Mount Polley Disaster — Six Years Later is B.C. Any Safer?
The government of British Columbia made some important changes to the province’s mine legislation following the Mount Polley tailings dam disaster six years ago, but significant reforms are still needed to ensure the health and safety of dozens of communities living downstream of existing or planned tailings dams.

While the Mount Polley dam failure did not result in any fatalities in nearby communities, the lakes and rivers impacted by the release of 24 million cubic metres of contaminated mining waste remain polluted and the mine operator is still being allowed by the provincial government to dispose of treated mine wastewater into Quesnel Lake.

The threat of dam failures was tragically illustrated in January 2019 when the dam of a tailings storage facility at Vale’s Corrego do Feijão mine in Brumadinho, Brazil broke killing at least 259 people.

A new analysis of B.C.’s mine law reforms following the report in 2015 of an expert panel appointed to investigate the Mount Polley disaster shows that more still needs to be done to improve the safety of tailings dams and safeguard communities and the environment from what the panel warned could be an average of two dam failures every 10 years and six every 30 years if mining companies were allowed to conduct “business as usual.”

The analysis, by Dr. David Chambers, an expert geoscientist and founder of the Center for Science in Public Participation, found that the concept of “safety first” is still lacking in British Columbia’s tailings dam regulations. He notes that B.C.’s regulations emphasize “physical stability” in general terms, but do not carry this through to specific standards for risk assessment – it is simply assumed that engineers and risk assessors will automatically make “safety first” their guiding principle whereas in reality, economic considerations are often the priority.

While transparency of decisions by mine operators has been improved by recent regulatory reforms and stakeholders now have more access to information than in the past, more needs to be done to enable direct community involvement regarding design, management and monitoring to ensure tailings dam safety.

Dr. Chambers points out that while the Mines Act requires a conceptual reclamation plan for the closure or abandonment of a mine (and tailings storage facilities), including plans for long-term post-closure maintenance, there remains little direction, and a great deal of discretion, built into the process, so the actual outcome is uncertain. Clear guidance is needed along with public involvement, review and disclosure.

The Mines Act Guidance Document says selection of alternatives for tailings storage facilities for large projects should be conducted in consultation with local First Nations, communities and stakeholders to maintain a transparent, defensible evaluation. However, it does not specify how this is to take place and, as Dr. Chambers notes, consultation is not consent. This is a key issue the government will need to address to meet the requirements of the Declaration on the Rights of Indigenous Peoples Act.

Another key aspect of mine regulation reform that has still not been adequately addressed is the need for improved financial assurance for damage and loss caused by disasters, or for clean-up and reclamation when a mine closes, or the owner goes bankrupt. B.C. currently still leaves requirements for a financial security for reclamation to the discretion of the Chief Inspector of Mines. As above, the discretionary nature of several key Mines Act provisions – especially as they relate to tailings dam safety – remains a serious concern regarding the guarantees of public safety.
It should also be noted that companies can operate mines in B.C. without providing adequate financial guarantees that they will properly clean up the sites when the mines close or the companies go bankrupt, or following a disaster like Mount Polley.

The latest annual report by B.C.’s Chief Inspector of Mines shows that while the province has secured $1.6-billion in bonds from mining companies to cover land reclamation costs, the actual estimated cost is almost $2.8-billion, leaving B.C. taxpayers on the hook for the extra $1.2-billion.

There is also a need to strengthen appeal and grievance mechanisms given the serious risks to communities of mining operations.

One of the positive reforms is the requirement for an emergency preparedness and response plan for tailings storage facilities. The plan must be updated annually and tested for specific incidents. Development of the plan must include affected First Nations and communities in the identification of potential hazards, emergency communications and responses.

While the regulation does not specify roles of affected communities, it could provide an opportunity to engage community-based monitoring programs like Indigenous Guardians as first line observers of potential and actual hazards allowing mine operators to be alerted quickly and implement their response plan without delay.

But in spite of B.C.’s mine law reforms after Mount Polley, the elephant in the room still remains: should the BC government allow the development of new tailings dams upstream of communities and should those that currently exist be closed down?

In northern B.C. alone, more than 12 new mining projects have been proposed or are already under construction. One of them is the KSM Mine, which, if approved, could be the largest open pit gold and copper mine in North America. Its tailings pond ~ 28 times the volume of Mount Polley’s – will be behind a 239-metre high dam towering over the Bell Irving/Nass watershed. The mine’s waste rock pile will be above Sulphrets Creek, which runs into the Unuk River, an important salmon river in the region.

The tailings dam at the Red Chris mine in northern B.C. is the same design as that at Mount Polley and, at 105-metres high, approximately two and half times as tall, impounding seven times the tailings. The dam does not meet the recommendation of the expert panel into the Mount Polley disaster.

An independent review in 2014 found that any failure of the Red Chris tailings dam will likely have a much more significant environmental impact than the Mount Polley disaster.

Indigenous communities in B.C. are on the frontline of mining’s negative environmental impacts including disasters, polluted rivers, toxic waste sites and degraded land and air quality.

An analysis in northern B.C. of 35 tailings dams at 26 mine sites conducted by the BC First Nations Energy and Mining Council (FNEMC) showed that 8,678 km of streams, rivers, and lakes lie downstream of the flow paths of contaminants including lead, arsenic and mercury.
If the dams fail, 33 Indigenous communities could be impacted, including 17 in the immediate flow paths. There are 208 additional cities and settlements within watersheds that would be impacted by failed dams and downstream flow of contaminants.

Critics of B.C.’s current mining laws also point out that the threat to public safety is not from mine tailings alone. According to a 2018 report based on data obtained from provincial government records through a Freedom of Information request by the Centre for Policy Alternatives, nearly 100 unlicenced and potential dangerous dams had been built by gas fracking companies in B.C. over the previous few years.

There is also the question of who is ultimately accountable and liable for decisions made about tailings dam safety – the answer in British Columbia is unclear. There is a strong case to be made that company board of directors approve tailings dam plans before being submitted to government, in order to have clarity about the company’s commitment to safety. The Mt. Polley Expert Panel made recommendations to avoid the indemnification of company directors, but there has yet to be action taken by the government on this issue.

As this analysis shows, B.C. falls short of managing for safety and reducing risks to taxpayers, communities, and watersheds.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Make safety the guiding principle in design, construction, operation, and closure</td>
<td>The Expert Panel recommended that B.C. &quot;...develop improved guidelines...that emphasize protecting public safety.&quot;</td>
<td>From the Mines Act Guidance Document⁵: In setting objectives and targets for the design of tailings facilities, it is noted that: &quot;Physical stability is of paramount importance ...&quot; The Code requires risk assessments for all tailings storage facilities (TSF). However, safety is only one of many considerations in establishing the risk category/rating of a TSF.</td>
<td>BC emphasizes &quot;physical stability&quot;, but does not carry this through to the risk assessment – it just assumes engineers and risk assessors will automatically make &quot;safety first.&quot;</td>
</tr>
<tr>
<td>Ban new tailings facilities immediately upstream from inhabited areas</td>
<td>There is no discussion of this specific issue in the Expert Panel report.</td>
<td>There is no discussion of this specific issue in the Mines Act or Guidance Document</td>
<td>✗</td>
</tr>
<tr>
<td>Ban upstream dams at new mines and close existing upstream facilities</td>
<td>There is no discussion of this specific issue in the Expert Panel report.</td>
<td>There is no discussion of this specific issue in the Mines Act or Guidance Document</td>
<td>✗</td>
</tr>
</tbody>
</table>

4 Bill 6 – 2020, Mines Amendment Act, 2020 Legislative Session: 5th Session, 41st Parliament, First Reading  
|---|---|---|---|
| Tailings dam failure potential loss of life requires a dam to be designed to withstand the most extreme credible meteorological and seismic events:  
  - 10,000-year earthquake  
  - Probable Maximum Flood or 10,000-year flood | The Expert Panel did not make specific recommendations for potential dam-failure events. The Panel noted that seismic criteria for Mount Polley were based on a “low” consequence classification as defined by the Canadian Dam Association, and that excess water was a factor in the severity of the accident. This was related to using “average” precipitation rather than “wet” or a Probable Maximum Flood event for modeling. | “Extreme” hazard dam classification requires:  
  - 10,000-year earthquake  
  - Probable Maximum Flood  
  Dam hazard classifications less than “Extreme”, including a classification of “Very High”, which could include up to 100 potential fatalities, do not require use of the 10,000-year earthquake or the Probable Maximum Flood events for designing the dam. | The CDA dam hazard classifications allow use of less-than-maximum events for potential structural failures that could cause human fatalities. The BC hazard classifications are even less-strict than the CDA classifications. |
|---------------------------------------------------------------|----------------------------------------|-----------------------------------------------------------|-------------------------------------------------|
| Mandate the use of Best Available Technology for tailings, in particular filtered tailings | Implement Best Available Technologies (BAT) using a phased approach.  
  a. For existing tailings impoundments, rely on best practices for the remaining active life.  
  b. For new tailings facilities, BAT should be actively encouraged for new tailings facilities at existing and proposed mines.  
  c. For closure, BAT principles should be applied to closure of active impoundments so that they are progressively removed from the inventory by attrition.  
  The Expert Panel also noted, “... surface storage using filtered tailings technology is a prime candidate for BAT.” | New permit application requirements for alternatives assessment require:  
  • Consideration of Best Available Technologies (BAT)  
  • Declaration of Quantitative Performance Objectives, and  
  • A proposed program for prediction, identification and management of physical, chemical, and other risks associated with tailings storage facilities and dams  
  The alternatives assessment for TSFs will consider BAT and will provide a comparative analysis of options considering the following sustainability factors:  
  • Environment  
  • Society  
  • Economics | The concept of BAT is easily twisted to meet whatever “local conditions” demand. Often local conditions are in-fact driven by economic considerations.  
  For example, water covers are cheaper than dry closures, and help prevent ARD, yet pose more long-term risk if there is a dam failure.  
  By granting permits for water covers, BC is essentially saying that a dam will never fail. |
|---|---|---|---|
| Require the following design standards for safety:  
- Static Factor of Safety of 1.5  
- Pseudo-static Factor of Safety of 1.1  
- New outer embankments must be constructed with slopes 1-Vertical to 5-Horizontal or less | The Expert Panel did not specify factors of safety, but said:  
“The Panel considers that tailings dam guidelines and criteria tailored to conditions in B.C. would more effectively meet the needs of the Province in protecting public safety. ... The Panel anticipates that this will result in more prescriptive requirements for site investigation, failure mode recognition, selection of design properties, and specification of factors of safety.” | Requirements:  
- Static Factor of Safety of 1.5  
- No requirement for pseudo-static Factor of Safety  
- Downstream slope (outer embankment) 1-Vertical to 2-Horizontal or less | BC does not specify a pseudo-static Factor of Safety. They do not explain why.  
A maximum downstream slope of 2H:1V is much steeper than 5H:1V. It will probably work, as long as the construction material does not degrade - which cannot be guaranteed over millennia. |
Evaluate and characterize the dam foundation and the tailings and estimate their relationship to risk. Tailings and tailings water must be characterized and used to estimate the risk and consequence of a potential dam failure.

The Expert Panel recommends utilizing the concept of Quantitative Performance Objectives to improve Regulator evaluation of ongoing facilities (including):
- Beach widths
- Calibration of impoundment filling schedule
- Water balance audits and calibration

The Panel also notes:
“Closure of tailings deposits is subject to two fundamental considerations: physical stability and chemical stability. Although the former is the object of the Panel’s investigation, no treatment of tailings technology can ignore the latter.”

Requires analysis of:
- Water balance
- Dam foundation

From the Guidance document:
Failure modes are to be assessed with specific analyses for both operating and closed facilities include, but are not limited to (a long list of factors, including):
- Acid generation from tailings or dam construction materials
- Metal leaching from tailings or dam construction materials

Does BC Meet NGO Requirements?
(Chambers Assessment)

✅
|---|---|---|---|
| Appropriate monitoring systems must be in place to identify and mitigate risk | The Expert Panel recommends utilizing the concept of Quantitative Performance Objectives to improve Regulator evaluation of ongoing facilities (including):  
- Instrumentation adequacy and reliability  
- Trigger levels for response to instrumentation  
- Performance data gathering, interpretation, and reporting intervals | Requires a surveillance & monitoring program, including:  
- Seepage rates and seepage  
- All embankments, including number and type of instrumentation, movement and piezometric thresholds and response  
- Groundwater contamination  
- All waste rock storage facilities | ✓ |
### Safety First: Guidelines for Responsible Mine Tailings Management

|-------------------------------------------------------|------------------------------------------|-----------------------------------------------------------|---------------------------------------------------|
| The Expert Panel notes: *Experience has shown that the effectiveness of an ITRB in specific circumstances depends on the following:*  
  - That it not be used exclusively as a means for obtaining regulatory approval.  
  - That it not be used for transfer of corporate liability by requesting indemnification from Board members.  
  - That it be free from external influence or conflict of interest.  
  - That there be means to assure that its recommendations are acted upon. | The Terms of Reference and the proposed membership of the Independent Tailings Review Boards (ITRB) must be approved by the Chief Inspector of mines. | “Independent” is not defined by BC Code or Guidance, so the interpretation is left entirely to the discretion of the Chief Inspector. A definition of “independent” is needed to avoid misapplication. |

### Tailings facilities must be reviewed, inspected, monitored, and maintained until they reach a permanent state where the potential for failure is essentially impossible.

For closure planning, the Expert Panel recommends the application of Best Available Technologies, with “Full consideration of life cycle costs, including environmental liabilities and other externalities.”

The Mines Act requires a conceptual reclamation plan for the closure or abandonment, including plans for long-term post-closure maintenance. Also required for closure is a Tailings Storage Facility Operations, Maintenance and Surveillance Manual.

BC requires a plan that would logically meet this guideline, but there is little direction, and a great deal of discretion, built into the process, so the actual outcome is uncertain.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaningful engagement, participation and consent of all affected communities must be obtained for any tailings facility.</td>
<td>The Expert Panel report did not address public engagement or stakeholder participation.</td>
<td>The Mines Act Guidance Document says selection of alternatives for tailings storage facilities for large projects should be conducted in consultation with local communities, First Nations, and stakeholders in order to maintain a transparent, defensible evaluation.</td>
<td>BC guidance requires &quot;consultation&quot; but does not specify how this is to take place. In addition, Consultation is not Consent.</td>
</tr>
<tr>
<td>Independent grievance procedures must be established and made available in a culturally appropriate way to all employees, contractors, suppliers, and regulators, as well as Indigenous Groups and rights holders, including affected community members. Whistleblower protection best practices must apply to all workers as well as vendors, contractors and auditors.</td>
<td>The Expert Panel report does not address labor or grievance issues.</td>
<td>The Mines Act has sections on: “Employees Right to Refuse Work” that is focused on worker safety “Discrimination” that prohibits discrimination ‘... in any manner ...’</td>
<td></td>
</tr>
<tr>
<td>Emergency response plans related to catastrophic failure of tailings facilities must be discussed and prepared together with all communities downstream of the flow of a potential failure, as well as with mine workers, and in collaboration with first responders and relevant government agencies.</td>
<td>Emergency response, and planning, was not addressed by the Panel.</td>
<td>The Code requires an emergency preparedness and response plan for tailings storage facilities, to be updated annually and tested for specific incidents on a frequency suitable for its consequence classification for response and recovery. Development of the Mine Emergency Response Plan must include affected communities and First Nations in the identification of potential hazards, emergency communications and responses.</td>
<td>Yes</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Information regarding mine safety must be made publicly available.</td>
<td>It is “essential” that Independent Tailings Review Board reports go to senior corporate management and regulators, and “should also be open to other stakeholders”</td>
<td>Annual tailings dam inspection reports will be posted and made available publicly.</td>
<td>BC is required to make annual dam inspection reports available, but it is not clear that other safety report and data are similarly available.</td>
</tr>
</tbody>
</table>

Operating companies must have the necessary financial assurance to cover the full cost of closure and post-closure plans.
Operating companies must have public liability insurance to cover economic, social and environmental damages from sudden, accidental, or gradual pollutant releases including waste dump and tailings dam failures.

No discussion of financial surety. The Expert Panel does ask for “Full consideration of life cycle costs including closure, environmental liabilities, and other externalities will provide a more complete economic picture. While economic factors cannot be neglected, neither can they continue to pre-empt best technology.”

B.C. requires a financial security for reclamation. The amount is left to the discretion of the Chief Inspector.
No requirement for liability insurance. There might be enough wiggle room in the language of the statute so that the Chief Inspector could require environmental liability coverage, but it would be a stretch and could face legal challenge.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountability for risk, minimizing consequences, preventing failure, and the consequences of failure must primarily rest with the Board of Directors.</td>
<td>Corporations proposing to operate a tailings storage facility should be required to be a member of the Mining Association of Canada, or be obliged to commit to an equivalent program for tailings management, including the audit function. The Expert Panel did note, in a discussion of Independent Tailings Review Boards, “That it not be used for transfer of corporate liability by requesting indemnification from Board members.”</td>
<td>The code requires that mines develop and maintain a Tailings Management System that includes regular system audits. The Mining Association of Canada Guide is referenced. No specific requirement of the board of directors.</td>
<td>✗</td>
</tr>
</tbody>
</table>

All content © First Nations Energy and Mining Council

First Nations Energy and Mining Council
1959 Marine Drive, North Vancouver
B.C. V7P 3G1

For more information please contact us:
604-924-3844
info@fnemc.ca

Special thank you to Dr. Dave Chambers