



## Vancouver Geotechnical Society

A Local Section of the Canadian Geotechnical Society

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## NOTICE OF UPCOMING DINNER PRESENTATION

### CANADIAN GEOTECHNICAL SOCIETY

#### 2012 SPRING CROSS CANADA LECTURE TOUR

THURSDAY, APRIL 26, 2012

#### **SUBJECT:**

**Can we successfully reclaim Oil Sands Mine Closure Landforms?**

#### **SPEAKER:**



**S. Lee Barbour, Ph.D.**  
Professor at the University of Saskatchewan

Lee is a professor in the Department of Civil and Geological Engineering at the University of Saskatchewan in Saskatoon, Saskatchewan. The focus of his research is the modelling of seepage and transport processes in saturated or unsaturated ground water flow systems. Lee began his career with EBA Engineering Consultants (Edmonton) and Clifton Associates (Saskatoon) before returning to the university in 1982. His PhD, under the supervision of Dr. Fredlund, included a term of study with the hydrogeology group at the University of Waterloo. Not surprisingly, this led to a career-long interest in contaminant transport and water migration processes within unsaturated soils. The formation of the Unsaturated Soils Group at the University of Saskatchewan with Dr. Fredlund and Dr. Ward Wilson, gave him opportunity to apply these interests to mine closure challenges such as waste rock, tailings and engineered soil covers. For the past 15 years, he has led a number of multidisciplinary research studies associated with mine closure in the oil sands industry, including the long-term performance of reclamation soil covers, and containment and closure issues associated with tailings, sulphur and coke. The Canadian Geotechnical Society (CGS) awarded Lee the Canadian Geotechnical Colloquium in 1995 as well as the GeoEnvironmental Division Award in 2004. He is a Fellow of both the EIC and the CSCE. Lee is married and has two daughters who have brought him great joy, including in recent years the joy of 4 (+) grandchildren. He is an avid cyclist, commuting by bike throughout the year. He also spends as much time as he can at the family cabin enjoying hiking, snowshoeing, cross country skiing... and grandkids.

#### **CONTENT:**

The goal of reclamation at oil sands mines in Northern Alberta is the reconstruction of landforms following mining, which have an equivalent capability to those present prior to mining. This reclamation is occurring at unprecedented scales over extremely challenging parent materials. Syncrude, for example, has reclaimed nearly 3500 ha (2011) of disturbed land since 1978, approximately 17% of a total disturbance area of 20,000 ha. These reconstructed profiles have been placed over a range of parent materials comprised of saline/sodic overburden, sand and fine tailings, as well as refining by-products such as coke. The goal of these reconstructed profiles is to accelerate the development of soil profiles through the placement of an organic rich 'A' horizon of peat/mineral mix overlying a 'B' horizon of salvaged glacial lacustrine clay or till. It is anticipated that these reconstructed soil profiles and the associated ecosite characteristics (particularly available water, soil chemistry and nutrients) will then evolve along a trajectory towards that of comparable natural profiles.

A collaborative, multi-disciplinary, research program into the design and performance of reconstructed soil profiles on lands disturbed by oil sands mining has been ongoing at the

University of Saskatchewan since the late 1990s. This presentation will highlight the performance of several reconstructed soil profiles over different parent materials including saline-sodic shale, sand tailings and a refiner by-product, coke. Of particular interest will be the evolution of the hydraulic properties, the controls on water and salt transport within these cover profiles and the dynamic nature of the water balance over time. The evolution of shale chemistry due to pyrite oxidation and its impact on the reconstructed soil profile will also be highlighted. The research highlights the relatively long time frames that are required to demonstrate the trajectory and maturation of these reclamation cover profiles; decades (10s of years) for physical changes and water dynamics and longer (50-100 years) for chemical weathering and the re-establishment of upland forests.

## **DETAILS**

**Executive Inn**, 4201 Lougheed Highway, Burnaby, BC V5C 3Y6 (Phone: 604-298-2010)

**Social Hour:** 5:30 to 6:30 pm (drinks available at the hotel bar)

**Technical Presentation:** 6:30 to 7:30 pm

**Dinner:** 7:45pm (\$30 will be charged for dinner)

**RSVP:** Dinner reservation to ali.amini@shaw.ca by Tuesday, April 24, 2012.

*The VGS would like to thank the following companies (in alphabetical order) for financially sponsoring this Cross Canada Lecture Tour:*

- *BGC Engineering Inc.*
- *EBA Engineering Consultants Ltd.*
- *Golder Associates Ltd.*
- *Thurber Engineering Ltd.*

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