

# Environment and Carbon Management

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Reclamation Scientist

Reclamation

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Bonnie Drozdowski is the program lead of the reclamation program and has broad experience in soil reclamation and amendment applications in industries such as mineable oil sands, conventional oil and gas, forestry – pulp and paper, agriculture and diamond and coal mining.

She has been working in research for over 5 years and has interest and experience in a wide variety of reclamation related issues including hydrocarbon toxicity and remediation

The reclamation program at Technology Futures develops and evaluates applied, innovative, practical and holistic reclamation and remediation procedures and technologies for landscapes disturbed by industrial development for the benefit of Albertans, partners and clients. The reclamation group provides technical expertise in reclamation, revegetation and remediation research, environmental performance monitoring, soil amendment application, environmental chemistry of trace metals, carbon and nitrogen cycling processes, environmental fate and transport of organic contaminants, and hydrogeology. We have in-depth experience with field technologies such as: LICOR soil respiration monitoring equipment, soil moisture and density neutron probes, lysimeters, soil classification and sampling, surface water sampling, vegetation identification and sampling and meteorological monitoring stations.



## Recent Projects

### Remediation and Validation Research

**Stratified Remediation Project** to validate the current AENV subsoil guidelines by providing empirical evidence that regional deep rooted crops are not affected by critical petroleum hydrocarbon concentrations in subsoil under drought conditions when the plants are forced to extract moisture from the depths below 1.5 m. A soil column study, funded by PTAC was established in 2011 to validate these guidelines and to determine the phytotoxic effects of PHC contaminated subsoil on deep rooted crops.

### Indirect Thermal Processing System Validation

– The objective of the project is to validate claims regarding the performance of the Indirect Thermal Process and heaters developed by a client related to heater efficiency, soil remediation, oil recovery, water quality, energy consumption and emissions to the atmosphere.

### Public Assurance Monitoring in the Three Creeks

**Peace River Region** – The project was completed on behalf of Alberta Environment to determine if there was a detectable impact on soils from activity in the Peace River Region.



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### Recent Projects *(continued)*

#### Oil Sands Research

**Assessment of the Impacts of Tailings Water on Soil Quality and Vegetation Cover at the Syncrude Southwest Sand Facility** – the objective of the research is to determine whether the water that leaches out of the SWSS has any negative impact on reconstructed soil quality and vegetation growth over the long term (15+ years).

**Evaluation of Long-term Changes in Reconstructed Soils at the Operations of Syncrude Canada Ltd.** In this long-term research program, bulk density, soil water content and meteorological parameters have been monitored to compare the physical status and moisture regime of the reconstructed soil covers with natural soils in the area. Evaluation of the long term patterns in moisture and density of the reclaimed soil covers provides a measure of performance of the various capping prescriptions as the landscape matures and moisture demands increase.

**Carbon Dynamics in Reclaimed and Natural Landscapes at the Operations of Syncrude Canada Ltd.** – The objective of this project is to compare the carbon dynamics of natural and reclaimed by monitoring the soil, biomass and dead organic matter carbon pools from the time of initial reclamation forward at Syncrude Canada Ltd. To achieve this objective carbon losses and gains are monitored through respiration and biometric assessments, respectively. These methods are used to evaluate the carbon dynamics of various reclamation strategies and soil prescriptions compared to targeted natural undisturbed ecosystems.



#### Biochar

**Evaluating the Ameliorative Potential of Biochar in Solonchic Soils in Alberta** – The objective of this study is to determine crop response to incorporation of straw biochar into the Bnt horizon at two different rates in comparison to deep tilling.

**Evaluation of biochar as a substitute for vermiculite or perlite in growth media under greenhouse conditions (Proposal)** – The objective of this project is to determine if biochar produced from forest product waste streams can be a suitable substitute for vermiculite or perlite in growth media for greenhouse production of bedding plants and tree seedlings.

#### Proximal Soil Sensors

**Proximal Soil Sensing Technology for Reclamation Monitoring** – The objective of this work is to determine applicable soil proximal sensors and availability for the adaptation of the technology for reclamation monitoring under Alberta conditions.

#### Pulp and Paper

Mechanical pulp mill partners (Slave Lake, Millar Western, ANC) initiated a research consortium in 1991 to determine the **best practices for sludge utilization**. Sludge, long considered a waste product, has now been proven to have many applications and opportunities for diversifying or creating new businesses. Tech Futures continues to work with this consortium.