

February 14, 2010

EBA File: W23101159.020

Yukon Energy Corporation  
2 Miles Canyon Road  
Whitehorse, Yukon Y1A 6S7

Attention: David Morrison  
President and CEO

**Subject: Exploration of Geothermal Potential at Volcano Mountain – 2009 Geophysics Survey Program**

## 1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) is presently managing a Yukon geothermal exploration program for Yukon Energy Corporation (YEC). The Volcano Mountain area of recent Selkirk volcanics was identified as a favourable target worthy of further evaluation. The Selkirk volcanic unit was deposited 7000 to 8000 years before present. As the youngest volcanic unit in the Yukon, it is possible that magma sources in the area could occur at a relatively shallow depth resulting in an elevated geothermal gradient. This report summarizes the results of the geophysical survey conducted in 2009 to characterize potential geological structures in the area.

Volcano Mountain is located north of Fort Selkirk across the Yukon River, about 30 km west of Pelly Crossing. An all-season road from Pelly Crossing connects with trails that extend into the Volcano Mountain area; however, trails are overgrown and unmanaged and access to the area is mainly by helicopter.

## 2.0 GEOPHYSICS SURVEY PROGRAM

The area geology is dominated by an extensive cover of young volcanic flows that originate from Volcano Mountain, a distinctive cone. Lava flows have masked exposures of pre-eruption bedrock thus limiting surface mapping and understanding of the structural history of the region.

Permits were received from YTG Lands to approve access for the geophysical surveys. A total of 11.5 line kilometres of Horizontal Loop Electromagnetic (HLEM) survey and line cutting was completed from July 6, 2009 to July 15, 2009 by Aurora Geosciences of Whitehorse based at a field camp on Lava Lake (Figure 2). The HELM survey was conducted over three lines oriented about 150° southeast. The survey grid covered an area of about 26 ha on the lower southwest hillslopes of Volcano Mountain.

### 3.0 RESULTS, CONCLUSIONS AND RECOMMENDATIONS

Results from the HELM survey indicate a distinct change in magnetic response forming a linear anomaly sub-perpendicular to the grid lines, suggesting a distinct geological structure oriented about 060° northeast. Detailed results of the HELM survey are appended.

A reconnaissance level assessment of water testing and aerial mapping of potential warm water targets completed in 2008 provided limited and inconclusive results. Further exploration to evaluate geothermal potential in this area will require sub-surface investigation methods to characterize geology and geothermal gradient. Additional geophysical surveys may provide the location of geological structures that could be used to guide further exploration. Geophysical surveys should cover an extensive area, requiring line-cutting through heavy forest and would require considerable effort and financial resources. Evaluation of the geothermal gradient at Volcano Mountain by drilling would provide direct and immediate assessment of the geothermal potential in the area. Drilling a 400 m-deep borehole is recommended as the next step to advance exploration in this area. Improvement of historic trails in the study area that link to an all-season road from Pelly Crossing may allow ground access to the area.

We trust that the foregoing information meets your present requirements. If you have any questions or require further information, please contact the undersigned.

EBA Engineering Consultants Ltd.

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Stephan Klump, Ph.D.  
Hydrogeologist  
phone: 867-668-2071 ext 250  
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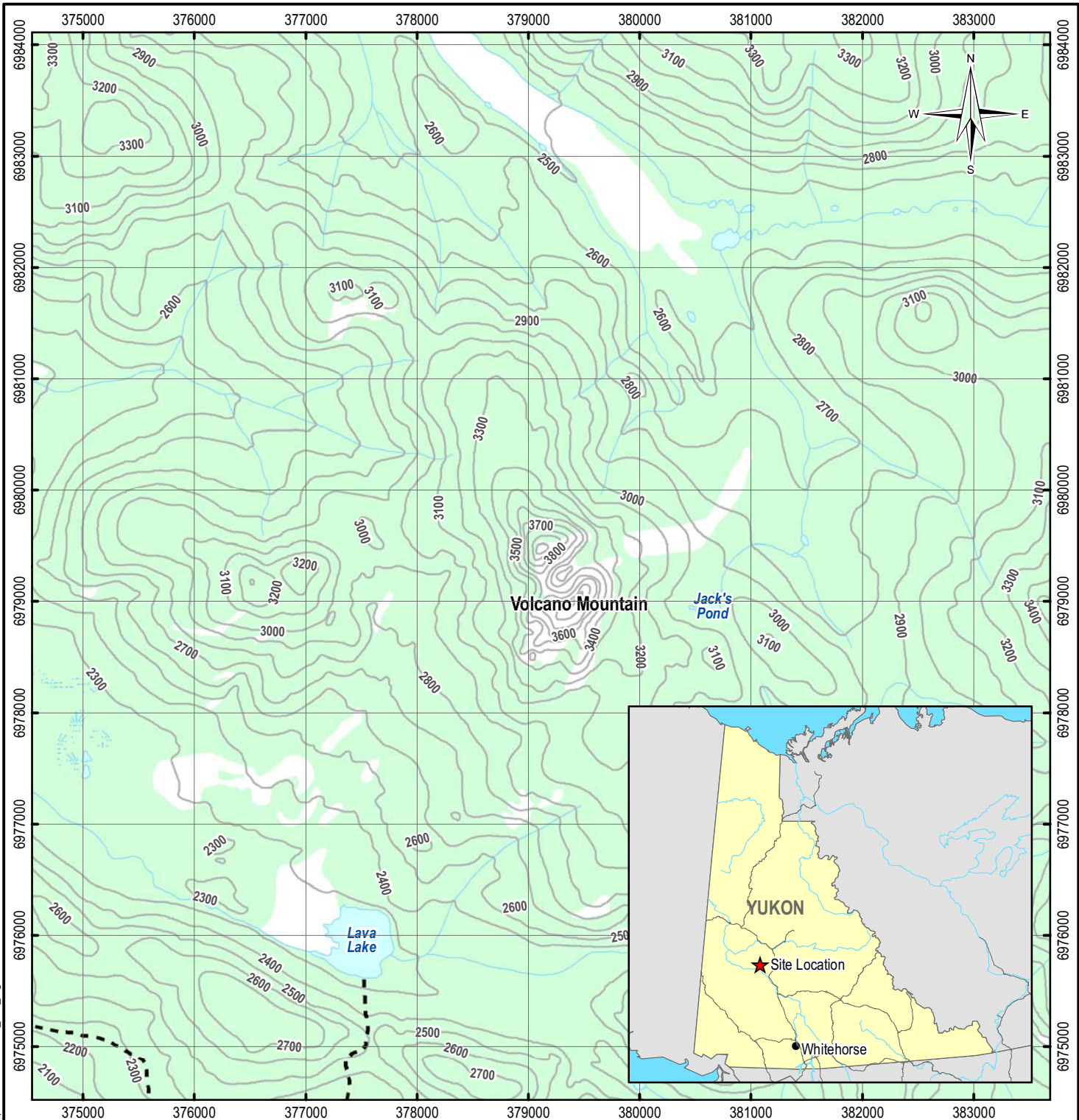
Attachments:

Figures 1 and 2:           Location Map, Site Detail  
Appendix A :             HELM Geophysical Survey



# FIGURES





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**LEGEND**

- Trail
- Contour (100 ft)
- Watercourse
- Waterbody
- Wetland
- Vegetation

**NOTES**

Base data source:  
NTS 1:50,000

**YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM**

**2009 Geophysical Survey  
Volcano Mountain Area**

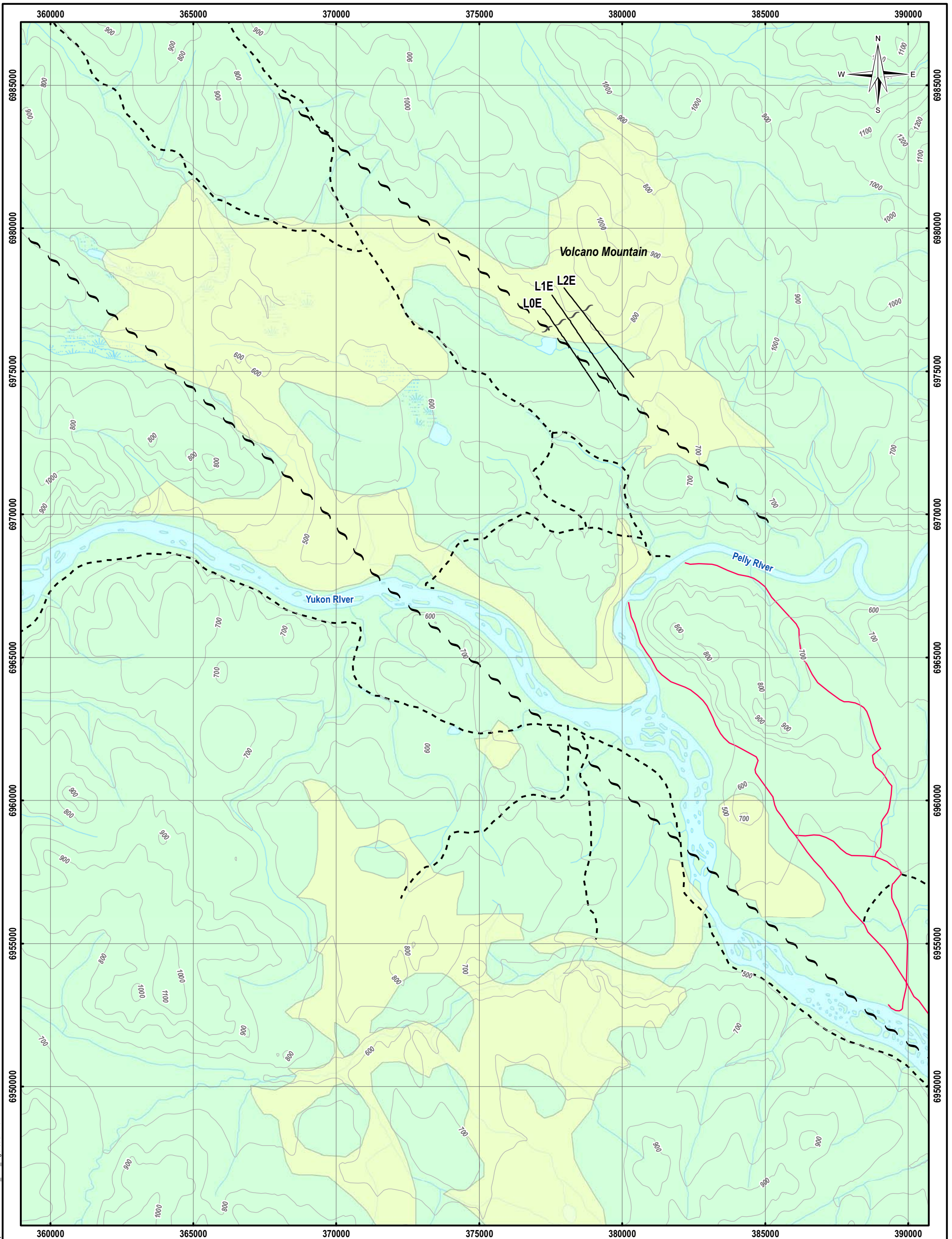
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Scale: 1:50,000			
FILE NO. W23101159_020_Figure01.mxd			
PROJECT NO. W23101159.020	DWN MEZ	CKD JD	REV 0
OFFICE EBA-VANC	DATE April 9, 2010		



EBA Engineering Consultants Ltd.

**Figure 1**

ISSUED FOR USE



**LEGEND**

- Geophysics TMF Survey Grid
- Fault
- Inferred Fault
- Selkirk Volcanics (Modern and Tertiary): basalt and andesite flows, breccias and tuffs
- Contour (100m)
- Limited Use Road
- Trail
- Vegetation
- Watercourse
- Waterbody
- Wetland

**NOTES**  
Base data source: NTDB 1:250,000

**YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM**

**2009 Geophysical Survey  
Volcano Mountain Area**

PROJECTION UTM Zone 8	DATUM NAD83						
Scale: 1:125,000							
FILE NO. W23101159_020_Figure02.mxd	 <b>EBA Engineering Consultants Ltd.</b>						
PROJECT NO. W23101159.020							
OFFICE EBA-VANC	<table border="1"> <tr> <td>DWN MEZ</td> <td>CKD JD</td> <td>REV 0</td> </tr> <tr> <td colspan="2">DATE April 9, 2010</td> <td></td> </tr> </table>	DWN MEZ	CKD JD	REV 0	DATE April 9, 2010		
DWN MEZ	CKD JD	REV 0					
DATE April 9, 2010							

**Figure 2**

**ISSUED FOR USE**

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# APPENDIX

APPENDIX A \*



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## MEMORANDUM

**To:** Jack Dennett  
EBA Engineering Consultants Ltd. **Date:** July 17, 2009

**From:** Shawn Walker

**Re:** Volcano Mountain, 2009 Line cutting & HLEM Survey – Field Report

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This memorandum is a field report describing the line cutting and a horizontal loop electromagnetic (HLEM) surveys conducted at the Volcano Mountain property, Dawson Mining District, Yukon Territory. All operations were conducted from the Aurora fly in camp located at 377779E, 6976169N. The line cutting was performed from July 6<sup>th</sup>, 2009 to July 14<sup>th</sup>, 2009. The HLEM survey was conducted from July 12<sup>th</sup>, 2009 to July 15<sup>th</sup>, 2009. In all, 11.48 line kilometres of HLEM were surveyed using 100m coil separation with 20m station separation. A full survey log has been appended to this report.

**a. Crew and equipment.**

The line cutting was conducted by the following personnel:

Warren Kapaniuk	Crew Chief	July 6 – July 10, 2009
Steve Kramar	Crew Chief	July 6 – July 11, 2009
Tim Stewart	Line cutter	July 6 – July 15, 2009
Bruce Germain	Line cutter	July 10 – July 13, 2009
Clint Brickner	Helper	July 6 – July 10, 2009
Earl Zimmer	Helper	July 6 – July 13, 2009
JP Lemire	Helper	July 6 – July 15, 2009
Ben Power	Helper	July 10 – July 13, 2009

The HLEM survey was conducted by the following personnel:

Steve Kramar	Crew Chief	July 12 – July 15, 2009
Earl Zimmer	Helper	July 12, 2009
Tim Stewart	Helper	July 13, 2009
Ben Power	Helper	July 14 – July 15, 2009

The line cutting crews were equipped the following equipment:

Line cutting:	4 – Chainsaws with tools and spare parts
	4 – Brush Axes
	4 – Hip Chains
	PPE for 3 cutters and 3 brushers
	3 – GPS receivers
	4 – compasses
Other:	1 – 6 Man Summer Camp
	1 – Standard office box
	1 – Iridium Satellite Phone
	1 – Firearm

The HLEM survey crew was equipped with the following instruments and equipment:

HLEM System:	1 – Apex Maxmin I-9 S/N:6317
	1 – Apex Maxmin computer S/N:104
	1 – 100m Maxmin cable
	1 – Clinometer
Other:	1 - Pentium 4 lap top computer
	1 - Iridium Satellite Phone
	1 – Firearm
	1 – Geophysical repair toolbox
Software:	MMCDUMP (Apex Parametrics Software)
	MMCREf (Apex)
	MMCFIX1 (Apex)
	MMCPRO87 (Apex)
	Geosoft Oasis Montaj 7.1
	Microsoft Excel

## **b. Grid.**

The Grid consisted of three lines approximately 500m apart oriented at 148 degrees from true north. Line 0 was 3.5 km long, line 1 was 4 km long and line 2 was 4 km long. The location of the starting points of the lines are at 377225E 6977224N, 377543E 6977659N, and 377967E 6977924N respectively, all using a datum of NAD 83, projection of UTM Z8N.

## **c. Survey specifications.**

The HLEM survey was conducted according to the following specifications

Survey geometry:	100 metre coil separation with 20 metre station spacing
HLEM Frequencies:	14080 Hz, 3520 Hz, 880 Hz & 220 Hz.
Terrain Slopes:	Recorded in percent.
Terrain Corrections:	Coils held at the indicated slope for coplanar coils. Short chaining errors caused by rough topography (such as steep slopes) were corrected for using the slope chaining method with Apex parametrics software MMCFIX1.

## **d. Data processing.**

The HLEM data was dumped in its raw form from the instrument using Apex Parametrics software MMCDUMP. Short coil spacing errors were corrected using the Apex software MMCFIX1. Data was exported to an ASCII format using MMCPRO87, and plotted using Geosoft Oasis software.

## **e. Products.**

The following data files are appended to the digital version of this report

Raw	Folder with all the unedited daily HLEM instrument and GPS dump files.
Data	HLEM processed data in Geosoft database format (*.gdb) and ASCII (*.xyz).
Figures	<b>1:10000</b> scale images of the stacked HLEM profiles.

EBA-9538-YT, Volcano  
Mountain LC & HLEM  
2009 – survey log.pdf

PDF copy of the field survey log.

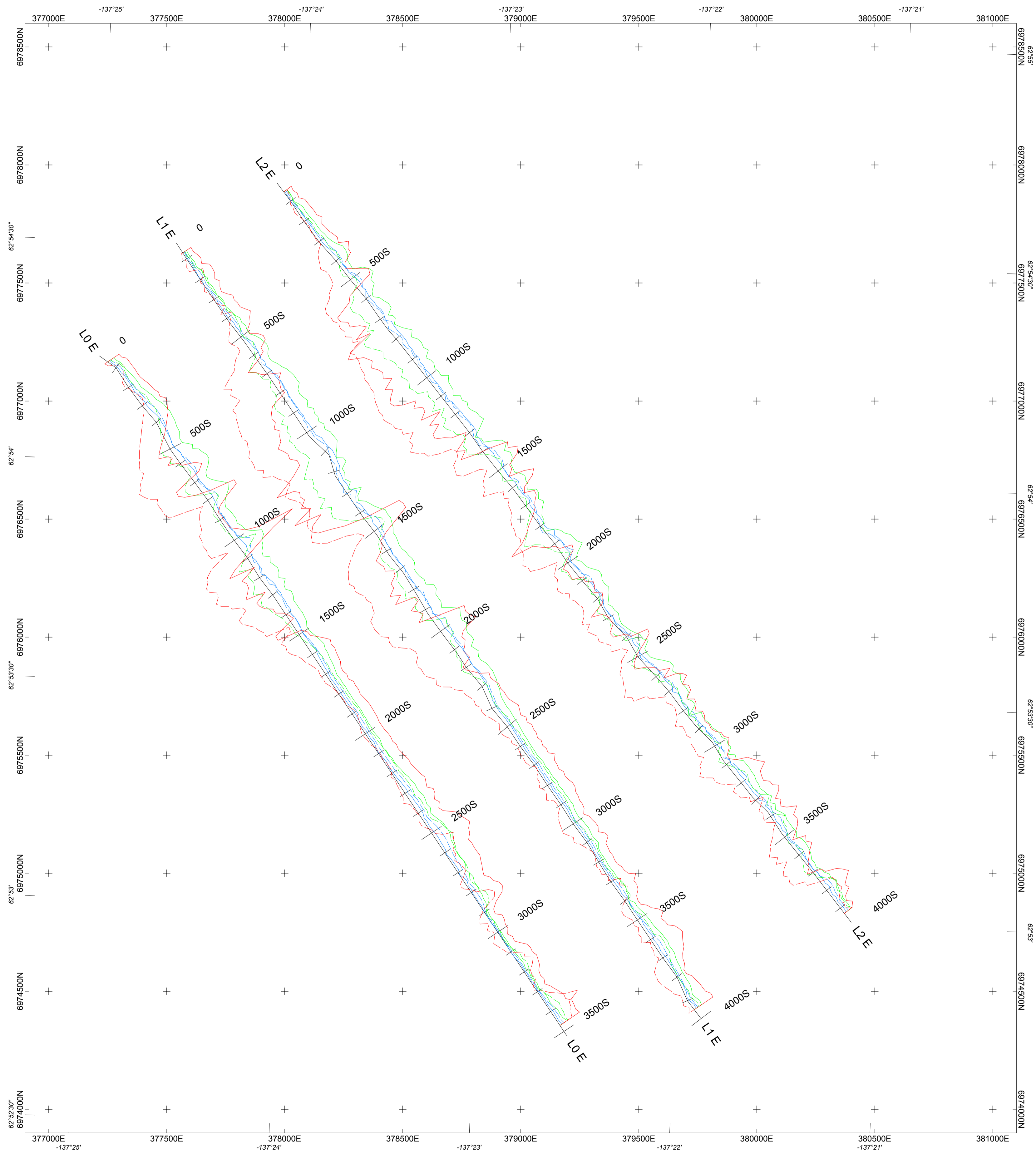
EBA-9538-YT, Volcano  
Mountain LC & HLEM  
2009 – Field Report.pdf

PDF copy of this preliminary field report.



Respectfully submitted,  
**AURORA GEOSCIENCES LTD.**

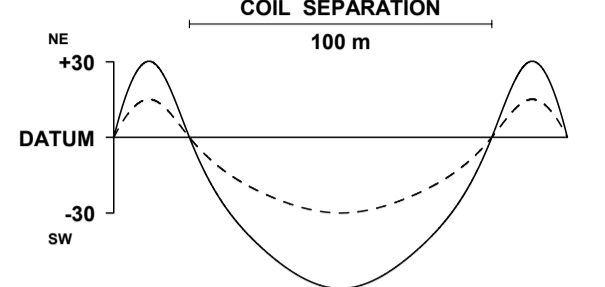
Shawn Walker  
Geophysicist

**FIELD**









### LEGEND HORIZONTAL LOOP EM

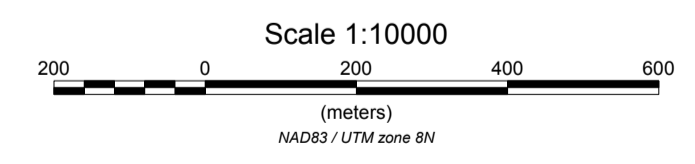
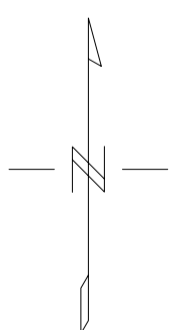
INSTRUMENT : APEX PARAMETRICS MAX-MIN I-9  
 PROFILE SCALE : 1 cm = 30%  
 IN PHASE :   
 QUADRATURE : 



IN-PHASE DATUM : 0%  
 QUADRATURE DATUM : 0%  
 DATA FILE : EBA-9538-YT.gdb  
 OPERATORS : SK, EZ, BP, TS  
 STATION SEPARATION : 20m  
 LINE-KM SURVEYED THIS SHEET : 11.48 km

Right of Line = Positive  
 All Frequencies have the 220Hz IP response removed from the In-Phase

- 880Hz In-Phase 
- 880Hz Quadrature 
- 3520Hz In-Phase 
- 3520Hz Quadrature 
- 14kHz In-Phase 
- 14kHz Quadrature 



**EBA Engineering Consultants Ltd.**

**VOLCANO MOUNTAIN HLEM**  
**100m COIL SEPARATION**  
**HLEM IN-PHASE & QUADRATURE PROFILES**

Dawson Mining District, Yukon Territory NTS: 115I/14  
 Datum: NAD 83 Proj: UTM Zone 8N  
 Date: July 20, 2009 Job#: EBA-9538-YT  
 Dates surveyed: July 12 - 15, 2009 Drawn by: SW

**AURORA GEOSCIENCES LTD.**