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# Tailings ponds remain environmental hazard post-Mount Polley

By [Jax Jacobsen](#)

On June 7, news broke that [Imperial Metals Corp.](#) has filed all the necessary paperwork — and presumably made the necessary repairs — that would allow the [Mount Polley](#) copper-gold mine in British Columbia to reopen as early as July.

In August 2014, Mount Polley was the site of one of the worst tailings breaches in mining history, as a [break](#) in the tailings wall led to the release of 24 million cubic meters of water contaminated with silt and mine waste.

An independent engineering review panel released a report in January, finding that the ultimate failure lay in the design of the tailings pond foundation — singling out the designer of the pond — and not with provincial regulators or the mining firm. The report went further, calling for the end of storing tailings in water, as the panel pegged this practice as one that was likely to lead to extensive environmental damage.

"The dominant contribution to the failure resides in the design" which "did not take into account the complexity of the sub-glacial and pre-glacial geological environment associated with the Perimeter Embankment foundation," the report said.

However, the report found Imperial Metals liable for poor planning and execution, emphasizing that there were several scenarios which could have led to the dam breaching at any point.

Continually rising water levels on the tailings pond were a problem at Mount Polley. To deal with the issue, Imperial Metals repeatedly raised the dam levels, always aiming to stay one step ahead of the water to prevent overflow. On May 24, 2014, the dam experienced a "seepage flow" following a rainfall of 24 millimeters over a 24-hour period. The report classifies this incident as a potential dam breach.

"There was little in the way of long-term planning or execution," the report says. "This was most clearly displayed by the absence of an adequate water balance or water treatment strategy, and the overtopping failure that nearly resulted [in May 2014]. Moreover, the related absence of a well-developed tailings beach violated the fundamental premise of the design as a tailings dam, not a water-storage dam."

The report's engineers also sharply criticized Imperial Metals for the "ad hoc nature" of dam expansion, arguing that it "so often ended up constructing something different from what had originally been designed."

The high volume of water in the tailings pond also made the spill much worse than it needed to be, the report found. Having a smaller pool would have resulted in fewer tailings spilling into the local waters, while a wider beach of unsaturated tailings might have delayed breach development long enough for Imperial Metals to implement emergency action.

## What is at risk

The engineers who authored the report have a grim warning: failures of tailings ponds resulting in breaches are inevitable so long as tailings are stored in water.

"On average, there will be two failures every 10 years, and six in every 30," the report calculated.

A report released June 2 by the BC First Nations Energy and Mining Council also sounded the alarm for the province.

The organization found that there are 35 tailings ponds at 26 mining operations in northern British Columbia, which are located on 48 watersheds. A breach in these ponds would have an impact on more than 200 communities, of which 33 are First Nations communities, and over 8,000 kilometers of fish-bearing waterways.

Tailings pond leaks and breaches are not just a concern in British Columbia, however. Tailings failures and releases can and do happen in other locations, most recently at [North American Palladium Ltd.](#)'s [Lac Des Iles](#) mine where contaminated water from a tailings pond was released into a local waterway to restore the water balance and prevent an overflow. The Ontario Ministry of the Environment estimates that 120,000 cubic meters of water containing suspended solids, iron and aluminum has been released.

In 2011, [Cliffs Natural Resources Inc.](#) experienced a tailings pond failure at its [Bloom Lake](#) iron ore mine in Quebec; the breach of the Triangle Tailings pond dam released more than 200,000 cubic meters of ferric sulfate into fish-bearing waters for nearly seven straight days. Environment Canada issued a record fine of C\$7.5 million to the company in December 2014.

It remains unclear how many tailings ponds there are in total throughout Canada, with some provinces not keeping records of these structures. In Ontario, there are 42 active mines, with no indication of how many tailings ponds. A representative from the Ontario Ministry of Northern Development and Mines told SNL Metals & Mining June 16 that tailings ponds in Ontario are much smaller than those in British Columbia.

Saskatchewan and Quebec also do not keep records of the number of tailings ponds in the province, provincial mining ministries told SNL. Saskatchewan has "around 20" active mines, while Quebec has 25 active mines.

There are four operating mines in the Northwest Territories, each of which have tailing ponds. In neighboring Nunavut, there are two operating mines, only one of which has tailing ponds, NWT & Nunavut Chamber of Mines Executive Director Tom Hoefler told SNL June 16.

The proposed mine construction on the world's largest-ever gold reserve at [KSM](#) by [Seabridge Gold Inc.](#) is also causing environmental groups to warn about the size of that tailing pond.

"KSM's tailings dam ... will be among the highest tailings dams in the world and ... contain 2 billion tonnes of mine tailings submerged underwater — more than 27 times the volume at Mount Polley," the report released by a consortium of environmental groups said June 17.

## **Panel report suggests water be removed from all tailings operations**

The authors of the Mount Polley panel report are adamant that incremental changes to how tailings ponds are designed and implemented are not sufficient to mitigate the risk of failure in handling mining waste.

Water must be eliminated completely from tailings so as to avoid another such environmental disaster, the authors said. Instead, mining firms should look to storing the majority of their mines' tailings underground, either in mined-out pits or for use as backfill for below-surface mining operations. Dry stack tailings — also referred to as filtered tailings, these include mine waste materials that are dewatered, compacted, and transported to another location to form a dry stack — are also a measure mining companies should consider, as well as  [dry covers](#) for mine closures.

Mining companies have not embraced these technologies due to their high costs. But the panel points out that the costs of environmental cleanup and mine damages are far greater than the costs companies would bear if they pre-emptively adopted these advanced tailings technologies.

Moving forward, mining companies and engineering firms must better integrate geographical and geotechnical conditions of the land when designing tailings storage facilities. However, the panel noted that knowledge of tailings management is not considered a critical skill in most mining firms.

For this reason, the panel strongly urges that mining companies be required by regulation to include a detailed evaluation of all potential tailings pond failures within a bankable feasibility study, as well as detailed cost analyses of best practices tailings and closure options.

Given the skills shortage in tailings and waste disposal in the industry, the panel also suggests the appointment of an independent tailings review board to consult on all aspects of tailings ponds and mining projects, from design to closure.

Though the panel cleared British Columbia's regulatory regime from responsibility for the Mount Polley disaster, it urged future inspections be on the watch for undrained shear failure for dams which have silt and clay foundation soils. Regulators should also verify that existing tailings pond structures are able to maintain water balance, especially in periods of heavy rainfall, and ensure the adequacy of filters, especially for dams which contain mine waste.

## **What has been done?**

In March, British Columbia's Environmental Assessment announced it would alter regulations for mining project proposals and their tailings ponds. In line with the Mount Polley report, mining companies are now required to provide alternatives for tailings management, with a focus on reducing and preventing the failure of these structures. Mining companies must factor in the impacts on the environment, health, social, heritage, and economic values in assessing these tailing pond measures.

SNL contacted the mining ministries of several other provinces, including Ontario and Saskatchewan. These provinces said they had no plans to alter their environmental assessment regulations in the wake of the Mount Polley disaster.

"There has been a number of calls for other provinces" to make regulatory changes as a result of the incident, Borden Ladner Gervais environmental regulations lawyer Sean Jones told SNL June 15. "To my knowledge, no one's taken that step."

As for the northern territories, a  [new law](#) allows the Yukon government to exempt mining projects from environmental assessment when amending or renewing a license. The law also imposes shorter timelines for these environmental assessments.

Mining industry advocates argue that the Mining Association of Canada has a guide to management of tailings facilities that was launched in 1998, by which all members of the organization must abide. However, the establishment of these guidelines has not prevented tailings pond failures throughout Canada.

The Mount Polley panel report put it most pointedly: "The panel firmly rejects any notion that business as usual can continue."