ABITIBI GEOPHYSICS

Geo-Echoes

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On-Site Field Quality Control

For the past twenty years, geophysical instruments have witnessed a significant upgrade in technology by incorporating large memory storage capabilities and thus considerably reducing the potential for erroneous data entry. On the other hand, field operators' reading monitoring has become somewhat less thorough. Poor quality data may consequently enter the ever increasing flow of stored information.
In addition to quality control involved throughout the reading process, it is yet required that the operator be able to access and easily review daily data in order to detect any underlying fault that could affect survey quality and efficiency.
Accordingly, Abitibi Geophysics uses highly specialized software programs such as :

MAGneto® : magnetic surveys (including those with integrated GPS);
Refusilo® : induced polarization / resistivity surveys (ground and borehole);
Maxwell® (EMIT Ltd.) : electromagnetic surveys (especially time domain).

The first two programs have been developed through our in-house research & development (R & D) department. This Geo-Echoe issue will be introducing the main functions of the **Refusilo®** program.

To begin processing IP data, one must first open a new project by creating a project book that will contain all the information concerning that specific project (such as client, property, language, field crew, survey type, survey parameters, instruments, quality factors, etc.).

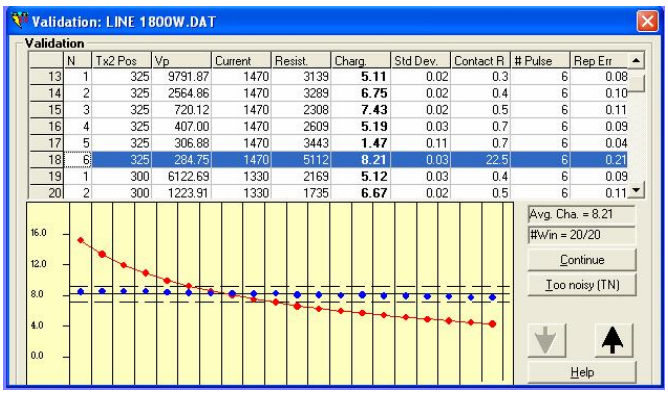
The data can then be dumped from the receiver to the computer (efficient quality control performed by the **Refusilo®** program can only be applied to IP receivers operating within time domain).

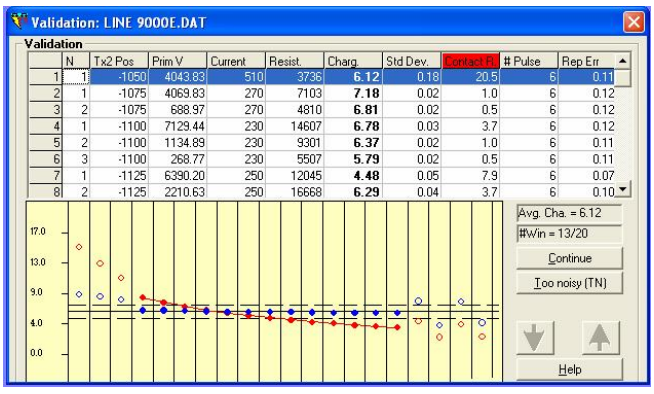
Raw data is next converted into a universal IP file format, regardless of the receiver type.

Data validation (quality control) may then be initiated according to the quality factors previously entered in the project book. A set value must therefore be respected for each of these parameters:

- Minimum primary voltage (i.e. 5 mV)
- Minimum number of pulses (i.e. # 6)
- Maximum contact resistance? (i.e. 20 kΩ)
- **Normalized decay curve** tolerance (standard deviation of the normalized windows) (i.e. 5%)
- Readings' repetition error (i.e. 2 mV/V)

Only the readings successfully passing each quality factor tests will automatically be labelled as valid. An ideal reading is shown on the left figure below. This validation display shows the chargeability decay curve in red and the **normalized decay curve** in blue. The latter is nearly horizontal with each of its twenty measured windows located within the two dashed lines representing the (5%) normalized decay curve tolerance. This **normalized decay curve** also matches the average chargeability (shown by the central horizontal line).





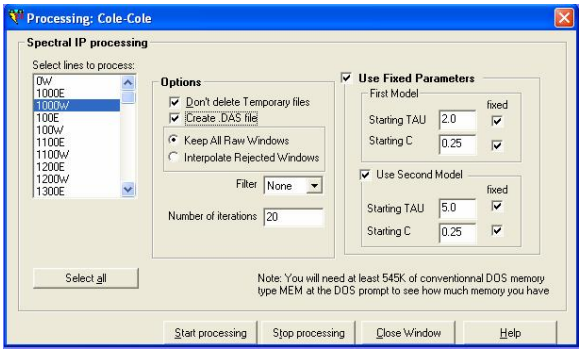
Conversely, the above figure on the right shows a rather noisy IP decay curve:

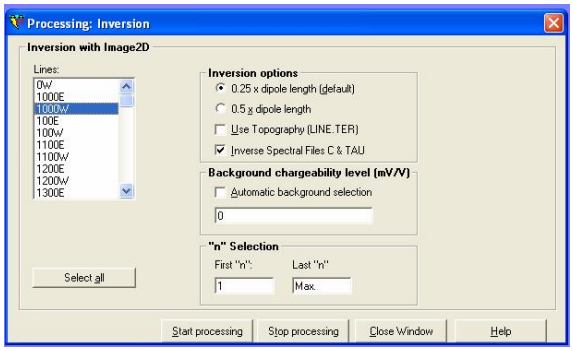
- here, the first three windows (from the left) illustrate a positive electromagnetic coupling effect. **Refusilo®** normalized IP(1) decay curve (in blue) has allowed detection of such a phenomenon and the validation resulted as rejected windows (shown as empty circles).
- additionally, the last four windows (from the right) are subject to telluric noise. These were also automatically rejected during **Refusilo®** final chargeability calculation.

Where only a few chargeability windows within a reading are rejected, this program automatically validates the reading. Then again, if a greater percentage of windows are outside tolerance, the program requires the user whether to accept or reject the reading. This way the data can not be modified and chargeability results as higher quality data, free of parasitic effects. Validation thus promptly identifies any potential phenomenon that could eventually degenerate and reduce survey quality.

The spectral analysis of the IP decay curves results in a quantitative evaluation of the IP time constant of the various polarizable minerals. This parameter may then lead to mineral discrimination (i.e.: sulphides vs magnetite).

The *image2D ®* pseudosections inversion (imaging process not requiring any starting model) readily allows for enhanced anomaly resolution and easy target location by the client.





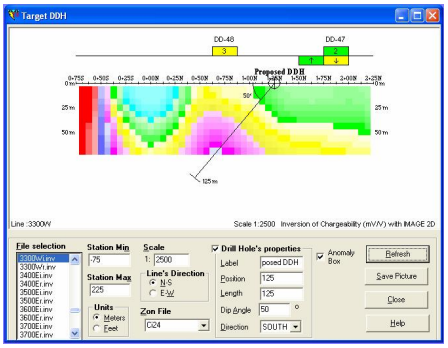
Plotting of pseudosections and *image2D®* true-depth sections (resistivity, chargeability & optional Cole-Cole spectral parameters) with magnetic profile (if available), topographic profile, field notes and interpretation.

Printing of the above-mentioned pseudosection plates.

Complementary tool functions, including:

- plotting of contoured color plan map corresponding to a specific «n» spacing or *image2D®* inversion at a chosen depth.
- plotting of stacked-pseudosections maps or stacked-*image2D®* inversions maps.
- individual survey-line summary or complete project summary showing statistical-quality information (the most relevant parameters statistics are included in the final report).

The target program allows the user to quickly plot a chargeability inversion section with recommended drill hole parameters or prospecting location.



(1) A Power Point presentation is available for more information on the normalized validation process.

See our next Geo-Echoe issue: **MAGneto®**

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