



Safety Issues at Mine Tailings Impoundments are Driving Environmental Regulations

On November 5, 2015, a mine tailings dam gave way at the Mariana mining site in the state of Minas Gerais, Brazil, creating a 2-mile-wide river of toxic waste that stretched 400 miles to the Atlantic Ocean. According to The Guardian (<http://www.theguardian.com/sustainable-business/2015/nov/25/brazils-mining-tragedy-dam-preventable-disaster-samarco-vale-bhp-billiton>), "Between 40-62m cubic metres of the water and sediment from iron ore extraction sluiced down a mountainside more than two weeks ago when the Fundão tailings dam failed at an open-cast mine operated by Samarco, a joint venture between mining giants BHP Billiton and Vale."

The Guardian reported that the disaster was highly preventable and that it occurred because of "lax safety regulation in the Brazilian mining industry." Concerns about the dam's height had been raised as early as 2013. According to the Wall Street Journal, Brazilian federal prosecutors filed a \$43.8 Billion lawsuit against BHP Billiton and Vale on May 3, 2016.

The Mariana disaster came to mind during the 2016 Canadian Institute of Mining Expo held in May 2016 in Vancouver, British Columbia. Present at the expo was a representative from the B.C. Ministry of Energy and Mines, who reported on that agency's response to another mining disaster that happened in the region in August 2014. The Mount Polley mine disaster was a significant event, and like in Brazil, accusations were made that safety regulations had been lax and not well adhered to.

The Mount Polley Mining Disaster

The Imperial Metals' tailings dam at the Mount Polley Mine, located in the Cariboo region of British Columbia, failed at 6:30 AM on August 1, 2014. According to the Mount Polley Review Panel Report (<https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf>), the tailings storage facility had been surrounded by three embankments. The one that failed was on the northern flank. The contaminated water that the storage facility had been holding was released into the British Columbian Quesnel watershed, completely destroying Hazeltine Creek along with endangering salmon in the area and putting the people of Likely at risk. As an August 2015 article from Huffington Post Canada points out (http://www.huffingtonpost.ca/david-suzuki/bc-must-heed-mount-polley_b_7973864.html), the reputation of the Canadian mining industry was also deeply damaged. At first blush, it does not seem like the mining industry got the



message. “First Nations, scientists and the independent review panel investigating the breach point to dry stacking as a safer, proven alternative to century-old wet tailings technology.” Despite these concerns, all ten B.C. mine proposals included plans to use wet tailings. All of these proposals have either already been approved or are waiting for approval. The root cause of the breach was related to the design. The panel report states, “The design did not take into account the complexity of the sub-glacial and pre-glacial geological environment associated with the Perimeter Embankment foundation. As a result, foundation investigations and associated site characterization failed to identify a continuous GLU (glaciolacustrine) layer in the vicinity of the breach, and also failed to recognize that it was susceptible to undrained failure when subject to the stresses associated with the embankment.

The Canadian government continues to work with First Nations, investigative panels, and the mining industry to inventory the mine tailings piles throughout the country and evaluate potential risk to human health and the environment. This study is expected to be completed over the next couple of years and new regulations are expected to be promulgated. The cost and timeframe for coming into compliance is unknown at this time, but significant changes are expected.

These disasters are nothing new

The mining industry will certainly be concerned with any new regulations that come its way, but the fact is that mine tailings dam disasters are nothing new. One of the worst catastrophes occurred in 1966. Nuffield College, Oxford, offers the following information on a page commemorating the event (<https://www.nuffield.ox.ac.uk/politics/aberfan/desc.htm>):

“At 9.15 am on Friday, October 21, 1966 a waste tip slid down a mountainside into the mining village of Aberfan, near Merthyr Tydfil in South Wales. It first destroyed a farm cottage in its path, killing all the occupants. At Pantglas Junior School, just below, the children had just returned to their classes after singing *All Things Bright and Beautiful* at their assembly. It was sunny on the mountain but foggy in the village, with visibility about 50 yards. The tipping gang up the mountain had seen the slide start, but could not raise the alarm because their telephone cable had been repeatedly stolen. (The Tribunal of Inquiry later established that the disaster happened so quickly that a telephone warning would not have saved lives.) Down in the village, nobody saw anything, but everybody heard the noise. Gaynor Minett, an eight-year-old at the school, remembered four years later:

It was a tremendous rumbling sound and all the school went dead. You could hear a pin drop. Everyone just froze in their seats. I just managed to get up and I reached the end of my desk when the sound got louder and nearer, until I could see the black out of the window. I can't remember any more but I woke up to find that a horrible nightmare had just begun in front of my eyes.



The slide engulfed the school and about 20 houses in the village before coming to rest. Then there was total silence. George Williams, who was trapped in the wreckage, remembered that 'In that silence you couldn't hear a bird or a child'.

144 people died in the Aberfan disaster: 116 of them were school children. About half of the children at Pantglas Junior School, and five of their teachers, were killed.”

What does this mean for you?

When the US EPA reacted to a 2008 coal ash impoundment spill in Tennessee, the response was far reaching. New rules were implemented in 2015, and those new rules have created a major increased workload for environmental drillers, many of whom are using Sonic Drilling methodologies to produce near in-situ core samples and install networks of groundwater monitoring wells.

New regulations for the mining industry would likely create the same impact. Areas surrounding tailings impoundments will need to be monitored closely, and in regions impacted by disasters already, monitoring will need to be implemented for years to make sure that pollutants are not impacting drinking water and wildlife.

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