

Are other tailings ponds in B.C. at risk of failing?

Mount Polley probe raises concerns in Alaska over proposed mines in Golden Triangle

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By Nelson Bennett

How many more of the 98 mine tailing ponds in B.C. are vulnerable to sudden, unexpected collapse? And is there a viable alternative to storing massive amounts of mine waste under water behind dams?

Those are some of the questions that have been raised after an expert panel of engineers pinpointed the cause of the worst mine disaster in B.C. history.

A dam containing tailings from the Mount Polley mine collapsed without warning August 4, 2014, because of a design flaw, the three-person panel of engineering experts concluded.

Engineers responsible for designing, building and maintaining the dam failed to account for a clay-like layer of glacial material underneath the dam's foundation that gave way under the weight of the growing tailings pond.

The cleanup alone will cost the mine's owner, Imperial Metals (TSX:III), roughly \$67 million. That doesn't include the cost of repairing the dam so that the mine can restart – something that is still months away. The company is also facing a class-action lawsuit from shareholders.

While a layer of clay-like glacial material beneath the dam's foundation loaded the gun, it was a decision by engineers to increase the steepness of the dam's slope that "pulled the trigger," the panel concluded, causing a collapse that could not have been anticipated through increased inspections.

And although the increasing volume of water in the dam had been identified as a concern, it did not cause the breach, although it did result in more mine slurry washing into fish-bearing waters than might otherwise have occurred.

Unlike other types of dams, mine tailings pond dams are not static; they continue to be built up over the years to accommodate a growing pile of mine waste, stored under water to prevent oxidization, which can lead to acid rock drainage.

The dams are the responsibility of the engineering firms that mine companies hire. Imperial Metals' engineers of record were Knight Piésold Consulting and AMEC.

“The decision on the design always lies with the engineers of record,” said Steve Robertson, Imperial's vice-president of corporate affairs. “It's their dam. So they design it; they tell us how it needs to be constructed; they oversee the construction.”

Neither Knight Piésold nor AMEC responded to interview requests.

Asked if Imperial Metals plans to hold either engineering firm to account for the dam's failure, Robertson pointed out that the technical panel did not have a mandate to assign blame.

That will be the mandate of two other investigations that are still underway. Last week, as part of one of those investigations, a search warrant was executed on Imperial Metals' offices in Vancouver and the mine site.

In response to the technical panel's findings, Energy and Mines Minister Bill Bennett ordered all mine companies with operating or decommissioned mines in B.C. to report back and inform the ministry if their own tailings ponds have similar glacial material underlying their dams.

And those that haven't already set up independent review boards to look at engineering and geotechnical issues have been ordered to do so.

But that gives small comfort to Alaskan fishermen, First Nations and politicians who fear more loaded guns will be built just across the border in salmon-bearing watersheds.

They're concerned mostly about Imperial Metals' new Red Chris mine, which is still in commissioning, and the massive KSM underground open-pit copper-gold mine complex, both of which are in the “Golden Triangle” near the Alaskan border.

“The take-home message is the fact that these tailings dams just seem to inherently degrade,” said Chris Zimmer, Alaskan campaign director for Rivers Without Borders. “We have mines like Red Chris and KSM – vastly bigger and with tailings that are much more toxic – how do we know those dams aren't going to fail over the long term?”

Brent Murphy, vice-president of environmental affairs for Seabridge Gold Inc. (TSX:SEA), said the KSM mine's tailing facility is not upstream of U.S. waters.

The panel concluded that fundamental changes must be made to the way mines are permitted and tailings ponds designed.

“The panel recognizes that we can’t continue business as usual,” said panellist Steven Vick. “We can’t continue to use technology that’s fundamentally 100 years old.”

Practicality of dry-stacking alternative in B.C. questioned

Storing tailings under water is the cheapest way to operate a mine in B.C., mainly because it allows finely crushed waste rock to be piped into a manmade pond, rather than hauled by truck.

The drawback – apart from potential catastrophic dam failure – is that it has a larger environmental footprint and takes longer to reclaim when a mine is decommissioned.

However, as the technical panel investigating the collapse of the Mount Polley tailings pond dam pointed out, there are alternatives to wet tailings ponds.

They include filtration and dry stacking, in which moisture is removed from wet mine waste and stacked in layers, eliminating the need for tailings ponds with large volumes of water.

The panel pointed to the Greens Creek underground mine on Admiralty Island in Alaska as an example. Some of the tailings there are put back underground. The rest are filtered (to remove moisture) and dry stacked. But even Hecla Mining Co. (NYSE:HL), the company that built Greens Creek mine, acknowledges that filtration and dry stacking would not be economically feasible for large mines like the KSM. The conventional process for filtering and dewatering tailings so they can be stacked in dry layers is energy-intensive.

Vancouver-based CEC Mining Systems has a new approach. It uses a vacuum system that the company says reduces cost and water consumption, which makes dry stacking more economically feasible.

“In some cases we see up to 80% reductions versus conventional presses,” said CEC project development manager Cameron Stockman.

But dry stacking doesn’t entirely eliminate the problem of managing runoff in high rainfall areas, which is why it’s used more in dry climates, where low rainfall poses less of a danger of acid drainage.

The tailings pond that Seabridge Gold Inc. (TSX:SEA) has planned for its KSM mine is like the mine complex itself: multi-faceted. It would be located in a valley, so it doesn’t have the same geological features the Mount Polley mine has, such as an underlying glacial lake deposit, according to Seabridge.

Rather than one large pond, tailings will be stored in three separate cells, with the centre cell containing the waste that’s more prone to generating acid. That cell would be lined to prevent leakage. The other cells will contain the waste with less acid-generating waste.

The cells will have long-sloped “beaches” of double-cycloned sand, which is coarsened and is more porous and allows for better drainage. This stability measure keeps water from pushing directly against the dam walls.

As the Mount Polley technical investigation highlighted, even seasoned engineers can fail to anticipate basic design problems. Seabridge has therefore established an eight-member panel to provide independent technical oversight of the tailings facility.

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