

Painted into a Regulatory Corner: Next Steps for Oilsands Closure Planning

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Abstract

The Athabasca oilsands region in Alberta, Canada have been a primary economic driver for the country for decades. While production continues at an increasing rate with decreasing emissions per barrel, legacy producers are fast approaching the point where major tailings storage facility assets will need to be reclaimed. Past reclamation research programs have provided a rich dataset on technical aspects of optimizing landforms, cover system configurations, and re-establishing functional ecosystems. Thus, it is not a matter of scientific and engineering uncertainty that makes oilsands reclamation difficult. Rather, it is a matter of policy, legislation, and regulation that may preclude successful reclamation of tailings assets in the region.

The pathway towards reclamation certification of tailings ponds has not been tested. The intent of the paper is to propose new approaches for a satisfactory reclamation outcomes in the region. By taking a realistic approach to examining the challenges faced by oilsands producers we can begin to develop ways to achieve satisfactory outcomes for all stakeholders.

Introduction

Mining has been underway in the Athabasca oilsands region north of Fort McMurray, Alberta, Canada since the 1960s. As legacy operators near the end of approved life of mine (LOM), the focus on assets such as tailings ponds and the water stored within them necessarily turn to reclamation. Oilsands operators have consistently communicated that the goal for reclamation in the region is to return the land to a self-sustaining, locally common, boreal forest ecosystem. The return to a boreal forest ecosystem where an oilsands mine once existed is the expectation of the Alberta Energy Regulator (AER), stakeholders, and represents the currently permitted condition.

Investors in oilsands operations are increasingly looking for concrete action on sustainability commitments, such as recently stated goals of being carbon neutral. At the same time, operators have a stated objective of returning investment on shareholder capital. It will be increasingly difficult for operators to satisfy both the

aims of shareholder returns and achieving net-zero carbon emissions while maintaining closure liabilities. Investors will place their money where they feel there will be a return, and if closure liabilities are not reduced via reclamation activities, the impetus for investment is lost. Thus, operators have both financial, regulatory, and reputational obligations to satisfy when being induced to undertake closure operations.

Technical scientific and engineering aspects of oilsands reclamation are well understood and have been the subject of extensive research for decades. Furthermore, there is extensive technical guidance available around cover system design, landform optimization, and the establishment of functional ecosystems. However, the challenge associated with achieving successful reclamation is not simply a technical matter. Rather, the challenge lies in the interlacing of policy, legislation, and regulations that govern the process of lease relinquishment for mining operations. While the expectation for reclamation is to have a lease relinquished to the Crown, achieving the permitted closure vision for many operators is dependent on receiving reclamation certification for each asset on site. The process for receiving reclamation certification has not been tested in the oilsands for a tailings storage facility.

To date, a reclamation certificate has not been granted to a conventional tailings facility containing large volumes of water and flowable tailings behind a dam. Oilsands producers are largely at a point where a decision must be made regarding the preferred path toward closure to begin implementation of closure plans in the coming years. Committing to the current path towards achieving reclamation certification is untested and may prove challenging. Conversely, an alternative land use scenario, or implications for an element of long-term care, may not be feasible from the perspective of stakeholder expectations, irrespective of whether the closure outcomes are improved. Decades of expectations from oilsands stakeholders as to what successful closure looks like, may be difficult to reverse.

The Problem

Investment in oilsands producers will flow to where there can be a reasonable expectation of return on investment. If oilsands operators are to offer a return to shareholders on the capital investment, while simultaneously upholding sustainability commitments, then major liabilities – in this case closure liabilities – must be acted upon with commitment. Demonstrating a reduction in closure liabilities will be a signal to shareholders that operators are serious about following through on sustainability commitments, thus providing confidence for further investment.

Investment will flow to operators that demonstrate serious commitment to sustainability goals and follow through on closure commitments. Following through on closure commitments also presumes that the pathway to achieving closure is well known and has a reasonable chance of success. However, this may not always be the case, and presents an additional challenge that must be considered.

Regulatory Overlap

Many tailings storage facilities (TSFs) in the Athabasca oilsands region are nearing the end of their design service life. Oilsands operators are legally obligated under EPEA to pursue Reclamation Certification as part of closure operations, with the intention of relinquishing the oilsands lease back to the Crown. The expectation from many stakeholders has been that the land once used for mining will be returned to a state that closely resembles the pre-existing state, making oilsands mining a temporary use.

An ostensibly well-defined process exists that outlines how an oilsands lease could be returned to the Crown (Figure 2.1). This process is familiar to oilsands operators and guides the current planning approach to closure in the industry.

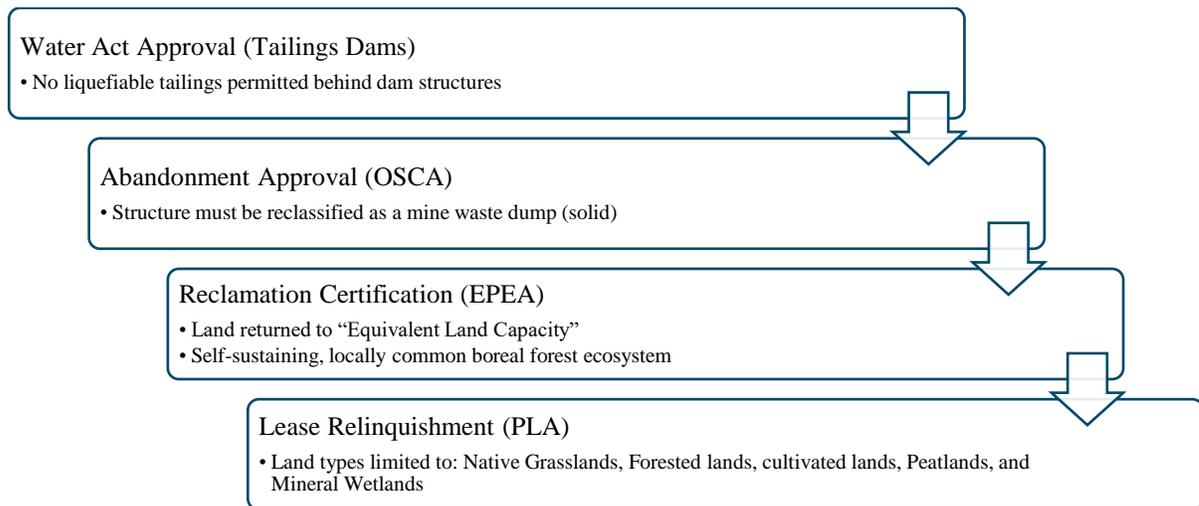


Figure 2.1: Regulatory Overview

The first step towards relinquishment begins with the Water Act (Government of Alberta, 2020) and the updated Manual 019 – Decommissioning, Closure, and Abandonment of Dams at Energy Projects – published by the Alberta Energy Regulator (AER) in 2020. Manual 019 requires that a tailings dam be delicensed to meet the conditions of closure. Delicensing dam structures ties into the Canadian Dam Association (CDA) criteria identifying when a dam is no longer classified as such (CDA, 2014); that is, when there is no liquefiable material behind the dam. Allowing tailings dams to drain and consolidate naturally may take decades or centuries and could still result in quantities of material that may be considered flowable. Natural settlement of tailings within the facilities likely requires timelines that could be considered *de facto* long-term care, a state that is in contravention of EPEA approvals for these facilities.

Manual 019 identifies that oilsands tailings facilities are expected to be permanent structures on the landscape and must be designed to be physically stable in perpetuity. Irrespective of this design criterion, a TSF must have its contents rendered non-flowable through removal of entrained pore water to receive reclamation certification, as part of the process outlined in Figure 2.1. Once the water is removed and

tailings material within a dam is rendered non-flowable, the structure can be classified as a solid waste structure rather than a dam as part of the Oil Sands Conservation Act (OSCA). This allows the former TSF to be reclassified and regulated as a mine waste dump.

An abandonment approval for a mine waste dump issued under OSCA is the next step in the process. The abandonment approval confirms that the structure will be geotechnically stable and will not require continued maintenance. The criteria for receiving the abandonment approval may require an indeterminate time to verify.

Application for a reclamation certification under EPEA points toward the regulatory endpoint for the leaseholder. The application can be made once the chemical, ecological, and social concerns associated with the facility are addressed. The most important aspect of reclamation certification under EPEA is the requirement to demonstrate Equivalent Land Capability (ELC). The Conservation and Reclamation (C&R) Regulation under EPEA defines ELC as the ability to support various land uses following reclamation in a fashion that is similar, but not necessarily identical, to what existed prior to mining. It is under C&R that the commonly understood objective of achieving a locally common, self-sustaining boreal forest for oilsands sites is found.

Closure Incentives

The fundamental reason any mine will undertake closure activities is to reduce a liability. Oilsands operators have a legal obligation under EPEA to pursue reclamation certification. The MFSP is a financial mechanism for the AER to recover prospective costs for closure if an operator abandons the asset prior to achieving reclamation certification. Thus, an oilsands operator retains both a legal and financial liability that will induce the company to undertake closure operations.

There are four security deposits under MFSP, with the most relevant instrument being the Operating Life Deposit (OLD). Provisions for the OLD begin 15 years prior to the end of mine life (EOM) and must be fully funded based on the approved MFSP calculations with six years of reserves remaining. Legacy operators in the region are quickly approaching the point where the OLD must be fully funded to meet this commitment. Given the size of mining assets on the operator's leases, MFSP obligations represent a non-trivial percentage of their total market capitalization. Thus, there is a strong financial incentive to undertake progressive closure operations, exactly as the policy has intended.

The Water Act

While the process to delicense a tailings dam and move towards closure of tailings structures begins with the Water Act, truthfully this policy comes into play much earlier in the life on oilsands tailings dams. Under current regulatory regimes, there is a lack of defined criteria for water release in the oilsands. While the Alberta Tier 1 Soil and Groundwater Remediation Guidelines provide well-defined metrics for release

over myriad land use characterizations, the AER and Alberta Environment and Parks (AEP) have not specified release quality metrics for oilsands operators.

Much of the challenge surrounding oilsands closure relate to the requirement to store water on-site. Storage and recycling of process water in lieu of treatment and release leads to hypersalination, further exacerbating an existing environmental liability. Storage of water in TSFs increases the risk classification for tailings dams on-site.

Were water treatment completed and release allowed, the geotechnical stability and safety of these TSFs would improve dramatically, reducing the risk of catastrophic failures and the inadvertent release of tailings to the Athabasca in the exceedingly unlikely event of an embankment failure. Furthermore, many challenges related to closure arise due to storage requirements of water and the timing of reclamation. Having the option to release treated process water would set off a chain of timing events that would immediately accelerate closure timelines.

Policy Solutions

The physical scale of the oilsands reflects the scale of the challenges facing the oilsands industry with respect to how water is dealt with in closure. Myriad financial, environmental, and legal issues overlap with societal expectations, investor pressure, and corporate reputation. Despite challenges in conducting closure operations, there are policy solutions with the potential to address perceived barriers to achieving closure objectives. The current regulatory regime seems to let perfect be the enemy of the good, and the following policy suggestions are offered to build momentum in the industry.

It must be noted that in proposing the following policy solutions, the intent is not to minimize objections, ignore concerns, or advocate for lower standards on behalf of oilsands operators. The attention called here is especially true for the very real and present concerns that local Indigenous communities have with respect to the environmental effect of the oilsands on downstream communities. Any changes to current regulations must be made with the free, prior, and informed consent of the Indigenous communities that will be affected. The following is simply offered for consideration by all affected stakeholders on how to progress closure in the oilsands region. The important decisions involving and made by Indigenous communities are outside the scope of this paper.

Develop Performance-Based Criteria

The Alberta Tier 1 Soil and Groundwater Remediation Guidelines and the AEP Environmental Quality Guidelines for Alberta Surface Waters exist to protect important receptors, including aquatic life, agricultural use, and recreational use. These guidelines do not consider antecedent environmental conditions, such as the hyper saline groundwater in the Athabasca Oilsands region or the presence of petroleum hydrocarbon compounds in the Athabasca River from natural oil seeps along the banks.

If oilsands operators were permitted to release water to the Athabasca River from tailings pond supernatant utilizing performance-based guidelines at downstream monitoring points, cumulative effects from release by multiple operators can be coordinated without negatively impacting the downstream ecosystem. However, the management of cumulative effects in this way requires a level of coordination that may not be possible, and if implemented may still require significant ‘guess and check’ with respect to release in order to capture appropriate volumes over multiple operators.

Allow Water Release

While the decision on whether to release water to the Athabasca River carries with it important social implications, the technical matter of water treatment is straightforward. Water treatment and release to major receptors is a widely accepted practice in many industrial, municipal, and mining contexts worldwide. The technical ability to treat water to a level of quality such that it would meet applicable guidelines is currently available.

With influence from operators, it is possible that the case could be made to the AER and AEP that water meeting the Alberta Surface Water Quality Guidelines, or the Alberta Tier 1 Soil and Groundwater Remediation Guidelines is acceptable for release to the Athabasca River. However, this requires a regulator and stakeholders that are amenable to allowing release under stringent release guidelines, as there has currently been no permitted release.

Consider Long Term Care

Much of the problem with oilsands reclamation surrounds timelines. Much of the water entrained in tailings storage facilities will naturally drain, allowing the system to consolidate, given sufficient time periods. In other words, under a long term care scenario, closure could proceed exactly as promised. Long term care models exist and have ample historical precedent. Many examples exist of successful long term care of closed mines in Canada, and the model could be adapted to the oilsands. While public perception may be that long term care is synonymous with “walk away”, the reality is that when a risk-based monitoring approach, long term care is a perfectly feasible means of managing environmental liability.

A risk-based approach can be implemented to estimate the level of remediation and associated costs at oilsands sites, as well as considerations for long-term management and funding. The process for long term care with respect to the evaluation of potential sites and planning for long-term management. includes completion of a detailed site assessment and characterization followed by a comprehensive and accurate risk analysis process. Following a risk analysis, estimation of activities and costs for remediation and long-term management are completed, based on the identified risks and objectives.

In the case of limited or incomplete data available to characterize the current site hazards and risks, a site investigation and data acquisition program can be developed. Detailed site assessment is required to

assess public safety and ecological risk to inform remediation and long-term management decisions. Once sufficient information is available to inform discussion, a comprehensive and accurate risk analysis process should be completed to determine the level of remediation required. This analysis will also be required to estimate the cost of long-term management to ensure that costs are not significantly underestimated. Conversely, there is a chance that precluding a risk assessment may result in expenditure without justification.

By adopting a risk-based long term care model, sites can be adaptively managed while granting public access to areas where the owner still retains liability. In this way, the objectives of closure are largely retained, while not imposing onerous costs to artificially accelerate a process that is otherwise expected to take decades or centuries.

Conclusion

Investors are increasingly demanding demonstrable and measurable action on sustainability initiatives from oilsands owners. To deliver on their sustainability commitments, oilsands companies must manage liabilities, thus ensuring there is a steady return on capital. The primary liability facing oilsands owners is in closure, specifically the enormous volumes of water entrained in tailings facilities, and the associated reclamation costs. Thus, it is a financial, legal, and reputational imperative for oilsands operators to expeditiously advance closure.

Despite the importance of advancing closure, there are regulatory challenges that make the process less than straightforward. While a pathway exists on paper, that path to closure has not been tested on a large scale in the oilsands. The untested process is especially true for tailings storage facilities. Thus, the regulatory outcome for closure may not be exactly as once envisioned and communicated to stakeholders.

The widely communicated closure goal of returning the oilsands region to a locally common, self-sustaining boreal forest ecosystem may be both difficult to achieve, and no longer the optimal outcome. Fortunately, alternative closure end states exist, and have historical precedent. Allowing alternative end land uses, permitting water release, applying an institutional control program, and facilitating long term care are all examples of how closure objectives can be satisfied within realistic timeframes. By exploring and implementing realistic alternatives, the oilsands industry can be a major player in facilitating a sustainable transition following the end of operations.