Background/Approach: Englobe has worked for over a decade on developing a technology to allow salt-impacted soil to be treated and re-used on sites instead of being disposed of at landfills. As part of the development, various treatability studies were completed followed by pilot-tests on sites in Alberta. The technology, based on the adaptation of Englobe’s Ex-Situ biopile technology, relies on the use of freshwater that is mixed with amendments to create a solution that is injected on a pile of soil to remove salts through a cationic exchange process. The technology is scalable and can be used to treat various volumes per batch up to about 10,000 m³ per batch. Our presentation will focus on an upstream oil and gas site located in Central Alberta where this innovative Salt-impacted Soil Treatment Technology was implemented. The site has a significant volume of salt-impacted soil, in excess of 100,000 m³, that was generated from a historical spill from a produced water pipeline.

In 2018, Englobe designed and constructed an on-site Soil Treatment Facility (STF) with a capacity of treating batches of up to 5,000 m³. A first batch of 2,750 m³ was put under treatment and successfully remediated. On this site, Englobe’s technology was paired with a reverse osmosis (RO) unit operated by the client as part of the overall remediation strategy for the site. Impacted groundwater from the excavation was treated by the RO unit to supply freshwater to Englobe’s treatment technology. In addition to treating impacted groundwater, the process water from the soil treatment activities was processed through the RO unit and reused in the soil remediation process. The implementation of the RO system greatly reduces the amount of water that required disposal.

Treatment Results: The results from this full-scale application of the technology demonstrated reductions in each salt-related parameter such as soil Electrical Conductivity (EC), chloride concentrations and Sodium Adsorption Ratio (SAR); each of these parameters met site-specific treatment objectives after one season of treatment. The soil was subsequently backfilled on the site. Our presentation will provide further details on treatment efficiency for this project and present the overall capabilities of the technology.

This full-scale implementation of the technology clearly demonstrates the viability of a salt-impacted soil treatment technology. Englobe’s technology offers a competitive solution to the disposal of salt-impacted soils. As a note, this technology can also be combined with hydrocarbon-impacted soil treatment using the same treatment platform. The implementation of the RO unit allows treatment of impacted groundwater for use, recycling and reuse of water in the overall treatment system. The overall system therefore represents a sustainable strategy for the remediation of the site.

Alexandre Myre, MSc

Alexandre Myre obtained a bachelor's degree in Environmental Geology and a Master’s Degree in Earth Sciences from the University of Quebec in Montreal. He then began his career in 2004 as a Research Officer at the Animal Sciences laboratory at Laval University where his main task was managing a mass spectrometry laboratory. In 2006, he joined Englobe Corp. as Project Manager for the Research and Development Department. He worked on research projects associated to the treatment of soil and water impacted by different organic and inorganic contaminants. He also provided technical assistance on matters related to geochemistry of soil and water to other departments within the company.

In 2016, he was appointed as Project Manager and started working on site assessments and large-scale In Situ and Ex Situ site remediation projects, for various types of contaminants. These projects are throughout Canada and are completed for Provincial and Federal organizations, private commercial clients as well as oil & gas companies.

Byron Mazur, BSc

After obtaining an honors diploma in Biological Sciences - Renewable Resources Technology from the Northern Alberta Institute of Technology in 2004, Byron Mazur continued his education and received his Bachelor of Science degree from the University of Lethbridge in 2007. Mr. Mazur began his career in 2007 as a field technician; he later became a project coordinator and then project manager. He is currently the Manager of Client Services for Englobe in Western Canada. He has worked on a variety of environmental-related projects including environmental site assessment (ESA), environmental monitoring, contaminated site remediation, reclamation and environmental consulting. Mr. Mazur is continuing to professionally develop and diversify his experience in the engineering and geotechnical discipline; he has started providing support to engineering and geotechnical projects for which Englobe is working.