Statement of Qualifications

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1. Introduction

ClearView Geophysics Inc. (ClearView), founded in 1996, is a geophysics surveying company that services the **mineral exploration**, **geotechnical** and **environmental** industries. ClearView applies state-of-the-art methods and instruments for non-intrusive investigations. These methods and instruments are selected and tailored for the specific requirements of each project. Data collected are analyzed, plotted and interpreted using expertise and years of experience.

2. Capabilities and Methodologies

ClearView is one of very few companies that can provide professional geophysical services for three industries (**mineral exploration/geotechnical/environmental**). Mineral exploration projects are typically larger scale in all aspects. They are deeper penetrating and longer duration. Geotechnical projects are usually smaller scale and require higher resolution surveys for near surface investigations. Environmental projects are typically the smallest and can include private locates. A brief description of how ClearView services these areas is as follows:

a. Mineral Exploration

ClearView is arguably the industry leader in providing **snowmobile-mode GPS-guided cesium magnetometer surveys** in Arctic Canada. The system consists of an in-house custom designed and built aluminum frame sled tethered behind a snowmobile. Mr. Joe Mihelcic, President of ClearView, continues to personally carry out snowmobile-mode cesium magnetometer surveys every year since 1998. Walking-mode surveys are also carried out to fill-in areas not safely accessible by snowmobile.

Survey production rates average 60 km to 80 km per day, with lower production rates of 45 km per day in boulder fields and low snow cover. Readings are typically taken at 5x per second. Heading and static tests are routinely carried out for quality assurance. The GPS antenna is located a few metres ahead of the cesium sensor to keep heading errors at negligible levels. Layback and latency corrections are performed with in-house software.

At least two base station magnetometers are operated for quality assurance and backup protection. They are also used to 'leap-frog' along the survey area to ensure the base stations are as close as possible to the rover systems. This is crucial in high latitude Arctic environments where diurnal variations can be significant even within 10 km, as proved in field data quality tests.

ClearView also specializes in providing **<u>spectral induced polarization (IP) surveys</u>** for gold exploration. The most common surface IP surveys carried out by ClearView consists of injecting an electrical current into the ground for two seconds. The transmitter current is then turned off for two seconds, during which time an IP receiver records the decaying voltage at pre-defined intervals. One transmitter electrode is placed at the end of the potential electrode spread and the second is located at electrical 'infinity'. ClearView used stationary high power 10 kW and mobile 3 kW transmitters. Borehole IP surveys utilize multi-conductor cables for multiple dipoles per reading.

For descriptive purposes, surface IP surveys are carried out as follows: The line current electrodes are moved along the survey line and maintained a distance of 25 metres to 100 metres ("a"=25 m to "a"=100 m) apart and from the nearest receiver electrode. There are typically seven (6 dipoles) or ten (10 dipoles) receiver electrodes placed at equal or combo-array configuration intervals down the survey line. The potential receiver electrode, which is nearest the transmitter current electrode, is called "P1". The furthest electrode down the line is called "P7" or "P11". Six or ten dipoles are read for every position except at the end of the completed survey line segments where dipoles are dropped.

Voltage drops are measured between adjacent receiver electrode pairs, also called "dipoles". The transmitter operator measures the contact resistance and electric current passing through the current electrodes during the readings. These current measurements are relayed to the receiver operator and entered into the IPR12 instrument for subsequent apparent resistivity calculations. As the dipoles increase in distance from the transmitter current electrodes, they obtain decay information from deeper features. Therefore, the results are displayed as "pseudosections".

The transmitter operator also writes down field notes relayed by the line workers. These notes are related to topography and obstacles encountered along the survey line (e.g., cliffs, swamps, etc.) that could be relevant to interpretation of the data.

IP surveys are mostly completed on adjacent survey lines so that lateral trends and anomalies can be detected. The data are presented as plates which include a number of panels presenting IP, apparent resistivity, magnetics and topographic data if available. Inversion models for the IP and apparent resistivity data are also presented as depth sections on these plates. Pseudosection panels are presented for the Mx chargeability (690 ms – 1050 ms decay slice), apparent resistivity, Spectral *M-IP*, Spectral *Tau* and Spectral *c*.

Inversion models are completed and presented as stacked sections on the pseudosection plates. Inversion parameters and results are preserved for future reference. Colour contour plan maps for the pseudosection n=2 cut are also presented.

The selected chargeability slice of 690 ms to 1050 ms is the industry standard slice used by the *Scintrex* IPR11 receiver. This was done so that experience gained during the past few decades could be applied more readily to the present data.

Spectral data for ***Tau, M-IP*** and ***'c'*** are calculated from a modified version of *Scintrex' Spectrum* software. This software matches the IP data to a suite of master curves. Readings with poor matches are screened and not plotted.

Detailed information about Spectral IP can be found in the following technical paper: *Geophysics, Vol. 49, No. 11, (November 1984), P. 1993-2003 "Spectral induced polarization parameters as determined through time-domain measurements"*. A brief description of Spectral IP follows:

The spectral parameters calculated from the IPR12 data provide an increased dimension to IP interpretation. The time constant *Tau* and exponent *c* are measurable physical properties which describe the shape of the decay curve. *Tau* can be used to discriminate between fine and coarse-grained polarizable mineralization. For a 2-second pulse, it ranges between 0.01 s for fine-grained sulphides, to 100 s for coarse-grained sulphides. *Tau* is important in gold exploration as gold is often associated with fine-grained sulphide mineralization.

Exponent *c* is diagnostic of the uniformity of the grain size of the target. It ranges from 0.1 for non-uniform grain size to 0.8 for uniform grain size and 1.0 for inductive coupling effects. Low *c* means that there is less certainty to the calculated *M-IP* and *Tau* values because there are likely multiple chargeable sources contributing to the response. The Cole-Cole models are based on theoretical decay curves for a uniform source.

The *M-IP* is the relative residual voltage which would be seen immediately after the shut-off of the transmitted pulse. It is expressed as mV/V and its amplitude relates to the quantity of the polarizable mineralization.

M-IP is very useful because theoretically it is not affected by ground resistivity. Normally, low resistivity tends to suppress the measured (apparent) chargeability decreasing its amplitude. A problem in areas of very high resistivity is that the apparent chargeability moves sympathetically with high resistivities. Therefore, when a high chargeability anomaly correlates with a resistivity high, it is impossible to know when the anomaly is solely caused by sulphides unless the *M-IP* parameter is used.

It allows for the selection of chargeability anomalies associated with resistivities that have a high probability to be associated with sulphides. In gold exploration this is very important because highly silicified areas are usually associated with gold mineralization. However, sulphide zones are the most favourable gold exploration targets within the zone of silicification.

The procedure for determining the spectral parameters plotted on the pseudosections is the result of Cole-Cole model curve matching. Matches that have a poor RMS standard deviation fit are not plotted. Poor fits to the model curves can result from inductive coupling, which is usually seen in the early decay slices, lack of significantly chargeable response, or noisy readings.

For base metals exploration, ClearView specializes in **time-domain electromagnetic (TDEM) surveys**. These surveys are carried out in surface or borehole modes using Geonics instrumentation. The receivers acquire 3D component data. The transmitters can be configured in a wide variety of configurations, with the most common being large fixed loop and moving loop. ClearView typically uses 10 gauge wire and multiple transmitters and power modules to provide high electrical currents for all loop sizes. For examples, with two transmitters and four power modules, ClearView can produce up to 15 amps of current through an 8 km loop. Coupled with the air-cored surface 3D coil, the data are cleaner and therefore can discern more subtle anomalies compared to competing systems. Planning and analysis of acquired data are carried out using Lamontagne's MultiLoop III software.

b. Geotechnical and Environmental Investigations

Mr. Mihelcic personally carries out and manages most geophysical surveys related to geotechnical and environmental investigations. These investigations vary over a broad range of applications and project requirements:

- UST (underground storage tank)/drums and buried metal detection
- Former structure delineation
- Void characterization
- Leachate plume and fill detection and delineation
- Private pipe and utility locates
- Depth to bedrock
- Water target prioritization
- Soil characterization
- Buried object detection

The application of multiple instrumentation and methods are standard practice to provide information that complements each other. For example, UST detection is typically carried out with a Geonics EM61 metal detector using a survey grid. For large open areas, a Geonics EM31 ground conductivity meter is used instead. These surveys are followed-up with GPR (ground penetrating radar) in areas too cluttered for EM instrumentation, or to further define metal related anomalies detected by the EM surveys. The EM61 metal detector is also used to follow-up EM31 anomalies. A Metrotech pipe and cable system is used to trace associated piping if fill and vent pipes are visible.

Examples of other methods include seismic refraction for depth to bedrock, GPR/micro-gravity for voids, resistivity imaging and MASW for soil characterization, and EM31/EM34 for leachate plume detection and delineation.

3. Personnel

ClearView was founded by Mr. Joe Mihelcic in 1996 to provide geophysical services. He has more than 25 years of geophysical survey and interpretation experience. He conceived of and implemented snowmobile cesium magnetometer surveys in the early 90's when GPS was becoming more readily available to the general public. He agreed to assume the role of navigator for a river survey for diamonds in Angola in order to help devise a method of GPS-guided services that could be applied in Arctic Canada. Soon after, Mr. Mihelcic designed and successfully implemented a snowmobile-mode GPS-guided cesium magnetometer system to acquire high resolution and high quality total field magnetics data in Nunavut. He has carried out these surveys every year since inception, averaging 2000 line-km to 3000 line-km of ground coverage per spring season.

Mr. Mihelcic helped to revive the standard use of Spectral IP soon after the Scintrex IPR12 receiver was introduced. Until that time, Scintrex *SoftII* was the only software available to calculate spectral parameters from Scintrex IPR11 data. He developed and implemented software that allowed IPR12 data to run with the original *SoftII* software. For environmental surveys, Mr. Mihelcic wrote software to streamline surveys that typically require on-site analysis and interpretation. This software allowed for rapid editing and importation to *Geosoft Oasis Montaj* software for presentation and reporting purposes.

ClearView is rounded out by operators and technicians that specialize at the task at hand. Personnel are hired by ClearView on a project by project basis. Ms. Sabina Mihelcic, administrator and field operator, assists Mr. Mihelcic with all aspects of the operations.