GM 65997

INDUCED POLARIZATION AND RESISTIVITY GEOPHYSICAL SURVEYS, VORTEX PROJECT - SULLIPEK EAST

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INTERPRETIVE GEOPHYSICAL REPORT

Consisting of:

INDUCED POLARIZATION AND RESISTIVITY GEOPHYSICAL SURVEYS

during the dates of
October 25th to November 9th, 2009

on the

VORTEX PROJECT - SULLIPEK EAST

Centered at or within
Latitude 48° 52', Longitude -65° 53'

GASPÉ AREA, QUEBEC

NTS: 22 A/13

for:

KIMPAR RESOURCES INC.
Bonaventure, Québec

Vickers Geophysics Inc.
Bathurst, New Brunswick

April 2010
Job No. W1709

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1.0 INTRODUCTION

At the request of the Kimpar Resources Inc., of 115-B Route Dion, Bonaventure, Québec, the geophysical contractor Vickers Geophysics Inc. of 2881 North Tetagouche Road, North Tetagouche, New Brunswick, conducted a deep pole-dipole Induced Polarization (IP) with resistivity survey from October 25th to November 9th, 2009 on Vortex Project - Sullipek East. The site is situated near the city of Murdockville, Québec (figures 1 & 2). The project was carried out under the supervision of Wayne Lockhart.

The objective of the survey is to determine at surface and at depth the chargeability and resistivity responses on the Vortex Project - Sullipek East to a calculated depth of 500 meters. The choice of the present chargeability and resistivity surveys is to aid the geological mapping with resistivity highs and lows responding to different rock types at a depth that was not explored with previous surveys. Areas of very low resistivity may represent conductive mineralization and may contain mineralization where coincident with a strong chargeability signature.

The induced polarization (IP) survey employed the pole-dipole array with ten potential dipoles (n=1 to 10) with dipole “a” spacing equal to 100 meters. The IP array configuration gives a calculated depth of 500m. The present 2009 survey was conducted on five survey lines covering a total of seven thousand three hundred line-meters (7 300m).

The following report describes the geophysical work undertaken, the instrumentation used, survey techniques implemented, logistical parameters and interpretation of the results with recommendations. The survey results are presented as pole-dipole pseudo sections displaying selected contoured field measurements and inversion of the pole-dipole results.

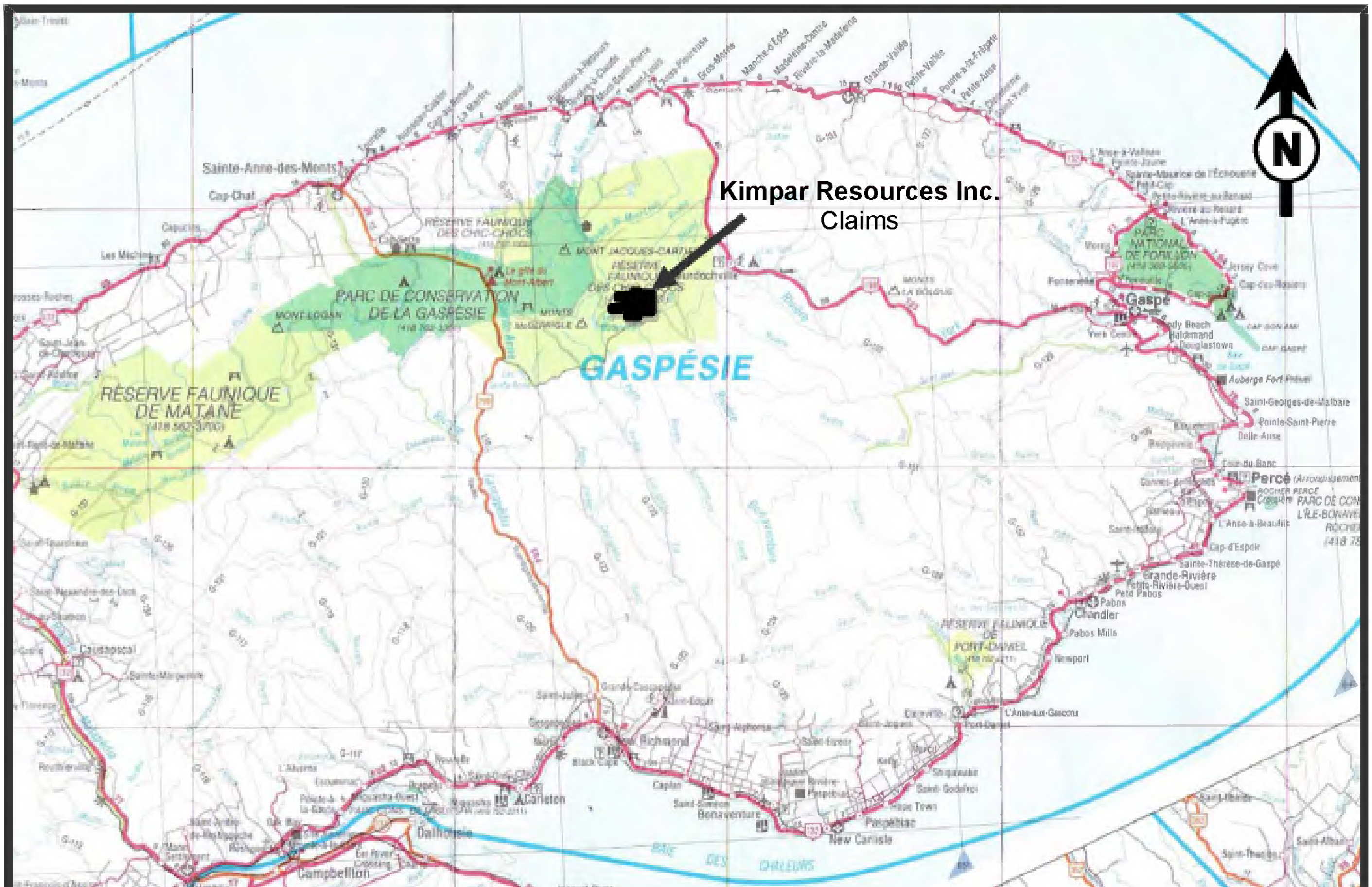
2.0 GENERAL SURVEY DETAILS

2.1 Location and Access

Vortex Project - Sullipek East is located approximately 70 southeast of Saint Anne des Monts, Quebec (**Latitude 48° 52’, Longitude -65° 53’**, NTS: 22 A/13, figures 1 & 2). The property can be easily accessed from gravel roads that are approximately 22 km east from Mont-Albert off highway 299. Most of the survey lines can be accessed via trails and roads that intersect the property and survey grid (figures 1 & 2). A four wheel All Terrain Vehicle (ATV) was used along old logging roads to transport wire and equipment within the survey grid.

2.2 Survey Grid and Coverage

Survey control on Vortex Project - Sullipek East consists of cut and chained survey lines with chained stations every 25 meters (Figure 2). The lines and stations are labeled according to the NAD83 UTM20 coordinate system.

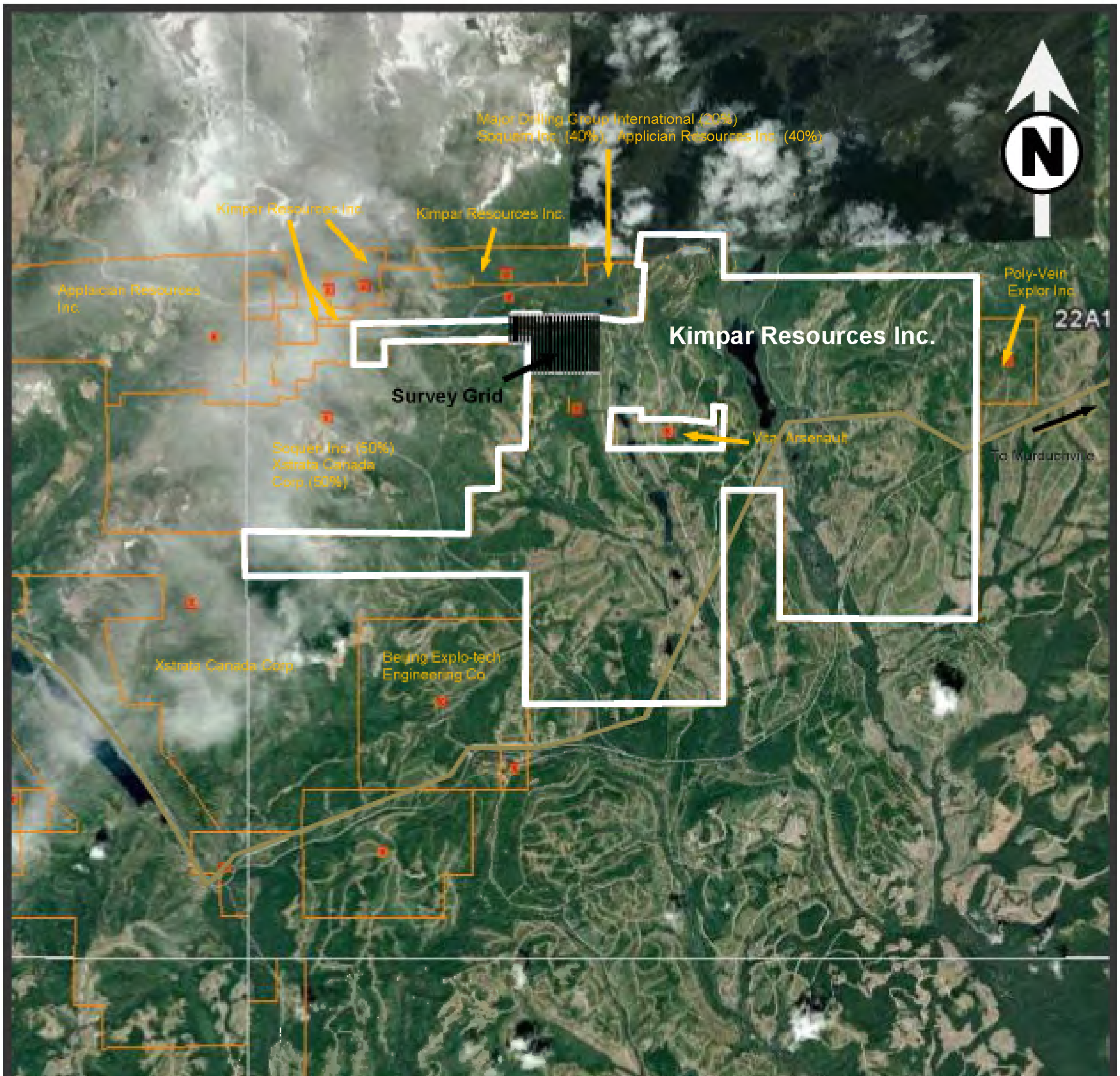


KIMPAR RESOURCES INC.
VORTEX PROJECT - SULLIPEK EAST
Claim Location Map
NTS: 22 A/13

Property Location Map & Survey Line

Scale 1: 48 500

Figure 1



KIMPAR RESOURCES INC.

VORTEX PROJECT - SULLIPEK EAST
Claim Block with Survey Grid
NTS: 22 A/13

Claim Map

Scale 1: 20 000

Figure 2a

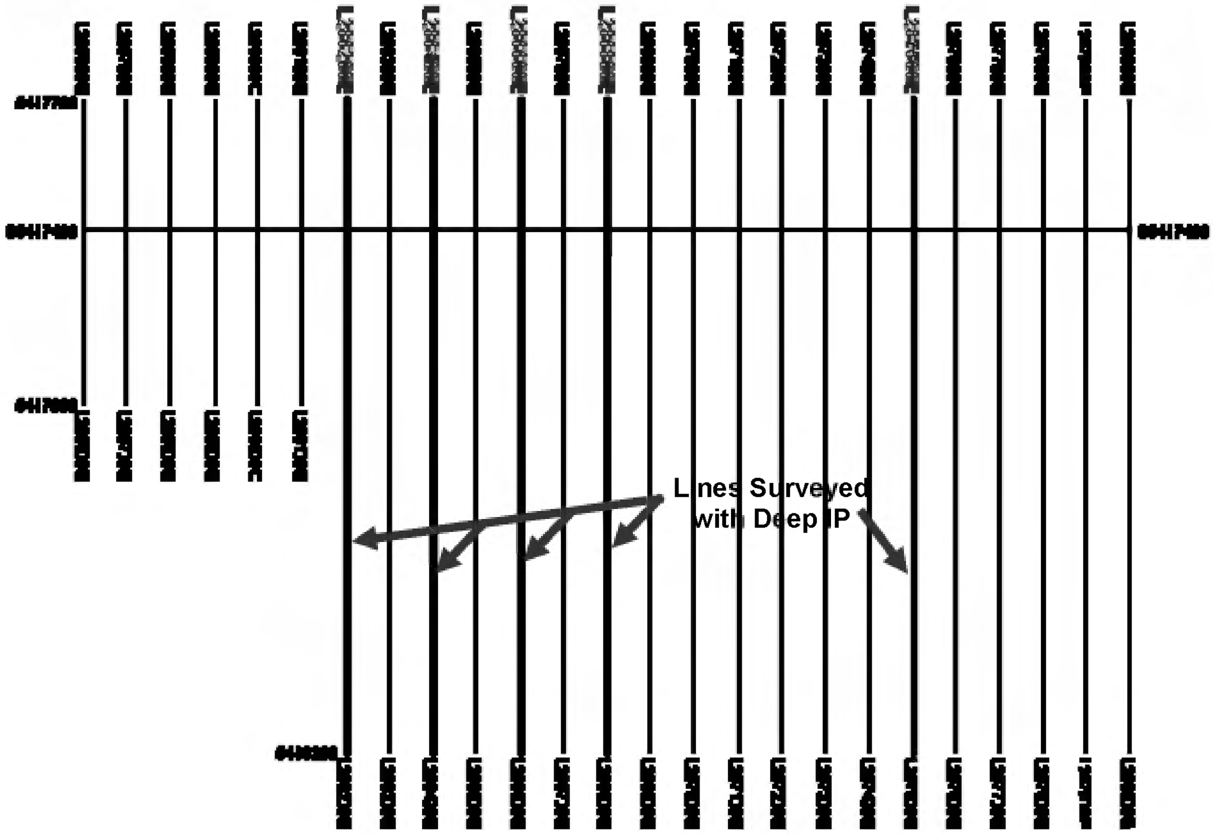


Figure 2b: Survey Grid and Deep IP Survey Coverage

The IP/resistivity geophysical program was undertaken from October 25th to November 9th, 2009 on Vortex Project - Sullipek East property over twelve production days. A total of seven thousand three hundred line-meters (7 300m, back current electrode to front pot) of IP/resistivity measurements were taken in the form of a pole-dipole survey. The pole-dipole IP/Resistivity production summary on the property is detailed in the following table 1 and on the position of the lines on figures 2 & 3.

P-LINE (Read Line)	**START C_1** (south Tx current electrode station)	**END P_7** (north Rx potential electrode station)	**TOTAL SURVEY COVERAGE**
L286200**E**	16200**N**	17700**N**	1500**m**
L286400**E**	16200**N**	17700**N**	1500**m**
L286600**E**	16400**N**	17700**N**	1300**m**
L286800**E**	16100**N**	17700**N**	1600**m**
L287500**E**	16300**N**	17700**N**	1400**m**
TOTAL:			**7 300m**

Table 1: Pole-Dipole IP/Resistivity Survey Coverage at Vortex Project - Sullipek East

2.3 Personnel

The deep pole-dipole IP/resistivity surveys require a minimum of six personnel. Data quality and placement of current electrodes was overseen by the main IPR-12 receiver operator, who is knowledgeable and familiar with statistical data quality and general interpretation of the data.

3. SURVEY METHOD

3.1 IP Survey Description

A total of seven thousand three hundred line-meters (7 300m, back current electrode to front pot) of IP/resistivity measurements were taken in the form of a pole-dipole survey on the Vortex Project - Sullipek East Grid. The pole-dipole IP/resistivity production is summarized in the above table 2.

The electrodes marked C_1 and C_2 comprise the current electrodes. Those marked by a P_1, P_2, etc., are the potential electrodes. The receiver measures the voltage across adjacent pairs of potential electrodes, e.g. P_1-P_2, P_2-P_3, ... P_{10}-P_{11}. (figures 3 & 6) These potential pairs are labeled by an integer 'n' that indicates the multiple of the dipole width that the given dipole lays away from the near current electrode.

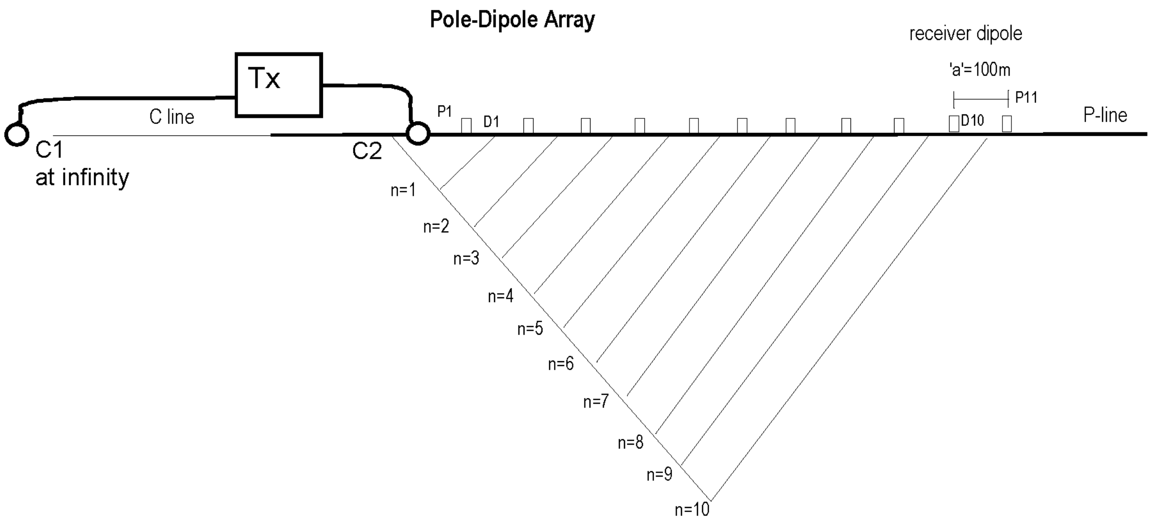


Figure 3a: Description of Pole-Dipole Array and Geometric Parameters

The further the potential dipole lies from the current dipole the greater is the depth of investigation. However, the effective limit of distance is restricted by the attenuation of the signal as the distance increases. Resolution of the survey is increased by decreasing the 'a' separation however a smaller 'a' also decreases the depth of investigation as illustrated in figures 3a and 3b.

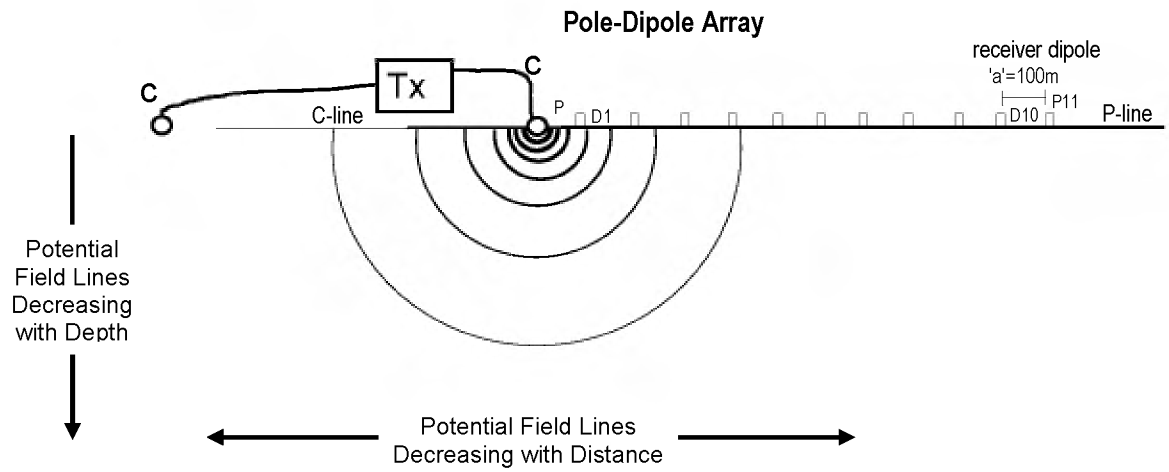


Figure 3b: Potential -Dipole Field Induced into the Ground

The phenomenon of the IP effect, which in the time domain can be likened to the voltage relaxation effect of a discharging capacitor, as caused by electrical polarization at the rock or soil interstitial fluid boundary with metallic or clay particles lying within pore spaces (figure 4). The polarization occurs when a voltage is applied across these boundaries. It can be measured quantitatively by applying a time varying sinusoidal wave (as in the frequency domain measurement) or alternately by an interrupted square wave (as in the time domain measurement).

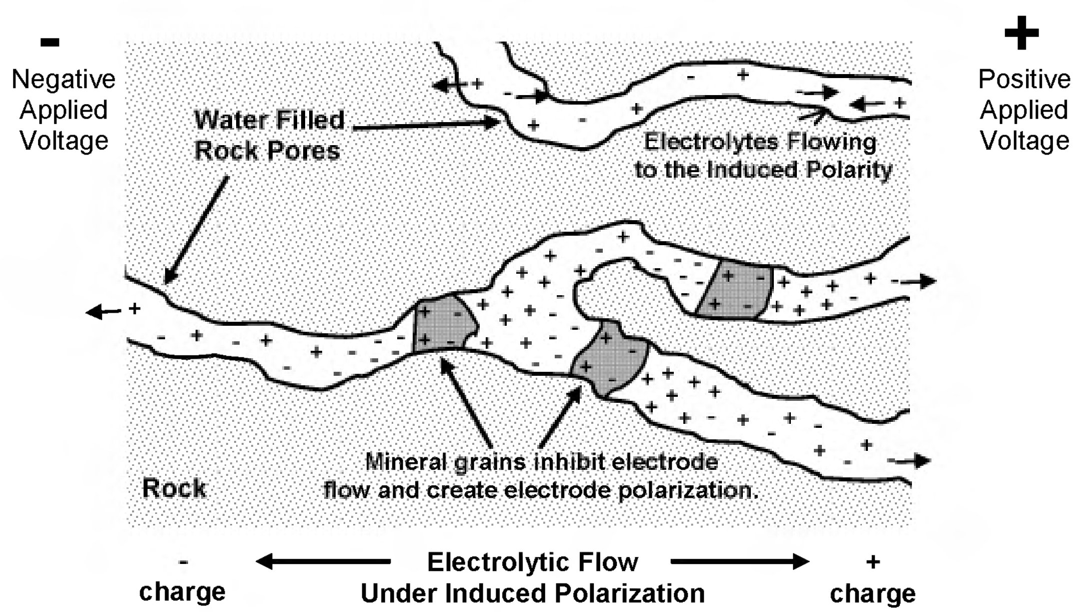
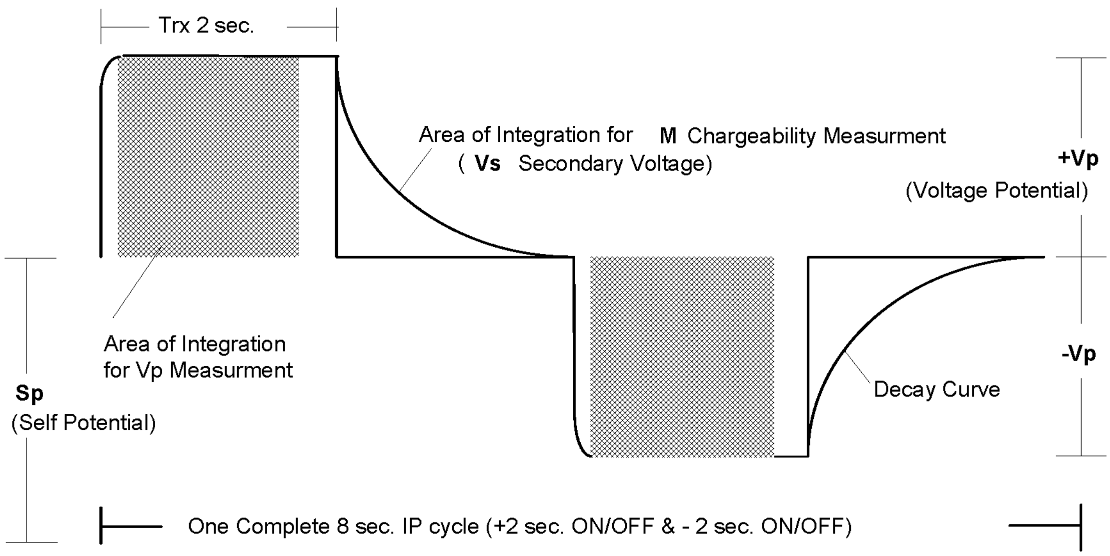


Figure 4: Polarization of Mineral Grains in Rock

In the time domain the IP effect is manifested by an exponential type increase or decrease in voltage with time. The frequency domain measures either the difference in voltage as a function of frequency (maintaining constant current) or the real with its quadrature component of the voltage compared to the transmitted current.

Both methods measure essentially the same phenomenon and theoretically the response of one can be translated to the other domain by fourier analysis. The two methods are qualitatively comparable if only a change in relative response amplitude is required. The IP survey on Vortex Project - Sullipek East was a time domain survey with the IP waveform illustrated below in figure 5.



<u>Figure 5: IP Waveform with IP Parameters for Each Receiving Dipole</u>

The current pole and receiver dipoles were setup on the P-line and measured with a roll-along receiver spread of seven electrodes with a dipole ”a” spacing of 25 meters. Both the primary voltages (Vp) and secondary voltage decays (chargeability M) were acquired in the time-domain, using a square waveform transmitted at a frequency of 0.125 Hz at 50% duty cycle (2-seconds ON, 2 seconds OFF).

3.2 Equipment and Survey Procedures

3.2.1 IP system

The survey IP survey employed the IPR-12 time-domain induced polarization/resistivity receiver manufactured by Scintrex Ltd. of Toronto Canada. The unit is a portable, microprocessor-controlled acquisition system capable of simultaneously measuring eight dipoles. The primary voltage, self-potential and individual transient windows are continuously averaged and the display is updated every cycle so the operator is fully aware of signal improvement. Geometric parameters, time parameters, primary voltage, array types and station numbers are fully programmable. A large display screen allows the operator real time access to <u>graphic and numerical display of measured data</u>. For each dipole, the unit measures or calculates the self-potential (Sp - mV), primary voltage (Vp - mV), apparent resistivity, the secondary voltage decay over 11 time slices, the total apparent chargeability (M - mV/V) and Cole-Cole Parameters (Spectral data). All programmed parameters, and measured and calculated values, are stored in solid state memory. (Appendix B).

The IPR-12 calculates in-field Cole-Cole spectral parameters and displays them in addition to the many other calculations and statistical parameters. The IPR-12 calculates the true chargeability (**"M"**) and time constant tau (τ) for a fixed "**c**" of 0.25. These parameters, which are recorded in memory, may be used to assist interpretation by distinguishing between different chargeable sources, based mainly on textural differences.

The Huntec 2.5W IP variable frequency transmitter was employed **(maximum output voltage 2400 volts**, weight 30 kg) in conjunction with a motor-generator. The generator consists of a Honda 6.5 Hp, three-phase 400 Hz generator (78 lb.). The system provided a stable, regulated current (10 amps maximum) at an 8 second, 50 percent duty cycle (2 sec. on-off).

Stainless steel current electrodes connected via 10 gauge copper wire were used for current injection contacts (C_1 & C_2). Electrode contacts were watered with saturated CaCl solution in order to improve the contact resistance when needed. Contact resistance varied between .02k-30k ohms, with an overall average of 25 k ohms. Transmitted currents between 0.3 - 3500.00 milli-amperes were achieved on high resistivity and low resistivity ground respectively.

All measured values were routinely stored in the receiver's solid state memory, and at the end of each survey day, the IPR-12 was interfaced with an IBM compatible notebook portable computer and the data transferred to disk for storage and processing. All data was copied on to secondary storage devices at the Bathurst office as a form of backup. Field plots were generated daily, using a HP 350C color printer, to monitor the data quality and to provide a preliminary interpretation capability. Motorola GRMS band radios provided communication links for the crew in the field.

The induced polarization survey on Vortex Project - Sullipek East implemented the pole-dipole electrode configuration, using a dipole "a" spacing of 100 meters and current pole of 100 meters from the first receiver dipole (figures 3 & 6). The receiver array consists one current pole (1 current rods 100m apart) and eleven receiver dipoles (11 receiver roads 100m apart) end-on dipoles, totaling 1000 meters in length, and the profiles were surveyed using the roll-along technique. The 10 (D_n) end-on dipoles consisted of 11 (P_n) receiving non-polarizing rod electrodes that are in turn connect to the receiver (Rx) with 14 gauge copper insulated wire. The survey lines were read at 100m intervals with the 10 dipole receiver dipoles read five at one time. Up to one thousand two (1000) line-meters of coverage were surveyed at Vortex Project - Sullipek East site on a good field day.

3.3 Quantities Measured and Data Processing

3.3.1 Resistivity Measurements and Processing

Once the data have been collected in the field, the receiver is interfaced with a microcomputer and the raw field data is transferred onto diskette for further reduction. Following this, the data sets are reduced, using Geosoft™ software to calculate apparent resistivity, total chargeability, and cole-cole parameters as explained in the following figures and equations.

The applied current and measured voltage (Vp) equates an electrical resistivity as a measure of the bulk electrical resistivity of the subsurface. Electricity flows in the ground primarily through the ground water present in the subsurface bedrock. The current flows primarily within the pore-spaces and fractures of the bedrock. Silicates, which form the bulk of the rock forming minerals, are poor conductors of electricity, weathered layers are generally intermediate conductors and sulphides and graphite are very good conductors. For any array, the value of resistivity is a true value of subsurface resistivity only, if the earth is homogeneous and isotropic. Since homogeneous and isotropic conditions are improbable, the apparent resistivity is a qualitative calculation based on measured and idealized results used to locate relative changes in subsurface resistivity only.

Due to the electrical potential field decreasing with distance from the current electrode (figures 3 & 7) a k-factor is used to normalize the resistivity.

The **K-factor calculations** are based on the *general formula* for the calculation of the potential distribution in a current pole.

(1) $\Delta V = I_p(1/C_1P_1 - 1/C_1P_2 - 1/C_2P_1 + 1/C_2P_2)/\pi$

The K-factor calculations are based on the grid coordinates of C_1, C_2 and P_1, P_2. (figures 3 & 6)

The **Apparent Resistivity** (ρ) calculation is defined as:

(2) $\rho = k * V / I$

Where:

V_p is the primary Voltage of the respective dipole

I is the transmitter current

K is the K-factor

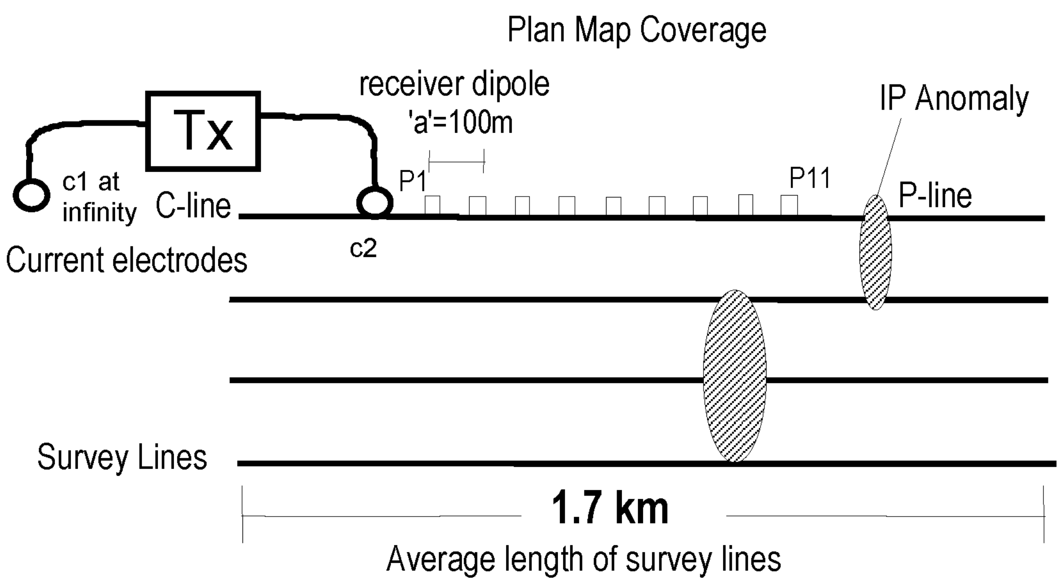


Figure 6: Plan Map Description of Pole-Dipole for Vortex Project - Sullipek East

The above diagrams (figures 3 & 6) illustrate the Pole-Dipole array electrode configuration and nomenclature as described in the above equations. The potential field distribution from the Pole-Dipole array configuration varies in intensity from D_1 to D_6 station to station. The potential field decreases with distance from the current electrodes. Figure 3b (Potential Field Distribution) illustrates the potential field as an approximation of current distribution with the decrease in current from D_1 to

D_{10}. When calculating the resistivity, the general formula for k-factor calculations corrects for this variation in the potential field distribution. One should note that the character of the potential field distribution limits the number of dipoles measured from a current setup. A receiver electrode spread of 10 dipoles was used on Vortex Project - Sullipek East.

3.3.2 IP Measurements and Processing

The IPR-12 also measures the secondary or transient relaxation voltage during the two second off cycle. Eleven slices of the decay curve are measured at semi-logarithmically spaced intervals between 50 and 1770 milliseconds after turn-off. The measured transient voltage when normalized for the width of the slice and the amplitude of the primary voltage yields a measure of the polarizability called chargeability in units of milli-volts/volt.

The **Chargeability (M)** calculation is defined in the following formulas and figures 4 & 6:

(3a) $$M = V_s * 1000 / V_p$$

Where:

(3b) $$V_s = \sum_{t_1}^{t_2} V_s dt$$

t_1 = time at beginning of slice
t_2 = time at end of slice
t_r = t_1-t_2 (integration time)
V_p = primary voltage measured during current on
V_s = secondary voltage measured during current off

The time slices M_9 M_{10} M_{11} (450 - 1050 sec, figure 7) were chosen as the optimal chargeability time windows for Vortex Project - Sullipek East IP survey.

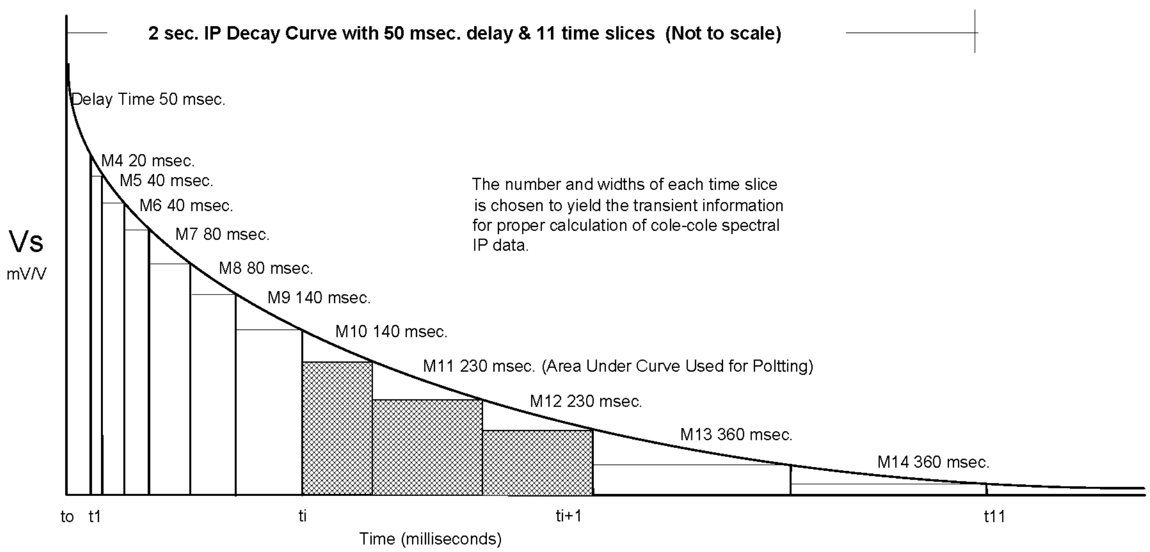


Figure 7: IPR-12 Time Slices of a 2 sec. IP Decay Curve (Not to Scale).

The measurement of the time-domain IP chargeability (**M**) is given by equations 3a & 3b where ti, ti+1 are the beginning and ending times for each of the chargeability slices as set in the IPR-12 for a 2 sec ON/OFF cycle. To ensure optimum anomaly resolution and noise suppression - according to the specific geologic/geomorphologic environment the chargeability time-gate chosen for Vortex Project - Sullipek East grid is M_X (Where X represents 450 - 1050 msec from ti, to t_{i+1} figure 7).

3.3.3 Spectral Observations and Processing

Spectral data was observed in the field and used as a data quality check. The spectral data is processed and stored with all IP and resistivity parameters, but is not plotted as of the date of this report.

The spectral parameters "**M**" and **tau (τ)** with "**c**" fixed at 0.25 are calculated in-field by the IPR-12. On the bases of Johnson (1984) a summary of the spectral parameters is as follows:

"M": The chargeability ("M") is the relative residual voltage which would be seen immediately after shut-off of an infinitely long transmitted pulse (Seigel, 1959). "**M**" is the numerically derived equivalent to Seigel's "m" or theoretical chargeability. It is related to the traditional chargeability, which is measured at discrete time intervals after the shut-off of a series of pulses of finite duration.

The "**M**" calculated on the IPR-12 is the ratio of voltage immediately after, to the voltage just before an infinitely long transmitted pulse (measured from the 2 second on/off cycle) and may represent the volume percent metallic sulphides.

tau (τ): The time constant tau **(τ)** and exponent (c) are measurable physical properties which describe the shape of the decay curve in time domain or the phase spectrum in frequency domain. For conventional IP targets, the time constant has been shown to range from approximately .01 seconds to greater than 100 seconds and is thought of as a measure of grain size. Fine grained mineralization loses charge quickly; coarse grained mineralization holds charge longer. The EM effect associated with IP and the breakdown of the capacitive membrane effect are other factors that are recently being understood.

c: The exponent (c) has been shown to have a range of interest from 0.1 to 0.5 or greater and is diagnostic of the uniformity of the grain size (0.5 single grain size - 0.1 - many grain sizes).

"M" and **tau (τ)** are generally plotted in pseudo-section format for the Pole-Dipole data. Recalculation of the IP data with a variable spectral parameter, c, and plotting of other time slices of decay curve (M_4 to M_{14}) may be found in the data disks in the appendix.

Please note that this data collected has minor differences to Johnson's (1984) approach. Field experience has shown several phenomena that can alter the shape of the time-domain induced polarization decay.

- electromagnetic (EM) coupling
- interline coupling between read wires
- variations of the average size of metallic particles
- degree of interconnection of metallic particles
- multiple IP sources
- telluric noise

To help resolve these problems the first time slices are omitted from the cole-cole calculation (curve fitting) in addition to the extra care in collecting the data. The exponent "c" is fixed at 0.25 to help achieve a better fit, provided c is close to 0.25.

The spectral parameters have proven useful in differentiating between fine and coarse-grained sulphides. Experience has shown the "**M**" parameter (derived m) is helpful in ranking anomalies in areas of high resistivity, where the apparent chargeability is increased accordingly. Also in areas of low conductivity, the parameter has proved advantageous in determining which anomalies have sulphide sources.

In summary, the source discrimination capability of the IP measurement (in the time or frequency domain) is not always apparent, but, it is recommend that in areas with geologic control, the IP decay forms be studied for significant and systematic differences. If such differences appear (at a particular receive time), such may be applied elsewhere in the same geologic environment.

More detailed descriptions on the theory and application of the IP/Resistivity method, and the Cole-Cole Spectral parameters, can be found in the list of references of appendix A.

3.4 Difficulties Encountered and Accuracy of Measurements

The quality of measurements in the field was closely monitored during the course of the survey in order to detect any weaknesses, either technical or natural, which could have affected the quality of the data recorded. Overall, the survey progressed deliberately and efficiently with a few exceptions over areas of EM distortion and possible interpreted geological contacts. A considerable amount of time was needed to obtain a valid reading over such ground.

IP & Cultural Noise

The location of the Vortex Project - Sullipek East IP survey lines are some what isolated and do not lend to apparent cultural features. However, <u>linear features</u> such as long cables of 25m or more that may be left from previous logging operations, groundings along power-lines, chain link fences and wire from drilling or previous geophysical surveys may cause problems. The results of such cultural features can give an EM distortion that is distinguishable from conductive mineralization by an experienced operator. No such problems were noticed.

<u>Non-linear</u> cultural features such as abandoned cars, sheet metal, fuel drums, logging equipment and garbage that include metal cans do not redirect current hundreds of meters or act as a capacitor. The IP and resistivity do not respond to these types of relatively small non-linear features, unless a reading is taken directly on one of these cultural sources. If a small cultural feature were not noticed at the placement of an IP receiver rod, a cultural response would be suspected with a high spectral response and above average standard deviation of errors. The correction would be made in the field by moving the IP receiver rod a few feet and repeating the reading.

An average current of only 0.3 A was maintained throughout the survey. Overall, a repeatability of approximately 1 decade ohm-m for the resistivity, and 0.5mV/V for the chargeability were easily maintained throughout the course of the survey. In general, the excellent data quality is evidenced by the low standard errors of measurement and high repeatability-as shown in the relatively smooth nature on the pseudo sections.

The appearance of some irregular and discontinuous apparent resistivity anomalies may be attributed to changes in rock types that may distort the idealized potential field measured at the receiving dipoles. The result of both the topography and significantly differing geoelectrical lithologies will distort the resistivity and IP response at a contact.

The appearance of some irregular and discontinuous chargeability and cole-cole spectral anomalies may also be attributed to relatively small cliffs and interpreted trends. The following figure 8 depicts such an example.

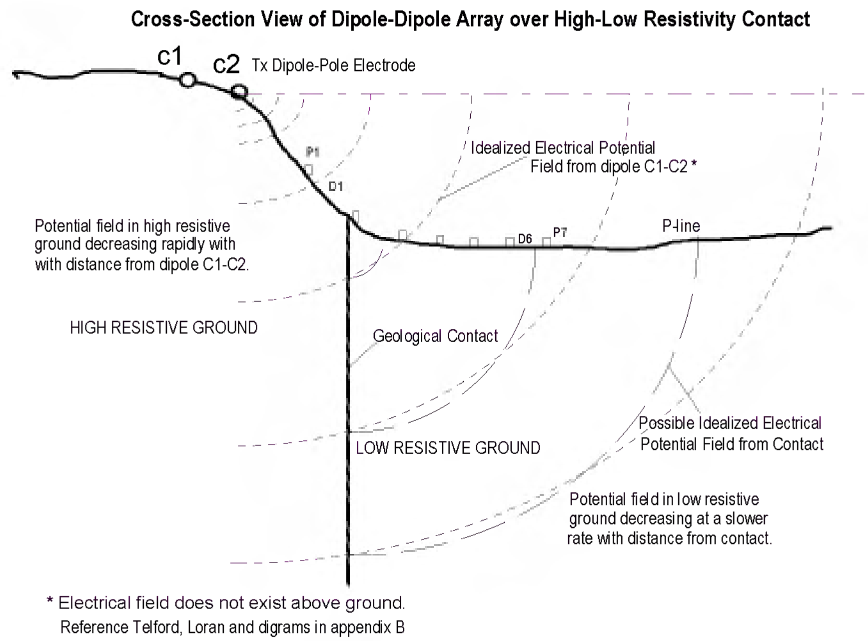


***Figure 8: Approximate Distortion of the Potential Field with Changes in Resistivity and Topography** (section view, not to scale)*

The data collected on the Vortex Project - Sullipek East Grid exhibited electromagnetic (EM) distortions on the IP decay curve that can be diagnosed graphically in the field in a similar manner as illustrated in figure 10. Some of the distorted readings are associated with the geology and mineralization while other EM distortions are related to cultural features. The natural occurring geological EM distortions include geological contacts with significant variable conductivity of igneous and metamorphic rock types, trends striking sub-perpendicular to the survey line, and most importantly conductive metallic mineralization. The cultural features included power-pole ground wires and chain link fences. To minimize the EM distortion effect, various currents were applied, readings repeated, and the best reading recorded for plotting.

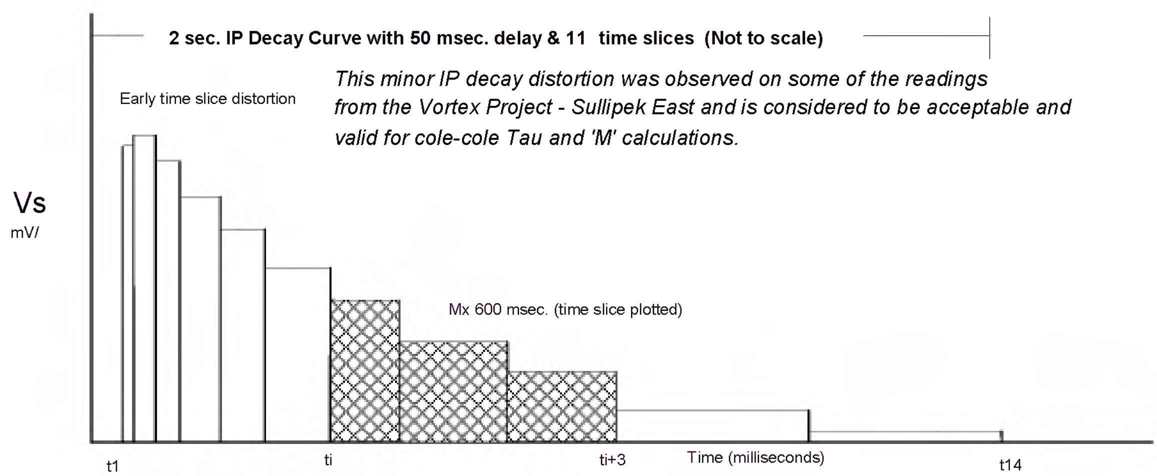
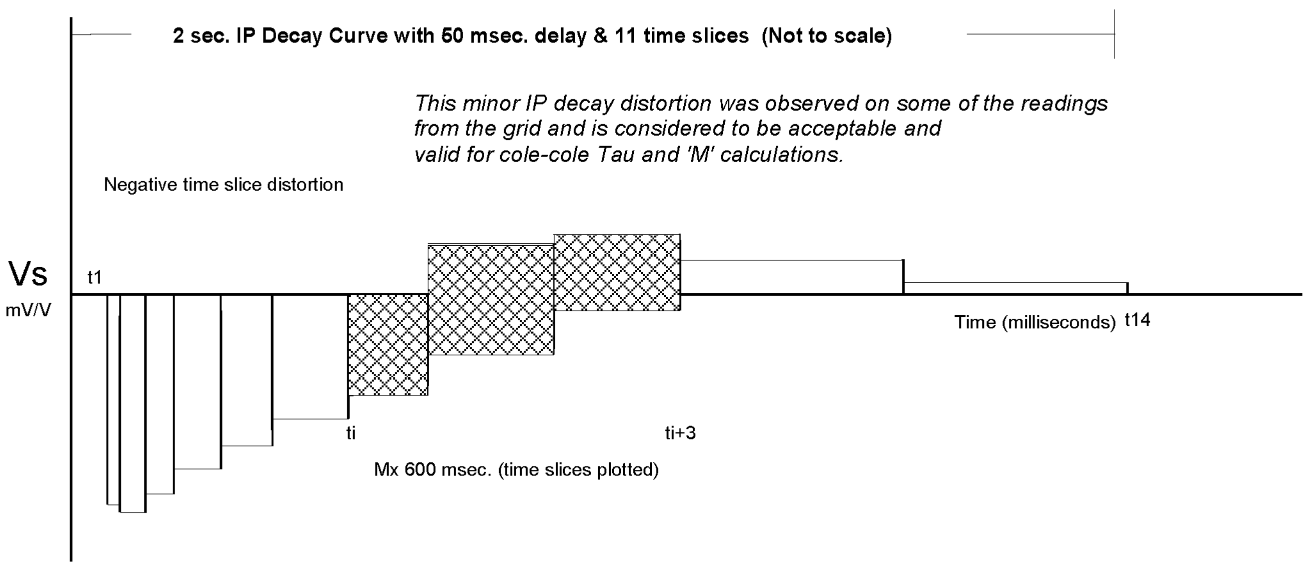


Figure 10: Early Time Slice IP Decay Resulting from Minor EM Effects.

Some conductive responses, that are either natural or cultural, give a minimal to strong EM distortion effect on the IP decay curve. Figure 10 illustrates a minor EM distortion suppressing the first four semi-logarithmic IP decay slices. Along the Vortex Project - Sullipek East Grid this minor EM distortion is usually a prelude to a much stronger EM distortion a few stations further along the survey-line. As the survey approaches a strong EM conductor, the negative decay readings can not be compensated by reducing the current. When the IP decay appears as in figure 11 only the resistivity is reliable as an interpretation tool where the corresponding very low resistivity usually indicates a strong conductive response.

With this survey there were negative decay readings along the east half of the grid that can be attributed to a strong EM conductor. With such a situation only the resistivity is reliable as an interpretation tool where the corresponding very low resistivity usually indicates a strong conductive response.



<u>Figure 11: Early to Middle Time Slice IP Decay Resulting from Strong EM Effects.</u> ***<u>(Not to Scale).</u>***

The data collected on the Vortex Project - Sullipek East Grid exhibited electromagnetic (EM) distortions on the IP decay curve that can be diagnosed graphically in the field in a similar manner as illustrated in figures 10 and 11. Some of the distorted readings are associated with the geology and mineralization while other EM distortions may be related to cultural features. The natural occurring geological EM distortions include geological contacts with significant variable conductivity of igneous and metamorphic rock types, trends striking sub-perpendicular to the survey line, and most importantly <u>conductive metallic mineralization</u>. To minimize the EM distortion effect, various currents were applied, readings repeated, and the best reading recorded for plotting.

3.5 Presentation of Results and Digital Data Formats

All geophysical data are included with this report and are listed in Appendix C (List of Maps). The IP/resistivity survey results are presented as contoured pseudo-sections with posted values. Within this study all apparent resistivities are in ohm-m, all chargeability values are expressed in mV/Volt and all Metal Factor values are expressed in mV/V / ohm m.

The IP/resistivity data with is plotted in pseudo section format using GeosoftTM IP mapping system programs. The ρ (apparent resistivity) and M_X chargeability are presented in stacked pseudo-section format at the scale of 1:2500 (1cm=25m) scale and filtered plan maps at the scale of 1:5000 (1cm=50m) scale (Appendix C).

All IP data are processed and separated according to line numbers containing all geoelectric parameters and statistical information. They are stored as MicroSoftTM ASCII files in both Scintrex IPR-12, GeoSoftTM .XYZ and Oasis montaj database formats. The files use the following labeling formats:

Raw data files from the IPR-12 receiver are named according to date and the consultant's job number. The complete IPR-12 dump file format includes current electrode coordinates and all data collected and calculated. The description of the data is included with each dump file.

The data files are further broken down into line files and survey component, i.e., M_{11}, RES, TAU, etc., and labeled according to line number.

GeoSoft / Scintrex Formats

287500E.DMP

Line No. ——— ——— IP Component*

* *Coordinates of current electrodes and all necessary PseudoSection information is contained within the file.*

The ASCII format of each line file follows**:**

LINE STATION 1 STATION 2 Vp A Sp M_4 to M_{14} "M" τ

Where **Vp, A, Sp, M_4 to M_{14}** are described in the above sections of this report.

The geophysical pseudo sections are stored as GeoSoftTM Oasis and converted to other digital formats. Digital formats included, Tiff, JPG, MapInfo, ArcView and .DXF formats and the files are labeled according to map numbers (see Appendix B). The GeoSoftTM maps can be viewed, exported into various formats and plotted using GeoSoft Montaj viewing software that is included with the CD-ROM. The Geosoft Oasis viewer is free and can be downloaded from the GeoSoft Website.

4.0 INTERPRETATION AND RECOMMENDATIONS

At the request of the Kimpar Resources Inc., of 115-B Route Dion, Bonaventure, Québec, the geophysical contractor Vickers Geophysics Inc. of 2881 North Tetagouche Road, North Tetagouche, New Brunswick, conducted a pole-dipole chargeability with resistivity (IP) from October 25th to November 9th, 2009 on the Vortex Project - Sullipek East. The claim area is situated southwest of the city of Saint Anne des Monts (figures 1 & 2) where survey crew was based. The project was carried out under the supervision of the Mr. Wayne Lockhart of Kimpar Resources Inc.

The induced polarization (IP) survey employed the pole-dipole array with ten potential dipoles (n=1 to 10) with dipole "a" spacing equal to 100 meters. The survey was conducted on five survey lines averaging 1 300m in length for a total of 7 300m.

The objective of the survey is to determine at surface and at depth the chargeability and resistivity responses on Vortex Project - Sullipek East to a depth of 500m and to evaluate significant values that may be the result from economic mineralization. The choice of an IP survey aids the geological mapping with resistivity highs and lows responding to different rock types when interpreted with chargeability. The results of the survey on the selected lines reveal areas of moderate low resistivities that may represent weak conductive mineralization and may be further validated for mineralization where coincident with the strong to very strong chargeability signatures.

Introduction and Classification

Almost all sulphide bearing and oxide minerals are electrically conductive and can be detected by IP electrical techniques when present in massive to small disseminated quantities. It is important to note that there are exceptions.

The main sulphide exceptions that do not respond to IP and resistivity are sphalerite, cinnabar and stibnite. Some of the main non-sulphur oxides that exhibit electrode polarization include magnetite, ilmenite, pyrolusite, cassiterite and graphite. Clay may give a relatively weak IP response. The apparent resistivity will map the massive conductive mineralization as a resistivity low, if mineralization is in sufficient concentration, and will aid in mapping lithological units, zones of alteration and silicification ,i.e., high resistivity, and shear zones. The following interpretation does not claim to define non-conductive minerals, but it is possible to get chargeability IP responses where non-conductive minerals are present due to their association to disseminated minerals such as pyrite (FeS_2).

CHARGEABILITY (IP) RESPONSE CLASSIFICATION	RESISTIVITY RESPONSE CLASSIFICATION
Very Strong greater than (>) 40 mV/V	**Very Low** Less than (<)100 ohm m
Strong 30 to 40 mV/V	**Low** 100 to 500 ohm m
Moderate 20 to 30 mV/V	**Moderate Low** 500 to 1000 ohm m
Weak 10 to 20 mV/V	**Weak Low** 1000 to 2000 ohm m

Figure 12: Interpretive Classification Symbols for Chargeability and Resistivity

Vortex Project - Sullipek East Geophysical Interpretation

The results of the chargeability and resistivity surveys on Vortex Project - Sullipek East 2009 IP grid meet the objectives with a range of chargeability highs from strong (30 to 40 mV/V) to very strong (greater than 40mV/V) associated with moderate low resistivity responses (500 to 1000 ohm x m) that appear at a depth of approximately 250 meters (n=5) and deeper. The values may delineate possible sulphide mineralization. These values are taken from the pseudo-sections and the location and depth (each ‘n’ value is equal to 50m depth) arrived from the inversions. Plan maps of the filtered chargeability and resistivity give an overview of the strong chargeabilities and moderate low resistivities with an east west strike. The plan maps are based on a summation (filter) of the pseudo-sections and appear to approximate the inversions. Due to various factors that include, changes in overburden conductivity, rock type, geological structures and EM effects, there is no attempt to directly relate mineralization to the strength of the IP responses.

Strong to Very Strong Chargeability (centered at approximately 5416950E)

From the results of the pseudo-section and inversions, there is a significant very strong chargeability greater than 40mV/V at approximately 250 meters depth striking east southeast from line L286200E centered at station 5417100N to line L286400E centered at station 5416800E. Due to characteristics of the inversion program, this very strong chargeability high appears to connect with a second very strong chargeability high to its south; however this connection may not be real. The very strong chargeability may continue east from line L286600E at station 5417000N to line L287500E at station 5417050N where the inversion diminished the chargeabilities strength. The inversion also reveals small narrow high chargeabilties that appear to come to surface. This may represent small stringer mineralization that may come to surface and could be verified with a detailed IP survey consisting of a 25 meter or 50 meter ‘a’ spacing.

The chargeability plan map (C-1) also expresses the main chargeability trend that appears weaker due to summation and filtering, with the strongest chargeability on line L286400E. Associated with this strong high chargeability is a moderate low resistivity (see R-1) that is intersected and directly south of the main chargeability.

The resistivity pseudo-sections give low to moderate low resistivities values of 500 to 1000 ohm x m below and south of the main very strong chargeability at 250 meter inversion calculated depth. High resistivities greater than 5000 ohm x m are above and to the north of the main chargeability on lines L286200E to line L286600E. The inversion gives a small weak to moderate low resistivity above and to the north on lines L286800E at station 5416950N and line L287500E at station 5417050N. There is a deep moderate low resistivity on the north edge of line L5417500N that is below the weak chargeability. The association of chargeability highs with resistivity lows or a high/low resistivity contact with may be a significant factor for mineralization. The resistivities are not significantly low enough to respond to conductive mineralization and may only respond to geophysical relatively high frequency electromagnetic (EM) such as VLF or high frequency HLEM (maxmin).

Strong to Very Strong Chargeability (south end of lines)

The pseudo-sections and inversions indicate a second moderate to strong chargeability high on the south end of the survey lines that is coincident with a moderate low resistivity on most of the lines. It is important to note; the inversion gives results beyond the pseudo-section that may not be the best representation of the geophysical subsurface. On line L286200E at station 5416450N the chargeability is strong with values greater than 30 mV/V and coincident with low resistivities less than 500 ohm x m to a depth of approximately 50 meters. This significant anomaly is interpreted to continue east northeast to line L286400E at station 5416450N with a moderate chargeability and moderate low resistivity. On line L286600E, the anomaly is assumed south of the line due to the survey running a few hundred meters short, but the anomaly appears to continue on line L286800E with a deeper response. Below this resistivity low, a deeper broad moderate low resistivity at a depth greater than 350 meters is observed on the inversion and is consistent to line L286800E.

On line L286800E the pseudo-sections and inversions continue with the "second" very strong chargeability high at station 5416450N with a corresponding moderate low resistivity. The resistivity is interpreted by the inversion to a depth no greater than 100m. The chargeability has a depth similar to the moderate low resistivity with a second deeper chargeability that is centered at approximately 200 meters depth. This deeper chargeability is between the relatively shallow resistivity above and the large broad moderate low resistivity below. The strike of the "second" chargeability may continue to line L287500E at station 5416500N centered at a depth of approximately 150 meters and is interpreted to be coincident with the a moderate low resistivity. The association of the high chargeabilities that are coincident or adjacent to resistivity lows may be significant for possible mineralization and further investigation is recommended.

It is hoped that results from this survey will be used in conjunction with other available geological, geochemical and geophysical information, through mapping and drilling, to further determine the potential of the Vortex Project - Sullipek East.

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QUÉBEC

Respectfully Submitted,

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APPENDIX A

LIST OF REFERENCES

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APPENDIX B

INSTRUMENT SPECIFICATIONS

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INSTRUMENT SPECIFICATIONS

SCINTREX IPR-12 TIME DOMAIN IP/RESISTIVITY RECEIVER TECHNICAL SPECIFICATIONS

Inputs	Multiple inputs, allowing from 1 to 8 simultaneous dipole measurements. 9 binding posts mounted in a single row for easy reversal of the connection of the dipole array.
Input impedance	16 MΩ
Input voltage range	50 µV to 14 V
Sum Vp2....Vp8	14 V
SP bucking range	± 10 V. Automatic, linear slope correction operating on a cycle by cycle basis.
Chargeability range	0 to 300 m V/V
Tau range	2^{-14} to 2^{11}s
Reading resolution of Vp, SP and M	Vp - 10 µV, SP - 1 mV, M - 0.01 m V/V
Absolute accuracy	Better than 1%
Common mode rejection	> 100 dB
Vp integration time	10% to 80% of the current on time.
IP Transient program	Total measuring time keyboard selectable at 1,2,4,8,16 or 32 seconds. Normally 14 windows except that the first four are not measured on the 1 second timing, the first three are not measured on the 2 second timing and the first is not measured on the 4 second timing. See diagram in the Measurement and Calculation section. An additional; transient slice of a minimum 10 ms width, and 10 ms steps, with delay of at least 40 ms is keyboard selection.
Transmitter timing	Equal on and off times with polarity reversal each half cycle. ON/OFF times keyboard selectable at 1,2,4,8,16 or 32 seconds. Timing accuracy of transmitter better than ± 100 PPM required.
External circuit test	All dipoles are measured individually in sequence, using a 10 MHz square wave. Range is 0 to 2 MΩ with 0.1 kΩ resolution. The resistance is displayed on the LCD and is also recorded.
Synchronization	Self synchronizes on the signal received at a keyboard selected dipole. Time limited to avoid mis-triggering.

SCINTREX IPR-12 TIME DOMAIN IP/RESISTIVITY
RECEIVER TECHNICAL SPECIFICATIONS (CONT.)

Filtering	RF filter, anti-aliasing filter, 10 Hz 6 pole low-pass filter, statistical noise spike removal, linear drift correction, operating on a cycle by cycle basis.
Internal test generator	SP = 1200 m V, Vp = 807 m V, M = 30.28 m V/V
Analog meter	For monitoring input signals, switchable to any dipole via keyboard.
Keyboard	17 key keypad with direct access to the most frequently used functions.
Display	16 line by 42 characters, 256 *x* 128 dot graphics liquid crystal display. Displays instruments status during and after the reading.
Display Heater	Used in below -15°C operation. Thermostatically controlled. Requires separate rechargeable batteries for heater display only.
Memory capacity	Stores information for approximately 400 readings when 8 dipoles are used, more with fewer dipoles.
Real time clock	Data is time stamped with year, month, day, hour, minute and second.
Digital output	Formatted serial data output to printer or computer. Data output in 7 or 8 bit ASCII, one start, stop bits, no parity format. Baud rate is keyboard selectable, for standard rates between 300 Baud & 57.6 k Baud. Selectable carriage return delay to accommodate slow peripherals. Handshaking is done by X - on/X – off.
Standard rechargeable batteries	Eight rechargeable Ni-Cad D cells. Supplied with a charger, suitable for 115/230 V, 50 to 60 Hz, 10 W. More than 20 hours service at + 25°C, more than 8 hours at - 30°C.
Ancillary rechargeable batteries	An additional 8 rechargeable Ni-Cad D cells may be installed in the console along with the Standard Rechargeable Batteries. Used to power the Display Heater or as back-up power. Supplied with a second charger. More than 6 hours service at - 30°C.
Use of non-rechargeable Batteries	Can be powered by D size Alkaline batteries, but rechargeable batteries are recommended for longer life and lower cost over time.
Field wire terminator	Used to custom make cables for up to eight dipoles, using ordinary field wire.
Optional multi-conductor cable Adapter	When installed on the binding posts, permits connection of the Multi-dipole Potential Cables.
Operating and storage: Temperature range	- 30°C to + 50°C
Dimensions	Console: 355 *x* 270 *x* 165 mm Charger: 120 *x* 95 *x* 55 mm
Weight	Console: 5.8 kg Standard or Ancillary Rechargeable Batteries: 1.3 kg Charger: 1.1 kg

HUNTEC 2.5Kw INDUCED POLARIZATION TRANSMITTER

Power:	96-144 V line to line, 3 phase, 400Hz (from Huntec generator set), 1000 W maximum
Output:	Voltage: 150-2200V dc in 8steps Current: 10A maximum on low ranges
Current Regulator:	<.1% current change for 10% change in load resistance. Settling time to 1% approximately 15 msec.
Output Frequency (selectable in binary steps on front panel):	01/16 Hz to 1Hz (time domain and complex resistivity) 1/16 Hz to 4 Hz (frequency domain).
Frequency accuracy:	± 50 ppm, -30°C to 60°C
Output duty cycle defined as $t_{on}/t_{on}+t_{off}$):	½ to 15/16 in increments of ω (time domain) 15/16 (complex resistivity) ¾ (frequency domain)
Output current meter:	Two ranges – 0-5A, 0-20A
Ground resistance meter:	Two ranges – 0-10K ohms, 0-100K ohms
Input voltage meter:	0-150 v
Dummy load:	Two levels: 1750W, 5250W
Temperature Range:	-34^{0}Cto + 50^{0} C
Size:	53 x 43 x 80 cm (21 x 17 x 31.5 ins)
Weight:	27 kg (59 lbs)

APPENDIX C

LIST OF MAPS

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VORTEX PROJECT - SULLIPEK EAST

MAP TYPE	MAP NUMBER Line Number	SCALE
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L286200E	1:2500
Chargeability & Resistivity with Pseudo-Sections & Inversions	L286200E	1:2500
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L286400E	1:2500
Chargeability & Resistivity with Pseudo-Sections & Inversions	L286400E	1:2500
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L286600E	1:2500
Chargeability & Resistivity with Pseudo-Sections & Inversions	L286600E	1:2500
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L286800E	1:2500
Chargeability & Resistivity with Pseudo-Sections & Inversions	L286800E	1:2500
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L287500E	1:2500
Chargeability, Resistivity, Metal Factor & Tau Pseudo-Section,	L286200E	1:2500
Chargeability Plan Map	C-1	1:5000
Resistivity Plan Map	R-1	1:5000

Digital data and digital maps in various formats are included in a Microsoft compatible CD-ROM.