

**Alberta's Underfunded Environmental Liabilities
Problem:
Inactive Wells and Oil Sands Tailings**

Or:

**The Value of Alberta:
The Other Side of the Ledger**



**UNIVERSITY OF
CALGARY**

**Martin Olszynski
University of Calgary Faculty of Law
18 January 2020**

- The Inactive and Orphan O&G Well Problem
 - What is it?
 - How big is it?
 - How did we get here?
 - Where do we go from here?

- The Oil Sands Tailings Pond Problem
 - What is it?
 - How big is it?
 - How did we get here?
 - Where do we go from here?

- Q & A Period

- Environmental liabilities related to oil and gas activity in Alberta are estimated to be anywhere between \$60 - \$230 billion dollars;
- Oil and gas companies are **legally responsible** for these liabilities but have been required to set aside only a **fraction of the anticipated costs**;
- Consequently, there is a real risk that a significant portion of these liabilities will be transferred to the public purse;
- Albertans need and deserve a **transparent assessment and accounting** of the problem and a **realistic plan** for addressing it;

The Inactive and Orphan Well Problem

INVESTIGATION

Hustle in the oil patch: Inside a looming financial and environmental crisis

Just a few years after the boom, energy companies are shedding distressed wells for next to nothing. It's a brisk trade in junk assets — and it's going virtually unchecked by regulators. Who will pay to clean it up?

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INVESTIGATIONS

Cleaning up Alberta's oilpatch could cost \$260 billion, internal documents warn

BY MIKE DE SOUZA, NATIONAL OBSERVER, CAROLYN JARVIS, GLOBAL NEWS, EMMA MCINTOSH AND DAVID BRUSER, TORONTO STAR
SPECIAL TO GLOBAL NEWS
Posted November 1, 2018 2:00 am
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Global NEWS

Stunning internal documents from Alberta's Energy Regulator estimate the cost to clean up Alberta's oil and gas industry

CALGARY HERALD

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Varcoe: Alberta seeks Ottawa's help – and money – in cleaning up abandoned wells

CHRIS VARCOE, CALGARY HERALD Updated: November 26, 2019



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September 28, 2017

All's Well that Ends Well: Addressing End-of-Life Liabilities for Oil and Gas Wells

RESEARCH

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Alberta ranchers, farmers furious over oil and gas companies' failure to clean up their geriatric wells

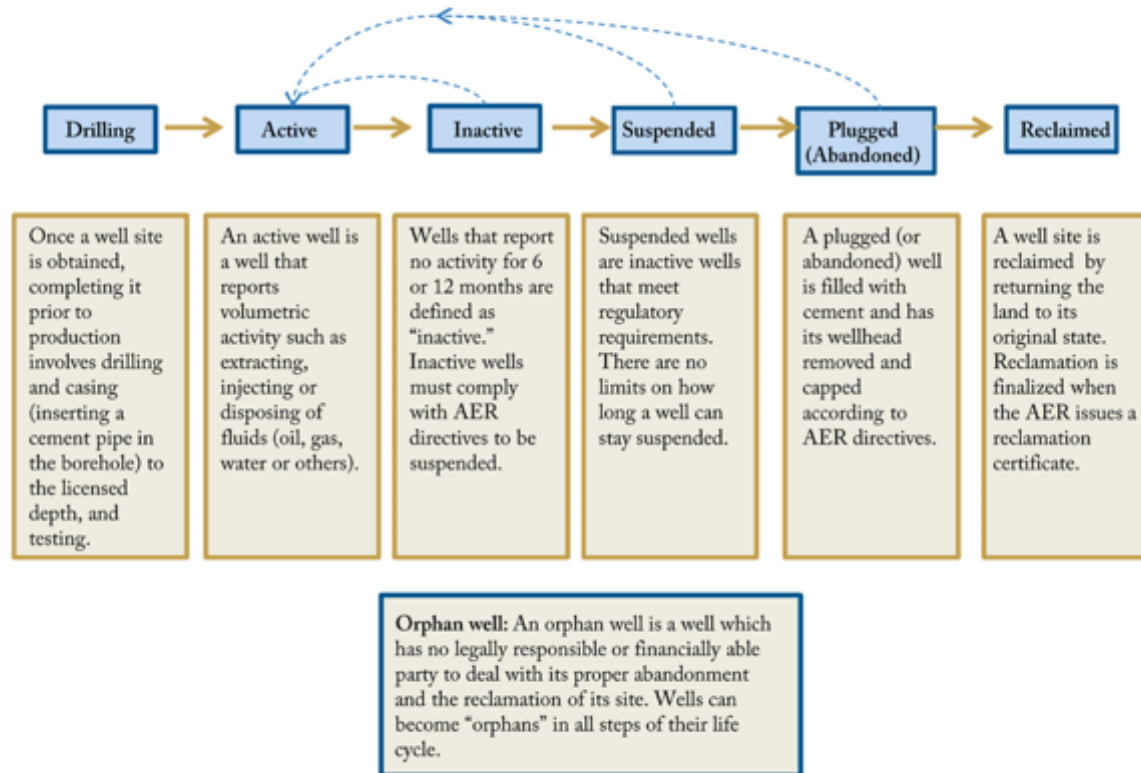
And they're concerned an extra 93,805 wells could become orphaned given Alberta's economic outlook, completely overwhelming clean-up efforts



- **# Wells of oil & gas wells in AB: ~ 450,000**
- **# Inactive wells** (*i.e.*, have not produced oil or gas, injected fluids, or disposed of waste for 6 or 12 months, depending on the type of well): estimates ~ **90,000**
- **Suspended well:** Company must notify AER and perform a series of procedures to ensure no risk to the public and environment per [Directive 013: Suspension Requirements for Wells](#). Wells can remain suspended for **an indefinite period**.
- **Abandoned well:** Permanently closed per [Directive 020: Well Abandonment](#). Reclamation and remediation of surrounding land may follow (total # of inactive and not yet remediated wells ~ 145,000 per CD Howe).
- **Orphan well:** can be in any state: inactive, suspended, abandoned, or even producing. A well is considered orphaned when a licensee becomes defunct without having properly abandoned the well and reclaimed the well site.

What is the Problem cont'd

Figure 1: Simplified Life Cycle and Taxonomy of Alberta Wells



C.D. Howe, "All's Well that Ends Well: Addressing End-of-Life Liabilities for Oil and Gas Wells:

<https://www.cdhowe.org/public-policy-research/all%E2%80%99s-well-ends-well-addressing-end-life-liabilities-oil-and-gas-wells>

What is the Problem cont'd

The reporting points to a looming financial and environmental crisis: Of the 610,696 oil and gas wells in those three provinces, some 20 per cent are sitting inactive, according to The Globe's data. Almost two-thirds of these 122,456 idle wells have been shut off for more than five years. And a growing proportion are owned by companies that can least afford to clean them up – a process known as reclamation – when their commercial life ends. Costs have already overwhelmed dedicated cleanup funds set up by the industry, put a strain on regulators and prompted Alberta's NDP government to step in with hundreds of millions of dollars in loans.

Jeff Jones, Jeff Lewis, "Hustle in the Oil Patch" *Globe and Mail*:

<https://www.theglobeandmail.com/canada/article-hustle-in-the-oil-patch-inside-a-looming-financial-and-environmental/>

How Big is the Problem?

What could well cleanup costs be in Western Canada?

In billions of dollars

Low-end estimate ● High-end estimate

Orphan wells only

Up to \$0.6-billion



Orphan wells plus wells owned by high-liability companies

\$1.8 \$4.1



Orphan wells plus wells owned by medium- and high-liability companies

\$13.2

\$26.9



ALBERTA

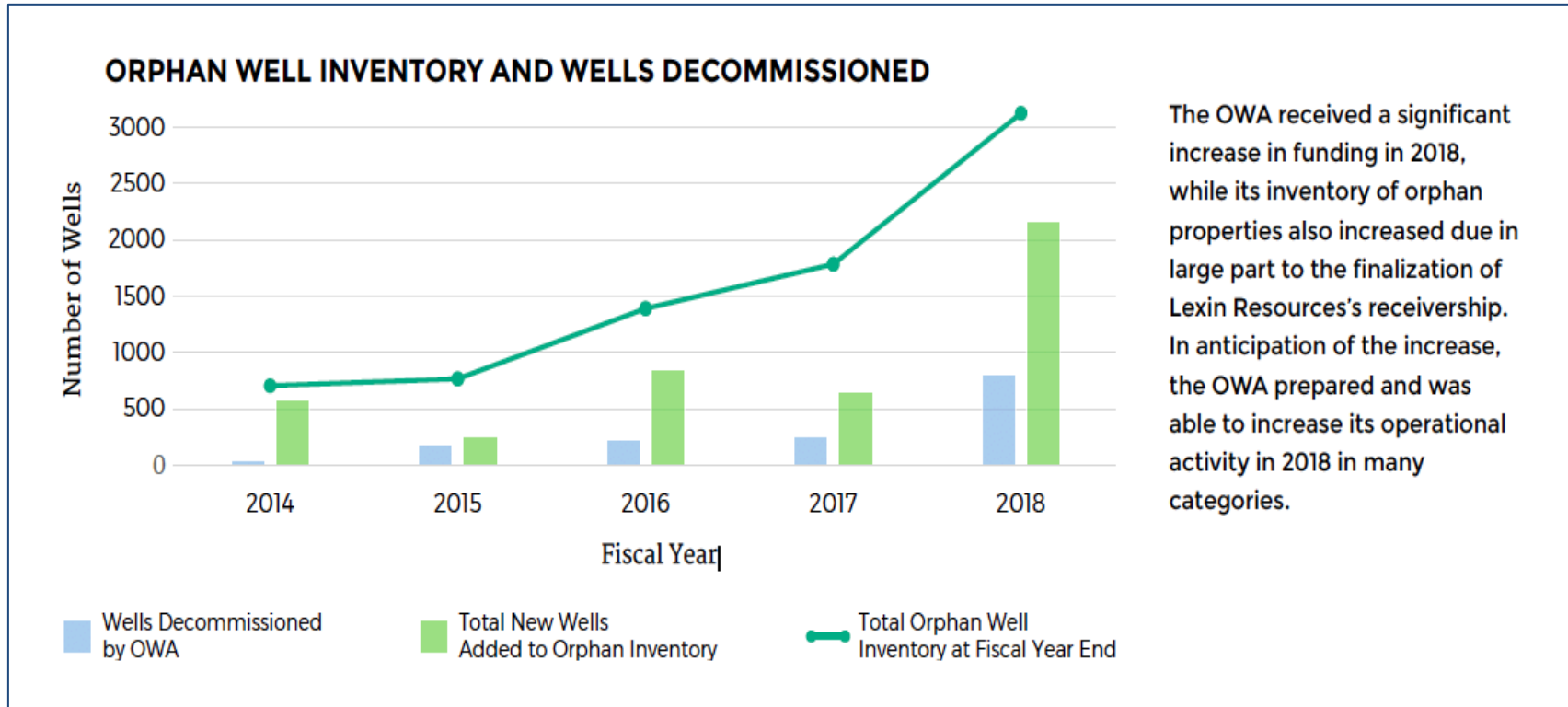
SASK. B.C.

Jeff Jones, Jeff Lewis,
“Hustle in the Oil
Patch” *Globe and Mail*:
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Of the roughly 450,000 wells registered in the province, approximately 155,000 are no longer producing but not yet fully remediated. These wells impose potential risks and costs not borne by those who benefited during the productive phase. The authors use a financial stress test for this potential exposure based on various ranges of future bankruptcy rates and well cleanup costs. Their estimate for non-oil-sands wells ranges from \$338 million (including all firms whose asset value of their wells is less than their expected liabilities) to \$8.6 billion (when including wells from firms with asset values just greater than their liabilities.)

Dachis,
Schaffer, “All’s
Well that Ends
Well:
Addressing
End-of-Life
Liabilities for Oil
and Gas
Wells” (C.D.
Howe)

How Big is the Problem?



- At \$60K/well (avg. decommissioning & reclamation (2019)) = \$191 Million
- OWA collected \$45 million in 2018, posted operating deficit of \$54 million
- Previous AB gov't loaned \$235 million, plus \$30 million from fed for interest

How Did We Get Here?



How Did We Get Here?

- Insufficient regulatory requirements?
 - AER's Liability Management Regime under [Oil and Gas Conservation Rules](#), Alta Reg 151/1971
 - Specified ratio of assets to liabilities, below which licensee must post security
 - Was 1, raised to 2, but also based on numerous assumptions that are problematic (C.D. Howe)
 - Poorly enforced (Jones and Lewis, *Globe and Mail*);
 - See *contra* Texas → stronger bond requirements
 - No time limits on abandonment?
- Other factors?
 - Corporate Structure of O&G industry
 - Limited liability encourages investment but does not incentivize abandonment and reclamation
 - Orphan Well Levy
 - Insufficient
 - Current (since 2014) low oil prices?

Inactive Wells in Alberta – How Did We Get Here?

The number of inactive wells in Alberta has more than doubled over the last 20 years (figure 4). The AER determined that the large inventory of inactive wells in the province limits alternative land use due to a lack of abandonment and reclamation. Because the wells are no longer producing, resource recovery is not being optimized and no royalties are being generated. The noncompliant inactive wells could also potentially lead to unknown wellbore integrity issues. Even noncompliant low- and medium-risk wells have the potential to cause the release of energy products such as oil or gas. The IWCP was created to protect the public and environment by ensuring that the backlog of noncompliant inactive wells in the province complies with AER suspension requirements by April 1, 2020.

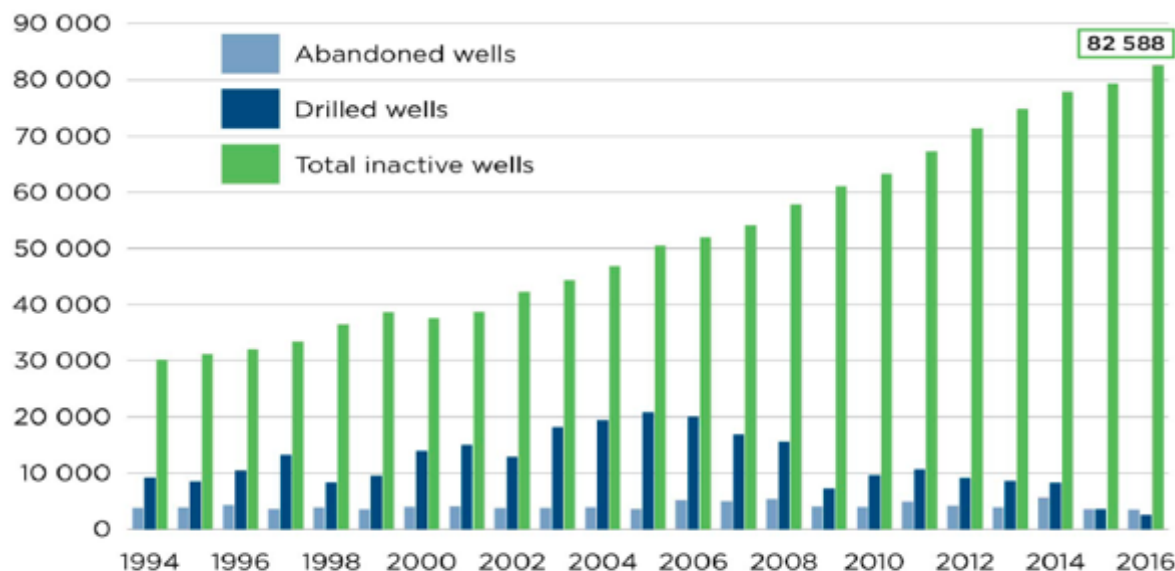


Figure 4—Alberta's inactive wells: 1994–2016

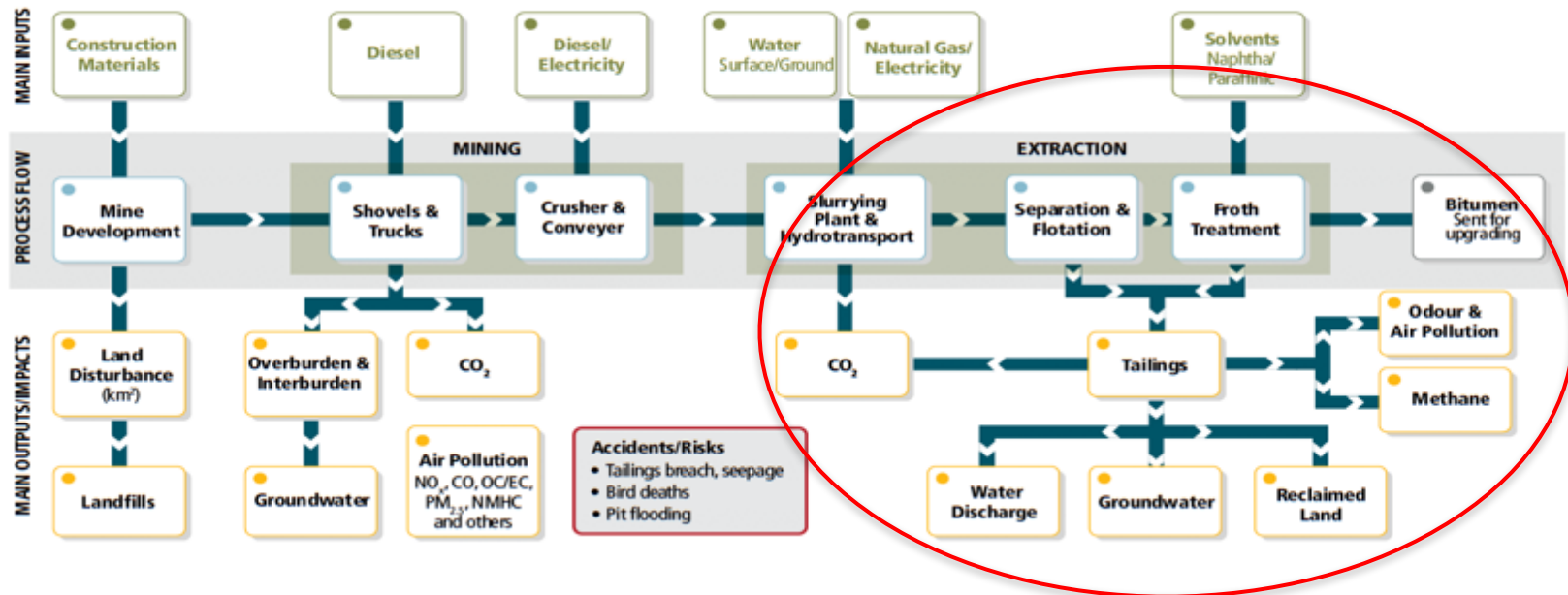
Where Do We Go From Here?

- Industry favors area-based closure (ABC) approach
 - Enables efficiencies
- Stricter bonding requirements?
- Time limits on suspended wells?
- Increase orphan well levy?
- ??

The Oil Sands Tailings Pond Problem



What is the Problem



- 176 km² or ~ 390,000 Olympic-sized swimming pools or 1.4 trillion L:
 - "...a number of organic and inorganic compounds resulting from the extraction process including naphthenic acids, phthalates, asphaltenes, benzene, phenols, cresols, humic and fulvic acids, and toluene... The most significant constituents of concern are the naphthenic acids and the salinity (CEMA, 2014)" CCA Panel Report (2015)

How Big is the Problem?

Figure 1. Fluid tailing ponds volume growth since 1968

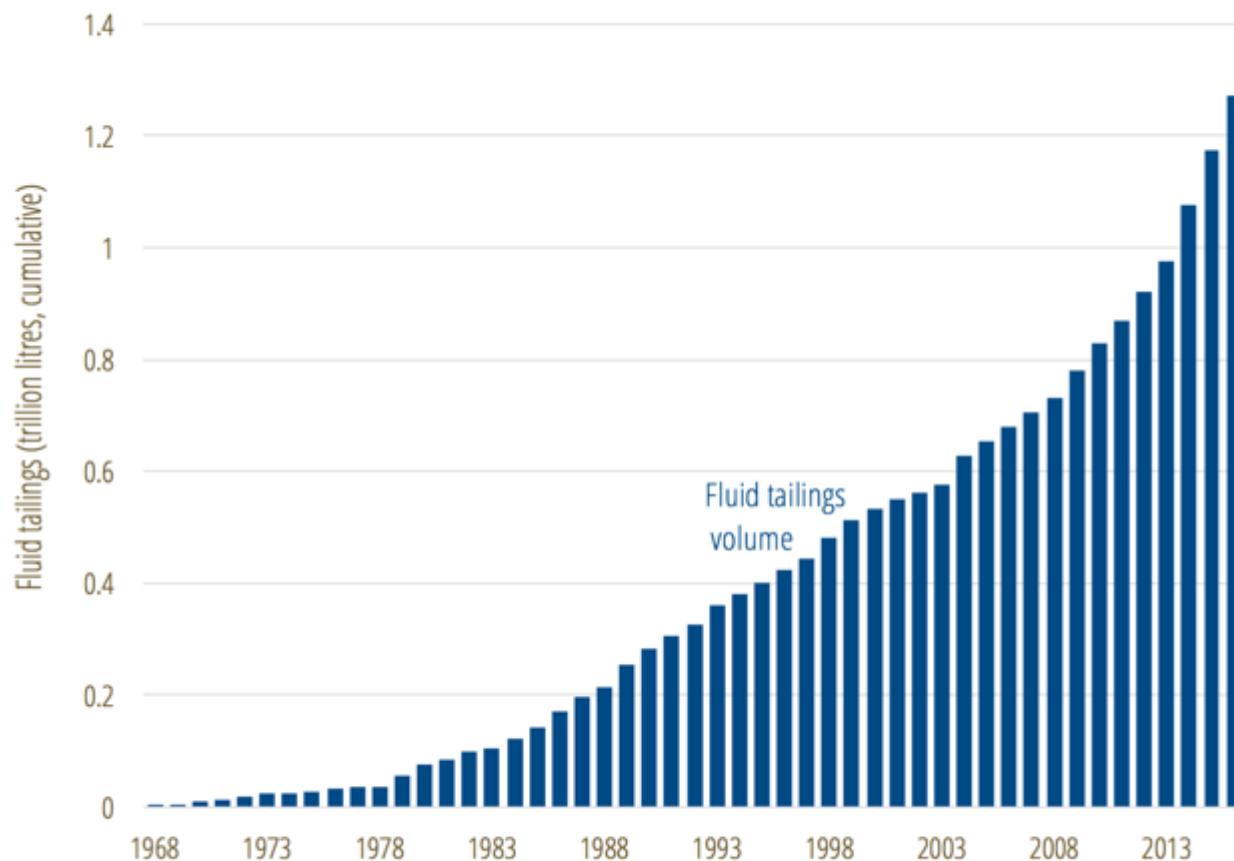


Figure 1. Fluid tailing ponds volume growth since 1968

Source: Pembina: <https://www.pembina.org/blog/tailings-ponds-worst-yet-come>

Edmonton · Exclusive

Kenney government praises Pembina Institute, alleged energy industry enemy, in court documents



Pembina Institute cited as 'well-respected, non-partisan environmental policy think tank'

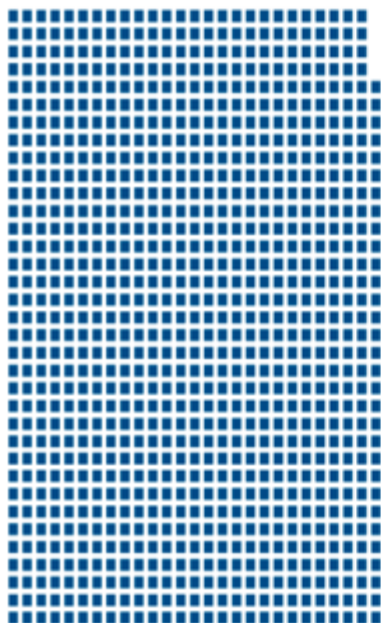
[Jennie Russell, Charles Rusnell](#) · CBC News ·

Posted: Dec 17, 2019 6:00 AM MT | Last Updated: December 17, 2019



Figure 1. Comparison of the area permanently reclaimed and the active (disturbed) area of oilsand mines

One square represents 100 hectares (ha) of land



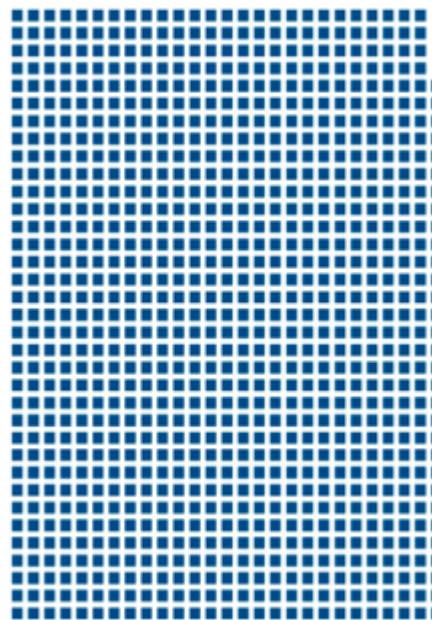
Active area of the land mined
for oilsands (94,095 ha)



Area of the land mined for oilsands
reclaimed by the industry (6,164 ha)

Figure 2. Comparison of the area certified as reclaimed and returned to the province and the active (disturbed) area of oilsand mines

One square represents 100 hectares (ha) of land



Active area of the land mined
for oilsands (94,095 ha)



Area of the land mined for oilsands
certified as reclaimed and returned
to the province (104 ha)

How Did We Get Here?



- A regulatory system, including EA, that has punted the identification of effective mitigation measures far into the future;
 - When oil sands projects have been assessed, review panels have accepted vague assurances that proponents will apply “adaptive management” until effective mitigation is found
- As with oil and gas wells, insufficient financial incentives to innovate as a result of Mine Financial Security Program (MFSP) design

How Did We Get Here?

Project	EIS or Joint Review Panel Report
1. Fort Hills (True North) (2001 application)	<p>Page 7-79: Project Effect at Post-Closure (EIS)</p> <p>The project reclamation water bodies are likely to support viable aquatic ecosystems. <u>However, there are several issues with regard to end pit lakes and reclamation wetlands that require further evaluation.</u> It is, however, recognized the EPLs can be designed and operated to achieve various end uses and the industry is committed to realizing this goal through <u>adaptive management</u>.</p>
2. Shell Jackpine (2004)	<p>In areas such as ... EPLs and the compensation lake, the panel recognizes that a number of uncertainties exist. However, the panel finds that with current regulatory processes and the efforts of regulators and CEMA to develop leading edge environmental objectives and management systems, <u>the uncertainties are manageable and acceptable.</u> The panel does not believe that decisions regarding the project should be deferred. The panel believes that regulatory requirements, <u>adaptive management</u> processes, monitoring and mitigations measures, and implementation of the panels recommendations provide sufficient protection for the environment.</p>
3. Imperial Oil's Kear Oil Sands Project (2007 application)	<p>7 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT (JRP)</p> <p>Imperial Oil identified mitigation options and contingencies that could be applied to the EPLs to ensure that by the time discharges took place, the water would be of acceptable quality. Imperial Oil stated that these might include water treatment and that the pit lake system would be part of a remediation <u>adaptive management</u> program. Imperial Oil stated that it would demonstrate that it was meeting objectives in test pits. It maintained that adequate time existed to progressively apply and incorporate key findings from ongoing research and modelling to resolve uncertainties before and after the first pit lakes were completed.</p>

How Did We Get Here?

<https://www.syncrude.ca/environment/tailings-management/tailings-reclamation/>



Base Mine Lake:

- *Only* current (since 2014) commercial scale attempt to demonstrate viability of water capping

SYNCRUDE SUSTAINABILITY REPORT 2017-18

Monitoring indicates that shoreline erosion and stability is occurring as expected. FFT consolidation is also as expected, with the water cap around 11 metres in depth as of the end of 2017. In addition, oxygen saturation in the water is increasing, water quality is improving, and naphthenic acids are decreasing. Skimming and shoreline cleaning are underway to address the presence of residual hydrocarbons. Waterfowl deterrents continue to be in place throughout this demonstration period.

“It’s a promising approach. It’s far from proven,” he said. “It might (end up becoming) a safe way to store tailings, but the jury is out on whether you’re going to end up with a nice self-sustaining system.”

Report of the Joint Review Panel

Teck Resources Limited Frontier Oil Sands Mine Project

Fort McMurray Area

July 25, 2019

[304] Teck indicated that should the project be approved, there will be opportunities to confirm and optimize design and planning assumptions for cake deposits before large-scale in-pit cake deposition in 2037. Teck also stated that, based on stakeholder input and in order to achieve progressive reclamation, it will not place tailings in the end-pit lakes. Teck also confirmed tailings will not be deposited in the north pit watershed.

[305] Notwithstanding its commitment to not placing tailings in end-pit lakes, Teck indicated that it may wish to re-evaluate its position on the placement of tailings in end-pit lakes, water capping of tailings, in the future should this technology be approved by the Government of Alberta and offer opportunities to improve project performance. However, Teck stated that it would not consider that approach until having discussions with indigenous communities, and it would be subject to receiving the necessary regulatory approvals.

Analysis and Findings

[306] The panel finds that Teck's proposed tailings management plan is aligned with the objectives of the *TMF*. The panel accepts Teck's proposed use of centrifuge technology to treat fluid tailings. The panel also accepts Teck's commitments to not place tailings in the end-pit lakes or the watershed containing the north pit and will include these as conditions in the AER approvals.²⁵ Should Teck want to place tailings in end-pit lakes in the future, it will need to apply for amendment to the project's approvals. The

- **Directive 074: Tailings Performance Criteria & Requirements for Oil Sands Mining Schemes**
 - Introduced in 2008, suspended in 2015 and replaced by Directive 085 due to compliance difficulties;
 - Prohibited long term storage of FFT [Fine Fluid Tailings] and required operators to reclaim fines as they progress the mine plan. Required capture of all new FFT within 1 year of deposition and fully reclaim the area in 5 years.

- **Directive 085: Fluid Tailings Management for Oil Sands Mining Projects**
 - Developed pursuant to the Lower Athabasca Regional Plan
 - Requires operators to submit Tailings Management Plans (TMPs)
 - Tailings must be “ready to be reclaimed” w/in 10 years of mine closure
 - AER has begun to require alternative measures should water capping prove unsuccessful (e.g. Syncrude approval for MLX);

Alberta Energy Regulator

Decision 2019 ABAER 006: Syncrude Canada Ltd. Mildred Lake Extension Project and Mildred Lake Tailings Management Plan

Base Mine Lake

[831] Base Mine Lake is a previously approved demonstration lake and should continue as a demonstration. We recognize that extensive research on water-capped tailings continues and Alberta will likely be developing direction and performance criteria for water-capped pit lakes. For Base Mine Lake, Syncrude is required to meet future direction and performance criteria for water-capped pit lakes.

Although 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.

[832] By September 30, 2020, Syncrude is required to provide a conceptual alternative technology plan that will demonstrate the treatment of 173.7 Mm^3 of fluid tailings currently placed in Base Mine Lake to satisfy the requirement set out in section 4.6 of *Directive 085* and if Base Mine Lake demonstration does not prove viable.⁵⁵

How Did We Get Here?

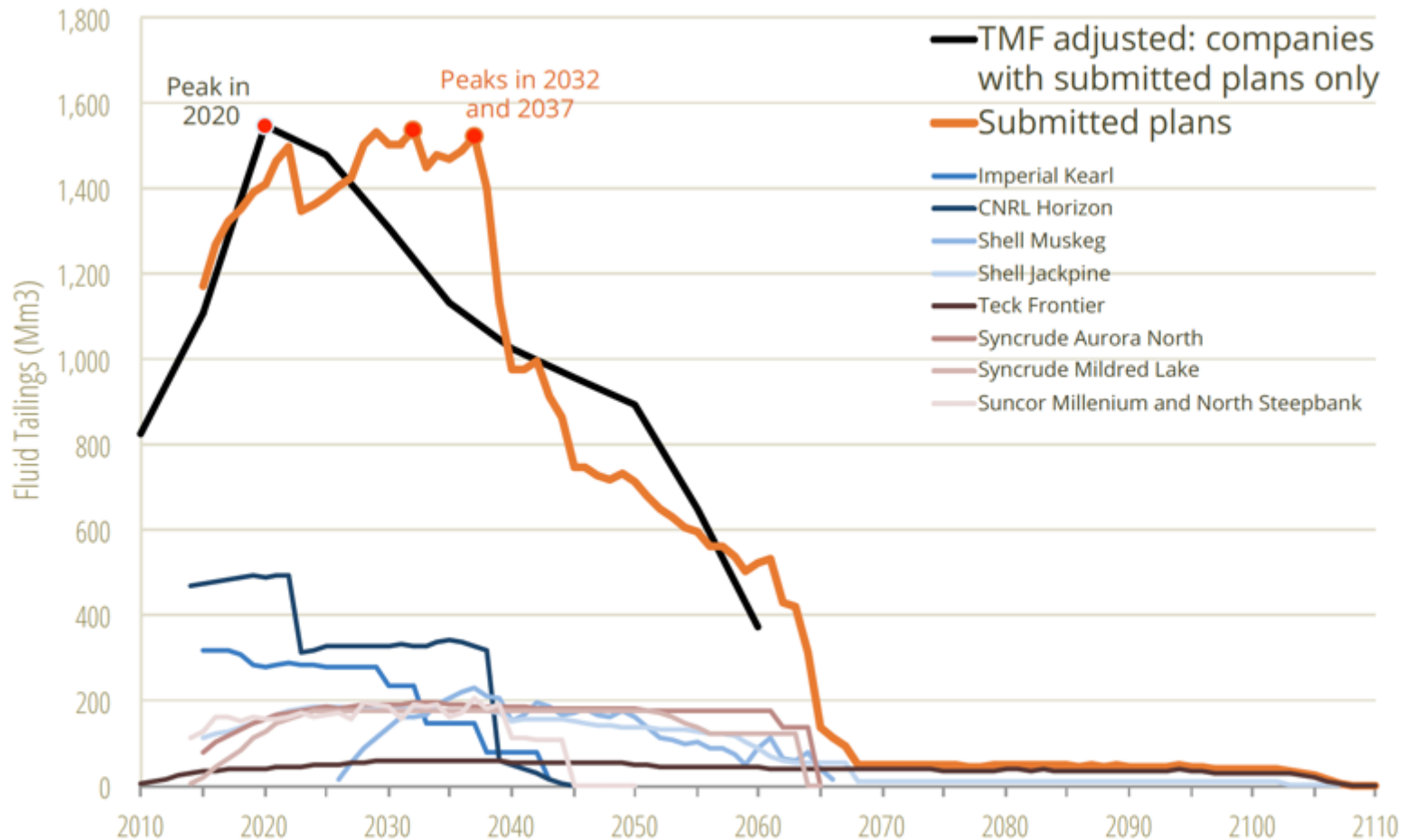
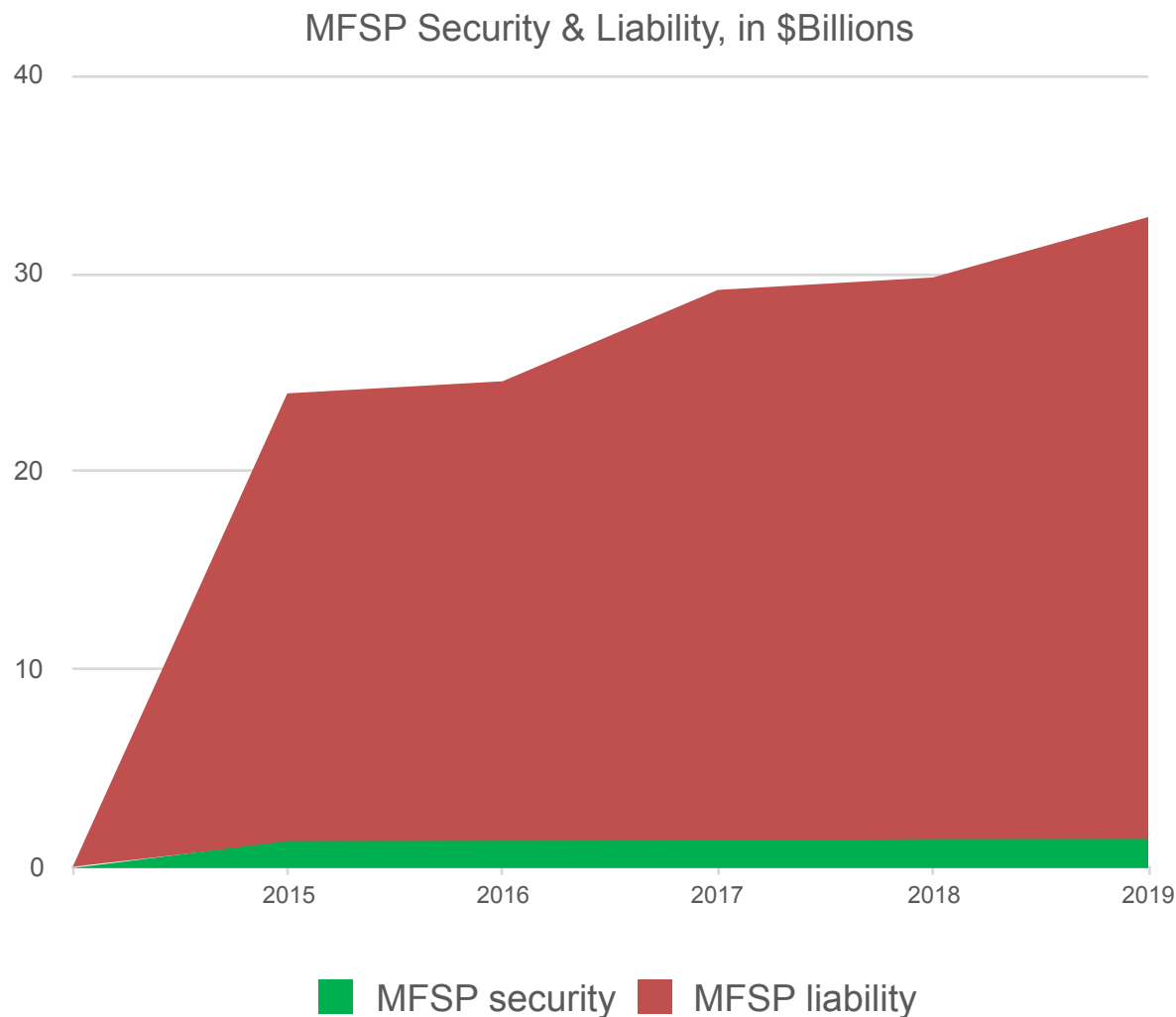


Figure 2. Analysis of cumulative fluid tailings volumes

How Did We Get Here?



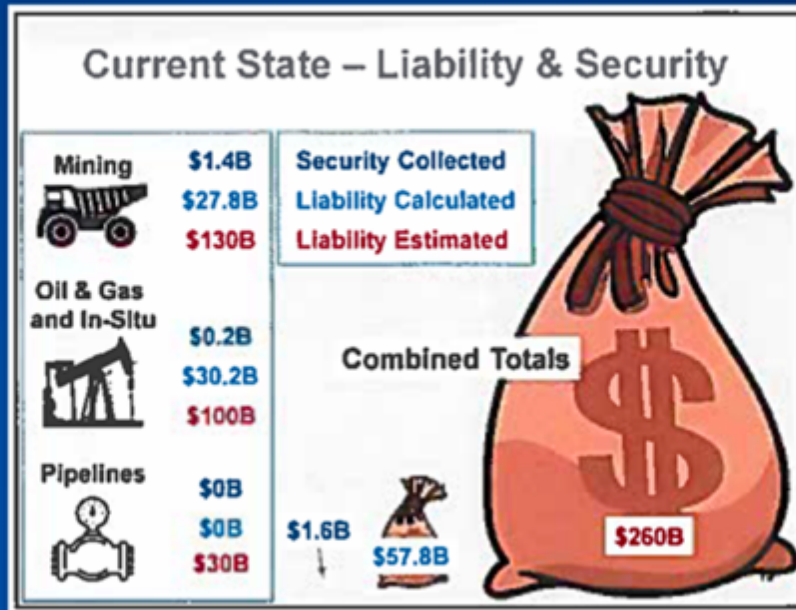
- MFSP requires only “base security deposit” assuming asset to liability ratio > 3.0
- “Operating life deposit” required when mine enters remaining 15 years
- Auditor General’s 2015 Report: “In the event that a mine operator cannot fulfill its reclamation obligations, and no other private operator assumes the liability, the province may have to pay a potentially substantial cost for this work...”

How Did We Get Here?

Table 6: Design features of Alberta's financial-assurance regime for mining and their implications for policy goals

Financial-assurance regime feature	 Deterrence	 Compensation	 Economic activity
The MFSP (under the Operating Life Deposit program) asks for full financial assurance against reclamation costs only as a mine nears the end of its life. Compared to up-front assurance requirements, this creates a lighter financial burden on firms during mines' early and mid-life. However, it also increases the public's exposure to potential social costs in the interim.	Negative	Negative	Positive
The MFSP (under the Base Security Deposit program) requires a set amount of financial assurance based on project type. Projects that present greater environmental risks are not required to submit additional assurance.	Negative	Negative	Positive
The MFSP (under the Asset Factor Safety Deposit program) aims to differentiate firms' financial-assurance requirements based on their estimated financial risk — more financially risky firms face more stringent financial-assurance requirements.	Positive	Positive	Negative
Annual reports that firms submit under the Asset Factor Safety Deposit program detailing their asset and liability estimates do not require supporting documentation. In addition, the methodologies that the program uses allow firms to include both proven <i>and</i> probable reserves in their assets, which may overstate their financial health.	Negative	Negative	Positive
Technological uncertainty in oil-sands remediation is not reflected in the MFSP's financial-assurance requirements. The remediation technique of "water capping" is still unproven at scale. ¹⁶ If water capping is not effective, then other, more costly approaches may be required. However, financial assurance is calculated based on the assumption that water capping will prove a successful reclamation method at scale.	Negative	Negative	Positive
The regime faces challenges around the sufficiency of monitoring, closure plan updating, enforcement, and overall transparency (AGA, 2015).	Negative	Negative	Positive
Financial assurance does not cover potential disasters (e.g., a tailings spill).	Negative	Negative	Positive

Alberta Oil and Gas Industry Liabilities



Source: Alberta Energy Regulator: "Liability Challenges Presentation", Robert Wadsworth, Vice President Closure & Liability, Feb 28, 2018

Schneider, the accounting professor, said the liabilities have the potential to affect Alberta's balance sheet and its credit rating. "There's no way industry could fund that right now," he said in an interview. "It's a matter of when are we going to deal with it. Are we going to deal with it now? Are we going to deal with it in 50 years or 100 years? What kind of legacy is going to be left?"

<https://www.thestar.com/news/investigations/2018/11/01/what-would-it-cost-to-clean-up-albertas-oilpatch-260-billion-a-top-official-warns.html>

Where Do We Go From Here?

Figure 3.2 ▶ Global oil demand and crude oil price by scenario

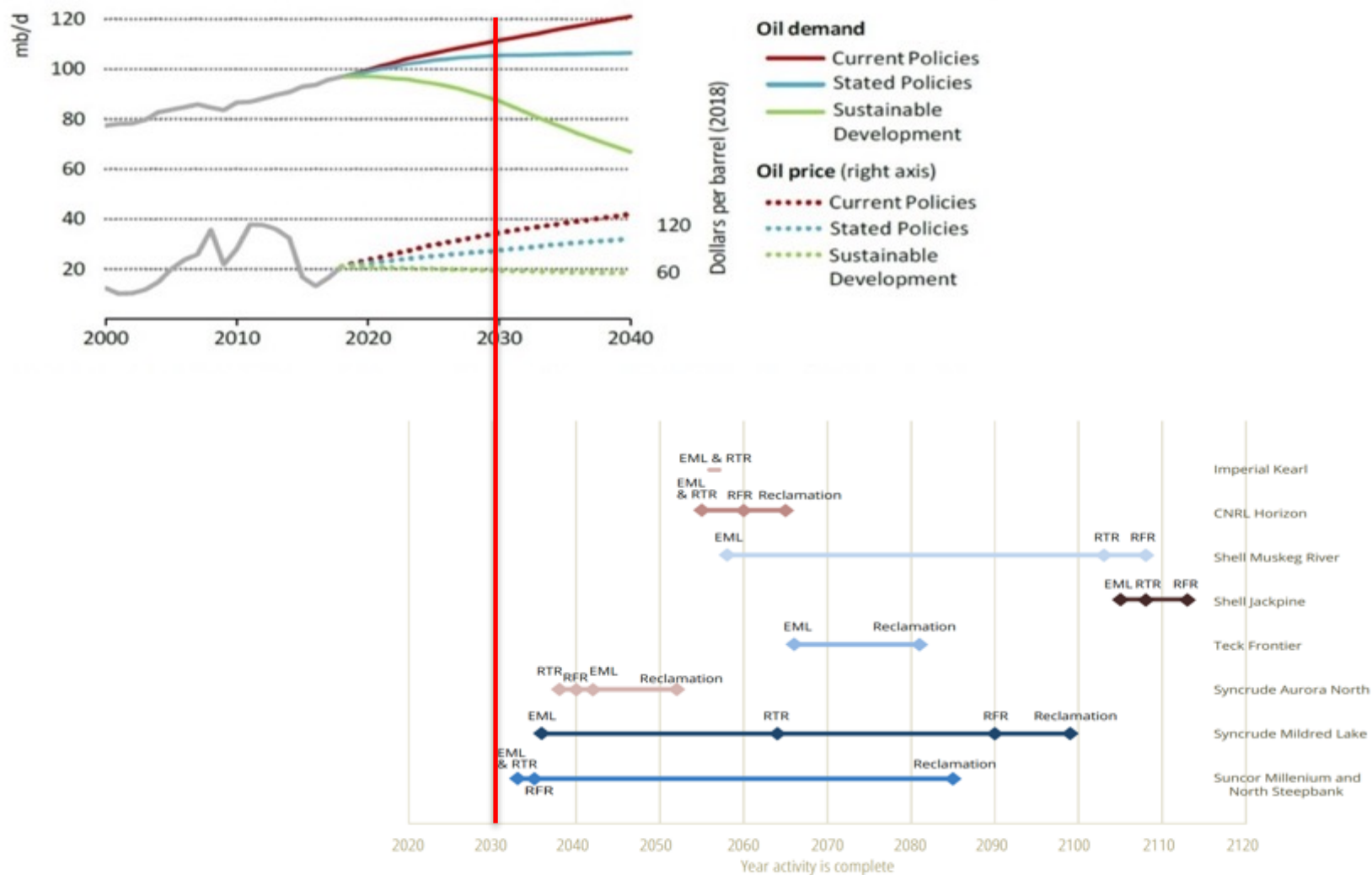


Figure 3. Comparative timelines for terrestrial tailings reclamation

Questions & Comments

Thank you!