BA Belton	July 11-13, 2013	
	3 Man days @ 400	1,200.00
Travel & L/O		1,575.00
ATV rental	3 @ 150	450.00
Fred Cook	Data Interpretation & Analysis	3,200.00
	Report	2,400.00
	Total	$ 10,325.00

11.0 Statements of Qualifications

I, Frederick A. Cook do hereby certify that:

1) I attained the degree of Doctor of Philosophy (Ph.D.) in geophysics from Cornell University in Ithaca, New York in 1981.
2) I have a B.Sc. in geology (1973) and an MSc. in Geophysics (1975) from the University of Wyoming in Laramie, Wyoming.
3) I am a registered member of the Association of Professional Engineers and Geoscientists of British Columbia (P. Geo. 2009). Previously, from 1984-2009, I was registered with the Association of Professional Engineers, Geologists and Geophysicists of Alberta as both a P. Geol. and a P. Goph.
4) I am a member of the American Geophysical Union and the Geological Society of America.
5) I have worked as a geophysicist/geologist for a total of 36 years since my graduation from university.
6) I have worked for the Continental Oil Company (1975-1977) and the University of Calgary (1982-2010).
7) I was the Director of the Lithoprobe Seismic Processing Facility at the University of Calgary from 1987-2003.
8) I have recently (2011) been appointed an International Consultant for the Chinese SinoProbe project.
9) I have a thorough knowledge of the geology of southern British Columbia based on extensive geological and geophysical field work.
10) I have authored more than 125 scholarly publications in peer-reviewed journals and books.
11) I was retained by Kootenay Silver Inc. to undertake analyses of the geophysical data in the vicinity of the Bird property.
12) I am one of the authors of this report.
13) I am not aware of any material fact or material change with respect to the subject matter of this report, which is not reflected in this report.
14) I have no interest, direct or indirect, in the property.

"signed and sealed" at Salt Spring Island, B.C.

Frederick A. Cook, P. Geo.
Salt Spring Imaging, Ltd
128 Trincomali Heights
Salt Spring Island, B.C.

Dated at Salt Spring Island, B.C. this 12th day of March, 2014
Registration License No. 34585
Association of Professional Engineers and Geoscientists of British Columbia

I, Brian Alexander Belton, hereby do declare that:

1. I graduated with a Bachelor's degree in Geography (Environmental Studies, Resource Management, Regional Development) from the University of Victoria, Victoria, British Columbia in 1996.
2. I graduated with a Bachelor of Education degree (Environmental Studies) from the University of British Columbia, Vancouver, British Columbia in 1998.
3. I have completed course work in the Geographic Information Systems program (covering GIS Applications I, Cartography and Mapping Fundamentals, Remote Sensing, GIS Professional Development, Multimedia, GPS) at Selkirk College, Castlegar, British Columbia, 2003.
4. I have worked in geological exploration and geoscience as an independent consultant and contractor since 2002.
5. I was in charge of both running and cutting grid lines for the geophysical survey and conducted the geophysical survey in the field.

Dated this 12th day of March, 2014

B. A. Belton


Legend
Rock Sample: 2012
Label: Sample ID
Vegetation Sample: 2012
Label: Sample ID
KTN Claim
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358,000 mE
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360,000 mE
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5,943,000 mN
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E
S
W
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751,282
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SAK12-17
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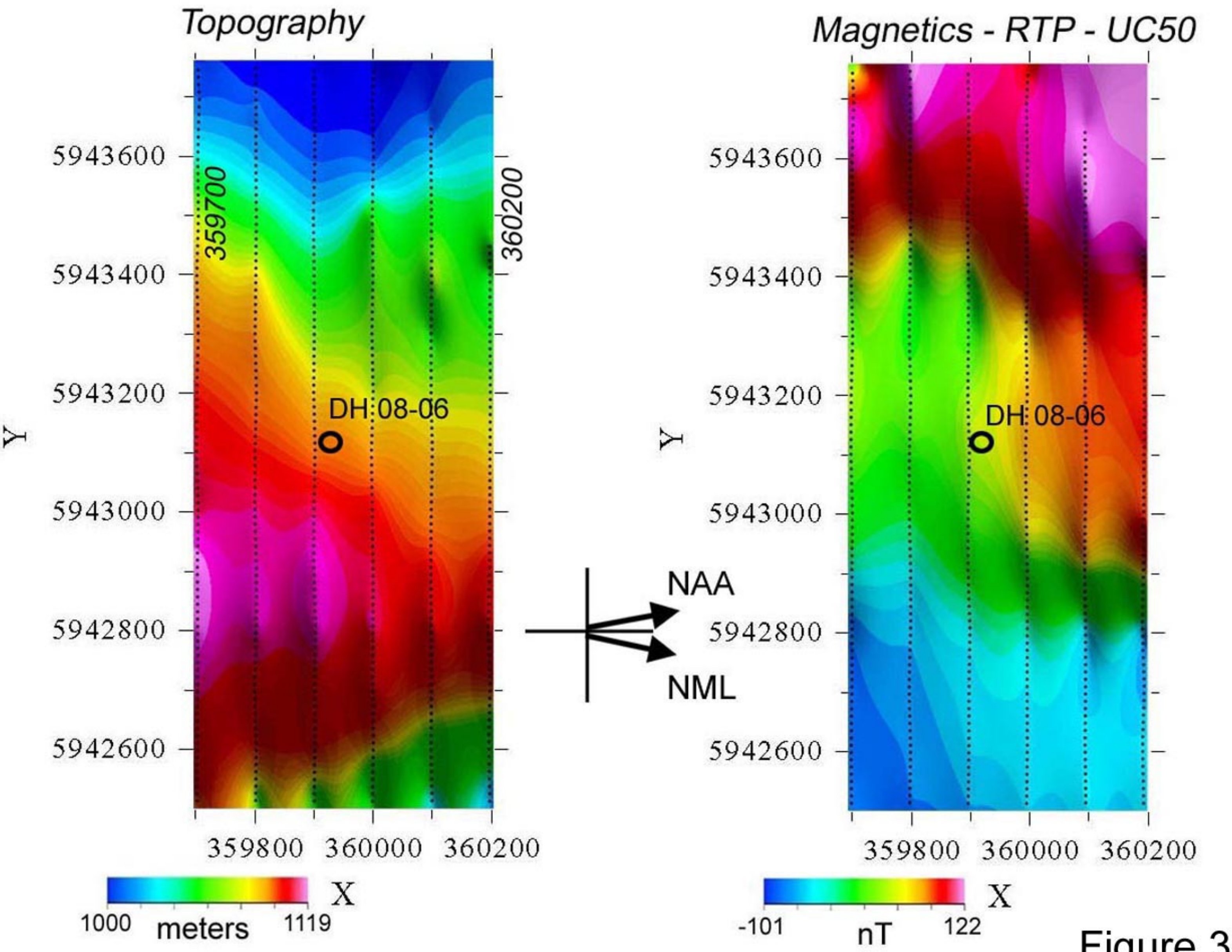
B50
KOOTENAY
SILVER INC.
Bird Property
British Columbia
Rock Sampling
Sample ID
Date: 9/26/2012
Author: Curt Huebert
Office:
Drawing:
Scale: 1:10000
Projection: UTM Zone 10 (NAD 83)
0 125 250 500
metres

Figure 2



Topography
Magnetics - RTP - UC50
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5942600
Y
3597000
360200
DH 08-06
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X
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meters
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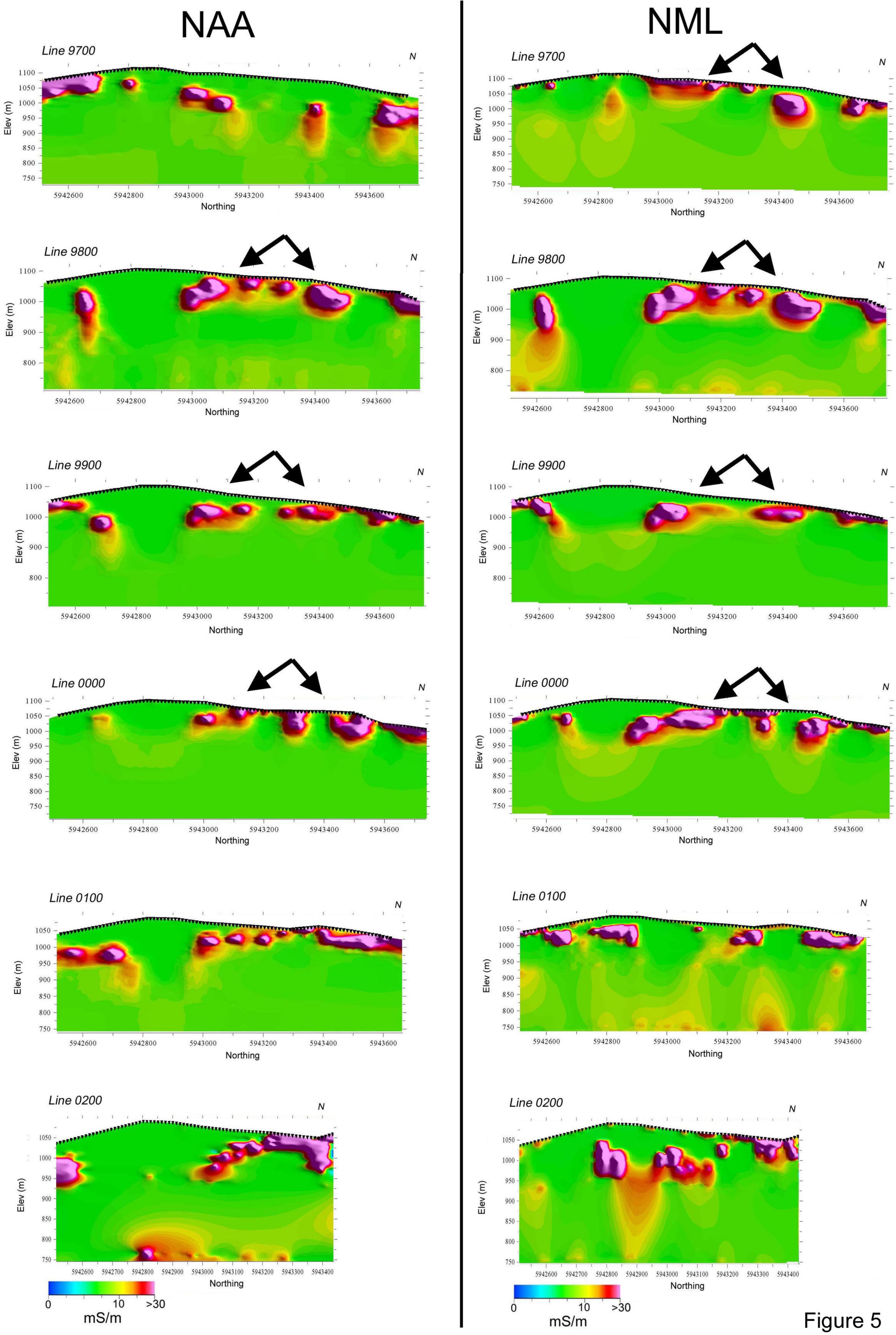
NAA
NML
-101
nT
122

Figure 3



NAA
NML
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Line 9800
Line 9900
Line 0000
Line 0100
Line 0200
N
Elev (m)
Northing
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0
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>30
mS/m

Figure 5

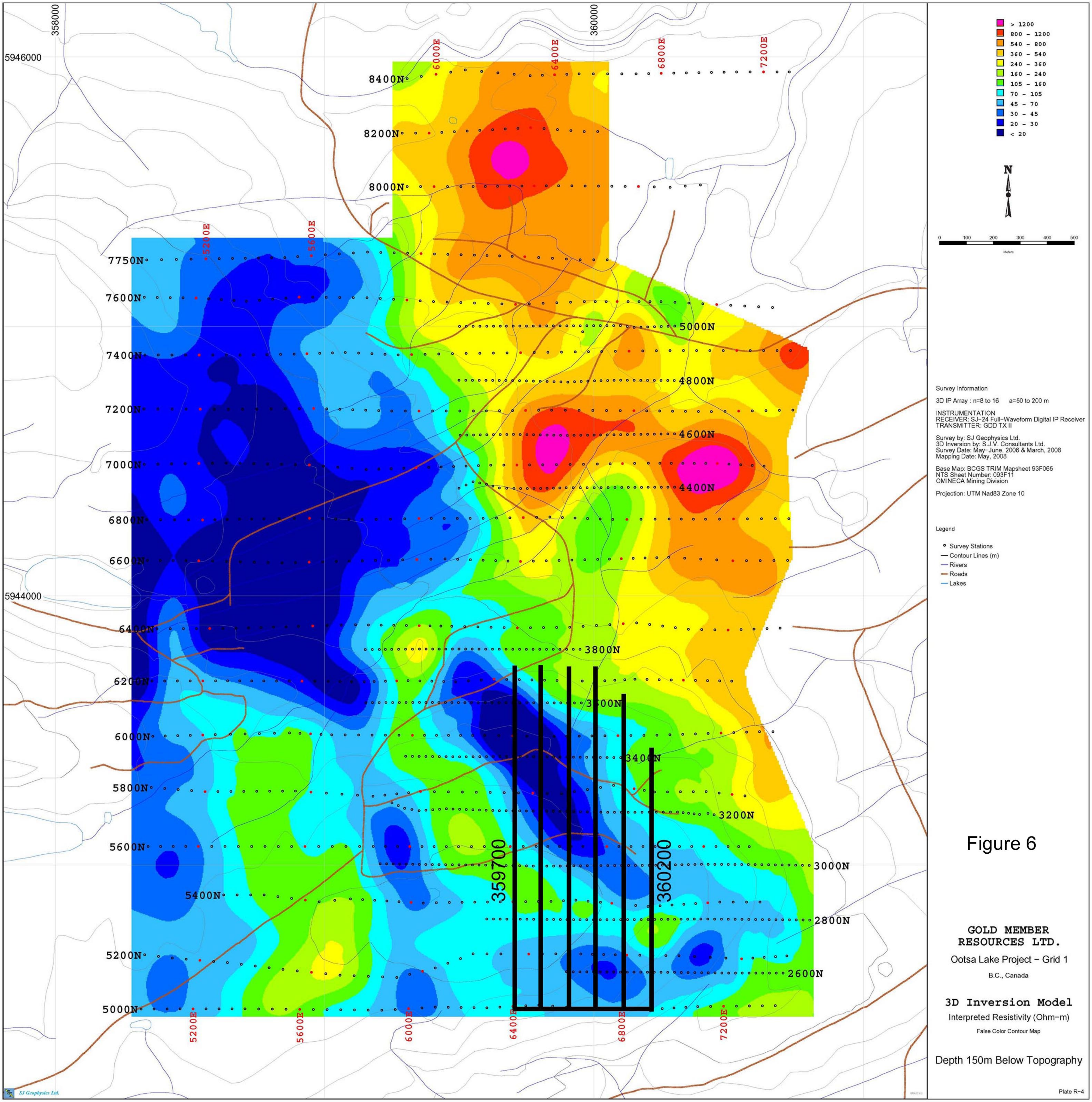


Figure 6

GOLD MEMBER RESOURCES LTD.

Ootsa Lake Project - Grid 1

B.C., Canada

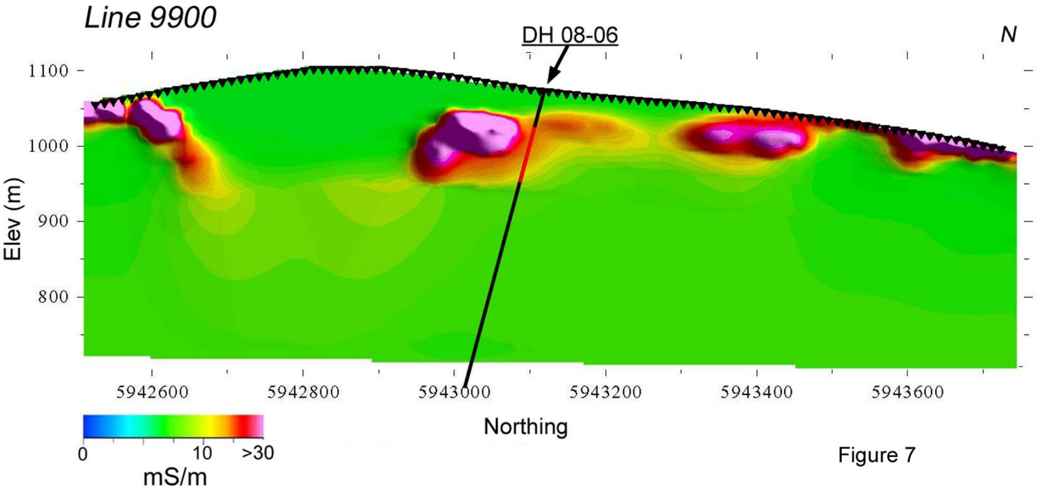
3D Inversion Model

Interpreted Resistivity (Ohm-m)

False Color Contour Map

Depth 150m Below Topography

Plate R-4



Line 9900
DH 08-06
N
1100
1000
900
800
Elev (m)
5942600
5942800
5943000
5943200
5943400
5943600
Northing
0
10
>30
mS/m

Figure 7