

Abstracts – New Technologies in Exploration Mini Symposium

April 3, 2018

Keynote Introduction – Dr. Ross Sherlock – Director of MERC & Chair of Exploration Targeting, Laurentian University

In his current role as Director of the Metal Earth program, and previous role as VP – Geoscience at Kinross, Dr. Sherlock will provide a unique insight into the delivery of new geoscience knowledge and technologies.

New Approaches for Dating Hydrothermal Gold Deposits – Dr. Bill Davis, Section Head, Geochronology, Natural Resources Canada

Establishing the absolute ages of minerals within hydrothermal ore-mineral assemblages, either in ore-bearing veins or intergrown with ore minerals in alteration zones, is critical to quantify the timing of fluid flow events in ore-forming systems. Accurate age information can help discriminate relevant geologic triggers controlling hydrothermal systems, at the local and regional scale. For example, it may differentiate between fluids systems driven by plutonic events from tectono-metamorphic fluids driven by regional orogenic processes. Historically, determining accurate ages of mineralising events has posed both analytical and interpretive challenges, as it is often difficult to establish synchronicity of the dated mineral phases with ore minerals. Dating fluid flow events requires a thorough understanding of the geology and paragenesis of the ore system and dateable phases, coupled with precise analytical data. This presentation will highlight latest advances in imaging and dating of alteration assemblages with examples from Uranium and orogenic gold systems.

Use of Drones for Exploration – Gordana Slepcev, Chief Operating Officer, Anaconda Mining

Drones are being widely used in our industry, from grassroots exploration through to mine operation and closure. UAVs (Unmanned Aerial Vehicles) or 'Drones' produce high resolution georeferenced photos and topographic surfaces. High resolution topographic surfaces are used both in mining and exploration for the planning activities and volume calculations. Those photos and surfaces are also used to plan exploration activities including trail access, three cutting and drills setups. Mine application includes monitoring mine advances including pit, dump, tailings and stockpile progress. High resolution photos produced by drones are imported into graphic software's like Surpac, AutoCAD and MapInfo and used to prepare base geological maps. Some exposed surface features are being captured by high resolution photos.

Introduction to TruScan – Dr. Kirk Ross, XRF Geochemist, Boart Longyear

Compositional analysis of drill core in a timely and cost-effective manner has long been a challenge for exploration companies, until now. Instead of the costly, time-consuming, and destructive methods

employed by third party analytical facilities that give only the average composition over a meter of core, calibrated XRF technology solutions provides insight into the complex chemo-stratigraphic relationships such as (quartz or carbonate) veining, gneissic texture, etc. in the rock.

The TruScan XRF trailer unit provided by Boart Longyear provides on-site (i.e. at the drill location) concentrations ranging from weight percent to tens of ppm for elements ranging from sodium to uranium for AQ-TK to P sized drill core without the requirement of additional personnel . Element concentrations or ratios can be plotted versus depth and can reveal cryptic (non-visible) compositional variations in lithology, alteration, and grade of existing ore bodies.

Here we give a cost-effective solution to the expense (both analytical and transportation) and time required for typical analytical procedures. We can produce data in “real-time” on a sample scale that can be reduced to millimeters in size through the application of an automated XRF core scanning apparatus.

Machine Learning for Geologists – Dr. Adrian Martinez, Senior Resource Geologist, CSA Global

Machine learning techniques are becoming popular in the mining industry but only a selected group of academic researchers and industry technologists are actively working with these revolutionary tools. This presentation is to promote the use of machine learning techniques by ‘non-experts’ to solve geological problems. The presenter will share his experiences on how to dive into machine learning, from simple to complex techniques, and will provide comment on what software are commonly used by beginners and experts. The presentation includes demonstrative examples of geological problems solved with machine learning, with emphasis on the complexity of each problem and the techniques required to solve it. This talk also includes comments on what kind of techniques may be used for different problems, based on the nature of the informing data.

Innovations in earth imaging for exploration, implications for improved drill targeting. Rob Gordon, Geophysicist & Manager Marketing, Quantec Geoscience

Quantec commercialized and pioneered the concept of "Deep Earth Imaging" in 2000. While it has been some time since then, new innovations in these technologies have improved their accuracy and reliability. In addition, Quantec has recently introduced ORION a flexible complete 3D multi parameter survey which images to depths in the 800 m range and deeper (2km).

With advances in modelling capability, large areas are being explored with large volume data acquisition programs to provide cubes of data that can be interrogated and interpreted prior to drilling. New examples of these programs will be reviewed in the context of an industry backdrop that has demonstrated decreasing discovery rates of most commodities over the last 10-15 years. These surveys, while in early days, are promising to help explorers investigate the subsurface more effectively.

The presentation will discuss the evolution of Deep Earth Imaging Technology with case studies and real-world examples and demonstrate how drilling targeting is improving with innovation.