Downhole Electromagnetic Survey – Kudz Ze Kayah

105G/07 Yukon, Canada

WORK PERFORMED:
June 28 – September 28, 2016

Prepared for:

BMC Minerals Ltd.

Prepared by:

AURORA GEOSCIENCES

Field Report
BHEM at Kudz Ze Kayah

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Contents

1 SUMMARY

This report describes the borehole electromagnetic survey (BHEM) conducted for BMC Minerals Ltd. on the Kudz Ze Kayah property, Yukon to assist in locating VMS ore deposits in the near proximity of select diamond drill holes.

The project consisted of 11 BHEM surveys, using 4 transmitter loops on 11 individual drill holes. The majority of drill holes were concentrated in one area allowing them to be surveyed using the Sebesi loop that was set up on the first day of the project. Surveys on holes K16-406, K16-409 and K16-415 each required a new transmitter loop to be built for single-survey use. Most of the drill holes were surveyed through the drill string as the diamond drill crew pulled rods to ensure that the hole did not collapse before the survey could be completed. The crew was prepared for open-hole surveying using a hand-winch but used it only once, on hole K16-369.

Aurora Geosciences completed the work in 5 separate deployments: June 28- July 7, July 29 - August 12, September 2-5, September 16-18 and September26-28. Transportation to the site from Whitehorse was by truck or, when timing allowed, on board scheduled chartered flights. The crew stayed on site in accommodations provided by BMC. The survey drill holes and loops were accessed by truck, all-terrain vehicle or helicopter depending on the proximity of the loops and the survey holes to the access road. The transmitter loops were tested and repaired as required prior to each hole being surveyed. A crew log describing daily operations and production is included with this report.

2 CREW AND EQUIPMENT

Typical surveys were conducted with one Aurora Geosciences technician with help from the drill crew on site. The first deployment had three people on site, including a consultant from the BHEM instrument (Volterra) supplier, allowing multiple people to familiarize themselves with the equipment.

Additional support was provided periodically by BMC and Equity Exploration staff to help set-up, maintain and tear down the transmitter loops.

The following personnel conducted the survey:

Dave Hildes	Senior Geophysicist	June 28- July 5, 2016
Shawn Scott	Geophysical Technician	June 28 – September 28, 2016
Ross Polutnik	Volterra Consultant	June 28- July 5, 2016

Wire intended for use in transmitter loops was shipped to site via Small's Expediting before the project began, all remaining instruments and equipment were brought in by flatbed truck with the first crew rotation. All Volterra related equipment was packed and returned to Whitehorse between rotations in order to qualify for standby rates as per Aurora Geoscience's agreement with the instrument supplier. All other gear was left on-site between rotations.

The crew was equipped with the following instruments and equipment

Volterra BHEM:	1	-	Borehole dabtube s/n 8063 & 8064 (June and July), 8061&8062 (August and September)
	1	-	Borehole magnetometer sensor (s/n 006)
	1	-	Borehole b-field coil sensor (s/n 004)
	2	-	Borehole battery pack (s/n 004 & 006)
	10	-	Extension rods
	2	-	Tablets with Volterra Monitor and EM Timer software (s/n 007 & 029)
	1	-	Asus Laptop with Volterra CSPROC software
	1	-	Zonge coil
	1	-	Volterra transmitter assembly
	3	-	Dabtubes (s/n 8033, 8049, 8057)
	1	-	Toroid current monitor
	1	-	Downhole winch and cable
	1	-	Downhole cable counter
	2	-	Volterra battery chargers
Other Equipment:	1	-	Flatbed truck (depending on rotation)
	1	-	Laptop with Geosoft
	2	-	Honda 2Kw Generators
	1	-	20L gas can
	12	-	Large spools of 10 – 14 gauge wire
	2	-	Backpack wire reel
	1	-	Iridium Satellite Phone
	3	-	Bear spray and bear bangers
	2	-	Handheld Garmin GPS
	1	-	Geonics ProTem Transmitter (back-up)
	1	-	AGL standard Office Box

3 SURVEY LOCATION

The drill holes and BHEM parameters are described in Table 1. Figure 1 is a map showing the drill holes and loop locations. The transmitter loops were located so that the surveyed drill holes were inside the loop and positioned to have good coupling with expected conductor geometry. All loops were slightly modified on the ground to account for waterways, wetlands and other obstacles. All loop modifications were tracked by the operator as they were laid out. Coordinates in this report are in the NAD 83 datum, UTM Zone 9N projection, elevations are height above ellipsoid.

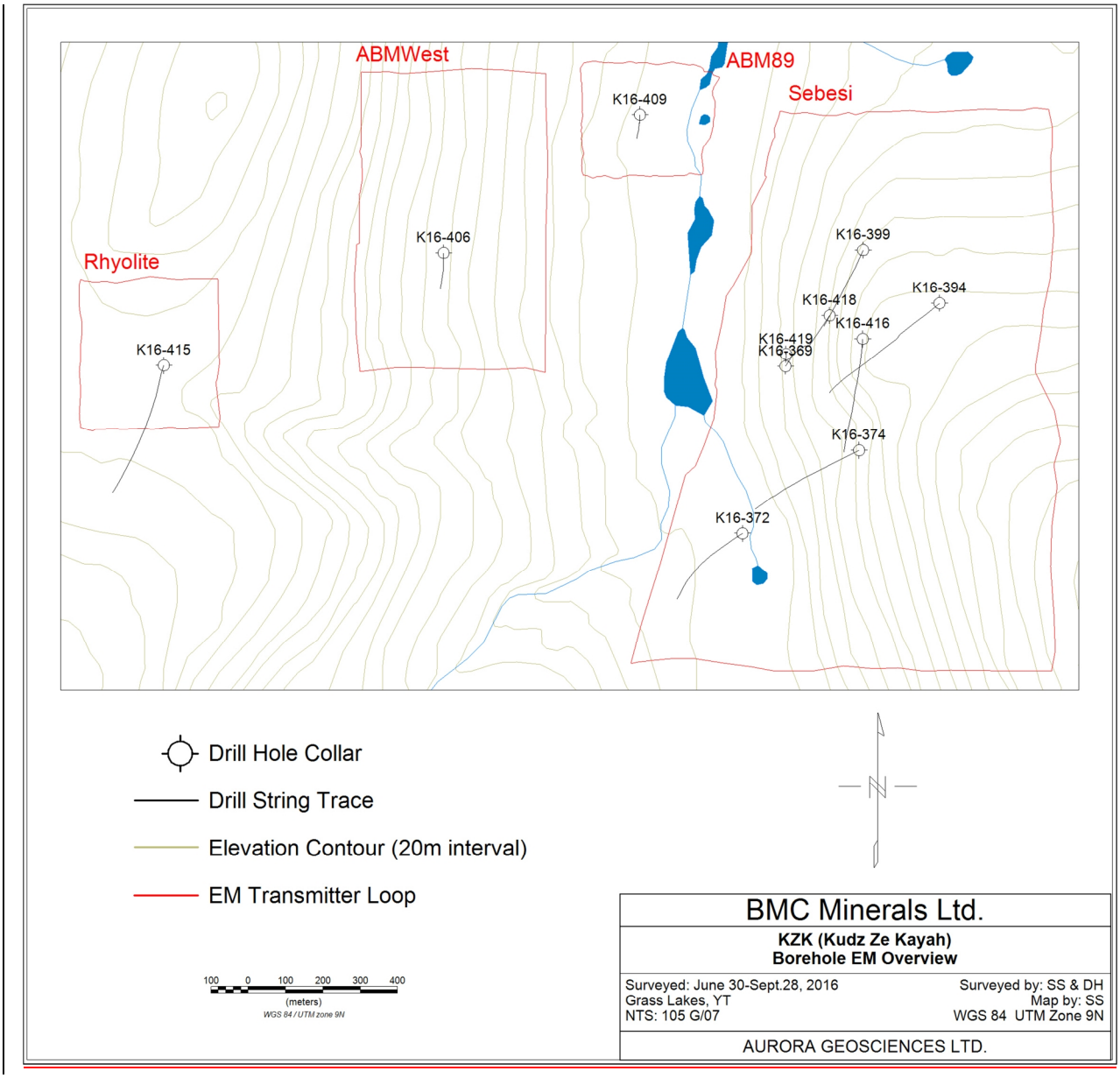

Figure 1: Drill hole and loop locations.

Table 1: Summary of surveys performed.

DDH-ID	UTM Z9N	Az.	Dip	Depth	Readings	Loop used	Date surveyed
K16-369	415239, 6815212	31˚	-72˚	450 m	57	Sebesi	June 30, 2016
K16-372	415140, 6814775	240˚	-60˚	600 m	75	Sebesi	July 2, 2016

K16-374	415540, 6814995	245˚	-60˚	800 m	73	Sebesi	July 6, 2016
K16-406	414325, 6815522	180˚	-70˚	300 m	43	ABMWest	July 29, 2016
K16-399	415450, 6815529	205˚	-76˚	800 m	88	Sebesi	August 2, 2016
K16-409	414851, 6815891	180˚	-80˚	300 m	47	ABM89	August 6, 2016
K16-394	415655, 6815385	233˚	-65˚	860 m	80	Sebesi	August 11, 2016
K16-415	413579, 6815228	195˚	-60˚	855 m	77	Rhyolite	September 4, 2016
K16-416	415448, 6815293	184˚	-68˚	835 m	72	Sebesi	September 17, 2016
K16-418	415362, 6815355	214˚	-77˚	476 m	52	Sebesi	September 29, 2016
K16-419	415242, 6815246	6˚	-87˚	510 m	51	Sebesi	September 28, 2016

4 SURVEY SPECIFICATIONS

Station depth was determined by the length of the drill string, or when necessary by the winch counter. Depths were adjusted to reflect a depth of 0 m when the middle of the Volterra tool was at the top of the drill hole collar. Coordinates of the drill hole collars were supplied by Equity Exploration. Station spacing was set at 5 m for the single open-hole surveys using the winch. Discrepancies between the winch counter and the hole depth supplied by geologists appear to indicate poor calibration of the counter and as a result the final data the assumes a station spacing of 4.6 m. Station spacing for through-the-bit surveys were set at 6 m to account for the intervals available with 3 m drill rods; larger station spacing was used in low-priority parts of the hole to expedite the survey.

The survey was performed with the following specifications:

Geographic datum & projection:	NAD83(CSRS) datum, UTM Zone 9N projection
Elevation datum:	Height Above Ellipsoid

Station locations:	6 m, 9 m, 12 m or 15 m (tailored to the targets set by geologists) when surveying through the bit, 5 m intervals when using the winch counter.
Frequency:	5.00 Hz
Waveform:	100% duty cycle square wave
Components:	A (axial, down hole), U (transverse to axial, in the vertical plane containing the drill hole), V (transverse to axial, in the horizontal plane containing the drill hole), B-field coil (axial, down hole)
Reading length:	Readings were recorded for 120 seconds following a 20 second settling period at each station.
Synchronisation:	Transmitter and receiver were synchronized via GPS immediately prior to and following the survey.
Sample rate:	32 kHz
Channels:	20 Channels. Channel 20 is early time and channel 1 is late time as detailed in Table 2.

Table 2: Channel times in milliseconds.

Channel	Start (ms)	End (ms)	Width (ms)
20	0.097656	0.138107	0.040451
19	0.138107	0.195313	0.057206
18	0.195313	0.276214	0.080901
17	0.276214	0.390625	0.114411
16	0.390625	0.552428	0.161802
15	0.552428	0.781251	0.228823
14	0.781251	1.104855	0.323605
13	1.104855	1.562501	0.457646
12	1.562501	2.209710	0.647209
11	2.209710	3.125002	0.915292
10	3.125002	4.419420	1.294418
9	4.419420	6.250004	1.830584
8	6.250004	8.838841	2.588837
7	8.838841	12.50001	3.661168
6	12.500009	17.67768	5.177673
5	17.677682	25.00002	7.322336
4	25.000018	35.35536	10.35535
3	35.355364	50.00004	14.64467
2	50.000035	70.71073	20.71069
1	70.710728	99.75599	29.04527

5 DATA COLLECTION

Data was collected over the course of 5 site visits. One hole (K16-369) was surveyed with a hand-cranked winch, all others were surveyed in the presence of a diamond drill through the drill string. When surveying at the drill, 5 drill rods were removed leaving a 15 m gap at the bottom of the hole. The instrument and extension rods were assembled into 3 sets and combined and attached to the latch head as they were lowered into the hole. The full assembly was lowered down the hole using the drill's wire line and released when the latch head was sitting in the landing ring of the core barrel.

The full assembly hung through the core barrel and the bit, extending 9 m from the brill bit to the bottom of the instrument. The elevation of the instrument was considered to be the bit depth plus 7 m, approximately the centre of the instrument. The readings were conducted 20 seconds after the drill crew finished removing rods and had shut down the drill. Readings were at least 120 seconds in length. During the initial survey on the first hole, reading length was set at 270 seconds, allowing the data to be reprocessed using various reading lengths. After several tests it was decided that 120 seconds provided an adequate signal to noise ratio while still allowing a high volume of readings to be recorded on a single battery charge. Station spacings were in multiples of 3 m to account for drill rod length and actual station spacing varied between 6 m and 15 m. High and low priority targets were detailed by Equity or BMC geologists ahead of time and the survey was tailored to best accommodate these targets without fully exhausting the battery life of the instrument.

Instrument failure was responsible for partial loss of data in several instances. On hole K16-406, B-field coil data was properly recorded but all flux-magnetometer data was unrecoverable. This issue could not be resolved in the field and resulted in the instrument being replaced by the supplier on August 2. Toroid data was lost on several occasions: a battery failure caused irregular waveforms to be recorded on holes K16-409 and K16-394 and a corrupt file meant that no toroid data was collected on hole K16-419. In all cases, data collection from a back-up current monitor allowed the timing of the transmitter signal to be faithfully recorded resulting in good quality raw data. The raw data could then be properly aligned and normalized but not deconvolved.

6 DATA PROCESSING

The BHEM data were downloaded from the Volterra receiver dabtubes and from the current monitor dabtubes and reading timing files were downloaded from tablets running Volterra EM Timer software. Loop files were created using waypoints from hand-held Garmin GPS units, hole location files were created from files given by Equity Exploration geologists. All data were imported into Csproc software where all location data was visually inspected and any timing errors were identified and adjusted manually.

All plots were made using TEMplot software. On the plots channel 01 is presented as the HSensor value (measured primary field, in pT) subtracted from the channel 01 values (last time channel, in pT).

Channels 02 through 20 use channel 01 as a reference and are plotted as point normalized to channel 1 (channel X – channel 01 in pT).

Final data is presented in three formats: user-aligned, normalized and deconvolved. User-aligned data is raw data where receiver and transmitter timing has been verified and adjusted by a technician. Normalized data is user-aligned data that has been adjusted to account for the measured transmitter current. Deconvolved data is normalized data that has been adjusted to account for the measured transmitter waveform.

7 PRODUCTS

The following are attached to the digital version of this report:

Folder	File Name	Description of Contents
Documents\	*KZK 2016 BHEM Crew Log.pdf*	Production summary, daily log and personnel tracking sheet in PDF format.
Documents\	*KZK 2016 BHEM Report.pdf*	A copy of this report in PDF format.
Documents\	*KZK 2016 BHEM Map.pdf*	Map showing drill hole and loop locations.
Final Data\K16-*\Use Aligned\	K16-*A.*tem* K16-*U.*tem* K16-*V.*tem* K16-*Coil.*tem*	Processed final databases in ASCII format.
Final Data\K16-*\Normalize\	K16-*A.*tem* K16-*U.*tem* K16-*V.*tem* K16-*Coil.*tem*	Processed final databases in ASCII format.
Final Data\K16-*\Deconvolve\	K16-*A.*tem* K16-*U.*tem* K16-*V.*tem*	Processed final databases in ASCII format.

	K16-*Coil.*tem*	
Final Data\	*Channels.txt*	Describes the data channels
Loops\	*Rhyolite.csv*	Coordinates of loop corners in NAD83 datum, UTM Zone 9N projection with height above ellipsoid elevations.
	Sebesi.csv	
	ABMWest.csv	
	ABM89.csv	
Profile Plots\K16-*\Use Aligned\	K16-*A.*png*	BHEM data profiles in .png format.
	K16-*U.*png*	
	K16-*V.*png*	
	K16-*Coil.*png*	
Profile Plots\K16-*\Normalize\	K16-*A.*png*	BHEM data profiles in .png format.
	K16-*U.*png*	
	K16-*V.*png*	
	K16-*Coil.*png*	
Profile Plots\K16-*\Deconvolve\	K16-*A.*png*	BHEM data profiles in .png format.
	K16-*U.*png*	
	K16-*V.*png*	
	K16-*Coil.*png*	

Respectfully submitted,

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