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Not Fit for Purpose: Oil Sands Mines and Alberta's Mine Financial Security Program

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EXECUTIVE SUMMARY

Mining jurisdictions around the world are grappling with the significant environmental harms and costs associated with orphaned mines, i.e., mines whose owners are financially unable or otherwise unwilling to remediate and reclaim their mine sites. Numerous Canadian examples, including the notorious Giant Mine in the Northwest Territories, have significantly harmed water, soil, air, and wildlife, as well as human health, safety, and well-being. Such impacts can be particularly devastating for Indigenous peoples, who continue to rely on their traditional territories for cultural and other purposes.

Canadian governments have gradually developed remediation and reclamation liability regimes to ensure that mine operators remediate and reclaim in a timely manner, or to at least ensure that governments have access to sufficient funds to carry out this closure work themselves. While they differ in various ways, the basic logic of such regimes is the same: by requiring mine owners to set aside some funds (e.g., in the form of cash or a letter of credit), they act as a kind of insurance that the public will not bear the costs of remediation and reclamation.

Unfortunately, Alberta has refused to develop an effective regime to protect Albertans from bearing the costs of oil sands mine remediation and reclamation. The regime in place today will not ensure that there are sufficient funds set aside to complete this closure work in the event that operators fail to do so. In some respects, this is not news. It has been over two decades since Alberta's Auditor General first identified serious deficiencies in Alberta's regime. Continued mismanagement has left Albertans with a significant risk that they will be responsible for cleaning up oil sands mines that threaten potentially irreversible environmental harm, including a growing inventory of nearly 1.6 trillion litres of toxic tailings.

Alberta's Mine Financial Security Program (MFSP), which applies to both coal and oil sands mines, is a misnomer. While it *allows* mine owners to post full security against their closure liabilities, it also allows them to rely on the estimated value of their assets (proved and probable reserves) as collateral to *avoid* posting meaningful security. This is essentially the mining equivalent of the province's failed asset-to-liability approach in the conventional oil and gas sector. The results are staggering. While the coal mining sector has chosen to secure nearly the entirety of its estimated closure liabilities (approximately \$700 million), oil sands companies have posted less than \$1 billion in security against an official estimate of approximately \$46 billion in total closure liabilities. This is less than two percent of official estimates, and less than one percent of internal estimates leaked to the media in 2018, which suggested that total closure liabilities could be as high as \$130 billion.

Finally, following two critical reports from the Auditor General (2015 and 2021), Alberta undertook a year-long review of the MFSP in 2022. The results of this review, however, are currently unknown.

Significant reforms are necessary. The MFSP rests on a series of unrealistic assumptions about asset values, future oil markets and prices, and the development of effective but also low-cost remediation and reclamation technologies. The MFSP's asset-to-liability approach, which allows oil sands companies to avoid posting security where their assets are deemed to be worth at least three times more than their liabilities (3:1), is also counter-intuitive and counter-productive: instead of collecting security when operators can afford it, operators would be required to post security when profitability is declining — precisely when operators are least able to afford it and resulting in further financial distress. Simply put, the MFSP will not provide insurance precisely when it is needed most.

Correcting the MFSP asset calculations, requiring annual security deposits, and opening the process for estimating remediation and reclamation costs to independent scrutiny are three reforms that could be instituted in the short term and that would go some way towards ensuring the fulfillment of the polluter-pays principle upon which all such regimes are ultimately based. In the longer term, the MFSP exposes Albertans to far too much risk and uncertainty. Our primary recommendation is for Alberta to convene an independent and transparent expert panel, with opportunities for public participation, to recommend a regime that adequately incentivizes progressive remediation and reclamation and secures outstanding oil sands liabilities while not exacerbating the near-term risk of default. No matter the specific structure that is adopted for security, the assurance of independent, transparent assessment of the degree to which potential liabilities are fully funded, perhaps in the style of pension fund reporting, is essential.

DEFINITIONS AND SPECIALIZED TERMS

This paper may be of interest to a wide range of stakeholders affected by the financial and environmental risks associated with oil sands mine sites, including Indigenous governments, municipalities, lenders, energy industry leaders and taxpayers; therefore, it has been written to be readable by non-experts. To that end, we simplify technical terms and aim to explain complex formulas and calculations.

Closure obligations, costs and liabilities: The closure process comprises three steps: abandonment, remediation and reclamation (each of these is further defined below). This paper often uses the generic terms ‘closure obligations’ for the entirety of that process and ‘closure costs’ or ‘closure liabilities’ for the associated costs.

Abandonment: The permanent deactivation of a mine and associated facilities to ensure the mine is in a permanently safe and secure condition, without safety hazards and with long-term structural stability. Abandonment is desirable and distinct from “orphaning,” which occurs when mine operators become insolvent.

Financial security: Funds set aside by a company or made available by third parties for the purposes of paying for closure obligations. Security can come in various forms and is sometimes divided into hard security (cash, trusts, letters of credit or insurance bonds) and soft security (self-assurance, pledges of assets).

Remediation: Decontamination, or the removal or neutralization of any wastes and hazardous material.

Reclamation: The removal of equipment and the decontamination and reconstruction of surface land, aimed at returning land to a capability equivalent to what existed prior to the development (CanLII 2000). For large mine sites, the reclamation process can last many decades.

PART 1: INTRODUCTION

Mining jurisdictions around the world are grappling with the significant environmental harms and costs associated with mines “for which responsible parties cannot be found because they have gone bankrupt, left the jurisdiction, or are unwilling to accept responsibility...” (Auditor General of British Columbia 2002/3, 12–13; UNEP 2001, 14).¹ Canada is no exception to this trend.

Canada’s history of contaminated sites makes plain how much is at stake. In general, contaminated sites “can lead to significant contamination of water, soil and air, thus threatening human health and the environment... Contamination of a site can force nearby residents to move or to find alternative sources of water, which may be costlier, or if they live off the land, it can jeopardize their way of life” (CESD 2002, 2.12). Such impacts can be particularly relevant to Indigenous peoples who continue to rely on their traditional territories for cultural and subsistence purposes (Keeling and Sandlos 2015, 8).

Consequently, in addition to paying for the costly and uncertain task of reducing current contaminated site inventories,² federal, provincial and territorial governments throughout Canada have gradually developed liability management regimes intended to ensure that mine operators remediate and reclaim their sites or, in the alternative, ensure that governments have access to sufficient funds to carry out this work themselves. While they differ in various ways, the basic logic of such regimes is the same: “security deposits are taken by... government to prevent companies from simply defaulting on their future reclamation obligations after all the wealth has been extracted from the land. In a way, security deposits are a “surety” or “guarantee” that the public will not bear the cost of restoring the land” (Cook 2018, 180). In a recent assessment of mine liability regimes in Yukon, British Columbia, Alberta, Ontario and Quebec, Quebec’s regime was assessed as the most rigorous: “Mining firms in Quebec must provide hard, full and timely financial assurance against the risk of non-remediation.” (Ecofiscal Commission 2018, 43).

Unfortunately, Alberta has refused to develop an effective regime to ensure that oil sands mine operators will fulfill their remediation and reclamation obligations, or that there are sufficient funds set aside for Alberta to pay for remediation and reclamation in the event that operators fail to do so. Over two decades of continued mismanagement since Alberta’s Auditor General first identified serious deficiencies has left a large and ever-growing risk that Albertans will become responsible for cleaning up oil sands mines that threaten significant and potentially irreversible environmental harm, including a still-growing inventory of nearly 1.6 trillion litres of toxic tailings (AER 2023).

The Mine Financial Security Program (MFSP) currently applies to both coal and oil sands mines. This paper focuses on oil sands mines because the oil sands are far and away the larger liability. Official estimates from the Alberta Energy Regulator (AER) put oil sands mines at over \$46 billion in remediation and reclamation liabilities while all coal mines save one are estimated at a total of \$700 million (Government of Alberta 2023). Internal AER documents from 2018, however, estimate that oil sands liabilities are at least \$130 billion (De Souza, Jarvis, McIntosh, and Bruser 2018). Moreover, the estimated coal mine liability is secured with security deposits of \$770 million (an industry-wide liability-to-security rate approaching 100 percent), while only \$912 million in security deposits are held against the much larger oil sands liability (a liability-to-security rate of roughly 2 percent of official estimates, or 0.7 percent of internal unofficial estimates).

¹ Commonly referred to as abandoned mines in other jurisdictions, in Alberta such mines are referred to as orphaned mines.

² “The 2022 public accounts state the gross liability for the 2,524 federal contaminated sites where action is required is nearly \$10 billion based on site assessments. Of the 3,079 unassessed sites, 1,330 are projected to proceed to remediation with an estimated liability of \$256 million.” (Blake 2022)

Assessing the MFSP is a complex and transdisciplinary endeavour, engaging law, economics, accounting and environmental science. When assessed in this way, however, it becomes clear that the MFSP is entirely unfit for purpose. Perhaps the most revealing fact about the MFSP is that from 2014 to 2023, which spans a period of two major oil price shocks, it collected a grand total of less than a dollar from oil sands operators, while official liability estimates have more than doubled, from \$20 billion to just under \$47 billion.

'MFSP' is a misnomer. Rather than collecting security from operators to ensure funds for remediation and reclamation, it has been designed to allow operators to rely on the estimated value of their mine assets as collateral in order to *avoid* having to post any meaningful security until near the end of their mine's life.³ Fundamentally, the MFSP regime rests on a series of unrealistic assumptions about asset values, future oil markets and prices and the development of effective but also low-cost remediation and reclamation technologies. The MFSP's asset-to-liability approach is also counter-intuitive and counter-productive: instead of collecting security when operators can afford it, operators are required to post security when profitability is declining — precisely when operators are least able to afford it and resulting in further financial distress.

Such an approach not only exposes Albertans to significant environmental and economic risk but is also inconsistent with the honour of the Crown in relation to Indigenous peoples, many of whom live throughout the Lower Athabasca Region, which is part of Treaty 8 territory. Canadian courts have been clear that the honour of the Crown requires diligent planning to ensure that Indigenous peoples' constitutionally enshrined rights, including to the continued meaningful exercise of their Treaty rights, are respected and protected (*Yahey v British Columbia*, 2021 BCSC 1287 (CanLII) at para 1725).

Significant reforms are necessary. Correcting the MFSP asset calculations, requiring annual security deposits, and opening the process for estimating liability to scrutiny are three reforms that could be instituted in the short term and that would go some way towards ensuring the fulfillment of the polluter-pays principle upon which all such regimes are ultimately based. In the longer term, the MFSP exposes Albertans to far too much risk and uncertainty. Our primary recommendation is for Alberta to convene an independent and transparent expert panel, with opportunities for public participation, to recommend a regime that adequately incentivizes progressive reclamation and secures outstanding oil sands liabilities while not exacerbating the near-term risk of default. No matter the specific structure that is adopted for security, the assurance of independent, transparent assessment of the degree to which potential liabilities are fully funded, perhaps in the style of pension fund reporting, is essential.

³ Both Yukon and Ontario allow for assets to be considered for some projects on a discretionary basis (Ecofiscal Commission 2018), but no other mining liability regime in Canada adopts the MFSP's asset-to-liability approach.

PART 2: A SHORT HISTORY OF SECURITY FOR MINE CLOSURE MANAGEMENT IN ALBERTA

A. BEFORE THE MINE FINANCIAL SECURITY PROGRAM

Prior to the implementation of the MFSP, Alberta collected security for the closure of mine sites without any principled approach. Starting in 1998, the Auditor General of Alberta began regularly noting that Alberta Environment (now Alberta Environment and Protected Areas or AEPA) had no consistent process to determine the amount of financial security they collected for the closure of coal and oil sands mines (Auditor General of Alberta 1998-99, 158-159). In 2005, the Auditor General wrote:

For oil sands and coal mines, for which the Ministry is legislatively responsible to collect reclamation security, *there are still many inconsistencies*. Some sites posted security under prior legislation and that security has been continued under existing legislation, with the result that some sites have security based on production. *Some sites use outdated information to determine their estimated full cost of reclamation*. Some estimates do not include all required costs. As a result of these inconsistencies, *the sufficiency of security for the completion of reclamation is not ensured...*

(Auditor General of Alberta 2005, 181, emphasis added)

In 2009, the Auditor General noted Alberta Environment was working on an approach to the issue, with stakeholder consultation between government departments, the Energy Resources Conservation Board (the precursor to the current AER) and industry representatives (Auditor General of Alberta 2009, 208-209). Environmental groups and the general public were not included in these consultations (Cook 2018, 181). In 2011, Alberta Environment finalized the MFSP, and it remains responsible for the policy decisions and program design, although the AER became responsible for administering the MFSP in 2014 (Auditor General of Alberta 2015, 27). Table 1, below, shows the security held by the Alberta government for oil sands mines when the MFSP came into effect (AER 2017, 47):

Table 1: Oil Sands Mining Security as of December 31, 2010

Oil sands mining – Security as of December 31, 2010 (EPEA approval number in brackets)	\$912,852,619
Aurora North and Mildred Lake Mines (26) – Syncrude Canada Ltd	\$205,303,024
Muskeg River Mine (20809) – Albian Sands Energy Inc.	\$111,277,441
Steepbank/Millennium (94) – Suncor Energy Inc.	\$359,096,654
Fort Hills Oil Sands (151469) – Suncor Energy Inc.	\$38,958,605
Horizon Oil Sands Project (149968) – Canadian Natural Resources Limited	\$61,200,000
Jackpine Oil Sands Mine (153125) – Shell Canada Ltd.	\$72,361,895
Kearl Oil Sands Mine (46586) – Exxon Mobil and Imperial Oil	\$64,655,000

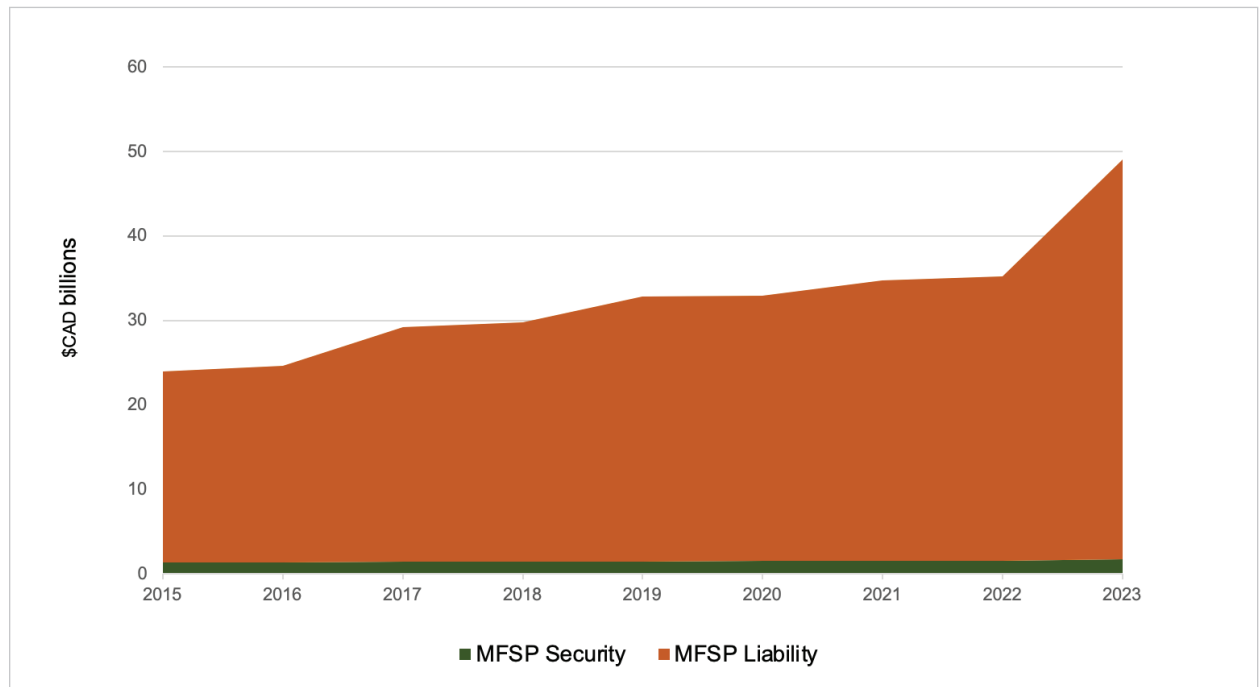
(AER, 2017)

B. THE MINE FINANCIAL SECURITY PROGRAM IN ACTION (2014–2023)

The MFSP is based on the same — and to date wholly inadequate — asset-to-liability approach as Alberta’s system for conventional oil and gas closure liabilities (Powter 2011; Yewchuk, Fluker, and Olszynski 2023). Rather than requiring full amounts of security in the form of cash or letters of credit as is the case for Quebec’s mining sector, the MFSP allows companies to use an estimate of the value of their mine assets (both proved and probable resource reserves) as collateral against their estimated environmental liabilities. If a mine’s deemed assets are worth more than three times the mine’s estimated remediation and reclamation liabilities, which are based on their own internal calculations that are not publicly disclosed nor independently verified, only an initial “base security deposit” is required; further security is not required until the mine approaches its last fifteen years of operating life (Alberta Environment and Parks 2021).

As of September 30, 2023, the MFSP held \$912,852,620 in security deposits for oil sands mines. For the purpose of collecting financial security from oil sands operators, the MFSP has been functionally equivalent to having no system at all. Proportionally, against official estimates of liability, the MFSP currently holds *less* security than it did back in 2014 (Figure 1) (with respect to oil sands mines specifically, it is now roughly 2 percent from the previous high of 5.7 percent)⁴. Although the MFSP did take security in some years, the MFSP has since returned that security to oil sands operators. One return occurred in 2015, when an oilsands mine first switched to the asset-to-liability approach, and the second occurred in 2021, when one oil sands mine operator purchased another mine and consolidated the mines, so that the base security deposit for one of the mines was returned.

Figure 1: MFSP Estimated Reclamation Liabilities and Security Deposit Holding



(AER, MFSP Security and Liability, 2015 – 2022)

⁴ This does not account for inflation lowering the purchasing power of the posted security.

In 2015, Alberta's Auditor General analysed the MFSP and concluded that "for the design and operation of the MFSP to fully reflect the intended objectives of the program, improvements are needed to both how security is calculated and how security amounts are monitored" (Auditor General of Alberta 2015, 25). More specifically, the Auditor General found that there is:

a significant risk that asset values... are overstated within the MFSP asset calculation, which could result in security amounts inconsistent with the MFSP objectives. The MFSP asset calculations do not incorporate a discount factor to reflect risk, use a forward price factor that underestimates the impact of future price declines, and treat proven and probable reserves as equally valuable.

(Auditor General of Alberta 2015, 25)

The thrust of these criticisms, which are further discussed below, was that the MFSP regime tends to inflate asset values, which reduces the likelihood that operators will need to post additional security. The Auditor General also expressed concerns about the inclusion of reserves from *in-situ* operations⁵ in the asset calculation, as well as the extension of mine life through mine expansions or mergers (Auditor General of Alberta 2015, 30). The extension of mine life matters because the design of the MFSP is focused on collecting security in the last fifteen years of a mine's planned life.

Six years later, in 2021, a follow-up audit concluded that "the department has not made satisfactory progress in implementing our recommendation" (Auditor General of Alberta 2021, 29-34). While AEPA had completed several analyses in the intervening six years, no changes have been made with respect to the deficiencies identified back in 2015.

Around that same time (2020/21), oil prices dropped as a result of the COVID-19 pandemic, which temporarily but drastically reduced the value of oil sands reserves (Evans 2020) and should have triggered the posting of security under the MFSP. Rather than collecting that security, however, and in a perfect illustration of the counterintuitive and counterproductive design and management of the MFSP, the Alberta government rapidly and without public consultation made changes to the MFSP formula to *relieve* operators of this obligation (Yewchuk 2021). Simply put, the COVID-19 pandemic showed that, in periods of declining profitability, government will be unwilling to pressure industry for security, and industry will be unwilling or unable to post such security.

During this period, and again without public consultation, AEPA and AER also considered accepting 'surety bonds' as a new form of security under the MFSP, as well as allowing the use of captive insurance companies, essentially a form of self-assurance,⁶ to post such bonds.⁷ While surety bonds have since been incorporated (see below), the use of captive insurers in relation to the MFSP is not currently permitted.

⁵ *In situ* operations are entirely different from mining, injecting steam underground to collect bitumen from deposits that are too deep to be mined (AER 2013-2023).

⁶ A captive insurance company is a company owned by the company whose risks it insures. Captive insurers need to be carefully regulated to ensure they remain sufficiently capitalized, or it is merely a roundabout method of self-assurance. On the failures of self-bonding, see Macey and Salovaara, 2019.

⁷ See *Freedom of Information* request record AER 2022-G-0036, on file with the authors.

In January 2022, AEPA and AER launched a review of the MFSP (the 2022 MFSP Review), largely framed around finally responding to the Auditor General's 2015 recommendations (Government of Alberta 2022). Two separate consultation tracks were followed, one for industry and one for First Nations, although a few joint industry and First Nations meetings were held (Powter, Cotton and Daniels 2022).⁸ The general public and environmental groups were once again not invited to participate (Weber 2023), although they were permitted to submit comments. The review was concluded in early 2023, with potential changes to the MFSP — if any — expected in 2024. Midway through this review (May 2022), and without notice to First Nations participants, Alberta made the aforementioned changes to the regulatory regime to accept surety bonds as a form of security (Government of Alberta 2022; Powter, Cotton, and Daniels 2022).

The Alberta government's decades-long refusal to adequately address the Auditor General's concerns about the MFSP, its hasty modifications to the MFSP in 2021 to avoid taking security in the midst of depressed oil demand and prices, and its 2022 decision to begin accepting surety bonds while contemplating allowing captive insurers to provide such bonds are all indicative of a troubling disposition to avoid taking security from oil sands operators at all costs. In this and other respects, the MFSP regime bears strong similarities to Alberta's liability management regime for conventional oil and gas liabilities: both regimes minimize the amount of financial security required, demand security too late in project life, and include unreliable estimates of asset value and liability costs. A recent assessment of that regime (conventional oil and gas) identified three factors that have contributed to what is described as a massive regulatory failure: a lack of transparency, excessive delegation of discretionary authority and regulatory capture by the industry. (Yewchuk, Fluker, and Olszynski 2023). All three factors are similarly present in the design and implementation of the MFSP.

PART 3: HOW THE MFSP WORKS

A. THE REGULATORY FRAMEWORK FOR THE MFSP

In Alberta, mine closure is primarily regulated through the provincial *Environmental Protection and Enhancement Act (EPEA)*⁹ and associated regulations, approvals and policies, especially the *Conservation and Reclamation Regulations (CRR)*.¹⁰ EPEA requires mine operators to reclaim their mine sites to “equivalent land capability” and obtain a reclamation certificate from government.¹¹ To this end, mine operators must prepare and submit a Life of Mine Closure Plan (LMCP), Mine Reclamation Plan (MRP) and annual reclamation progress tracking reports.¹²

There is longstanding ambiguity surrounding the “equivalent land capability” standard, as well as uncertainty regarding the effectiveness of existing and planned remediation and reclamation approaches, especially in relation to tailings and end-pit lakes, an issue addressed in detail in Part 4. When oil sands mines were approved, provincial and federal regulators acknowledged the absence of proven and cost-effective remediation and reclamation techniques but accepted vague proponent commitments to ‘adaptive management,’ essentially to managing through

⁸ In the interest of disclosure, Martin Olszynski was hired as a consultant in this review for the Athabasca Region First Nations (ARFN), while Andrew Leach was retained by the ARFN to prepare an expert report. Parts of this paper are informed by the authors' experience and analyses performed in the course of that review, as well as information and data provided by the Government of Alberta and the independent experts hired by it to assist First Nations, Enviro Q & A Services and Solstice Environmental Management.

⁹ RSA 2000, c E-12.

¹⁰ Alta Reg 115/1993.

¹¹ EPEA, s.137, CRR, s 2.

¹² The requirements for closure plans are found in a variety of directions and directives set by the AER (Nikolaou 2022).

experimentation, over the life of the mine. Those commitments to adaptive management appear to have faltered (Olszynski 2017).

In addition to *EPEA*, tailings are directly regulated through the *Lower Athabasca Region: Tailings Management Framework for the Mineable Athabasca Oil Sands*¹³ (an environmental management framework developed for the Lower Athabasca Regional Plan under the authority of the *Alberta Land Stewardship Act*)¹⁴ and the AER's Directive O85¹⁵ (directives are a form of subordinate legislation, functionally equivalent to regulations but promulgated by the Regulator under the authority of the *Oil and Gas Conservation Act*).¹⁶ Directive O85 replaced the earlier, more stringent Directive O74, which would have required near-term decreases (within five years) in fluid tailings volumes but was deemed infeasible by industry and eventually abandoned by the Regulator (see Figure 2).¹⁷

The *Tailings Management Framework* and Directive O85 have several components, but their main thrust is to require all legacy fluid tailings (pre-2017) to be “Ready to Reclaim” (RTR) at mine closure and all new fluid tailings (post-2017) to be RTR within ten years of when the mining of bitumen is planned to be complete (which, under current plans at least, means many decades from now for most oil sands mines). “Ready to reclaim” is another nebulous standard defined as the “state achieved when fluid tailings have been processed through an accepted technology, have been placed in their final landscape position, and have achieved necessary performance criteria.”¹⁸ The overarching objective is to reclaim oil sand mining projects “to a self-sustaining boreal forest ecosystem that is (1) integrated with the surrounding area and (2) consistent with the values and objectives identified in local, subregional and regional plans” (AER 2022).

In order to evaluate whether tailings deposits are on a trajectory to meet this high-level objective, Directive O85 defines two subobjectives (operators are permitted to define additional subobjectives): (1) to ensure deposit's physical properties are on a trajectory to support future stages of activity; (2) to minimize the effect the deposit has on the surrounding environment and ensure that it will not compromise the ability to reclaim to a locally common, diverse and self-sustaining ecosystem. Specific performance criteria and indicators are selected by oil sands operators themselves, who must file annual Tailings Management Plans for approval by the AER.¹⁹ As further discussed in Part 4, the reclamation trajectory currently set by this regime comprises a landscape of waste disposal areas in the form of end-pit lakes.

¹³ *Lower Athabasca Region: Tailings Management Framework for the Mineable Athabasca Oil Sands* (Government of Alberta 2015)

¹⁴ SA 2009, c A-26.8 [ALSA].

¹⁵ Directive O85: Fluid Tailings Management for Oil Sands Mining Projects (October 12, 2017).

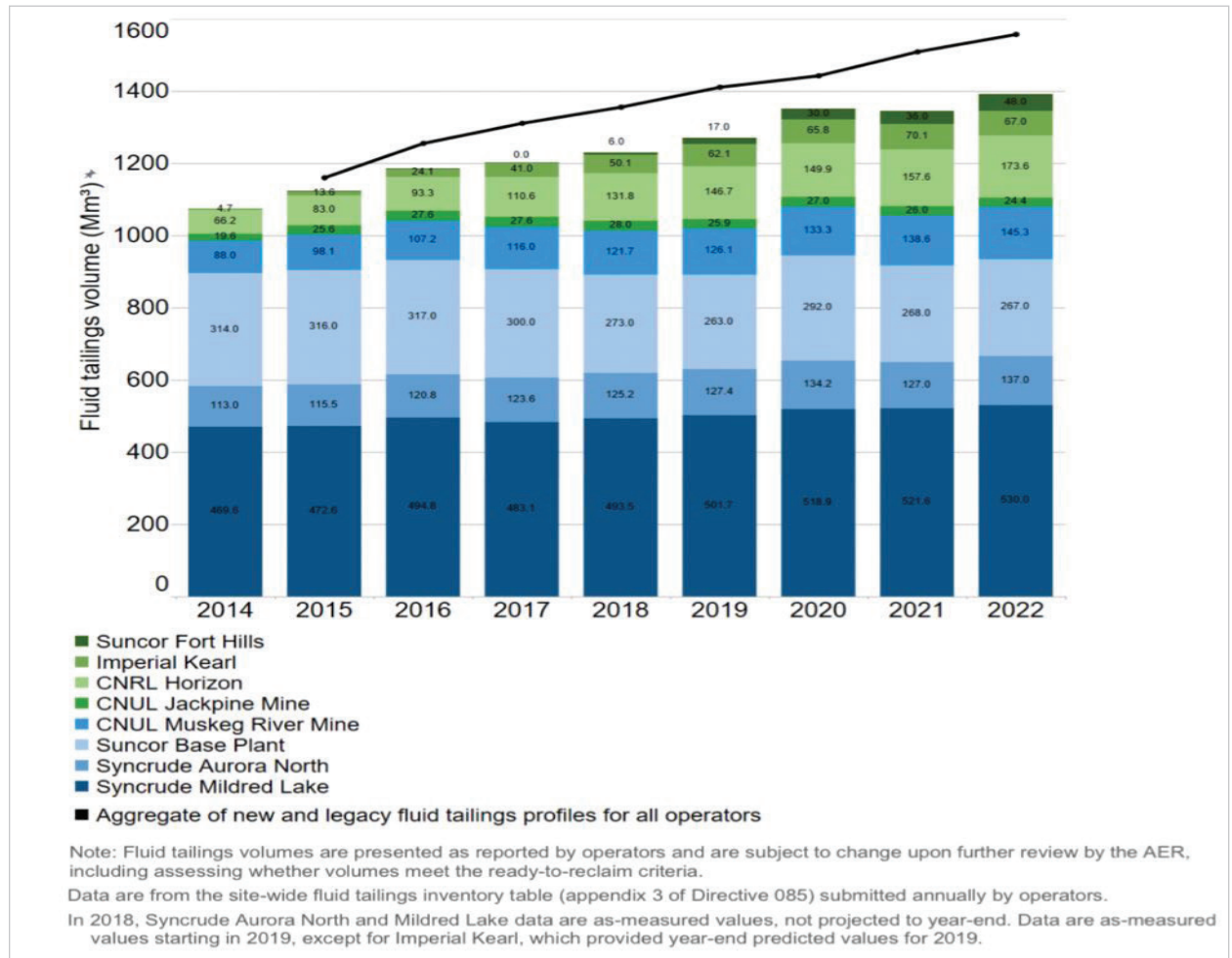
¹⁶ RSA 2000, c O-6.

¹⁷ For more background on Directive O74 and the events leading to its eventual abandonment, see *Oil Sands Magazine* 2023.

¹⁸ Directive O85, *supra* note 16.

¹⁹ *Ibid.*

Figure 2: Regional Fluid Tailings Volumes and Approved Aggregate Profiles, 2014-2022



(AER 2023)

The CRR also authorizes Alberta to operate a program for collecting financial security for mine closure, but does not establish legislative constraints or objectives to guide its design.²⁰ Through the combined operation of EPEA section 28 and CRR section 16.1, the “*Mine Financial Security Program Standard*” made by the Director and published by the Department, as amended or replaced from time to time, is adopted by reference in this Regulation.” Subsection 18(1.1) of the CRR states that “security for a mine approval shall be in an amount determined in accordance with the Standard,” while section 21 sets out the forms of permissible security and includes irrevocable letters of credit, performance bonds and, following the above noted amendments to the CRR passed in the middle of the 2022 MFSP Review, surety bonds. As with Alberta’s conventional oil and gas liability regime (Yewchuk, Fluker, and Olszynski 2023), AEPA and the AER appear to have nearly unfettered discretion in the design and implementation of the MFSP.

The MFSP Standard has received three updates. There is also an MFSP Guide that assists in interpreting the Standard, including an itemization of relevant reclamation obligations (AER 2021) that has been updated twice. These changes modified details of the MFSP but did not modify the MFSP’s basic four-part structure.

²⁰ CRR, s 16-24.4.

B. THE MFSP STRUCTURE

The MFSP consists of four different types of security mechanisms, each ostensibly meant to protect against a different possible problem. In this section, we explain each of these. Presently, only the first type of security — the Base Security Deposit — has been collected.

Base Security Deposit (BSD)

The base security deposit is collected once at the beginning of a mine's operating life. It is meant to protect against a situation where a mine operator, for reasons unrelated to the oil sands mine's profitability, enters bankruptcy or ceases to operate. The amount of the BSD was meant to be an estimate of the amount required to pay for the suspension, care and custody activities required to maintain the security and safety of the site (AER 2015). The amount of the base security deposit is determined by the type of mine: \$2 million for non-export coal mines, \$7 million for export coal mines, \$30 million for oil sands mines (with no upgraders) approved after January 1, 2011 and \$60 million for oil sands mines (with integrated upgraders) approved after January 1, 2011.

The MFSP came into force on January 1, 2011. Before then, security for the seven existing oil sands mines had been collected under an unsystematic approach taken by Alberta Environment (described in Part 2). Those amounts were all higher than the new base security deposit requirements, and Alberta Environment chose to retain those amounts in place of new base security deposits (AER 2021, s. 4). Fort Hills Oil Sands posted security from 2011 to 2014, but in 2015 the mine became eligible to rely on their asset safety factor, and their security was returned to them except for their base security deposit (AER 2018). A base security deposit was posted for Joslyn North mine by 2014, but that deposit was returned in 2021 after Joslyn North mine was consolidated with the Horizon oil sands mine.

Operating Life Deposit (OLD)

The operating life deposit applies near the end of mine-life and is supposed to address the concern that an operator may expend all of a mine's reserves and then enter bankruptcy without having performed remediation and reclamation. The OLD compares both proved and probable reserves to a three-year average annual sales volume to determine remaining mine lifespan. An operator is required to have posted financial security worth 10 percent of estimated remediation and reclamation costs each year when a mine has less than fifteen years of reserves remaining, with the aim that all closure costs are fully secured by the time there are five years of reserves remaining.²¹ Because no oil sands mine is within fifteen years of the end of its operating life, no oil sands operator has posted security under the OLD.

Asset Safety Factor Deposit (ASFD)

The ASFD implements the asset-to-liability approach throughout the life of a mine. The ASFD is meant to protect against declines in oil prices decreasing the value of a mine's reserves below the cost of its liabilities. If a mine's asset-to-liability falls below 3.0 (arbitrarily selected during the MFSP's development), the operator must post financial security in an amount that brings the asset-to-liability ratio back up to 3.0.

In order to calculate the value of a mine's reserves, the ASFD multiplies remaining proved plus probable reserves by the trailing three-year average netback (gross bitumen revenue minus

²¹ Note that the base security deposit counts towards the OLD security deposits required so that the first payment required under the OLD will be lowered by the amount of the base security deposit.

operating costs) and by a 'forward price factor.' The forward price factor is what makes the ASFD distinct from the OLD because it is meant to include a consideration of the possibility that the value of the resource itself will decline. The forward price factor is calculated as the ratio of the next three-year New York Mercantile Exchange's West Texas Intermediate price (three-year strip on the last trading day of December for the Reporting Year in \$US/bbl) divided by the past three year's values for the same contract. The 'forward price ratio' is smaller than one if the market expectations are that oil prices will decrease in the next three years relative to the previous years, but is capped at one if forward prices are higher than previous years' prices.

Liabilities are estimated by operators based on the MFSP Guide and submitted to the AER on an annual basis. According to the MFSP Standard, "MFSP Liability (\$) = ARO Liability (\$) + Other Liability (\$). Each of these terms is defined as follows:

"ARO Liability" means the unescalated and undiscounted estimated cost required to settle the suspension, abandonment, remediation and reclamation *obligation* for the MFSP site;

"Other Liability" means liability amounts which may be excluded from the ARO Liability value, including but not limited to:

- (i) The estimated suspension, abandonment, remediation and surface reclamation costs for any components that were not included because:
 - (A) they had an indeterminate life,
 - (B) the methods to undertake the suspension, abandonment, remediation or surface reclamation are not certain or are unknown, or,
 - (C) any other excluded liability amounts associated with components of the project that are outside the scope of the Approval issued by the Director,
- (ii) Remediation of known contamination not included in the Financial Reports,
- (iii) All other plants and infrastructure, irrespective of ownership, Approval Holder, or purpose of the plant or infrastructure, that are located on the land leased or owned for the purposes of mining or processing of coal or oil sands and that are not the subject of a separate MFSP submission,
- (iv) Costs to revise the abandonment and reclamation plan for the site so that it reflects current site conditions, and
- (v) If the ARO Liability does not include a "fair value" component then the Approval Holder will be required to estimate a "fair value" component and add it to the reclamation cost estimates. The "fair value" component would be based on third party costs, which would need to be reasonably accessible to the Alberta Energy Regulator/Government of Alberta in the event of an unexpected default of the operation;

The bifurcation between "ARO [Asset Retirement Obligation] Liability" and "Other Liability" appears to be a consequence of incorporating standard accounting rules for AROs. The MFSP Guide refers to various accounting standards in the United States and in Canada (e.g. Section 3110 of the Accounting Standard Board of the Canadian Institute of Chartered Accountants (CICA)), as well as related rules regarding financial disclosures and reporting (e.g. National Instrument 52-109, *Certification of Disclosures in Issuers' Annual and Interim Filings*). The upshot of all of this is that ARO Liability for the purposes of the MFSP *should* match ARO amounts in companies' financial statements and reports. However, those same accounting rules generally confine ARO

reporting to obligations that are reasonably determined (Cook 2018, 191). As noted above and further discussed in Part IV, there is considerable *uncertainty* surrounding oil sands remediation and reclamation, especially with respect to tailings, *i.e.* their remediation and reclamation may not be reasonably determinable. It is therefore probable that many, if not most, liabilities are reported as “Other Liability” (where “methods to undertake the suspension, abandonment, remediation or surface reclamation are not certain or are unknown”), but these other liabilities are not subject to ARO accounting and financial disclosure rules (which, to be clear, have their own shortcomings, as also further discussed below). To further cloud the issue, some oil sands operators are apparently including some of the costs associated with RTR not as remediation or reclamation costs but as operating costs in the trailing three-year average netback (Powter, Cotton, and Daniels 2022, 7–8).

Ultimately, because annual MFSP submissions are not public, there is no way to determine how oil sands mines characterize the various aspects of their mines’ remediation and reclamation liabilities. What we do know is that no oil sands mine operator has ever been required to post security under the ASFD.

Outstanding Reclamation Deposit (ORD)

The ORD is meant to address the problem of an operator deferring remediation and reclamation obligations that are possible during mine life. An operator must post security if they fail to meet their reclamation plan targets. However, each mine sets its own reclamation plan targets and may apply for exceptions and modifications to the reclamation they are required to do each year (AER 2021, s. 4). In his 2015 report, the Auditor General noted the perverse incentive that this structure creates: “The more optimistic an operator’s yearly reclamation forecast is, the more likely an operator will have to post security; thus, *there is a potential disincentive for operators to plan to reclaim more disturbances earlier*” (Auditor General of Alberta 2015, 30, emphasis added).

The amount of ORD security was set at \$75,000 per hectare for 2012, 2013 and 2014, and the new version of the MFSP standard published in May 2022 failed to update this amount. During the 2022 MFSP Review, Alberta suggested that accounting for inflation only, this amount should now be approximately \$95,000–\$100,000 per hectare (Powter, Cotton, and Daniels 2022, 32).

PART 4: DEFICIENCIES IN THE MFSP REGIME

As noted above, Alberta’s Auditor General identified problems with the MFSP in 2015 and again in 2021, primarily but not exclusively related to the asset calculations. In its review of several provincial mining liability regimes, the Ecofiscal Commission noted that “[m]any of the design features of Alberta’s MFSP support economic activity *at the expense of deterrence and compensation*. Financial-assurance requirements become significant only late in a project’s operating life. Further, the financial assurance required from firms *assumes the efficacy of a still-unproven remediation technology*.” (Ecofiscal Commission 2018, 47). A 2018 assessment published in the *Alberta Law Review* identified four deficiencies: “(1) lack of transparency, (2) potentially insufficient amounts of security collected, (3) a narrow definition of environmental liabilities and (4) a failure to take into account that the assets upon which the security is taken may become ‘stranded’ due to climate change legislation and international oil prices.” (Cook 2018, 180)

In this part, we discuss four broad deficiencies: overestimating assets; underestimating liabilities; delaying remediation and reclamation; and failing to account for climate policy-related risks.

A. OVERESTIMATING ASSETS

The MFSP's Asset Safety Factor Deposit (ASFD) will overestimate the value of assets when prices are declining, both because the forward price factor does not properly account for the non-linear manner in which declining prices affect asset values over a long period of time and because it is always focused on a rolling six-year window for assessing long-term values. This can result in a large difference between the approximate value of mining projects to the proponents (their net present value) and the deemed asset value under the MFSP. This, in turn, means that the MFSP provides a false sense of security regarding reclamation liabilities.

The MFSP uses a metric that combines recent project financial performance and forward-looking prices to assess the value of the remaining proved plus probable reserves associated with an oil sands mine. Specifically, the ASFD multiplies remaining proved plus probable reserves by the trailing three-year average netback (gross bitumen revenue minus operating costs) and by a forward price factor. The forward price factor reflects expected future price changes and is calculated by dividing the next three years' average NYMEX West Texas Intermediate (WTI) oil futures settlement prices by the past three-year NYMEX WTI average year-ending prices in \$US/bbl, with the maximum value capped at one. The forward price factor thus reflects potential oil price decreases insofar as they are reflected in the near-term futures market and adjusts asset values downward if prices are expected to decrease in the coming years.

A quick, numerical example illustrates the issue, before we turn to more complex modeling work. Consider an oil sands mine that produces one hundred million barrels of oil per year at a cost of \$30 per barrel, and that oil presently sells for \$60 per barrel allowing an operating profit (or netback) of \$30 per barrel. Assume the mine has thirty years of oil production remaining (its proved plus probable reserves are three billion barrels of oil). If prices and profits had been stable and were expected to remain so, the MFSP would value the production from that mine at \$90 billion (\$30 per barrel average netback on one hundred million barrels for thirty years). Now suppose that prices are expected to drop by \$5 per barrel each year until they reach \$20 per barrel. The mine will begin losing money after seven years, at which point the owner would rightly decide to shut it down if they were confident in continued low prices. The total, undiscounted profits available from the mine under the lower prices would be \$10.5 billion, assuming it shut down before taking on a long period of losses. The MFSP, however, would look at that project much more optimistically. An expected price decline from \$60 to \$55 and then to \$50 per barrel would lead to a forward price factor of 91.7 percent, and the MFSP would value the mine in the first year of the declining price trajectory at a healthy \$82.5 billion, despite the mine having total future profits of only \$10.5 billion (assuming the price decline was fully captured in futures prices). By year seven in this simple example, the last year the mine would be able to break even under declining prices, the mine would have no future profits to speak of, but the MFSP would still assign it a value of over \$18.7 billion based on its previous three years of positive profits, its remaining reserves, and a forward price factor of 62.5 percent. If the mine had \$5 billion in reclamation liabilities, it would never trigger any call for additional security before it was too late, because the value of the mine would still, per the MFSP, be more than three times the incurred liability and the mine would have decades of remaining reserves. If this hypothetical mine were to close, there would be no funds for remediation and reclamation, and taxpayers would be left holding the bag.

In reality, many other factors are involved in determining both actual asset values and MFSP valuations. Reserve evaluations might, if the continued price declines were expected, write down some of the reserves associated with the project, which would downgrade the value of the mine as estimated by the MFSP. Taxes, royalties and other policies change the financial outlook for oil sands production. Energy prices other than the price of oil matter, too. With these complexities

taken into account, however, the MFSP would still exacerbate a challenging financial situation and make bankruptcy more likely.

This counterintuitive aspect of the MFSP creates counterproductive and potentially catastrophic outcomes: if we follow the MFSP formulae, the program will collect no additional security until it is too late, so long as future production plans remained unchanged. By the time security deposits are required, a mine may already have very small or negative forward-looking value to its owners, and the premise of the MFSP is that — at this point — the Government can to request and receive billions in security deposits from an operation that is already insolvent in any normal sense of the word. As then-Alberta Environment Minister Jason Nixon explained in 2021 when the regulator hastily changed the MFSP formula in response to the COVID-19 crisis, “the math [of the MFSP] does not work if you have extremely low prices.”²² What this incident really showed, however, is that this aspect of the MFSP cannot be expected to work at all.

If price expectations were to decline significantly, as in the case of the Global Net-Zero scenario explored by the Canadian Energy Regulator, it is plausible that mine operators would decide to shorten production lives to avoid losses from a sustained period of low prices. That also creates problems for the MFSP, since it would accelerate the requirement for both an operating life deposit and, at least potentially, an asset safety factor deposit. The MFSP rules could trigger an immediate, multi-billion-dollar cash call once the reduced lifespan of the mine was confirmed, which would put the government in a position of demanding cash from an entity already suffering from low prices. The history of oil and gas liability management in Alberta makes it highly doubtful that government would be willing to engage in such actions.

Oil sands project valuations and profits are much more sensitive to declining prices than is the valuation assigned by the MFSP. This happens because the structure of the MFSP implicitly assumes that a decline in prices will translate linearly to a similar reduction in profits, which is not the case. For clarity, consider a smooth decline of oil prices from current levels of US\$80 per barrel for West Texas Intermediate crude to \$50 per barrel by 2030, with prices constant in real terms thereafter. In such a scenario, the minimum MFSP forward price ratio would be 84 percent, meaning that, in that year, the MFSP would value the mine’s future production at 84 percent of the trailing three years of profits times all remaining production. But, even on a three-year basis, that math is deeply flawed, since the mine’s profits drop much more quickly than prices because many costs do not drop with oil prices (for instance, the costs of labour and materials are not directly tied to oil prices). Using our model and allowing for all energy input costs to fall at the same rates as oil prices, in the same year in which the MFSP would see future prices at 84 percent of past prices, we estimate that future profits would be only 14 percent of trailing three-year average profits. With smoothly declining prices, again, the MFSP over values mines substantially.

In summary (with respect to asset valuation), the MFSP has three key challenges. First, it can value remaining resources at a level far above their value to the operator, in particular when prices are expected to decline or when costs are expected to increase. Second, the lagging indicators in the MFSP mean that calls for additional security come after, or in the midst of, a price crash. Finally, as the Auditor General’s Report into the MFSP highlighted, applying the forward price factor to the netback (profit) instead of applying it to only revenues and deducting operating costs underestimates the impact of future price declines on the valuation of a mine’s resource assets. The MFSP assumes that costs will drop coincidentally with oil prices, which need not be and has historically not been the case.

²² Government of Alberta, “Financial Deposits for Reclamation Work under Review,” May 2021: <https://www.alberta.ca/release.cfm?xID=7810596FE35ED-C572-CED2-1715FDFECBA79492>

All of this matters because it increases the probability that taxpayers will be left to shoulder the reclamation liability. If an operator becomes insolvent, the liabilities will fall on taxpayers and would not be covered even if the government could re-sell the asset to another operator. A new operator might be willing to buy the asset, but the value to any new operator is not equivalent to the MFSP valuation — it's not even necessarily close. A new operator would value the project based on the expected after-tax net present value of the asset net of any associated liabilities. If the new operator were expected to take on the reclamation liabilities, the amount they would be willing to pay for the asset would be reduced to reflect those liabilities. The government would, implicitly, cover the reclamation liabilities through a lower-priced sale of the asset. It is also possible that the mine would have no value to another operator at all, or that operators will only assume control of the mine on the condition they do not become responsible for mine closure, as occurred at Giant Mine (O'Reilly 2015, 353-4) — to date one of the most notorious cautionary tales in this context.

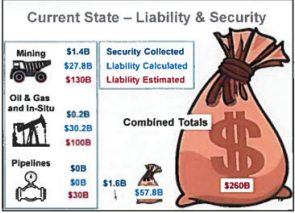
The MFSP is a mining engineer's plan, not a risk reduction regime. It will work well where the execution of an oil sands mine follows a prescribed, orderly path where 1) production and mine life are known with certainty; 2) prices follow a reasonably predictable path and do not decline rapidly or for long periods; 3) operators have the financial ability and willingness to fund a cash-call for a distressed asset when or if prices do fall; and 4) governments will be willing to require operators to fulfill their financial obligations in a time of distress. The MFSP provides insurance when it is least valuable and risks leaving the public with the bill in cases where insurance against stranded liabilities is sorely needed. Ultimately, this dynamic needs to be inverted, collecting and setting aside security when mines are profitable.

B. UNDERESTIMATING LIABILITIES

\$130 Billion Questions

Concerns that oil sands liabilities may be underestimated are long standing (Pembina Institute 2010, 32-7) but gained credibility in 2018 when various Canadian media organizations reported on a private presentation by the then vice president of closure and liability for the AER, Robert Wadsworth, who estimated liabilities associated with Alberta's entire oil and gas sector to be at least \$260 billion and liabilities related to oil sands mines to be \$130 billion — over four times the official estimate at the time (De Souza 2018).

Figure 3: Slides and Notes from the Wadsworth Presentation



Current State – Liability & Security

Sector	Security Collected	Liability Calculated	Liability Estimated
Mining	\$1.4B	\$27.8B	\$130B
Oil & Gas and In-Situ	\$0.2B	\$30.2B	\$100B
Pipelines	\$0B	\$0B	\$30B
Combined Totals	\$1.6B	\$57.8B	\$260B

- 2 Key Messages:
 - The money bags are to scale. There is a bag for security, it is just very hard to see.
 - Estimating liability values is very difficult with huge error bars. Even the Estimated Liability displayed is likely less than the actual cost.
- On the left side of the slide, 3 values are displayed for each sector:
 - Security Collected;
 - Liability Calculated; and
 - Liability Estimated.
- The Security Collected data is accurate.
- The Liability Calculated data is based on what is reported to the AER by Industry. It is calculated from LMR and MFSP.
- The Liability Estimated data has been calculated internally by SMEs based on best available data for certain pieces of the overall puzzle. This is a rough estimate that needs to be refined over time. This number is expected to grow as more data becomes available.
 - The Mining estimate takes an average \$/m3 for tailings closure and

adds that to the liability value, as this is not covered fully under MFSP. It does not assess other potentially under-reported liabilities in the sector. This is a very broad assessment that needs to be refined.

- The Oil & Gas estimate uses average Remediation and Reclamation costs for well sites and multiplies that across wells on the landscape. This is still considered to be a low value, as few heavily contaminated well sites have been reclaimed. Additionally, the Liability Estimated data does not include any adjustments for under-reported liabilities at large facilities such as gas plants and In-Situ central processing facilities.
- The Pipelines estimate uses NEB cost estimates as a proxy for our pipelines data.

On the right side of the slide, the combined totals of security and liability are displayed.

(AER, 2018)

At the time, the AER responded that this presentation provided “a snapshot in time of estimated total liability” and was based on a “worst-case scenario” (AER 2018), but it has never demonstrably refuted these figures — including during the 2022 MFSP review when they were dismissed as a “back of envelope” description.²³

Mr. Wadsworth’s speaking notes make clear that the estimate was calculated internally by subject matter experts (SMEs) “based on best available date for certain pieces of the puzzle.” A September 2019 document (“2019 Liability Narrative”) prepared by the AER and obtained by journalists in 2023 also contradicts the AER’s official response, suggesting also that the estimate was not calculated entirely internally:

Costs from discussions during a *multi-stakeholder working group*... were used as a proxy for liability. The working group was established to capture a diverse mix of opinions/views, and values used for liability [were] not agreed upon by all stakeholders.

- Worst-case estimate is \$130 billion and *may include tailings management plans (for treating FFT [Fine Fluid Tailings] and RTR)*, estimates inventory at the end of life, treatment of water, maintenance/replacement of pumping equipment, monitoring activities to move from RTR to RFR, etc.

(Anderson 2023, emphasis added)

²³ The Athabasca Region First Nations (ARFN) requested that AER and AEPA staff explain the discrepancy between official MFSP liability estimates (~\$34 billion) and the \$130 billion estimate. Initially, AEPA and AER staff simply refused to do so. Subsequently, in July 2022, AER and AEPA staff indicated that they had no further records and suggested that Mr. Wadsworth’s estimates represented a “broad, back of envelope description”: June 9, 2022 and July 28, 2022 Meeting Summary Notes prepared by AER/AEP staff, included as Appendix 2 in Powter, Cotton, and Daniels 2022.

Both Mr. Wadsworth's notes and the 2019 Liability Narrative suggest that the MFSP liability calculation may not currently capture tailings management (either as ARO Liability or as Other Liability), which is also consistent with concerns raised by the Pembina Institute in 2010. This conclusion is also supported by the independent experts hired by Alberta to assist First Nations during the 2022 MFSP review. In response to a request from the Athabasca Region First Nations for an itemization of which matters are and are not included within the MFSP liability calculation, they wrote that "production, treatment and placement of tailings in tailings ponds or the final landscape" and "transfer of tailings to pit lakes or dedicated tailings disposal areas" are not included within MFSP liability (Powter, Cotton, and Daniels 2022, Appendix 4, 144). In a subsequent email, however, staff from AEPA indicated that tailing production, treatment and placement (presumably as part of RTR requirements) are included either as MFSP liability or as operating costs within the asset calculation (specifically the trailing three-year average netback) (Powter, Cotton, and Daniels 2022, 7–8).

Most recently, the MFSP's estimated total liability jumped from \$33 billion in 2022 to \$47 billion in 2023. The AER provided little explanation for this almost 40 percent increase, saying only that it was due to a combination of inflation (currently at 4 percent) and changes in "mine reclamation plans and life of mine closure plans." (AER 2023). Suffice it to say, neither industry nor the Regulator have said or done anything in the past five years to relieve concerns that remediation and reclamation liabilities may be several times official estimates.

Uncertainty about Remediation and Reclamation Standards

Uncertainty about remediation and reclamation is not limited to tailings and includes defining "equivalent land capability" in any given instance. In 2010, based on industry applications and subsequent regulatory approvals, a Panel of the Royal Society of Canada suggested that "equivalent land capability in the oil sands implies post-mining landscape will be similar to undisturbed boreal forest" (Gosselin et al. 2010, 157). However, the panel noted considerable variation and controversy in the meaning of that term, as well as ongoing uncertainty with respect to its feasibility:

Even if reclaimed ecosystems to be developed after oil sands mining could be agreed upon, there is major scepticism whether reclamation to equivalent land capability could be achieved in a reasonable time period. This is particularly germane given the small amount of land certified to date in the oil sands. With so little certified reclaimed land to evaluate, judging the likelihood of reclamation to any interpretation of equivalent land capability can only be based on land that has been reclaimed but not certified and on reclamation research. (Gosselin et al. 2010, 157)

As further discussed below, the amount of certified reclaimed land today is the same as it was in 2010. While there has been more research into remediation and reclamation in the oil sands, prospects for success remain uncertain, especially with respect to wetland and aquatic reclamation. Relevant scholarship notes "a significant development across the field of restoration ecology," namely that "highly assertive disturbances such as mining can and often do cause irreversible effects to natural landscapes leading to the emergence of novel ecosystems," and "reclamation of highly disturbed postmining landscapes may not provide realistic opportunities for the development of 'historical' ecological processes and recovery" (Audet, Pinno, and Thiffault 2015, 365 and 369; see also R.E. Young et al. 2022, 25; Gerwig, Hawkes and Murphy 2023). An expert panel convened by the Council of Canadian Academies in 2015 (at the request of Natural Resources Canada) described oil sands tailings ponds in precisely such terms:

The environmental footprint of tailings stems from the need to construct and maintain large ponds that can store fluid tailings for several decades or more before they can be reclaimed. These tailings ponds, which are some of the largest tailings facilities in the world (U.S. Department of the Interior 2012), are both a legacy problem from past production and an essential part of current and new surface mining projects... The resulting environmental footprint from tailings is multifaceted and includes the large areas of land disturbed; seepage of process-affected water into groundwater; the quantity, quality and fate of process-affected water in the tailings pores; off-gassing of various chemical substances of concern (e.g., polycyclic aromatic compounds (PAHs), volatile organic compounds (VOCs) including benzene and methane); windblown fugitive dust from tailings sand beaches that contain chemicals of concern; risk of an accidental dam breach; and long-term reclamation of tailings ponds, which remains a significant technological, economic and environmental challenge.

(Council of Canadian Academies 2015, Executive Summary, xv)

In addition to questions as to *whether* the production, treatment and placement of tailings are included in the MFSP, there has been a lack of clarity about the *manner* in which tailings will be remediated and reclaimed. AER and AEPA policy, guidance and directives do not clearly indicate how the Alberta Contaminated Sites Policy Framework (CSPF) (Alberta Environment and Sustainable Resource Development 2014) and more specifically AER Manual O21: Contamination Management (AER 2021), apply to oil sands tailings. Manual 21 operationalizes Alberta's CSPF and requires operators to take remedial measures when a substance that may cause an adverse effect *is released into the environment*, following the guidance of the Tier 1 and Tier 2 soil and water guidelines, but there are no references to this guidance or the CSPF in either the *Tailings Management Framework* or Directive O85. Nor does discussion of them appear in operator submitted Tailings Management Plans.

During the 2022 MFSP Review, Alberta appears to have confirmed that if tailings deposits are considered RTR, then those tailings *do not* require further remediation:

Deposited tailings are not required to meet Alberta Tier 1 or 2 Soil and Groundwater Guidelines. *Tailings ponds or deposits are waste storage facilities, like landfills.* The tailings are not considered "soil" or "groundwater."

Directive 85 – Fluid Tailings Management for Oil Sands Mining Projects (D-85) outlines tailings management prior to reclamation. Under D-85, tailings must be processed with an accepted technology, placed in their final landscape position, and meet performance criteria to meet ready to reclaim (RTR) status.

Once the deposit has reached RTR status it would be capped, then following settlement, subsoil and topsoil would be placed and the area would be re-vegetated if the targeted end land use was upland or wetland. The new landform and vegetation would be monitored until the area could be reclamation certified.

Principles of the Alberta Soil and Groundwater Guidelines still exist in the oil sands reclamation certification process. *If contaminants were found in the overburden, a risk assessment would be required to obtain a reclamation certificate.* (Powter, Cotton, and Daniels 2022, 6, emphasis added)

In other words, Alberta policy considers future end-pit lakes to be waste storage facilities, so that tailings deposits in end-pit lakes are technically not releases into the environment, even though the AER has yet to approve water-capping of fine tailings as an effective mitigative technology. In its 2019 approval of Syncrude's Tailings Management Plan, the AER noted that while "Syncrude has identified

2023 as a date by which water capping of fluid tailings might be successfully demonstrated at Base Mine Lake, *there is significant uncertainty about whether the technology will be successfully demonstrated by this date*” (AER, Decision 2019 ABAER 006, para 831, emphasis added).

Recent peer-reviewed research reflects this uncertainty. For example, Kabwe et al. suggest that “oil sands operators have tended to assume the bottoms of end-pit lakes will be ‘self-sealing’ as fine tailings plug holes,” but “little research has been performed to evaluate this bottom seal assumption.” For a 10 km² EPL, Kabwe et al. estimate a seepage rate of 200 000 m³/year, suggesting that “the monitoring of their performance may have to continue for 100 years...” (Kabwe et al. 2019, 71 and 73),

There also remain uncertainties with respect to oil sands processed water (OSPW):

OSPW is a complex mixture of inorganic and organic compounds. It may contain, at varying concentrations, suspended solids, salts, organic compounds, acid extractable fraction compounds (AEF), total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), trace elements, BTEX components (benzene, toluene, ethyl benzene, and xylenes) and phenols...

OSPW has been reported to show toxicity to aquatic and other living organisms... The naphthenic acids (NAs), included in the AEF, have been recognized as a contributor to the acute toxicity found in OSPW... (Zubot, Benally, and Gamal El Din 2021)

Industry has recently reported some positive results with petroleum coke treatment, including no measurable acute toxicity, but non-lethal chronic effects remain, which are attributed to high salinity (Zubot, Benally, and Gamal El Din 2021) (see also Madison et al., 2020 on the use of titanium dioxide)).

A comprehensive assessment of the current status and state of knowledge of oil sands remediation and reclamation is beyond the scope of this paper, but the foregoing is sufficient to conclude that this challenge — and related liability estimates — remain uncertain, confounding liability estimates. As but one example, it is not at all clear whether and how operators currently factor in the potential for overburden and groundwater contamination in end-pit lakes and the additional sampling, monitoring, and remediation costs that would be required should that risk materialize.

Accounting and Financial Disclosure Rules Are Opaque and Ill-Suited

Scholars and organizations have noted that the accuracy of liability estimates is further undermined by problems with the rules for ARO accounting and financial disclosures. Michelle Cook notes that “the mining industry has a long history of underestimating reclamation costs and therefore reliance on self-reporting should be viewed with skepticism. There is long-standing evidence that corporate environmental disclosures are primarily ‘selective, self-laudatory and public-relations driven’” (Cook 2018, 185; Li and McConomy 1999, 288). A recent study of publicly listed small-cap oil and gas producers found that estimates “reported by companies on their balance sheet compared to actual liabilities vary from \$100 million to more than \$1 billion” (IEEFA 2022, 17). The AER is very aware of the problems with calculating ARO from their experience with the conventional oil and gas industry. In litigation involving the Orphan Well Association, for example, ARO estimates using the AER’s model and those of a third-party expert diverged up to 55 percent (\$78 million under the former, \$140 million under the latter).²⁴

²⁴ See *Orphan Well Association v. Trident Exploration Corp et al.*, file no. 1901-06244, Affidavit of Lars De Pauw, 6 June 2022 at para. 12-13. https://www.pwc.com/ca/en/car/trident/assets/trident-100_060822.pdf.

ARO calculations, which are not publicly disclosed, are replete with discretionary and subjective elements that can drastically affect estimates:

Companies can choose not to include many environmental liabilities under their ARO. For example, AROs currently exclude tailing lakes, assets of an indefinite life, and reclamation activities if the fair value cannot be determined. The ARO definition of a “liability” can be restrictive: i) “they embody a duty to others that entails yielding of economic benefits,” ii) there is “little or no discretion to avoid it,” and iii) the “event obligating the entity has already occurred.” ... Companies have discretion whether to incorporate planned development into their ARO figure. Furthermore, new legislation is only taken into account under AROs if it is “virtually certain to be enacted.”

(Cook 2018, 193)

The challenges of estimating liability costs are exacerbated by the prevalence of ambiguous standards like “equivalent land capability” and “RTR” (ready to reclaim): “Clear legislative definitions are essential because legislation lays out the scope of what is deemed to be included in reclamation costs. Corporations will only account for liabilities when the likelihood of the liability being incurred is reasonably determinable” (Cook 2018, 195). Simply put, accounting rules appear poorly suited where closure liabilities are as uncertain and indeterminable as they appear to be in the oil sands mining context.

Confidentiality vs. Public Disclosure

Bearing in mind all the uncertainties regarding oil sands remediation and reclamation, and the limitations of accounting and financial disclosure rules, the MFSP’s near total lack of transparency poses an insurmountable barrier to assessing the reliability of official MFSP liability estimates. The MFSP Guide states that contingencies “are built into cost estimates as part of good engineering and budgeting practice” (AER 2021, 18), but there is no way to assess the size of these contingencies in current MFSP liability estimates. As noted by Cook, there is “strong tension between corporate confidentiality and public disclosure in this area.”

From a business perspective, it is understandable that operators may wish to keep the breakdown of their reclamation liabilities secret. Reclamation is typically carried out by third parties who bid on these extremely lucrative reclamation contracts. However, there is a strong corresponding public interest in restoring the land as well as a high financial risk.” (Cook 2018, 185)

Where confidentiality and the public interest in disclosure collide, freedom of information legislation often privileges the public interest.²⁵ Arguably, the public interest in understanding the full extent of what a hundred-billion-dollar liability outweighs operator interests in confidentiality. Another option would be to require independent third-party verification of oil sands operators’ liability estimates. Such an approach was recently adopted for New Zealand’s offshore oil industry. New Zealand’s recently passed *Crown Minerals (Decommissioning and Other Matters) Amendment Act 2021*,²⁶ and planned regulations will require that an independent third party develop, or at least verify, liability estimates for offshore wells (Powter, Cotton, and Daniels 2022, Appendix 4, 147–153).

²⁵ See e.g., *Freedom of Information and Protection of Privacy Act*, RSA 2000, c F-25, s. 32 (Information must be disclosed if in the public interest despite any other provisions of the act.), *Access to Information Act* R.S.C. 1985, c. A-1, subs 20(6) (disclosure of confidential third-party information permitted when in public interest).

²⁶ 2021 No 53.

C. DELAYING REMEDIATION AND RECLAMATION

The ORD (Outstanding Reclamation Deposit), described in Part 3, is the part of the MFSP meant to address the problem of a corporation deferring remediation and reclamation obligations that are possible during the mine’s operating life. Unfortunately, an assessment of remediation and reclamation progress to date appears to validate the Auditor General’s concerns that the ORD disincentivizes ambitious reclamation planning.

In its report from over a decade ago, “Environmental and Health Impacts of Canada’s Oil Sands Industry,” an expert panel convened by the Royal Society of Canada noted “considerable concern that so little land has been certified as reclaimed since the Alberta oil sands were first developed. As of 2008, 60,234 hectares have been disturbed [but] to date a reclamation certificate has been applied for and issued for only 104 hectares” (Gosselin et al. 2010, 166, emphasis added).²⁷

Table 2 below shows that twelve years later (2020), disturbed area had grown to 73,859.20 hectares, total active footprint is now 105,541.60 hectares, while certified reclaimed land remains at 104 hectares (see also Figure 4).

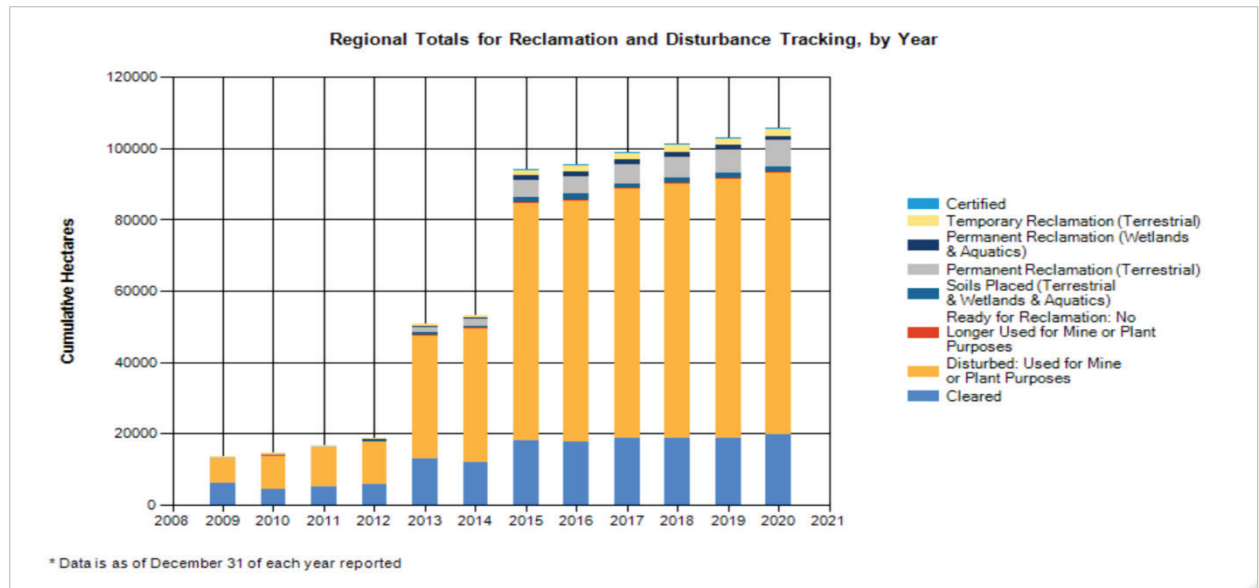
Table 2: Disturbance and Reclamation Progress in the Oil Sands (hectares) (2020)

Year	(Hectares)											
	EPEA Approved Footprint	Mine Site Footprint	Plant Site Footprint	Total Active Footprint	Cleared	Disturbed: Used for Mine or Plant Purposes	Ready for Reclamation: No Longer Used for Mine or Plant Purposes	Soils Placed (Terrestrial & Aquatics)	Permanent Reclamation (Terrestrial)	Permanent Reclamation (Wetlands & Aquatics)	Temporary Reclamation (Terrestrial)	Certified
2009	51,342.2	11,533.7	1,994.8	13,528.3	6,047.7	7,063.5	88.6	0.0	53.0	0.0	275.5	0.0
2010	51,342.2	12,383.6	2,042.5	14,426.1	4,478.8	9,519.7	31.2	116.5	56.9	0.0	223.0	0.0
2011	52,831.9	14,589.8	2,045.4	16,635.2	4,862.9	11,263.1	30.8	2.5	151.1	0.0	324.7	0.0
2012	52,832.0	16,531.0	2,107.0	18,636.0	5,609.0	12,401.0	31.0	31.0	163.0	82.0	318.3	0.0
2013	93,381.1	47,686.4	2,864.3	50,601.3	12,812.6	34,762.9	181.4	467.9	1,821.7	159.8	417.9	0.0
2014	93,381.1	50,297.0	2,945.0	53,291.0	11,871.0	37,808.0	86.0	457.0	2,163.0	160.0	483.0	0.0
2015	142,807.1	89,541.3	4,503.1	94,095.0	18,064.8	66,559.1	294.3	1,304.8	4,891.9	1,271.8	1,632.1	104.0
2016	142,807.1	90,112.8	5,188.6	95,301.5	17,712.5	67,590.1	376.5	1,450.2	5,063.3	1,275.5	1,896.3	104.0
2017	142,099.1	94,184.9	4,735.0	98,919.6	18,571.1	70,248.2	233.5	1,069.5	5,497.4	1,276.0	2,021.7	104.3
2018	143,714.9	96,661.8	4,498.1	101,160.0	18,713.2	71,449.5	212.4	1,346.8	5,928.1	1,291.6	2,119.5	104.3
2019	149,138.1	100,605.7	2,420.9	103,026.5	18,724.7	72,689.5	157.7	1,357.3	6,612.0	1,290.6	2,196.5	104.3
2020	159,961.9	103,120.7	2,420.9	105,541.6	19,572.4	73,859.2	140.9	1,127.8	7,438.9	1,291.2	2,110.5	104.3

(Alberta Environment and Protected Area, 2023)

²⁷ Readers should note that there appears to be a discrepancy between the Royal Society of Canada report, which states that 104 hectares were certified reclaimed in 2008, and AEP’s data, in Table 2, indicating that this 104 hectares was certified only in 2015.

Figure 4: Disturbance and Reclamation Progress in the Oil Sands (hectares) (2020)



(OSIP 2023)

The Royal Society of Canada panel noted the many reasons given for the lack of reclamation progress: “Oil sands mining takes place on large temporal and spatial scales. Mining landforms are constructed over decades, with progressive reclamation occurring as areas become available. Land that is mined and reclaimed may be needed for storing materials, future operations or access...” (Gosselin 2010, 168).

While there are operational and logistical considerations to account for, there is reason to doubt that they are entirely responsible for the glacial pace of reclamation. It must also be remembered that delayed reclamation carries its own risks, including continued pressure on various species — many of which are already endangered — and that reclamation may not be carried out at all (e.g., if an operator undergoes bankruptcy). At the very least, this is an issue that requires further exploration and substantiation.

It is also past time to reconsider the implementation of “disturbance caps” briefly mentioned by the Royal Society of Canada panel (Gosselin 2010, 168), e.g., an absolute limit on the amount of disturbance allowed over a given area, where progressive reclamation offsets new disturbance beyond the cap. Disturbance caps are a feature of the new agreement between the province of British Columbia and the Blueberry River First Nation (Blueberry) in the aftermath of that First Nation’s recent landmark legal victory, wherein the British Columbia Supreme Court declared that the terms of Treaty 8 have been unjustifiably infringed as a result of the cumulative impacts of resource development in Blueberry’s traditional territory (British Columbia 2023). The oil sands are also situated in Treaty 8.

D. OIL SANDS IN A CARBON CONSTRAINED WORLD

The MFSP was deliberately designed not to account for potential structural changes to oil markets, including changes resulting from domestic and global climate policies. This flaw was noted by the Auditor General as early as 2015:

If an abrupt financial and operational decline were to occur in the oil sands sector it would likely be difficult for an oil sands mine operator to provide this security even if the need for the security was identified through the program. *It is important to recognize that the department has accepted the risk of not protecting against a broad based and rapid structural decline in the oil sands sector*, having designed the program with the intent of capturing what they believe are a reasonable range of economic conditions. (Auditor General of Alberta 2015, emphasis added)

This design choice, and its implications, were confirmed during the 2022 MFSP Review. AEPA acknowledged that, in the event of a bankruptcy, current security would be insufficient to cover liabilities for any given operator, but that “[e]very effort would be made to find a new approval holder... to operate the mine site” (Powter, Cotton, and Daniels 2022, Appendix 2, 56). Pressed further to explain what would happen in the event that multiple operators went bankrupt or into financial distress due to declining demand for oil (e.g., due to global net-zero policies), AEPA stated that the MFSP “is designed to adjust to gradual declining demand and resulting price and reserve values. If there was a sudden, extreme and permanent drop in oil prices and reserve values, which caused multiple operators to go bankrupt, a policy and program response by government would be required” (Powter, Cotton, and Daniels 2022, Appendix 2, 56). At the risk of stating the obvious, at that point government’s available responses would be severely limited.

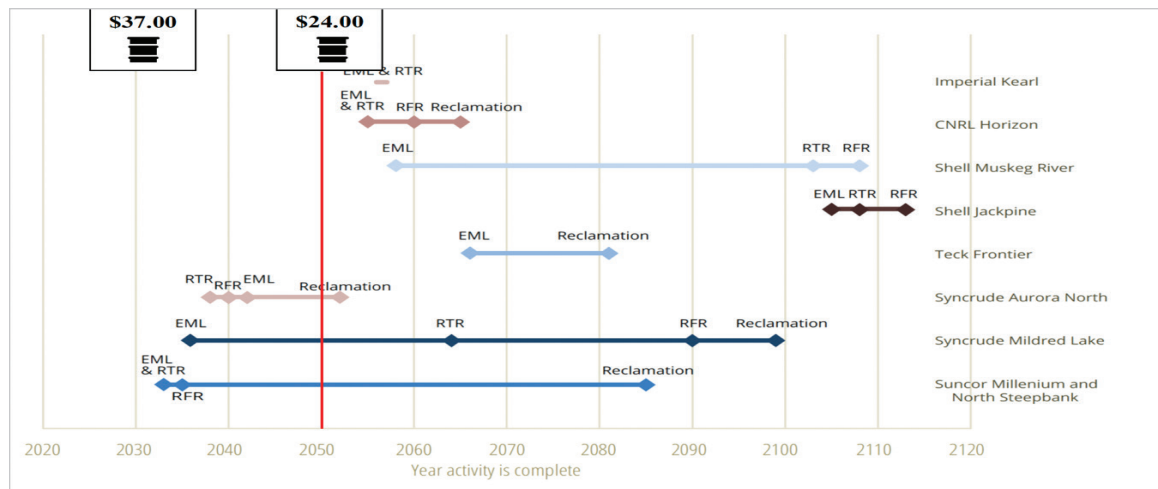
Setting aside whether such program design decisions would have been defensible in 2015, they clearly are not defensible in 2023, following the signing of the Paris Agreement (UNFCCC 2016) and the implementation of significant climate policies both in Canada and abroad. Domestically, in 2018 Parliament passed the *Greenhouse Gas Pollution Pricing Act*,²⁸ which imposes minimum national standards for greenhouse gas (GHG) pricing (currently at \$65/tonne), while the federal government has a growing series of regulatory measures in development, including a cap on GHG emissions from the oil and gas sector and a ban on the sale of internal combustion engine cars by 2035. The United States recently passed the *Inflation Reduction Act*,²⁹ which is expected to drive a 40 percent reduction in that country’s GHG emissions by 2030. There can be “no question that global action on climate change has and will continue to dramatically affect global oil markets and outlooks” (Leach 2022).

Ultimately, the question is whether and how the liability funding gap (Figure 1, above) will be closed, bearing in mind that remediation and reclamation are not really scheduled even to *begin* until after 2030, when global net zero commitments are broadly expected to start impacting global oil demand and prices (International Energy Agency 2021, 51). Moreover, the *majority* of remediation and reclamation activity is not expected to begin until 2050 (see Figure 5, below), the time at which an increasing number of countries have committed to achieving net-zero GHG emissions (Government of Canada 2023).

²⁸ SC 2018, c 12 [GGPPA].

²⁹ H.R. 5376.

Figure 5: Timelines for Terrestrial Tailings Reclamation and Oil Price (IEA NZP)³⁰



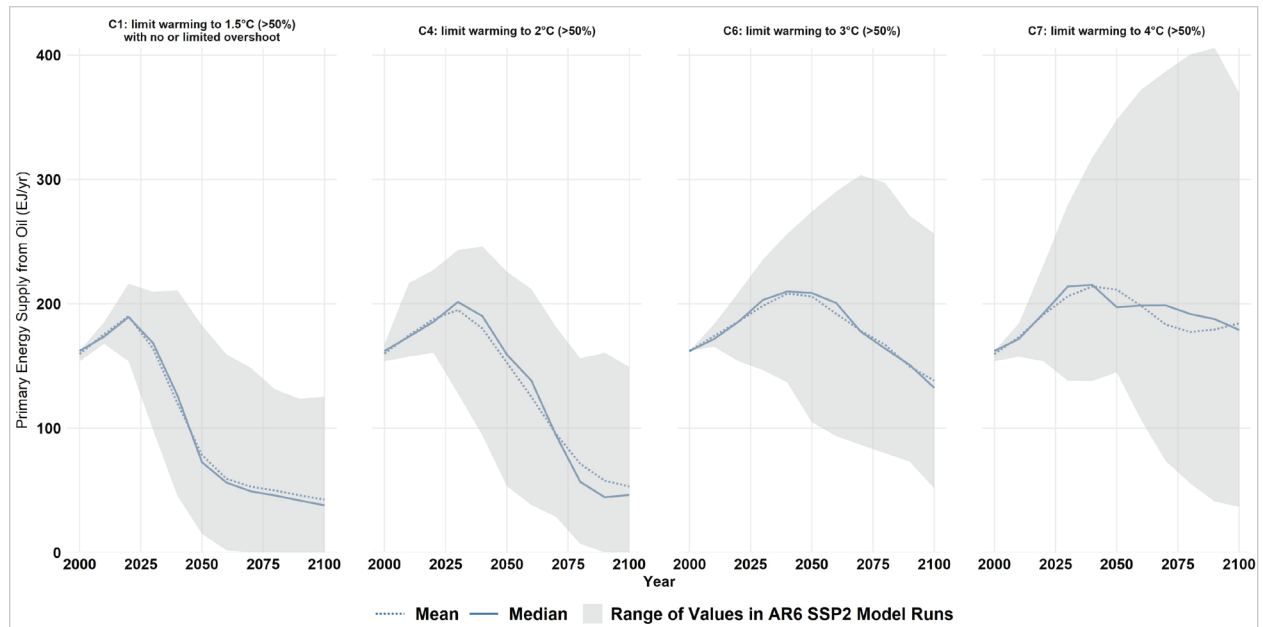
(McNeil and Lothian, 2017)

Already there are signs of a significant disruption underway. For example, the number of battery electric vehicles (BEV) sold worldwide is growing exponentially and may already have reached a tipping point (Lam and Mercure 2022). Transportation accounts for roughly 60 percent of all oil demand (International Energy Agency 2021).

While predicting global oil demand and prices is undoubtedly a difficult and uncertain exercise (see Figure 6 for a recent range of scenarios), refusing even to acknowledge and account for potential structural changes to oil markets in 2023 fundamentally undermines the MFSP regime.

³⁰ This figure is borrowed McNeill and Lothian 2017. We acknowledge that some of these timelines have likely changed in the intervening years.

Figure 6: Oil Demand Mean, Median and Ranges from Models Used to Inform the IPCC Sixth Assessment Report



(Byers et al. 2022)

To design an oil sands mine security program that protects the public in the era of energy transition, one prudent approach would be to start with the best possible objective predictions of the year that global responses to climate change are likely to undermine oil sands mines' profitability, and then ensure that full security is posted in advance of that time.

PART 5: CONCLUSION AND RECOMMENDATIONS

As of this writing, the AER estimates over \$45 billion in remediation and reclamation liabilities in the oil sands. This number may be a dramatic underestimate, with figures in leaked, official presentations suggesting as much as \$130 billion in liabilities covered by less than \$2 billion in security deposits. Alberta's MFSP allows companies to rely on potential future bitumen production revenues as collateral against current environmental damages, with the expectation that the province can collect additional security deposits to cover liabilities should the fortunes of the oil sands industry sour. Unfortunately, the fallout from the COVID-19 price crash revealed a key flaw in this system. As then-Environment-Minister Jason Nixon said at the time, the MFSP's math does not work when prices decline. What this incident showed is that Alberta's environmental liability system will not work in precisely those situations that Albertans will need it the most.

The MFSP regime is clearly not fit for purpose. It is no answer to say that oil sands operators have a legal obligation to remediate and reclaim pursuant to their EPEA permits and plans; corporate bankruptcy can significantly compromise and even entirely defeat the environmental obligations of corporations. The existence of the Orphan Well Association and ongoing litigation in Alberta over conventional oil and gas liabilities shows very clearly that companies can and do enter into financial distress, and that regulatory obligations can be left unfulfilled (Jones and Lewis 2018).

South of the border, the US coal industry presents a closely analogous and cautionary tale, where “[t]he past decade has seen more than fifty US coal companies fall into bankruptcy... as a drop in natural gas prices and a surge in renewables has inflicted a devastating blow on the fossil fuel’s future” (Murray 2020, IEEFA 2020). Significant underfunded liabilities lay in their wake: “Since 2012, four of the largest American coal producers have used Chapter 11 to discharge or otherwise avoid approximately... \$1.9 billion in environmental liabilities” (Macey and Salovaara 2019, 883). US coal companies used three key strategies. First, they neglected to fund their liabilities, and if pressured to fund them, threatened to enter bankruptcy. Second, they spun off subsidiaries to avoid liability. Third, they overvalued assets and undervalued liabilities to continue operating as long as possible without raising alarm (Macey and Salovaara 2019, 934–935). An effective system for ensuring remediation and reclamation would block these strategies. The MFSP does not.

The structural issues with MFSP are as significant as they are plain. On the asset side, the MFSP can overestimate asset values relative to real world valuations especially when prices are expected to decline or costs are expected to increase, and the security represented by those assets will not be there when that security is needed most. On the liability side, and taking into account the uncertainty of remediation and reclamation approaches coupled with the subjective and discretionary rules of ARO accounting, oil sands operator estimates are simply not trustworthy, and neither the Government of Alberta nor industry have done anything to restore trust in the wake of leaks from the regulator that total liability is many times the official estimate. The MFSP regime is also deliberately blinkered to potential structural changes in oil markets and prices caused by international and domestic climate change policies.

Fundamentally, the entire MFSP regime rests on an incredibly uncertain foundation: the unproven technology of remediation and reclamation of oil sands mines, including the use of hydrologically open end-pit lakes as waste disposal areas. Consequently, our primary recommendation is for Alberta to convene an independent and transparent blue-ribbon panel, composed of experts in science, accounting, law and economics, with opportunities for public participation, to inquire into and make recommendations regarding the remediation and reclamation challenges facing oil sands mines and a suitable replacement for the MFSP. This work should build upon prior assessments by the Royal Society of Canada (2010) and the Council of Canadian Academies (2015) discussed throughout this report. No matter the specific structure that is adopted for security, the assurance of independent, transparent assessment of the degree to which potential liabilities are fully-funded, perhaps in the style of pension fund reporting, is essential. In the interim, changes to MFSP asset calculations, the timing of security deposits, and the process for estimating liability — especially in terms of transparency and verifiability — are three reforms that could be instituted immediately and that would go a considerable way towards rectifying the problems with the MFSP.

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