

Pond 1 Backgrounder

From: Pembina Institute

Date: 10-09-22

Re: On September 23, 2010, Suncor Energy is hosting an event to showcase its efforts to convert a tailings lake (Pond 1) into a surface solid enough to be actively re-vegetated and reclaimed.

Has there been any successful, long term and complete reclamation of oil sands mining tailings waste to date?

- No. The complete reclamation of toxic tailings waste has not been fully demonstrated. There have been no reclamation certificates issued to an oil sands mining operator for tailings reclamation. Tailings reclamation is in its infancy and needs to stand the test of time before it can be deemed successful.

What is the industry position on Pond 1?

- Suncor: "First tailings pond completely reclaimed by 2010."¹
- "... Suncor has already achieved a solid surface with its Pond 1. If a picture is worth 1,000 words, June 2010 and June 2007 photos reveal the significant progress that we've made towards reclamation of this area. We have planted over 140,000 trees on the surface this year and are on track to plant a further 460,000 trees this fall. We will mark the surface reclamation of Pond 1 on Sept. 23."²

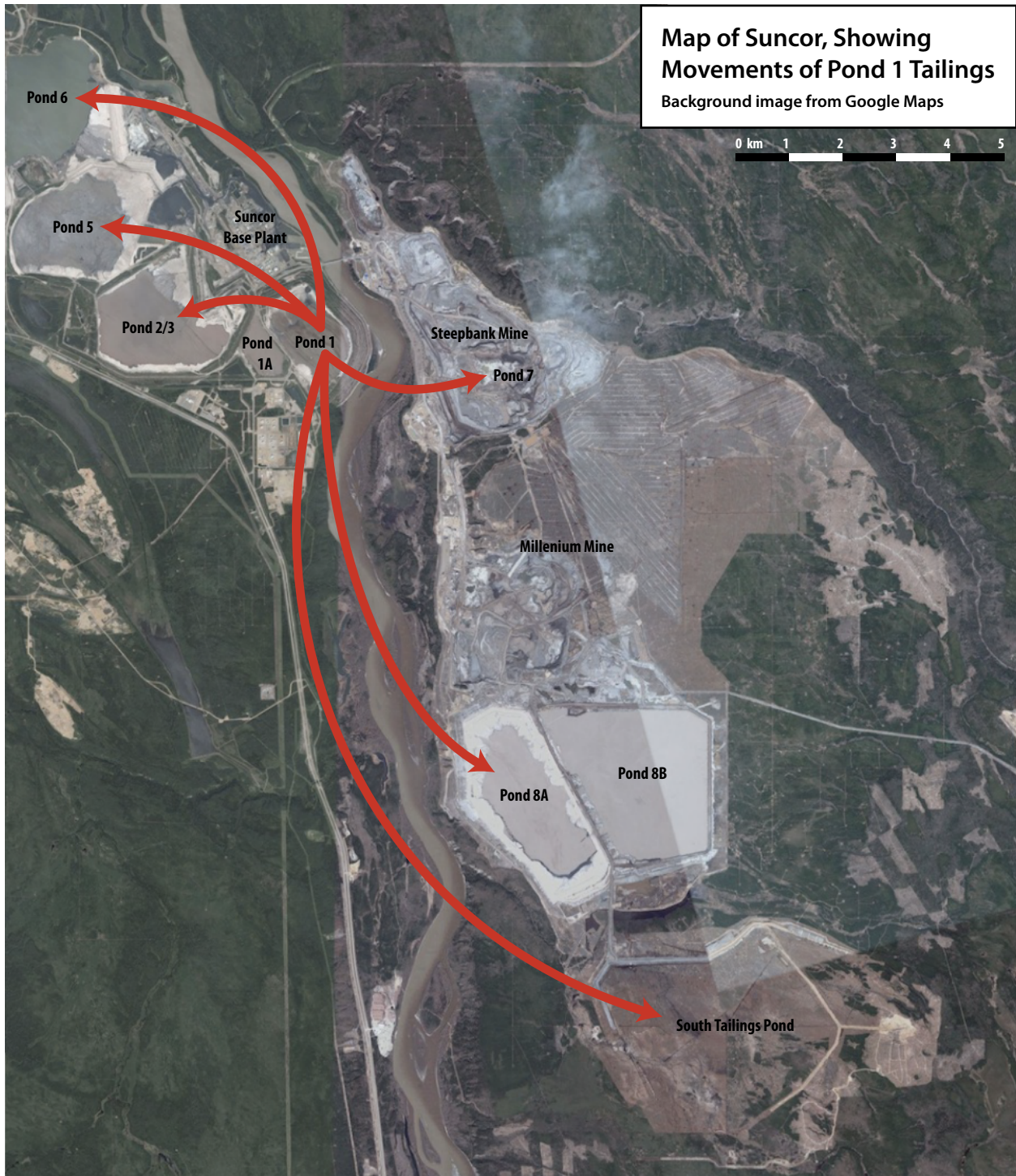
What is the Energy Resources Conservation Board (ERCB) position on Pond 1?

- 2008: ERCB releases a paper about its proposed tailings directive and notes that Suncor is "reclaiming" the Tar Island Pond by "transferring fluid tailings to other ponds and infilling the pond with coarse sand."³
- 2010: ERCB notes that while fluid tailings were removed from Pond 1, it should be acknowledged that a portion of the tailings was treated. Specifically, some fluid fine tailings (also known as mature fine tailings or MFT) from Pond 1 was used to make consolidated tailings (the Suncor method to densify MFT and get it to a land-reclaimable state).

¹ Don Thompson, "Oil Sands: Challenges + Opportunities," presented at the 4th Annual Insight Water & Land Management Conference (2008), 21.

² <http://www.edmontonjournal.com/business/Suncor+reclaims+land/3344668/story.html#ixzz0yU2nAOBj>

³ Richard Houlihan, Haneef Mian, and ERCB Tailings Team, "Past, Present and Future Tailings: Regulatory Perspective," presented at the International Oil Sands Tailings Conference, Edmonton (2008), 2.



The fluid tailings contents of Pond 1 were transferred to other ponds. Some of the Pond 1 contents were treated using consolidated tailings technology. Pond 1 was filled in with coarse sand.

Do we know the full story of the contents of Pond 1?

- The Pembina Institute is starting to get a complete picture, but it's challenging because we have not yet seen the consolidated tailings (CT) reports. The following points summarize the stages Suncor achieved in its efforts to empty Pond 1.
 - 1994: Suncor starts CT.
 - 1997: Alberta EUB (now ERCB) approves Suncor's Steepbank mine with conditions, one of which is to make Pond 1 (also known as Tar Island Pond), a large tailings containment area beside the Athabasca River, trafficable by 2010.⁴
 - Late 1990s: Suncor starts moving MFT from Pond 1, thereby commencing work on its closure and remediation.
 - 2006: Pond 1 MFT gets moved to Pond 2/3. Initially Suncor used MFT from Ponds 1 and 2/3 for CT trials. The CT was placed in Ponds 5 and 6. Because CT did not always work to specifications, there was also MFT in Ponds 5 and 6.
 - 2007 to 2009: MFT from Pond 1 was placed in Pond 7, Pond 8A and the South Tailings Pond (STP) on the east side of the Athabasca River. For operational reasons, related mainly to making space in Pond 2/3 and getting MFT out of Ponds 5 and 6, MFT was transferred from pond to pond on the west side of the river and even across the river (see figure).

How much MFT was transferred out of Pond 1 and moved to other locations?

- The following summary is from information provided to the Pembina Institute by Suncor on September 16 and 21, 2010: At its peak, the volume of material in Pond 1 was 222 million cubic metres (including dykes). Since July 2006, approximately 12.5 million cubic metres of MFT was transferred out of Pond 1 to achieve Pond 1 closure. Suncor says it appears most of the Pond 1 MFT went into Pond 7 inventory, where it was used to begin CT deposition in Pond 7, over the past three years. It is possible that some of the Pond 1 MFT went to tailings reduction operations in Ponds 5 and 6, but actual volumes are unknown.

How much did it cost to return Pond 1 to a solid surface?

- Unknown

What are companies doing to reclaim tailings waste?

- **CONSOLIDATED TAILINGS**
Suncor uses consolidated tailings (CT) technology, a process that helps free up a fraction of this water to be recycled back for plant use and reduce the overall MFT volume. In theory, CT is non-segregating during transport, discharge and deposition, but at the 2006 hearing for Suncor's Steepbank Mine extension and Voyageur bitumen upgrading facility Suncor noted that "it had not achieved the level of performance it desired on a daily basis with respect to CT performance."⁵ Government and regulatory acknowledgement of the uncertainties with CT is becoming more apparent, and regulators are beginning to put performance stipulations on further mine expansions.⁶

⁴ Alberta Energy and Utilities Board, Application by Suncor Inc. Oil Sands Group for Amendment of Approval No. 7632 for Proposed Steepbank Mine Development, Decision No. 97-1, Application No. 960439, Calgary, 1997.

⁵ Alberta Energy and Utilities Board, *EUB Decision 2006-112, Application for Expansion of an Oil Sands Mine (North Steepbank Mine Extension) and a Bitumen Upgrading Facility (Voyageur Upgrader) in the Fort McMurray Area*, (2006), 29.

⁶ Randy Mikula, Team Leader, Emulsions and Tailings Advanced Separation Technologies, CANMET Energy Technology Centre, personal communication, e-mail received April 2008.

- **TAILINGS REDUCTION OPERATIONS**

More recently, Suncor announced that it is planning to adopt a new approach called Tailings Reduction Operations (TRO). The implementation of TRO involves converting fluid fine tailings more rapidly into a solid landscape suitable for reclamation. TRO uses an MFT drying process, which results in a dry material that can be reclaimed in place or moved to another location for final reclamation. TRO, if successful, could enable Suncor to meet the current ERCB tailings directive and could also enable the clean up of existing tailings waste. Suncor's proposal raises the bar for all companies operating in the oil sands, and it is essential that other oil sands companies are required to meet the new rules to deal with toxic tailings waste.

- **END PIT LAKES**

A proposed long-term solution to the tailings problem is for mining companies to dump toxic tailings waste into old mine pits and cap it with freshwater from the Athabasca River.⁷ Operators hope that the tailings layer and freshwater layer won't mix. Pit lakes are used in other mining sectors to control water drainage before discharging the water into the environment; in the oil sands, end pit lakes (EPLs) are uniquely being pitched as disposal sites for toxic tailings waste. EPLs will be a permanent feature of the reclaimed landscape, but it is not yet known if they will support a sustainable aquatic ecosystem. Modelling and relevant background studies have been the basis of research, but a fully realized EPL has yet to be constructed.⁸ At least 27 EPLs are planned for the Athabasca Boreal region within the next 60 years.⁹ These were approved in the absence of a single demonstrated EPL by any oil sands operator

What are the key risks associated with tailings?

- Tailings are created during the oil sands extraction process. They are a fluid mixture of water, sand, silt clay, unrecovered hydrocarbons and dissolved chemicals. Tailings lakes pose an ongoing threat to surface water and groundwater through seepage, they could become a significant public liability if a company cannot cover the cleanup costs, and they pose a mortality risk to waterfowl and other wildlife.
- Tailings contain a host of toxic compounds, including polycyclic aromatic hydrocarbons, metals and naphthenic acids. Metals detected in tailings lakes include arsenic, cadmium, chromium, copper, lead and zinc, all of which are labelled as priority pollutants under the United States Clean Water Act.¹⁰ Heavy metals, such as arsenic, cadmium and lead, are very toxic and can build up in biological systems and become a significant health hazard.¹¹ Historic data from tailings lakes indicate exceedances of Canadian Council of Ministers of the Environment (CCME) water quality guidelines for trace metals.¹²

⁷ Synenco Energy Inc., *Application for approval of the Northern Lights Mining and Extraction Project, Volume 3: Management Plans*, 2006, 6–28.

⁸ Fay Westcott and Lindsay Watson, *End Pit Lakes Technical Guidance Document*, prepared for The Cumulative Environmental Management Association End Pit Lakes Subgroup Project 2005-61, 2007, 4.

⁹ *Ibid.*, 1.

¹⁰ Allen, Erik W. 2008. Process water treatment in Canada's oil sands industry: 1. Target pollutants and treatment objectives. *J. Environ. Sci.* 7: 123-138 (2008).

¹¹ United States Department of Labor. Occupational Safety and Health Administration. Safety and Health Topics Toxic Metals. www.osha.gov/SLTC/metalsheavy/index.html.

¹² Allen, Erik W. 2008. Process water treatment in Canada's oil sands industry: 1. Target pollutants and treatment objectives. *J. Environ. Sci.* 7: 123-138 (2008).

What is the current volume of oil sands tailings on the landscape?

- The ERCB reports that the current volume of tailings that require long-term containment is more than 840 million cubic metres.¹³ The volume of MFT is expected to grow by 30% to over 1.1 billion cubic metres by 2020. It will still be over 1.1 billion cubic metres in 2065.¹⁴ Oil sands tailings lakes currently cover an area of 170 square kilometres.¹⁵

How does the 2009 ERCB Directive 074 address the growing tailings problem?

- Upon its release, the ERCB Directive 074 was considered a meaningful step taken by the government to reduce toxic tailings because it requires oil sands operators to divert at least 50 per cent of a component of their tailings, known as fine tailings, by June 30, 2013.
- In September 2009, nine plans were submitted to deal with liquid tailings from the oil sands extraction process. An analysis of the plans by the Pembina Institute and Water Matters concluded that seven of the nine plans that were not compliant with Directive 074.
- In April 2010, the ERCB announced decisions to accept three plans, despite the fact that two of the plans — those for Syncrude's Mildred Lake and Aurora oil sands mines — do not meet the requirements of the directive.
- In August 2010, Ecojustice, acting on behalf of the Pembina Institute and Water Matters, filed an application with the ERCB requesting approval be withdrawn until management plans are brought in line with ERCB's tailings management directive 074.
- In September 2010, the ERCB announced its decision to accept the Shell Muskeg River plan, despite the fact that it does not meet the requirements of the directive.

¹³ News Release – ERCB Approves Fort Hills and Syncrude Tailings Pond Plans with Conditions. April 23, 2010, www.ercb.ca/portal/server.pt/gateway/PTARGS_6_0_308_0_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/news/news_releases/2010/nr2010_05.aspx (accessed July 19, 2010).

¹⁴ Simieritsch, Terra, Joe Obad and Simon Dyer. 2009. Tailings Plan Review — An Assessment of Oil Sands Company Submissions for Compliance with ERCB Directive 074: Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes.

¹⁵ Government of Alberta. "ERCB Approves Fort Hills and Syncrude Pond Plans with Conditions." (2010), www.ercb.ca/docs/new/newsrel/2010/nr2010-05.pdf.