Logistics Report Prepared

for

Rockhaven Resources Ltd.

Volterra-3DIP

on the

Klaza Property

Carmacks, Yukon, Canada
Latitude: 62°06'N Longitude: 137°14'W
Whitehorse Mining District

Survey conducted by SJ Geophysics Ltd.
June, 2016

Report prepared by
Nathan Anderson
July 12, 2016

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1. Survey Summary

SJ Geophysics Ltd. was contracted by Rockhaven Resources Ltd. to acquire Volterra-3DIP data on their Klaza property. Table 1 provides a brief summary of the project.

Client	Rockhaven Resources Ltd.
Project Name	Klaza
Location (approx. centre of grid)	Latitude: 62º06' N Longitude: 137º14' W 6888000N 383500E; UTM NAD83 Zone 8N
Survey Type	Volterra 3D Induced Polarization
Total Line Kilometres	18.4 km (in-line)
Production Dates	June 22nd, 2016 – June 30th, 2016

Table 1: Survey Summary

The Klaza property is located in the Yukon Territory in northwestern Canada. It is situated in the southern portion of the Dawson Range. These mountains fueled the Klondike Gold Rush of the late 1800's. The Yukon Territory displays multiple varieties of mineralogic deposits including orogenic and intrusion-related metamorphosis, epithermal deposits, and porphyry-style deposits. The area north of Carmacks all the way to Dawson City is riddled with placer mining operations.

The Klaza property has seen numerous years of exploration. These exploration activities include mapping, geochemistry, geophysics, and diamond drilling. Unlike the nearby placer operations, this deposit is a subterranean porphyry structure. The 2016 Volterra-3DIP work is designed to cover a broad area with a relatively deep depth of investigation to map porphyry-style signatures. The Volterra-3DIP was optimized to delineate known structures and serve to direct drilling efforts.

2. Location and Access

The Klaza project is located in the Yukon Territory of Canada (Figure 1).

Figure 1: Overview map of the Klaza project

The Klaza project is located in the Dawson Range. The closest town to the Klaza project is Carmacks, YK which is located 50 km east of the property. From Carmacks, the property is reached by driving along the Mt. Nansen mine road for approximately 70 km.

A map of the project area along with road access is shown in Figure 2.

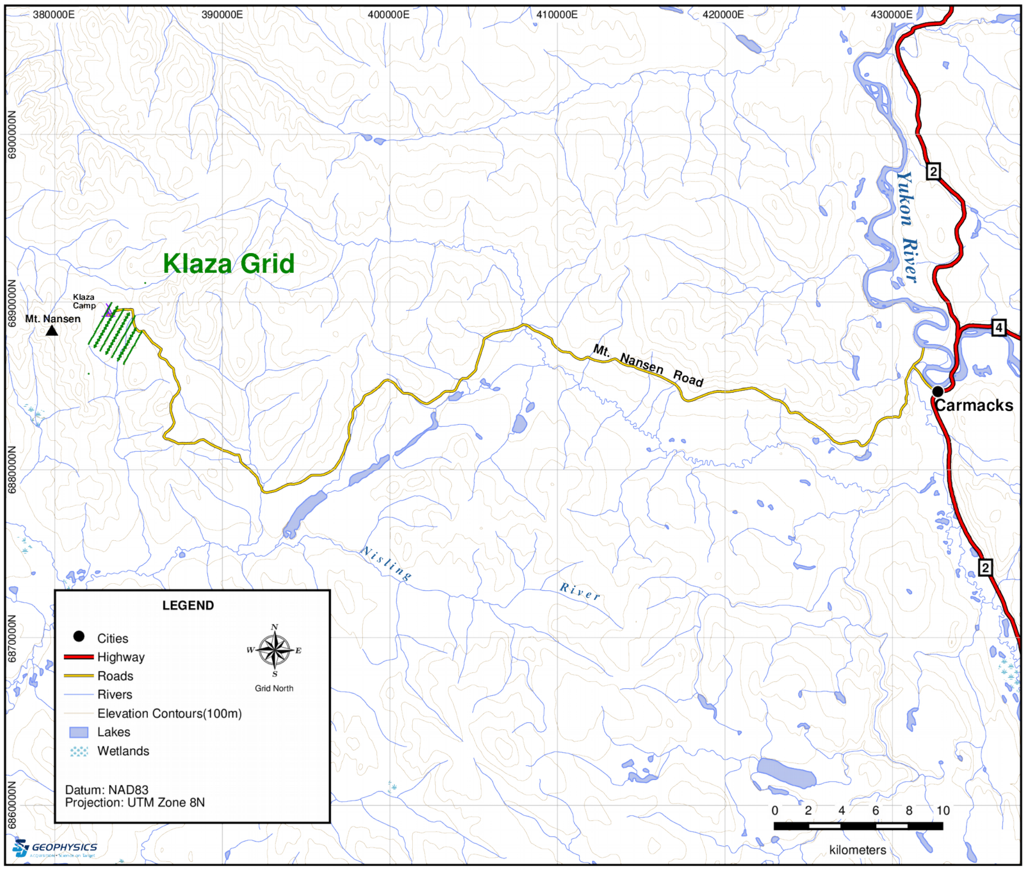

Figure 2: Location map for the Klaza project

Lying just four degrees south of the Arctic Circle, the region surrounding Carmacks, YK 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. Survey Grid

3.1. Grid Design

The Klaza 3DIP grid is comprised of 7 survey lines spaced at 400 m. Survey stations along these lines were distributed in 100 m intervals. The survey coverage is estimated at 7.8 km^2. The line and station numbers were based on a local sequential numbering system defined by distance in meters. The survey grid parameters are summarized in Table 2 and displayed in Figure 3.

Grid	Klaza 3DIP
Number of Surveyed Lines	7
Survey Line Azimuth	29.5º
Line Spacing	400 m
Station Spacing	100 m
Elevation Range	1150 – 1475 m

Table 2: Grid parameters

Please refer to Appendix A for a detailed breakdown of the survey lines.

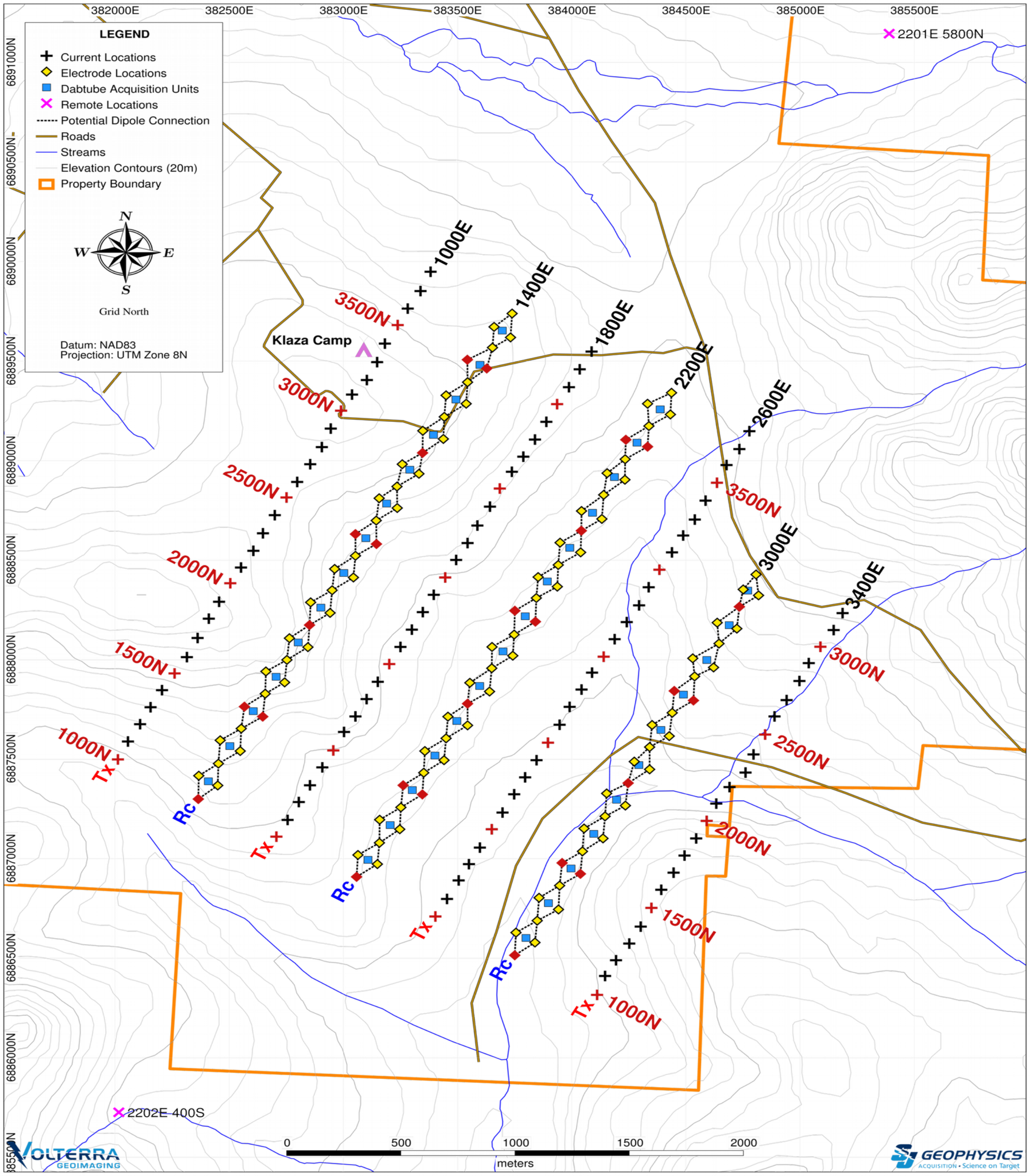

Figure 3: Grid Map showing the Klaza grid

4. Survey Parameters and Instrumentation

4.1. Volterra Distributed Acquisition System

The Volterra Distributed Acquisition System was developed internally by SJ Geophysics. The heart of the system are the Volterra data acquisition units, internally known as Dabtubes. Each four-channel Volterra acquisition unit contains 24-bit analog-to-digital electronics that record the full waveform signal from various sensor configurations. This allows for varying suites of geophysical techniques such as induced polarization (IP), electromagnetics (EM), magneto tellurics (MT), controlled source audio-frequency magneto tellurics (CSAMT), etc. to be measured. The recorded full-waveform data is then passed through proprietary signal processing software to calculate the relevant geophysical attributes (ie. apparent resistivity/chargeability for IP surveys).

4.2. Volterra-3DIP Survey

SJ Geophysics Ltd.'s proprietary Volterra Distributed Acquisition System was utilized for the induced polarization (IP) survey. Current injections were controlled using a GDD TxII transmitter and the resulting ground response was measured using each Volterra data acquisition unit.

The distributed nature of the Volterra-3DIP system allows for highly customizable array and survey configurations. The resulting flexibility is a huge benefit in challenging terrain conditions where rivers, roads, cliffs, or other obstacles can easily be avoided. The crew took full advantage of these features to optimize the field logistics and maximize production.

The transmitter and IP signal recording/processing parameters used for the survey are described in Table 3. The full instrument specifications are listed in Appendix B.

IP Transmitter	GDD TxII
Duty Cycle	50%
Waveform	Square
Cycle and Period	2 sec on / 2 sec off; 8 second
IP Signal Recording	Volterra Acquisition Unit (Dabtube)
Reading Length	120 seconds
IP Signal Processing	CSProc (SJ Geophysics proprietary software)
Vp Delay, Vp Integration	1200 ms, 600 ms
Mx Delay, # of Windows Width (Window Width) (integrated over full window)	50 ms, 26 26, 28, 30, 32, 34, 36, 39, 42, 45, 48, 52, 56, 60, 65, 70, 75, 81, 87, 94, 101, 109, 118, 128, 140, 154, 150 (50–1950 ms)
Properties Calculated	Vp, Mx, Sp, Apparent Resistivity and Chargeability

Table 3: 3DIP transmitter and reading parameters

Receiver dipoles were set up using 50 cm long and 10 mm diameter stainless steel electrodes hammered into the ground and connected into the array by single or double conductor wire. The electrodes used for current injections were significantly larger (1 m x 15 mm) with two to four electrodes used at each injection site to improve ground contact. Current electrodes were connected to the current transmitter by a single conductor wire.

The Volterra-3DIP system was configured using a diamond array. Details of the survey configuration are described in Table 4.

Array Type	Volterra-3D Distributed Array
Array Configuration	Diamond Array
Acquisition Set	3 Lines (Tx-Rc-Tx)
Active Array Length per Receiver Line	Minimum: 1600 m Maximum: 2200 m
Total Active Dipoles per Current Injection	32–44
Dipole Length	111.8 m
Current Interval	100 m

Table 4: Volterra-3DIP Survey parameters

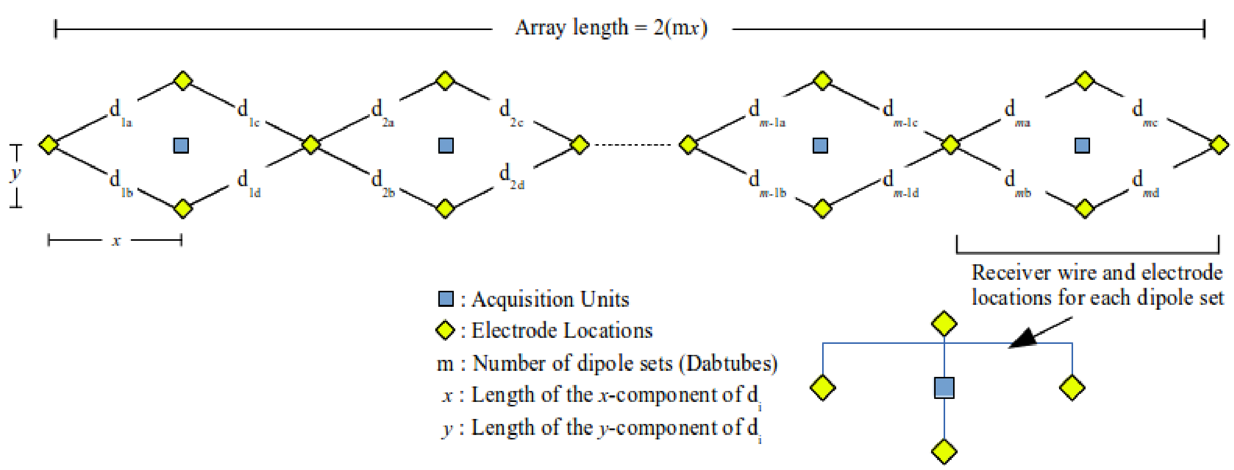

Figure 4: Schematic representation of the Diamond Array

Two different remote electrode stations were utilized over the course of the survey. The locations of the remote current electrodes are listed in Table 5 below.

Name	**Label**	**Easting NAD83 Z8N**	**Northing NAD83 Z8N**
South Remote	2202E 400S	382017	6885726
North Remote	2201E 5800N	385390	6891145

Table 5: Location of 3DIP remote sites

4.3. GPS

All location data were collected using handheld Garmin GPS units. GPS 60, GPSMAP 62s, and GPSMAP 64s models were used. Location data were collected in WGS84 lat/long and projected into the NAD83 Zone 8N datum. The open nature of the grid and gentle topography made for ideal GPS conditions. Locations were collected with high level of accuracy throughout the project. Elevation information from the GPS units were mostly satisfactory, except for one GPS unit. When the elevation data for this GPS unit was reviewed, it was found that the elevation calibration was out by almost 80 m at times. The GPS elevation data was replaced with an NTS DEM for the the final processing stage (§ 6.1).

5. Field Logistics

The SJ Geophysics field crew consisted of two geophysical operators and one field technician to perform the day-to-day operations of the survey. This team oversaw all operational aspects including field logistics, data acquisition and initial field data quality control. Table 6 lists the SJ Geophysics crew members on this project. Three local helpers were hired by the client to assist the geophysical crew in the operation of the survey.

Crew Member Name	Role	Dates on Site
Jordan Perk	Geophysical Operator	June 22nd - June 30th
Nathan Anderson	Geophysical Operator	June 22nd - June 30th
Carlos Bazan	Field Technician	June 22nd - June 30th

Table 6: Details of the SJ Geophysics crew on site

The SJ Geophysics crew's first day on site at the Klaza Project was June 22nd and they remained on site through June 30th. Mobilization to the project occurred on June 21st. Demobilization from the project site to Whitehorse occurred on the evening of June 30th.

During the course of the geophysical survey, the SJ Geophysics crew participated in the Klaza camp’s weekly safety meetings as well as holding daily tailgate meetings. The safety meetings included a comprehensive review of safe work practices specific to our geophysical surveys and field operations. At the tailgate meetings, personnel discussed issues related to changing weather conditions (including ramifications on the survey/personal safety), encounters with or sightings of potentially problematic wildlife, efficient organization of daily tasks, and any other work-related questions or concerns.

The SJ Geophysics crew was accommodated by the client at their Klaza exploration camp. This camp was a standard exploration camp with canvas, four-person tents for sleeping. There was a slightly larger tent with solid walls that served as the kitchen. There were also shower and gear dry facilities in a larger, solid-walled tent. Communication from the camp was only possible using satellite Internet and phone. The Internet connection was available in the office tent and worked well enough to handle all necessary business with the SJ Geophysics head office.

Access to the camp is via the Mt. Nansen mine road. This is a rough gravel road requiring low speeds. The geophysical crew and all of the equipment was transported from Whitehorse to the Klaza camp by the client in a large diesel truck. Once on-site, all equipment and personnel transportation was completed with two off-road, side-by-side UTV's (Kubota). Having two Kubotas available greatly increased crew efficiency.

The crew began the survey by surveying the lines nearest camp first. This allowed for a thorough set-up to be completed on June 22nd and data acquisition to commence on June 23rd. Data acquisition progressed at a steady pace over the entire seven days with each acquisition set requiring two days to complete. June 25th was used as a day to move array equipment between lines 1400E and 2200E. Some of the equipment was picked up after completing data acquisition on June 29th with the remainder picked up on June 30th.

During the Volterra-3DIP survey, each acquisition day began with the setup of the Volterra acquisition units along the receiver lines and the setup of the transmitter site. If necessary, breaks in the wire linking the remote station to the transmitter were fixed.

Breaks are most often caused by roaming wildlife. Although one or two transmitter lines were broken on the majority of the days, these breaks did not create much difficulty for the crew. Using the Kubotas, it was often possible to transport crew members relatively near to where they had to go to perform tasks, either fixing breaks or setting up Volterra acquisition units.

Prior to field data acquisition, a contact resistivity test was performed using a small waveform generator attached in parallel to a given Volterra acquisition channel. This was done for each dipole in the array, and allowed the operators to identify breaks in the wire or areas of poor ground contact which could degrade input signal quality. Furthermore, this test allowed the operator to inspect the raw signal, ensuring that the Volterra acquisition units were functioning correctly, and to ensure that the receiver was synchronizing with the correct GPS time.

Upon completion of these tasks, acquisition would begin. During acquisition stages, a dedicated 'transmitter' Volterra acquisition unit and a current monitor were used to measure the current being injected at each station. By inspecting the quality of the current output, the current operator could detect current leakage and ensure the transmitter was functioning correctly. An Android tablet with an in-house Volterra software app was used to record the current injection start time and duration. The acquisition stage generally required five crew members to carry-out, leaving one person available to complete wire set-up and pick-up tasks as required. Transmitter wire was often laid out ahead of time and picked up during the survey as it progressed. Volterra acquisition units were collected at the end of each acquisition day.

6. Field Data Processing & Quality Assurance Procedures

6.1. Locations

Good quality location data is the first step to the successful analysis and interpretation of geophysical survey data. For this survey, Garmin GPS 60, GPSmap62s, and GPSMAP 64s model units were utilized to collect location information. Measurements are taken at every survey station. The quality of the location data and labeling were checked every night using GPS management software such as Garmin BaseCamp or GIS packages like QGIS and GRASS. Any inconsistent measurements were discarded and the remaining points, referred to as control points, were incorporated into a database using proprietary software called Location Manager. The crew collected all necessary GPS points, leaving none to be interpolated. (If any points had been missed, the missing data points would be interpolated based on the known points, measured slopes between stations if available, line azimuth, and idealized ground distances.)

GPS measurements typically have a much lower accuracy in the vertical direction compared to the horizontal direction. The elevation information collected by the GPS units was used for initial modelling. A DEM was used in the final processing stage, alleviating slight calibration issues in some GPS units.

6.2. Volterra-3DIP Data

The Volterra-IP data go through a series of quality assurance checks both in the field and in the office to ensure that the data are of good quality. At the end of each acquisition day the recorded signal was downloaded from the Volterra acquisition units to a personal computer. The signals were then clipped to the GPS time windows of each current injection, lightly filtered for noise, and imported into SJ Geophysics' proprietary QA/QC software package called JavIP. This software package integrates location data with DCIP data in order to calculate the apparent resistivity and apparent chargeability values. JavIP contains interactive quality control tools to allow the field geophysicist to display decay curves, view a dot plot of the calculated parameters, and manually reject bad data points.

The majority of the data points flagged for removal were due to non-coupling, a phenomena typical in IP surveys related to the survey configuration. Non-coupling occurs when a receiver dipole is sub-parallel to lines of constant potential, leading to a significant decrease in signal strength and corresponding poor data quality. Additional data can also be deemed untrustworthy due to low signal quality or dipoles being inadvertently disconnected (usually due to animal activity).

After the first data quality review in the field, the database was delivered to SJ Geophysics' head office for a second review. The data were then carefully checked to ensure that erroneous data points had been removed and were not passed along to the final stage of processing: the inversion.

7. Data Quality

7.1. Locations

As mentioned previously in § 4.3, GPS data was of good quality throughout the survey. No GPS points were missed by the crew and none of the acquired points were deemed untrustworthy. Elevation data was sufficient for initial modelling purposes but a DEM was used in the final inversion stage to alleviate elevation calibration issues from hand-held GPS units. The DEM used was the National Topographic System (NTS) mapsheet 115i03 at a scale of 1/50,000.

7.2. Volterra-3DIP data

The IP data that was collected at Klaza was of good quality. Even with very shallow permafrost, the terrain and ground cover allowed for sufficiently low contact resistances to get clean data over the whole grid. The only notable anomalous zone was near a placer mining operation in the middle of line 3000E. Here, ground contact resistance had dramatic fluctuations but these features did not have a significant impact on data quality.

Voltage potential values were strong; the majority ranged from 1 mV to 20 mV. There were some measurements outside of this range, however, no data was removed due to low signal. The majority of the points removed were affected by non-coupling. The non-coupled region of each reading occupied 300 m to 400 m along the receiver line in some cases due to coarsely spaced lines. However, because of the diamond array design, dipoles oriented in the other direction were not null-coupled and still recorded data in this region. There were also some points removed in which a Volterra acquisition unit experienced a mid-day disconnection.

Resistivity values were precise, showing consistency with known geological information. Background values hovered around 300 Ω-m. The majority of the chargeability decay curves were clean. Readings with lower currents created noisier but still usable curves at long offset dipoles.

Figures 5 and 6 show examples of decay curves. Those in Figure 5 are quite clean, while those in Figure 6 are more noisy. The current is ~300 mA lower for the curves in Figure 6.

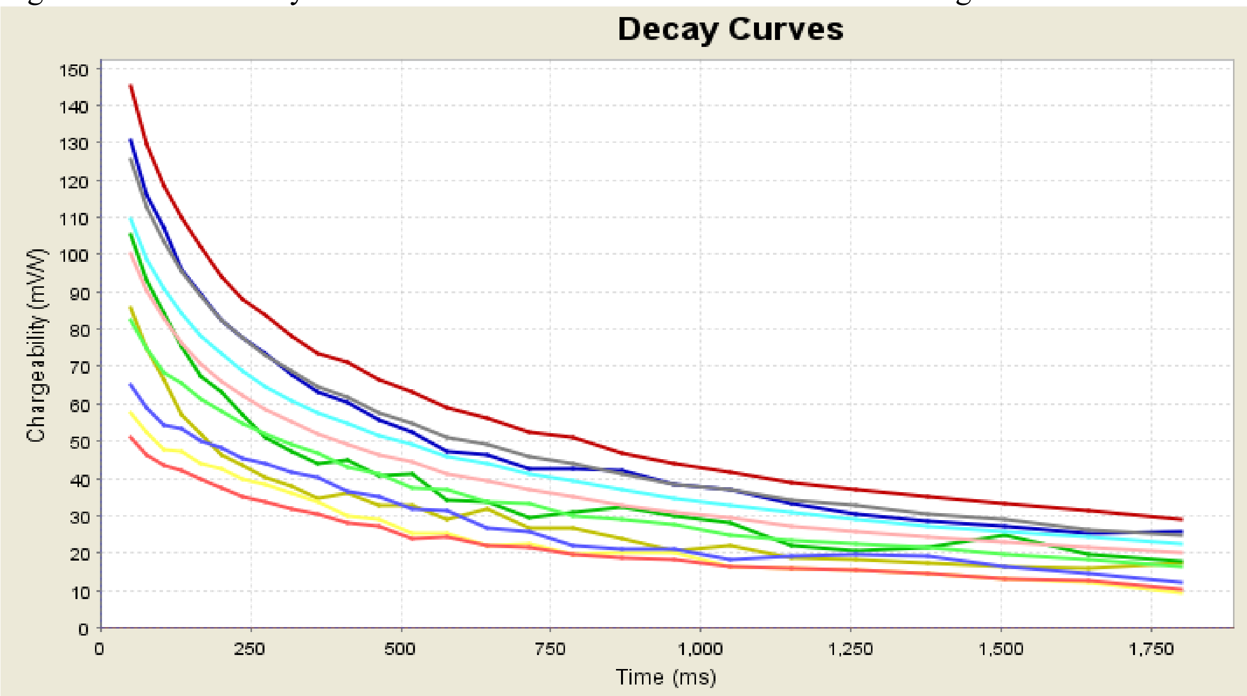

Figure 5: Example of clean decay curves

(L2200E, current line 1800E station 2400N)

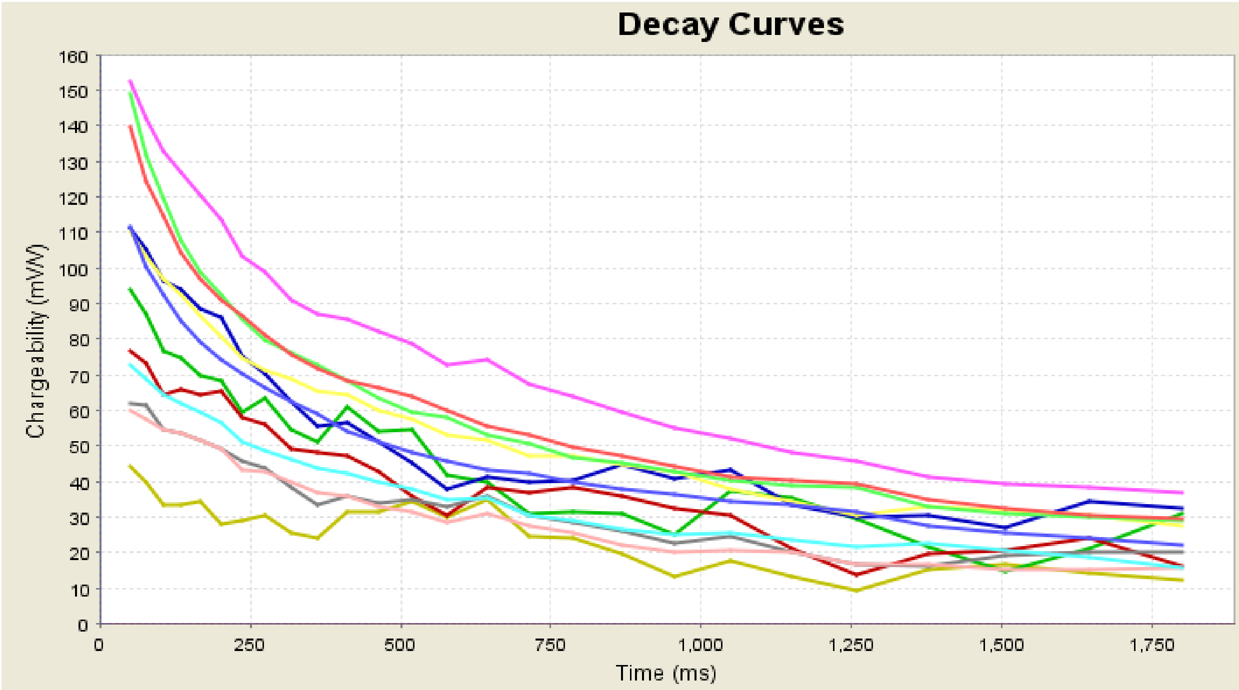

Figure 6: Example of relatively noisier decay curves

(L 2200E, current line 1800E station 1500N)

8. Geophysical Inversion

The purpose of geophysical inversion is to estimate the 3D distribution of subsurface physical properties (density, resistivity, chargeability, and magnetic susceptibility) from a series of geophysical measurements collected at the surface. Unfortunately this is a challenging problem – the subsurface distribution of physical properties is complex and only a finite number of measurements can be collected. These complications lead to an under-determined problem. As a result, there are many different possible 3D physical property models that can be obtained which mathematically fit the observed data. Utilizing known geological and geophysical information to evaluate the model allows the best or most geologically realistic model to be selected and leads to a better understanding of the subsurface.

Geophysical inversions are commonly performed for every survey carried out by SJ Geophysics. Several inversion programs are available, but SJ Geophysics primarily uses the UBC-GIF algorithms (e.g. DCIP2D, DCIP3D, MAG3D, GRAV3D) which were developed by a consortium of major mining companies under the auspices of the University of British Columbia's Geophysical Inversion Facility.

In general, multiple inversions are carried out for each dataset and the resultant inversion models are compared with known information to evaluate the model. For example, known geology, drill assays, the estimated depth of investigation, and the quality of the input data are all used during the evaluation. The most geologically reasonable model that fits the data is then chosen as the best model. When available, additional information such as geological boundaries and down-hole geophysical data can be incorporated into the inversion in order to constrain the inversion model.

Once the final inversion model is selected, the model is gridded and mapped for interpretation. Typically, cross-sections and plan maps are created, sliced at different depths beneath the surface. The inversion results can be visualized in 3D using open source software packages such as Mayavi and Paraview in both 2D and 3D views. Additional data can then be overlain to aid in interpretation and help facilitate the identification of potential drilling targets.

9. Deliverables

This logistics report and maps are provided as two paper copies and digitally in PDF format. All data including the geophysical survey and location data are also provided digitally. A brief description of the provided data is below.

- 3DIP Data - Raw DCIP data exported as a .txt file
- 3D models
  - UBC - inverted model in UBC-GIF standard format: .chg, .con, .res, sensitivity, and mesh files. UTM coordinates.
  - UBC-local - inverted model in UBC-GIF standard format: .chg, .con, .res, sensitivity, and mesh files. Local coordinates.
  - VTK - inverted model in open-source vtk format: chg, con, res, and sen files
  - XYZ - ASCII format of models are converted from UBCgif inversion models; the value of each voxel is positioned at the centre of the model cell: chg, con, res, sen files
- Location - Locations of survey stations with DEM elevation
- Maps
  - Chargeability plan maps at constant depth below topography
    - 50 m, 100 m, 150 m, 200 m, 300 m, 400 m, 500 m, 600 m
  - Resistivity plan maps at constant depth below topography
    - 50 m, 100 m, 150 m, 200 m, 300 m, 400 m, 500 m, 600 m
  - Plan maps in GeoTiff format
  - Section maps along survey lines
  - Location map of project
  - Grid map
- Reports
  - Interpretation Report
  - Logistics Report

Appendix A: Survey Details

Klaza Grid

Line	Series	Type	Start Station	End Station	Survey Length (m)
1000	E	Tx	1000	3800	2800
1400	E	Rc	1000	3800	2800
1800	E	Tx	1000	3800	2800
2200	E	Rc	1000	3800	2800
2600	E	Tx	1000	3800	2800
3000	N	Rc	1000	3200	2200
3400	N	Tx	1000	3200	2200

Total Linear Metres = 18,400

Rc = Receiver Line, Tx = Transmitter Line

Appendix B: Instrument Specifications

Volterra Acquisition Unit (Dabtube)

Technical:	
Input impedance:	20 MΩ
Input overvoltage protection:	5.6 V
ADC bit resolution:	24-bit
Internal memory:	Storage Capacity 16 GB
Number of inputs:	4
Synchronization:	GPS
Selectable Sampling Rates (samples/second):	128000, 64000, 32000, 16000, 8000, 4000, 2000, 1000
Common mode rejection:	More than 80 dB (for Rs=0)
Voltage sensitivity:	Range: -5.0 to +5.0 V (24 bit) Custom Gain available
General:	
Dimensions:	Diameter: 5.5 cm, Length: 60 cm
Weight:	0.85 kg
Battery:	3.6 V internal
Operating temperature range:	-40 ºC to 40 ºC

GDD Tx II IP Transmitter

Input voltage:	120V / 60 Hz or 240V / 50Hz (optional)
Output power:	3.6 kW maximum.
Output voltage:	150 to 2400 Volts
Output current:	0.030 to 10Amperes
Time domain:	1,2,4,8 second on/off cycle.
Operating temp. range:	-40^0 to $+65^0$ C
Display:	Digital LCD read to 0.001A
Dimensions (h w d):	34 x 21 x 39 cm
Weight:	20kg.

Appendix C: Geophysical Techniques

IP Method

The time domain IP technique energizes the ground by injecting square wave current pulses via a pair of current electrodes. During current injection, the apparent (bulk) resistivity of the ground is calculated from the measured primary voltage and the input current. Following current injection, a time decaying voltage is also measured at the receiver electrodes. This IP effect measures the amount of polarizable (or "chargeable") particles in the subsurface rock.

Under ideal circumstances, high chargeability corresponds to disseminated metallic sulfides. Unfortunately, IP responses are rarely uniquely interpretable as other rock materials are also chargeable, such as some graphitic rocks, clays, and some metamorphic rocks (e.g., serpentinite). Therefore, it is prudent from a geological perspective to incorporate other data sets to assist in interpretation.

IP and resistivity measurements are generally considered repeatable to within about five percent. However, changing field conditions, such as variable water content or electrode contact, reduce the overall repeatability. These measurements are influenced to a large degree by the rock materials near the surface or, more precisely, near the measurement electrodes. In the past, interpretation of a traditional IP pseudosection was often uncertain because strong responses located near the surface could mask a weaker one at depth. Geophysical inversion techniques help to overcome this uncertainty.

Volterra-3DIP Method

Three dimensional IP surveys are designed to take advantage of recent advances in 3D inversion techniques. Unlike conventional 2DIP, the electrode arrays in 3DIP are not restricted to an in-line geometry. This means that data can be collected from a large variety of azimuths simultaneously leading to a highly sampled dataset containing more information about the Earth's physical properties. In an ideal world, a 3DIP survey would consist of randomly located current injections and receiver dipoles with randomized azimuths. Unfortunately, logistical considerations usually prohibit a completely randomized approach.

The Volterra-3DIP distributed acquisition system is based on state-of-the-art 4-channel, full-waveform, 32-bit Volterra acquisition units. The system is highly flexible and can utilize any number of Volterra units. The Volterra-3DIP system's untethered, distributed design, eliminates the need for specialized receiver cables and a centralized receiver control station. The dipoles can be in any orientation, can have varying lengths, and completely avoid inaccessible areas if necessary.

A typical Volterra-3DIP configuration establishes alternating current and receiver lines in sets of 5, but can be customized based on the project. The current lines are located on adjacent lines to the receiver line and current injections are performed sequentially at fixed increments (25 m, 50 m, 100 m, 200 m) along each current line. By injecting current at multiple locations along each current line, the data acquisition rates are significantly improved over conventional surveys. Customized receiver arrays are utilized to provide greater cross-line focus for a better azimuthal distribution of the data. Cross-dipoles are frequently used to maximize signal coupling and improve the surface resolution.