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## **No shift in tailings strategy since Mount Polley failure**

### **Expert panel called for dry stacking but no mine projects plan to use them**

By Gordon Hoekstra, Vancouver Sun April 5, 2015

### **After the catastrophic failure of the Mount Polley mine tailings dam last summer, an expert engineering panel appointed by the B.C. government called for a major shift in how to deal with mine waste.**

After the catastrophic failure of the Mount Polley mine tailings dam last summer, an expert engineering panel appointed by the B.C. government called for a major shift in how to deal with mine waste.

The panel recommended a move away from the conventional method of storing waste behind dams. But companies in British Columbia with proposals for large, open-pit metal mines have no plans, at least for now, to follow the panel's recommendation, a review by The Vancouver Sun has found.

Among the conventional proposals is Seabridge Gold's \$5.4-billion KSM copper-gold project that includes a 239-metre-high earth dam, which would be among the highest in the world. It would store more than two billion tonnes of tailings under water, 27 times more than the amount of tailings stored at Mount Polley northeast of Williams Lake in the Interior.

The KSM mine has already been approved by the B.C. and Canadian governments, and the company is seeking a partner to finance the massive project.

Like Seabridge's planned mine, all large mines in British Columbia have stored tailings — the finely ground rock remaining after metals are extracted — under water, behind earth-and-rock dams.

The purpose is usually two-fold: it keeps potentially acid-generating mine waste from exposure to air and leaching into the environment, and it provides a supply of water to run the plant that grinds and extracts metal from the rocks.

The panel said, however, that to reduce dam failures, the number of dams must be reduced.

So, it recommended an alternative method of filtering the water out of the tailings and then stacking them in a big pile, a method commonly called dry stacking.

The result is there is no dam to fail, and if a dry stack shifted or moved, including as a result of an earthquake, it would not go as far as water-saturated tailings. The Mount Polley dam failure released millions of cubic metres of water and tailings into the Quesnel watershed, destroying a nine-kilometre creek and raising concerns about the long-term effects on millions of salmon.

The panel pointed to the Greens Creek silver-gold underground mine in Alaska, which has used filtered tailings and dry stacking for decades.

However, all 10 of the active open-pit metal mine proposals either approved or on the province's assessment list have plans to build conventional storage facilities with dams to store tailings.

Mining companies say filtering and dry stacking won't work in B.C. — there's too much rain and it is too costly.

There are several proposals for smaller underground mines — including Pretium's Brucejack mine in northwest B.C., just approved by the province — that plan to store tailings by backfilling it underground and storing some waste underwater in lakes.

But the large, open-pit projects are sticking with the conventional method.

Seabridge concluded dry stacking was not a feasible option in the mountainous, wet, seismically active area. It would require a large footprint with piles up to 300 metres high, according to the company.

Peter Williams, senior vice-president, technical services at Seabridge, said the wet climate in northwestern B.C. where KSM will be built is not conducive to dry stacking.

The challenge with rain (and melting snow in the spring) is that it must be kept away from the dry stack of tailings and channelled into collection ponds before it can be discharged to the environment.

“If you have very low production rates, it's possible. But with high production rates, that's a hard thing to do,” said Williams.

New Gold has also rejected dry stacking at its proposed \$1.8-billion Blackwater gold and silver project southwest of Prince George. That proposal is to store about 350 million tonnes of tailings, four times as much as was stored at Mount Polley.

Tim Bekhuys, director of the New Gold's Blackwater project, said they determined that dry stacking would take up a larger surface area and would require more than one watershed, which didn't fit with their aim to keep the mine site tight and avoid fish habitat.

New Gold has experience with dry stacking at its small Peak Mine in Australia.

But Bekhuys noted that no mine of the size they have proposed, which would process 60,000 tonnes of material per day, uses dry stacking.

One of the largest mines to use dry stacking is the La Coipa gold-silver mine in Chile, about one third the size of the planned Blackwater project.

But the panel pointed out that larger projects are being proposed.

Hudbay Mineral's proposed Rosemont Copper mine in Arizona, which would process 68,000 tonnes of material per day, plans to use dry stacking.

Bekhuys added that dry stacking would be more costly than the conventional approach for Blackwater.

"When we looked at dry stack as an option, in trying to balance our issues, it really doesn't work," he said.

New Gold doesn't plan to proceed with Blackwater until the company finishes constructing the Rainy River gold mine in Ontario. However, they will continue with the Blackwater environmental assessment in order to be in a position to begin construction when Rainy River is complete in 2½ years.

Other mining companies cited similar concerns of cost and difficulty in operating in wet climates, including Spanish Mountain, Taseko's Prosperity and Aley projects and Pacific Booker's Morrison mine. The proposed Schaft Creek, Harper Creek and Kitsault mines all have plans for conventional tailings storage.

"My issue with this dry stack is that for some tailings it works great," said Spanish Mountain CEO Morris Beattie. "But we've known for 40 or 50 years that the best place for tailings is underwater. You keep them submerged and the oxidation processes stop and the stuff just sits there forever."

Only KGHM International appears to be taking a second look at the use of dry stacking at its proposed \$535-million Ajax copper and gold mine.

Their original proposal was for dry stacking, but they switched to a conventional plan over concerns from the residents of Kamloops about dust, said Ajax project development manager Clyde Gillespie.

"It's not a given that dry stack is a one-size fits-all solution to tailings management," said Gillespie.

However, he said the company has committed to the community to take any lessons learned from Mount Polley and apply them specifically to the Ajax project in Kamloops.

The three-member engineering panel, chaired by University of Alberta professor emeritus Norbert Morgenstern, acknowledged that filtering and dry-stacking was more expensive, may require separate water storage, and was more commonly used in dry climates.

However, the panel also said the filtering and dry-stacking method has been adapted to cold regions and was in use in wet regions, including at Greens Creek.

“Additional enhancements are ripe for development if there is incentive to do so ... There are no overriding technical impediments to more widespread adoption of filtered tailings technology,” the panel stated in its 156-page report.

The panel also said decisions based on comparing capital and operating costs take a limited view, as they do not include risk costs of potential failure.

“The Mount Polley case underscores the magnitude of direct costs for cleanup, but indirect losses — notably in market capitalization — can be even larger,” said the panel. Repairs and cleanup costs have been pegged at as much as \$400 million.

At its lowest point since the dam collapse on Aug. 4, 2014, Imperial Metals had lost \$670 million in market capitalization, nearly half its value. The market value has recovered some since then, regaining about half its loss.

Vancouver-based geotechnical engineer Jack Caldwell, who worked on the Greens Creek tailings project 30 years ago, said that project and others are proof that you can use dry stacking in wet and cold climates.

There is a more persuasive argument that cost is a limiting factor, but tailings cost is a small portion of the overall cost, argued Caldwell.

“And there’s the final argument: you are going to spend that money at any rate because you are going to be caught with your pants down if you have a failure or something like that,” he said.

Mining operators also do not like filtering and dry stacking because it adds another manufacturing process to their mine operation, one that could cause bottlenecks and negatively affect production. It’s much simpler to put the tailings in a pipe and deposit them in a storage facility, say miners.

The key to gaining more acceptance of filtering and dry stacking is to reduce the cost to mine operators, says Cameron Stockman, project development manager at CEC Mining.

CEC is a Vancouver-based firm that designs and builds tailings filtering systems.

Stockman said it’s easier to make an economic argument for filtering and dry stacking in a dry environment such as Chile where you are trying to preserve water and projects are proposing to move desalinated water from the ocean hundreds of kilometres to feed their projects.

He said he believes the cost curve can be shifted in B.C.

“Then it’s not so much of an uphill battle because there’s all these downstream and long-term environmental, political, regulatory benefits which can come from it,” observed Stockman.

Still, even the operation the panel singled out as being an example to follow, Greens Creek, does not advocate filtering and dry stacking for all mines.

Hecla Mining, the company that owns the Alaskan mine, says it was surprised it was singled out as an example in the Mount Polley report.

While dam integrity is a key issue, there are also other issues that need to be considered, including the geochemistry of the tailings and challenges such as dust, said Hecla Mining vice-president external affairs Luke Russell.

Because the mine is in a federal protected area, reducing the footprint of the tailings, particularly its impact on wetlands, was a key consideration, he said.

That’s why about 40 per cent of the tailings, which are potentially acid-producing, are also backfilled in the underground mine.

Said Russell: “We’re not ascribing that the Greens Creek tailings as identified in the peer review panel was a silver bullet, by any means.”

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