

## **MEMORANDUM**

**To:** Dennis Ouellette  
Northern Tiger Resources Inc. **Date:** Nov 30, 2012

**From:** Louis Rosenthal

**Re:** 2012 Del IP survey – 3D Inversion

This memorandum describes the data inversion steps taken to model the resistivity and induced polarization data provided in the field report submitted on June 8<sup>th</sup>, 2012. Additionally, this report integrates all the geophysical and geological data on the “D” zone and makes recommendations based on the results of the interpretation.

### **1) Data Inversion**

The final resistivity and chargeability data were modeled using the DCIP3D inversion software developed by the University of British Columbia Geophysical Inversion Facility. This software package produces a geo-referenced chargeability (V/V) and conductivity (mS/m) model.

The inversions incorporated the 2D gradient and expanding pole-dipole (EPLDP) data from the field report as well as EPLDP and gradient data acquired using a 3D array. The 3D array consists of a static 50m 20 pin (on L100) receiver array flanked by roving current sources on adjacent lines (L0 and L200). This 3D array simultaneously produces both a 3D EPLDP and a 3D gradient dataset. The 3D EPLDP is collected when both current electrodes are on the same side of the receiver dipole. The 3D gradient data is collected when the receiver dipole is between the current electrodes. To avoid confusion, the 3D data collected with current source on L0 is labelled L50 and the 3D data collected with the current source on L200 is labelled L150.

The DC inversions used the primary voltage normalized by the current as input and the IP inversions used dimensionless averaged IP as input. The assumed data error for the DC inversions was  $\pm 5\%$  of the

primary voltage plus a floor of 0.0001 V/A and the assumed data error in the IP inversion is the averaged standard deviation calculated by the IP receiver.

### *DC inversion*

Initially, the DC dataset was inverted with a coarse 25m mesh to provide a reasonable first model while minimizing computer time. This model was used as a starting point for the next stage of the inversion which used a finer 12.5 m mesh. The final inversion was weighed from the top down to discourage surface noise. The final model required no additional smoothing and fit the data closely. There appears to be a small discrepancy between the 2D and 3D data which caused the inversion to fit the 3D data more closely due to the higher density of data collected. No prior geological knowledge was incorporated into the inversion process. Stacked sections of the observed and predicted conductivity and a difference calculation plot are included in with this report for all four datasets.

### *IP inversion*

The sensitivity of the IP inversion was calculated using the final DC model. Different models were calculated using several combinations of initial and reference models. The best model used a default reference and initial model, and used surface weighing to discourage spottiness. The inversion was able to fit the data very closely. No prior geological knowledge was incorporated into the inversion process. Stacked sections of predicted and observed chargeability and a difference calculation are included with this report for all four datasets.

## **2) Processing**

The padding cells were removed from the final models which were then imported into Oasis Montaj as 3D voxels. A resistivity model was created by taking the inverse of the conductivity model. Isosurfaces were extracted from these models to visualize the data more effectively. The processed voxels are included with this report in various formats (geosoft Voxels, packed maps, and a 3D PDF).

## **3) Interpretation**

The survey was centered on and perpendicular to a malachite bearing fracture zone which is located 350m SW of a 400x300m soil sampling anomaly delineated in 2011. This area, the D-Zone, is an inferred geologic contact between andesitic rocks to the northeast and monzonitic rocks to the southwest. The purpose of the survey was to identify the potential for "Minto-style mineralization" in the area. The expected geophysical response of this type of target would be a modestly high chargeability, moderate resistivity, and a magnetic high.

Generally, the magnetic response (Figure 1) of the area show a 100-200m wide magnetic high at the fracture zone bounded by areas of low magnetic intensity to the east and west. The strike of the highly magnetic feature is approximately Az 130. The highly magnetic area has a sharp contact to the east and

a more gradual contact to the west. The magnetic intensity variations in the area could potentially be due to variations in the overburden thickness as the magnetic highs correspond to areas with outcropping bedrock.

This interpretation splits the study area into 3 zones (figures 1 - 3). The variations in magnetic intensity, resistivity and chargeability in the study area are modest, so in the following discussion, qualitative adjectives such as high and low are used relative to the domain of the local variation.

Zone 1 is interpreted as the monzonite unit and has a low resistivity, negligible chargeability response and a low magnetic intensity.

Zone 2 is interpreted as the contact between the monzonite to the west and the andesite to the east. It contains the malachite bearing fracture zone. The geophysical response of Zone 2 is moderate to high resistivity, low chargeability and high magnetic intensity.

Zone 3 interpreted as the andesite and the anomalous geochemical samples were collected on the surface in this zone. The geophysical model contains a low resistivity area under L100 flanked by highly resistive areas to the northwest and southeast. The resistive parts of this zone are moderately chargeable and the low resistivity core is variably chargeable. Both the resistive and chargeable zones connect at depth which suggests an synclinal fold structure. The magnetic intensity in this zone was generally low, with a few subtle highs.

The geophysical response of zone 3 closely matches the expected response from “minto style” mineralization. The main chargeable body is hosted within the resistive outer limb of the fold. The north limb of the fold is modelled on surface just north of L200N and the south limb is south of L0N. There are some smaller scale variations resistivity and chargeability variations within the “core” of the fold. Magnetic highs coincided with chargeability highs within this zone.

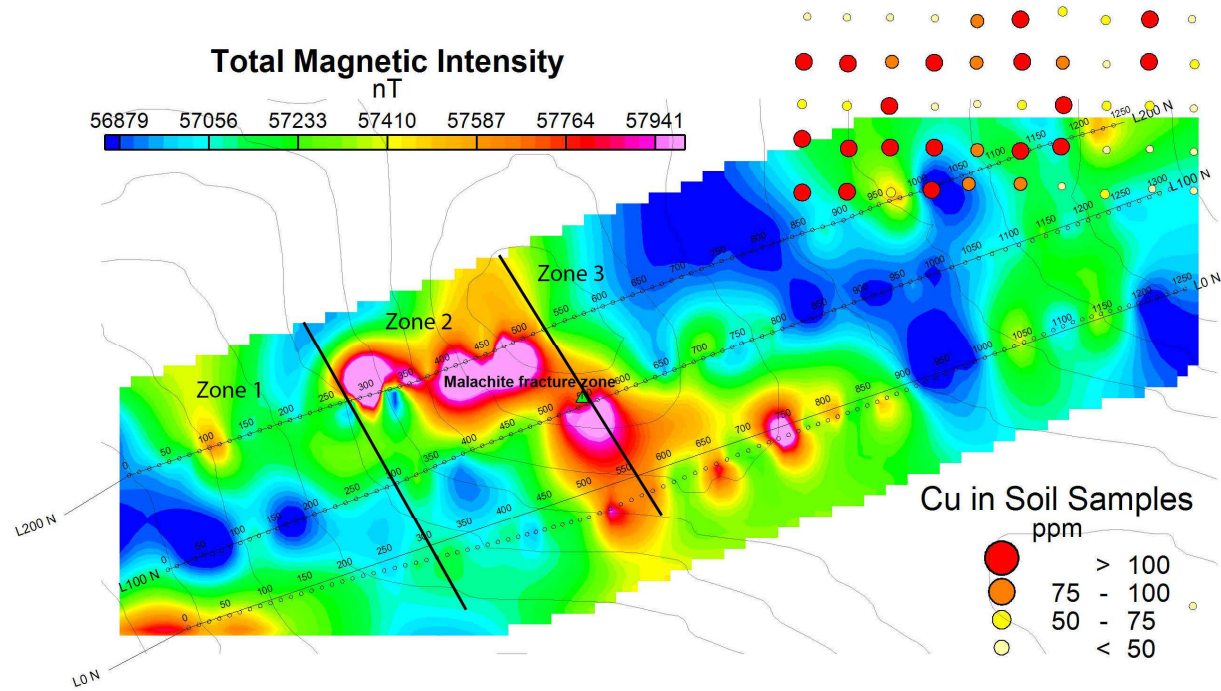


Figure 1: The total magnetic intensity in the survey area.

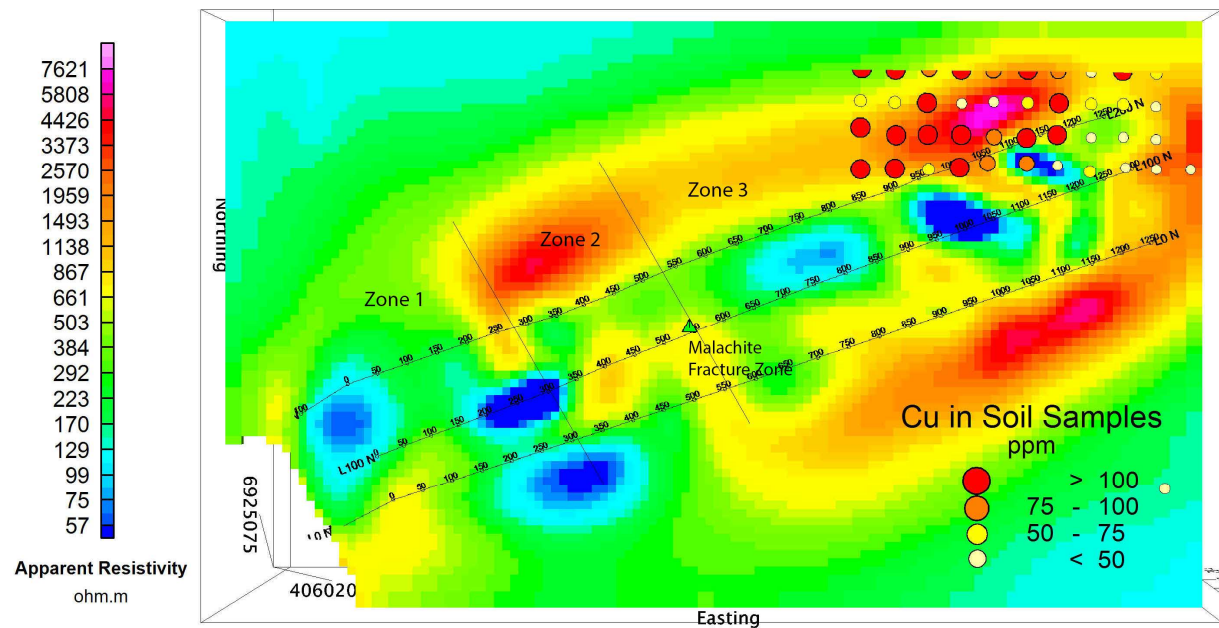


Figure 2: Plan Map view of the recovered resistivity model at an elevation of 900m.



#### 4) Recommendations

Table 1 shows the collar and survey of the recommended drill holes and figure 4 and 5 show the location of these drillholes.

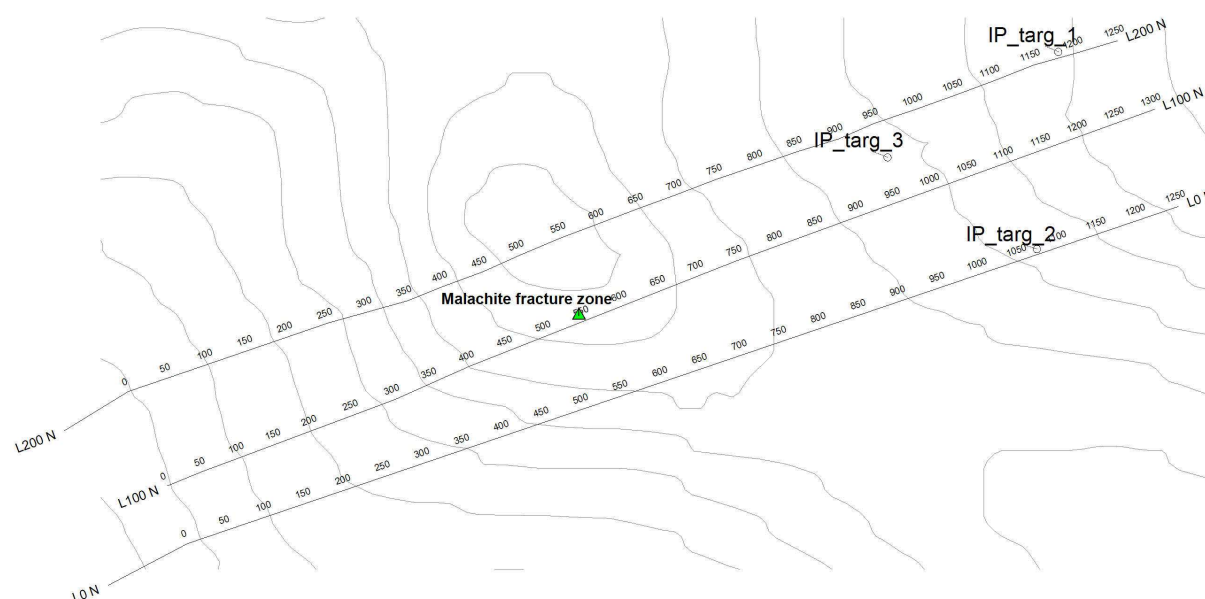
Hole_ID	Easting	Northing	Elevation	Azimuth	Dip	Depth to anomaly
IP_targ_1	407326	6925813	946.67	0	-90	25-50m
IP_targ_2	407301	6925583	969.85	0	-90	75-100m
IP_targ_3	407127	6925690	977.97	0	-90	100-125m

IP\_targ\_1 targets the northern limb where it is the most chargeable.

IP\_targ\_2 targets the south limb where it is the most chargeable.

IP\_targ\_3 targets a smaller IP anomaly located in the core of the fold.

In addition to the drill targets, additional geophysical and geochemical surveys are recommended to close off the anomaly. Further IP surveying from station 400 to 1400 is recommended both north and south of the current survey with priority being to the north. Further geochemical sampling is recommended throughout the area interpreted to be underlain by the andesite (Zone 3).



**Figure 4: Location of proposed drill holes.**

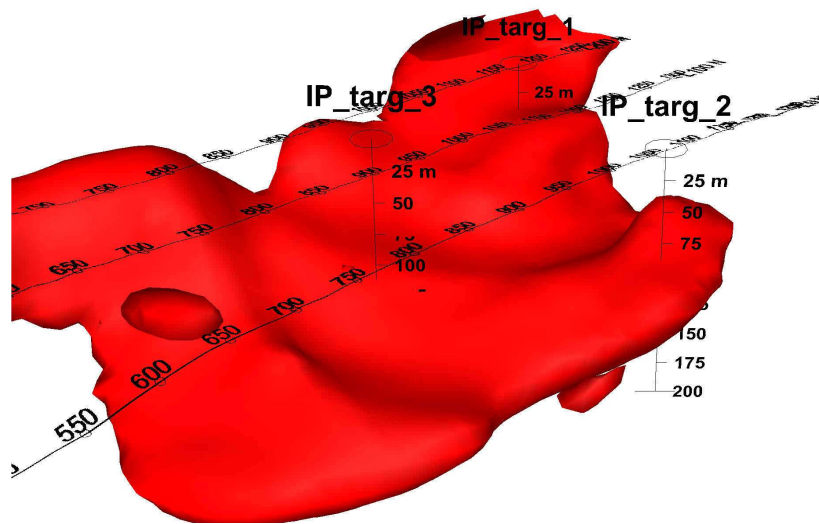


Figure 5: Proposed drill targets plotted with a 13 mV/V chargeability isosurface

## 5) Products

The following files are included with the digital version of this report

\MAP	Packed 3D geosoft map containing voxels, isosurfaces and other data used to make the figures in this report.
\UBC	Final UBC models and mesh file
\3D PDF	3D PDF of the final IP and DC models
\Voxel	Final models in voxel format
\Pred vs Obs	Predicted vs Observed Stacked Sections and raw data
Del 2012 IP - 3D Inversion Report.pdf	A copy of this report
IP Target Database.xls	Excel database containing drill targets

Respectfully submitted,

AURORA GEOSCIENCES LTD.

Louis Rosenthal