Cost Effective and Responsible Tailings Management

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Blight (2010) records that for two examples (Bafokeng and Merriespruit) of catastrophic failure involving loss of life, which led to a subsequent judicial inquest, the root cause of both was: “poor management, resulting from ignorance of the principles of soil mechanics, poor training of staff, negligence...”

Caldwell & Charlebois (2010) noted (about the Merriespruit failure) that “the mining company had cut to the bone to reduce costs and as a result the dam was neglected, competent people were not involved, and the contractor’s staff were overly confident”
Figure 3 - Copper Price (inflation-adjusted) - 1968 to 2009
What could we do as an Oil sands tailings industry to reduce the cost of tailings management?

Tailings dam safety is under greater scrutiny than ever before

Reckless cost cutting is clearly not the way to go

Can costs be cut responsibly, without escalating the risk of tailings failure?
Know how much your facility costs
Keep tabs on individual costs
Track changes and trends in costs
Know which items are risky
Track changes in risk profile
Know which operational actions are essential
Prioritize; postpone costs where justified

Ref: Boswell and Sobkowicz (2011)
Components of Life Cycle Cost: Waste Management

Ref: Boswell (1997)

- LAND, 3.22, 10%
- PERMIT, 2.49, 8%
- INFRASTR., 2.56, 8%
- CELL, 3.54, 12%
- OPS, 14.99, 48%
- AUDIT+MON., 0.33, 1%
- CLOSURE, 0.77, 3%
- DEPREC., 1.92, 6%
- AFTERCARE, 1.27, 4%
Primary areas where money is wasted

Based on 2016 questionnaire responses

1. Rework
2. Planning for the short term only
3. Poor water management
4. Mistakes in the application of technology
5. Not considering closure
Risk escalating cost cutting measures

Based on 2016 questionnaire responses

Which ill-advised cost cutting measures have done the most damage in substantially escalating tailings risk?

1. Departure from the design
2. Storage of water
3. Cutting on geotechnical investigation and instrumentation
4. Going cheap (steepening dyke slopes, lowest cost consultants, short term decisions)
5. Training cuts
How to cut costs responsibly

The Mining Association of Canada (MAC) sets forth a practical and useful approach with joint consideration of both cost and risk

- Define responsibility
- A small effective team
- Reliability concepts
- Monitoring and surveillance actions
- Target failure modes
How to cut costs responsibly

- Division of elements:
  - Essential
  - Nice-to-have
  - Luxuries

- Consider prudently the new responsibilities of the Engineer of Record (EoR)

- Develop a list of accountabilities

- Balanced reliance on in-house and external resources
Cost cutting in tailings should not be attempted willy-nilly

Careful consideration of the risks involved

Goal should be to safely operate to closure a tailings facility which is lowest in life cycle cost
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Thank You
thurber.ca
Some Useful Websites

- www.cda.ca (dam safety guidelines)
- www.acr-alberta.com/AboutACR/Committees/DamIntegrity/tabid/333/Default.aspx (Alberta Dam Integrity Advisory Committee)
- www.mining.ca (General guidance regarding tailings management)
- www.aep.alberta.ca (Responsible for updating AB dam safety regulations)
- www.aer.ca (Enforcement of dam safety and regulatory compliance for oil sands mining)