



Decision and Reasons for Decision of the Chief Inspector of Mines on whether to submit a Report to Crown Counsel to assess if charges should be laid and a prosecution commenced for contravention of the *Mines Act*.

Decision

Under my direction, Ministry of Energy and Mines (MEM) staff conducted a comprehensive and thorough investigation with respect to the understanding, operation, and ultimate failure of the Mount Polley Mine Tailings Storage Facility (TSF). The investigation showed that there was no significant contravention of the *Mines Act*, the Mines Regulation, Mines Act Permit M-200 or the Health, Safety and Reclamation Code for Mines in British Columbia (the Code). Together these documents will be referred to in this decision document as Regulatory Requirements. Although I have concerns about the oversight of the TSF activities on the mine site, orders pursuant to the BC Mines Act have been issued to address these concerns. For the reasons set out below, I do not believe there is sufficient evidence of a contravention with respect to the Regulatory Requirements. Therefore, I have decided not to submit a Report to Crown Counsel to assess whether charges should be laid and a prosecution commenced. As is our normal practice in these investigations, we sought legal advice throughout the investigation.

Background

On the night of August 3-4, 2014, the TSF at Mount Polley Mine, a copper and gold mine in interior British Columbia, failed. Over an approximately sixteen hour period, there was a progressive breach of the Perimeter Embankment (PE) of the TSF, which resulted in the release of over 21 million cubic metres of water and mine tailings into the surrounding environment and watercourses.

Section 7 of the *Mines Act* gives me the statutory authority to investigate and report on an accident that has caused serious personal injury, loss of life or property or environmental damage. The breach of the TSF at Mount Polley Mine caused environmental damage.

Section 37 of the *Mines Act* states that a person who contravenes a provision of the *Mines Act*, the Mines Regulation, the Code or an order made under any of them commits an offence.

One of the objectives of my investigation was to determine whether the Regulatory Requirements had been contravened, and if so, to determine whether to submit a Report to Crown Counsel to assess if charges should be laid.

Reasons

Root cause analysis (RCA) is a structured evaluation method which was applied to the analysis of information and determination of findings of my investigation. The details of the RCA are comprehensively described in my Investigation Report.

RCA applied in the investigation exposed the following proximate causes that led to the TSF failure. In RCA, proximate causes are those which, had they not occurred, would have prevented the undesired event from taking place.

In my investigation report, I found that the mechanism of the structural failure was a sliding of materials within the lightly overconsolidated glaciolacustrine clay unit located approximately ten metres below the foundation of the PE. The failure caused the embankment crest to drop approximately 5 metres and is considered the initiating event of the ultimate breach of the TSF. The structural failure of the embankment alone did not cause the breach but, coupled with the condition of insufficient beaches on the upstream side of the PE and too much supernatant water being stored within the TSF, a progressive erosional failure of embankment rapidly widened into a complete breach.

- 1) Structural failure of the PE occurred because of the following three conditions:
 - a) Weak uncharacterized Upper Glaciolacustrine Unit (UGLU) underlying the foundation of the PE, confirmed in the area of the breach.

Criteria for TSF foundation investigation were not outlined by the Canadian Dam Association (CDA), Association of Professional Engineers and Geoscientists of BC (APEGBC) or formalized as Regulatory Requirements. In the absence of a regulatory requirement for foundation investigation, there is no contravention of the Regulatory Requirements.

My Investigation Report recommends that the APEGBC develop specific guidelines for TSF foundation investigation. As Chair of the Code Review Committee, the Committee is considering revisions to the Code and will incorporate as appropriate guidelines for foundation investigations developed by APEGBC.

- b) Open buttress sub-excavation of the PE downstream toe.

The sub-excavation at the toe of the downstream PE caused a reduction in the safety of the embankment. The sub-excavation at the toe of the embankment would not have caused the embankment to fail if the UGLU had been identified in the foundation and the embankment designed accordingly.

The sub-excavation at the toe of the embankment did not constitute a contravention of the Regulatory Requirement because it was in general conformance with design.

In my Investigation Report, I recommend that mine operators assign a mine dam safety manager to improve oversight of TSFs. One of the responsibilities of a mine dam safety manager will be to recognize and prevent conditions that could impact the safety of a tailings dam. I also recommend that professional organizations define the roles and responsibilities of the EoR and the mine dam safety manager. The on-going Code Review Committee is considering revisions to the Code to incorporate, as appropriate, guidelines to improve oversight of design, construction and operation of impoundments.

c) Over-steepened geometry and height of the PE.

The PE was built with an over-steepened slope and was approved by the EoR to meet the required CDA guidelines for safety of the dam. The UGLU underlying the PE was not identified in the foundation investigations on which the design was based. The professional judgment exercised by the EoR was based on a mistaken belief in the strength of the foundation.

There are no TSF foundation investigation guidelines or formalized Regulatory Requirements. An error in professional judgment is not a contravention of the Regulatory Requirements.

In my Investigation Report, I recommend that the CDA update their safety guidelines to reduce ambiguity, and develop specific guidelines for mining embankments which recognize the continued design changes and raises during the life of a TSF. The Code Review Committee is considering revisions to the Code to incorporate, as appropriate, revisions to the CDA guidelines.

2) The structural failure (consisting of three proximate causes outlined above) combined with insufficient beaches and too much supernatant water stored in the TSF led to the ultimate breach:

Mount Polley Mine management did not develop an adequate water management plan and did not adequately characterize the risk of surplus supernatant water in the TSF. There was an ongoing need for the storage of surplus supernatant water and an inability to obtain the appropriate authorizations for water treatment and discharge to the environment. Adequate beaches could not be continuously maintained primarily as a result of the surplus supernatant water.

Specific design parameters for the maintenance of beaches were not required by the EoR, and design parameters for storage of surplus supernatant water are not formalized as regulatory requirements. Therefore, these do not constitute a contravention of Regulatory Requirements.

In my Investigation Report, I recommend a qualified professional design and oversee the water balance and water management plan. Furthermore, to enhance oversight of TSFs, I recommend that the respective roles of the mine dam safety manager and EoR at mines be clearly defined with respect to the integration of water management and TSF design. This recommendation is being reviewed by the Code Review Committee, and will be incorporated as appropriate.

Conclusion

As outlined above, these proximate causes led to the breach of the TSF and the ultimate release of water and tailings to the environment. The analysis to determine the proximate causes, and root causes is fully described in my Investigation Report. In my opinion, there is not sufficient evidence of an offence of the Regulatory Requirements to warrant the submission of a Report to Crown Counsel.

I appreciate that the decision not to submit a Report to Crown Counsel is a significant one. However, a possible prosecution under the *Mines Act* is only one avenue to ensure compliance and enforcement. My decision does not preclude the issuance of future orders, revisions to the Code, review of MEM operational policy, or investigative processes by other agencies.

In my Investigation Report, I make numerous recommendations which I believe will significantly mitigate the risk of a similar occurrence. The recommended improvements to TSF safety in the future are directed towards the Mount Polley Mine, the mining industry generally, professional organizations and regulators.



Al Hoffman, P.Eng.
Chief Inspector of Mines
December 8th, 2015