

**Session #6 - Integrated Remediation Practices**

<b>Time</b>	<b>1140am-Noon</b>
<b>Topic</b>	<b>Remote Monitoring at Northern Reclamation Mine Sites: Remote Sensing and Telemetry approach study</b>
<b>Abstract</b>	<p>The Colomac Mine is a former gold mine located approximately 220 km northwest of Yellowknife, NT. The mine site consisted of a main production area along the shore of Steeves Lake, three open pits, waste rock dumps, a tailings containment area, airstrip and various access roads. The mine was in operation from 1990-1997. At that time, legacy issues included: contaminated tailings water; hydrocarbon impacted soils, bedrock and lake sediments; extensive stockpiles of hazardous wastes; and abandoned buildings, open pits and rock dumps.</p> <p>A progressive remediation and water treatment plan was implemented in two phases from 2004 until 2011 by INAC including; demolition of buildings, Steeves Lake shoreline restoration, Truck Lake Channel contaminated soil excavation/treatment, waste disposal and general grading and site access controls. Upon completion, INAC implemented a comprehensive long term monitoring plan which included geotechnical, hydrological, vegetation, stream, adaptive hydrocarbon management monitoring in addition to the Surveillance Network Program.</p> <p>In 2017, remote monitoring feasibility studies were reviewed to evaluate various options: Remote Sensing (Earth observation technologies) and Telemetry for real-time in-situ contamination readings. Remote Sensing, a very diverse field of study, is best described as the use of satellite imagery to assess ground conditions without physically going to the site. Using various optical and radar sensors, it is possible to qualify and quantify the ground conditions using numerous processes such as vegetation indices after completing a baseline site visit. Satellite imagery was then acquired over the Colomac Mine site over a series of years to observe trends in the revegetation process of the remediation and monitoring phases of the project.</p> <p>In the fall of 2017 a remote monitoring pilot project was implemented to obtain daily parameters from the mine site. Various parameter specific monitoring probes were installed with solar power telemetry radio communication to two centrally located solar powered satellite communication master stations. The collected data was uploaded on a daily basis from the master station on site to a web based cloud database. Data was collected from surface water bodies, groundwater monitoring wells, thermistor strings, thermal radiators and air temperature. The data addresses many of the regulatory requirements for the site.</p> <p>The results of the first spectral analysis study show signs of stable vegetation growth of remediated site features and will be discussed. The telemetry results have been very favourable and will be described in more detail including lessons learned. With this new dataset it may now be possible to reduce the frequency of required on site sampling events, thus, reducing the annual budget, project costs and health and safety of the monitoring staff.</p>
<b>Presenter(s)</b>	Yannick Lanthier, BluMetric Environmental
<b>Bio(s)</b>	<p>Yannick has a Bachelor's degree in geography and geomatics and a Master's degree in remote sensing from the University of Ottawa. Mr. Lanthier is the Geomatics Manager at BluMetric for the past year and has over ten years of high precision surveying experience. His Geomatics department at BluMetric Environmental Inc offers a wide range of services, from UAV surveys, RTK GPS and Bathymetry. Many other services include volumetric calculations based on surveys, as well as landfill design modelling for small municipalities. He has worked with a multitude of multispectral sensors to create, implement and model GIS for the management of natural resources. Mr. Lanthier has been a member of several of BluMetric's northern field teams and has been responsible for both surveying in the field and producing drawings and figures in support of these northern projects.</p>