Suncor’s Tailings Future
A new tailings management approach
Tailings

- Like all mines, oil sands mines generate tailings
- Tailings are
  - left over mixture of fine clay, sand, water, residual bitumen
  - produced during extraction process that separates bitumen from the oil sand
Tailings Handling & Storage

• Tailings are pumped into holding ponds to settle solids from water
  – Heaviest material – mostly sand – settles to bottom
  – Water rises to the top
  – Middle layer – mature fine tailings (MFT) – is made up of fine clay particles suspended in water
The Tailings Challenge

• Some MFT particles settle, but much remains suspended in water
• MFT takes many decades to firm up sufficiently for reclamation
• As a result, Suncor has need more and larger tailings ponds over the years to store MFT
Suncor’s Tailings Ponds

• Eight ponds
  – Covering a total of 26.8 square km
  – Containing about 179 million cubic metres of MFT

• Active ponds
  – Account for nearly 15 percent of the 19,737 hectares of disturbed land Suncor is working to reclaim
Speeding MFT Consolidation

- Consolidating tailings (CT) technology currently used to speed MFT consolidation
- CT process
  - Pioneered by Suncor in the 1990s
  - Adds coarse sand, gypsum to MFT to accelerate release of water
- Suncor has developed a new and better process to further accelerate MFT consolidation called MFT drying
- MFT drying is a key TRO™ process component

™ Trademark of Suncor Energy Inc.
CT: Mining Operation Life-Cycle
TRO\textsuperscript{TM} Process – Overview

• TRO\textsuperscript{TM} process a new approach for managing tailings at our oil sands mining operations near Fort McMurray
  – Expected to result in significant improvement in the speed of tailings reclamation
  – Will help meet new regulatory requirements, changing stakeholder expectations
  – More than $1 billion investment planned for implementation
TRO\textsuperscript{TM} Process Overview
TRO™ Process: Mining Operation Life-Cycle
How the TRO_{TM} Process Works

- Process involves converting MFT more rapidly into a solid landscape suitable for reclamation
  - MFT is mixed with a polymer flocculent
  - Mixture is deposited in thin layers over sand banks with shallow slopes
  - Resulting product is a dry material that can be reclaimed in place or moved for final reclamation
  - Drying process occurs over a matter of weeks
About The Polymer

• Adheres to clay particles in MFT causing them to bundle together
  – Clay separates from the water

• A class of chemical used in municipal water treatment to settle out solids
  – Safe, as it is inert and does not react with the environment
Expected TRO\textsuperscript{TM} Process Benefits

- Use of TRO\textsuperscript{TM} process to manage tailings:
  - Reduces need to build more tailings ponds
    - MFT will be consumed more quickly as it is generated
  - Accelerates reclamation
    - Allows reclamation of mined areas soon after mining
  - Reduces existing MFT inventory
    - As MFT is consumed independently of plant operations, TRO\textsuperscript{TM} process can be used to reduce MFT inventory held in existing ponds
Use of TRO™ over CT technology is expected to result in a shorter time to reclamation.

**TRO™ process**
- A reclaimable surface 10 years after initial disturbance

**CT**
- A reclaimable surface 30 years after initial disturbance
TRO\textsuperscript{TM} Process Implementation Under Way

- More than $1 billion allocated for full commercial scale implementation
- Heading into the 2011-2012 winter season, Suncor had:
  - Processed over 5 million tonnes of tailings fines
  - Capacity to process 25,000-30,000 tonnes of tailings fines per day
  - Six TRO\textsuperscript{TM} process MFT drying systems
TRO™ Process Implementation Under Way

- Implementation project
  - First phase complete Q1 2012
  - Second phase complete Q4 2012
- Suncor on track to meet, exceed fluid tailings reduction targets
  - As mandated by ERCB under Directive 74
TRO™ Process Impacts – Now, In The Future

• Fundamentally changing how tailings are managed
  – 180 million tonnes of oil sand processed annually
  – 50,000 tonnes of fine clays ingested per day
• Plans for five additional tailings ponds cancelled
• Expected to reduce tailings ponds at mine site from eight to one
  – Total land area covered by ponds to shrink by 80%
TRO™ Process – Tailings Collaboration

• Suncor, six oil sands companies to work together
  – A unified effort to advance tailings management

• Each company to:
  – Share existing tailings research and technology
  – Remove barriers to collaborating on future tailings research, development

• Suncor to share TRO™ process details
  – Companies in turn committed to future tailings research investments
TRO™ Process – Recognition

- Emerald Foundation
  - 2011 Emerald Challenge Award
- Alberta Chamber of Resources
  - 2011 Major Reclamation Award
- Canadian Association of Petroleum Producers
  - 2010 Responsible Canadian Energy Award
- ASTech Foundation
  - 2010 ASTech Award
For More TRO\textsuperscript{TM} Process Information

- Visit [http://www.suncor.com/tailings](http://www.suncor.com/tailings)
- View our TRO\textsuperscript{TM} process video
- View our Reclamation video