



Tailings EPA

2015 Performance Update

October 21, 2015





Polling Questions

EPA 2015 Achievements

- Focus on **transition from 'ready to reclaim' to 'reclaimed'** status through a strong interdisciplinary group.
- Active portfolio with **46 active JIPs** and **17 active EPA-led studies**.
- Continued strong outreach on solicitation and **advancing early stage research proposals** through the Tailings Research Working Group and the Institute for Oil Sands Innovation.
- Refined the **sharing best practices** on established and emerging technologies through technology exchange events (workshops and field tours).
- **Fast-track technology development from pilot to commercial scale** for implementation of fines centrifugation.
- Completed mandate of the Tailings Measurement Steering Committee.

Tailings EPA Ambition

Our Aspiration is to strive to...

Transform tailings from waste into a resource that speeds land and water reclamation.



Tailings EPA Opportunity Areas



Tailings Opportunity Areas:

- Water-solids separation processes,
- Tailings materials conveyance,
- Tailings deposition/placement,
- Enhance tailings deposit densification, and
- Deposit capping to support reclamation.

Water-Solids Separation Processes

2015 Water-Solids Separation Processes Project Activity

New: 0

Active: 25

Completed: 10

Value: \$0

Value: \$66.22M

Value: \$7.66M

Successes

- Commercial-scale commissioning of Canadian Natural's Non-Segregating Tailings technology and Syncrude's Centrifuged Tailings technology.
- Continuous improvement on tailings thickeners, composite/ consolidated tailings and thin lift fines drying at commercial scale (throughput and product quality and less water).
- Held several work shops and field tours in Fall 2015 to promote open exchange between operators on established and emerging technologies.
- Continued engagement with third parties for assessment of unsolicited novel water-solids separation processes including validation studies with NAIT and SAIT.

Learnings

- Room to improve establishing common best practices and operating standards for established and emerging processes, including thickener implementation.

Future Opportunities

- Greater continuous improvement through more open exchange of challenges in pursuit of maximum understanding and efficiency.
- Step change sustainability process opportunities.
- Better understand the challenges of introducing processed tailings into a reclaimed landscape, including a more holistic lifecycle analysis approach.

Tailings Materials Conveyance

2015 Tailings Materials Conveyance Activity

New: 0	Active: 2	Completed: 1
Value: \$0	Value: \$1.52M	Value: \$7M

Successes

- ✦ Excellent cooperation with external agencies on improved understanding of pipe-flow physics, including through work conducted by the Saskatchewan Research Council.

Learnings

- ✦ Portfolio is light in technologies with transformative potential.
- ✦ Activity in support of advancing novel Tailings Material Conveyance solutions is modest (i.e. trucking and conveyor belt solutions).

Future Opportunities

- ✦ Solicit new concepts.
- ✦ Push operating window for established techniques like:
 - Pump throughput performance, and
 - Ability to handle greater densities of product.

Tailings Deposition/ Placement

2015 Tailings Deposition/ Placement Activity

New: 2	Active: 11	Completed: 4
Value: \$250k	Value: \$21.1M	Value: \$24.2M

Successes

- ✦ Strong focus for publication of industry best practices, including beach fines capture, in order to share understanding and increase the pace of change.
- ✦ High activity levels and spirit of exchange in Enhanced Beach Fines Capture Working Group.
- ✦ Balanced portfolio: fundamentals of segregation combined with applied field scale solutions experimentation – combining theory with practice to find the best solutions.

Learnings

- ✦ Better understand mechanics /fundamentals and further improve field level execution to test applications.
- ✦ Seek added insight from globally recognized leaders in their field like Delft Netherlands.

Future Opportunities

- ✦ Establish industry best practice across a broad scope of activity, from technical fundamentals to field application.

Enhanced Tailings Deposit Densification

2015 Enhanced Tailings Deposit Densification Activity

New: 0	Active: 11	Completed: 0
Value: \$0	Value: \$14.6M	Value: \$0

Successes

- ✦ Strong alignment between NSERC Industrial Research Chair and Collaborative Research Development programs with the University of Alberta and Carleton University respectively when working on COSIA Gaps.
- ✦ High activity levels and strong cooperation seen in the Deep Deposit Working Group and the newly created Deposit Capping Working Group.

Learnings

- ✦ Many technologies presented are at an early stage of investigation and have yet to be thoroughly evaluated.

Future Opportunities

- ✦ Improved engagement of international audiences like South Africa and Australia from other sectors to gain fresh perspectives and expertise.
- ✦ Establish industry best practices for:
 - In situ electro kinetic densification;
 - Wick drains, and
 - Surcharge consolidation.
- ✦ More publication of results.

Deposit Capping to Support Reclamation

2015 Deposit Capping to Support Reclamation Activity

New: 0

Active: 1

Completed: 0

Value: \$0

Value: \$30M

Value: \$0

Successes

- ✦ Initiated 'Ready to Reclaim' to Reclaimed' Working Group to maximize synergies between Land and Tailings EPA and better understand how treated tailings can contribute to a reclaimed landscape.
- ✦ Creation and staffing of a Deposit Capping Working Group– high levels of activity.
- ✦ Significant collaboration and investment in support of Base Mine Lake JIP.
- ✦ Strong multidisciplinary scientific community engagement, including multiple scientific chairs.

Learnings

- ✦ Looking for more opportunities to flesh-out portfolio, both conceptual and for field demonstration.
- ✦ Limited experience in variety of methods to cap large commercial scale soft deposits.

Future Opportunities

- ✦ Increased transparency on life cycle performance predictions, including better understand the implications for introducing varying qualities of tailings (like water content) into the reclaimed landscape.
- ✦ Increase speed of sharing insights from trials to spur faster improvement, broader expert engagement.

2015 Highlighted Projects

Status	Project
Completed in 2015	Composite Tailings Tremie Diffuser Project (Syncrude)
Continued in 2015	Industrial Research Charis in Oil Sands Geotechnique (COSIA)
	Carton University NSERC Collaborative Research Development (Imperial)
	Consolidation Columns (Syncrude)
New in 2015	Applied Process Innovation Centre (Canadian Natural)
	Instrumentation and Control of Inline Flocculation (Shell)
	Consolidation Columns (Shell)

Opportunities in 2016

- ✦ Tailings EPA agreement renewal – support at executive level for further five years of collaboration and improvement through innovation.
- ✦ Renewed enthusiasm to engage interested external stakeholders on collaborative develop of solutions.
- ✦ Continue to pool resources to develop innovative solutions faster and at lower cost.
- ✦ Improve technical gap descriptions and communicate in a more efficient and effective manner to support solution development.
- ✦ Continue to provide technical support to CAPP as new regulatory framework develops.
- ✦ Greater industry exchange on best practices.



