

OSTRF - News

OIL SANDS TAILINGS RESEARCH FACILITY

OCTOBER 2005



Departments

Civil
& Environmental
Engineering

Renewable Resources

Chemical
& Materials
Engineering

OSTRF
MEMBERS



Grand Opening & Tour a Success

The OSTRF officially threw out its welcome mat on October 1st, 2004, with an opening ceremony and reception at the University of Alberta's Faculty Club. Guest speakers included Dave Sego, Principal Investigator, OSTRF; David Lynch, Dean of Engineering, U of A; Chris Cameron, CETC-Devon, representing the Honorable Minister Efford, Natural Resources Canada; and Jim Carter, President and COO, Syncrude Canada.

The grand opening of the OSTRF was coordinated with the opening of the U of A Markin/CNRL Natural Resources Engineering Facility and the Alumni Weekend. This provided an excellent venue for the opening, and resulted in many alumni of the Faculty of Engineering participating in this event, which was attended by well over 100 people.

The official opening was followed by a bus trip and visit to the OSTRF located in Devon, Alberta. Forty-five people participated in a more detailed presentation on the technical capabilities of the Facility, followed by a tour.



Dave Sego welcomes supporters



L-R: David Lynch, Dave Sego, Chris Cameron, Jim Carter



Tour of the OSTRF at the Devon Research Centre



Deer Creek Energy Limited Joins OSTRF



L-R: Ray Reipas and Geoff Stevens

The OSTRF membership has been further strengthened with the addition of Deer Creek Energy Limited. Ray Reipas, General Manager, Mining has joined the Management Committee; and Geoff Stevens, Manager, Extraction has joined the Scientific Committee. Deer Creek is a Calgary-based oil sands company engaged in the development of its Athabasca oil sands deposits through SAGD and mining extraction methods. Ray states that Deer Creek's development of its mining resources fits well with the tailings research program at the OSTRF.



Dave Sego
Principal Investigator, OSTRF
Professor, Civil & Environmental Engineering,
University of Alberta

"The recently completed facility is a unique research platform for students to propose and test innovative approaches to treat and manage oil sand tailings to meet the industry's desire to dispose of the mine wastes in landscape that allows for 'reclaim as you go'."

COACH'S CORNER

The oil sand industry is expanding at an unprecedented rate to meet the ever-growing North American and world demand for oil. The industry- and government-sponsored Oil Sands Tailings Research Facility offers graduate students a unique opportunity to undertake important and innovative research related to Alberta's oil sands industry. The recently-completed facility is a unique research platform for students to propose and test innovative approaches to treat and manage oil sand tailings to meet the industry's desire to dispose of the mine wastes in landscape that allows for "reclaim as you go". The University community via the supervisors and graduate students need now to propose research to meet these industrial challenges.

To date, the Oil Sands Tailings Research Facility is funding 13 students in their master's and doctoral programs. The first student research projects were funded starting in 2003 and the first student defunded in late 2004. The funded projects vary with the interest of the supervisor and student. Those projects are listed separately in this newsletter.

Research funding covers the cost of the student stipend and research costs associated with the research program. Special funding to attract outstanding graduate students is available and the students are offered an opportunity to work with industry at an operating mining operation. This ensures that students develop additional hands-on knowledge of the industrial challenges and better understand the operating challenges associated with managing the oil sands tailings.

Funding of the next round of research will focus on innovative projects that will use the new facilities at the Devon Research Centre. Academic supervisors will be asked in mid-October 2005 to propose student research topics for funding to begin in the spring of 2006.

Commissioning of the OSTRF



Commissioning Event, April 22, 2005:
L-R: Khalid Hashmi, (CETC-Devon); Ben Zheng and Jack Hazeldine, (Westways); Barry Temple, (U of A); Hassan Hamza, (CETC-Devon); Dave Sego, (U of A); Kirk Gilmar (ECO-Technica); George Cymerman, (Syncrude); Shawn Arnold (Westways); Jacek Olearczyk, (Ferrotech 3D Design); Steve Greenberry and Tom Hoy (Westways)



Sand being dumped into hopper



George Cymerman and Hassan Hamza discussing functioning rotary mixer

What's Up?

- Apr. 2005: Commissioning of the OSTRF begins
- Mar. 2005: Construction begins on student office space
- Feb. 2005: OSTRF Design Team Final Review
- Dec. 2004: First student graduates under the OSTRF
- Nov. 2004: OSTRF Scientific Committee meets
- Nov. 2004: OSTRF Management Committee meets

STUDENT FOCUS

Projects Funded by the OSTRF

Heather Kaminsky, PhD completion expected in 2007.
NSERC Postgraduate Scholarship.

“Mineralogy of Oil Sand Solids Using High Resolution Transmission”

Reza Moussavi Nik, PhD completion expected in 2008.

“Dewatering Non-Segregating Mixtures of Oil Sands Tailings”

Jun Wen Yang, PhD completion expected in early 2006.

“CFD Modeling of Oil Sands Tailings Slurries”

Bryan Bale, MSc completion expected in 2006.

NSERC Industrial Postgraduate Scholarship (Syncrude).

“Tailings Reclamation Using Natural Processes: Freeze-Thaw Dewatering”

Mohyeddin Bateni, MSc completion expected in 2007.

“Physical Laboratory Study of Oil Sands Tailings Slurries”

Nicholas Beier, MSc completion expected in 2005.

Sponsored by CETC-Devon.

“Freeze-Separation of Contaminates from Oil Sands Recycle Water”

Michelle Lai Mun Chang, MSc completion expected in 2006.

Funded by AERI COURSE program and Syncrude.

“Recovery of Commercial Kaolin from Oil Sands Fine Tailings”

S.M. Nafisul Islam, MSc completion expected in 2007.

“Impact of clay Mineral-water-bitumen Geochemistry on Oil Sand Tailings Behavior and Recycled Water Quality”

Eric Niven, MSc completion expected in 2005.

NSERC Industrial Postgraduate Scholarship (Syncrude).

“Densification of Beach Below Water Tailings”

Shihong Wu, MSc expected in 2006.

“Field Experiment of Biological Dewatering Using Native Species”

Projects Completed

Silawat Jeevaripoolvam, MSc completed.

“Creep Compression, A Novel Approach to Settlement of Tailings Slurries”

Student Research Opportunities

Approved by the OSTRF Scientific Committee for funding:

- *“Thickening of Oil Sands Tailings using Longitudinal, Inclined Vibrating Plate Thickeners”*
- Awaiting qualified PhD student
- *“Foamed Tailings”*
- Awaiting qualified MSc Student



Bryan Bale with one-dimensional freezing cell used to measure effects of freezing and thawing of mine tailings.

Dewatering to strengthen oil sands tailings is required to initiate placement of reclamation soils and plants. Use of the cold winters in Fort McMurray to assist with this dewatering is an option being studied by **Bryan Bale**. He is an MSc research student funded by the OSTRF program, and sponsored by Syncrude Canada Ltd. along with NSERC in the Industrial Graduate Scholarship Program.

Bryan is being supervised by Dave Segó, Kevin Biggar and Lukas Arenson of the *U of A Geotechnical Centre*.

The research is focused on developing a fundamental understanding of how the fine tailings from mature fine tailings to different sand to fine ratio of CT freeze. The importance of the development of near horizontal ice lenses during freezing and contribution to developing suctions just in front of the ice lenses is being determined. This process causes water to move upward to the advancing freezing front and the process dewaterers (strengthens) to unfrozen tailings that lose the water to the ice lens. On thaw in the spring the water from the ice lens moves upward to the surface and is drained away.

It is anticipated that repeated freezing and thaw will dewater a particular tailings to a greater depth than freezing will reach, increasing the strength in this upper layer, and thus assisting with stabilizing the surface prior to reclaiming the material.

The freezing tests are being carried out in the CFI-funded **Geotechnical and Geoenvironmental Cold Regions Research Facility** located in the recently opened Markin/CNRL Natural Resources Engineering Facility.



Congratulations!

• Silawat Jeevaripoolvam has
• successfully completed requirements
• for the degree Master of Science from
• the University of Alberta, based on his
• thesis, “Creep Compression, A Novel
• Approach to Settlement of Tailings
• Slurries.”

OSTRF Design Team Works Itself out of a Job



Back L-R: Johnny Chow and Roman Zrobok, (CETC-Devon); Trevor Peters, (Alberta Infrastructure); Kirk Gilmar, (ECO-Technica); Jacek Olearczyk, (Ferrotech 3D Design Ltd); Geoff Stevens, (Deer Creek Energy Ltd.); Ted Lord, (Syncrude)
Front L-R: Ed Siminoski, (Alberta Infrastructure); Kelvin Yau, (Alberta Research Council); George Cymmeron, (Syncrude); Jack Hazeldine, (Westways Group); Dave Sego, (University of Alberta); Theo Paradis, (Canadian Natural Resources Ltd.); Barry Temple, (University of Alberta)

The OSTRF Design Team met for a final review in March, 2004, midway through the commissioning process. The Team started up in September of 2003 with a commitment to meet biweekly throughout the fall and winter of 2003/04, pulling together a flow diagram to meet industry and student research needs. The Design, Build, Construct and Commissioning contract was awarded to Westways Group in May, 2004. A sub-group made up of George Cymmeron, acting in an advisory capacity; Barry Temple, as U of A Project Manager; and the team of Jack Hazeldine, Jacek Olearczyk, Kirk Gilmar and Patrick Engineering, put together the actual nuts & bolts of the facility as it stands.

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Mandate of the OSTRF:

- To develop novel approaches for tailings treatment, to reduce their volume, and to improve their physical characteristics to assist in the development of cost-effective, environmentally superior post-depositional restoration.
- To attract world-class researchers and students to undertake projects at the facility.
- To train significant pools of highly qualified scientists and engineers who will become the next generation of oil sands industry leaders, consultants and regulators.

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If you would like to contribute an article/photos/etc. to OSTRF-News, please contact the editor.

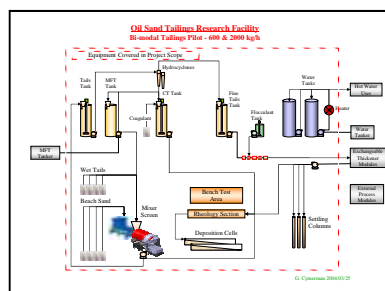
A flow diagram resulted in the creation of a 3D computer image. Vision turned it into nuts and bolts, and eventually, a functioning reality.



Design Team meeting in progress



Fabrication of Equipment



Flow Diagram for 600 & 2000 kg/hr



Modifications and Installation



Computerized 3-D Imaging



Painted and Operational