Overview of Current State of Practice for Closure of Tailings Dams

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Presentation Outline

• Introduction
• National State of Practice
• International State of Practice
• Discussion
  • Design Life
  • Alberta Considerations
  • Jurisdictions of Significance
• Summary
# Introduction

**Long-term Management of Oil Sands Tailings Dams**

<table>
<thead>
<tr>
<th>Dam Failures</th>
<th>Complex Structures</th>
<th>Current Closure Expectations</th>
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</thead>
<tbody>
<tr>
<td>• Obed 2013</td>
<td>• Upstream construction</td>
<td>• Regulated by AER (Dam safety program)</td>
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<tr>
<td>• Mount Polley 2014</td>
<td>• Variety in construction materials and tailings</td>
<td>• Reclaim to ELC</td>
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<td>• Fundao 2015</td>
<td>• Weak foundations</td>
<td>• Land certified and transferred back to the crown</td>
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<tr>
<td>• Cadia 2018</td>
<td>• Complexity highlights closure design challenges</td>
<td>• Walk away closure</td>
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<td>• Highlights consequences associated with failure</td>
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<td>• Few examples of successful walk away closure globally</td>
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Is Alberta equipped to handle closure of tailings dams?
National State of Practice

Alberta
- AER dam safety program
- Moving away from prescriptive approach
- Requires reclamation and decommissioning plan
- Walk away closure
- References CDA, OSTDC, ICOLD, MAC

British Columbia
- Ministry of Energy and Mines dam safety program
- Prescriptive
- Requires reclamation and decommissioning plan
- Walk away closure
- References CDA, ICOLD, MAC

Saskatchewan
- No dam safety program
- Requires reclamation and decommissioning plan
- Institutional Control Program
- References CDA
International State of Practice

• Trend towards sustainable development which is emphasized by organizations such as ICOLD, ICMM, UNEC, and ISO

Prescriptive Approaches
• US Surface Mining Control and Reclamation Act
• Superfund Program

Performance Based Approaches
• South Africa
• Western Australia

• Mining companies may also be bound to:
  • Financial backers
  • Social standards
  • Environmental standards
Design Life

• Global trajectory towards 1000-year design life
• Concept of “in perpetuity” difficult to fathom
• Challenges in designing for cumulative effects of nature and integrating climate change

1850 - 1900
• 1867 Confederation

1900 - 1950
• 1905 formation of Alberta

1950 - 2000
• 1967 opening of Great Canadian Oil Sands Project

2000 - 2050
• 2016 Fort McMurray Fires
• 2055 Muskeg River Mine and Kearl End of Life

2050 onward
• 2105 Jackpine Mine (JPM) End of Life
• 2125 JPM permanent reclamation completed
Alberta Considerations

- Alberta and BC require walk away closure
- Push towards risk-based design is promising for successful closure
  - Lack of evidence showing its ability to support walk away closure
- Morgenstern (2012) suggested an alternative end game to walk away closure
- Sole area returned to Crown is Gateway Hill
- Should Alberta be working towards altering our end goal for closure?
Alberta Considerations

- Incoming changes to Alberta Dam Safety Guidelines anticipated to move away from a prescriptive approach towards a risk-based approach
- Major challenges in tailings dam closure in Alberta:
  - Fluid nature of tailings
  - Inability to discharge water
  - Unproven and changing technology
  - Regulator
  - Long-term projections and time frames
Jurisdictions of Significance

- **Western Australia**
  - Closure guidelines and regulatory review process

- **Saskatchewan**
  - Regulatory framework for long-term management

- **South Africa**
  - Legislative Framework
Summary
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Questions?
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