# INTERPRETIVE GEOPHYSICAL REPORT

**Consisting of:**

# DEEP INDUCED POLARIZATION AND RESISTIVITY GEOPHYSICAL SURVEYS

**on the**

## WITNEY BROOK ( 4068 )

D. JOHNSTON
Latitude 47.057°, Longitude -65.978°, NAD83, 8 Claims
Claim Numbers 1623084E, L, 1623094A-B, G-J

within the area of:

Northumberland County
NTS: 21 P/04, O/01

Within the dates of:
March 21st to March 30th, and August 18th to 25th 2022

## MIRAMICHI AREA, NEW BRUNSWICK

**for:**

## ANTHONY JOHNSTON
## Miramichi, New Brunswick

**Vickers Geophysics Inc.**
**Bathurst, New Brunswick**

**August 2022**
**Job No. W0422**

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## 1.0 INTRODUCTION

At the request of the Anthony and Delbert Johnston, of Miramichi, New Brunswick, Vickers Geophysics Inc. of 2881 North Tetagouche Road, North Tetagouche, New Brunswick, conducted deep pole dipole induced polarization with resistivity ( DPD - IP / resistivity ) survey within the dates of March 21st to March 30th, 2022 on Mullin Stream West Claim Block 9405**, Witney Brook** and August 18th to 24th on Mullin Stream Northwest ( 10548 ). The claim blocks are situated approximately 25 kilometers northwest of the village of Sunny Corner, NB ( figures 1 & 2 ). The project was carried out under the request of prospectors A. and **D. Johnston**, the holder's of the claims.

The objective of this deep pole dipole IP / resistivity geophysical survey is twofold.

**First objective** is to locate and interpret significant deep mineralization to depth of hundreds meters that may be of disseminated to massive mineralization, i.e., strong chargeable and low resistivity conductors as classified below in table 2b. This first objective is within an area where past geophysics and drilling results reveal very weak conductive responses as indicated with previous time domain electromagnetic surveys that do not give a reliable drill target from relative weak conductors ( TDEM / Pulse EM, NB from assessment file 473936 ). This area was also surveyed with shallow IP / resistivity that gave strong chargeability from disseminated mineralization and moderate low resistivity from weak conductivity ( assessment files 473936 ). The previous IP / resistivity results are relatively better to interpret than the EM results but are limited to 75 meters depth and cannot indicate a potential deep mineral source.

**Second objective** is to receive a measurable high quality reliable chargeable and conductive response that comes from a depth that extends hundreds of meters below the previous exploration limited of 75 meters. This is achieved by implementing a survey design that can induce to depth and receive from depth deep electric responses from far below a few hundred meters. These deep received signals can reveal both shallow and deep mineralization from both large mineralized zones and small mineralized stringers. With high quality results, one can interpret and display the accurately measured data in standard formats without filtering and biases.

**These two objectives** are met with the deep pole dipole IP / resistivity ( DPD - IP ) survey chosen to explore, with consistent 50 meter resolution, high quality reliable resistivity and chargeability responses from surface to a calculated depth of 400 meters. The experience and survey customization of VGI achieves deep high quality results from their deep IP / resistivity survey design with reliable and unedited inversions that can reveal both large mineralized zones and small stringer mineralization. This objective is achieved within and beyond the defined area of interest, where past drilling and geophysical exploration consisted of relatively shallow exploration techniques, with two and three dimensional displayed that can be accurately interpreted.

The induced polarization ( IP ) survey employed the deep pole dipole array with sixteen receiving potential dipoles ( n = 1 to 16 ) utilizing a dipole "a" spacing of 50 meters ( figure 3 ). The IP array configuration gives a calculated depth of 400 meters. The present 2022 Mullin Stream Northwest, Mullin Stream West and Witney Brook surveys were conducted on chained and flagged survey lines covering a total of four thousand one hundred fifty line - meters ( 4 150 meters ).

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 deep pole dipole pseudo-sections displaying selected contoured field measurements and inversion of the deep pole dipole results.

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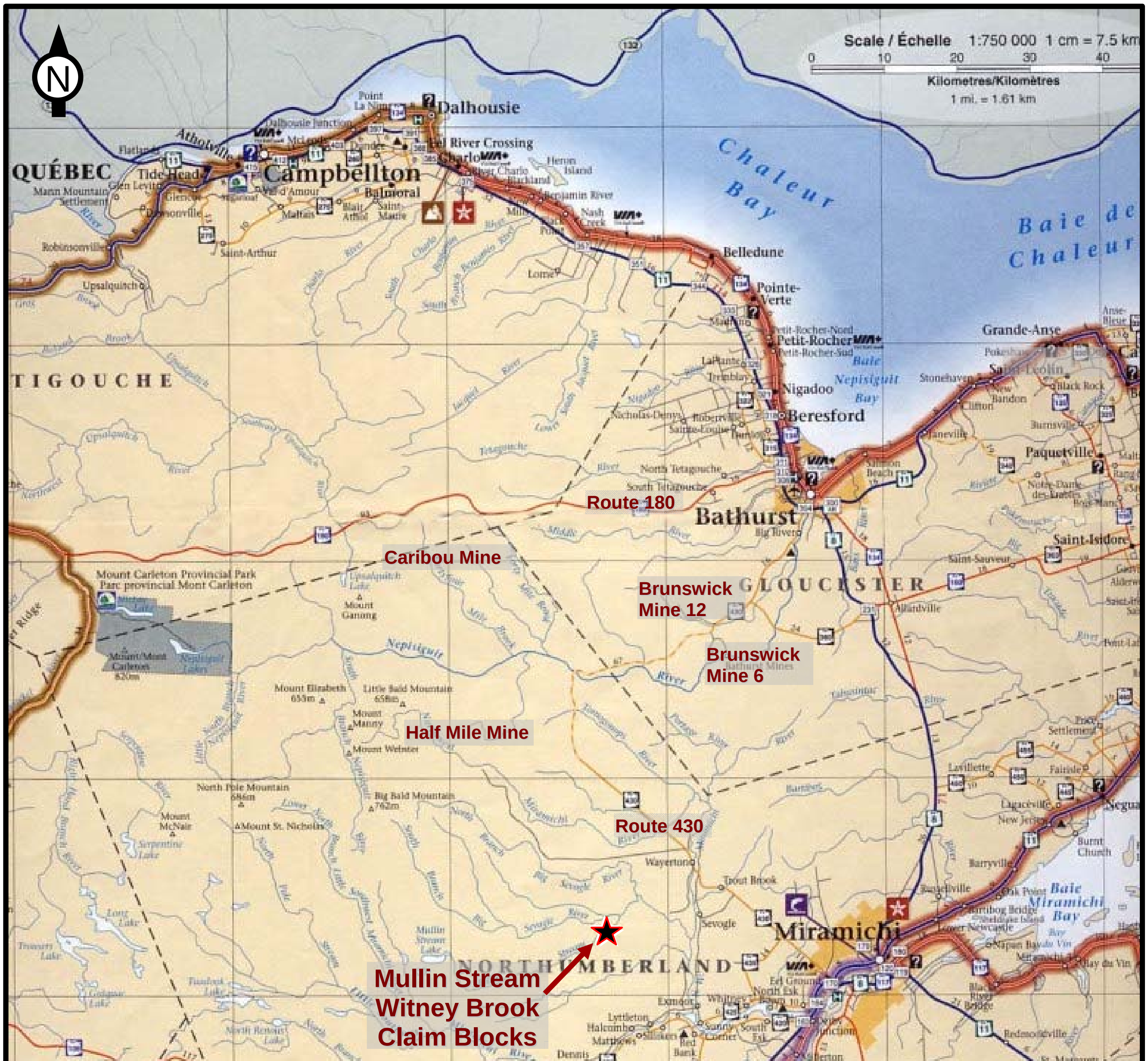
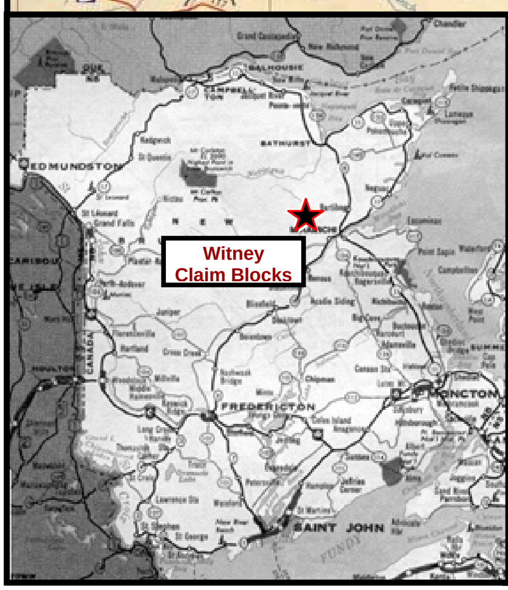



# PROPERTY LOCATION MAP

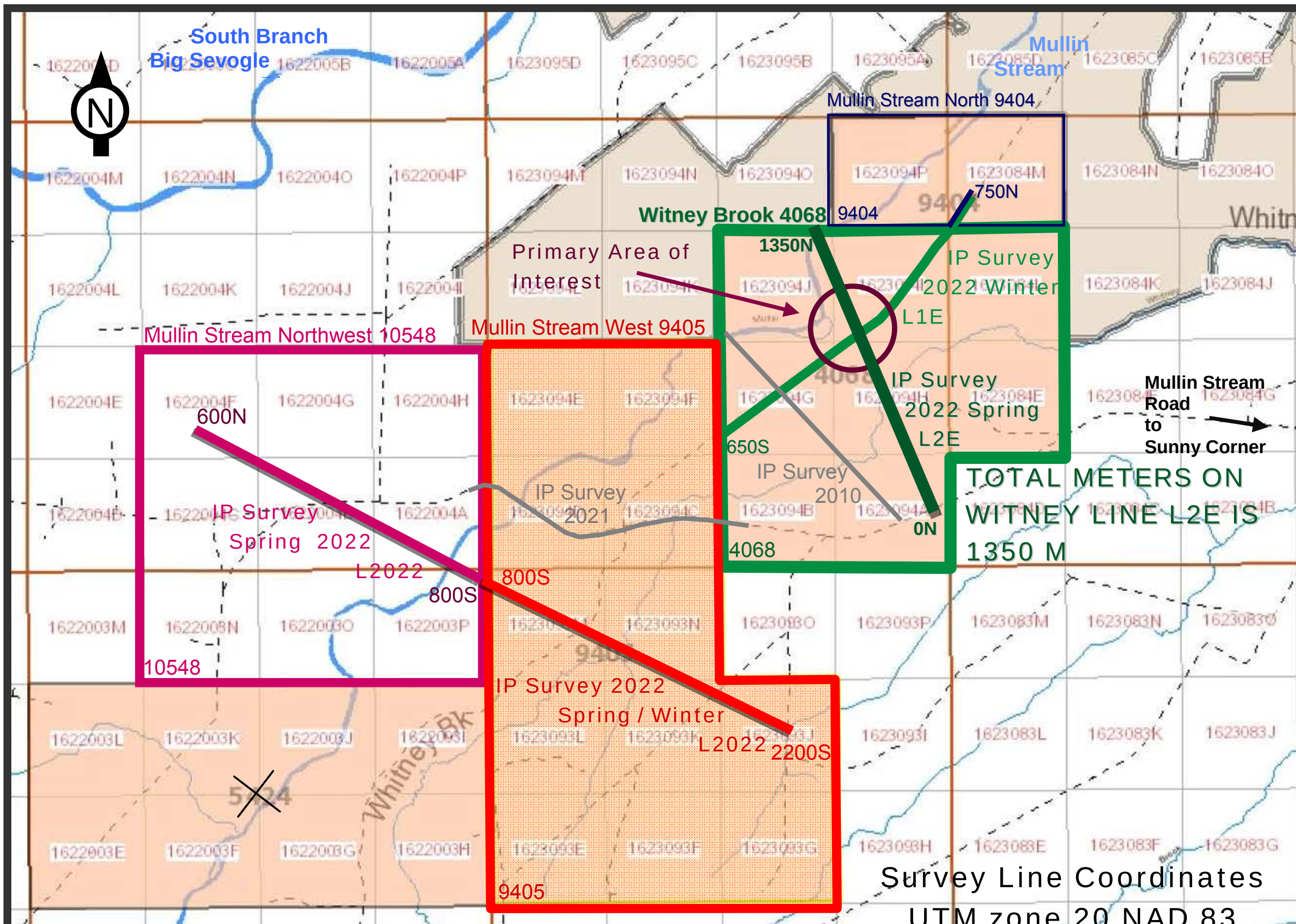
**WITNEY BROOK ( 4068 ), D. JOHNSTON**
Latitude 47.057°, Longitude -65.978°, NAD83, 8 Claims
Claim Numbers 1623084E, L, 1623094A-B, G-J

**MULLIN STREAM WEST ( 9405 ), A. JOHNSTON**
Latitude 47.047°, Longitude -65.994°, NAD83, 12 Claims
Claim Numbers 1623093E-G, J-N, 1623094C-F

**MULLIN STREAM NORTHWEST ( 10548 ), A. JOHNSTON**
Latitude 47.053°, Longitude -66.009°, NAD83, 9 Claims
Claim Numbers 1622003N-P, 1622004A-C, F-H

SCALE 1:290 000
1 cm = 2900 m

**Figure 1**




Survey Line Coordinates
UTM zone 20 NAD 83

| Line | Station | Easting | Northing |
|---|---|---|---|
| 2022 | 600N | 270834 | 5215663 |
| 2022 | 2200S | 273309 | 5214594 |
| L2E | 0N | 273694 | 5215145 |
| L2E | 1350N | 273558 | 5216423 |
| Road L1E | 650S | 273041 | 521578 |
| Road L1E | 750N | 274162 | 5216450 |

# CLAIM LOCATION AND SURVEY LINES

WITNEY BROOK ( 4068 )
D. JOHNSTON
Latitude 47.057°, Longitude -65.978°, NAD83, 8 Claims
Claim Numbers 1623084E, L, 1623094A-B, G-J

MULLIN STREAM WEST ( 9405 )
A. JOHNSTON
Latitude 47.047°, Longitude -65.994°, NAD83, 12 Claims
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MULLIN STREAM NORTHWEST ( 10548 )
A. JOHNSTON
Latitude 47.053°, Longitude -66.009°, NAD83, 9 Claims
Claim Numbers 1622003N-P, 1622004A-C, F-H

Scale 1: 48 500

**Figure 2**

## 2.0 GENERAL SURVEY DETAILS

### 2.1 Location and Access

Mullin and Witney Claim Blocks are located 128 kilometer southwest of Bathurst, New Brunswick (within the general area; Latitude 47.052715°, Longitude -66.009636°, NAD83 UTM Zones 19 an 20, NTS: 21 P/04 O/01, figures 1 & 2 ) where the survey crew was based. The property can be easily access from Bathurst, 83 kilometers west on route 430, 21.5 kilometers south on Northwest Road, 1.5 kilometers west on Back Road, and 22 kilometers northwest on Mullin Stream Road. Most of the survey lines can be accessed via trails that intersect the property and grid ( figures 1 & 2 ). In spring a snowmobile was used along old logging roads to transport wire and equipment within the survey grid ( figures 1 & 2 )

### 2.2 Survey Grid and Coverage

Survey control on all the three claim blocks, Witney Brook, Mullin Stream West and Mullin Steam Northwest consist of one chained survey line on each claim block with flagged stations every 50 meters each claim. The total line-meters for each chained and flagged line is four thousand one hundred fifty ( 4 150 meters ) line-meters. The Witney Brook survey lines L1E ( previous spring report ) and L2E are positioned over an area of interest ( figure 14, above ) that consists of previous exploration programs, notably the 1989 Nova Gold Resources geophysical, geochemical, and drilling assessment report 473936, and the recent MMI geochemical results included in appendix d. Survey control for line L2022 on the Mullin Stream West 9405 and Mullin Stream Northwest 10548 is one survey line totaling two thousand eight hundred ( 2 800 meters ) line-meters divided equally with one thousand four hundred line-meters on each claim block. The total length of the 2022 summer survey line L2E and L2022, excluding line L1E from a previous report, is one thousand four hundred fifty ( 4 150 meters ) line-meters. The position of the survey lines are also based on the conductivity results from the 1996 airborne survey as indicated in figure 16 below. The survey line coverage on each claim block follows in table 1 and the position of the lines in relation to topography and claim boundaries is outlined in the above figure 2.

| **Survey Type**<br>**DPD-IP 400 meters depth** | **P-LINE**<br>(Read Line) | **START $C_1$**<br>(Tx current electrode station) | **END $P_{16}$**<br>(Rx potential electrode station) | **TOTAL SURVEY COVERAGE** |
|---|---|---|---|---|
| **Witney Brook 4068** | **L2E** | **0N** | **1350N** | 1 350 m |
| Mullin Stream West 9405 | L2022 | 600N | 800S | 1 400 m |
| Mullin Stream Northwest 10548 | L2022 | 800S | 2200S | 1 400 m |
| TOTAL | | | | 4 150m |

*Witney Brook survey line L1E was included in a previous spring 2022 report but is included in this report.*

***Table 1: Deep Pole Dipole IP / Resistivity ( DPD-IP ) Survey Coverage for Witney Brook, Mullin Stream West, and Mullin Stream Northwest Claim Blocks***

The IP / resistivity geophysical program was undertaken from March 21st to March 30th and from August 18th to 25th 2022, on the Mullin Stream West, Mullin Stream Northwest and **Witney Brook** Claim Blocks over eight survey production days and two wire set-up and chaining days. The total survey coverage for all three claim blocks is four thousand one hundred fifty line - meters ( 4 150 meters, back current electrode to front pot ) of IP / resistivity measurements in the form of a pole - dipole survey. The deep pole dipole IP / resistivity production summary on the property is detailed in table 1 and on the position of the lines in figure 2.

### 2.3 Personnel

The pole - dipole IP / resistivity survey requires a minimum of six hard working personnel that have experience with geophysical surveys. Survey measurements, data quality checks and placement of current electrodes is performed and overseen in the field by the "in - field P.Geo." Professional Geoscientist Albert Vickers who is registered with the Association of Professional Engineers and Geoscientist of New Brunswick. This Professional Geoscientist is the field operator and crew chief that is responsible, knowledgeable and experienced with statistical and spectral data quality and general in - field interpretation of the data.

## 3. SURVEY METHOD

### 3.1 IP Survey Description

The electrodes marked $C_1$ ( infinity ) 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. $P_1$ - $P_2$, $P_2$ - $P_3$, .... $P_{16}$ - $P_{17}$. ( 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.

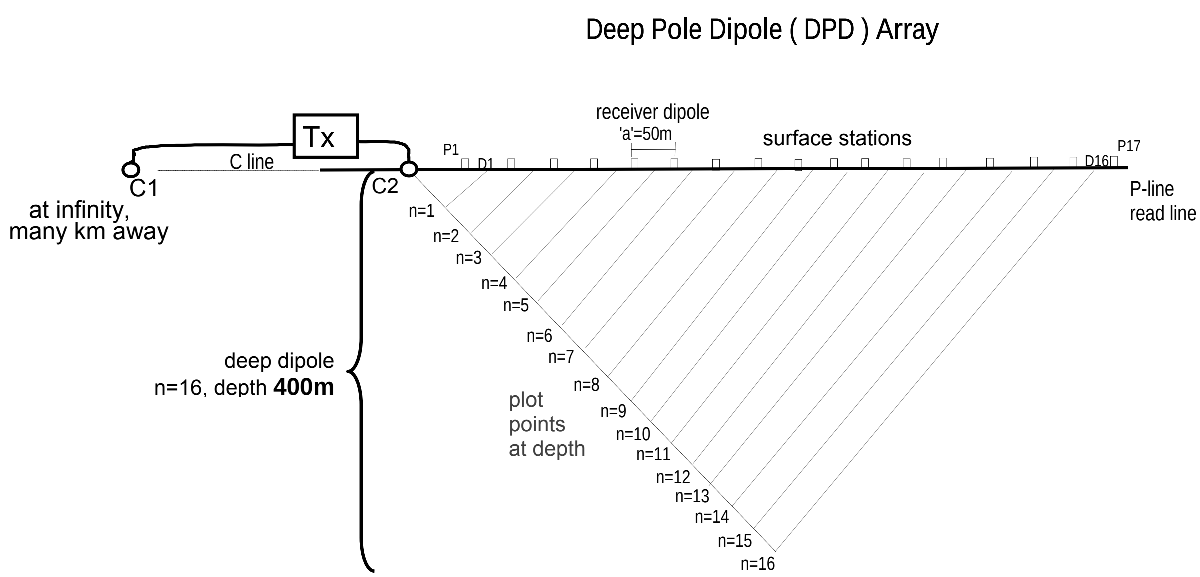



***Figure 3a: Description of Deep Pole Dipole Array and Geometric Parameters***

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.

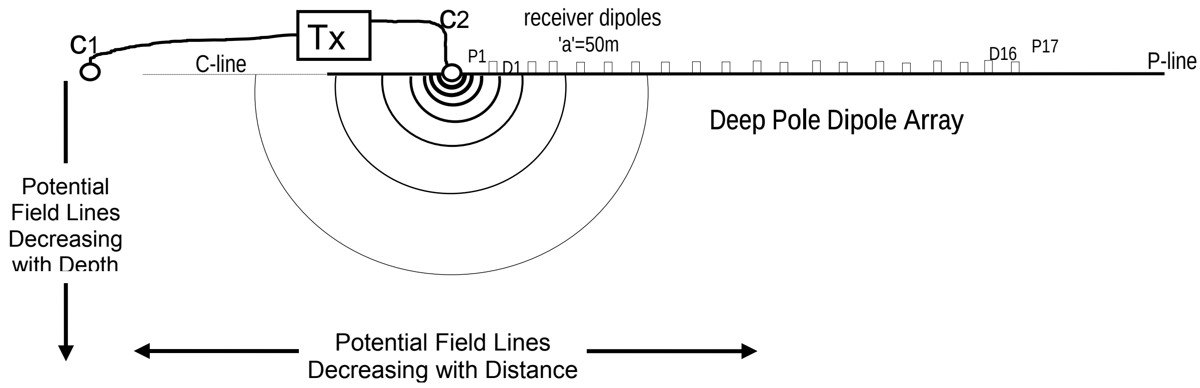



***Figure 3b: Potential Pole - Field Decreasing with Distance from Source***

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 ).

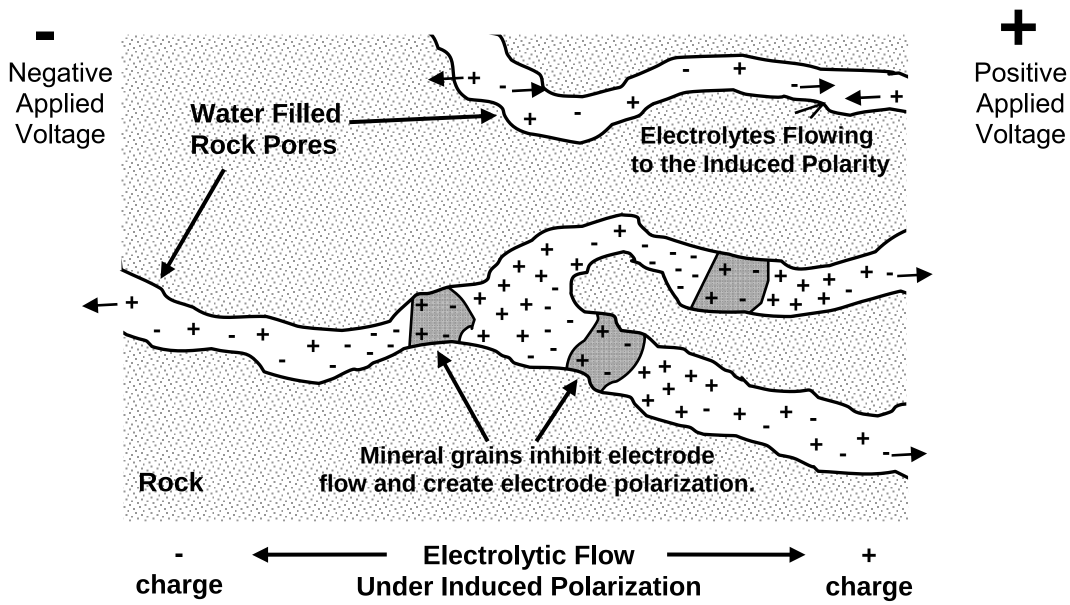



***Figure 4: Polarization of Mineral Grains in Rock***

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 Mullin Stream West was a time domain survey with the IP waveform illustrated below in figure 5.

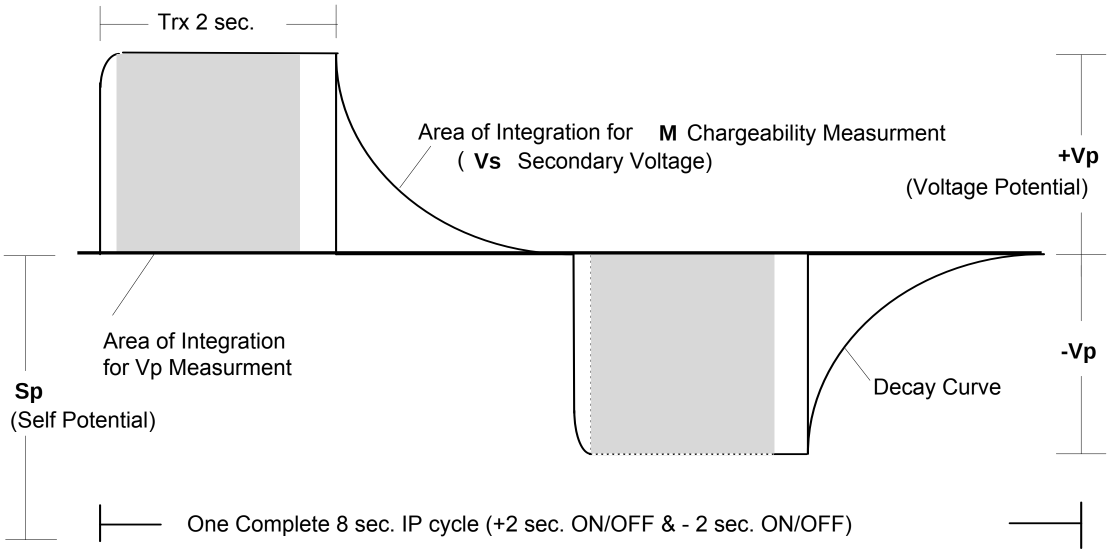



***Figure 5: IP Waveform with IP Parameters for Each Receiving Dipole***

The current dipole and receiver dipoles were setup on the P-line and measured with a roll-along receiver spread of seventeen electrodes with a dipole "a" spacing of 50 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 graphic and numerical display of measured data. 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 and plotted as sections a maps. ( appendix c ).

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 ( $\tau$ ) 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 GDD 5000W IP variable frequency transmitter was employed **( maximum output voltage 2400 volts**, weight 63 kg ) in conjunction with a motor-generator. The generator consists of a Honda 389 $cm^3$ ( 24 $in^3$ ) with a three-phase generator ( 330 lb ) total. The system provided a stable 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 $CaCl_2$ solution in order to improve the contact resistance when needed. Contact resistance varied between 0.02k-30k ohms, with an overall average of 25 k ohms. Transmitted currents between 0.3 - 3500.00 milli-amperes were achieved on high resistive dry ground and low resistive wet 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 USB memory for storage and processing. All data was loaded to cloud storage in addition to secondary storage devices at the Bathurst office as a form of compiled data backup. Field plots were generated daily, using a HP 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 Mullin Stream West Claim Block implemented the deep pole-dipole electrode configuration, using a dipole "a" spacing of 50 meters and current pole of 50 meters from the first receiver dipole ( figures 3 & 6 ). The receiver array consists one current pole ( 1 current rod 50m apart ) and sixteen receiver dipoles ( 17 receiver roads 50 m apart ) end-on dipoles, totaling 950 meters in length, and the profiles were surveyed using the roll-along technique. The 16 ( $D_n$ ) end-on dipoles consisted of 17 ( $P_n$ ) 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 50m intervals with the 16 dipole receiver dipoles read eight at one time. Up to one thousand ( 1 000 ) line-meters of coverage were surveyed at Mullin Stream and Witney Claim Blocks survey grid 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$^{TM}$ 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 & 6) 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 dipole.

(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 $C_1$ (infinity), $C_2$ and $P_1$, $P_2$. ( figures 3 & 6 )

The **Apparent Resistivity** ( $\rho$ ) 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

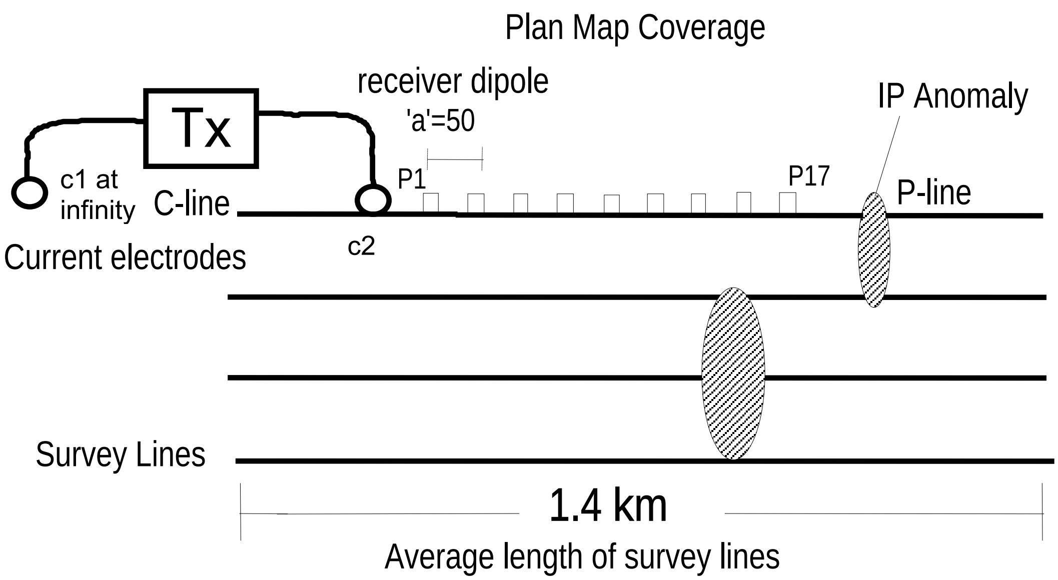



***Figure 6: Plan Map Description of Deep Pole Dipole for Mullin Stream West Claim Block***

The above diagrams ( figures 3 & 6 ) illustrate the deep 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 $D_{16}$ 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 $D_{16}$. 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 16 dipoles was used on Mullin Stream West Claim Block.

### 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 1760 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 & 7:

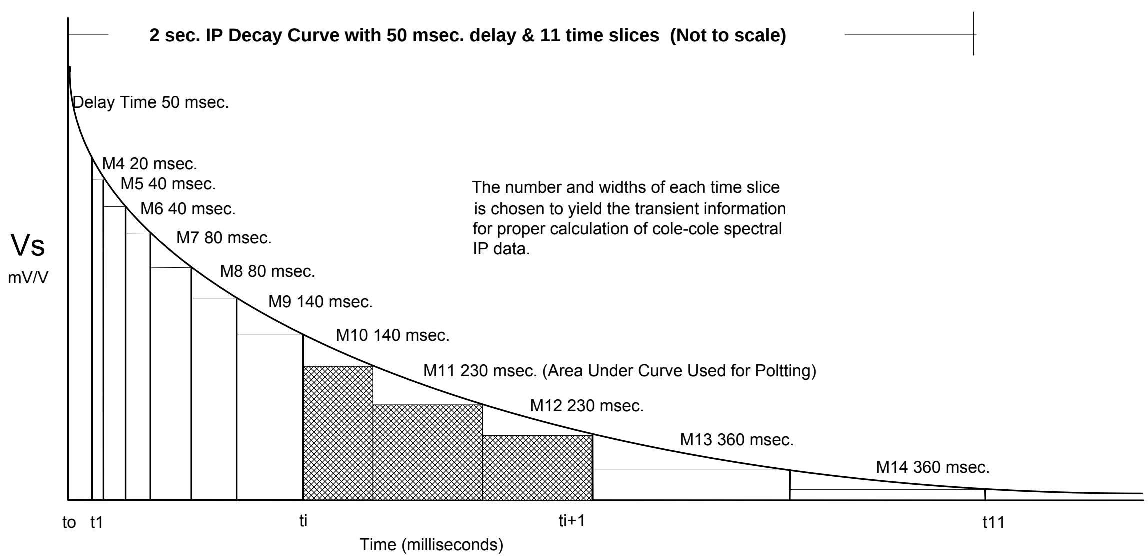
(3a) $$M = V_s * 1000 / V_p$$

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 Mullin Stream West Claim Block IP survey.




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

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 Mullin Stream West Claim Block 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 ( $\tau$ )** 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 ( $\tau$ )**: The time constant tau **( $\tau$ )** 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 ( $\tau$ )** 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.

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

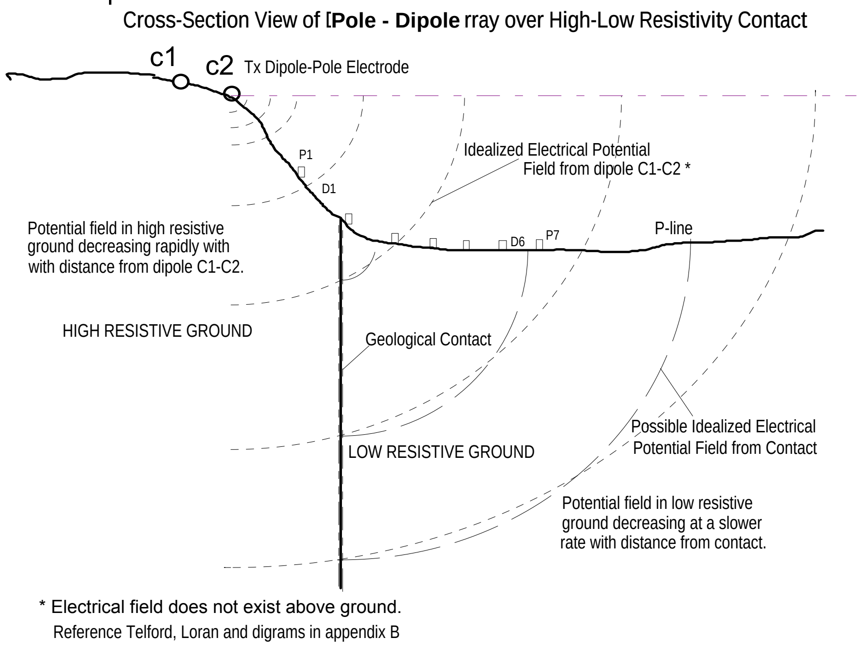
The location of the Witney Brook and Mullin Stream West IP survey line are somewhat isolated and do not lend to apparent cultural features. However, <u>linear features</u> such as long cables of 10 meters or more that may be left from previous logging operations, groundings along power-lines, chain link 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.

<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 0.4 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 geo-electrical 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 9 depicts such an example.




***<u>Figure 9: Approximate Distortion of the Potential Field with Changes in Resistivity and Topography</u>*** *<u>( section view, not to scale )</u>*

The data collected on the Mullin Stream West 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 <u>conductive metallic mineralization</u>. 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.

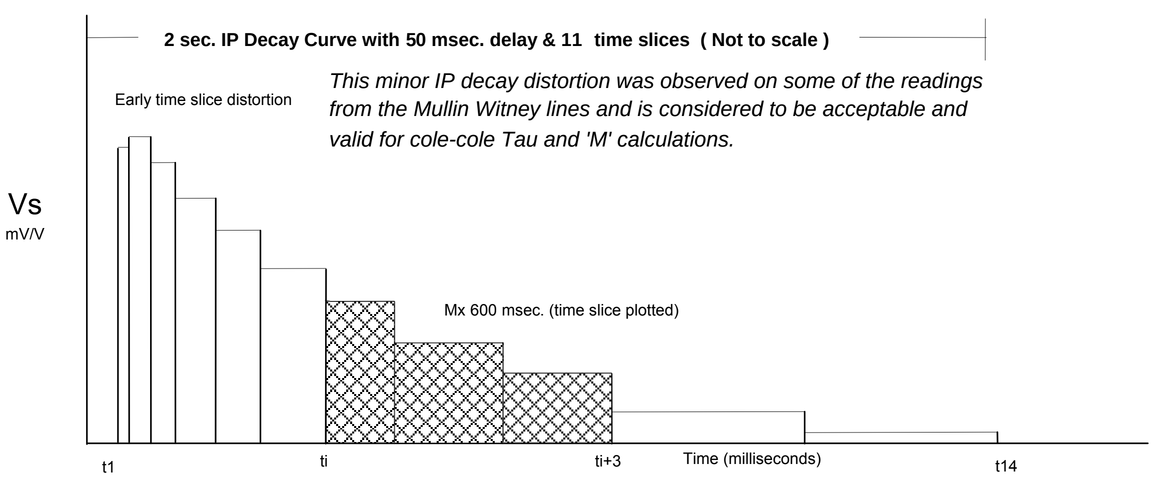


***Figure 10: Early Time Slice IP Decay Resulting from Minor EM Effects.***

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 Witney Brook and Mullin Stream survey lines 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 cannot be compensated by reducing the current. When the IP decay appears as in figure 10 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.

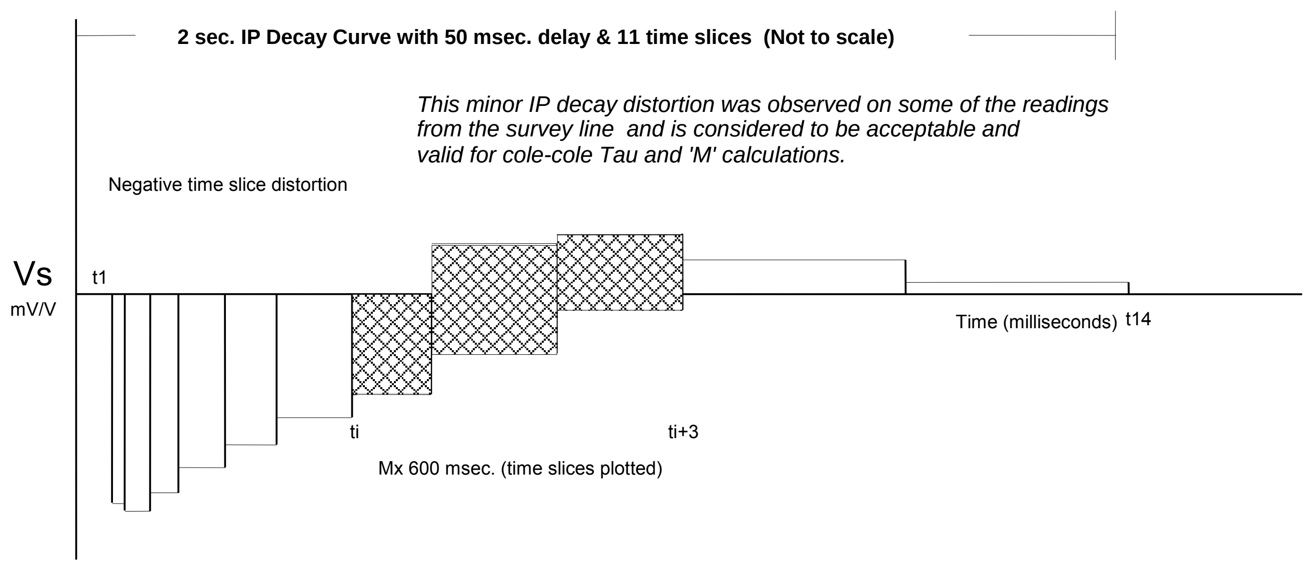



***Figure 11: Early to Middle Time Slice IP Decay Resulting from Strong EM Effects. ( Not to Scale ).***

The data collected on the Witney Brook and Mullin Stream survey lines exhibited minor 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 conductive metallic mineralization. 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 standard geophysical results included with this report that are based on the list of maps in appendix e. The IP / resistivity survey results are presented as color pseudo - sections with posted values, inversions and three dimensional maps. All data and maps are available in GeoSoft™ Oasis GDB exportable formats .XYZ, .CSV, XLS and GeoSoft™ Oasis MAP exportable formats, PDF, JPG, GeoTIFF, MapInfoTAB, ArcView, DXF, and most other standard formats.

The IP / resistivity data is plotted in pseudo - section and inversion formats using Geosoft™ IP mapping system programs. The $\rho$ ( apparent resistivity ), Mx ( chargeability ), derived cole-cole spectral tau ( $\tau$ ) and "M" ( $\tau$ and "M" may not be plotted ), and calculated MF ( metal factor ) are presented in stacked pseudo - section and inversion formats at a scale of 1 : 5000. Within this study all apparent resistivities values are expressed in ohm*m, all chargeability "Mx" values are expressed in mV / V, all chargeability "MF" values are expressed in mV/V / ohm*m and TAU values expressed in sec.

All geophysical data are processed and separated according to line number containing all geo - electric parameters and statistical information. They are stored as MicroSoft™ ASCII files in both Excel .CVS, GeoSoft™ .XYZ and GeoSoft database GDB formats. All data and associated maps in various formats are available upon request from Vickers Geophysics Inc.

The GeoSoft™ maps and data can be viewed, exported to various formats and printed / plotted using GeoSoft Montaj free viewing software that can be downloaded from the GeoSoft™ / Seequent website, https://www.seequent.com/products-solutions/geosoft-viewer/ as of the date of his report.

## 4.0 INTERPRETATION AND RECOMMENDATIONS

At the request of the Anthony and Delbert Johnston, of Miramichi, New Brunswick, Vickers Geophysics Inc. of 2881 North Tetagouche Road, North Tetagouche, New Brunswick, conducted deep pole dipole induced polarization with resistivity ( DPD - IP / resistivity ) survey within the dates of March 21st to March 30th, 2022 on Mullin Stream West Claim Block 9405**, Witney Brook** and August 18th to 24th on Mullin Stream Northwest ( 10548 ). The claim blocks are situated approximately 25 kilometers northwest of the village of Sunny Corner, NB ( figures 1 & 2 ). The project was carried out under the request of prospectors A. and **D. Johnston**, the holder's of the claims.

The objective of this deep pole dipole IP / resistivity geophysical survey is twofold.

**First objective** is to locate and interpret significant deep mineralization to depth of hundreds meters that may be of disseminated to massive mineralization, i.e., strong chargeable and low resistivity conductors as classified below in table 2b. This first objective is within an area where past geophysics and drilling results reveal very weak conductive responses as indicated with previous time domain electromagnetic surveys that do not give a reliable drill target from relative weak conductors ( TDEM / Pulse EM, NB from assessment file 473936 ). This area was also surveyed with shallow IP / resistivity that gave strong chargeability from disseminated mineralization and moderate low resistivity from weak conductivity ( assessment files 473936 ). The previous IP / resistivity results are relatively better to interpret than the EM results but are limited to 75 meters depth and cannot indicate a potential deep mineral source.

**Second objective** is to receive a measurable high quality reliable chargeable and conductive response that comes from a depth that extends hundreds of meters below the previous exploration limited of 75 meters. This is achieved by implementing a survey design that can induce to depth and receive from depth deep electric responses from far below a few hundred meters. These deep received signals can reveal both shallow and deep mineralization from both large mineralized zones and small mineralized stringers. With high quality results, one can interpret and display the accurately measured data in standard formats without filtering and biases.

**These two objectives** are met with the deep pole dipole IP / resistivity ( DPD - IP ) survey chosen to explore, with consistent 50 meter resolution, high quality reliable resistivity and chargeability responses from surface to a calculated depth of 400 meters. The experience and survey customization of VGI achieves deep high quality results from their deep IP / resistivity survey design with reliable and unedited inversions that can reveal both large mineralized zones and small stringer mineralization. This objective is achieved within and beyond the defined area of interest, where past drilling and geophysical exploration consisted of relatively shallow exploration techniques, with two and three dimensional displayed that can be accurately interpreted.

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 ( $FeS_2$ ).

## Spring 2022 Survey Interpretation of Line L1E

### CHARGEABILITY RESPONSE CLASSIFICATION

| | |
|---|---|
| VVSC | **Very Very Strong**<br>greater than ( > ) 45 mV/V |
| VSC | **Very Strong**<br>35 to 45 mV/V |
| SC | **Strong**<br>25 to 35 mV/V |
| MC | **Moderate**<br>15 to 25 mV/V |
| WC | **Weak**<br>10 to 15 mV/V |
| VWC | **Very Weak** ( background )<br>**less** than ( < ) 10 mV/V |

### RESISTIVITY RESPONSE CLASSIFICATION

| | |
|---|---|
| VLR | **Very Low** ( conductive )<br>less than ( < ) 100 ohm m |
| LR | **Low** ( weak conductive )<br>100 to 500 ohm m |
| MLR | **Moderate Low**<br>500 to 1000 ohm m |
| MHR | **Moderate High**<br>1000 to 2000 ohm m |
| HR | **High**<br>2000 to 10 000 ohm m |
| VHR | **Very High**<br>greater than ( > ) 10 000 ohm m |

***Table 2a:  Interpretive Classification for Chargeability and Resistivity***

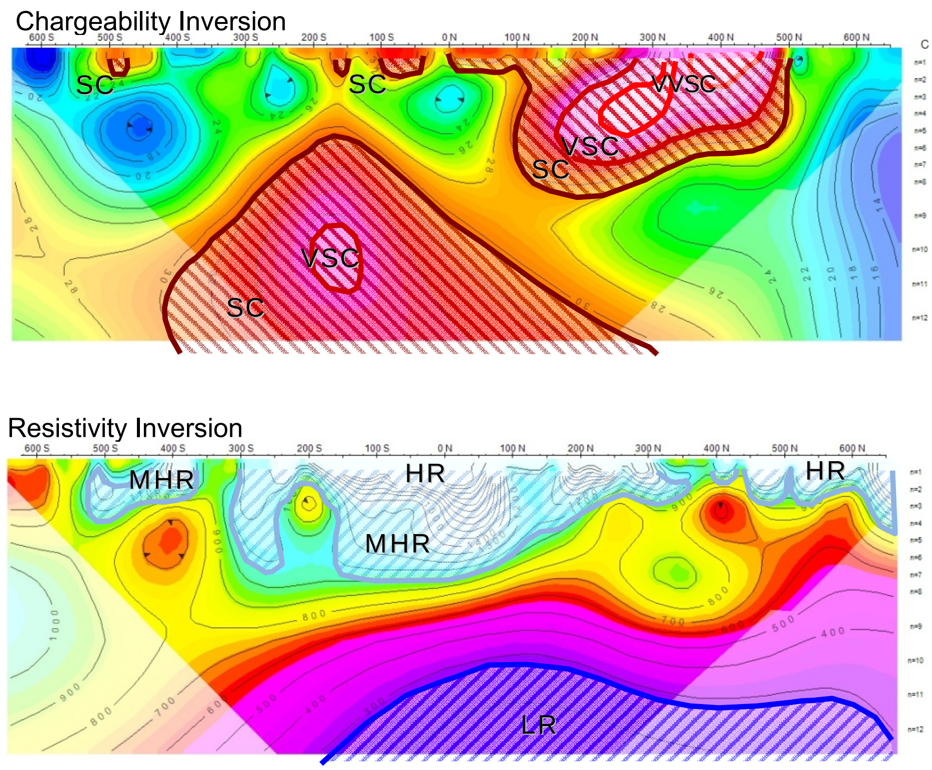



***Figure 12:  Lin L1E Interpretation of Significant Chargeability and Resistivity Inversion Results Based on the above Classification of Table 2a.***

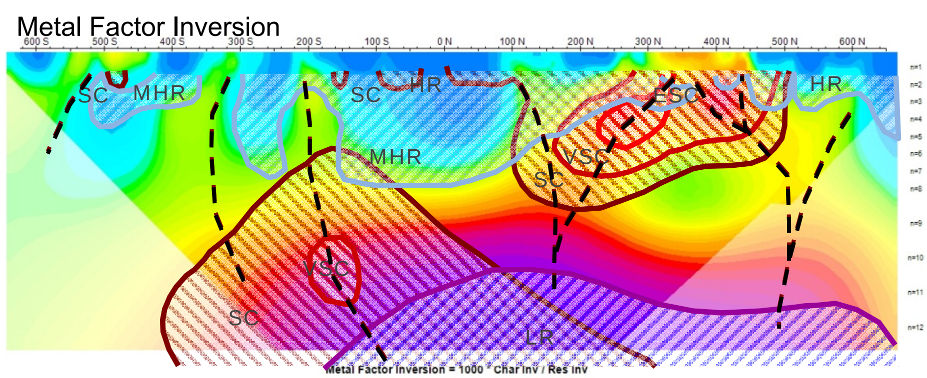



***Figure 13:  Line L1E Compilation of Significant Chargeability and Resistivity Inversion Results from the above figure 11 Superimposed on Metal Factor with Interpretive Vertical Trends***

The results of the 2022 deep pole dipole IP / resistivity ( DPD ) survey L1E give a range of significant chargeability and resistivity pseudo-section values near surface and at depth.  Figure 12, outlines the interpreted areas of significances that are labeled according to the classification of table 2a. Derived from the interpretive inversion compilation of both chargeability and resistivity, on the derived metal factor of figure 13, vertical trends are interpretive from the deep low resistivity into the shallow high resistivity.

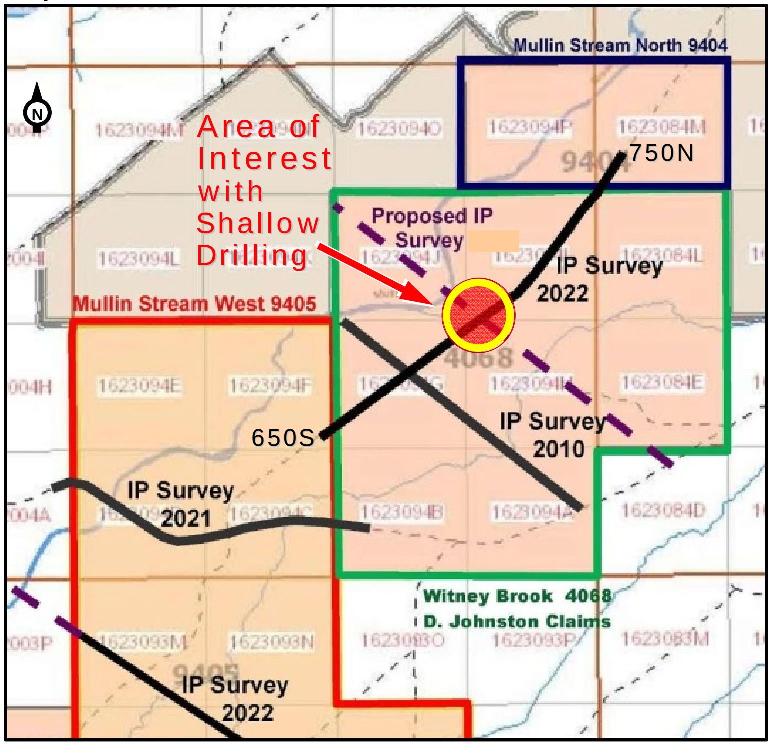



***Figure 14: Area of Spring 2022 Exploration Interest of the Witney Brook and Mullin Steam North 2022 with Survey Line L1E and Proposed Northwest Striking Survey Line***

From near surface down to a vertical depth of approximately 125 meters a moderate high resistivity, with values of 1100 ohm m that exceed 2000 ohm m, is interpreted as flat laying with a shallow dip to the southwest ( survey line direction south ). Below this flat lying high resistivity, the resistivity values decrease to a low resistivity with values less than 300 ohm m at approximately 300 meters depth. This low resistivity classification is weakly conductive and will respond to geophysical **f**requency **d**omain **e**lectromagnetic ( FDEM ) surveys, on both in-phase and out-phase over most frequencies. A **t**ime **d**omain **e**lectromagnetic ( TDEM / Pluse EM ) geophysical survey may not give a significant response.

The dashed lines of figure 13 are vertical trends, interpreted from the metal factor, chargeability and resistivity compilation of figure 13, that start at the deep low resistivity and extend upward into the moderate high resistivity above. These trends are based on both strong to very to very chargeability highs associated with moderate low resistivities that intersect the high resistivity above. The interpreted trends may be the result of conductive graphite and sulphides associated with quartz veining, as indicated in drill logs. These trends may exist throughout the Mullin Stream West Claim area and may be the weak EM drill targets from previous exploration programs, notably the 1989 Nova Gold Resources geophysical, geochemical and drilling assessment report 473936. One shallow area between stations 300N and 450N has near surface excessive strong chargeability highs, with some values greater than 45 mV/V, should be given further follow-up. One deep area below station 250S at approximately 200 meters vertical depth exhibits a very strong chargeability on the top edge of a deep low resistivity ( weak conductor ). This combination of low resistivity associated with strong chargeability suggest mineralization within this deep area. A proposed deep IP survey line striking northwest across the northeast striking geology ( figure 14, proposed northwest striking survey line ) should be established to locate the best deep drill targets where strong chargeabilities are associated with deep low to very low resistivities ( conductors ).

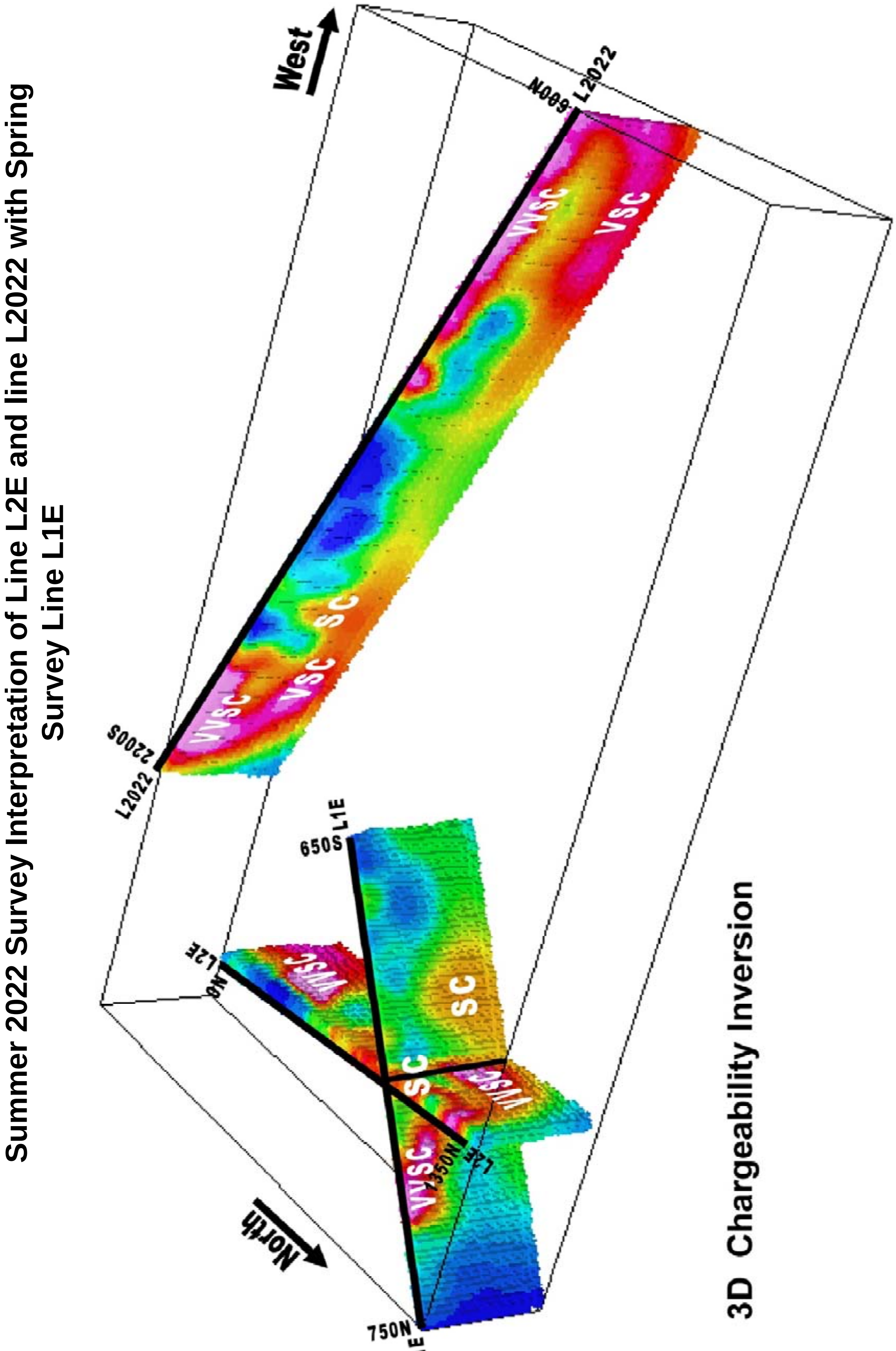



*Figure 15a: Chargeability Three Dimensional ( 3D ) Representation of Survey Lines L2E and L2022 with Previous Surveyed Line L1E.*

## Summer 2022 Survey Interpretation of Line L2E and line L2022 with Spring Survey Line L1E

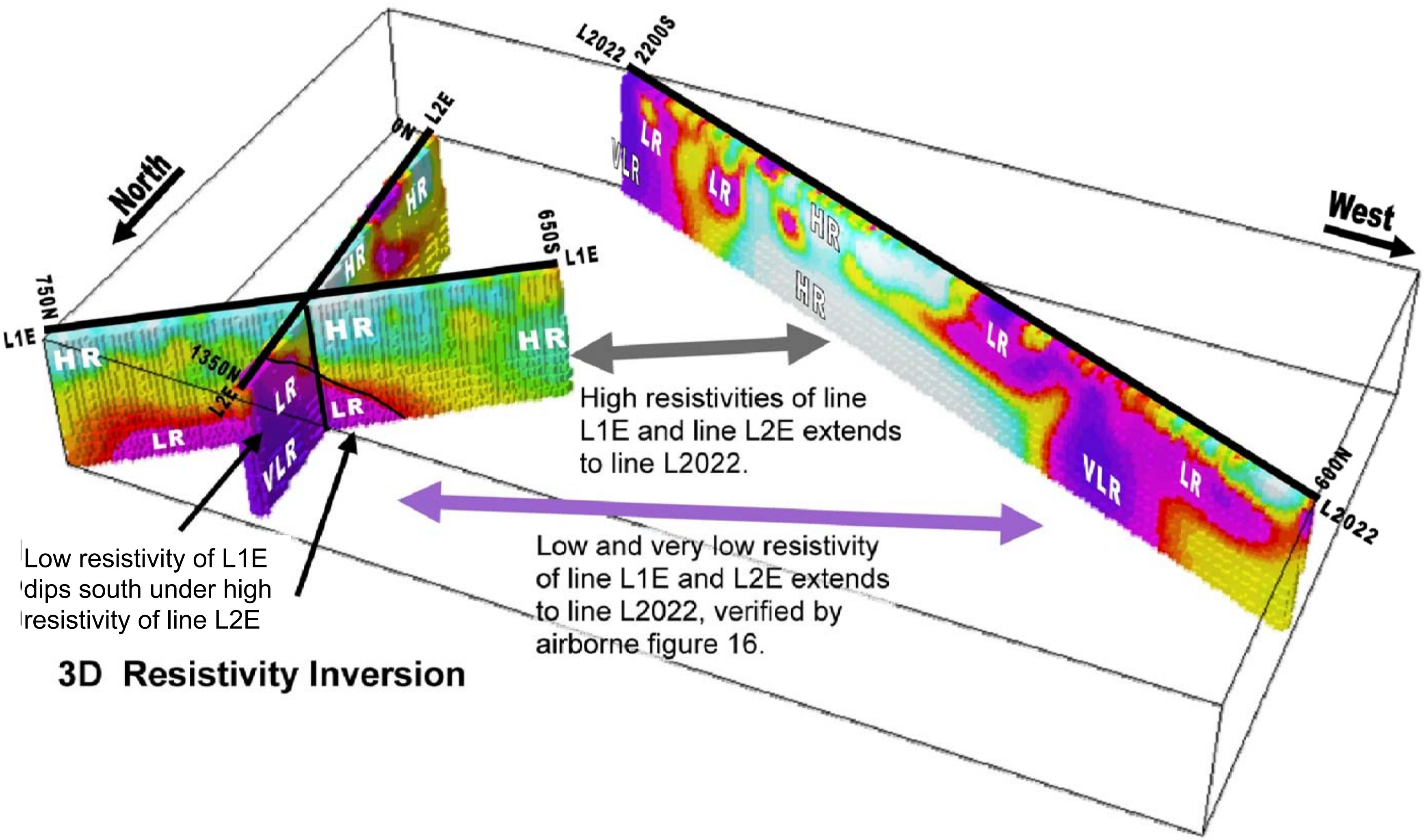



***Figure 15b: Resistivity Three Dimensional ( 3D ) Representation of Survey Lines L2E and L2022 with Previous Surveyed Line L1E.***

## Summer 2022 Survey Interpretation of Line L2E and line L2022 with Spring Survey Line L1E.

| CHARGEABILITY RESPONSE CLASSIFICATION | | RESISTIVITY RESPONSE CLASSIFICATION | |
|---|---|---|---|
| VVSC | **Very Very Strong**<br>greater than ( > ) 45 mV/V | VLR | **Very Low** ( conductive )<br>less than ( < ) 100 ohm m |
| VSC | **Very Strong**<br>35 to 45 mV/V | LR | **Low** ( weak conductive )<br>100 to 500 ohm m |
| SC | **Strong**<br>25 to 35 mV/V | MLR | **Moderate Low**<br>500 to 1000 ohm m |
| MC | **Moderate**<br>15 to 25 mV/V | MHR | **Moderate High**<br>1000 to 2000 ohm m |
| WC | **Weak**<br>10 to 15 mV/V | HR | **High**<br>2000 to 10 000 ohm m |
| VWC | **Very Weak** ( background )<br>**less** than ( < ) 10 mV/V | VHR | **Very High**<br>greater than ( > ) 10 000 ohm m |

***Table 2b: Copy of Table 2a, Interpretive Classification for Chargeability and Resistivity***

The following interpretation is based on the two dimensional ( 2D ) pseudo-section values with inversions as displayed in appendix e with the three survey lines combined in three dimensional ( 3D ) resistivity and chargeability ( IP ) inversions from the above the above figures 15a and 15b. The separate interpretation of earlier of the spring survey line L1E is also referenced. Included with the IP interpretation is the mid-frequency results from the 1996 Extech electromagnetic airborne survey over the claim blocks with interpreted results included in figure 16 on the following page. In addition to the geophysical results, the recent MMI geochemical results of appendix d are also included with references to New Brunswick Mineral Occurrence Data base. The chargeability and resistivity values from the pseudo-sections and inversions of appendix e should be referenced for drill hole selections.

As indicated in the above 3D inversions of figure 15b the near surface low resistivity ( LR: 100 to 500 ohm*m ) of the spring survey line L1E dips south into the deep low resistivity of line L2E where it is overlaid by a high resistivity ( HR: 2000 to 10 000 ohm*m ). This overlain high resistivity extends the length of line L1E and also extends south along the intersecting line L2E. Intersecting this overlain high resistivity are moderate low resistivities ( MLR: 500 to 1000 ohm*m ) that appear to extend horizontal and vertical upward as indicated in the spring line L1E interpretation of figure 14 on the above pages. There are moderate high resistivities ( MHR: 1000 to 2000 ohm*m ) that represent the transition from the underlain low resistivity to the overlain high resistivity. For the most part, the moderate low resistivity appears to be horizontal along 150 meters depth with some vertical extensions to surface as perversely indicated in an earlier interpretation of the spring line L1E of figure 14 in the above pages. The previously mentioned high resistivity of line L1E and L2E is also interpreted to extend west to line L2022 where it is also intersected by a moderate low resistivities layer at 150 meters depth with vertical extensions to surface.

The near surface low resistivity LR of line L1E with its' deeper south extension into line L2E is also interpreted to extend west to line L2022 as illustrated in the above figure 15b. Associated with the low resistivity are very low resistivities ( VLR; less than 100 ohm*m ) with values below 100 ohm*m that indicate a good conductor. This good conductor and associated moderate conductor is coincident with the airborne electromagnetic survey displayed in figure 16 on the following page and validates the interpreted LR - VLR extension that connects line L1E and L2E to L2022. The south end of line L2022 also has a very low resistivity that appears to be coincident with a conductive feature observed on the airborne electromagnetic survey.

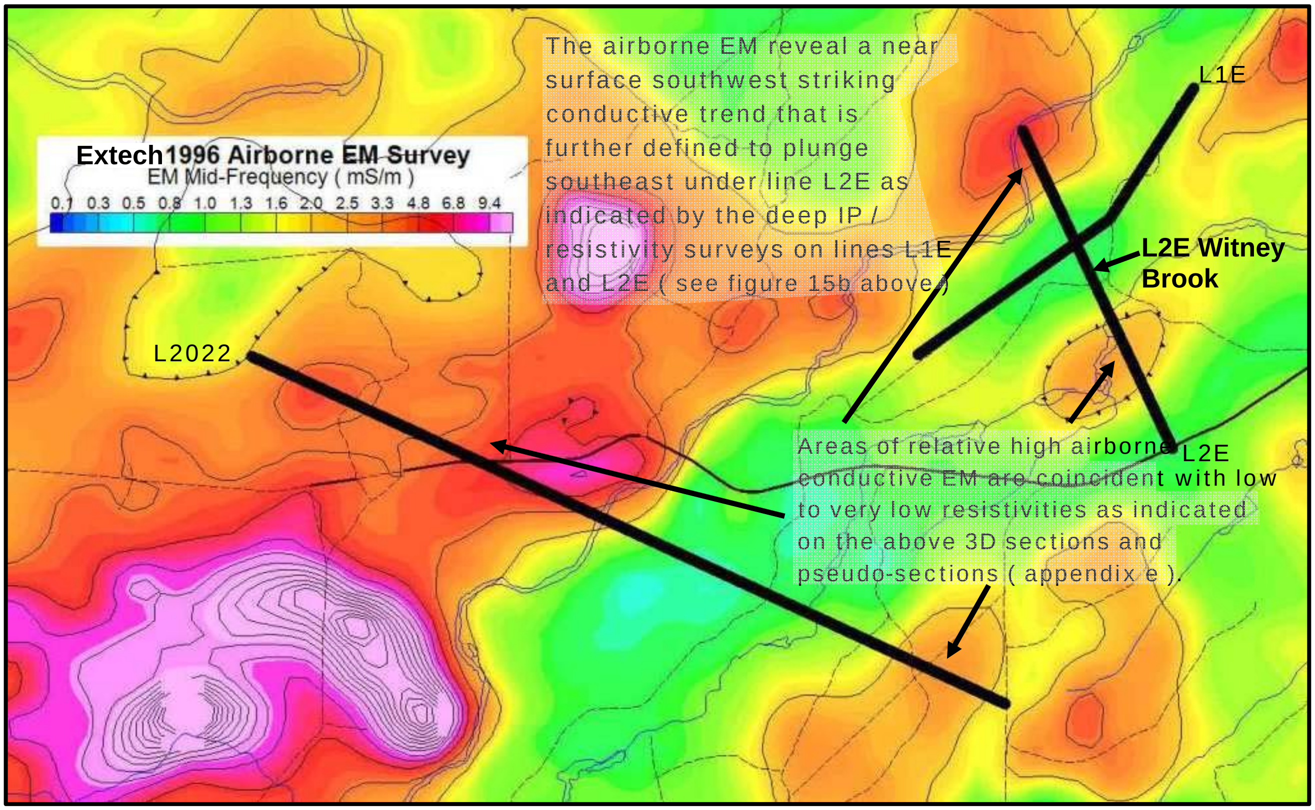



***Figure 16: Extech 1996 Airborne Electromagnetic Mid-Frequency EM and Survey Lines L1E, L2E and L2022 with Noted Areas of Low to Very Low Resistivity and Conductive Trend.***

Supplementing the resistivity, the corresponding chargeability ( IP ) appears to be on the edges of the low resistivities and within the moderate low resistivity with some vertical extension into the high resistivity as viewed in figure 15a, 15b, and figure 14. Chargeability can vary from weak to very strong due to disseminated conductive mineralization that is within conductive low resistivities to high resistivities but typically does not give a significant value within conductors. This appears to be the situation on the Mullin stream and Witney Brook 2022 IP / resistivity survey with very strong ( VSC: 35 to 45 mV/V ) to very very strong ( VVSC: greater than 45 mV/V ) chargeabilities closest to the very low resistivities but not within. The corresponding TAU gives the most significant high results ( greater than 100 seconds ) where chargeability is associated with the low to very low resistivities.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Previous exploration was focused on the north part of the lines near the southwest striking airborne conductor and low resistivity as indicated in figure 14 and 15b. This previous exploration was concentrated on the relatively shallow moderate low resistivities and associated chargeability stringers that are now interpreted to intrude from a deeper low resistivity conductor. The deep pole dipole IP / resistivity survey reveal a southwest striking low to very low resistivity conductor to extend at depth beyond 400 meters, as expressed in the above 3D resistivity and pseudo-sections with inversions of appendix e. Future followed-up should take into account low resistivity features at depth of one hundred fifty meter and at depth hundreds of meters below the near surface stringers. These deeper low to very low resistivity conductors may also be part of larger stringers that are remobilized sulphide mineralization. The remobilized mineralization may have come from a deep or nearby massive sulphide source as suggested from the New Brunswick mineral database occurrence number 67, that suggests the Witney Brook area of interest may represent sulphide mineralization that is older than the cleavage, i.e., remobilized mineralized stringers.

***Occurrence Number 67 ( appendix d, figure d1 and Mineral Occurrence Database Characteristics )***

*"The occurrence does not resemble the "Bathurst Camp massive-sulphide ores", but mineralization does appear to predate penetrative cleavage and may represent remobilized stringer sulphide mineralization."*

This remobilized stringer sulphide mineralization may originated from depth as indicated by the deep IP, and the remobilized stringer sulphide mineralization may originated from sulphide mineralization along the southwest striking airborne conductor. This airborne conductor is also a low resistivity conductor that has shallow aspects and extends to depth as a very low resistivity. The very low resistivity from the deep IP survey lines is interpreted to follow the airborne conductor where there is apparent evidence of originating sulphide mineralization as indicated in the mineral database occurrence number 1506.

***Occurrence Number 1506 ( appendix d, figure d1 and Mineral Occurrence Database Characteristics)***

*"Stringer style pyrite-pyrrhotite mineralization in chloritic to talcose altered sedimentary rocks. Highly anomalous to sub-economic base metal (Cu, Pb, Zn) and Au, Ag and Co grades. <u>Typical of footwall mineralization in VMS systems</u>"*

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 Mullin Stream West, Mullin Stream Northwest, and **Witney Brook** Claims.

Respectfully Submitted,

Albert Vickers, BSc., P.Geo.
Geophysicist

# APPENDIX A

# LIST OF REFERENCES

# APPENDIX A

## LIST OF REFERENCES

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https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=1506

# APPENDIX B

# STATEMENT OF QUALIFICATIONS

## APPENDIX B

## STATEMENT OF QUALIFICATIONS

I Albert J. Vickers, hereby declare that:

- I am a geophysicist with residence in Bathurst, NB and I am presently employed in this capacity with Vickers geophysics Inc. of Bathurst, NB
- I am a graduate of the University New Brunswick, Fredericton, NB, in 1987, with a Bachelor's Science Degree in Geology/Physics.
- I am a member of: The Association of Professional Geoscientists of New Brunswick, New Brunswick Branch of the Canadian Institute of Mining, Metallurgy and Petroleum (CIMM), New Brunswick Prospectors & Developers Association and Prospectors & Developers Association of Canada.
- I have practiced my profession throughout North America continuously since graduation.
- I have no interest nor do I expect to receive any interest, direct or indirect, in the properties or securities of Delbert Johnston.
- The statements made by me in this report represent my best opinion and judgment based on the information available to me at the time of the writing of this report.

August 30, 2022

REGISTERED PROFESSIONAL GEOSCIENTIST
Province of New Brunswick
#M5675
Albert J. Vickers
Signature
Date
GEOSCIENTIFIQUE IMMATRICULE

Albert J. Vickers, BSc., PGeo.
Geophysicist

# APPENDIX C

# INSTRUMENT SPECIFICATIONS

# APPENDIX C

## 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<br>Charger: 120 *x* 95 *x* 55 mm |
| Weight | Console: 5.8 kg<br>Standard or Ancillary Rechargeable Batteries: 1.3 kg<br>Charger: 1.1 kg |

## GDD 5000W IP TRANSMITTER, MODEL Tx4

| | |
|---|---|
| Size: | Tx4 - 5000W with a blue carrying case: 34 x 52 x 76 cm<br>Tx4 - 5000W only: 26 x 45 x 55 cm |
| Weight: | Tx4 - 5000W with a blue carrying case: ~ 53 kg<br>Tx4 - 5000W only: ~ 40 kg |
| Operating Temperature: | -40° C to 65° C ( -40° F to 150° F ) |
| Transmission Cycle: | ON+, OFF, ON-, OFF |
| Time Base: | DC, 1, 2, 4, 8 and 16 seconds |
| Output current: | 0.030A to 20A ( standard operation )<br>0.0A to 20A ( open loop protection disabled )<br>Maximum 5A in DC mode |
| Rated Output Voltage: | 150V to 2400V<br>Up to 4800V in a Master / Slave configuration |
| LED Displays: | Output current, 0.001A resolution<br>Output power<br>Ground resistance ( when the transmitter is turned off ) |
| Power Source: | 220 - 240V / 50 - 60Hz |

# APPENDIX D

## Mobile Metals Ions ( MMI ) Results
## with Comments

## New Brunswick Mineral Occurrences

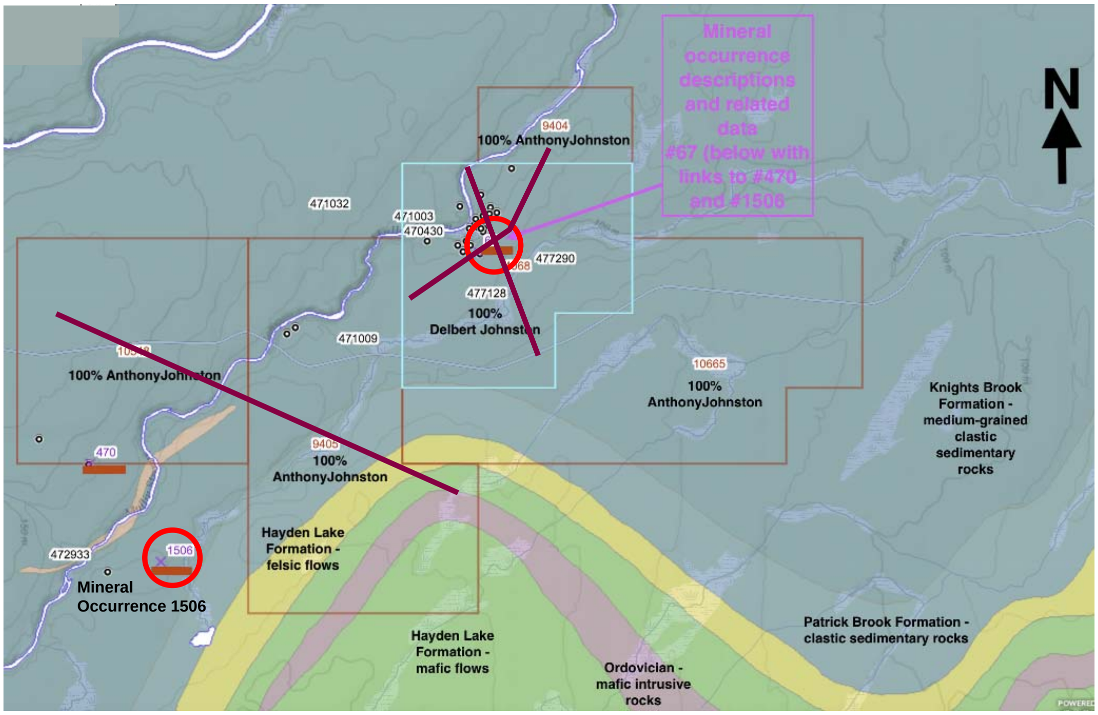



***Figure 1d: Mineral Occurrence 67 and 1506 Locations with, Survey Lines, Claim Blocks and Regional Geology***

**From: September 15 email ( from Dallas Davis )**
**Tony Johnston request to provide MMI soils results for claims 3499, 4068 &**

Re 4068, note on the attached SGS spreadsheet that Rubidium at 693 ppb is relatively high in soil sample 4068-3 as are Ag (282), Bi (14), Ce (156), Cu (1190), In (2.6), Pb (9900), Sb (1.8), Th (104), Ti (1170), Zn (1370) and Zr (188). The relatively high Rubidium (and a few of the other elements such as Bi) is consistent with the comment by government geologists in the occurrence #67 description (below the second image), namely, that: The occurrence does not resemble the "Bathurst Camp massive-sulphide ores", but mineralization does appear to predate penetrative cleavage and may represent remobilized stringer sulphide mineralization.

Perhaps it is possible that the higher than expected Rubidium could reflect a deep intrusive source of similar chemistry to that associated with porphyry copper deposits (see portion of abstract below government description of #67 Mullin Stream on the following pages, https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=67 )?

Dallas Davis, FEC

**Rubidium as a guide to ore in Chilean porphyry copper deposits**
G. A. Armbrust, J. Arias, Published 1 October 1977, Geology, Economic Geology

Hypogene mineralization in porphyry copper deposits is characteristically associated with zones of potassic alteration. The mineralization and hydrothermal alteration are thought to be produced by an aqueous phase which has separated from a crystallizing magma. Due to the similarity in geochemical characteristics of K and Rb, Rb can be incorporated in K minerals that crystallize from a magma. The Rb ion is only 0.14 Aa larger than the K ion, but this size difference results in a higher bonding energy between K and O than between Rb and O. Therefore, when K minerals crystallize from a magma, K is preferentially removed with respect to Rb. The Rb tends to concentrate in the residual melt. If an aqueous phase separates from a magma during late stages of crystallization, it should have relatively higher Rb concentrations and low K/Rb ratios. High Rb concentrations and low K/Rb ratios might therefore be expected in rocks that have undergone potassic alteration. - https://www.semanticscholar.org/paper/Rubidium-as-a-guide-to-ore-in-Chilean-porphyry-Armbrust-Arias/7e431cfffd3dee99a3e2069ededd8729c8160a2d continuation of appendix e ( referenced above by Dallas Davis )

| Soil samples from 3 claims of Tony Johnson (#s4068, 3499 & 6951) for MMI-M analyses - collected by Dallas & Adrian Davis on 26 May 2022 | | | |
|---|---|---|---|
| | | | |
| Latitude | Longitude | Claim and soil sample number | Descriptions of soil samples |
| 47.05817 | -65.98125 | # 4068-1 | Medium brown pebbly clay from dry site at top edge of Mullin Stream valley. |
| 47.05811 | -65.98131 | # 4068-2 | Medium brown pebbly clay from dry site at top edge of Mullin Stream valley. |
| 47.05791 | -65.98101 | # 4068-3 | Pale yellow-brown pebbly clay from dry site across road from above samples |
| 47.05174 | -65.99241 | # 4068-4 | Pale yellow-brown clay with few pebbles from site distant from deep IP anomaly |
| 47.22255 | -66.42720 | # 3499-1 | Pale grey clay base and >60% angular pebbles from site with no soil profile |
| 47.22259 | -66.42720 | # 3499-2 | Medium brown clay from shallow ant hill over bedrock quartz breccia rubble |
| 47.22273 | -66.42711 | # 3499-3 | Pale grey clay base and >60% angular pebbles from site with no soil profile |
| 47.20416 | -66.37157 | # 6951-01 | Pale grey pebbly clay base infilling angular breccia float with no soil profile |

| ANALYTE | WTKG | Ag | Al | As | Au | Ba | Bi | Ca | Cd | Ce | Co | Cr | Cs | Cu | Dy | Er | Eu | Fe | Ga | Gd | Hg | In | K | La | Li | Mg | Mn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **METHOD** | G_WGH_KG | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM |
| **DETECTION** | 0.01 | 0.5 | 1 | 10 | 0.1 | 10 | 0.5 | 2 | 1 | 2 | 1 | 100 | 0.2 | 10 | 0.5 | 0.2 | 0.2 | 1 | 0.5 | 0.5 | 1 | 0.1 | 0.5 | 1 | 1 | 0.5 | 100 |
| **UNITS** | kg | ppb | ppm | ppb | ppb | ppb | ppb | ppm | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppm | ppb | ppb | ppb | ppb | ppm | ppb | ppb | ppm | ppb |
| **4068-1** | 0.35 | 66.9 | 353 | 30 | 0.5 | 130 | 1.6 | <2 | 7 | 45 | 9 | <100 | 5 | 740 | 4.1 | 2.1 | 1 | 121 | 5.5 | 3.6 | <1 | 0.6 | 11.4 | 23 | <1 | 2 | <100 |
| **4068-2** | 0.48 | 44.7 | 233 | 20 | 0.2 | 70 | 1 | <2 | 13 | 96 | 15 | <100 | 11.2 | 1460 | 28.9 | 19.2 | 5.2 | 25 | 11.9 | 19.5 | <1 | 0.2 | 7.6 | 40 | <1 | 1.2 | 500 |
| **4068-3** | 0.34 | 282 | 338 | 170 | 2.2 | 160 | 14 | <2 | 10 | 156 | 21 | <100 | 13.9 | 1190 | 12.4 | 5.3 | 4.2 | 73 | 11.1 | 12.6 | 1 | 2.6 | 11.3 | 66 | <1 | 1.5 | 800 |
| **4068-4** | 0.37 | 32.8 | 366 | 20 | <0.1 | 410 | 2.5 | 4 | 51 | 73 | 75 | <100 | 10.3 | 310 | 57.5 | 35.7 | 6.6 | 57 | 23.9 | 35.7 | <1 | 0.3 | 21.2 | 40 | 1 | 2.6 | 2600 |

***continue on following page***

*continued from previous page*

| ANALYTE | Mo | Nb | Nd | Ni | P | Pb | Pd | Pr | Pt | Rb | Sb | Sc | Sm | Sn | Sr | Ta | Tb | Te | Th | Ti | Tl | U | W | Y | Yb | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **METHOD** | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM | GE_MMIM |
| **DETECTION** | 2 | 0.5 | 1 | 5 | 0.1 | 5 | 1 | 0.5 | 0.1 | 1 | 0.5 | 5 | 1 | 1 | 10 | 1 | 0.1 | 10 | 0.5 | 10 | 0.1 | 0.5 | 0.5 | 1 | 0.2 | 10 | 2 |
| **UNITS** | ppb | ppb | ppb | ppb | ppm | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb | ppb |
| **4068-1** | <2 | <0.5 | 19 | 38 | 1.3 | 1900 | <1 | 5.2 | <0.1 | 183 | 0.7 | 34 | 4 | <1 | 20 | <1 | 0.7 | <10 | 59.8 | 300 | 0.4 | 27.1 | <0.5 | 15 | 1.9 | 770 | 104 |
| **4068-2** | <2 | <0.5 | 64 | 43 | 0.3 | 1840 | <1 | 14.1 | <0.1 | 198 | <0.5 | 77 | 19 | <1 | <10 | <1 | 4.1 | <10 | 56.8 | 90 | 0.6 | 36.1 | <0.5 | 150 | 17.2 | 1160 | 81 |
| **4068-3** | 4 | 4 | 72 | 67 | 1.7 | 9900 | <1 | 18.2 | <0.1 | 693 | 1.8 | 52 | 16 | 1 | 10 | <1 | 2.3 | <10 | 104 | 1170 | 0.8 | 32 | 0.8 | 42 | 4.7 | 1370 | 188 |
| **4068-4** | <2 | 0.9 | 95 | 120 | 2.5 | 1980 | <1 | 18.5 | <0.1 | 281 | <0.5 | 64 | 29 | <1 | 60 | <1 | 7.8 | <10 | 70.9 | 750 | 1 | 51.8 | 0.7 | 318 | 30.3 | 890 | 75 |

continuation of appendix e ( referenced above by Dallas Davis )
https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=67

**MINERAL OCCURANCE NUMBER 67**



# MULLIN STREAM *

**(Also known as BLACK PROPERTY)**

Reference Number: 67

Primary Commodities: Cu

## Characteristics

The occurrence consists of two showings approximately 1150 m (3773 ft) apart along a NE-trending shear zone. Mineralization is in the form of stringers 3 mm - 2.5 cm wide in Cambro-Ordovician Miramichi Group feldspathic quartzite. The stringers are 15-61 cm apart and consist of quartz & disseminated sulphides. This location is eastern showing.

In Oct 1983, a hole was drilled near the bridge over Mullin Stream. No assessment report was filed. Collar position of DDH 89-26-4 (Assessment Report 473936), D. Johnston (drilling by Novagold), 1990. GPS coordinates of the collar were collected by J.A. Walker (2007)

The occurrence does not resemble the "Bathurst Camp massive-sulphide ores", but mineralization does appear to predate penetrative cleavage and may represent remobilized stringer sulphide mineralization.

Mineralization occurs within a zone of intense shearing, 6 to 8 m (19.7 to 26 ft) wide, in highly folded and faulted rocks.

| | |
|---|---|
| Status: | Minor occurrence with assays over one to three dimensions |
| Discovery: | 1955 - Prospecting |
| Relationship of Mineralization to Metamorphism: | Predates |

## Location

Show on Google Maps...

| | |
|---|---|
| NTS: | 21P/04W |
| Location Source: | NB mineral occurrence file |
| Coordinates: | 47.05752, -65.98131 |
| Current Coordinate System: | WGS 84 / World Geodetic System (4326) |
| Tectonostratigraphic Belt: | Miramichi North (BMC) |
| How Located: | Jim Walker, Field Check |

## Detailed Description

This occurrence was discovered by Oka Bathurst Mining Corp (Assessment Report 471032) who reported drilling (19 holes at their #1 showing and 2 holes at their #2 showing).

This occurrence is plotted from the collar position of NovaGold DDH 89-26-4 (473936, D. Johnston, 1990). which appears to be southeast of Oka Bathurst's original discovery.

In 2009 Anthony Johnson (ROW 476743) reported on the results of a soil survey in the vicinity of this occurrence. Results were generally low with maximum Au assays on the order of 36ppb.and maximum Pb of 1120 ppm.

In 2010 Johnston reported results of an IP survey over this property (477042). Chargeability highs and coincident resistivity lows may indicate sulphide mineralization. In 2012, Johnston report the results of an IP survey over this occurrence (Assessment Report 477290). The identification of coincident chargability highs and resistivity lows warrant further work.
This occurrence was visited by J.A Walker and S.R. McCutcheon in 2007. At that time Rubble of strongly chloritized, poly-deformed Miramichi Group sedimentary rocks containing disseminated and vein chalcopyrite were visible beside the road.

## Age

| | |
|---|---|
| Radiometric Age: | |
| Radiometric Age Uncertainty: (±) | |
| Stratigraphic Age Min.: | Ordovician |
| Stratigraphic Age Max.: | Cambrian |

Dating Method: No Data

## Mineral Reports of Work

| Report Number | Claim Holder | Property Name | NTS | Year Submitted |
|---|---|---|---|---|
| 477290 | JOHNSTON, ANTHONY | Whitney Brook | 21P/04W | 2012 |
| 477042 | JOHNSTON, ANTHONY | Whitney Brook | 21P/04W | 2011 |
| 476743 | JOHNSTON, ANTHONY | Whitney Brook | 21P/04W | 2009 |
| 473936 | JOHNSTON, DELBERT | Mullin Stream | 21P/04W | 1990 |
| 471032 | OKA-BATHURST MINING CORP LTD | Black | 21P/04W | 1956 |

## Geoscience Publications

| Publication Number | Title | Source | Type | Date |
|---|---|---|---|---|
| MP 72-85 | P-11 Sevogle - Lower Parts of Sevogle River | NB Publications | Map Plate | 1972 |
| GEOL 1092A GSC | | | | |

## Mineral History Articles

| Article ID | Date | Text Preview |
|---|---|---|

## Commodities

| Commodity | Development Status | Chemical Class | Priority |
|---|---|---|---|
| Copper | Assays over 1 dimension | Sulphide, sulfosalt, arsenide, telluride, antimonide | Primary |
| Zinc | Assays over 1 dimension | Sulphide, sulfosalt, arsenide, telluride, antimonide | Secondary |

## Classification

| Class List | Primary/Secondary | New Brunswick Deposit Type Classification |
|---|---|---|
| New Brunswick | Primary | Quartz-carbonate veins and stockworks associated with fracture/shear zones in a wide variety of settings |

## Metal / Non-Metal / Alteration Minerals

| Type | Description |
|---|---|
| Metal(s) | Bornite, Chalcopyrite, Pyrite, Sphalerite |
| Non-Metal(s) | Quartz |

## Tonnage/Production/Assay - Assay 1

| | |
|---|---|
| Resource/Reserve Type: | No Data |
| Material Produced: | No Data |
| Tonnes (x 1000): | 0 |
| Details: | GRAB SAMPLES FROM TRENCHES 1 & 2 /COMMOD10,GRADE10 IS FROM TRENCH 2 (SHOWING 2), THE OTHER TRENCH 1. |
| Source: | ASSESSMENT # 471003 - COLUMBIA PLACERS |
| Start Year: | 1955 |
| End Year: | |
| Confidential Until Date: | |
| NI 43-101 Compliant?: | ☐ |

## Tonnage/Production/Assay - Assay 1 - Commodities

| Commodity | Value | Priority |
|---|---|---|
| Copper | 2.15 % | |
| Copper | 8.9 % | Primary |

## Tonnage/Production/Assay - Assay 2

| | |
|---|---|
| Resource/Reserve Type: | No Data |
| Material Produced: | No Data |
| Tonnes (x 1000): | 0 |
| Details: | HOLE DRILLED BY COLUMBIA PLACERS TO TEST NO 1 SHOWING: 1 INTERSECTION OVER 38 CM |
| Source: | ASSESSMENT # 471003 - COLUMBIA PLACERS |
| Start Year: | 1966 |

End Year:
Confidential Until Date:
NI 43-101 Compliant?: ☐

### Tonnage/Production/Assay - Assay 2 - Commodities

| Commodity | Value | Priority |
|---|---|---|
| Copper | 0.35 % | Primary |

### Rocks (1 of 1)

| | |
|---|---|
| Category: | **Host Rock** |
| Rock Type: | **Sandstone** |
| Metamorphism: | Regional Metamorphism |
| Degree of Metamorphism: | Greenschist |
| Lithostratigraphic or Lithodemic Unit: | TETAGOUCHE GROUP |
| Radiometric Age: | |
| Radiometric Age Uncertainty (±): | No Data |
| Stratigraphic Age Min.: | Ordovician |
| Stratigraphic Age Max.: | Cambrian |
| Dating Method: | No Data |

### Bedrock Lexicon Entries

| Unit Name | Lithology |
|---|---|
| MIRAMICHI GROUP | The Miramichi Group is a generally fining-upward sequence of fine- to medium-grained greenish grey q ... |
| TETAGOUCHE GROUP | The Tetagouche Group has been studied by many workers since the discovery of base-metal deposits in ... |

### Bibliography

| Reference |
|---|

Last revised 2022-09-28

Reference:
https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=67

https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=1506

# MINERAL OCCURANCE NUMBER 1506



## TSN1

Reference Number: 1506

Primary Commodities: Cu, Pb, Zn

### Characteristics

Stringer style pyrite-pyrrhotite mineralization in chloritic to talcose altered sedimentary rocks. Highly anomalous to sub-economic base metal (Cu, Pb, Zn) and Au, Ag and Co grades. Typical of footwall mineralization in VMS systems.

| | |
|---|---|
| Status: | Minor occurrence with assays over one to three dimensions |
| Discovery: | SLAM Exploration 2008 |
| Relationship of Mineralization to Metamorphism: | Mineralization predates mineralization |

### Location

Show on Google Maps...

| | |
|---|---|
| NTS: | 21O/01E |
| Location Source: | |
| Coordinates: | 47.0403278, -66.0071389 |
| Current Coordinate System: | WGS 84 / World Geodetic System (4326) |
| Tectonostratigraphic Belt: | Miramichi North (BMC) |
| How Located: | GPS |

### Detailed Description

According to SLAM (476856) DDH TS-09-01 intersected two distinct stringer sulphide zones which may suggest a footwall sequence proximal to a sulphide body. This hole was drilled approx.. 400m west of trench TSN08-5 which contained a massive sulphide sample which yielded 7.95%Zn, 4.71% Pb, 118 g/t Ag and 1.09 g/t Au.

From 4 trenches (TSN08-1, -3, -3 and -5) over a strike of 400 m, six samples ranging from 1.58-7.95% Zn, 1.4 to 4.71% Pb, 26.16 to 118.57 g/t Ag were collected.

Outcrop in the area is poor; however, regional mapping suggests that the area is underlain by poly-deformed Cambro-Ordovician sedimentary rocks of the Knights Brook Formation (Miramichi Gp), with the eastern most part of the work area underlain by the sedimentary rocks of the Partrick Brook Formation (MP 2014-1)..

SLAM's work suggest that narrow intervals of felsic crystal tuff of the Clearwater Stream FM are interlayered with the Miramichi Group rocks in the area of trench TDS08-05. It is more likely that these rocks are in fact grits with abundant quartz and feldspar phenoclasts. However, to the north shallow felsic intrusions of the Squirrell Falls member of the Clearwater Stream Formation were mapped by Fyffe (MP 2014-16).

SLAM reported the results of airborne geophysics flown in 2008; versatile time domain EM (VTEM) and magnetometer (Mag) surveys (476927).

### Age

| | |
|---|---|
| Radiometric Age: | |
| Radiometric Age Uncertainty: (±) | |
| Stratigraphic Age Min.: | Ordovician, Middle |
| Stratigraphic Age Max.: | Ordovician, Middle |
| Dating Method: | |

### Mineral Reports of Work

| Report Number | Claim Holder | Property Name | NTS | Year Submitted |
|---|---|---|---|---|
| 476927 | SLAM EXPLORATION LTD | MULLIN STREAM LTD | 21O/01E | 2010 |

| | | | | |
|---|---|---|---|---|
| 476856 | SLAM EXPLORATION LTD | Mullin Stream | 21O/01 | 2010 |

## Geoscience Publications

| Publication Number | Title | Source | Type | Date |
|---|---|---|---|---|
| MP 2014-1 | Geology of the Big Bald Mountain area (NTS 21 O/01), Northumberland County, New Brunswick | NB Publications | Map Plate | 2014 |
| MP 2014-16 | Geology of the Little Sheephouse Brook area (NTS 21 O/01a), Northumberland County, New Brunswick | NB Publications | Map Plate | 2014 |

## Mineral History Articles

| Article ID | Date | Text Preview |
|---|---|---|

## Commodities

| Commodity | Development Status | Chemical Class | Priority |
|---|---|---|---|
| Copper | Assays over 1 dimension | Sulphate, carbonate, phosphate, tungstate, borate, molybdate, chromate, vanadate | Primary |
| Lead | Assays over 1 dimension | Sulphate, carbonate, phosphate, tungstate, borate, molybdate, chromate, vanadate | Primary |
| Zinc | Assays over 1 dimension | Sulphide, sulfosalt, arsenide, telluride, antimonide | Primary |

## Classification

| Class List | Primary/Secondary | New Brunswick Deposit Type Classification |
|---|---|---|
| Canadian | Primary | Stratiform Sulphide, Barite - Volcanic-associated massive sulphide - Zinc-lead-copper |
| New Brunswick | Primary | Stratiform bimodal volcanic & sediment-hosted massive sulphide deposits; includes stringer & disseminated sulphides |

## Metal / Non-Metal / Alteration Minerals

| Type | Description |
|---|---|
| Metal(s) | Pyrite, Pyrrhotite |
| Alteration Metal(s) | Chlorite Stringers, Talc |

## Bedrock Lexicon Entries

| Unit Name | Lithology |
|---|---|
| CLEARWATER STREAM FORMATION | Medium to dark greyish green, plagioclase-phyric, variably chloritic, dacitic to rhyolitic tuffs. Th ... |
| KNIGHTS BROOK FORMATION | Thin- to medium-bedded, greenish grey to dark grey sandstone (quartzite), quartz wacke, minor feldsp ... |
| MIRAMICHI GROUP | The Miramichi Group is a generally fining-upward sequence of fine- to medium-grained greenish grey q ... |
| PATRICK BROOK FORMATION | The Patrick Brook Formation consists of dark grey to black, generally thin-bedded shale siltstone, f ... |

## Bibliography

| Reference |
|---|

**Reference:**
https://dnr-mrn.gnb.ca/MineralOccurrence/default.aspx?componentID=5&urn=1506

## APPENDIX E

## LIST OF MAPS

## MULLIN STREAM NORTHWEST, MULLIN STREAM WEST AND WITNEY BROOK CLAIM BLOCKS

| MAP TYPE | Line Number (map no.) | SCALE |
|---|---|---|
| Induced Polarization Survey Poly Dipole Pseudo - Section with Inversion ( 400 m depth ) | Spring 2022 Road Line L1E | 1 : 5 000 |
| **Induced Polarization Survey ( Witney Brook ) Pseudo - Section with Inversion ( 400 m depth )** | **L2E** | **1 : 5 000** |
| Induced Polarization Survey Pseudo - Section with Inversion ( 400 m depth ) | L2022 | 1 : 5 000 |

## APPENDIX F

## Summary of the Combined 2019 and 2020 Bouguer Gravity Results

Results from the detailed 25 meter station bouguer gravity survey on the Witney Brook Claim Block reveal a gradual bouguer gravity increase along all lines from west to east of approximately 1.00 mgals. This increase is interpreted as part of the regional increase observed on 2009 regional gravity with one kilometer spaced gravity stations ( *Allard, S., and Rennick, M.P. 2009, Plate 2009-6b* ). The west to east bouguer gravity gradient is removed and the result is presented as a residual color contoured gravity map that is displayed below.

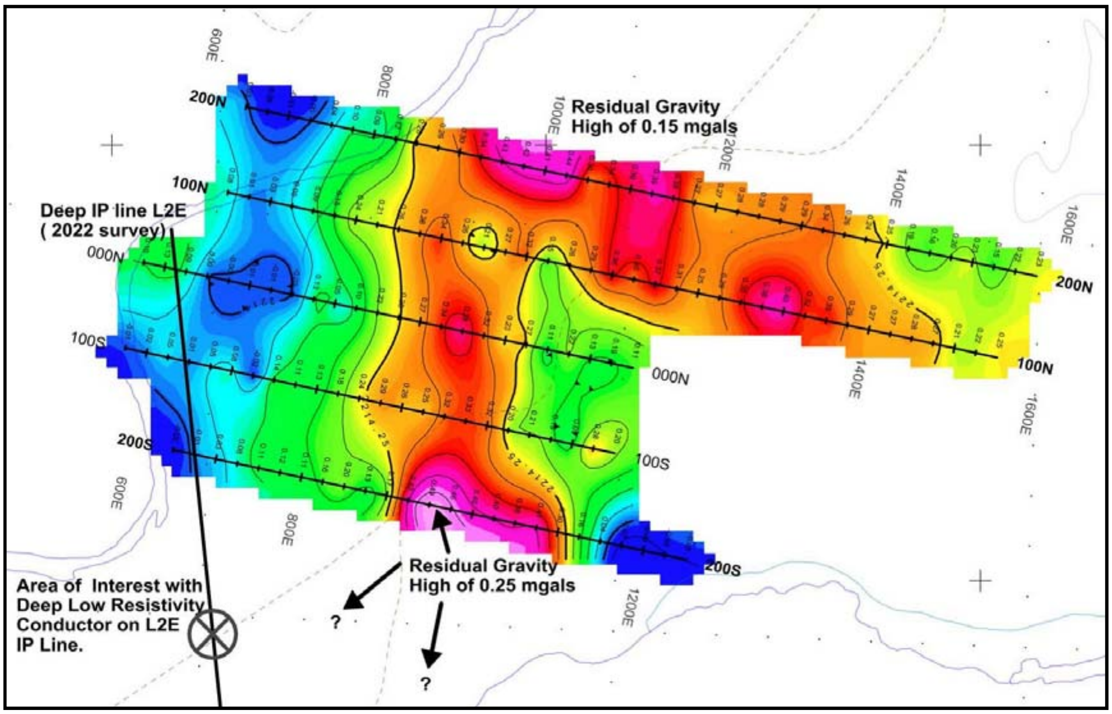



***Figure 1:*** **Residual Color Contoured Bouguer Gravity Map of Witney Brook Claim Block *( map not to scale )***

The residual gravity contour map reveals a weak residual gravity high striking south across all five lines from line L200N to L200S. At the north end of the south striking trend, there is a modest to weak residual gravity high greater than 0.15 mgals on line L200N centered at approximately 950E. In addition to striking south, this weak residual gravity high on line L200N extends to the east along line L100N and may be part of density variations associated with the regional gravity. This weak residual gravity high on line L200N diminishes as it strikes to the south and then increases at the south end of the survey grid.

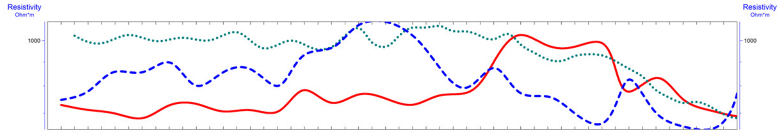
At the south end of the survey grid, the residual contour map reveals a modest residual gravity high on line L200S with values greater than 0.25 mgals centered at station 950E. Indicated on the above figure 1, this modest gravity high may be an extension from the deep low resistivity conductor that is approximately 200 meters to the south west of the modest gravity high ( see the above IP resistivity interpretive report ). Additional gravity lines to the south may reveal an association with the south striking gravity highs to the deep low resistivity conductor of possible high density mineralization.

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 Mullin Stream West, Mullin Stream Northwest, and **Witney Brook** Claims.

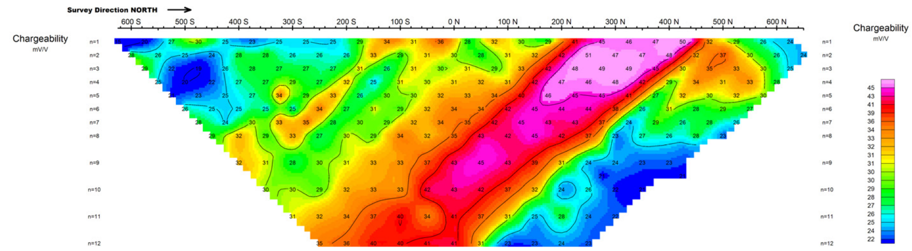
Respectfully Submitted,

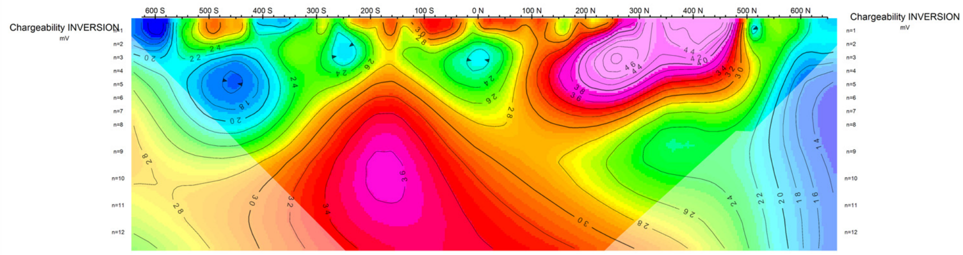
Albert Vickers, BSc., P.Geo.
Geophysicist

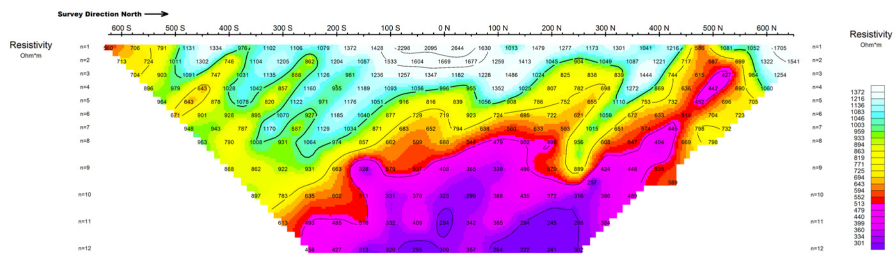
REGISTERED PROFESSIONAL GEOSCIENTIST
Province of New Brunswick
#M5675
Albert J. Vickers
Signature
Nov 10, 2022
Date
Province du Nouveau-Brunswick
GÉOSCIENTIFIQUE IMMATRICULÉ

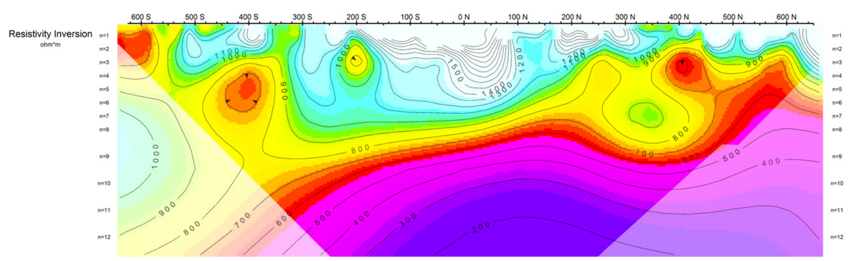


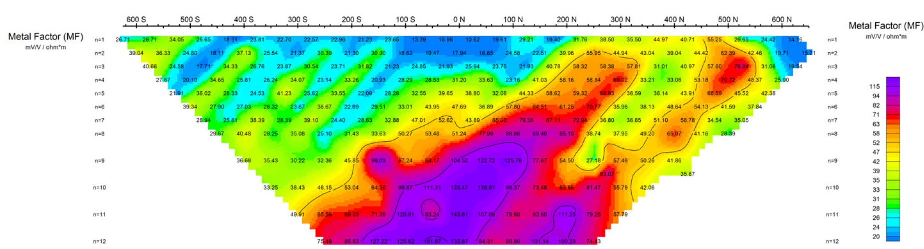

Line 1E
Section Facing West

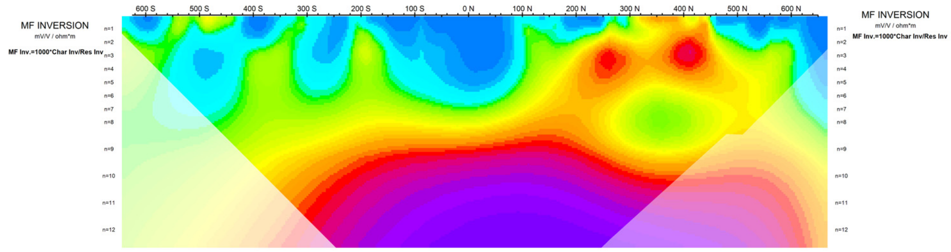


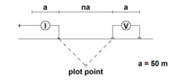




Metal Factor Inversion = 1000 * Char Inv / Res Inv

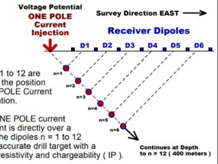
## Pseudo Section Plot

*1 E*

Pole-Dipole Array




**Survey direction from SOUTH to NORTH with current trailing.**




Dipoles n = 1 to 12 are plotted from the position of the ONE POLE Current Injection Station.

When the ONE POLE current injection point is directly over a conductor, the dipoles n = 1 to 12 will give an accurate drill target with a REDUCED resistivity and chargeability ( IP ).

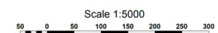
**GEO - ELECTRICAL PARAMATERS**

**Dipole ( 'a' spacing )..............................................50 & 100 m**
**Survey Station Interval..........50 m for both 'a' = 50 & 100 m**
**Receiver Time Slice Plotted......................50 ms to 1760 ms**
**Apparent Resistivity Correction............k - factor corrected**
**Transmitter Frequency....0.125 Hz ( 50% duty, 2 s on & off )**
**Pole - Dipole Spread ( Array Depth )......n = 1 to 12 ( 400 m )**
**IP Tx and Rx...................Scintrex IPR - 12, GDD 5 kW / 7 Hp**
**Survey By..............................AV of Vickers Geophysics Inc.**
**Processing and Data Quality...................................AVickers**

**Inversion...................................UBC Geophysical Inversion**
**Inversion Chifact...........................................................default**
**Inversion Iterations.....................................................max 30**
**Metal Factor Inversion.....................1000*Char Inv / Res Inv**

**Deep Pole Poly Dipole IP ( DPPD - IP )**
**Road Line 1E**
**Section Facing West**

Scale 1:5000




*DELBERT JOHNSTON*

**INDUCED POLARIZATION SURVEY**

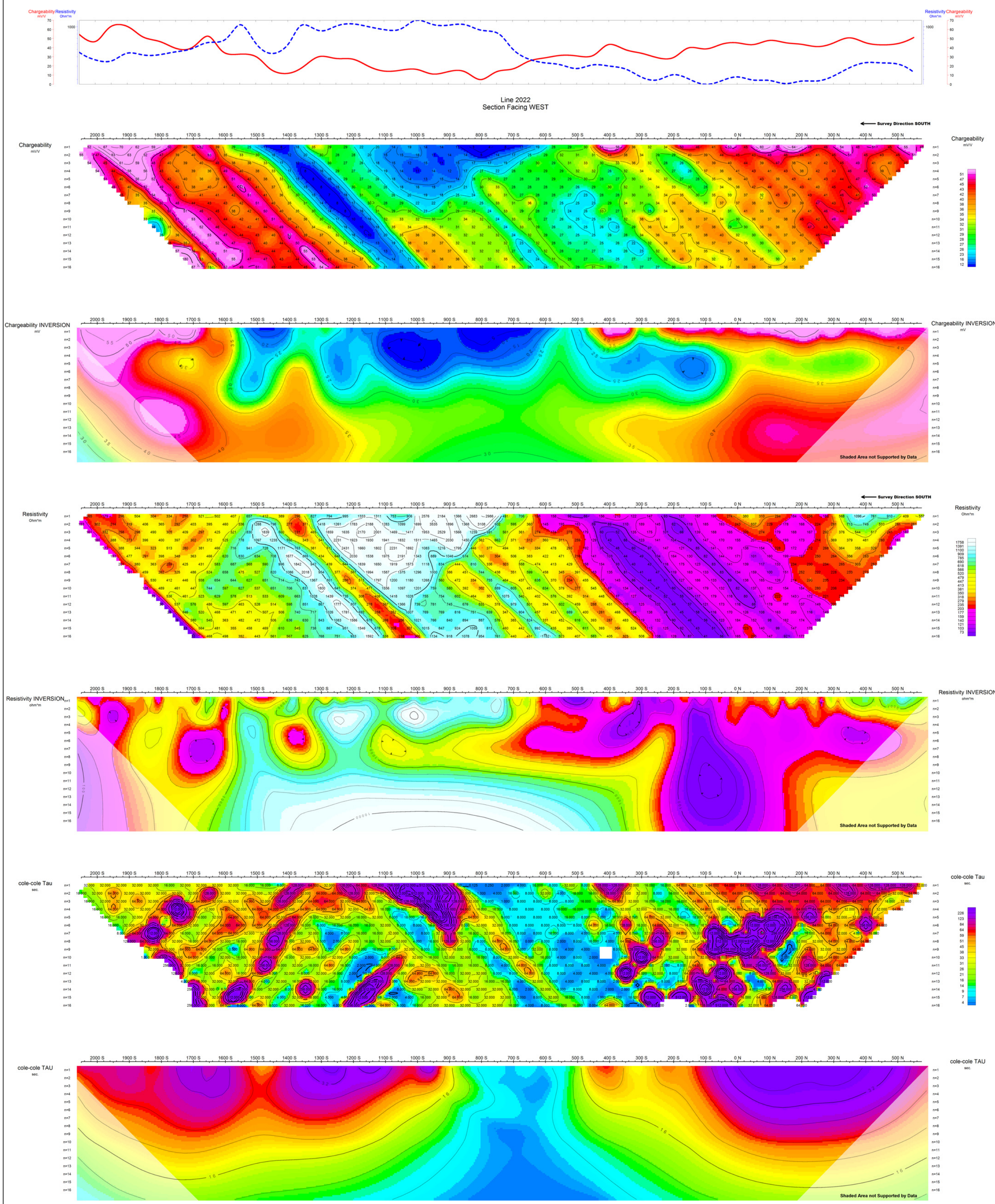
***WITNEY BROOK / MULLIN STREAM NORTH***

***Miramichi Area, NB***

Road Line L1E

Winter 2022

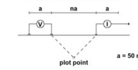
**VICKERS GEOPHYSICS INC.**



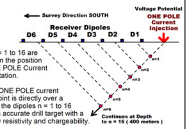

# Pseudo Section Plot

***2022 E***

Deep Pole Dipole Array




**Survey direction from NORTH to SOUTH with current trailing.**




Dipoles n = 1 to 16 are plotted from the position of the ONE POLE Current Injection Station.

When the ONE POLE current injection point is directly over a conductor, the dipoles n = 1 to 16 will give an accurate drill target with a REDUCED resistivity and chargeability.

**GEO - ELECTRICAL PARAMATERS**

**Dipole ( 'a' spacing )....................................................50 m**
**Survey Station Interval............50 m stations with 'a' = 50 m**
**Receiver Time Slice Plotted......................50 ms to 1760 ms**
**Apparent Resistivity Correction.............k - factor corrected**
**Transmitter Frequency....0.125 Hz ( 50% duty, 2 s on & off )**
**Pole - Dipole Spread ( Array Depth )......n = 1 to 16 ( 400 m )**
**IP Tx and Rx....................Scintrex IPR - 12, GDD 5 kW / 7 Hp**
**Survey By..............................AV of Vickers Geophysics Inc.**
**Processing and Data Quality....................................AVickers**

**Inversion...................................UBC Geophysical Inversion**
**Inversion Chifact.....................................................default**
**Inversion Iterations.................................................max 30**

**CHARGEABILITY CONTOUR INTERVALS:.............5 & 50 mV/V**
**RESISTIVITY CONTOUR INTERVALS:..semi-logrithmic ohm*m**
**TAU CONTOUR INTERVALS:.....................................4 & 16 sec.**

**Deep Pole Dipole IP ( DPD - IP )**
**Line L2022**
**Section Facing West**

Scale 1:5000

50 0 50 100 150 200 250 300 (meters)

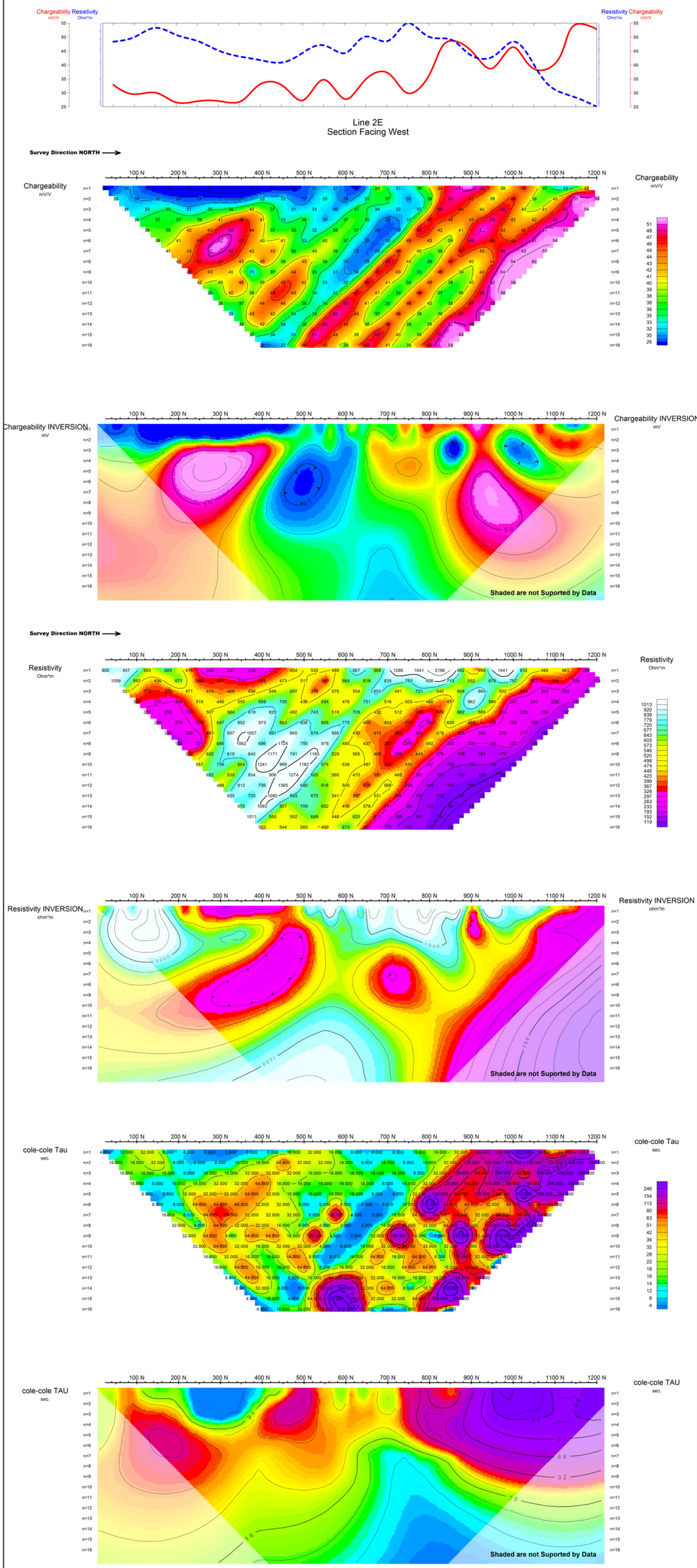
***DELBERT & TONY JOHNSTON***

**INDUCED POLARIZATION SURVEY**

***WITNEY BROOK & MULLIN STEAM***
***Miramichi Area, NB***

Line: 2022 E
summer 2022

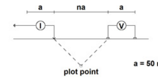
VICKERS GEOPHYSICS INC.



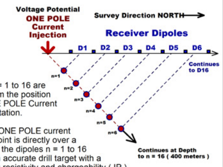

# Pseudo Section Plot

*2 E*

Deep Pole Dipole Array




**Survey direction from SOUTH to NORTH with current trailing.**




Dipoles n = 1 to 16 are plotted from the position of the ONE POLE Current Injection Station.

When the ONE POLE current injection point is directly over a conductor, the dipoles n = 1 to 16 will give an accurate drill target with a REDUCED resistivity and chargeability ( IP ).

**GEO - ELECTRICAL PARAMATERS**

**Dipole ( 'a' spacing )............................................................50 m**
**Survey Station Interval....................50 m for both 'a' = 50 m**
**Receiver Time Slice Plotted.......................50 ms to 1760 ms**
**Apparent Resistivity Correction.............k - factor corrected**
**Transmitter Frequency....0.125 Hz ( 50% duty, 2 s on & off )**
**Pole - Dipole Spread ( Array Depth )......n = 1 to 16 ( 400 m )**
**IP Tx and Rx....................Scintrex IPR - 12, GDD 5 kW / 7 Hp**
**Survey By..............................AV of Vickers Geophysics Inc.**
**Processing and Data Quality..................................AVickers**

**Inversion...................................UBC Geophysical Inversion**
**Inversion Chifact.......................................................default**
**Inversion Iterations..................................................max 30**

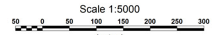
**CHARGEABILITY CONTOUR INTERVALS:...........5 & 50 mV/V**
**RESISTIVITY CONTOUR INTERVALS:..........semi-log ohm*m**
**TAU CONTOUR INTERVALS:...................................4 & 16 sec.**

## Deep Pole Dipole IP ( DPD - IP ) Induced Polarization Pseudo-Sections with Inversions

## Line 2E

## Section Facing West

Scale 1:5000




***DELBERT & TONY JOHNSTON***

**INDUCED POLARIZATION SURVEY**

***WITNEY BROOK & MULLIN STREAM***
***Miramichi Area, NB***

Line: 2 E
summer 2022

**VICKERS GEOPHYSICS INC.**