

GEOPHYSICAL SURVEYS

Magnetometer and VLF-EM surveys were conducted by Placer Dome Inc. personnel while the Induced Polarization and Resistivity survey was conducted by Scott Geophysics Ltd. on the Spring property. These surveys took place during the months of June, July and August 1989.

The Placer Dome Inc. surveys covered 75.62 km of line, 35.4 km of extension line on the 1988 grid and 40.22 km of line on the new grid in the northwest of the claims. The field grid coordinates for each reading were converted into a UTM based coordinate system to facilitate accurate plotting.

The Induced Polarization and Resistivity survey covered 15.15 km of line on the 1988 grid.

Equipment and procedures

VLF-EM Survey

The VLF-EM survey was conducted using a Geonics EM-16. Along the northwest trending extension lines of the 1988 grid, the survey employed the transmitting station at Jim Creek (near Seattle), Washington. Along the north trending lines of the northwest grid, the survey employed the transmitting station at Cutler, Maine, except on lines 3700E and 3900E between 5025N and 5975N where the Annapolis station was used. Readings were taken facing northerly along the lines at 25 metre intervals. Cross-overs are therefore in the sense of positive to negative as one traverses north along the lines. Positive values are plotted on the west side of the profile plots. VLF readings were entered onto disk in a Zenith laptop portable computer in the field. The stored data was later transferred to a Sun computer system for final processing and plotting.

Magnetometer Survey

The magnetometer Survey was conducted using two Geometrics G-856 portable proton magnetometers. One was used in field mode while the other was used in a base station mode. The internal clocks were synchronized before the commencement of the survey and subsequent daily readings were dumped out to disk in a Zenith laptop portable computer. Magnetometer readings were taken at 12.5 metre stations and corrections for diurnal changes were made by use of the base station recordings and an established base station value. The corrected results were stored on disk for eventual transfer to a Sun computer system for final processing and plotting.

Induced Polarization

A Scintrex IPR-11 time domain, microprocessor based receiver and a Scintrex IPC7 2.5 kw transmitter were used for the Induced Polarization survey. Readings were taken using a two second alternating square wave. The chargeability for channel 8 (690 to 1050 milliseconds after shut off; midpoint at 870 milliseconds) is the value that has been plotted on the accompanying plans and pseudosections.

The pole dipole electrode array was used for the survey, with readings taken at an "a" spacing of 25 metres and "n" separations of 1,2,3,4, and 5. The current electrode was to the south of the potential electrodes on all survey lines.

The survey data was put in archive, processed and plotted using a Sharp PC7000 microcomputer running Scintrex Soft II, IGS and proprietary software. All chargeability values were analyzed for their spectral characteristics using a curve matching procedure (Soft II). The Cole-Cole parameters, "c" and "tau" were calculated along with a goodness-of-fit. This fit parameter is a measure of the data quality, in as much as the data can be seen to conform to pre-established waveforms. Large "tau" values are indicative of large "grain" size. The "c" parameter is a measure of the variability or homogeneity of the "grain" size.

Survey Results

The VLF-EM survey results were plotted as stacked In-phase, Quadrature and Fraser Filter profiles at a scale of 1:10000. The Fraser Filter data was calculated as per the method put forth by D.C. Fraser (1969, Contouring of VLF-EM Data: Geophysics, v.34, p. 958-967). See map in the folder at the back of report.

The magnetometer survey results were plotted as plan maps of stacked profiles at a scale of 1:10000. (See maps in folder at the back of report.) The data was also processed using the Real Time Imaging Package (see figure XXX). RTI is a state of the art, 256 colour VGA processing package developed by Geopak Systems, the software division of Urquhart-Dvorak Limited, in association with Aerodat Limited. The RTI package greatly assists comprehensive data interpretation through the use of high speed algorithms and screen drivers. It requires any XT, AT or 386 computer with extended high resolution VGA capability and a math coprocessor. Gridded (digital) geophysical data or its derivatives may be manipulated interactively on screen, either singulary or in stacked multiple grid format, by a mouse driven interface.

Colour or grey shadow displays of survey data may be varied according to selected colour tones and contrast. Inclination and declination of the "sun angle" in shadow mapping may be varied in real time (i.e. as the cursor moves - driven by the mouse - so does the apparent shadow produced by the "sun"). The on-screen image is three dimensional in nature and gives a pseudo topographic view of the data set. Controlled changes in the "sun angle" greatly enhance structural features, geological contacts and lithologic changes, and assist the interpreter (user) in identifying subtle trends not readily apparent in the hard copy map products usually associated with geophysical data."

Resistivity and chargeability data for slice M7 (channel 8) are presented as pseudosections at the back of this report (scale 1:2000). Plan maps of the posted first and second separation resistivity and chargeability readings are presented at a scale of 1:5000 in the pocket at the end of this report. Contoured plan maps of the above data has also been presented at the end of this report at a scale of 1:5000.

Discussion of Results

VLF-EM Survey

The VLF survey detected numerous conductors which confirmed the 1988 observations. The predominant direction of these conductor axes is 060 Azimuth. Several offsets which trend 010 Azimuth can be outlined.

Magnetometer Survey

A number of linear zones of low magnetic readings were detected by use of the RTI processing package (~~see Appendix 1~~). These breaks have been outlined on figure XXX.

Induced-Polarization

ZONE 2

The above survey detected an area of anomalous chargeabilities on Lines 700 through 1400 East. This can best be seen on the N=3 and N=5 contoured chargeability maps. The resistivities are quite low on this grid due to increased thicknesses of glacial till. In the vicinity of the anomalous zone, it is evident that the till layer is the thinnest on Lines 700 and 800 East with the thickest area being on Lines 1000 through 1200 East on the south side of the anomaly.

Line 1000 East was also covered with I.P. south of the base line with a weak anomaly being detected between the Baseline and 100 South.

ZONE 4

A weak chargeability anomaly was detected on the South ends of Lines 800 and 1000 West. The increase in resistivity values on this grid reflects a general thinning of the overburden on this grid as compared to Zone 2.

LINE 200W

A moderate anomaly centered at 3200 North was detected. The resistivity results on this line are indicative of increased overburden as can be seen from the layering on the I.P. pseudosections.

The best possibilities for trenching are on Lines 700 and 800 East at 575 North and on Lines 800 and 1000 West at 1275 South.