LOGISTICAL & INTERPRETIVE REPORT

ON

SPECTRAL-IP AND RESISTIVITY SURVEY

CONDUCTED ON

THE GLENWATER PROPERTY, THE HORNE PROPERTY AND THE BATEMAN LAKE PROPERTY

CONMEE AND HORNE TOWNSHIPS

THUNDER BAY AREA

ONTARIO

FOR

AVALON VENTURES LIMITED
LOGISTICAL AND INTERPRETIVE REPORT
ON
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CONDUCTED ON
THE GLENWATER PROPERTY, THE HORNE PROPERTY
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THUNDER BAY AREA
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JVX Ref: 9680-glenwtr
March, 1997
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1. INTRODUCTION

JVX Ltd. conducted a time-domain Spectral Induced Polarization (IP) and Resistivity survey during the period of December 5, 1996 through February 1, 1997 on behalf of Avalon Ventures Limited. The survey was located in three separate areas: (i) the Glenwater Property grid in Horne Twp. (NTS: 52A/12 ), (ii) the Horne Township Property grid (NTS: 52A/12) and (iii) the Bateman Lake Property grid in the Conmee and Horne Twp. (NTS: 52A/12). These grids are all located in the Thunder Bay Area of Ontario.

These locations are shown in the Location Map in Figure 1, and the survey grids are shown in Figure 2 & Figure 3.

The Grids covered the following claims:
The Glenwater Property:
1224680, 1224681, 1224683, 1215010
The Horne Township Property:
1215011, 1215012
The Bateman Lake Property:
1224923, 1224922, 1224924, 1173947, 1224908, 1224907

The purpose of this survey was to locate zones of disseminated sulphide mineralization associated with gold-bearing quartz veins which may be present in the three selected areas of interest. The sulphide targets could be hosted in a series of Archean mafic flows as well as intrusives, with interbedded metasediments. Previous IP surveys in the region suggested the presence of some north-east trending zones of anomalous chargeability which cross-cut the local stratigraphy.

2. SURVEY SPECIFICATIONS & PRODUCTION SUMMARY:

<table>
<thead>
<tr>
<th>IP / Resistivity</th>
<th>Specifications for the IP/Resistivity Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter</td>
<td>Scintrex IPC7/2.5 kW, Huntex 2.5 kW</td>
</tr>
<tr>
<td>Receiver</td>
<td>Scintrex IPR-12</td>
</tr>
<tr>
<td>Array Type</td>
<td>Pole-Dipole (some Dipole-Dipole)</td>
</tr>
<tr>
<td>Transmit Cycle Time</td>
<td>2 sec</td>
</tr>
<tr>
<td>Receive Cycle Time</td>
<td>2 sec</td>
</tr>
<tr>
<td>Number of Potential Electrode Pairs</td>
<td>6</td>
</tr>
<tr>
<td>Electrode Spacing</td>
<td>25 metres</td>
</tr>
</tbody>
</table>
LOCATION MAP

AVALON VENTURES LTD.

HORNE GLENWATER - BATEMAN LAKE PROPERTIES

Horne & Connee Twps., Thunder Bay area, NW Ontario

N.T.S. 52 A/12

GROUND GEOPHYSICAL SURVEY

Scale: 1 : 1,725,000

Survey by JVX Ltd.

Feb., 1997
GRID / CLAIM MAP
AVALON VENTURES LTD.
HORNE GLENWATER PROPERTY
Horne Twp., Thunder Bay area, NW Ontario
N.T.S. 52 A/12
GROUND GEOPHYSICAL SURVEY
Scale: 1 : 40,000

Survey by JVX Ltd.
Feb., 1997

Figure 2
GRID / CLAIM MAP
AVALON VENTURES LTD.
BATEMAN LAKE PROPERTY
Horne & Conmee Twps., Thunder Bay area, NW Ontario
N.T.S. 52 A/12
GROUND GEOPHYSICAL SURVEY
Scale: 1 : 40,000

Survey by J VX Ltd.
Feb., 1997

Figure 3
The production summary are listed in the following tables:

**THE GLENWATER PROPERTY**

**Table 2: Line Summary for IP/Resistivity Survey**

<table>
<thead>
<tr>
<th>Line</th>
<th>From Station</th>
<th>To Station</th>
<th>Distance (m)</th>
<th>No. of Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>3600E</td>
<td>10850N</td>
<td>12750N</td>
<td>1900</td>
<td>77</td>
</tr>
<tr>
<td>3800E</td>
<td>10625N</td>
<td>12800N</td>
<td>2175</td>
<td>88</td>
</tr>
<tr>
<td>4000E</td>
<td>10600N</td>
<td>12750N</td>
<td>2150</td>
<td>87</td>
</tr>
<tr>
<td>4200E</td>
<td>10600N</td>
<td>12625N</td>
<td>2025</td>
<td>82</td>
</tr>
<tr>
<td>4400E</td>
<td>10600N</td>
<td>12575N</td>
<td>1975</td>
<td>80</td>
</tr>
<tr>
<td>4600E</td>
<td>10600N</td>
<td>11900N</td>
<td>1300</td>
<td>53</td>
</tr>
<tr>
<td>5000E</td>
<td>10925N</td>
<td>11850N</td>
<td>925</td>
<td>37</td>
</tr>
<tr>
<td>5400E</td>
<td>11025N</td>
<td>12100N</td>
<td>1075</td>
<td>44</td>
</tr>
<tr>
<td>5800E</td>
<td>11025N</td>
<td>12100N</td>
<td>1075</td>
<td>44</td>
</tr>
<tr>
<td>6200E</td>
<td>11375N</td>
<td>12000N</td>
<td>425</td>
<td>18</td>
</tr>
<tr>
<td>6600E</td>
<td>11375N</td>
<td>11850N</td>
<td>475</td>
<td>20</td>
</tr>
<tr>
<td>6800E</td>
<td>11275N</td>
<td>11750N</td>
<td>475</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>15,975</strong></td>
<td><strong>650</strong></td>
</tr>
</tbody>
</table>

**THE HORNE TOWNSHIP PROPERTY**

**Table 3: Line Summary for IP/Resistivity Survey**

<table>
<thead>
<tr>
<th>Line</th>
<th>From Station</th>
<th>To Station</th>
<th>Distance (m)</th>
<th>No. of Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6300E</td>
<td>9925N</td>
<td>10350N</td>
<td>425</td>
<td>18</td>
</tr>
<tr>
<td>6700E</td>
<td>9850N</td>
<td>10350N</td>
<td>500</td>
<td>21</td>
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<tr>
<td>7100E</td>
<td>9875N</td>
<td>10350N</td>
<td>475</td>
<td>20</td>
</tr>
<tr>
<td>7500E</td>
<td>9875N</td>
<td>10350N</td>
<td>475</td>
<td>20</td>
</tr>
<tr>
<td>7900E</td>
<td>9925N</td>
<td>10400N</td>
<td>475</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>2,350</strong></td>
<td><strong>99</strong></td>
</tr>
</tbody>
</table>
THE BATEMAN LAKE PROPERTY

Table 4: Line Summary for IP/Resistivity Survey

<table>
<thead>
<tr>
<th>Line</th>
<th>From Station</th>
<th>To Station</th>
<th>Distance (m)</th>
<th>No. of Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>8500E</td>
<td>9125N</td>
<td>9500N</td>
<td>375</td>
<td>16</td>
</tr>
<tr>
<td>8600E</td>
<td>9075N</td>
<td>9700N</td>
<td>625</td>
<td>26</td>
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<tr>
<td>8700E</td>
<td>9075N</td>
<td>9700N</td>
<td>625</td>
<td>26</td>
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<tr>
<td>8800E</td>
<td>9075N</td>
<td>9700N</td>
<td>625</td>
<td>26</td>
</tr>
<tr>
<td>8900E</td>
<td>9225N</td>
<td>9900N</td>
<td>675</td>
<td>28</td>
</tr>
<tr>
<td>9000E</td>
<td>9225N</td>
<td>9900N</td>
<td>675</td>
<td>28</td>
</tr>
<tr>
<td>9100E</td>
<td>9225N</td>
<td>9975N</td>
<td>750</td>
<td>31</td>
</tr>
<tr>
<td>9200E</td>
<td>9225N</td>
<td>10000N</td>
<td>775</td>
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<td>9300E</td>
<td>9300N</td>
<td>9975N</td>
<td>675</td>
<td>28</td>
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<tr>
<td>9400E</td>
<td>9225N</td>
<td>11175N</td>
<td>1950</td>
<td>79</td>
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<tr>
<td>9500E</td>
<td>9325N</td>
<td>11175N</td>
<td>1850</td>
<td>75</td>
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<tr>
<td>9600E</td>
<td>9225N</td>
<td>11175N</td>
<td>1950</td>
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</tr>
<tr>
<td>9700E</td>
<td>9225N</td>
<td>10875N</td>
<td>1650</td>
<td>67</td>
</tr>
<tr>
<td>9800E</td>
<td>9325N</td>
<td>11175N</td>
<td>1850</td>
<td>75</td>
</tr>
<tr>
<td>9900E</td>
<td>9075N</td>
<td>11125N</td>
<td>2050</td>
<td>83</td>
</tr>
<tr>
<td>10000E</td>
<td>9175N</td>
<td>11125N</td>
<td>1950</td>
<td>79</td>
</tr>
<tr>
<td>10100E</td>
<td>9100N</td>
<td>11175N</td>
<td>2075</td>
<td>84</td>
</tr>
<tr>
<td>10200E</td>
<td>9100N</td>
<td>11150N</td>
<td>2050</td>
<td>83</td>
</tr>
<tr>
<td>10300E</td>
<td>9325N</td>
<td>11175N</td>
<td>1850</td>
<td>75</td>
</tr>
<tr>
<td>10400E</td>
<td>9150N</td>
<td>11175N</td>
<td>2025</td>
<td>82</td>
</tr>
<tr>
<td>10500E</td>
<td>9075N</td>
<td>11175N</td>
<td>2100</td>
<td>85</td>
</tr>
<tr>
<td>10600E</td>
<td>9175N</td>
<td>11175N</td>
<td>2000</td>
<td>81</td>
</tr>
<tr>
<td>10700E</td>
<td>9200N</td>
<td>11175N</td>
<td>1975</td>
<td>80</td>
</tr>
<tr>
<td>10800E</td>
<td>10800N</td>
<td>11175N</td>
<td>375</td>
<td>16</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>33,500</strong></td>
<td><strong>1364</strong></td>
</tr>
</tbody>
</table>
3. PERSONNEL

(A) Glenwater and Horne Grids –

Chris Hale (Geophysicist and Party Chief)
Mr. Hale was in charge of the whole survey, and was responsible for data quality and preliminary processing of IP data in the field.

Alex Jelenic (Geophysical Operator)
Mr. Jelenic operated the IPR-12 receiver.

Gord Hume (Geophysical Operator)
Mr. Hume operated the IP transmitter.

Two field assistants were also engaged by JVX: Gerald Chaput and Adam Dixon.

(B) Bateman Grid –

Fred Moher (Geophysicist and Party Chief)
Mr. Moher operated the IPR-12 receiver, and was responsible for the overall data quality of the survey.

Jean-Guy Harvey (Geophysicist Operator)
Mr. Harvey operated the transmitter in this survey.

Mr. Michel Daizle and Mr. Vitali Dorodnov were field Operators. In addition two other field Assistants (Gary and Tyier) engaged by JVX, assisted in with the survey.

At JVX' head office in Richmond Hill, Ontario, the following personnel were involved in this project:

Dagmar Piska (Draftsperson):
Ms. Piska carried out the manual and ACAD drafting on the figures/plates and assembled this report.

Vaso Lymberis (Draftsperson):
Ms. Lymberis carried out the manual and ACAD drafting on the figures/plates.

Irina Dorodnova (Data Processing Specialist):
Ms. Dorodnova processed and plotted the data and was responsible for data storage.
Andrew G. Hwang (Geophysicist):
Mr. Hwang interpreted the survey results and wrote this report.

Blaine Webster (President, JVX Ltd.):
Mr. Webster provided overall supervision of the survey.

4. DATA PROCESSING

The IP and Resistivity field data were edited and processed via industry-standard GeoSoft programmes to produce the standard pseudo-sections of the Resistivity, Chargeability (M7), Spectral-M (sometimes denoted as M-IP), and TAU (decay time-constant). These four parameters were plotted together in a standard format, for each of the lines surveyed. In the few instances where the Spectral-M and TAU values were not computed by the IPR-12 Receiver unit itself, JVX’s proprietary in-house software was utilized to complement this shortfall by finding (via a least-squares criterion) an appropriate ‘best-fit’ decay curve (from a large set of ‘master curves’ database) from which the Spectral-M and time-constant values were derived.

Next, the colour-contoured maps for the depth-level, n=2, of the Chargeability as well as the Resistivity for each of the three grids were produced, to provide a preliminary view of the distributions of these quantities in plan view. The level n=2 was a usual and standard choice (although other depth-level(s) could have been selected for contouring as well).

Finally, stacked pseudo-sections were assembled and plotted in one map, for each grid, using a universal colouring scheme, for each of the two IP-quantities (Chargeability and Resistivity). Note that the colouring scheme used in the standard pseudo-sections may differ from those of the stacked pseudo-sections because the former was applied on a line-by-line basis, to emphasize the relative contrast of the IP parameters along a given line.

5. INTERPRETATION AND DISCUSSIONS OF RESULTS

For each of the three survey areas, the IP-Chargeability and Resistivity anomalies were manually selected and prioritized by studying the standard colour pseudo-sections (of the Chargeability, Resistivity, Spectral-MIP and the Time Constant, TAU) for each of the lines surveyed. The locations and extents of these anomalies were compiled on the three Compilation Maps, labelled Plates CM-1 (for Glenwater Property), CM-2 (for Home Property) and CM-3 (for Bateman Lake Property).
5.1 THE GLENWATER PROPERTY

Plate CM-1 shows the Compilation map for the Glenwater Property. In the western region of this grid, three near-surface features representing areas having a relatively conductive overburden layer (CO-1, CO-2 and CO-3) were identified; these could have the negative effect of masking out the IP responses that may occur below the overburden layer. Thus, caution need be exercised in the interpretation of the IP data within these three shaded areas.

Striking approximately east-west across the grid, and running deeper, are two distinctly separated resistivity-low zones, RL-1 and RL-2, as interpreted from the resistivity data. Part of RL-1 are found to be in coincidence with the important chargeability zone, IP-1 (to be discussed later). A few other resistivity-low zones have been identified (see Plate CM-1); these are of smaller extent and probably of lesser significance.

A number of interesting IP-anomalous features and zones have been identified within this grid, even though the inter-line spacings were larger than usual (eg. some with up to 400 m line-spacings). As such, the correctness of the interpolation in the areas in between adjacent lines may be somewhat uncertain. Nonetheless, the following prioritized anomalous IP-chargeability regions were listed and described in the following:

Zone IP-1: This is probably the most important chargeability-high zone in the grid (see Plate CM-1). It trends east-west from Lines 3600E to 4600E, beyond which and further to the east of Line 4600E, it extends approximately N-E, reaching at least Line 6200E, and possibly extending further eastward, till Line 6600E. Four important large Spectral-M targets (T-1 through T-4) are identified and selected within this zone:

- **Target T-1** is ranked low in priority. It was found to coincide with the resistivity-low zone, RL-1. It has a Spectral-M value of 209 mV/V, with a relatively long time constant (had the TAU value been short, T-1 could have been moved up in priority).

- **Target T-2** is ranked medium priority, requiring further detailed investigation in this locale. Its M-IP value is 238 mV/V, with a short to medium time constant (indicative of the possible presence of small to moderate grain-size mineralization). It coincides well with RL-1, hence the relative importance of this target.

- **Target T-3** is also ranked medium in priority (even though its location was found to be not fully coincident with RL-1), since its Spectral-M value (359 mV/V) is amongst the highest in the this grid. Its time constant is short to medium. In fact, T-3 is seen to correlate more closely with a local resistive-high layer (at n=1), indicative of possible silicification process.
Targets T-4 and T-5 are both ranked low in priority, even though their M-IP values are comparable to the previous targets. This is due to the lack of correlation with any one of the larger resistive/conductive zones at these positions. (Note, however, that T-4 correlates with a local resistive-low, whereas T-5 is located near a local resistive-high (silicification)).

Overall, it is important to state that Targets T-1 through T-5 are all reasonably well cross-correlated from Line 4600E through to Line 5800E, giving confidence to validity of the field results as well as to the interpolation/interpretation approach adopted here. Still, one would strongly recommend that the missing lines (e.g. Lines 4800E, 5200E, 5600E and 6000E) be similarly surveyed in the near future, to properly complete the IP picture, if at all possible.

Zone IP-2: Running roughly adjacent to and located just north of zone IP-1, lies the second anomalous chargeability zone, IP-2. This is rated as next in importance, after zone IP-1. There is no apparent correlation with either a resistive-low or -high zone in this case. Three target locations (T-6, T-7 and T-8) have been identified:

T-6: This is rated as medium priority target, having an M-IP value of 352 mV/V, with some correlation with a local resistive-low (at n=3) in the area. Its time-constant is of long duration, indicative of possibly coarser-grained mineralization.

T-7: This target area is rated as low priority since its M-IP value is quite small, at 143 mV/V. There is some evidence of the presence of a local resistive-low zone at depth (n=5), and thus, this target may be of some interest.

T-8: This is also rated as low priority; its M-IP value is 254 mV/V, and the target correlates with a local resistive-high area as well. Its TAU value is of short to medium duration, possibly indicative of fine-grain mineralization.

Numerous other IP zones have been delineated and outlined (see Plate CM-1). Of note was Target T-9; this is located within the chargeability zone, IP-6. This target is rated as medium priority, with a relatively sizable Spectral-MIP value of 359 mV/V. Also, the target coincides with the second resistive-low zone, RL-2, at about the same level (n=1). Finally, Target T-10, of medium priority, was found where zone IP-1 meets RL-2 on Line 6600E. Its M-IP value is 246 mV/V, with a relatively long time-constant.
Overall, the Glenwater Property has some well defined and interesting IP anomalies. The delineation and interpolation of the IP results in the areas located in between the lines surveyed can be improved upon by utilizing smaller line-spacings (eg. 200 m instead of 400 m), wherever possible. To balance this, one should also note that the maximum Spectral-M values detected in the area was about 350 mV/V, perhaps not sufficiently high enough to warrant a more detailed survey campaign, provided other geological and/or geophysical information were available to take into consideration. Notwithstanding, perhaps a limited geochemistry sampling survey could be recommended to be conducted over some of the near surface IP target areas identified above.

5.2 THE HORNE TOWNSHIP PROPERTY

The IP and Resistivity anomalies for the Horne Township Property were compiled and plotted in the Compilation map labelled Plate CM-2. Again, the line-spacing for this grid was larger than usual, at 400 m; thus the following interpolation and interpretation could be problematic, and caution in this respect is advised.

Several resistive-low zones were identified (the shaded areas in Plate CM-2). As well, five IP zones were delineated (IP-1 through IP-5), these were generally found not to coincide with the resistive-lows. Three possible targets (T-1, T-2 and T-3) were selected; these were deemed of low priority. Their Spectral-M values range from 221 to 254 mV/V, with TAU of short to medium duration. It is recommended that Lines 6500E, 6900E, 7300E and 7700E be surveyed first before a more detailed and reliable interpretive work can proceed beyond this preliminary stage.

Relatively speaking, at the present time, the Horne Township Property is ranked of lesser importance than the Glenwater Property, as far as the IP-responses are concerned.

5.3 THE BATEMAN LAKE PROPERTY

The IP-survey over the Bateman Lake Property grid, in comparison with the previous two grids, shows significantly better probability of finding possible economic mineralization. A number of promising anomalous-chargeability zones have been identified (IP-1 through IP-10, cf. Plate CM-3), and more than a dozen prioritized targets have been selected (T-1 through T-16) and recommended for further follow-up studies. Detailed discussions of these IP zones and targets shall be discussed in this section.
5.3.1 The Resistivity Data

From the resistivity results, the areas showing resistivity-highs are labelled (eg. H, VH, VVH, etc.) along each of the survey lines. No apparent overall resistive trends are readily observed from the compilation map (see Plate CM-3). Thus, only localized association of a resistive-high with each of the target areas will be discussed, if and when such a concurrence existed.

In contrast, numerous resistivity-low zones (RL-1 through RL-13) have been delineated; some of these have partial correlation with the various identified IP-anomalous zones. Owing to the selected line-spacing of only 100 m over the entire grid, the interpolation here (for both the RL- and IP-zones) should be quite acceptable. As an overview, it was noted that the grid could be divided into two distinct regions: an area to the north of the grid, and an area to the south, separated by a central zone (which roughly range from Station Nos. 10000N to 10400N) where no apparent resistivity-lows are observed. In contrast, both the northern and southern regions have numerous zones of resistivity-lows, mostly trending approximately east-west, with a few trending north-east as well (cf. Plate CM-3).

In the northern region of the grid, a large resistivity-low zone, RL-1, striking roughly east-west, as well as north-easterly in the mid-region, was identified as one of the prominent geoelectric features in the area. It extended from Lines 9400E to 10700E, and was observed to be partially correlated with the chargeable zones IP-6, IP-7 and IP-8. Additionally, four important target areas (T-12, T-13, T-14 and T-15) were located within RL-1. These targets shall be discussed subsequently in more detail. A second, but less extensive resistive-low zone is RL-2; this is located near the south-east corner of the grid, from Lines 10400E to 10700E. Two important targets (T-4 and T-5) are positioned within RL-2, which correlate well with the chargeability zone, IP-3.

Numerous other resistivity-low zones have been identified, with quite good line-to-line correlation in their resistivity values (eg. RL-4, RL-5, RL-6, RL-7, RL-8 and RL-9). However, these generally do not appear to follow closely the various defined IP zones. Also, there are several occurrences where the resistivity-lows are apparently very localized (across 1-2 lines only); these probably have little geologic significance.

5.3.2 The IP-Chargeability Data

In this grid, at least ten anomalous IP-zones have been delineated from the chargeability data. Some of these are relatively extensive in strike-length, albeit somewhat narrow in width (< 100 m); a number of these notable anomalies can become wider at depth (cf. the colour-plotted standard pseudo-sections attached). The zones trend generally east-west, with occasional ones striking north-east (eg. IP-1 and IP-4).
In the southwest corner of the grid, a long, anomalous-chargeability region was identified and labelled as IP-1; it extends from Lines 8500E to 9800E, striking roughly in the north-easterly direction (Plate CM-3). This is an IP-zone of moderate priority; it encompasses four target locations (T-7 though T-10), whose details are discussed in the next subsection 5.3.3. To the east of IP-1, three other chargeable zones have been identified: IP-2, IP-3 and IP-10. IP-2 has two important targets, T-1 and T-2; and this zone is ranked high in priority. Adjacent to and just north of IP-2 is zone IP-3; wherein three target-areas (T3, T-4 and T-5) are located. IP-3 is ranked medium priority. Just north of IP-3 is the small, localized zone, labelled IP-10; this is associated with a medium-priority target, T-6. Finally, in the southern-half of this grid, to the north and west of IP-1, two other chargeable areas have been identified: IP-4 and IP-5; the latter has a target, T-11, contained therein. These zones are ranked low and medium priority respectively.

In the northern-half of the grid, at least four anomalous-chargeability zones have been identified (IP-6, IP-7, IP-8 and IP-9). IP-6 is ranked high priority, since it contains three important targets, T-12, T-13 and T-14. IP-7 and IP-8 each has one target (T-15 and T-16 respectively), both zones are ranked medium priority. Finally, the last chargeable zone is IP-9, located to the northern edge of the grid. It is ranked low in priority, and even though no target has been selected, this zone appears to correlate well with the resistivity-low zone, RL-10.

5.3.3 Selection of IP-Targets

In this important grid, as many as 16 IP-Targets have been selected and prioritized. These were recommended for detailed follow-up studies in the near term. The particulars of each of these targets are listed and described in the following:

**Targets T-1 and T-2**: Both of these are ranked high priority; they are encompassed within the chargeable zone, IP-2. Their Spectral-M values are just over 540 mV/V, amongst the largest in the grid (indeed, the highest M-IP values of all three grids). Their decay time-constants (TAU) are short to medium in duration, suggestive of the possible presence of fine-grain mineralization. There is apparently some association with nearby resistivity-highs, indicative of possible silicification/alteration process in this vicinity. Further, T-1 and T-2 are positioned right next to each other (on the two adjacent Lines 9900E and 10000E, close to Station No.-9200N); this correlation would tend to suggest that these two target areas should be ranked somewhat higher in priority than the other high priority targets. Adjacent and to the north of T-1 and T-2, the standard pseudo-section plots of Lines 9900E and 10000E show possible shear zones, indicative of geologic alterations, eg. hydrothermal processes which may be relevant to fine-grain sulphide and possibly gold formation (it would be even more desirable if the Spectral-M values were found to exceed, say 800 mV/V — which could improve the odds, considerably).
Targets T-3, T-4 and T-5: these three targets are located in IP-3, and are ranked medium priority. Their Spectral-M values are in the range of 350-420 mV/V; with relatively long time-constants, suggestive of coarser-grained mineralization in these target areas. T-3 appears to be associated with local resistivity-high, whereas T-4 and T-5 are more closely related to resistivity-lows (RL-2).

Target T-6: this is ranked of medium priority, and is located within IP-10. Its M-IP value is 370 mV/V, with a long time-constant. Deeper (n=6) and just north of T-6, a localized resistivity-low is observed.

Targets T-7, T-8, T-9 and T-10: these four targets are located in the IP-1 zone. Interestingly, not one of them are seen to associate with the resistivity-low zone, RL-7. These targets are ranked of low priority (compared to the other targets in this region), despite their moderate M-IP values of 268-358 mV/V. They are found to mostly associate with resistive zones, apart from T-8 and T-9. All have long time-constants, except T-8.

Target T-11: this is ranked medium priority; it is situated in a resistive zone (silification), within the IP-5 zone. Its M-IP value is a respectable 390 mV/V, but it has a long time-constant.

Targets T-12, T-13 and T-14: these three important targets are located within the IP-6 anomalous zone. T-12 is rated high priority; its Spectral-M value is quite large, at 488 mV/V. Additionally, it has a short time-constant (<0.1 sec), suggestive of fine-grained mineralization. To its southern flank, the presence of a shear zone is suggested based on a study of the standard pseudo-section plot for Line 9400E. This would imply the presence of some geologic alteration in the vicinity. Along the line, to the south, a moderately resistive zone is observed, indicative of possible silicification process. Hence the importance of this target area. T-13 and T-14 are both rated of medium priority; their M-IP values range from ~450-466 mV/V, with short to long time-constants. Owing to the lack of evidence for the presence of moderately high resistivity values in the vicinity of these targets (they apparently coincide more closely with resistivity-lows defined by the RL-1 zone), they are rated medium instead of high priority.

Target T-15: this is rated medium in priority. It is located within the IP-7 zone, roughly correlating with the resistivity-low section of RL-1. Its Spectral-M is high, at 536 mV/V; but its time-constant is of long duration.

Target T-16 is also rated of medium priority. It is located within the IP-8 anomalous zone. Its Spectral-M value is a respectable 439 mV/V, with an associated long time-constant. Since there is no resistive anomaly seen in this locale, silicification may be less prominent, hence the rating assigned to this target.
As a final comment, one should note that the IP and Resistivity responses of the Bateman Lake Property area show rather complex distributions of the Chargeability- and Resistivity-anomalous zones. Additionally, one should note that there are numerous other instances wherein locations having rather high posted M-IP values may not be included within any IP-zone, nor have they been selected as targets. In such cases, the corresponding pseudo-sections themselves should be studied to appreciate the implied reasonings behind their de-selection (eg. the IP-anomalies may be too localized and limited in extent, to be of interest).

6. RECOMMENDATIONS AND CONCLUDING REMARKS

Of the three grids in this IP/Resistivity Survey, the Bateman Lake Property Grid shows the most promise in the search of possible economic mineralization. Over a dozen targets have been selected for follow-up work in this area; many of their Spectral-M values are in excess of 450 mV/V, with short to medium time-constants (probably relating to the presence of fine-grained mineralization), and often with closely associated resistivity-highs which could be indicative of possible silicification process. Many of these targets are ranked medium to high priority, and strongly recommended for more detailed studies in the near term. To further prioritize these IP targets and zones, a geochemistry sampling program is recommended. The sampling should be taken ‘down-ice’, along the defined IP trends/zones. In areas of deep overburden (eg. n=2 or deeper), enzyme leach techniques may be employed.

Next, the Glenwater Property Grid is ranked second in importance, as far as the IP/Resistivity responses are concerned. About half a dozen targets had been selected here, mostly of low to medium priority, the maximum Spectral-M values being below 360 mV/V in this area.

Finally, the Horne Township Property apparently show less significant IP-responses, and is ranked last in importance.

However, one should be aware that both the Glenwater Property and the Horne Township Property were surveyed with the larger line-spacings of 200-400 m, hence the above overall conclusions about these two properties should be regarded as somewhat preliminary, ie., more definitive conclusions could only be drawn if and when the IP/Resistivity data were acquired at the standard 100 m line-spacings, as per the Bateman Lake Property.
If there are questions with regard to the survey or its interpretation, kindly contact the undersigned.

Respectfully submitted,

J VX LIMITED

[Signature]

Mr. Andrew G. Hwang, Ph.D.
Geophysicist

[Signature]

Mr. Blaine Webster, B.Sc.
President

[cc/CW/a:glenwtr.rep]
The IPR-12 Time Domain IP/Resistivity Receiver is principally used in exploration for precious and base metal mineral deposits. In addition, it is used in geoelectrical surveying for groundwater or geothermal resources, often to great depths. For these latter targets, the induced polarization measurements may be as useful as the high accuracy resistivity results since it often happens that geological materials have IP contrasts when resistivity differences are absent.

Due to its integrated, lightweight, microprocessor based design and its large, 16 line display screen, the IPR-12 is a remarkably powerful, yet easy to use instrument. A wide variety of alphanumeric and graphical information can be viewed by the operator during and after the taking of readings. Signals from up to eight potential dipoles can be measured simultaneously and recorded in solid-state memory along with automatically calculated parameters. Later, data can be output to a printer or a PC (direct or via modem) for processing into profiles and maps.

The IPR-12 is compatible with Scintrex IPC and TSQ Transmitters, or others which output square waves with equal on and off periods and polarity changes each half cycle. The IPR-12 measures the primary voltage (Vp), self potential (SP) and time domain induced polarization (Mi) characteristics of the received waveform. Resistivity, statistical and Cole-Cole parameters are calculated and recorded in memory with the measured data and time.

Scintrex has been active in induced polarization research, development, manufacturing, consulting and surveying for over thirty years. We offer a full range of instrumentation, accessories and training.

The IPR-12 Receiver measures spectral IP signals from eight dipoles simultaneously then records measured and calculated parameters in memory.

**Benefits**

**Speed Up Surveys**

The IPR-12 saves you time and money in carrying out field surveys. Its capacity to measure up to eight dipoles simultaneously is far more efficient than older receivers measuring a single dipole. This advantage is particularly valuable in drillhole logging where electrode movement time is minimal.

The built-in, solid-state memory records all information associated with a reading, dispensing with the need for any hand written notes. PC compatibility means rapid electronic transfer of data from the receiver to a computer for rapid data processing.

Taking a reading is simple and fast. Only a few keystrokes are virtually needed since the IPR-12 features automatic circuit resistance checks, SP buckout and gain setting.

**High Quality Data**

One of the most important features of the IPR-12 in permitting high quality data to be acquired, is the large display screen which allows the operator easy real time access to graphic and alphanumeric displays of instrument status and measured data. The IPR-12 ensures that the operator obtains accurate data from field work.

The number and relative widths of the IP decay curve windows have been carefully chosen to yield the transient information required for proper interpretation of spectral IP data. Timings are selectable to permit a very wide range of responses to be measured.
Specifications

Inputs
1 to 8 dipoles are measured simultaneously.

Input Impedance
16 Megohms

SP Bucking
±10 volt range. Automatic linear correction operating on a cycle by cycle basis.

Input Voltage (Vp) Range
50 µvolt to 14 volt

Chargeability (M) Range
0 to 300 millivolt

Tau Range
1 millisecond to 1000 seconds

Reading Resolution of Vp, SP and M
Vp, 10 microvolt; SP, 1 millivolt; M, 0.01 millivolt/volt

Absolute Accuracy of Vp, SP and M
Better than 1%

Common Mode Rejection
At input more than 100db

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 on page 2.) An additional transient slice of minimum 10 ms width, and 10ms steps, with delay of at least 40 ms is keyboard selectable.

Transmitter Timing
Equal on and off times with polarity change each half cycle. On/off times of 1, 2, 4, 8, 16 or 32 seconds. Timing accuracy of ±100 ppm or better is required.

External Circuit Test
All dipoles are measured individually in sequence, using a 10 Hz square wave. The range is 0 to 2 Mohm with 0.1kohm resolution. Circuit resistances are displayed and recorded.

Synchronization
Self synchronization on the signal received at a keyboard selectable dipole. Limited to avoid mistriggering.

Filtering
RF filter, 10 Hz 6 pole low pass filter, statistical noise spike removal.

Internal Test Generator
1200 mV of SP; 807 mV of Vp and 30.28 mV/V of M.

Analog Meter
For monitoring input signals; switchable to any dipole via keyboard.

Keyboard
17 key keypad with direct one key access to the most frequently used functions.

Display
16 lines by 42 characters, 128 x 256 dots, Backlit Liquid Crystal Display. Displays instrument status and data during and after reading. Alphanumeric and graphic displays.

Display Heater
Available for below -15°C operation.

Memory Capacity
Stores approximately 400 dipoles of information when 8 dipoles are measured simultaneously.

Real Time Clock
Data is recorded with year, month, day, hour, minute and second.

Digital Data Output
Formatted serial data output for printer and PC etc. Data output in 7 or 8 bit ASCII, one start, one stop bit, no parity format. Baud rate is keyboard selectable for standard rates between 300 baud and 51.6 kBaud. 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 110/230V, 50 to 60 Hz, 10W. More than 20 hours service at +25°C, more than 8 hours at -30°C.

Ancillary Rechargeable Batteries
An additional eight 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.

Operating Temperature Range
-30°C to +50°C

Storage Temperature Range
-30°C to +50°C

Dimensions
Console: 355 x 270 x 165 mm
Charger: 120 x 95 x 55mm

Weights
Console: 5.8 kg
Standard or Ancillary Rechargeable Batteries: 1.3 kg
Charger: 1.1 kg

Transmitters available
IPC-9 200 W
TSQ-2E 750 W
TSQ-3 3 kW
TSQ-4 10 kW

In Canada
222 Snidercroft Rd. Concord, Ont. L4K 1B5
Tel.: (905) 669-2280 Telex: (905) 06-964570
Fax: (905) 669-6403

In the U.S.A.
85 River Rock Drive Unit # 202 Buffalo, N.Y. 14207
Tel.: (716) 298-1219 Fax: (716) 298-1317

IPR-12/94
Apparent Resistivity:

\[ \rho_a = 2\pi n a(n+1) \frac{V_p}{I} \]

where

- \( \rho_a \) = apparent resistivity (ohm.m)
- \( n \) = dipole number (dimensionless)
- \( a \) = dipole spacing (m)
- \( V_p \) = primary voltage (mV)
- \( I \) = primary current (mA)

Pole-Dipole Array
Array Geometry and Formula for Apparent Resistivity
**Function**

The IPC-7/2.5 kW is a medium power transmitter system designed for time domain induced polarization or commutated DC resistivity work. It is the standard power transmitting system used on most surveys under a wide variety of geophysical, topographical and climatic conditions.

The system consists of three modules: A Transmitter Console containing a transformer and electronics, a Motor Generator and a Dummy Load mounted in the Transmitter Console cover. The purpose of the Dummy Load is to accept the Motor Generator output during those parts of the cycle when current is not transmitted into the ground, in order to improve power output and prolong engine life.

The favourable power-weight ratio and compact design of this system make it portable and highly versatile for use with a wide variety of electrode arrays.

**Features**

- Maximum motor generator output, 2.5 kW; maximum power output, 1.85 kW; maximum current output, 10 amperes; maximum voltage output, 1210 volts DC.
- Removable circuit boards for ease in servicing.
- Automatic on-off and polarity cycling with selectable cycling rates so that the optimum pulse time (frequency) can be selected for each survey.
- The overload protection circuit protects the instrument from damage in case of an overload or short in the current dipole circuit.
- The open loop circuit protects workers by automatically cutting off the high voltage in case of a break in the current dipole circuit.
- Both the primary and secondary of the transformer are switch selectable for power matching to the ground load. This ensures maximum power efficiency.
- The built-in ohmmeter is used for checking the external circuit resistance to ensure that the current dipole circuit is grounded properly before the high voltage is turned on. This is a safety feature and also allows the operator to select the proper output voltage required to give an adequate current for a proper signal at the receiver.
- The programmer is crystal controlled for the very high stability required for broadband (spectral) induced polarization measurements using the Scintrex IPR-11 Broadband Time Domain Receiver.
Technical Description of IPC-7/2.5 kW Transmitter System

Complete 2.5kW induced polarization system including motor-generator, reels with wire, tool kit, porous pots, simulator circuit, copper sulphate, IPR-8 receiver, dummy load, transmitter, electrodes and clips.

IPC-7/2.5kW transmitter console with lid and dummy load.

**Transmitter Console**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Output Power</td>
<td>1.85 kW maximum, defined as VI when current is on, into a resistive load</td>
</tr>
<tr>
<td>Output Current</td>
<td>10 amperes maximum</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>Switch selectable up to 1210 volts DC</td>
</tr>
<tr>
<td>Automatic Cycle Timing</td>
<td>T:T:T:T; on:off:on:off</td>
</tr>
<tr>
<td>Automatic Polarity Change</td>
<td>Each 2T</td>
</tr>
<tr>
<td>Pulse Durations</td>
<td>Standard: T = 2, 4 or 8 seconds, switch selectable</td>
</tr>
<tr>
<td></td>
<td>Optional: T = 1, 2, 4 or 8 seconds, switch selectable</td>
</tr>
<tr>
<td></td>
<td>Optional: T = 8, 16, 32 or 64 seconds, switch selectable</td>
</tr>
<tr>
<td>Voltage Meter</td>
<td>1500 volts full scale logarithmic</td>
</tr>
<tr>
<td>Current Meter</td>
<td>Standard: 10.0 A full scale logarithmic</td>
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<tr>
<td></td>
<td>Optional: 0.3, 1.0, 3.0 or 10.0 A full scale linear, switch selectable</td>
</tr>
<tr>
<td>Period Time Stability</td>
<td>Crystal controlled to better than .01%</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-30°C to +55°C</td>
</tr>
<tr>
<td>Overload Protection</td>
<td>Automatic shut-off at output current above 10.0 A</td>
</tr>
<tr>
<td>Open Loop Protection</td>
<td>Automatic shut-off at current below 100 mA</td>
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<tr>
<td>Undervoltage Protection</td>
<td>Automatic shut-off at output voltage less than 95 V</td>
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<tr>
<td>Dimensions</td>
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<td>30 kg</td>
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<td>Shipping Weight</td>
<td>41 kg includes reusable wooden crate</td>
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**Motor Generator**

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<th>Parameter</th>
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<tr>
<td>Maximum Output Power</td>
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<td>Output Voltage</td>
<td>110 V AC</td>
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<tr>
<td>Output Frequency</td>
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<tr>
<td>Motor</td>
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<tr>
<td>Shipping Weight</td>
<td>90 kg includes reusable wooden crate</td>
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SCINTREX

222 Snidercroft Road
Concord Ontario Canada
L4K 1B5

Telephone: (416) 669-2280
Cable: Geoscint Toronto
Telex: 06-964570

Geophysical and Geochemical Instrumentation and Services
WARNING

THE CURRENTS AND VOLTAGES PRODUCED BY THIS INSTRUMENT SYSTEM ARE DANGEROUS TO LIFE AND CAUTION SHOULD BE EXERCISED DURING USE.
1.2 SPECIFICATIONS

a) Power: 96-144 V line to line, 3 phase, 400Hz (from Huntec generator set), 2500W

b) Output: Voltage: 150-2200V dc in 8 steps
  Current: 7A maximum on low ranges

c) Current regulator: <.1% current change for 10% change in load resistance
  Settling time to 1% approximately 15 msec

d) Output frequency (selectable in binary steps on front panel):
  1/16 Hz to 1Hz (time domain and complex resistivity)
  1/16 Hz to 4 Hz (frequency domain)

e) Frequency accuracy: ± 50 ppm, -30°C to 60°C

f) Output duty cycle defined as \( \frac{t_{ON}}{t_{ON} + t_{OFF}} \):
  \( \frac{1}{16} \) to 15/16 in increments of 1/16
  (time domain)
  15/16 (complex resistivity)
  3/4 (frequency domain)

g) Output current meter: Two ranges - 0-5A, 0-10A

h) Ground resistance meter: Two ranges - 0-10K ohms, 0-100K ohms

i) Input voltage meter: 0-150V

j) Dummy load: Two levels: 500W, 1750W

k) Temperature range: -34°C to 50°C

l) Size: 53 x 43 x 29cm (21 x 17 x 11.5 ins)

m) Weight: 26 kg (57 lbs.)
APPENDIX B
GLENWATER PROPERTY
TAU (msec)

Spectral-M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

---

**Resistivity and Chargeability Anomalies**

- **Very Strong**
- **Strong**
- **Medium**
- **Weak**
- **Very Weak**
- **Extremely Weak**

Scale 1:2500

**Line 4000 E**

Pole-Dipole Array

plot point

AVALON VENTURES LTD.

INDUCED POLARIZATION SURVEY
GLENWATER TWP./SHABAQUA
THUNDER BAY AREA, ONT.

Date: 97/03/21

JVX LTD. (Ref. 9680, Jan 1997)
Line 4400 E

Pole-Dipole Array

Resistivity and Chargeability Anomalies

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
GLENWATER TWP./SHABAQUA
THUNDER BAY AREA, ONT.

Date: 97/03/21

JVX LTD. (Ref. 9680, Jan 1997)
Line 4600 E

Pole-Dipole Array

a = 25.0 M

plot point

Resistivity and Chargeability Anomalies

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
GLENWATER TWP./SHABAQUA
THUNDER BAY AREA, ONT.

Date: 07/03/21

JVX LTD. (Ref. 9680, Jan 1997)
TAU (msec)  Spectral-M (mVA)  Chargeability (mV/V)  Resistivity (Ohm.m)

Good Spectral target

IP-4  IP-1  IP-2  IP-2

Resistivity and Chargeability Anomalies

Very Strong
Strong
Medium
Weak
Very Weak
Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
GLENWATER TWP./SHABAQUA
THUNDERBAY AREA, ONT.

Date: 97/01/26

JVX LTD. (Ref.9680, Jan 1997)
### TAU

<table>
<thead>
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<th>Spectral-M (mV/V)</th>
<th>Chargeability (mV/V)</th>
<th>Resistivity (Ohm.m)</th>
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<tr>
<td>110+50N</td>
<td>111+00 N</td>
<td>111+50N</td>
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<tr>
<td>112+00 N</td>
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<td>121+00 N</td>
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**Line 5800 E**

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<th>Chargeability and Resistivity Anomalies</th>
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<td></td>
<td>Very Strong</td>
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<tr>
<td></td>
<td>Very Weak</td>
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<td></td>
<td>Extremely Weak</td>
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**Scale 1:2500**

**线5800 E**

**Pole-Dipole Array**

**Date: 97/02/25**

**AVLON VENTURES LTD.**

**INDUCED POLARIZATION SURVEY**

**GLENWATER PROPERTY, HORNE TWP.**

**THUNDER BAY AREA, ONT., NTS: 52A/12**

**JVX LTD. (Ref. 9500, Feb 1997)**
TAU (msec)

Spectral-M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

Line 6600 E

Pole-Dipole Array

Chargeability and Resistivity Anomalies

Very Strong
Strong
Medium
Weak
Very Weak
Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
GLENWATER PROPERTY, HORNE TWP.
THUNDER BAY AREA, ONT., NTS: 52A/12
Date: 97/02/14

JX LTD. (Ref. 9680, Feb 1997)
**Chargeability and Resistivity Anomalies**

- **Very Strong**
- **Strong**
- **Medium**
- **Weak**
- **Very Weak**
- **Extremely Weak**

---

**Scale 1:2500**

25 0 25 50 75 100 125 150

(metres)

---

**AVALON VENTURES LTD.**

**INDUCED POLARIZATION SURVEY**

**GLENWATER PROPERTY, HORNE TWP. THUNDER BAY AREA, ONT., NTS: 52A/12**

Date: 97/02/14

**JVX LTD. (Ref. 9680, Feb 1997)**
HORNE TOWNSHIP PROPERTY
TAU (msec)  

Spectral-M (mV/V)  

Chargeability (mV/V)  

Resistivity (Ohm.m)  

Line 6700 E  

Pole-Dipole Array  

Chargeability and Resistivity Anomalies  

Scale 1:2500  

AVALON VENTURES LTD.  
INDUCED POLARIZATION SURVEY  
HORNE TOWNSHIP PROPERTY  
THUNDER BAY AREA, ONT., NTS: 52A/12  

Date: 97/02/14  

JXV LTD. (Ref. 9680, Feb 1997)
TAU (msec)

Spectral-M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

Line 7100 E

Pole-Dipole Array

Chargeability and Resistivity Anomalies

Very Strong
Strong
Medium
Weak
Very Weak
Extremely Weak

xxx

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
HORNE TOWNSHIP PROPERTY
THUNDER BAY AREA, ONT., NTS: 52A/12
Date: 97/02/14

JXV LTD. (Ref. 9880, Feb 1997)
BATEMAN LAKE PROPERTY
POLE-DIPOLE ARRAY
TAU (msec)

Spectral-M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

---

Resistivity and Chargeability Anomalies

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremely Weak

Scale 1:2500

VH(I)

AVALON VENTURES LTD.

INDUCED POLARIZATION SURVEY

BATEMAN LAKE PROPERTY, Ontario

Commee & Horne Twp., NTS: S2A/12

Date: 07/03/11

JVX LTD (Ref. 9680, March 1997)
Shear zone

Resistivity and Chargeability Anomalies

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
BATEMAN LAKE PROPERTY, Ontario
Commee & Horns Twp., NTS: 52A/12
Date: 97/03/11

JVX LTD (Ref. 9680, March 1997)
LINE 9200 E

**Pole-Dipole Array**

**Chargeability**

**Spectral-M**

**Resistivity**

**Resistivity and Chargeability Anomalies**

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremly Weak

**Scale 1:2500**

**AVALON VENTURES LTD.**

**INDUCED POLARIZATION SURVEY**

**BATEMAN LAKE PROPERTY, Ontario**

**Commee & Horne Twp., NTS: 52A/12**

**Date: 97/03/11**

**JVX LTD** (Ref. 9600, March 1997)
<table>
<thead>
<tr>
<th>TAU (msec)</th>
<th>Spectral-M (mV/V)</th>
<th>Chargeability (mV/V)</th>
<th>Resistivity (Ohm.m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pole-Dipole Array**

- **Line 9300 E**
- **Pole-Dipole Array**
- **Resistivity and Chargeability Anomalies**
  - Very Strong
  - Strong
  - Medium
  - Weak
  - Very Weak
  - Extremely Weak

**Scale 1:2500**

**AVALON VENTURES LTD.**

**INDUCED POLARIZATION SURVEY**

**BATEMAN LAKE PROPERTY, Ontario**

**Conness & Horne Twp., NTS: 52A/12**

**Date:** 97/03/11

**JXV LTD (Ref. 9550, March 1997)**
TAU (msec)

Spectral-M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

Line 9700 E

Pole-Dipole Array

Sensitivity and Chargeability Anomalies

Very Strong
Strong
Medium
Weak
Very Weak
Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
BATMAN LAKE PROPERTY, Ontario
Connee & Horns Twp., NTS; 52A/15
Date: 97/03/11

JTV LTD (Ref. 9680, March 1997)
Resistivity and Chargeability Anomalies

- Very Strong
- Strong
- Medium
- Weak
- Very Weak
- Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.
INDUCED POLARIZATION SURVEY
BATEMAN LAKE PROPERTY, Ontario
Comnee & Horns Twp., NTS: 52A/12
Date: 97/03/11

JVX LTD (Ref. 9880, March 1997)
DIPOLE-DIPOLE ARRAY
Resistivity and Chargeability Anomalies

AVALON VENTURES LTD.

Line 9400 E

Date: 97/03/12

Conmee & Horne Twp., NTS; 52A/18

BATEMAN LAKE PROPERTY, Ontario

Spectral-M

Resistivity

(mV/V)

Chargeability

(mV/V)

(msec)

TAU

Extremely Weak

• Very Weak

• Weak

• Strong

plot point
BATEMAN LAKE PROPERTY, Ontario

INDUCED POLARIZATION SURVEY

AVALON VENTURES LTD.

Date: 97/03/12

Dipole-Dipole Array

Scale 1:2500

Line 9800 E

Resistivity and Chargeability Anomalies

Strong

Very Weak

Extremely Weak

Weak

Medium

Very Strong

a = 25.0 M
BATEMAN LAKE PROPERTY, Ontario

Resistivity and Chargeability Anomalies

Line 10300 E

Date: 97/03/12

Spectral-M
Line 10000 E
BATEMAN LAKE PROPERTY, Ontario

AVALON VENTURES LTD.

Date: 97/03/19

Resistivity and Chargeability Anomalies

Dipole-Dipole Array

Line 10000 E

Plot point

Medium

Weak

Strong

\( a = 25.0 \text{ m} \)}
TAU (msec)

Spectral—M (mV/V)

Chargeability (mV/V)

Resistivity (Ohm.m)

Line 10800 E

Dipole-Dipole Array

Resistivity and Chargeability Anomalies

Very Strong

Strong

Medium

Weak

Very Weak

Extremely Weak

Scale 1:2500

AVALON VENTURES LTD.

INDUCED POLARIZATION SURVEY

BATEMAN LAKE PROPERTY, Ontario

Connee & Horne Twp., NTS: 52A/12

Date: 97/03/14

JVX LTD. (Ref. 9680, March 1997)
Declaration of Assessment Work Performed on Mining Land
Mining Act, Subsection 66(3) and 66(3), R.S.O. 1990

(Mining Lands) (3) of the Mining Act. Under section 6 of the and correspond with the mining land holder.

Instructions: - For work performed on Crown Lands before recourting a claim, use form 0240.
- Please type or print in ink.

1. Recorded holder(s) (Attach a list if necessary)

Name: DON LEISHMAN, KEN FENWICK, SCOTT CHRISTIANSON
Address: 204 ANTEN STREET, THUNDER BAY, ON

Name: STEPHEN AND MICHAEL STARES
Address: 1124 W. ARTHUR STREET, THUNDER BAY, ON

2. Type of work performed: Check (x) and report on only ONE of the following groups for this declaration.
- Geotechnical: prospecting, surveys, assays and work under section 18 (regs)
- Physical: drilling, stripping, trenching and associated assays
- Rehabilitation

Work Type: INDUCED POLARIZATION SURVEY

3. Person or companies who prepared the technical report (Attach a list if necessary)

Name: DOUG PARKER - AVATON VENTURES
Address: 777 RED RIVER RD. T-BAY, ON

Name: BLAINE WEBSTER - JLV LTD
Address: 60 WEST WILMOT ST. UNIT2

Name: RICHMOND HILL ON L4B 1M6

4. Certification by Recorded Holder or Agent

I, DOUG PARKER, do hereby certify that I have personal knowledge of the facts set forth in this Declaration of Assessment Work having caused the work to be performed or witnessed the same during or after its completion and, to the best of my knowledge, the annexed report is true.

Date: MAY 1, 1997

Agent's Address: 777 RED RIVER ROAD T-BAY
Telephone Number: 767-3012
Fax Number:
Mining Claim Number. Or if work was done on other eligible mining land, list the location number and hectares.

<table>
<thead>
<tr>
<th>Claim Number</th>
<th>Number of Claim Units</th>
<th>Value of work performed on this claim or other mining land</th>
<th>Value of work applied to this claim</th>
<th>Value of work assigned to other mining claims</th>
<th>Bank, Value of work to be distributed at a future date</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB 7827</td>
<td>16</td>
<td>$26,825</td>
<td>N/A</td>
<td>$24,000</td>
<td>$2,825</td>
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<td>$8,892</td>
<td>$4,000</td>
<td>0</td>
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<td>0</td>
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<td>1224923</td>
<td>16</td>
<td>7,160</td>
<td>6,400</td>
<td>760</td>
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<tr>
<td>1173947</td>
<td>4</td>
<td>14,500</td>
<td>3,200</td>
<td>11,300</td>
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</tr>
<tr>
<td>1224922</td>
<td>6</td>
<td>10,800</td>
<td>4,800</td>
<td>6,000</td>
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</tr>
<tr>
<td>1224924</td>
<td>2</td>
<td>10,900</td>
<td>1,600</td>
<td>9,300</td>
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<tr>
<td>1224908</td>
<td>6</td>
<td>18,500</td>
<td>4,800</td>
<td>13,700</td>
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<td>10,900</td>
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<tr>
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<td>2,600</td>
<td>400</td>
<td>2,200</td>
<td></td>
</tr>
<tr>
<td>1215011</td>
<td>16</td>
<td>2,600</td>
<td>533</td>
<td>2,067</td>
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<td>1224683</td>
<td>6</td>
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<td>196</td>
<td>889</td>
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<td>1224680</td>
<td>15</td>
<td>5200</td>
<td>500</td>
<td>4700</td>
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<tr>
<td>1215010</td>
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<td>533</td>
<td>4667</td>
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<td>1224681</td>
<td>15</td>
<td>22972</td>
<td>1833</td>
<td>20,639</td>
<td></td>
</tr>
</tbody>
</table>

Column Totals: 112,417 $26,895 $1833 85,522

I, DOUGLAS PARKER, do hereby certify that the above work credits are eligible under subsection 7 (1) of the Assessment Work Regulation 6/96 for assignment to contiguous claims or for application to the claim where the work was done.

Signature of Holder or Agent Authorized in Writing

Date: 01/05/97

6. Instructions for cutting back credits that are not approved.

Some of the credits claimed in this declaration may be cut back. Please check (✓) in the boxes below to show how you wish to prioritize the deletion of credits:

- [ ] 1. Credits are to be cut back from the Bank first, followed by option 2 or 3 or 4 as indicated.
- [ ] 2. Credits are to be cut back starting with the claims listed last, working backwards; or
- [ ] 3. Credits are to be cut back equally over all claims listed in this declaration; or
- [ ] 4. Credits are to be cut back as prioritized on the attached appendix or as follows (describe):

Note: If you have not indicated how your credits are to be deleted, credits will be cut back from the Bank first, followed by option number 2 if necessary.
## Statement of Costs for Assessment Credit

Personal information collected on this form is obtained under the authority of subsection 8(1) of the Assessment Work Regulation 6/96. Under section B of the Mining Act, the information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to the Chief Mining Recorder, Ministry of Northern Development and Mines, 6th Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

### Work Type

<table>
<thead>
<tr>
<th>Units of Work</th>
<th>Cost Per Unit of Work</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Survey</td>
<td>51.825 KM</td>
<td>$2073</td>
</tr>
<tr>
<td>Supervision</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Associated Costs (e.g. supplies, mobilization and demobilization).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>

### Transportation Costs

<table>
<thead>
<tr>
<th>Units of Work</th>
<th>Cost Per Unit</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>620 KM</td>
<td>35¢/KM</td>
<td>217</td>
</tr>
</tbody>
</table>

### Food and Lodging Costs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>

**Total Value of Assessment Work**: 112,417

### Calculations of Filing Discounts:

1. Work filed within two years of performance is claimed at 100% of the above Total Value of Assessment Work.
2. If work is filed after two years and up to five years after performance, it can only be claimed at 50% of the Total Value of Assessment Work. If this situation applies to your claims, use the calculation below:

   \[
   \text{TOTAL VALUE OF ASSESSMENT WORK} \times 0.50 = \text{Total $ value of worked claimed.}
   \]

**Note:**
- Work older than 5 years is not eligible for credit.
- A recorded holder may be required to verify expenditures claimed in this statement of costs within 45 days of a request for verification and/or correction/clarification. If verification and/or correction/clarification is not made, the Minister may reject all or part of the assessment work submitted.

### Certification verifying costs:

- **Doug Parker** (please print full name) do hereby certify, that the amounts shown are as accurate as may reasonably be determined and the costs were incurred while conducting assessment work on the lands indicated on the accompanying Declaration of Work form as **Agent** (recorded holder, agent, or state company position with signing authority) I am authorized to make this certification.

**Signature**

**Date**: 01/05/97
RECORDED HOLDER

#3 AVALON VENTURES LTD.
777 RED RIVER ROAD
THUNDER BAY, ONTARIO
787-3012 (301086) 978159
September 22, 1997

DONALD MURRAY LEISHMAN
204 ANTEN STREET
THUNDER BAY, Ontario
P7B-5J6

Dear Sir or Madam:

Submission Number: 2.17459

Subject: Transaction Number(s):

W9740.00246 Approval After Notice

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

If you have any questions regarding this correspondence, please contact Lucille Jerome by e-mail at jerome_j@torv05.ndm.gov.on.ca or by telephone at (705) 670-5858.

Yours sincerely,

Blair Kite
Supervisor, Geoscience Assessment Office
Mining Lands Section
Work Report Assessment Results

Submission Number: 2.17459
Date Correspondence Sent: September 22, 1997
Assessor: Lucille Jerome

<table>
<thead>
<tr>
<th>Transaction Number</th>
<th>First Claim Number</th>
<th>Township(s) / Area(s)</th>
<th>Status</th>
<th>Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9740.00246</td>
<td>1224923</td>
<td>HORNE, CONMEE</td>
<td>Approval After Notice</td>
<td>September 22, 1997</td>
</tr>
</tbody>
</table>

Section:
14 Geophysical IP

The 45 days outlined in the Notice dated July 30, 1997 have passed.

Assessment work credit has been approved as outlined on the attached Distribution of Assessment Work Credit sheet.

Correspondence to:
Resident Geologist
Thunder Bay, ON

Assessment Files Library
Sudbury, ON

Recorded Holder(s) and/or Agent(s):
Douglas P. Parker
THUNDER BAY, ONTARIO

DONALD MURRAY LEISHMAN
THUNDER BAY, Ontario

KENNETH GEORGE FENWICK
THUNDER BAY, ONTARIO

SCOTT ALEXANDER CHRISTIANSON
THUNDER BAY, ONTARIO

STEPHEN A STARES
THUNDER BAY, Ontario

AVALON VENTURES LTD.
THUNDER BAY, ONTARIO
Distribution of Assessment Work Credit

The following credit distribution reflects the value of assessment work performed on the mining land(s).

Date: September 22, 1997
Submission Number: 2.17459
Transaction Number: W9740.00246

<table>
<thead>
<tr>
<th>Claim Number</th>
<th>Value Of Work Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1224923</td>
<td>5,924.00</td>
</tr>
<tr>
<td>1173947</td>
<td>11,600.00</td>
</tr>
<tr>
<td>1224922</td>
<td>8,700.00</td>
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<td>8,700.00</td>
</tr>
<tr>
<td>1224908</td>
<td>14,800.00</td>
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<td>8,700.00</td>
</tr>
<tr>
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<td>1215010</td>
<td>4,200.00</td>
</tr>
<tr>
<td>1224681</td>
<td>18,400.00</td>
</tr>
</tbody>
</table>

Total: $90,324.00