Six dead, at least 21 missing in Brazilian mine disaster

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Brazilian authorities have confirmed that at least six people died after a tailing dam burst at a major mine in the south-eastern state of Minas Gerais last Thursday, triggering mud slides that engulfed surrounding villages and towns. Reports immediately after the disaster indicated that as many as 17 people had perished.

At least 21 others are missing. These may include up to five children, and 13 mine workers. The disaster has created a mounting humanitarian and environmental crisis and displaced at least 631 people.

The rising death toll comes amid revelations that authorities issued reports in October 2013, just before renewing the mine's licence, of the danger of a catastrophic dam breach. There is also growing anger over the lack of any warning to residents surrounding the mine after the dam had burst. Operated by a Brazilian entity, Samarco, the mine is a joint venture of BHP Billiton, the world's biggest mining company, and the Brazilian-based Vale SA, the largest iron ore miner.

The disaster reportedly began at 4:20 p.m. on Thursday afternoon, when a dike collapsed sending mining waste from a major reservoir into the adjoining valley. A water reservoir burst shortly after. The breaches released some 60 million cubic metres of potentially toxic water and waste, creating a mud flow that has extended as far as 400 kilometres and caused widespread destruction.

The town of Bento Rodrigues, located just seven kilometres south of the burst dams was hardest hit. Its 600 residents were confronted with a wall of surging mud, estimated by some to have been 20-metres high, which completely engulfed homes.

Samarco did not sound any alarms after the dams burst. The company has since stated that it does not believe Brazilian law requires that mines operate emergency alarms. It has claimed to have made phone calls to some residents in the town alerting them to the impending disaster but has not provided any details.

Survivors have described their terror. Valeria de Souza, a 20-year-old with a young baby, told the Agence France-Presse, "There was a horrible noise and we saw the mud approaching. We ran for it. It is a miracle that we are still alive." The head teacher of the town's municipal school rushed its 58 students to higher ground, after her husband ran and told her of the approaching wall of mud.

It is increasingly feared that the missing perished in the disaster. Their relatives have expressed frustration over the lack of information. Marcelo Jose Felicio, a mine contractor whose mother disappeared in Bento Rodrigues, told Reuters yesterday, "No one tells me anything... I don't know if she is alive. I don't even know if she is on the list of the missing."

While Samarco immediately claimed that the waste was "inert," the local miners' union and environmental organisations have warned that it is likely to be toxic. The material has flowed near the banks of the Gualaxo de Norte River, prompting fears of widespread water contamination. On Monday, authorities cut off the water supply of Governador Valadares, a city of some 280,000 people about 300 kilometres from the mine, over fears of water pollution.

Samarco's license has been suspended, while various government figures have promised investigations. A leader of the governing coalition, Senator Delcidio Amaral, declared in the aftermath of the disaster, "This accident will bring consequences for those companies," and said that the government would bring their executives before congress.

A state public prosecutor has also pledged to bring a

case against the companies on behalf of the 200-worst affected families. On Tuesday, Brazilian prosecutors in the state of Espirito Santo, which has been severely affected, obtained a court order mandating that BHP and Vale preserve evidence relating to the dam failure.

However, the disaster has exposed collusion between authorities and the major mining companies, aimed at boosting profits at the expense of the health and safety of workers and impoverished villagers.

On Saturday, the *Wall Street Journal* revealed that a report prepared for the Minas Gerais public prosecutor's office and published on the website of Supram, the state environmental regulator, had made warnings about the potential for a large-scale disaster just eight days before the renewal of Samarco's licence in October 2013.

It recommended, as a precondition for a renewal, that the company develop a contingency plan, in case of accidents, "given the presence of the population in the community of Bento Rodrigues." The report pointed to areas of contact between one of the dams and piles of mining waste and warned that this posed "the possibility of destabilization." It stated that. "Depending on the radius of the rupture in this process, several collapses at various levels of the slope can occur, causing a great mass of waste to flow downstream..."

Questions have also been raised about recent changes to the dam. The site was the first in Brazil to trial an inflatable rubber top on top of its dam to increase capacity by one metre. Scott Dunbar, department head of the Norman B. Keevil Institute of Mining Engineering at the University of British Columbia told the *Australian* that, "Unlike hydro-electric dams, tailings dams aren't designed to hold substantial amounts of water. When they fail the culprit typically is excessive water."

At the same time, responding to the slump in global commodities, both Vale and BHP have sought to boost their profitability through increased production. Production at the Samarco mine rose by 37 percent last year, through the introduction of a new iron ore pellet plant. Prosecutors are reportedly investigating whether it affected the volume of the dam. It also appears that the company was extending an existing dam wall, rather than constructing a new one, at the time of the collapse.

There have been at least 20 major tailing dam wall failures around the world since 2005.

A Reuters report noted that Brazil, a center of mining projects, has been the scene of a number of similar accidents, many associated with expedited licensing arrangements and lax safety measures. In 2001, a tailing dam in Nova Lima burst, killing five people in Minas Gerais. The state had just four mine engineers and four geologists to coordinate the response.

In 2014, a dam burst in Itabirito resulting in the deaths of three workers. According to the Reuters article, Minas Gerais authorities identified over 200 dams at the time that required safety improvements.

Reuters noted that the long-delayed mining code, which remains before Congress and was drawn-up during the commodity boom, makes no mention of environmental measures, instead focusing on royalties and government revenue. Speaking of the latest disaster, Klemens Laschesfki, a professor of geoscience at the Federal University of Minas Gerais, told the news service, "The risks were known to all, from the company to the politicians. The government approved it and just hoped nothing would happen."

BHP has sent its CEO, Andrew Mackenzie to inspect the site and no doubt to try to stem the fallout. Reports indicate that the mine will remain closed indefinitely. The disaster resulted in the slashing of almost \$11 billion off the company's market value by Monday, with prominent Australian financial commentator Alan Kohler issuing an article headlined, "BHP's Brazilian nightmare."



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