
NEWS RELEASE

For Immediate Release
2015MEM0030-002119
Dec. 17, 2015

Ministry of Energy and Mines

Government takes action on Chief Inspector of Mines' recommendations

VICTORIA – In response to the findings and recommendations of the Chief Inspector of Mines' (CIM) investigation into the tailings storage facility (TSF) at Mount Polley Mine in August 2014, Energy and Mines Minister Bill Bennett announced today that government will introduce new regulations and requirements that will make British Columbia a national and international leader in safety standards for tailings storage facilities.

The CIM report found, as did the Independent Expert Panel in January, that the dam failed because the strength and location of a layer of clay underneath the dam was not taken into account in the design or in subsequent dam raises. The chief inspector also found other factors including the slope of the perimeter embankment, inadequate water management, insufficient beaches and a sub-excavation at the outside toe of the dam exacerbated the collapse of the dam and the ensuing environmental damage.

While the breach would not have occurred had it not been for the undetected glaciolauustrine layer of soils (UGLU), the consequences of the breach were made worse by the other factors. Although operations on the mine site were not in contravention of any regulation, the chief inspector found that the mine failed to operate using best available practices.

The chief inspector of mines investigation team conducted approximately 100 interviews and reviewed over 100,000 pages of documents going back to 1989. This is the largest and most-complex investigation and analysis ever done in B.C.

The CIM made 19 recommendations in seven categories directed toward the mining operator, the mining industry, professional organizations and the government regulator to prevent such incidents in the future and build a safer, more sustainable industry. Government will be working to implement all of the recommendations. Key recommendations include:

- All mines with TSFs will be required to have a designated mine dam safety manager and a designated individual to oversee the mine's water balance and water management plan.
- Mines with TSFs will be required to have water management plans designed by a qualified professional.
- Independent technical review boards will be required for all mines with TSFs.
- Establish a dedicated investigation, compliance and enforcement team within the Ministry of Energy and Mines lead by a new deputy chief inspector of mines. This team will provide additional support and oversight of existing ministry investigation, compliance and enforcement functions.
- To strengthen records management and improve openness and transparency around design, construction and operation, government will establish a formal documentation management system for all TSFs from development to post-closure.

- Foster innovations in the mining sector that improve current technologies in tailings processing, dewatering and discharge water treatment.

Many of these recommendations will be addressed through the review of the Health, Safety and Reclamation Code for Mines in British Columbia. Government will also work with industry and professional organizations to implement the other recommendations. It is anticipated this work will be completed by spring 2017.

Other actions will be taken to strengthen government's compliance and enforcement of mining. Bennett plans to introduce legislation in 2016 to add administrative penalties under the Mines Act. Compliance and enforcement tools under the Mines Act are presently limited to shutting down a mine through the cancellation of a permit, issuance of stop-work orders, or pursuing prosecutions. The proposed legislation would give ministry staff the power to issue penalties for non-compliance.

The chief inspector found that the mine and its engineers employed weak practices on the mine site and many recommendations go to new standards and guidelines to improve these practices. Weak practices, however, do not constitute a legal contravention of existing mining legislation. The CIM, with advice from the Ministry of Justice, did not find sufficient evidence that Mount Polley Mining Corporation contravened existing regulatory requirements. Based on these findings, the Chief Inspector of Mines determined there were no actions that would warrant a report to Crown Counsel pursuant to the Mines Act.

The British Columbia Conservation Officer Service (COS) is still conducting its investigation into the Mount Polley accident. The COS investigation is based on compliance with the Ministry of Environment legislation. It is possible that this investigation may find non-compliance that warrants a report to Crown Counsel.

Quotes:

Minister of Energy and Mines Bill Bennett –

"We've learned from this investigation that in the case of Mount Polley, the allowable margin of risk around the design, construction and management of the tailings storage facility was too narrow to allow for an unknown factor, the layer of unstable soils below the dam embankment."

We've also learned that weak practices on the mine site increased the risk of dam failure and exacerbated environmental consequences from the breach."

"This is unacceptable. My commitment is to implement all recommendations, work with the MABC and MAC, the APEGBC and the CDA to ensure that risk of dam failure is reduced by better regulations, better policies and better professional guidelines."

Chief Inspector of Mines Al Hoffman –

"We conducted a very thorough and in-depth examination of the Mount Polley Mining Corporation's actions from its initial site investigations 26 years ago to present. Through our investigation, we determined that while the mine did not contravene any existing regulatory requirements, its management and operational practices failed in a number of areas such as water management and misplaced confidence in the TSF design."

“My recommendations address these issues and will strengthen British Columbia’s regulatory framework and build a safer, more sustainable industry in B.C.”

Learn More:

A copy of the Chief Inspector of Mines investigation is available here:

www.gov.bc.ca/mountpolleyinvestigation

Four backgrounders follow.

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BACKGROUND 1

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Findings of the Chief Inspector

The Chief Inspector of Mines (CIM) for British Columbia has completed a 16-month-long investigation into the Aug. 4, 2014 tailings pond breach at the Mount Polley Mine near Likely, B.C.

The CIM investigation team consisted of the chief inspector of mines, primary investigator, file co-ordinator, information analysts, technical writer, geotechnical engineers, geoscientists and hydrologists from Klohn Crippen Berger, and a retired RCMP investigator. The team was supported throughout the investigation by staff with the Ministry of Energy Mines (MEM).

The investigation determined that because of the undetected glaciolacustrine layer of soils (UGLU) Mount Polley Mining Corporation (MPMC) and its engineering consultants did not fully recognize and manage geotechnical and water management risks associated with the design, construction, factor of safety and operation of the tailings storage facility.

The following is a summary of the chief inspector's findings:

- At approximately 11:40 p.m. on Aug. 3, 2014, a section of the Mount Polley Mine tailings storage facility (TSF) perimeter embankment failed and slumped roughly five metres. Water in the impoundment almost immediately overtopped the slumped crest. The failure led to a major and ongoing erosion breach at approximately 1:08 am on Aug. 4, 2014, which released tailings and process water into the environment beyond the mine site.
- The mechanism of the structural failure was due to a lightly over-consolidated glaciolacustrine clay unit approximately 10 metres below the dam's foundation. This clay layer was not properly identified and accounted for in the design of the structure.
- The investigation found that Mount Polley Mining Corporation and the engineers of record did not conduct adequate studies and site investigations of the perimeter embankment foundation. This was not a contravention of any existing regulatory requirements as there were no specific guidelines or regulatory requirements in place for foundation investigations.
- To address this issue, the Association of Professional Engineers and Geoscientists of B.C. is developing professional practice guidelines for dam site characterization assessments for release in spring 2016. The guidelines will outline the standard of care and professional obligations professional engineers and geoscientists must uphold when conducting these assessments, and will define the roles and responsibilities of the various participants and stakeholders involved in this process.
- Because the UGLU was not properly identified, it was not correctly factored in when determining the strength of the dam foundation. As a result, the structural failure occurred because of two additional conditions that contributed to the dam failure. One

was an over-steepening of the downstream slope of the dam, coupled with the constructed height. The other was an unfilled sub-excavation for a buttress foundation at the toe of the embankment at the site of the failure.

- Neither of these conditions contravened existing regulatory requirements. The steepness of the downstream slope was approved by the engineer of record to meet Canadian Dam Association guidelines for safety, and the sub-excavation was in general conformance with the design intent.
- The structural failure of the embankment combined with the condition of the tailings pond — with insufficient beaches and too much supernatant water — led to an erosional failure of the embankment that rapidly widened into a complete breach and resulted in the release of tailings and water into the surrounding environment. Two investigations have now confirmed the breach would not have happened if details of the clay layer had been fully understood and factored into the design of the dam.
- These conditions occurred because MPMC failed to effectively manage water at the mine site and in the TSF. An adequate water management plan did not exist, there was no qualified individual responsible for water balance in the TSF, and MPMC did not adequately characterize the risk of surplus supernatant water, which had been compounding since the mine reopened in 2005.
- This was not a contravention of any existing regulatory requirements as there were no specific guidelines or regulatory requirements in place for water management for mine sites.
- There is a need for the Regulator (MEM) to formalize professional reliance guidelines for tailings storage facility design, construction and management in legislation, regulation and-or the Health, Safety and Reclamation Code for mines in British Columbia.

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BACKGROUND 2

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Ministry of Energy and Mines

Chief Inspector of Mines' recommendations

The Chief Inspector of Mines for British Columbia has completed a 16-month long investigation into the Aug. 4, 2014, tailings pond breach at the Mount Polley Mine near Likely.

Based on the findings of this investigation, the chief inspector has made 19 recommendations in seven categories directed toward the mining operator– Mount Polley Mining Corporation (MPMC) – mining industry, professional organizations and the regulator– Ministry of Energy and Mines.

Many of these recommendations will be addressed through the review of the Health, Safety and Reclamation Code (the Code). Government will also work with industry and professional organizations to implement a number of other recommendations. It is anticipated this work will be completed by spring 2017.

This includes work the Association of Professional Engineers and Geoscientists of B.C. is undertaking to develop professional practice guidelines for dam site characterization assessments for release in spring 2016. Those guidelines will outline the standard of care and professional obligations professional engineers and geoscientists must uphold when conducting these assessments, and will define the roles and responsibilities of the various participants and stakeholders involved in this process.

Recommendations for the mining operator:

1. Proponent governance

- Mine dam safety manager – any mine with a tailings storage facility (TSF) should have a qualified individual designated as a mine safety manager responsible for oversight of planning, design, operation, construction and maintenance, and surveillance of the TSF, and associated site-wide water management (aligns with independent panel recommendation).
- Water balance management – water management and water balance issues for mining projects must be designed by a qualified professional (aligns with independent panel recommendation).
- TSF operations manual – mine manager should ensure the operation, maintenance and surveillance manual required by the Code for all impoundments adheres to applicable Canadian Dam Association and Mining Association of Canada guidelines.
- Mine emergency response plan – mine manager must ensure that the Mine Emergency Response Plan adheres to applicable regulations, is maintained on a regular basis for currency, incorporates appropriate response measures to emergencies including those involving the TSF, and is written and distributed in such format as to serve as a procedural

guide during an emergency or other event.

- Risk recognition and communication – all mine personnel have a role to play in recognizing and reporting risk conditions, especially those that could affect health, safety and environmental protection, and should be educated in the recognition of conditions and events that could impact TSF safety or contravene applicable permit conditions and regulations.

Recommendations for the mining industry:

2. TSF design

- Tailings storage and water management systems and structures should be designed for worker and public safety and the protection of the environment (aligns with independent panel recommendation).
- Mines with impoundments should each develop independent technical review boards to provide additional perspectives on site investigation, site selection, design, construction, maintenance, operations, surveillance, water management and closure (aligns with independent panel recommendation).

Recommendations for professional organizations:

3. Professional and association standards

- The Association of Professional Engineers and Geoscientists of BC, The Mining Association of Canada, and the Canadian Dam Association should update and strengthen guidelines and standards of practice including those specific to TSF design and management, dam safety and construction (aligns with independent panel recommendation).
- The Regulator (MEM) should consider and incorporate as appropriate guidelines from these external associations as applicable and consistent with MEM objectives (aligns with independent panel recommendation).

Recommendations for the regulator:

4. Regulator functions

- The Regulator should undertake a comprehensive review of the Code to ensure that the lessons learned and recommendations from this report are fully considered and appropriately incorporated.
- The Regulator should ensure a perspective that spans the life of the mine be considered for Mines Act permit applications, while acknowledging that the nature of mining frequently requires changes to the life-of-mine plan (aligns with independent panel recommendation).
- The Regulator must enhance its investigative capacity, as well as its ability to exercise its existing compliance and enforcement authority under the Mines Act and Code. A supported director-equivalent position specific to investigation, compliance and enforcement should be established to evaluate and oversee these roles. To increase compliance and achieve greater safety at mines, a full range of regulatory tools, such as incentives, administrative penalties, outside agency collaboration and other best practices should be considered (aligns with independent panel recommendation).
- A regulatory dam safety manager position dedicated to the coordinated regulatory

oversight of tailings dams should be established (aligns with independent panel recommendation).

- The Ministry of Energy and Mines should conduct an internal review of operational and business practices.

5. Strengthening records management

- To support long-term integrated decision-making by the Regulator, (MEM) should establish a formal documentation management system for all mines from development to post-closure. This system will provide greater openness and transparency of MEM decisions.

6. Regulatory integration

- Government should review the Ministries of Environment (MOE) and Energy and Mines and look for opportunities where processes and standards can be aligned to support timely and effective outcomes that meet agency objectives (environmental protection, worker health and safety, facilities integrity).
- Government should review MEM and MOE permitting processes and look for opportunities to integrate and align them as appropriate to avoid duplication and increase efficiencies.

7. Fostering innovation:

- MEM, the industry, professional organizations, and educational institutions should continue to seek new collaborative opportunities to foster education. This initiative could include the availability of standards for education to better define the knowledge, skills and abilities for various accountabilities within mining, and to increase the knowledge base, information sharing and innovation.
- Government and industry should support research and development efforts to improve tailings processing, dewatering and discharge water treatment technologies (aligns with independent panel recommendation).

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BACKGROUND 3

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Mount Polley Mine tailings storage facility construction chronology

The Mount Polley Mine tailings storage facility (TSF) was designed to be built and permitted in stages over the life of the mine, with each stage driven by a number of variables, including mine plan, milling process water requirements, storage capacity for tailings and storage capacity for mine-influenced water.

The stages were also dependent on a sufficient supply of construction materials (quarry or run-of-mill rock) as well as construction capacity, including adequate time in a construction season and logistics limitations such as equipment availability or weather constraints.

The Ministry of Energy and Mines evaluated and issued permits under the Mines Act for each successive stage of construction. Periodic inspections by MEM geotechnical inspectors were conducted at the site.

Chronology of construction stages:

Stage 1a to 931 metres – 1995-96. The initial Mines Act permit for Mount Polley Mine, issued Aug. 3, 1995, approved the construction of a starter dam for the TSF to an elevation of 931 metres, an embankment with a maximum height of 11 metres.

Stage 1b to 934 metres – 1996-98. The planned raise to an elevation of 934 metres was approved on Sept. 23, 1996.

Stage 2 – 1998-2000. An application for a Mines Act permit amendment to raise the dam to 940 metres was approved on April 7, 1998.

Stage 3 – 2000-01. Stage 3 was approved on June 13, 2000, allowing a raise to 944 metres. An additional Mines Act permit amendment application for Stage 3 to increase the raise to 945 metres was approved May 30, 2001.

Care and maintenance – 2001- 05. Mine operations were suspended in October 2001 and the mine was placed in care-and-maintenance status. Over the course of the closure, substantial water accumulated in both the pits and the TSF.

Stage 4 – 2005-06. A restart permit was issued May 4, 2005. The accompanying application to raise the dam to 948 metres was approved on May 25, 2005.

Stage 5 – 2006-07. An application for a Stage 5 raise of the dam to 951 metres was approved on Aug. 2, 2006.

Stage 6a – 2007-08. The Stage 6 raise planned for an elevation of 958 metres was issued a Mines Act permit amendment on Feb. 9, 2008 and resulted in a raise to 954 metres.

Stage 6b – 2009-11. The second year of construction completed the Stage 6 raise to 958 metres.

Stage 7 – 2011-12. An amendment application to raise the dam to 960.5 metres was approved Aug. 15, 2011.

Stage 8 – 2012-13. The application for the Stage 8 raise to 963.5 metres was approved on June 29, 2012. In the same construction season, an additional application amending the Stage 8 raise to 965 metres was approved Oct. 15, 2012.

Stage 9 – 2013-14. The application for a Stage 9 raise to 970 metres was approved Aug. 9, 2013.

Stage 10 (planned) – 2014. A Stage 10 design was produced, and a Mines Act permit amendment application was submitted but no Stage 10 raise was commenced due to the failure of the TSF embankment. The Stage 10 raise was planned to achieve a crest elevation of 972.5 metres, raise the buttress along the main embankment and add a buttress along the full length of the perimeter embankment.

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BACKGROUND 4

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Ministry of Energy and Mines

Government response to Mount Polley Mine tailings storage facility breach

On Aug. 4, 2014, a large and unprecedented breach occurred at the Mount Polley Mine tailings storage facility. Government took immediate steps to respond, addressing health and safety concerns and initiating three investigations.

Water sampling by Ministry of Environment (MOE) staff began on the evening of Aug. 4, 2014, and remains ongoing. The drinking water ban was lifted by Interior Health for Quesnel Lake, outside the immediate area of impact – 100 metres from the mouth of Hazeltine Creek, on Aug. 13, 2014. To date, MOE has taken over 190 water samples and continues to monitor impacts on fish. MOE's sampling is in addition to the more than 3,800 water samples taken by the Mount Polley Mining Corporation (MPMC).

As part of the pollution abatement order issued by MOE on Aug. 5, 2014, MPMC was ordered to take immediate action to stop the further release of mine tailings into nearby waterways and to submit environmental impact assessments and clean-up action plans to the ministry, including plans to stabilize Hazeltine Creek.

In December 2014, the Ministry of Energy and Mines approved an amendment to the MPMC Mines Act permit to allow the company to begin repairs of the breach in its tailings storage facility dam. This work was completed in April 2015.

Throughout the response and remediation process, government and the Mount Polley Mining Corporation have held regular community meetings to keep residents up to date on efforts to address the breach and related issues. To date, more than 20 community meetings have been held for residents of Likely, Williams Lake and members of the Soda Creek Indian Band (Xat'sull First Nation) and Williams Lake Indian Band.

Since the August 2014 failure of the tailings pond at Mount Polley Mine, the provincial government has continued to oversee all environmental remediation work undertaken by the MPMC. Phase 1 of this work, which focused on stabilizing Hazeltine Creek so it would be safe over the winter months and through the higher water flows from spring freshet is now complete. To-date, the company has spent nearly \$70 million on remediation work.

Phase 2 of the remediation and restoration will run through the summer of 2016 and beyond. It will focus on repairing impacts of the breach and will also have active participation from area First Nations and local communities.

On June 5, 2015, MPMC released its Post Event Environmental Impact Assessment Report which provides detailed information on the physical, chemical and biological impacts of the spill and will inform future work in the area. This document is available at:

On Jan. 30, 2015, the Independent Expert Engineering Investigation and Review Panel delivered a Final Report on its investigation into the cause of the failure of the tailings storage facility at the Mount Polley Mine. The report also included the release of 35,000 pages of documentation related to the panel's investigation. The panel concluded the dam failed because the strength and location of a layer of clay underneath the dam was not taken into account in its original design and made seven recommendations to prevent such incidents in the future.

Government committed to implement all of the panel's recommendations and on June 24, 2015, Energy and Mines Minister Bill Bennett appointed a Code Review Committee pursuant to section 34 of the Mines Act to determine how best to implement the panel's recommendations.

On July 9, 2015, statutory decision-makers with the ministries of Energy and Mines and Environment conditionally authorized the Mount Polley Mine Corporation to begin restricted operations. The amended Mines Act permit authorizes the company to operate at roughly half the rate of normal operations. The permit does not provide authorization for use of the tailings facility during the operation. Mount Polley Mine will use Springer Pit, an existing open pit on the mine site, to manage the tailings.

On Nov. 30, 2015, the Province approved MPMC's application for a short-term permit to treat and then discharge water outside of the mine site. The permit is needed because it is estimated that, under normal precipitation conditions, water levels in Springer Pit will reach permitted capacity in April 2016.

Mount Polley Mining Corporation must submit a long-term water treatment and discharge plan to government by June 30, 2016, in order to continue operations.

A third independent investigation into the cause of the Mount Polley tailings pond breach is being led by British Columbia's Conservation Officer Service, and assisted by Environment Canada, Department of Fisheries and Oceans Canada and the RCMP.

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