



Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report

November, 2014

1. Background

On August 4, 2014, a tailings pond breach occurred at Mount Polley Mine in south-central B.C., near the town of Likely. The Ministry of Environment (Ministry) issued a Pollution Abatement Order (Order) on August 5, 2014 to the Mount Polley Mine Corporation (MPMC). The Order outlined the required steps MPMC is required to take in order to monitor and assess the environmental impact of the breach, mitigate further pollution from occurring, and remediate the impacted area. The Ministry is overseeing the development and implementation of all the associated plans and actions under the Order. The Ministry will also be overseeing the implementation of the responsible party's actions to ensure MPMC meets the ministry's needs for assessing potential environmental impacts, monitoring ecosystem recovery, and remediating the impacted area.

This Progress Report provides an overview of the current approach to meeting the requirements under the Order, including the work done to date, and what remains outstanding. The Progress Report includes background and materials related to the response and approach to Phase I of the Remediation Plan, and also describes the Ministry's expectations for Phase II of the Remediation Plan.

A. Ministry's Role

The Ministry of Environment has various responsibilities in response to environmental remediation of the tailings breach. Most importantly, the Ministry is responsible for regulatory oversight, and for overseeing all clean-up, remediation and restoration work. The Ministry is also responsible to ensure a long-term environmental monitoring program is implemented by the company. The Ministry's regulatory oversight includes issuing Orders under the *Environmental Management Act*; issuing advisory or warning letters; amending orders under the *Environmental Management Act*; and, ensuring compliance with existing orders and permits under the *Environmental Management Act*.

The Ministry is also responsible for:

- Reviewing, providing input, and accepting the plans and actions of the company related to impact assessment, monitoring, mitigation and remediation of the incident.

- Coordinating regulatory actions and monitoring with other agencies such as Ministry of Forests, Lands and Natural Resource Operations, Interior Health Authority , Fisheries and Oceans Canada, and Cariboo Regional District and ensuring these agency needs are met.
- Reviewing, assessing and auditing the monitoring results from the company, the Ministry of Environment and other agencies as noted in appended *Monitoring Framework* and providing feedback and interpretation on the information collected. See the appended *Monitoring Framework*, which outlines the parties involved in monitoring, their roles, and anticipated actions throughout the phases.
- Establishing and running the Environmental Working Group to facilitate environmental technical discussions in response to the tailings breach as per the Letter of Understanding (LOU) between the Province and the Williams Lake Indian Band and the Soda Creek Indian Band, and the Science Advisory Panel. Also, participating in the Senior Officials Committee as per the LOU.
- Community outreach and support, including responding to enquiries from the public and holding information meetings.

B. Ministry of Environment's Long Term Goal's for Environmental Mitigation and Remediation

The Ministry's long-term goals for the Mount Polley tailings breach are that the Ministry, as the regulatory agency, will be satisfied with MPMC's final remediation plan and that the Ministry, as the regulatory agency, will be satisfied that the area has been cleaned-up/remediated to an acceptable standard.

To achieve these goals, an iterative process will be required, allowing planning to evolve as new information comes to light based on results of monitoring, research studies, and on-the-ground conditions to meet the requirements of the Order.

C. Phased Approach

Given the need for an adaptive management approach and the span of work that needs to be completed to meet the requirements of the Order, a phased approach is being taken. It is important to understand that while these phases are given start and end dates, impact assessment, mitigation, and remediation activities all began immediately after the breach and are ongoing. The following three phases are described in detail below:

The *Impact Assessment Phase* has been underway since August 2014, and will continue until August 2016. The primary focus of this phase has been to develop a comprehensive understanding of the impacts of the tailings breach on archaeology, hydrology, water quality, soil, sediment quality, terrestrial, and aquatic resources, in order to determine what information needs to be collected over time. The information collected will then be used to update our understanding of the impacts, and be used to refine and update the long-term monitoring plan and final remediation plan.

Phase 1, from October 2014 to June 2015, focuses on mitigating the impacts of the tailings breach, and ensuring that no additional damage to the environment or human health and safety occurs. It involves implementing measures and contingency plans to ensure that the increased water flow from thawing snow (also known as spring freshet or spring breakup) will not result in additional environmental or human health impacts.

Phase 2, from July 2015 to August 2016 and beyond, focuses on remediating the impacts of the breach. This phase will commence at the end of Phase 1 when the increased risk from high water levels has passed. While Phase 2, like the previous phases, will include ongoing impact assessment, monitoring, and mitigation activities, it will primarily focus on the remediation of the impact of the breach.

2. Progress Report for Phase I

The first phase of long-term remediation of the area impacted by the Mount Polley tailings breach focuses on human health and environmental safety from October 2014, through the winter and spring, to June 2015.

MPMC has already completed or initiated many components of Phase I, towards achieving three key Ministry expectations, which will ensure:

- No further unauthorized discharges into Hazeltine Creek;
- Stabilization of the impact zone to manage seasonal events; and,
- Water quality entering Quesnel Lake and at the outer edge of the impact zone will meet provincial water quality guidelines.

The Ministry considers the following activities completed or suitably initiated:

1. Safety:
 - Wood debris removal is initiated and ongoing, and
 - Polley Lake draw-down is complete but needs to be maintained.
2. Containment:
 - Tailings storage facility rock dyke is operational,
 - Tailings storage facility sump is operational, and
 - Pumping systems fully functional since Sept 4, 2014 but need to be maintained.
3. Monitoring:
 - Monitoring plan is in place and monitoring is ongoing,
 - Plume modelling is complete with final results yet to be received,
 - Individuals acting as environmental monitors are in place to observe and supervise development activities along Hazeltine Creek,
 - Five monitoring buoys are being installed in Quesnel Lake to provide plume monitoring through winter and other periods of poor weather, and
 - Monitoring program now includes using Fisheries and Oceans Canada zooplankton sampling methodology to enable valid comparison, particle size analysis, tissue analysis of juvenile sockeye for metals, and the Likely Bridge monitoring site.

4. Protecting Archaeological resources:
 - Utilizing First Nations members to monitor for First Nation archaeological values, and
 - Complying with Archaeologist direction.
5. Installing a fish fence at the mouth of Hazeltine Creek is complete.
6. Erosion mitigation:
 - Grass seeding is complete,
 - Silt fencing and hay bale installation are ongoing,
 - Bridge construction outside flow channel is complete,
 - Subject to safety considerations, inflows from Polley Lake into Hazeltine Creek are decreased when possible to reduce the potential erosion and sediment loading, and
 - Silt fence installation at mouth of Hazeltine Creek is complete.
7. Treatment:
 - Sediment control ponds are under development at the mouth of Hazeltine Creek.
8. Upon request, filters have been provided to residents who use Quesnel Lake surface water.
9. Reporting:
 - Weekly update reports submitted to MoE and the Environmental Working Group,
 - Weekly update calls with MoE and other agencies updating the environmental protection and monitoring activities at the mine and in the impact zone,
 - Ongoing monthly meetings with First Nations,
 - Regular public meetings, and
 - Weekly posting of monitoring updates on the MPMC website.
10. Plans submitted for:
 - Tailings storage facility downstream sump overflow protection pond and associated notice of work has been submitted to Ministry of Energy and Mines.
 - Evaluating the stability of the Polley Lake plug and associated notice of work has been submitted to Ministry of Energy and Mines. Stability evaluation is ongoing.
11. Plan Overview
 - A table summarizing MPMC's response is underway, which divides the impact zone from the tailings storage facility breach into 9 sub component areas:
 1. Tailings storage facility
 2. Polley Lake plug
 3. Polley Lake
 4. Upper Hazeltine Creek
 5. Hazeltine Canyon
 6. Lower Hazeltine Creek
 7. Edney Creek
 8. Quesnel Lake
 9. Quesnel River

While significant progress has been made, the Ministry still requires the following activities from the company over the short-term up-to and including spring freshet (breakup) 2015:

1. Tailings Storage Facility (TSF) subcomponent
 - Tailings berm breach repaired to a capacity that can store freshet 2015 flows, and
 - A plan to mitigate windblown dust from TSF.
2. Polley Lake Plug subcomponent
 - A plan for gravity outflow and fish control structure for Polley Lake, and
 - A plan to operate Polley Lake flow control in order to manage freshet flows and ensure the stability of the Polley Lake plug.
3. Polley Lake subcomponent
 - Complete bathymetric assessment in Polley Lake to determine extent of sediment distribution, and
 - An evaluation of breach impacts on the benthic environment in Polley Lake.
4. Upper Hazeltine Creek subcomponent
 - Complete stream channel and stream bank works to protect against erosion.
5. Hazeltine Canyon subcomponent
 - Determine possible works or prepare plans to mitigate erosion in the canyon area.
6. Lower Hazeltine Creek subcomponent
 - Develop stream channel and bank remediation works to protect against further erosion impacts and enable fish passage, and
 - Review of MPMC's proposed level of sediment removal by the lower Hazeltine Creek sedimentation ponds is 80% of the suspended sediment input levels. While this is considered acceptable with the current infrastructure limitations, the Ministry expects improved rates of sediment removal with the goal of achieving a Water Quality Objective of 8 NTU during non-storm events in the receiving environment. Possible further treatment options may include:
 - Additional source control,
 - Active sediment removal, and/or
 - Use of flocculant in sediment ponds.
7. Edney Creek subcomponent
 - Complete stream remediation works to protect against further erosion impacts and enable fish passage.
8. Quesnel Lake subcomponent
 - Evaluate and consider subsurface flows into Quesnel Lake from Hazeltine Creek.
9. Quesnel River subcomponent
 - Establish a sediment monitoring program to evaluate potential impacts in the river.

The Ministry is also requesting the following information from the company which is still outstanding over the short-term up-to and including spring freshet (breakup) 2015:

- Baseline data on pre- and post-event hydrology and water quality for Hazeltine Creek, Polley Lake and Quesnel Lake,
- Environmental risk assessment,
- Human health risk assessment, and
- *Mines Act* and *Environmental Management Act* permit applications and supporting information related to future development required to resolve issues related to the TSF breach.

The Ministry acknowledges submission dates for these reports are dependent upon the completion of related reports monitoring and sample analysis and evaluation.

This assessment outlining what actions have been completed/initiated to the Ministry's satisfaction, and what actions and information is still required over the short-term has been provided to Mount Polley Mining Corporation in a letter dated November 21, 2014.

This letter, along with other supporting documents, can be found in the appendices to this Progress Report and can also be found online at the Ministry's dedicated Mount Polley Incident website at <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/>.

It is important to understand that beyond this planning and activity for work through spring freshet 2015, long-term monitoring, work plans and mitigation measures will need to be initiated and reviewed to address potential long term impacts to fish, wildlife and vegetation. This work will continue over the course of years.

In response to the Order, and to fully describe activities planned during Phase I, MPMC has provided a number of planning documents, which have been reviewed by the Ministry, Environmental Working Group Members, First Nations, Ministry of Forests, Lands and Natural Resource Operations, and local community observers. The findings of these reviews have been regularly relayed to MPMC since the incident began in August 2014. The compilation and integration of all of these planning documents encompass the necessary planning for Phase I.

A. Related planning documents

The planning documents that have been submitted and reviewed include:

1. Comprehensive Environmental Impact Assessment and Action Plan (August 15, 2015)
2. Conceptual Interim Erosion and Sediment Control Plan (August 21, 2014)
3. Comprehensive Environmental Impact Assessment Work Plan (August 29, 2014)
4. Lower Hazeltine Creek Erosion and Sediment Control Plan (September 12, 2014)
5. MPMC Mount Polley Progress Report (September 15, 2014)
6. Integrated Contingency and Mitigation Plan for the Short Term Letter (October 10, 2014)

These planning documents have been developed by MPMC as a part of their response to the Order. These documents may be updated over time as more information becomes available.

B. Description of Planning Documents

The following provides a brief description of each of the planning documents.

1. Comprehensive Environmental Impact Assessment and Action Plan (August 15, 2015)
 - a. Submitted in response to Section 7 of the Order, requiring MPMC to submit an Action Plan by August 15, 2014 that is based on a comprehensive assessment of the impacts associated with the tailings release. This plan responds to the requirements for assessment and mitigation of the impacts associated with the Mount Polley Mine tailings breach.
 - b. Includes the following information: a review of the setting and environment that existed prior to the release for context to the assessment and action components of the plan; a plan for assessing impacts to the terrestrial and aquatic environments that were affected by the tailings release; a description of the processes to be implemented to develop specific actions in response to the tailings breach and to mitigate the impacts identified above; a plan for monitoring potential existing and future impacts to water, sediment, soil, lands, and aquatic and terrestrial life; a program to inform and consult with stakeholders; and, a schedule and program for reporting the progress and results of this Plan.
2. Conceptual Interim Erosion and Sediment Control Plan (August 21, 2014)
 - a. Describes measures to be implemented, at a conceptual level, to reduce sediment loading in Hazeltine Creek, including in-stream works and best management practices.
3. Comprehensive Environmental Impact Assessment Work Plan (August 29, 2014)
 - a. Outlines the impact assessment and monitoring work plans required as part of the Comprehensive Environmental Impact Assessment and Action Plan.
4. Lower Hazeltine Creek Erosion and Sediment Control Plan (September 12, 2014)
 - a. Describes, in greater detail, the specific plan to rehabilitate the lower portion of Hazeltine Creek, from below its canyon above the Ditch Road (Horsefly Lake Forestry Service Road), down to the shoreline of Quesnel Lake, as well as specific measures to be implemented to reduce sediment loading into Quesnel Lake.
 - b. The work described in this plan will be completed in parallel with the Comprehensive Environmental Impact Assessment and Action Plan. Where and when available, results and analyses generated by the CEIA will be used to inform and direct detailed implementation of this Plan.
5. MPMC Mount Polley Progress Report (September 15, 2014)
 - a. Responds to the reporting requirements of Section 8 of the Order, which required MPMC to submit a formal written update by September 15, 2014 on work at the Mount Polley site.
 - b. Provides the following information as required by the Order: a list of all other qualified professionals who contributed to the report, and a summary of their qualifications; a summary of the preliminary EIA and results; a summary of the comprehensive EIA and results to date; a description of clean-up activities, mitigation measures, site restoration and management actions that were implemented as a result of the preliminary and

comprehensive EIA; recommendations for additional mitigation and restoration measures, if appropriate; and, a proposed ongoing monitoring program.

6. Integrated Contingency and Mitigation Plan for the Short Term Letter (October 10, 2014)
 - a. This is a response letter from MPMC to the Ministry regarding the Ministry's request for an Integrated Contingency and Mitigation Plan for the short-term. MPMC provides an Environmental Response Plan Overview; Short Term Objectives, Monitoring, Mitigation and Contingency Plan; and Monitoring Update.

3. Ongoing Actions

Throughout Phase 1 and Phase 2, the Ministry will continue to:

- Monitor the receiving environment, on a less frequent basis, and conduct audit sampling of the mine and their consultants.
- Monitor MPMC for compliance with the *Environmental Management Act*, the Order and any related amendments.
- Work with MPMC to ensure longer term mitigation strategies are developed and implemented to ensure the long term health of Hazeltine Creek, and Polley and Quesnel Lakes. Examples would include development of a stable stream channel, development of spawning channels and fish habitat, development of sustainable riparian vegetation and habitat.
- Consider the findings of the sampling programs and determine what the most viable long term mitigation and remediation options are considering scientific knowledge, local knowledge and First Nations traditional knowledge of the area, and advice from Environmental Working Group and Science Advisory Panel.

Phase II of the long term plan covers the timeframe from July 2015 to August 2016, and focuses on remediating the impacts of the breach. During this period, the Ministry will work with the company to implement longer term mitigation strategies ensuring the health of Hazeltine Creek, and Quesnel and Polley Lakes, while continuing to monitor the company's compliance with the Environmental Management Act and the Pollution Abatement Order.

4. Conclusion

Responding effectively to the Mount Polley Tailings Storage Facility breach will rely on the constant interchange of information and adapting to new information as it becomes available. This approach will be the most effective and appropriate strategy for mitigating the impacts of the breach and successfully meeting provincial clean-up requirements.

The Ministry, the Environmental Working Group and the Science Advisory Panel with input from First Nations, and other ministries, agencies and levels of government will continue to provide feedback to MPMC on the most appropriate courses of action to resolve all issues.

It is also important to understand that beyond planning and activity for work through June 2015, long term monitoring, work plans and mitigation measures will need to be initiated and reviewed to address potential long term impacts to fish, wildlife and vegetation. This work will continue over the course of years.

Appendices

1. Ministry's Status Report Letter to Mount Polley Mining Corporation on Accepted and Outstanding Mitigation and Remediation Activities (November 21, 2014)
2. Monitoring Framework November 2014
3. Mount Polley Mining Corporation Planning Documents:
 - a. Comprehensive Environmental Impact Assessment and Action Plan (August 15, 2015)
 - b. Conceptual Interim Erosion and Sediment Control Plan (August 21, 2014)
 - c. Comprehensive Environmental Impact Assessment Work Plan (August 29, 2014)
 - d. Lower Hazeltine Creek Erosion and Sediment Control Plan (September 12, 2014)
 - e. Mount Polley Progress Report (September 15, 2014)
 - f. Integrated Contingency and Mitigation Plan for the Short Term Letter (October 10, 2014)
4. Ministry's Presentation to Communities on Progress Report (November 23 and 24, 2014)
5. Frequently Asked Questions