APPENDIX VIII

MAGNETIC AND VERY LOW FREQUENCY ELECTROMAGNETIC SURVEY ON THE KLAZA PROJECT: PREPARED BY SJ GEOPHYSICS

Logistics Report Prepared

for

Rockhaven Resources Ltd.

Magnetic and

Very Low Frequency Electromagnetic Survey

on the

Klaza Project

Carmacks, Yukon, Canada
Latitude: N62° 05'   Longitude: W137° 14'
Whitehorse Mining District

Survey conducted by SJ Geophysics Ltd.
August 08 – September 02, 2017

SJ GEOPHYSICS
ACQUISITION ▪ Science on Target

Report prepared by
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1. Survey Summary

SJ Geophysics Ltd. was contracted by Rockhaven Resources Ltd. to acquire magnetic and Very Low Frequency (Mag-VLF) data on their Klaza Project. The project consisted of two grids, Rusk and Val. The following table provides a brief summary of the project.

Client	Rockhaven Resources Ltd.
Project Name	Klaza Project
Location (approx. centre of grid)	Latitude: 62º 05' N Longitude: 137º 14' W 6885450N 383350E; UTM NAD83 Zone 8
Survey Type	Magnetic and Very Low Frequency (VLF)
Total Line Kilometres	~103 km
Production Dates	August 08 to September 02, 2017
Objective	SJ Geophysics was contracted to carry out magnetic and very low frequency (VLF) surveys with the purpose of identifying northwest - southeast trending magnetic and conductive features.

Table 1: Survey Summary

The Klaza Project is located approximately 50 km due west of the town of Carmacks in southwestern Yukon, Canada. Situated in the southern portion of the Dawson Range,within the Mount Nansen Gold Camp, the property hosts gold-silver mineralization associated with an extensive system of subparallel vein and breccia zones.

The Rusk grid extended a 2014 Mag-VLF survey to the south, while the Val rid was situated approximately six kilometres to the east of Rusk. The survey is intended to delineate linear magnetic lows and VLF-EM conductors that coincide with known mineralized zones. Northerly trending breaks in the VLF-EM conductors correspond to known or suspected cross-faults.

This logistics report summarizes the operational aspects and methodologies of the geophysical survey. This report does not discuss or interpret the survey results.

2. Location and Access

The Klaza project is located in the Yukon Territory (Figure 1) and is situated in the southern portion of the Dawson Range.

Figure 1: Overview map of the Klaza Project

Access is from Carmacks, a town approximately 50 km due east of project. From Carmacks, the property is reached by driving along the Mt. Nansen Mine road for approximately 70 km before arriving at the Klaza property. A map illustrating the project area along with road access is shown in Figure 2.

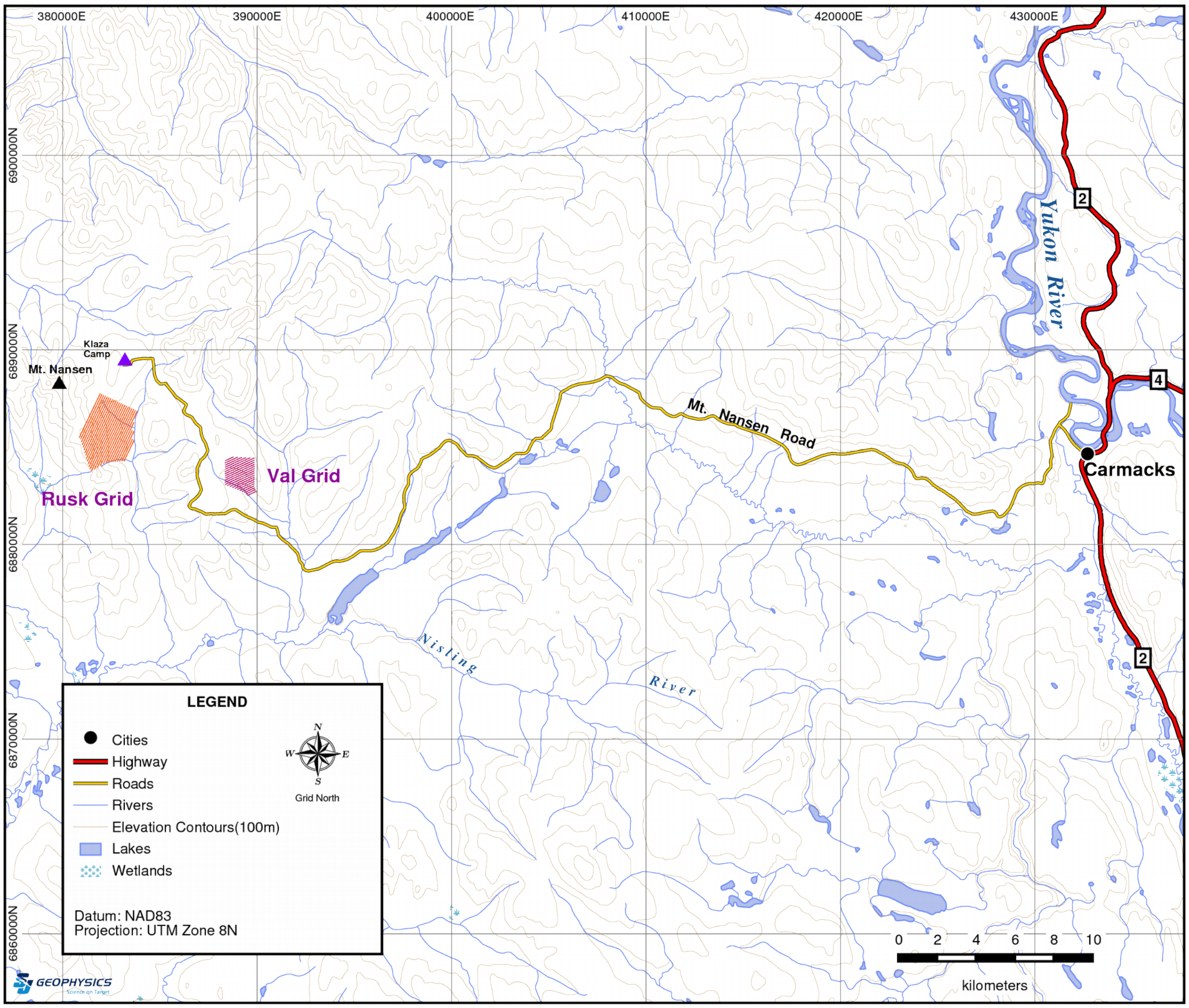

Figure 2: Location map for the Klaza project showing towns and road access.

Lying just four degrees south of the Arctic Circle, the region surrounding Carmacks, Yukon experiences drastic seasonal changes in hours of daylight throughout the year. Annual average temperatures see the daily mean below 0˚C for the majority of the year. However, the summer months can see daily highs above 30˚C. Most of the modest annual precipitation falls during the months of June, July, and August. Generally gentle slopes make for a rolling, mountainous landscape. Flora near the survey area is comprised mainly of low, tough buck brush and thick, soft mosses. There are some pockets of black spruce.

Many species of waterfowl can be observed in the region along with numerous species of other birds, notably large ravens and hawks. Larger mammals include elk, black bears and grizzly bears. There is a wide variety of smaller animals as well; some examples are squirrels, gophers, porcupines and foxes.

3. Grid Information

Grid	Rusk
Number of Survey Lines	27
Survey kilometres (km)	77.5
Survey Line Azimuth	25.5º
Line Spacing (m)	100
Station Spacing (m)	12.5

Table 2: Grid parameters

Grid	Val
Number of Survey Lines	22
Survey kilometres (km)	25.5
Survey Line Azimuth	65º
Line Spacing (m)	100
Station Spacing (m)	12.5

Table 3: Grid parameters

The Klaza project consisted of 49 survey lines, spaced at 100 m. The terrain varied over the grid, mostly consisting of gently rollings hills, except for a mountainous section in the southwest portion of the Rusk grid. Based on the expected easy terrain, it was elected not to prepare the grid with cut lines or marked stations. The geophysical crew occupied pre-planned 12.5 m stations by navigating to way points uploaded to handheld GPS units. The surveyed grids are presented in Figure 3 and Figure 4. A detailed breakdown of the survey line lengths is located in Appendix A.

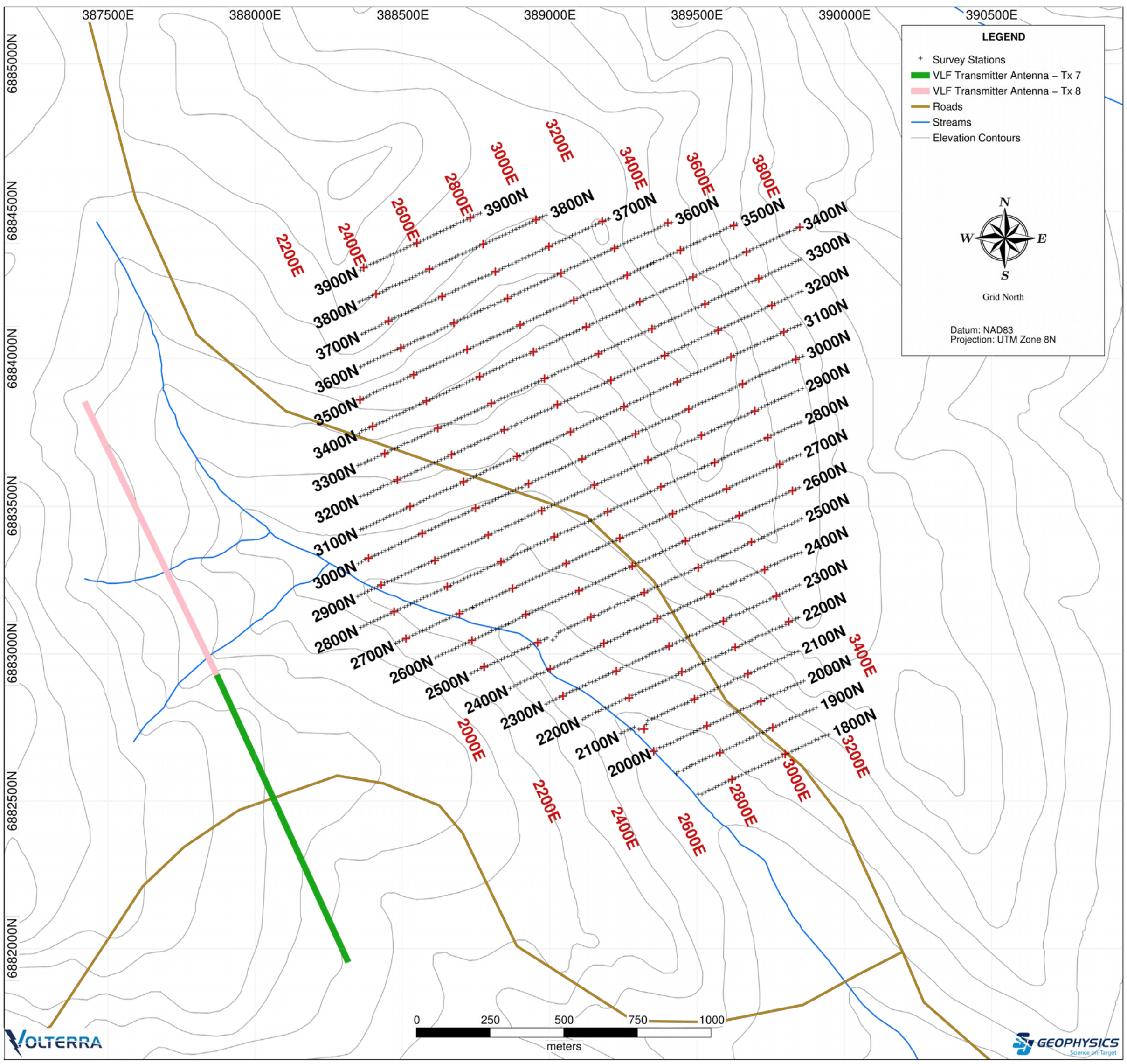

Figure 3: Grid Map showing the survey area for the Val grid.

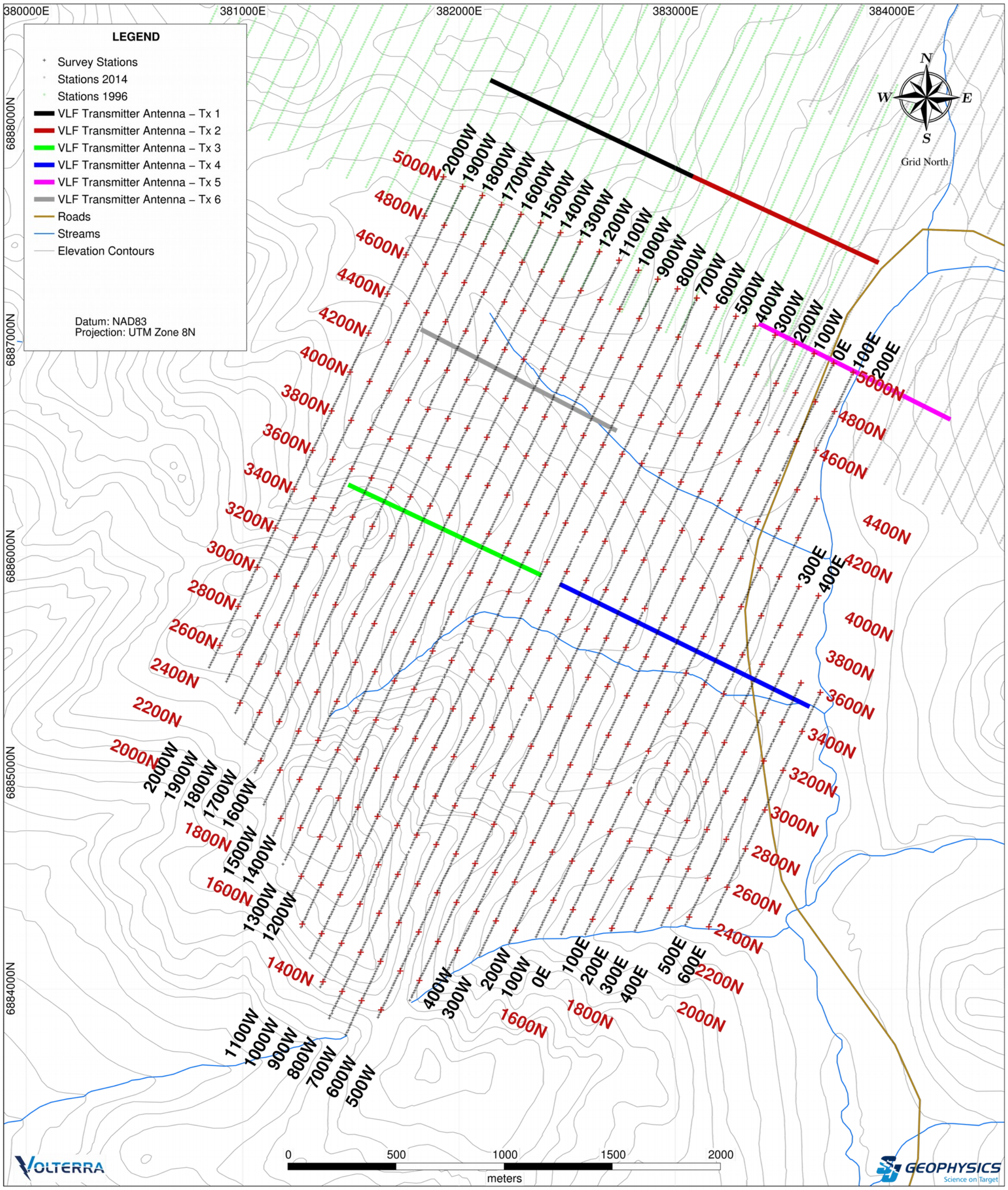

Figure 4: Grid Map showing the survey area for the Rusk grid.

All of the survey location information was recorded with Garmin GPSMAP 64s units and saved in NAD83 UTM Zone 8 coordinate system.

4. Field Work and Instrumentation

4.1. Field Logistics

SJ Geophysics' geophysical crew consisted of two field geophysicists or technicians used to acquire the Mag-VLF survey data. This team oversaw all operational aspects including field logistics, data acquisition and initial field data quality control. Table 3 lists the crew members on this project. A crew rotation occurred during the project to address SJ Geophysics internal staffing requirements.

SJ Geophysics crew's first day on site at the Klaza Project was August 8, 2017 and they remained on site through September 2. Mobilization to the project occurred on August 7 and the morning of August 8 and demobilization from the project site was on the afternoon of September 2 and September 3.

The geophysical crew utilized two Archer, Cathro & Associates (1981) Limited's employees during the course of the survey for a total of 4 man days. These two employees assisted the crew in the deployment of the controlled source VLF antenna.

Crew Member Name	***Role***	***Dates on Survey Site***
Alex Visser	Field Technician	August 08 – August 17, 2017
Santiago Tomassi	Field Technician	August 08 – August 28, 2017
Jay Enns	Field Geophysicist	August 17 – Sept 02, 2017
Jordan Perk	Field Geophysicist	August 28 – Sept 02, 2017

Table 4: Details of the SJ Geophysics crew on site

During the course of the geophysical survey, the SJ Geophysics crew regularly discussed field safety during tailgate meetings at camp. The crew also participated in all camp safety meetings. The safety meetings included a comprehensive review of safe work practices specific to our geophysical surveys and field operations. At the meetings, personnel discussed issues related to: working in bear country, working alone, cold and windy weather, and other safety concerns due to changing weather conditions. Other regular discussion points included efficient organization of daily tasks as well as any work-related questions or concerns.

The SJ Geophysics crew was accommodated by the client at Klaza exploration camp located on the property. The camp had satellite Internet and phone as well as showers and laundry. A camp cook provided excellent food. The geophysical crew were provided a Kubota UTV and a truck for transportation around the survey grid.

There are no ideal VLF stations that had an adequate incident angle and signal strength for the target orientation. Therefore, the geophysical crew deployed their own VLF transmitter just off the survey grid, and was utilized as the primary VLF signal. The transmitting antennae (grounded electric dipole) occasionally required to be moved with the survey to optimize signal strength and orientation.

The survey got off to a rocky start due to technical difficulties with the instrumentation. On the first survey day, after a good portion of the day was dedicated to the lay-out of the VLF transmitter. That afternoon one Mag-VLF console had issues collecting quality readings, as a result one operator did not achieve production. There was not enough time left in day to swap out the instrumentation. A few days later, the VLF transmitter would not turn. After attempts to troubleshoot and fix the transmitter with aid from the manufacturers, it was determined it had to be shipped out for repair. A new transmitter was located nearby and arrived two days later. Production on August 13 and August was 14 was lost due to issue.

A few lines that were acquired around the time the TX failed was repeated on the last day of surveying. No surveying occurred on September 1 as a new transmitter antennae was deployed for the requested resurvey. This was to verify the data quality and to improve the signal strength as some stations were noisy due to their distance from the transmitter.

After the addressing the transmitter issues, the survey progressed smoothly.

4.2. Survey Parameters and Instrumentation

The magnetic survey data was acquire with two GEM Systems GSM-19 Overhauser magnetometers with VLF option. A GEM Systems GSM-19T Overhauser magnetometer was used as a base station.

For the Magnetometer survey, a stationary base unit was used to record the diurnal variation in the total magnetic field at 3 second intervals. The mobile units, known as rovers, recorded the total magnetic field every 12.5 m along the grid survey lines. Calibration measurements were taken by the rover units at the start and end of each day to account for leveling of multiple rover instruments and to verify operator noise. Table 5 provides the UTM locations of the magnetic base station and calibration point.

Name	UTM Easting / NAD83	UTM Northing / NAD83
Magnetic Base Station	382769	6889015
Magnetic Calibration Point	382768	6889013

Table 5: Locations of magnetic base station and magnetic calibration point

VLF measurements were collected on two mobile GEM units, measuring multiple VLF stations. The primary VLF frequency measured was from the locally deployed VLF transmitter. Two additional VLF stations were measured to although signal strength and orientation were not ideal. A total of four frequencies were used over the course of the survey: 18.6 kHz (local VLF transmitter), 19.6 kHz, 23.4 kHz and 21.4 kHz. Frequency 19.6 kHz was replaced with 23.4 kHz due to better signal strength. The vertical in-phase component (dip-angle), vertical quadrature component, and 2 horizontal components as well as the total field strength were measured for each frequency at every station.

The VLF transmitter used was the Geonic Tx-27, which transmits at 18.6 kHz. Transmitting antennas were established perpendicular to the survey lines. The operating range of a given antenna varied over the survey area, but was typically between 400 m and 2500 m. The antennae locations are summarized in Appendix A and illustrated on the grid maps (Figure 3, Figure 4).

Locations for all surveyed stations, magnetometer calibration site, magnetic base station, and all electrode locations (VLF antennae) were acquired with Garmin GPSMAP 64s GPS units. The reported positional accuracies were on the order of +/- 3 m.

The specifications of these instruments are listed in Appendix B and the equipment parameters are summarized in Table 6.

Magnetometer	GEM Systems GSM-19 Overhauser Magnetometer
Station Spacing	12.5 m
Base Unit Reading Interval	3 seconds
Measured Property	Total magnetic field
VLF-EM	GEM Systems GSM-19 VLF Antenna
Station Spacing	12.5 m (with magnetometer stations)
Recorded Frequencies	18.6.0 kHz (Local Antenna) 19.6 kHz (Oxford, England) 23.4 kHz (Rhauderfehn, Germany) 21.4 kHz (Hawaii, USA)
Measured Property	In-Phase (dip-angle) and Out-Phase (quadrature) components of electromagnetic field; Total Field Strength (pT),
VLF-Transmitter	Geonics VLF TX27
Output frequency	18.6 kHz
GPS	Garmin GPSMAP 64s
Average Accuracy	3 m
Datum / Projection	NAD83 UTM Zone 8

Table 6: Magnetometer, VLF-EM and GPS instrument parameters

5. Geophysical Techniques

5.1. Magnetic Survey Method

Magnetic intensity measurements are conducted along survey lines (normally on a regular grid) and are used to identify metallic mineralization related to magnetic materials in the ground (e.g., magnetite and/or pyrrhotite). Magnetic data are also used as a mapping tool to distinguish rock types and to identify faults, bedding, structure and alteration zones. Line and station spacing are usually determined by the size and depth of the exploration targets.

The most common technique used in mineral exploration is to measure the amplitude of the magnetic field using an overhauser magnetometer. The instrument digitally records the survey line, station, total magnetic field and time of day at each station. After each day of surveying, data are downloaded to a computer for archiving and further processing.

The earth's magnetic field is continually changing (diurnal variations) so field measurements are calibrated to these variations. The most accurate technique is to establish a stationary base station magnetometer to continually monitor and record the magnetic field over the course of a day. The base station and field magnetometers are synchronized on the basis of time and computer software is used to correct the field data for the diurnal variations.

5.2. VLF-EM Method

The Very Low Frequency (VLF) method utilizes powerful military radio transmitters distributed throughout the world. The frequencies, in the range of 15 to 25 kHz, are quite high for geophysical exploration. These radio signals induce electric currents in conductive bodies, even those located thousands of miles away.

Induced currents in a sub-surface conductor produce secondary magnetic fields which are detected at surface through deviations in the normal VLF signal. The secondary field is added to the primary transmitter field such that the resultant field is tilted up on one side of the conductor and down on the other (depending on the direction of travel). All VLF receivers measures the tilt of the resultant field; the tilt angle is known as the in-phase component. Some receivers also measure the relative amplitude of the total field (or any component) and the phase between any two components. This phase difference is called the out-of-phase or quadrature component.

A successful VLF survey requires that the strike of the conductor be in the direction of the VLF station so that the magnetic field lines from the VLF signal are perpendicular to the conductor. Interpretation of VLF measurements is simple and usually conducted on profile plots that compare field components to the horizontal locations along the survey line. A conductor is generally located at the inflection point between positive and negative tilts and where the field strength is at a maximum. Reliable estimates of conductor quality cannot be made from VLF measurements but a rough depth estimate can be made from the distance between the positive and negative peaks in the tilt angle profile.

The VLF survey technique is an excellent prospecting tool because it is relatively inexpensive and fast. Moreover, the high VLF response to poor conductors aids in the mapping of faults, mineralization zones and rock contacts. The major disadvantage of the VLF method is that the high frequencies can generate multiple anomalies from unwanted sources such as swamp edges, creeks and topographic features. In addition, it is sometimes impossible to find a strong enough VLF station near the strike of the expected conductor. In these cases a short range portable VLF transmitters can be used.

6. Quality Assurance

6.1. Locations

The quality of the location data was generally good due to the open terrain and clear horizon. The field operators navigating within a reported 3m accuracy.

6.2. Magnetometer Data

All magnetometer data were run through an in-house quality control sequence to ensure the cleanest magnetic data possible. Space weather was monitored to recognize non-terrestrial influences on the data. For the duration of the survey there were a few days where there was increased magnetic activity. With the 3-second base station, the greater variation in the field was captured and corrected for by the diurnal correction.

Magnetic calibration points were measured at the beginning and the end of each survey day. Field crew members make notes of metal cultural features (e.g. fences, pipelines) encountered during the survey that could cause spikes in the data. Prior to gridding, a stacked profile of the measured magnetic intensity is plotted. Non-natural large-magnitude spikes in the magnetic data were then either removed by hand or filtered. Following these quality control steps, magnetic data was prepared for gridding and mapping.

6.3. Very Low Frequency Data

Similar to the magnetometer data, very low frequency data are run through an in house quality control sequence to ensure the cleanest VLF data possible. Here, suspect data and poor quality data are flagged for removal. The VLF data quality on the Klaza grid was generally good, however quality deteriorated as the signal strength decreased with increasing distance from the VLF antenna. Lines on the main grid reached up to 3 km in length so low signal strength was an issue encountered usually 2 km into the lines. This required the use of alternate antennas to survey farther into the grid.

Respectfully submitted,

per SJ Geophysics Ltd.

Jordan Perk

Appendix A: Survey Details

Surveyed Lines Rusk Grid

Line	*Series*	*Antenna*	*Start Station*	*End Station*	*Survey Length (m)*
-2000	E	Tx 1,Tx 3	2487.5	5000	2512.5
-1900	E	Tx 1,Tx 3	2462.5	5000	2537.5
-1800	E	Tx 1,Tx 3,Tx 6	2350	5000	2650
-1700	E	Tx 1,Tx 3	2237.5	5000	2762.5
-1600	E	Tx 1,Tx 3,Tx 6	2137.5	5000	2862.5
-1500	E	Tx 1,Tx 3	2025	5000	2975
-1400	E	Tx 1,Tx 3,Tx 6	1912.5	5000	3087.5
-1300	E	Tx 1,Tx 3	1812.5	5000	3187.5
-1200	E	Tx 1,Tx 3,Tx 6	1700	5000	3300
-1100	E	Tx 1,Tx 3	1587.5	5000	3412.5
-1000	E	Tx 1,Tx 3	1475	5000	3525
-900	E	Tx 2, Tx3	1375	5000	3625
-800	E	Tx 2, Tx3	1262.5	5000	3737.5
-700	E	Tx 2, Tx4	1225	5000	3775
-600	E	Tx 2, Tx4	1362.5	5000	3637.5
-500	E	Tx 2, Tx4	1500	5000	3500
-400	E	Tx 2, Tx4	1675	5000	3325
-300	E	Tx 2, Tx4	1825	5000	3175
-200	E	Tx 2, Tx4	1937.5	5000	3062.5
-100	E	Tx 2, Tx4	2012.5	5000	2987.5
0	E	Tx 2, Tx4	2075	5000	2925
100	E	Tx 2,Tx4,Tx5	2125	5000	2875
200	E	Tx 4,Tx 5	2187.5	4400	2212.5

Line	Series	Antenna	Start Station	End Station	Survey Length (m)
300	E	Tx 4,Tx 5	2237.5	4000	1762.5
400	E	Tx 4,Tx 5	2312.5	4000	1687.5
500	E	Tx 4,Tx 5	2362.5	3600	1237.5
600	E	Tx 4,Tx 5	2400	3600	1200

Total Linear Metres =77,537.5m

Surveyed Lines Val

Line	Series	Antenna	Start Station	End Station	Survey Length (m)
1800	N	Tx 7	2675	3162.5	487.5
1900	N	Tx 7	2637.5	3162.5	525
2000	N	Tx 7	2600	3162.5	562.5
2100	N	Tx 7	2525	3187.5	662.5
2200	N	Tx 7	2425	3237.5	812.5
2300	N	Tx 7	2337.5	3287.5	950
2400	N	Tx 7	2250	3337.5	1087.5
2500	N	Tx 7	2150	3387.5	1237.5
2600	N	Tx 7	2062.5	3425	1362.5
2700	N	Tx 7	1962.5	3475	1512.5
2800	N	Tx 7	1875	3525	1650
2900	N	Tx 7	1912.5	3575	1662.5
3000	N	Tx 8	1962.5	3625	1662.5
3100	N	Tx 8	2012.5	3662.5	1650
3200	N	Tx 8	2062.5	3712.5	1650
3300	N	Tx 8	2100	3762.5	1662.5
3400	N	Tx 8	2150	3800	1650
3500	N	Tx 8	2200	3612.5	1412.5

Line	*Series*	*Antenna*	*Start Station*	*End Station*	*Survey Length (m)*
3600	N	Tx 8	2250	3412.5	1162.5
3700	N	Tx 8	2300	3225	925
3800	N	Tx 8	2337.5	3037.5	700
3900	N	Tx 8	2387.5	2837.5	450

Total Linear Metres =25,437.5m

VLF Transmitting Antennae Locations

	Electrode A		*Electrode B*	
VLF Antenna Name	*UTM Easting / NAD83*	*UTM Northing / NAD83*	*UTM Easting / NAD83*	*UTM Northing / NAD83*
Tx 1	382146	6888204	383078	6887757
Tx 2	383078	6887757	383940	6887359
Tx 3	381488	6886333	382381	6885914
Tx 4	382466	6885873	383621	6885306
Tx 5	383387	6887078	384272	6886634
Tx 6	381811	6887043	382729	6886582
Tx 7	387870	6882928	388316	6881954
Tx 8	387426	6883845	387870	6882928

Appendix B: Instrument Specifications

GEM-19 Overhauser Magnetometer

Resolution:	0.01 nT, magnetic field and gradient
Accuracy:	0.2 nT over operating range
Gradient Tolerance:	up to 5000 nT/metre
Operating Interval:	4 seconds minimum, faster optional
Reading:	Initiated by keyboard depression, external trigger or carriage return via RS-232C
Input/Output:	6 Pin weatherproof connector, RS-232C, and optional analog output
Power Requirements:	12v 300 mA peak(during polarization), 35 mA standby, 600 mA peak in gradiometer
Power Source:	Internal 12 V, 1.9 Amp-hour sealed lead-acid battery standard External 12 V power source can be used
Battery Charger:	Input: 110/220 VAC, 50/60 Hz and/or 12 VDC Output: 12 V dual level charging
Operating Temperature:	-40 ºC to +60 ºC
Battery Voltage:	10 V min. to 15 V max.

Dimensions:

Console:	223 x 69 x 240 mm
Sensor staff:	4 x 450 mm sections
Sensor:	170 x 71 mm diameter

Weights:

Console:	2.1 kg
Staff:	0.9 kg
Sensor:	1.1 kg each

GSM-19 VLF Option

Frequency Range:	15 - 30 kHz in 0.1 kHz steps
Parameters Measured:	Vertical In-Phase and Out-of-Phase components as percentage of total field, 2 components of horizontal field
Resolution:	0.50%
Number of Stations:	Up to 3 at a time
Storage:	Automatic with time, coordinates, magnetic field/gradient, slope, frequency, in- and out-of-phase vertical and both horizontal components for each selected station
Terrain Slope Range:	0 – 90 (entered manually)
Sensor Dimensions:	14 x 15 x 9 cm(5.5 x 6 x 3")
Sensor Weight:	1.0 kg (2.2 lb)

Geonics VLF Tx-27 Transmitter

Input Voltage	115V or 220V
Output Frequency	18.6 kHz +/- 2Hz
Output Current	Less than 5A
Temperature range	-40 ºC to +60 ºC
Dimensions	43.2cm x 17.8cm x 30.5cm
Weight	12kg