"Not An Act of God"

The Embankment Failure at Mount Polley Mine[1]

A Submission to the Mount Polley Independent Expert Engineering Investigation and Review Panel

December 2014

Environmental Law Centre
UNIVERSITY OF VICTORIA

[1] Taken from Davies et. al.'s Tailings Dam Failure Axiom: "Tailings Dam Failures are a result of design and/or construction/operation management flaws - not 'Acts of God'." Michael Davies, Todd Martin, Peter Lighthall, "Mine Tailings Dams: When Things Go Wrong" (2002) at 8. Available at: http://www.infomine.com/library/publications/docs/Davies2002d.pdf.

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NOTE TO READERS: This report has been prepared by students enrolled in the Environmental Law Centre clinic program at the University of Victoria, Faculty of Law. Because the students are not qualified to practice law, any legal information in this report should not be construed as legal advice. It is believed to be accurate in its portrayal of the facts that led to the Mount Polley Mine disaster of August 4, 2014; however, the documents needed to fully assess the facts have not been made publicly available by the British Columbia Government. The Environmental Law Centre made two requests for information, one on August 18 and another on November 4, 2014, but no documents have been provided as of December 7, 2014 –the deadline for submissions set by the Mount Polley Independent Expert Engineering Investigation and Review Panel. This has hampered our ability to make fully informed submissions to the Panel. Government has advised that an extension of time is needed to provide the requested documents, and that "the new response due date" is February 2, 2015 – well after the due date for submissions to the Review Panel, and also after the due date for the Review Panel's report. The students were able to review some documents that had been filed with public libraries, but that information is incomplete.

We believe that many of the documents requested should be considered routinely releasable under freedom of information legislation. In October 2014, the Environmental Law Centre made a submission to the Office of the Information and Privacy Commissioner for BC, pointing out the many jurisdictions in which the mining information sought is made available online, and the legal obligation to make this information available.

In addition to the written documentation, we believe it is important for the Panel to hear direct testimony from mine workers, consulting engineers and government employees concerning the events, practices, inspections and regulatory oversight of Mount Polley Mine. The *Mount Polley Investigation and Inquiry Regulation* grants the Panel the power to compel persons to answer questions and order disclosure toward this end. Unfortunately, there is no whistleblower protection for workers in British Columbia, as there is in some other jurisdictions, which may deter some with important evidence for the Panel to hear from voluntarily coming forward in response to the Panel's invitation for submissions. The Environmental Law Centre, along with the United Steelworkers, BC Government Service and Employees' Union, Professional Employees Association, Xatśūll First Nation and Williams Lake Indian Band, wrote to Premier Clark on November 18, 2014, requesting legislation that would address this deficiency. A copy of this letter was provided to the Panel.

We hope that government and all of the parties involved in the Mount Polley Mine have disclosed all potentially relevant Mount Polley Mine documentation to the Investigation and Review Panel so that it can fulfill optimally its important public service. Given the lack of public disclosure to date concerning the circumstances that led to this mining disaster, we submit that it is important to the credibility of, and public trust in, the Investigation and Review Panel's report that the panel cite and make available all of the evidence it has considered in the course of its deliberations. We respectfully submit that this is a norm for an inquiry of this nature, and essential for public confidence in the independence, thoroughness and conclusions of this inquiry.

Executive Summary

This paper examines some of the facts and issues that may have contributed to the failure of the Mount Polley tailing storage facility. Unfortunately, many of the records concerning the Mount Polley Mine have not been made available to the public by the BC government. The Environmental Law Centre's information request dating back to August 18, 2014 still has not resulted in any disclosure. Our knowledge of the facts is based on information in the public doman that has been available on government websites and through public libraries. Even based on this record it is apparent that there are significant deficiencies in the regulatory, inspection, and enforcement regimes that govern mining in British Columbia, and the Mount Polley Mine in particular.

Each section of the report is focused on a particular stage in the mine's life, followed by recommendations for change to prevent future disasters and questions addressed to the Mount Polley Independent Expert Engineering Investigation and Review Panel, in response to its call for submissions in November 2014. As noted in its terms of reference, the Panel can examine a broad scope of issues, including:

- Inspection and surveillance procedures and implementation.
- Operational procedures and planning for tailings deposition and water management.
- Regulatory oversight by the Ministry of Energy and Mines and the Ministry of Environment.[2]

Further, we note that the Panel has authority to consider practices or successes in other jurisdictions that could be implemented in BC.[3]

This submission is intended to identify issues, questions, and possibly solutions and recommendations that fall within these terms of reference and which could reduce the potential for future mining disasters. It takes a chronological approach: **Part 1** primarily addresses critical analyses pertaining to mining dam breaches and tailings alternatives that seem absent in the pre-approval decision-making environmental assessment process for the Mount Polley mine. An evaluation of current mining environmental assessments in BC revealed these critical analyses, including those undertaken voluntarily by mine proponents, continue to lack sufficiency in scope and detail. We encourage the Panel to recommend that the BC government require these analyses in a standardized form. To encourage the development of safer tailings management technology, we discuss the value of British Columbia adopting best practice guidelines for tailings management.

Part 2 analyzes the permitting stage of the environmental assessment (EA). Mount Polley Mine was initially permitted under the Mine Development Assessment Act (MDAA), but operated

[2] Mount Polley Independent Expert Engineering Investigation and Review Panel, Terms of Reference, online: http://www.mountpolleyreviewpanel.ca/terms-reference.
[3] Mount Polley Independent Expert Engineering Investigation and Review Panel, Purpose of the Panel, online: http://www.mountpolleyreviewpanel.ca/terms-reference.

mainly under the current Environmental Assessment Act (EAA). The analysis will look at how the MDAA process set out policy for subsequent permits, and how enforcement occurs under the current EAA. The first issue discussed is the problematic nature of decision maker's discretion in the assessment process to the initial permit. The formulation of terms in Mount Polley's Mine Development Certificate and terms in many EA certificates under the EAA are then addressed. The terms make these certificates difficult to enforce or measure.

Part 3 discusses the permitting process following the acquisition of the certificate, including the application and review processes under the Mines Act and the Environmental Management Act. This part demonstrates the processes do not require adequate information dissemination, consultation, or baseline monitoring. The Mount Polley Mining Corporation's (MPMC) water management plan was not subjected to an appropriate level of review. A review may have caught the problems that became very apparent later in the process. This part concludes with suggestions for regulatory changes which would improve the safety and accountability of this process.

Part 4 analyzes the time period when Mount Polley operated, and the regulatory oversight in place during the operation. We begin with an analysis of the statutory basis for tailing storage facility inspections, and the interaction various guidelines that govern this regime.

We then canvass the Annual TSF (Tailings Storage Facility) Inspection Reports from 2009 and 2010, produced by Knight Piésold (KP). The documents indicate MPMC failed to implement recommendations made by the engineer of record, third party engineers, and government geotechnical inspectors. The consequences of dam classification as outlined by the CDA (Canadian Dam Association) guidelines are discussed. The scheme's application to Mount Polley is a point of concern: KP suggested the classification of the embankment in 2007 was incomplete.

"The Effluent Permit and Water Balance Considerations" discusses water management at Mount Polley, and how the effluent permit was amended over time to allow the mine to discharge water into the surrounding environment. The water balance concerns caused by the water surplus are traced from the initial 1997 permit to recent 2014 permit applications to discharge effluent into Polley Lake.

Government oversight and regulatory enforcement under the Mines Act is analyzed, along with some general discussion of the "professional reliance" regulatory model in BC. The current system provides broad powers to the chief inspector to carry out inspections and make orders relating to occupational, health, safety and environmental concerns at mine sites. Engineering recommendations made through annual inspections or safety reviews are not enforceable until an order is made, or the recommendation is added as a permit condition. We recommend solutions to correct the lack of enforcement in the current regulatory scheme.

Part 5 examines Ministry of Environment (MOE) decisions and activities since the breach on August 4, 2014. It focuses mainly on decisions about mitigation and remediation. The MOE has articulated goals and a general remediation plan, but the goals do not specify the remediation standard which MPMC will be held to, or when remediation is expected to be complete. The

MOE also identifies a cooperative approach for implementing long-term strategies, leaving room for MPMC to influence the process and negotiate less stringent requirements.

Publicly available information has been limited or delayed since the breach of August 4, 2014. This has exacerbated the uncertainties presented by the goals and MOE's approach, and leaving many questions unanswered. Consequently, in this section, we present a list of outstanding questions rather than recommendations. These questions will require follow-up as the MOE releases documents and makes progress on remediation decisions.

At many levels, the work of the Mount Polley Independent Expert Engineering Investigation and Review Panel is highly important to the regulation of mining and environmental protection in British Columbia. We appreciate the opportunity to contribute to the Panel's deliberations.

Abbreviations in Report

Act	The British Columbia *Mines Act*
CDA	Canadian Dam Association
Code	The Health Safety and Reclamation Code for BC
DSR	Dam Safety Review
EA	Environmental Assessment
EAA	Environmental Assessment Act
EAC	Environmental Assessment Certificate
EMA	Environmental Management Act
FMEA	Failure Modes Effects Analysis
FMPC	Fair Mining Practices Code
IMC	Imperial Metals Corporation
KP	Knight Piésold
MDC	Mine Development Certificate
MDAA	Mines Development Assessment Act
MEM	Ministry of Energy and Mines
MOE	Ministry of Environment
MPMC	Mount Polley Mining Corporation
NEPA	National Environmental Policy Act
TSF	Tailings Storage Facility
WDR	Waste Discharge Regulation

PREFACE

This report, prepared by students enrolled in the UVic Environmental Law Centre Clinic, is submitted to the Mount Polley Independent Expert Engineering Investigation and Review Panel as a constructive, forward-looking and solutions-oriented examination of events leading to the tailings storage facility disaster of August 4, 2014. These submissions are in keeping with the Panel's mandate to "make recommendations to government on actions that could be taken to ensure that a similar failure does not occur at other mine sites in BC" and "to comment on what actions could have been taken to prevent this failure and to identify practices or successes in other jurisdictions that could be considered for implementation in BC." The Panel's authority extends to "regulatory oversight by the Ministry of Energy and Mines and the Ministry of Environment" and "other matters the Panel deems appropriate to be examined." The most valuable contribution the independent Panel could make to public understanding of this disaster – and to deter against future ones – would be to examine and address all of these topic areas, recognizing that engineering design, mining operations and regulatory oversight issues are not merely questions of physical causation but occur within a legal and regulatory context that govern behaviour. It is our hope that this report will be useful to advancing the Panel's consideration of that legal and regulatory context.

The submission takes a chronological approach, beginning with the initial assessment of the proposed Mount Polley Mine prior to operations, then moving to permitting, operations, and post breach issues. Where necessary in order to keep the discussion current, relevant and forward-looking, we will comment on current practices and legislation, particularly where it tends to perpetuate some of the issues that arise in the Mount Polley approval process.

1. PRE-APPROVAL STAGE

1.1 Introduction

The purpose of this section is to consider whether the environmental assessment of the Mount Polley Mine adequately considered issues that contributed to the tailings disaster of August 4, 2014. BC legislation is highly discretionary when it comes to assessment of proposed mines, and the Panel should not assume that standard practices that occur elsewhere are uniformly followed here. For example, the consideration of alternatives to wet tailings storage, worst case scenario assessment (or dam break risk analysis), and the assessment of subsequent expansion of mine development into previously uneconomic ore bodies (with higher levels of tailings waste) are issues that the Panel could examine to consider whether there are lessons to be learned to prevent future tailings storage facility failures, and the consequent environmental damage downstream of the Mount Polley mine.

The Mount Polley EA application was conducted in 1992 under previous mining EA legislation, known as the provincial *Mine Development Assessment Act* (MDAA). That legislation was passed in 1990, and formed the basis for the later *Environmental Assessment Act* of 1994 which

adopted much of the structure of the MDAA but applied to more than mining projects. Problems with the analyses therefore persist in applications under the current mining EA legislation, the provincial *Environmental Assessment Act*.

Environmental assessments are the most commonly used environmental management tool in British Columbia's mining sector.4 A proposed mine project in BC may be subject to EAs under provincial and federal laws. There are many criticisms regarding the legal determination of whether a project must be subjected to an EA (the determination of whether a project is reviewable) and the scope and sufficiency of the EA process.[5] Currently, BC's *Reviewable Projects Regulation* has only identified thresholds triggering EAs based on project size and capacity.[6] Once a project has met the threshold, or has been designated for review by the discretion of the Executive Director of the Environmental Assessment Office (EAO), the scope of the review is determined by the EAO.

In BC, aside from a requirement to engage in public consultation, there are no other legal requirements for the content or scope of an EA.[7] The Fair Mining Collaborative recommends the BC government adopt thresholds triggering EAs based on consideration of environmental, wildlife, and social values.[8] In addition, the Collaborative recommends the provincial *Environmental Assessment Act* be amended to require EA standards for the consistent application of the EA process across the province. In particular, it has been identified that BC laws should require, as part of the EA process, consideration of adequate baseline data, information and analysis provided by proponents to be unbiased, and an alternatives analysis.[9]

The EA for Mount Polley Mine lacked both a dam break risk analysis and an alternatives analysis. The current EA process for mining projects in BC continues to be deficient on these analyses. The lack of a standardized risk analysis model results in the failure of the EA process to sufficiently address the risk for a dam breach and the potential damages resulting from a breach. The lack of a requirement for comprehensive alternatives analysis results in proponents failing to address their reasons for not implementing best available technologies, which may eliminate or mitigate the risk of a dam breach. Finally, it is important to address the inherent potential for abuse in all risk and alternatives analyses and the issue of professional reliance in the EA process.

1.2 Dam Break Risk Analysis

When seeking approval for a tailings dam in BC, proponents are not legally required to conduct a standardized risk analysis. A comprehensive risk analysis addresses dam stability, infrastructure, design considerations, potential causes for a dam break, and consequences of a potential dam

[4] Maya Stano and Emma Lehrer (Fair Mining Collaborative), *Fair Mining Practices: A New Mining Code for British Columbia*, (Fair Mining Collaborative, 2013) at 162, Online: <http://www.fairmining.ca/wp-content/uploads/2014/08/Fair-Mining-Practices-A-New-Mining-Code-for-BC-Web-Copy.pdf>
[5] Environmental Law Alliance Worldwide (ELAW), *Guidebook for Evaluating Mining Project EIAs*, (ELAW, 2010) Online: <http://www.elaw.org/files/mining-eia-guidebook/Full-Guidebook.pdf; and Fair Mining Collaborative>
[6] Fair Mining Collaborative at 162.
[7] Fair Mining Collaborative at 167..
[8] Fair Mining Collaborative at 180.
[9] Fair Mining Collaborative at 163.

break[10]. Information from a thorough risk analysis helps to ensure government decision-makers, and potentially affected communities, are sufficiently informed in their decision to approve and support the project. The execution of a risk analysis normally involves the participation of designers and operators of the tailings system, facilitation by an independent certified professional, and the use of a structured process designed to ensure that all modes of failure are assessed and identified.[11]

a. Legislation in BC

Under current BC legislation, proponents may voluntarily include a risk analysis as part of their application for an Environmental Assessment Certificate. However, there is no standard form of risk analysis a project proponent must undertake. Proponents commonly include a quantitative Failures Modes and Effects Analysis (FMEA). There is great variation in FMEA analyses between different project applications in BC. Proponents have discretion in choosing the type of algorithmic model used, the environmental, social, and economic factors to be considered, the geographical parameters for assessing downstream tailings consequences, and the number of failure modes identified.

The Brucejack Gold Mine Project's 2014 environmental assessment application is a good illustration of the current risk analysis gaps existing in BC. In the EA summary for Brucejack, the FMEA failed to provide alternative failures modes. It did not differentiate a sunny-day breach scenario from a flood-induced scenario for example, or account for the increased risk of dam breaches over the course of the mine's entire life.[12]

The recent independent review by Klohn Crippen Berger of Imperial Metal's Red Chris mine tailings dam design identified serious design concerns with the high permeability of the dam's foundation, and a lack of dam breach inundation studies.[13] This finding implies that there were significant gaps in the risk analysis for the Red Chris tailings dam. The lack of knowledge identified is very concerning because, unlike the tailings at Mount Polley, the tailings at Red Chris will be acidic and can leach potentially toxic metals into the environment. It is also important to note that this independent review was only conducted due to an agreement between Imperial Metals and the Tahltan Central Council reached after the TSF collapse at the Mount Polley Mine. In the normal course of an EA application approval process, only government agencies would review the design. With limited personnel due to budget cuts over the last decade, often these agencies cannot independently assess and verify data supporting the EA.[14] This considerably "ups the ante" in terms of government's reliance on the professionalism of the proponent's consultants preparing the assessment reports.

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[10] ELAW at 53.
[11] Minto Explorations Ltd. "Tailings Risk Assessment – Minto Project, Yukon Territory" (2009) at 1.
[12] Pretium Resources Inc. "Brucejack Gold Mine Project – Summary of Application for an Environmental Assessment Certificate" (2014) at 9.2.
[13] Gordon Hoekstra, "Third-party review of Red Chris mine tailings dam designs finds concerns", *The Vancouver Sun* (18 November 2014) Online: <http://www.vancouversun.com/technology/Third+party+review+Chris+mine+tailings+design+finds+concerns/10392164/story.html>
[14] Mark Haddock. *Environmental Assessment in British Columbia,* (Victoria: University of Victoria Environmental Law Centre, 2010) at 41, Online: <http://www.elc.uvic.ca/publications/documents/ELC_EA-IN-BC_Nov2010.pdf>.

b. Legislation Elsewhere in Canada

Elsewhere in Canada, governments have imposed requirements to complete a dam break risk assessment in order to receive certificates of approval for mine tailings facilities. The Department of Energy, Mines and Resources of the Yukon Government requested the proponents of the Minto Project to specifically address failure modes under operational conditions and post-closure, likelihood of failure, method of identifying which are the most significant risks, and the adequacy of the adaptive management plan for the tailings.[15] In order to predict and help prevent future dam breaks, it is critical for the BC government to adopt a similar requirement for a standardized risk analysis process for all mining projects. Furthermore, in cases where mining operations apply for expansions of current tailings dam facilities, as occurred at the Mount Polley Mine, the government should require an updated risk analysis to properly inform the approval process. Currently, EAA regulations in British Columbia only require environmental assessment if the mine expansion disturbs an additional 750 hectares (1,853 acres) or 50% of the area previously permitted for disturbance.[16]

c. Requirement of Dam Break Risk Analysis in the United States

In the United States, federal agencies have been required for several decades to prepare risk analysis of mining projects under the National Environmental Policy Act (NEPA).[17] The historical changes to NEPA regarding the requirement of a worst-case scenario illustrate the benefits and shortcomings of risk analyses in general. A NEPA regulation was enacted in 1978 requiring agencies to include a worst-case analysis as part of the risk analysis. This regulation was replaced in 1986 with more flexible requirements to evaluate "reasonably foreseeable" environmental impacts and to disclose incomplete or unavailable information.

In the years since the 1986 amendment, there has been significant controversy regarding the absence of a worst-case requirement in NEPA. Some legal scholars have demanded the reinstatement of the worst-case requirement as a better means of addressing catastrophic environmental risks. Other legal scholars argue against reinstating this requirement because worst-case analyses tend to negatively focus on the quantitative risks of a scenario representing the "worst-case".[18] Instead, these proponents argue that a qualitative risk analysis is more appropriate as it focuses on how to prepare for "risks and uncertainties that create a range of possible outcomes."

Both sides of this legal debate have valuable arguments. A risk analysis is best used when it can account for methodological and cognitive constraints. It would be prudent for the BC government to adopt a requirement for a standard risk analysis that takes into consideration both qualitative and quantitative risks.

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[15] Minto Explorations Ltd. "Tailings Risk Assessment – Minto Project, Yukon Territory" (2009) at 2, Online: < http://www.emr.gov.yk.ca/mining/pdf/mml_minto_tailings_risk_assessment_2009.pdf>

[16] *Reviewable Projects Regulation*, BC Reg. 370/2002, section 8. Online: <http://bclaws.ca/civix/document/id/complete/statreg/370_2002#section8>

[17] Todd Aagaard. (2012) "A Functional Approach to Risk and Uncertainties under NEPA" *Michigan Journal of Environmental and Administrative Law Vol 1:1* at 8, Online: < http://www.mjeal-online.org/index/wp-content/uploads/Aagaard_1MJEAL87_2012.pdf>

[18] Todd Aagaard at 90.

1.3 Alternatives Analysis

The opening section of an environmental assessment is often a description of the project proposed. In this section, the proponent seeks to sufficiently describe all crucial aspects of the project to fully inform decision makers and the public of the project's impacts. A comprehensive project description should include analyses of alternative ways to undertake the project.[19] The proponent should justify their proposed plans as using the least environmentally damaging practical alternatives. A comprehensive EA would address alternatives such as alternative locations for the mine site, alternative ore beneficiation methods, a comparative analysis of environmental and social impacts of a "no-action" alternative, and of particular relevance to the Mt. Polley case, consideration of alternative methods of tailings disposal. Alternatives analysis is very weak in BC legislation.[20]

a. Tailings Alternatives

We have been unable to obtain the full environmental assessment of the Mount Polley Mine from government. However, we have found a copy of the government's evaluation of that material, and it appears that there was no consideration of alternatives to the tailings treatment method chosen. Based on our research it appears that of the four main forms of tailings; conventional or "wet" tailings, thickened tailings slurry, paste tailings, and filtered "dry stacked" tailings, the latter are often the most environmentally advantageous for several reasons.[21] Compared to conventional tailings, they are superior in the efficiency of water use and are consequently more advantageous in both arid and cold regions where water conservation is important.[22] Dry stacked tailings are least susceptible to catastrophic failure as they are least susceptible to liquefaction due to seismic activity or floods. Dry stacked tailings are more environmentally friendly as it requires a smaller footprint for storage, permits ongoing reclamation, and has relatively low seepage rates. As such, despite issues with dust release, dry stacked tailings are associated overall with lower long-term liabilities with respect to structural integrity and potential environmental harm.[23]

With this current state of knowledge, when proponents do not propose dry tailings disposal, they should clearly show why this method of disposal is not feasible for their project.[24] In addition, the proponent should substantiate the claim that their chosen method of disposal has clear environmental advantages over dry tailings in the specific parameters of the project. Proponents often manipulate an alternatives analysis to justify their choice of tailings disposal in a manner described as "procedural posturing".[25]

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[19] ELAW at 26.; Fair Mining at 189.
[20] Mark Haddock. *Environmental Assessment in British Columbia,* (Victoria: University of Victoria Environmental Law Centre, 2010) at 30-31, Online: <http://www.elc.uvic.ca/publications/documents/ELC_EA-IN-BC_Nov2010.pdf>.
[21] ELAW at 29.
[22] Access Consulting Group "Examination of Revegetation Methodologies for Dry Stack Tailings in Northern Environments" (2003) at 5-6, Online: <http://www.geology.gov.yk.ca/pdf/MPERG_2003_2.pdf>
[23] Access Consulting Group at 6.
[24] ELAW at 31.
[25] Fair Mining Collaborative at 92.

b. Alternatives Analysis in BC

In BC, the use of alternatives analysis is often flawed and weak. A common critique of the alternatives analyses in EAs is that the process predominately relies on economic considerations of the building, maintaining, and remediating the alternative. This is problematic because "purely operating economic considerations rarely indicate a preference for dry stack tailings facilities over conventional slurry impoundments."[26] Not factored into the analysis are costs and impacts of damage to the environment, private and public property, and First Nations traditional lands resulting from the realized risks of different alternatives.[27] Based on our review of assessments outside BC that evaluate a range of tailings treatment options, it appears that dry stacking of tailings sometimes has a higher initial cost, but lower long term cost when maintenance over time is factored into the analysis.

The BC government should legally require cogent alternative analyses for all mining EAs, ideally through amendments to the *Environmental Assessment Act* rather than leaving it to discretion and negotiation with proponents.[28] The alternatives analysis should be standardized and sufficiently detailed for each alternative proposed. The analysis should not be able to justify harm to the environment solely on an economic basis. This specific concern was addressed in Minnesota, where the law prohibits the granting of a natural resource permit when the only justification for a particular alternative is based on economic considerations.[29]

1.4 Best Practice Guidelines for Tailings Management

In addition to requiring proponents to justify their use of tailings management in a comprehensive alternatives analysis, the BC government should adopt filtered tailings management as a best practice. The Government of Nunavut has deemed the best practices for tailings disposal in Nunavut to be "dry stacking combined with backfilling and/or open pit disposal".[30] In recommending this best practice, the government noted that although higher costs and there are issues such as windblown dusts associated with the technology, the technology can better "prevent future liabilities and environmental losses…in view of the uncertainties of climate change."

[26] Michael P. Davies and Stephen Rice (2004) "An Alternative to conventional tailing management – "dry stack" filtered tailings", Online: <http://www.infomine.com/library/publications/docs/Davies2004.pdf >
[27] Fair Mining Collaborative at 191.
[28] Fair Mining Collaborative at 190-191.
[29] Fair Mining Collaborative at 192.
[30] Journeaux Associates (2012) "Engineering Challenges for Tailings Management Facilities and Associated Infrastructure with regard to Climate Change In Nunavut" at 93-94. Online : <http://www.climatechangenunavut.ca/sites/default/files/tailings_final.pdf>

1.5 Modifications to Mine Development

As noted earlier, modifications to mine development should trigger a rigorous assessment of environmental impacts. The current threshold in the *Reviewable Projects Regulation*, which limits that obligation to additional disturbances of 750 hectares (1,853 acres), unduly limits the evaluation of additional environmental impacts resulting from modifications to mine development that were not considered in the original assessment. For example, exploiting a less productive ore body with proportionally much higher levels of waste tailings, may pose significant new impacts even though the overall increased footprint of the mine is less than 750 hectares. This may have occurred at Mount Polley, and may have contributed to the TSF failure of August 4, 2014. It would be a valuable contribution to public understanding if the Panel examined and made findings on this issue.

Questions for the Panel

1. In the Panel's expert opinion, can environmental assessment in the Pre-Approval Stage of a mine address issues that forestall or mitigate against tailings storage facility failures?

2. Should environmental assessment of mines include detailed and standardized evaluation of alternative tailings treatment options? Dam break risk analysis? Other methodology?

3. Should major modifications of mine projects be subject to these or similar assessments, even if they result in mine footprint increase of less than 750 hectares or 50% of the area previously approved disturbance?

4. Should the BC government regulate best practices for tailings management, or otherwise incentivize the industry to adopt safer tailing management technologies for new mines? Are there situations in which wet tailings storage should not be approved?

2. INITIAL PERMITTING STAGE: FROM ASSESSMENT TO PERMITS

2.1 Introduction

Another important function of the Environmental Assessment (EA) is to provide guidance for the subsequent permits that allow a mine to be developed. As EAs include a potentially extensive and thorough information gathering component, they have the potential to produce informed permitting policies. Due to several concerns with the transfer of information from the assessment stage to the permitting stage, there are concerns that EA certificates do not live up to their potential strengths.

There are two main issues:

1. The exercise of discretion involved in moving from the environmental assessment to the permitting process; and

2. The enforceability and measurability of former Mine Development Certificates (MDC) and current Environmental Assessment Certificates (EAC).

The Mount Polley Mine received its MDC in October 1992, under the *Mine Development Assessment Act* (MDAA). The MDAA was in force between 1990 and 1995 and required all mines producing above 10,000 tones of ore per year to acquire a MDC.[31] To obtain a MDC, a proponent submitted an application to the Minister of Energy, Mines and Petroleum Resources and the Minister of Environment, Land and Parks. The ministers then reviewed the application. They had the ability to require public consultation and to require additional information during this period.[32] Once the application was complete the ministers approved, rejected, or returned the application.[33] There was also an option for the ministers to refer the application to a Review Panel for additional assessment.[34]

The ministers approved the Mount Polley Mine without an independent Review Panel process, as is common in BC, even though the federal EA process has commonly utilized independent review panels for mine projects. Nevertheless, the information produced through the process contained considerable discussion of the development and operation of the Mount Polley Mine and its Tailings Storage Facility (TSF).

In 1995, the various environmental assessments managed by BC, including the MDAA, were brought together under the *Environmental Assessment Act* (EAA). This Act contained a new process for assessing the impacts of reviewable projects, but was similar to that of the MDAA.[35] When the EAA came in force, projects already approved fell under the regulatory scheme of the EAA.[36] As the Mount Polley Mine operated mainly under the EAA regime, and because the EAA replaced the MDAA, our focus will be to look to address issues that arise under the EAA.

2.2 Discretion in the Development of Mine Development Certificate Conditions and Commitments

During the Mount Polley mine development assessment process there was extensive discussion about the TSF. Major issues included the location of the TSF, appropriate water conservation within the mine and mill to reduce flow to the TSF, and stipulations for the development of further plans to deal with issues including spill control and monitoring.[37] Concerns canvased during the assessment process regarding the TSF did become commitments in the MDC. As all the supporting documents, reports, and meeting minutes that made up the mine development

[31] *Mine Development Assessment Act*, SBC 1990, c.55, s.2.
[32] *Mine Development Assessment Act*, SBC 1990, c.55, s 2.
[33] *Mine Development Assessment Act*, SBC 1990, c.55, s 3.
[34] *Mine Development Assessment Act*, SBC 1990, c.55, s 4.
[35] Mark Haddock, *Environmental Assessment in British Columbia,* (Victoria: University of Victoria Environmental Law Centre, 2010) at 13, online: <http://www.elc.uvic.ca/publications/documents/ELC_EA-IN-BC_Nov2010.pdf>.
[36] Find some source/talk to mark.
[37] Province of British Columbia Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment, Lands and Parks, *Mount Polley Copper/Gold Project* (Mine Development Assessment Process, 1992) at 17.

assessment process have not been made available to the public, it is not possible for us to evaluate whether the full depth of these recommendations made it into the final MDC. This could be an important question for the Panel to consider.

a. The Current EA System

Under the EAA, the EA begins under the direction of the executive director. The executive director has the option to skip the EA either by referring the project directly to the responsible ministers[38] or by determining that a project will have no significant adverse effects and therefore does not require an EAC.[39] If an EA is to be conducted, the executive director will decide whether it is to be conducted by the minister, executive director, commission, hearing panel, or other designated person.[40]

Regardless of the process under which the assessment is carried out, the proponent's application for an EAC is referred to the responsible ministers for decision.[41] This referral must be accompanied by an assessment report prepared by the Environmental Assessment Office, along with recommendations of its executive director. When the responsible ministers make a final decision regarding an application, they are required to consider the assessment report and recommendations, and have discretion to decide which conditions to include in the final certificate.[42] There is no requirement for the ministers to provide reasons for their final decision. This can be frustrating for those who participated in the EA process if they do not see how contributions were actually heard and applied to the eventual EA outcome.

b. Other Jurisdictions

Other jurisdictions have laws that require government to act transparently and provide reasons for EA decisions.[43] Discretion is useful in allowing ministers to adapt EA certificates to the individual nature of projects, but this discretion should not be coupled with the ability to keep the public in the dark as to why certain concerns or criticism were left out. There is no practical reason why these decisions should not be explained.

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[38] *Environmental Assessment Act,* SBC 2002, c 43, s 10(1)(a).
[39] *Environmental Assessment Act,* SBC 2002, c 43, s 10(1)(b).
[40] *Environmental Assessment Act,* SBC 2002, c 43, s 11, 13, 14, and 15.
[41] *Environmental Assessment Act,* SBC 2002, c 43, s 17(1).
[42] *Environmental Assessment Act,* SBC 2002, c 43, s 17(3).
[43] Maya Stano and Emma Lehrer, *Fair Mining Practices: A New Mining Code for British Columbia,* (Fair Mining Collaborative, 2013) at 228, online: <http://www.fairmining.ca/wp-content/uploads/2014/08/Fair-Mining-Practices-A-New-Mining-Code-for-BC-Web-Copy.pdf>.

2.3 Enforcement of and Amendments to Mine Development Certificates and Environmental Assessment Certificates

A key issue for the public and First Nations concerning approval of the Mount Polley Mine was impacts to pristine or near pristine water bodies such as Hazeltine Creek, Polley Lake and Quesnel Lake. This issue was so significant that Imperial Metals agreed there would be no discharges from the tailings pond or pits. This commitment was captured in the Mine Development Certificate (MDC) as follows:

> "Permits issued under the *Waste Management Act* or *Water Act* shall include the following conditions and expectations:
>
> - The Waste Management permit will not authorize a discharge from the tailings pond or pits to the receiving environment. Imperial Metals has committed to maximum recycle of tailings and pit water, evaporation enhancing techniques and, if necessary, raising the tailings pond berm height to maintain an allowable freeboard to achieve a negative balance in the tailings pond.

However, this key commitment was later waived. The MDC contemplated that this could be case by stating:

> - If recycle and other water conservation efforts are not successful, Imperial Metals will be required to apply for an amendment to its permit. The Ministry of Environment, Lands and Parks will at that time decide whether to authorize a discharge and assign the terms and conditions of the discharge. […]"[44]

For the public, the granting of an effluent permit was a significant departure from what had been proposed and agreed to. The MDC did not specify the circumstances under which this major change in operating conditions would be triggered, but left that as a discretionary matter for Ministry of Environment. So although the "no effluent discharge" was a key condition of mine approval, the enforceability of such conditions throughout the life of the mine was called into question.

The lack of an enduring, enforceable commitment to zero-discharge in the MDC is exacerbated when there are multiple government ministries involved. In the case of the Mount Polley Mine, the effluent permit (Permit PE-11678)[45] was administered by the Ministry of Environment, while the *Mines Act* permit (M-200)[46] was administered by the Ministry of Energy, Mines and Petroleum Resources. An amendment to one of these permits may have important implications for the other, and because the MDC commitments were phrased flexibly, subsequent permit changes were not fully aligned with the original rationale for mine approval. This raises issues of

[44] Province of British Columbia Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment, Lands and Parks, *Mount Polley Copper/Gold Project* (Mine Development Assessment Process, 1992) at 28.
[45] PE-11678 controls water discharged from the mine.
[46] M-200 controls water-balance within the TSF, approval of new mining pits, as well as the dam height.

the need for well drafted, enforceable environmental assessment certificates, as recommended by the Auditor General.

a. The Auditor General's Report

In 2011, the Auditor General of BC's Report "An Audit of the Environmental Assessment Office's Oversight of Certified Projects" identified that EAC conditions and commitments are often written in a manner that does not support enforcement and monitoring. Commitments often use qualified, vague or unenforceable language, lack clarity on timing of obligations, and lack clarity on how decisions will be made on unresolved issues.[47] The Auditor General found that this problem has occurred through both the MDAA and EAA processes, and in our submission, the Mount Polley Mine's MDC in an example of this.

The Auditor General provided six recommendations to address these issues. As of 2013, the EAO did a self-assessment and concluded it had "fully or substantially implemented"[48] all six of the recommendations. However, the EAO has not expressed how these issues will address problems arising from past EA certificates. If left unaddressed, problems of unclear or unenforceable permit conditions could create problems for other mines in addition to Mount Polley. However, there are problems with the *Environmental Assessment Act* because it unduly limits the government's ability to correct EA certificates that have already been issued.

b. The Need for Adaptive Management

Under the EAA, permits can only be amended in a narrow set of circumstances. An amendment to a certificate is either driven by the proponent[49] or by the minister if a limited set of circumstances allow.[50] Allowing *adaptive management* by giving the EAO continued discretion to amend certificates would allow the agency to better address changing situations and adverse effects.[51] The EAO should have the authority to update old certificates to reflect current standards of enforceability and monitoring as recommended by the Auditor General, and to better reflect current environmental mitigation standards and best safety practices.

Adaptive management can be understood simply as bringing increased discretion into the EA system. The Auditor General's report suggests that adaptive management coupled with strong conditions and commitments in EACs could be harnessed to allow government to dictate a strong policy that is adaptive to changes in applied knowledge and policy. The report recommends a shift away from a proponent driven system towards a transparent system was change based on

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[47] Maya Stano and Emma Lehrer, *Fair Mining Practices: A New Mining Code for British Columbia,* (Fair Mining Collaborative, 2013) at 235, online: <http://www.fairmining.ca/wp-content/uploads/2014/08/Fair-Mining-Practices-A-New-Mining-Code-for-BC-Web-Copy.pdf>.

[48] Environmental Assessment Office, *Self-Assessed Progress in Implementing Recommendations*, (Victoria: Environmental Assessment Office, 2013) at 2 and 3, online: <http://www.eao.gov.bc.ca/AG_report.html>.

[49] *Environmental Assessment Act,* SBC 2002, c 43, s 19.

[50] *Environmental Assessment Act,* SBC 2002, c 43, s 37. A minister may order amendments if the project has not been substantially started by the deadline specified in the certificate, the holder of the certificate is in default of an order made under s 34, 36(2), 35, 45, or 47, is in default of a requirement of the certificate, the holder has been convicted of an offence under this act, or the holder is in default of an order under 32.

[51] Mark Haddock, *Environmental Assessment in British Columbia,* (Victoria: University of Victoria Environmental Law Centre, 2010) at 51-52, online: <http://www.elc.uvic.ca/publications/documents/ELC_EA-IN-BC_Nov2010.pdf>.

results.

Questions for the Panel

5. Was the major shift from the Mount Polley Mine being a zero-discharge operation to one in which tailings discharge into Hazeltine Creek adequately justified?

6. Should the EAO have the authority to amend EA certificates where necessary to make their terms clear and enforceable, and to incorporate adaptive management into the EA process?

3. INITIAL PERMITTING STAGE: PERMITS

3.1 Introduction

After receiving an environmental assessment certificate, mines in British Columbia are governed by three main documents:

1. *Waste Discharge Regulation* (under the *Environmental Management Act*, hereafter referred to as the WDR);
2. *Mines Act* (the *Act*); and
3. *Health, Safety, and Reclamation Code* (the *Code*).

Each of these contains a mix of discretionary and mandatory provisions that will be discussed in more detail below. Broadly, the WDR governs discharges from the mine, the *Act* lays out the basic permitting and enforcement regime, and the *Code* contains more detailed requirements regarding design, inspection regimes, and reporting.

The permitting regime of the *Mines Act* is much the same now as it was when MPMC applied for its permit, which is to say, highly discretionary.

3.2 Consultation

In granting Permit M-200, the Chief Inspector (CI) evaluated reports submitted by the Imperial Metals Corporation which detailed a plan for the mine, including the tailings pond, pit areas, waste dumps, environmental monitoring plan, and reclamation plan. While **notice** of this application was posted in the Gazette and published in the Williams Lake Tribune, we have not found any record of the plans themselves being made publicly available. It is therefore difficult to evaluate the decision made by the Minister in a thorough way. The failure to publish fulsome information is not required by the statute, which unfortunately leaves public disclosure, comment and consultation to the Chief Inspector's discretion. This can mean the public is not meaningfully engaged in providing input into the terms and conditions of the permit.

3.3 Relevant Permit Conditions

Ultimately, the plans for the Mount Polley Mine were accepted as proposed, subject to the following conditions found in permit M-200 that we believe are relevant to the TSF breach:

> Protection of Land And Watercourses:
>
> > 1. Baseline Environmental Studies and Monitoring
>
> Work System:
>
> > 3(h), requiring an annual tailings dam report be submitted to the government.
> >
> > 3(i), requiring the Permittee to "submit to the Chief Inspector prior to operating the tailings impoundment, an operating manual, including a water management plan, which addresses normal and extreme operating conditions.[52]

While 3(h) is simply a restatement of a *Code* provision, 3(i) represents a requirement not formally laid out in the *Code* or any relevant Act. The section therefore shows that the Chief Inspector exercised his discretion to tailor the requirements for specific facilities to meet specific local needs, but problems arise when the conditions are examined in more detail.

a. Inadequacies in Baseline Monitoring

The requirements for baseline monitoring are laid out in s.10.1.4(2) of the *Code*. While the twelve topics listed are important issues to address, the *Code* fails to specify required time spans or measurements for this monitoring. The requirements in Permit M-200 contain additional specifications, related to the use of Polley Lake and Bootjack Lake as recreational areas. Reclamation programs were to be designed to the satisfaction of the Regional Manager, Ministry of Environment.[53]

A 2011 report prepared by Brian Olding & Associates for two First Nations in response to MPMC's discharge permit amendment application found that this monitoring, while in compliance with the requirements in the permit, was not sufficient to produce accurate data of Hazeltine Creek's normal condition.[54] This complaint is echoed by the Fair Mining Practices Code (FMPC), which argues that the requirements of the *Code* are insufficient to establish accurate baseline data. The FMPC goes on to state that the lack of a requirement for an analysis of land productivity, as opposed to simply land use, exacerbates the problem of inadequate

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[52] Ministry of Energy, Mines, and Petroleum Resources, " Permit Approving Work System and Reclamation Program M-200," 3 August 1995, Available at http://www.env.gov.bc.ca/eemp/incidents/2014/pdf/aug18/M-200-Mt.Polley-Mines-Act-Permit-and-Amendments.pdf

[53] Ministry of Energy, Mines, and Petroleum Resources, " Permit Approving Work System and Reclamation Program M-200," 3 August 1995. Online: <http://www.env.gov.bc.ca/eemp/incidents/2014/pdf/aug18/M-200-Mt.Polley-Mines-Act-Permit-and-Amendments.pdf>

[54] "Independent Review of the Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent (2009). Brian Olding and Associated Ltd. June 2011. Online: <http://s3.documentcloud.org/documents/1262983/final-report-mpmc-master-ta-review-jun21-2011.pdf> pp.10-15.

information in returning land to its original state.[55] Amendments to the *Code* or *Act* are necessary to ensure that any decisions about such remediation are based on accurate information. The issue of remediation standards will be further discussed in Section 5 below.

b. Water Balance Plan

The water management plan referenced in permit M-200's condition 3(i) details how Imperial Metals calculated the water balance for the mine facility. Given the agreement that Mt. Polley would be a zero-release facility, the robustness of this plan was critical to creating and maintaining a facility that could operate within the conditions provided in that permit, as presented to First Nations and the public during the consultation process. While the inclusion of a requirement in s.3(i) of the permit to address "extreme" conditions is important, we do not know if that aspect of the plan was carefully evaluated by the mines agency when it was provided, and on what timeframe this evaluation was based. These would be important questions for the Panel to answer in its investigation.

The problems with this approach become clear through an examination of Permit 11678, the liquid effluent discharge permit issued under the *Waste Management Act* (now regulated by the Waste Discharge Regulation under the *EMA*). When first issued in 1997, this permit prohibited effluent discharge from the tailings storage facility. This follows the requirements in the MDAA certificate.[56] This permit was amended in 2005 to allow limited discharge in order to address concerns over water balance in the tailings storage facility. The amendment process for this permit will be further discussed in section 4.5(b) below, but it becomes clear that the annual water balance plan was inadequate to some extent. Had this plan been required as part of the package of reports submitted prior to granting permit M-200, as opposed to being addressed by a subsequent amendment, it would have benefitted from the inter-agency referral process to which other reports were subjected, and perhaps its deficiencies would have been detected.

While a preliminary plan was provided as part of the MDAA process, and therefore available as part of the consultation that took part in that process, that plan did not specify a monitoring regime beyond describing it as “adequate.” More importantly, the plan relied on the ability to release (appropriately treated) water that might collect in the open pits;[57] permission to do this was not included in the initial permitting regime. The plan was also based on precipitation estimates, the reliability of which was only intended “to be in line with the intended preliminary requirements.”[58] It is important to note that the potential inadequacy of this preliminary plan in assessing long-term water balance at the mine may have contributed to the water balance issues discussed in section 4.5(c).

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[55] FMP Permits for Mine Development - Content. http://www.fairmining.ca/code/permits-for-mine-development-and-operation-2/content-of-mine-permit-application/
[56] Permit PE 11678. Ministry of Environment, Lands, and Parks. 20 October 1997.
[57] Imperial Metals. Mount Polley Project Stage I Environmental and Socioeconomic Impact Assessment Vol I July 1990. s.4.1.2.
[58] Imperial Metals. Mount Polley Project Stage I Environmental and Socioeconomic Impact Assessment Vol II Appendix 1 at 2.

Similarly, if WDR permits required consultation with potentially affected parties, it is possible that the deficiencies in this plan may have been exposed. Instead, approvals and amendments allowing an increase in discharge greater that 10% require only public "notice."[59] The specifications for this are laid out in schedule A of the WDR, but include nothing more onerous than directly notifying immediately adjacent property owners and posting in a local paper. Should such publication lead a concerned person to write to the director (within 30 days), the director "may" consider this response. Because the documentation supporting the application for PE 11678 has not been made available to us, it is unclear to what extent the water balance plan presented in the MDAA process, and therefore reviewed by the public and other agencies, was revised when the Mount Polley Mine Corporation applied for Permit 11678.

c. Annual Reports

Although condition 3(f) of Permit M-200 required qualified annual geotechnical inspection of the TSF, there does not appear to have been a requirement for evaluation of the TSF as a whole in the context of the water management plan until the mine re-opened in 2005 under an amended Permit 11678.[60] Ensuring continued performance of the TSF required such a re-evaluation,[61] which should have been mandatory at certain time intervals, and whenever significant changes to the water management plan were contemplated. A water balance analysis is now listed as a requirement in the application guidelines for major mines, though still not enshrined in legislation;[62] for greater certainty, this requirement should be included in the *Code*.

3.4 Mine Life

The lack of mandatory re-evaluation also applies to mine life. There was no requirement for re-evaluation of the TSF facility and water plan in the event of expansion or extension of mine life. All plans and conditions submitted in support of the permit application are based on a mine life of 14 years, which was based on a 1990 feasibility study conducted by Imperial Metals.[63] It is not clear whether the Chief Inspector or other officials verified this estimate in any way. When the mine re-opened in 2005, Knight Piésold confirmed that they had designed the dam to have an ultimate height of 965m.[64]

But in its 2013 Reclamation Report, MPMC stated that "identified ore reserves indicate a projected mine life into the year 2025," and expressed confidence that a permit amendment for

[59] *Public Notification Regulation*, BC Reg 202/94. s.6
[60] Compare October 1997 and May 2005 versions of PE 11678 s.3.8
[61] 2010 Annual Inspection report pg III
[62] Application Requirements for a Permit Approving the Mine Plan and Reclamation Program Pursuant to the *Mines Act*. Appendix I. s.3.6
[63] Mt Polley Technical Assessment Report - Discharge and Mine Effluent. Available online: http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/pdf/20140910/Mount-Polley-Mine-Technical-Assessment-Report-Discharge-of-Mine-Effluent.pdf pg. 18
[64] Same report pg III

extended life would be granted.[65] Although each dam raise required a permit amendment with documentation, this documentation is not available to the public, nor were consultations done, so the extent to which the overall site water management plan was re-evaluated at each stage of the dam raise is very unclear.

At the time of the breach, the mine was in its 13th year of active operation, and there is currently discussion of re-opening it. While it is unrealistic to expect a company to fully explore a site before applying for a permit, and while it must be recognized that the viability of a mine changes with fluctuating commodity prices, there are two potential solutions to the problems raised here. Particularly for a zero-discharge facility, MPMC could have been required to ensure that its operations were able to achieve neutral water balance over any time frame, even with expanding operations. If they were unable to do this, they could have stated this in their application, which may have altered the response from First Nations and other government agencies. Second, the permit could have contained a requirement for water management plan and TSF design to undergo immediate and thorough revision as part of plans to explore new ore bodies.

Questions for the Panel

7. Were the terms and conditions of *Mines Act* Permit M-200 adequate?

8. Should the *Health, Safety, and Reclamation Code* be improved to specify greater detail in its baseline monitoring requirements? Would more robust baseline monitoring requirements make standard-setting for remediation upon closure or accident more accurate?

9. Was the water balance plan prepared by Mount Polley Mine Corporation adequate? Was it thoroughly reviewed by all of the relevant government agencies?

10. Should a water balance plan be legally required, as part of the initial application for a permit? (This would ensure that these plans benefit from any consultation that does occur).

11. Should permit applications be required to be circulated to all relevant government agencies, and their input included in permit conditions?

12. Does the Panel agree that permit applications, including all supporting reports, should be made publicly available? (Ideally this would happen via an online database in order to maximize accessibility.)

13. Should the *Waste Discharge Regulation* (or the *Environmental Management Act*) include a requirement to consult both potentially affected persons and other government ministries before issuing a permit?

[65] Mount Polley Mining Corporation, 2013 Environmental and Reclamation Report. http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/pdf/20140929/MPMC-2013-Annual-Report.pdf pg 2

14. Should annual reports require updated water balance analysis in light of new ore bodies and other conditions?

15. Should the Chief Inspector be required to respond to deficiencies identified in annual reports within a certain timeframe? (Particularly in cases of danger to both human health and the environment?)

4. OPERATION OF THE MINE

4.1 Introduction

This section will explore the inspection process at Mount Polley mine. We will begin by outlining the statutory basis for the annual inspections and DSRs. Next, the two publicly available annual inspection reports, and their conclusions, are compared. Finally, government oversight and the regulatory regime, as they relate to MPMC, are set out.

4.2 Statutory Basis for Tailings Storage Facility Inspections

The requirement to complete annual TSF inspections for mines in British Columbia arises from the *Mines Act* and the *Health, Safety and Reclamation Code* (the *Code*).

a. The Health, Safety and Reclamation Code

Section 10.5.3 of the *Code* requires the mine manager to submit an "annual dam safety inspection report" to the chief inspector. The report must be prepared by a professional engineer, and must report on the operation, maintenance, and surveillance of the tailings and water management facilities and any associated containment structures.[66] This code regulates all aspects of health, safety, and reclamation in the operation of a mine.[67] The Code is given force via section 34(6) of the *Mines Act*.[68]

Only two of Mount Polley's annual inspection reports are available to the public. The engineering firm Knight Piésold (KP) performed these inspections in 2009 and 2010.

b. The *Code* and the CDA Guidelines

Section 10.1.5 of the *Code* requires that major impoundments, and their water management facilities, be designed in accordance with the criteria provided by the Canadian Dam Association Dam Safety Guidelines (CDA Guidelines).[69] Section 10.1.8 states that tailings impoundments must be designed by a professional engineer.[70] Although section 10.1.5 of the *Code* does not state

[66] *Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.5.3.
[67] *Mines Act*, RSBC, 1996, c 293, s 34(1), (3).. See also: Association of Professional Engineers and Geoscientists, *Professional Practice Guidelines- Legislated Dam Safety Reviews in BC*, APEG: 2014, at 53.
[68] *Mines Act*, RSBC, 1996, c 293, s 34(6).
[69] *Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.1.5.
[70] *Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.1.8.

specifically which CDA criteria must be adhered to, it is our understanding that as a matter of practice professional engineers generally adhere to all CDA design criteria where possible.

c. The Code and the Ministry of Energy and Mines Guidelines for Annual Dam Safety Inspection Reports

The Ministry of Energy and Mines' Guidelines for Annual Dam Safety Inspection Reports (MEM Guidelines) reference s.10.5.3 of the *Code*. The MEM Guidelines were released in 2002, and modified in 2013.[71] Although the MEM Guidelines do not appear to be legally binding, they "apply to every operating and closed mine in BC" and require the annual reports to contain the information enumerated in the MEM Guidelines. These guidelines incorporate inspection criteria from the CDA guidelines, even though they are not directly referenced in s. 10.5.3 of the *Code*.

Notably, the MEM Guidelines require all dams to be classified in accordance with the CDA guidelines. All tailings dams classified as High, Very High, or Extreme Consequence must then prepare an Emergency Preparedness Plan (EPP).[72] The annual inspection shall also provide the scheduled date for the next Dam Safety Review (DSR), at the frequency applicable to the dam classification. The MEM Guidelines note the difference between the DSR and the annual safety inspection.[73]

d. Professional Practice Guidelines - Legislated Dam Safety Reviews in BC

The Professional Practice Guidelines for Dam Safety Reviews, compiled by the Association for Professional Engineers and Geoscientists (APEG Guidelines), guides professional practice for conducting DSRs. In the mining context, DSRs are required under the MEM Guidelines, and through permit conditions –if the requirement is brought into the permit. The APEG Guidelines require any qualified professional engineer conducting a DSR to have current knowledge of the *Code*, the mine's permit conditions, the CDA Guidelines, and other international dam safety guidelines.[74]

Mount Polley's most recent DSR has not been made available to the public. The 2009 and 2010 annual inspection reports reference a 2006 DSR performed by the engineering firm AMEC at the mine.[75]

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[71] Ministry of Energy and Mines, "Guidelines for Annual Dam Safety Inspection Reports" (August 2013). Available at: http://www.empr.gov.bc.ca/Mining/Permitting-Reclamation/Geotech/Documents/Guidelines_for_Annual_Dam_Safety_Inspections(RevisedAug2013).pdf.

[72] "Ministry of Energy and Mines, "Guidelines for Annual Dam Safety Inspection Reports" (August 2013) s 1(a), (e).

[73] Ministry of Energy and Mines, "Guidelines for Annual Dam Safety Inspection Reports" (August 2013), s 1(f).

[74] Association of Professional Engineers and Geoscientists, *Professional Practice Guidelines- Legislated Dam Safety Reviews in BC*, APEG: 2014, at 51.

[75] Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 5, footnote 3.

4.3 The Annual Tailings Storage Facility Inspection Reports: 2009 and 2010

Mount Polley Mining Corporation (MPMC) submitted annual TSF Inspection Reports in 2009 and 2010 in accordance with s.10.5.3 of the *Code*. Professional Engineers with KP prepared and approved both reports.[76] Neither the government nor Imperial Metals has made any other annual inspection reports available to the public.

a. The 2009 Annual Inspection Report

The 2009 report identified several issues at the Mount Polley Mine, related to instruments, water balance, and the operation of the tailings dam. Most issues were raised again in the 2010 annual inspection report. It is important to note that KP's concerns had not been adequately addressed by MPMC in the intervening period. The water balance issue will be discussed in a following section, in conjunction with the concerns raised in the 2010 report.

i. Broken Piezometers

In 2009, KP reported that 32% of the piezometers used to measure pressure on the structure were no longer reporting data.[77] These instruments were embedded in the embankments and the tailings. The report goes on to cite the 2006 DSR completed by AMEC. In 2006, the number of piezometers was considered sufficient, but there was "little redundancy" in the system. It was suggested that lost instruments should be replaced.[78] In 2009, KP concluded by stating that MPMC was in the process of developing a plan to replace the lost instruments.[79] We feel it is important for the Panel to try to verify whether there is evidence that the piezometers were sufficient in number, properly placed and functioning between 2006 and August 4, 2014.

ii. Operation of the Dam- Tailings Beaches

The 2009 KP report recommended the continued dispersal of tailings around the TSF to further develop tailings beaches and manage the location of the tailings pond.[80] This recommendation is dealt with in greater depth in KP's 2010 report.

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[76]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2011), at 13. Available at: http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/updates6.htm. Les Galbraith, PEng and Ken J. Brouwer, PEng, Managing Partner.

[77]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2011), at 6. 29 of 91 total piezometers had failed at the time of the inspection. See also: Imperial Metals Corporation, *The Mount Polley Project Reclamation Plan* (1996), at 3-18. "Monitoring features" were a principle requirement of the TSF design.

[78]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2011), at 7.

[79]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2011), at 7.

[80]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2011), at 12.

b. The 2010 Annual Inspection Report

The same KP engineers also prepared the 2010 annual inspection report for MPMC. Many of the observations and recommendations made by KP in 2009, are repeated in the 2010 report. This presents an opportunity to analyze how or whether MPMC responded to the 2009 recommendations of their consulting engineer. The 2010 inspection report also outlines concern with the dam classification process for the Mount Polley Mine.

i. Tension Crack

The 2010 report notes concerns regarding the failure to report a tension crack on the perimeter embankment of the TSF. The crack appeared prior to the 2010 inspection. KP recommended further monitoring, but did not see the development of a tension crack in that area of the embankment, the top of the outer slope, as particularly unusual.[81] However, KP highlighted that the failure to report the tension crack immediately was problematic. They stated,

> *[I]t should also be noted that the identification of a tension crack, or any other abnormal observation at the tailings dam, should be reported to the design engineer immediately and prior to any remedial action being taken"* (emphasis in original).[82]

KP's observations reflect the suggested procedure for reporting problems in the CDA guidelines. The CDA guidelines point out that dam safety incidents may be the sign of problems in the overall safety procedures associated with the dam. Therefore reporting and dealing with these incidents has to be developed as part of the "dam safety management system."[83] Routine inspections of the structure should take place on a weekly or monthly basis. Significant or new changes, including "cracking of structural components," should be noted.[84] From the information provided by the 2010 report, it appears that KP had expected MPMC to follow the CDA guidelines, and found they did not.

ii. Broken Piezometers

By 2010 MPMC had not replaced the broken instrumentation mentioned in the 2009 report. Additionally, data from the instruments that were operational were not consistently recorded during this period.

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[81]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 6 and 14.
[82]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 6.
[83]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, ch 2.3.5 Visual Inspections, Corrective Actions, at 18-19.
[84]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, ch 3.6.2 Visual Inspections, at 36.

KP stated that approximately 40% of the piezometers were not functioning in 2010.[85] They recommended there be no further raises to the TSF embankment until the lost instrumentation is replaced. More significantly, they noted this was an outstanding item from the 2006 DSR.[86]

Further, KP reported the data from the operating instruments was not read as frequently as required by the Operation, Maintenance, and Surveillance Manual.[87] KP recommended: *"that MPMC develop an instrumentation reading plan to ensure the piezometers are read and reported to the design engineer at the required frequency"* (emphasis in original).[88]

A key problem this history seems to verify is that the existing "professional reliance system" put in place by the BC Government relies on the expertise and diligence of professional engineers to inspect and report, but gives them no power or authority to require that the mining operation actually make those changes. This problem seems to be compounded by the lack of a requirement for government itself to respond to engineer inspection reports in a timely manner and to ensure that engineering recommendations are implemented. There needs to be a legally effective mechanism for these recommendations to be followed; failure to do so should have a legal consequence and should be considered non-compliance.

iii. Dam Operation- Tailings Beaches

The 2010 report notes concerns regarding the tailings beaches. KP concluded that the single point dispersal of tailings –the production of an overly large tailings beach at one point of the TSF – has led to the "migration" of the supernatant pond up against the embankments on the opposite side of the TSF.[89] The TSF is designed to have the tailings dispersed in a relatively even band around the entire interior perimeter of the structure.[90] Water held in the pond is thereby prevented from touching the embankment wall by the exposed tailings buffer.

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[85]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 14.
[86]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 10.

[87]*Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.5.2. The Code creates the requirement for the preparation and regular revision of an OMS Manual. It does not set a specific monitoring schedule. MPMC's OMS required, at a minimum, monthly monitoring of piezometers. Frequency was to increase to weekly during periods of construction. See also: Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 3.
[88]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 9.
[89]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 7. See also Imperial Metals Corporation, *The Mount Polley Project Reclamation Plan* (1996), at 3-19. The 1996 Reclamation Plan identifies that "multiple spigot offtakes" will be used to control beach development and the pond location. This seems to have been done in 2010.
[90]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at Drawing no 255, Tailings Storage Facility Stage 6a – Instrumentation Plan View of Piezometer Planes. See also: [90] Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Drawing no. 255, Tailings Storage Facility Stage 6b – Instrumentation Plan View of Piezometer Planes. And: Association of Professional Engineers and Geoscientists, *Professional Practice Guidelines- Legislated Dam Safety Reviews in BC*, APEG: 2014, at 52.

This tailings beach is an essential component of the structure of the TSF – especially as the height of the embankments continue to grow. Each raise of the embankment wall is partially constructed on the adjacent tailings beach: "[t]he beached tailings, when left to drain and consolidate, form the competent foundation required for the modified centerline construction embankment raises."[91] The extended tailings beach serves as protection against liquefaction of the tailings material that is being used as a foundational support for the embankment.[92]

A 2008 geotechnical inspection by the Ministry of Energy Mines and Petroleum Resources noted inconsistent deposition of the tailings at Mount Polley.[93] At that time, KP recommended MPMC maintain tailings beaches between 10 and 20 meters in width around the entire structure. It also recommended MPMC develop a plan to enable the restoration of the 10 to 20 meter distance within two weeks, should it be encroached.[94] KP's 2009 annual inspection also recommended that the tailings should be evenly distributed around the TSF.[95] Yet, the tailings remained unevenly distributed inside the TSF at the time of the 2010 Inspection Report.[96]

This state of affairs raises some very serious questions. How could MPMC fail to comply for so long without the situation being corrected? Did this situation continue through August 4, 2014 when disaster struck? What government oversight existed throughout this time period, and why was no correction made to the identified irregularities concerning the Mount Polley tailings beaches? More fundamentally perhaps, what is the purpose of requiring annual inspections by professional engineers if nothing of consequence follows?

iv. Dam Classification

The 2010 report also raised concerns respecting Mount Polley's TSF dam classification. During the 2006 DSR, AMEC reclassified the TSF from "high" to "low" under the 1999 CDA guidelines. This change was the result of excluding from consideration the estimated cost of a breach to the

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The APEG guidelines refer to Upstream dams, not modified centre line dams, but the principles related to tailings and segregation seem to be very similar.

[91]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 7. See also: Imperial Metals Corporation, *The Mount Polley Project Reclamation Plan* (1996), at 3-20.

[92]David M. Chambers, Bretwood Higman, "Long Term Risks of Tailings Dam Failure" (2011) at 6. 6. See also: Michael Davies, Todd Martin, Peter Lighthall, "Mine Tailings Dams: When Things Go Wrong" (2002) at 8. Available at: http://www.infomine.com/library/publications/docs/Davies2002d.pdf.

Davies writes of the failure of the Sullivan Mine TSF in Canada in 1991.

[93]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), Executive Summary, at II.

[94]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 7. KP's 2008 recommendations were used in their 2010 Annual Inspection report as well.

[95]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at 12.

[96]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 7 and Executive Summary at II of III. Footnote 6 in the 2010 Inspection Report references a KP Memo from 2008 in response to a MEMPR geotechnical inspection that found deficiencies in the tailings deposition. This is, presumably the same 2008 MEMPR geotechnical inspection referenced at Executive Summary, II.

mine owner.[97] The TSF classification was 'significant' at the time of the 2010 inspection; KP's concerns regarding this are discussed in the following section.[98]

Questions for the Panel:

16. What is the significance of the 2010 tension crack in terms of forewarning of the TSF breach of August 4, 2014? What response should have followed from the identification of the tension crack? Did the Mount Polley Mine Corporation respond in a timely and appropriate way? Did the regulatory authorities?

17. For what periods between 2006 and August 4, 2014 is there verifiable evidence that the piezometers were sufficient in number and placement, and were properly functioning?

18. Should properly functioning piezometers have alerted MPMC, design engineers and regulatory authorities to the possibility of the TSF breach well in advance of August 4, 2014? If not, what other early warning system could have been put in place?

19. Why were the recommendations of Knight Piésold's annual inspection report not followed by Mount Polley Mine Corporation? How could MPMC fail to comply for so long without the situation being corrected? Did this situation continue through August 4, 2014 when disaster struck?

20. What government oversight existed throughout this 2006 to 2014 time period? Why was no correction made to the identified irregularities concerning the Mount Polley tailings beaches? More fundamentally perhaps, what is the purpose of requiring annual inspections by professional engineers if nothing of consequence follows?

21. Should the engineers of record for a mine have authority to compel that non-compliance and deficiencies respecting TSF design and operation be corrected?

22. What explains the extended periods of non-compliance with Knight Piésold's recommendations by the Mount Polley Mine Corporation? Was it in part attributable to its corporate culture?

[97] Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at 3. See also: Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 5, and Brian Olding & Associates Ltd and LGL Ltd, "Independent Review of the Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent (2009)", online: (2011) at 21 <http://s3.documentcloud.org/documents/1262983/final-report-mpmc-master-ta-review-jun21-2011.pdf >. DSR reviewed the classification and suggested that the owner's costs tied to a breach/failure were not included in the guidelines rating. When these costs were removed the dam hazard classification was modified from "high" consequence to "low" consequence per the 1999 CDA guidelines.

[98] Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 5.

4.4 The Consequences of Dam Classification

As mentioned in Section 4.2(c) of this report, the MEM guidelines require consideration of the CDA classification system during the annual dam safety inspections. Therefore KP's concerns regarding Mount Polley's TSF classification flow from the requirements of those guidelines.

In 2007, the CDA released new Dam Safety Guidelines. The new CDA Guidelines changed the rating scheme for dam hazard classifications, creating five classification options, from low to extreme. The classification directly corresponds to how often a Dam Safety Review must be conducted.[99] The change also meant the classification was determined by accounting for a larger range of considerations that more adequately capture the potential loss involved with a breach. This included the loss of environmental and cultural values.[100]

The Mount Polley TSF was reclassified to "significant" under the new guidelines in 2007. This was analogous to "low" under the 1999 CDA guidelines.[101] However, the 1999 CDA guidelines did not require consideration of environmental or cultural consequences of a breach. The old guidelines only considered "potential consequences to the receiving environment and public safety."[102] Therefore, without accounting for the environmental impacts of a breach, MPMC may have been classified incorrectly in 2007.

The 2007 CDA Guidelines require a "Dam Breach and Inundation Analysis" to consider *both* "sunny-day" failures, and "flood-induced" failures. The analysis includes mapping of inundation areas to estimate possible consequences of the breach. These maps should also be used for emergency planning.[103] The classification of a dam should be "determined by the highest potential consequences," and based on the scenario that would result in the worst consequences.[104] Classifying a dam under the 2007 CDA guidelines requires consideration of the following:

1. **The population at risk and loss of life**: the potential for loss of life is uncertain and variable, and should therefore consider specific scenarios, with documented assumptions and reasoning.

2. **The environmental and cultural values:** environmental loss is multifaceted and the loss should be assessed in terms of the feasibility and length of restoration. Irreplaceable social impacts should be considered on a site-specific basis.

[99]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, Table 5-1: Dam Classification, at 50.
[100]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, Table 2-1: Dam Classification, at 26.
[101]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 35.
[102]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 35.
[103]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, ch 2.5.2 Dam-Breach Analysis and Inundation Mapping, at 23.
[104]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, ch 2.5.4 Dam Classification, at 25.

3. **The infrastructure and economics:** Economic loss should include damage to third parties. "In most cases" loss to the owner should be considered separately, but where the owner's loss would significantly impact society, the cost can be assigned an economic value and considered an economic consequence.[105]

In its 2010 report, KP recommended an inundation analysis, considering the factors described above, be performed in 2011 to determine whether the "significant" classification was actually appropriate. This was recommended because the environmental impacts from a theoretical dam breach had not been evaluated at that time. An analysis of whether loss to fish and wildlife habitat would result from a dam breach could have changed Mount Polley's dam classification to "high" or "very high." Further, KP suggests this inundation analysis be incorporated into the Emergency Preparedness and Response Plan.[106]

Questions for the Panel:

23. Were there deficiencies in the Mount Polley dam classification? If so, what were they?

24. Did MPMC implement Knight Piésold's recommendations in an adequate and timely manner?

25. Did government regulators take adequate steps to follow through on Knight Piésold's recommendations concerning dam classification and inundation analysis, etc.?

26. Who completed the 2007 Dam Classification switch from "low" to "significant" when the new CDA Guidelines were released?

27. What was the proper classification for Mount Polley's TSF dam?

28. Would the proper classification have changed anything? I.e. would it have required actions that could have prevented the TSF dam failure of August 4, 2014?

29. Given the variety of classifications for the Mount Polley dam over time, and the fact that this significant dam failure occurred on a sunny day in August, are the CDA guidelines adequate?

30. Was proper classification of the risks posed by the Mount Polley TSF dam adequately incorporated into the legal governance of the mine? (e.g. The *Act*, *Code* or permit? Are there sufficient sanctions against improperly classified tailings dams in BC?

[105]The Canadian Dam Association, *Dam Safety Guidelines*, Edmonton: CDA, 2007, ch 2.5.3 Dam Failure Consequences, at 23-24.

[106]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 5 and 14. The Code notes that only dams with a failure consequence of "high," and "very high" are *required* to have an Emergency Preparedness Plan (note, the extreme classification is not mentioned in the Code). There is no requirement for dams classified as low or significant to have such a plan. Though, this is not to say a plan was not mandated as a part of their permit at the Chief Inspector's discretion. See: *Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.6.8, at 10-13.

4.5 The Effluent Permit and Water Balance Considerations

a. The Initial Effluent Permit

As noted in section 3.3(b), the Mount Polley Mine was initially certified as a zero-release facility. In May 1997, Permit 11678 was issued to MPMC under the *Environmental Management Act's Waste Discharge Regulation.*[107] The Permit allowed discharge into the TSF, but not into the surrounding environment. This is in accordance with the initial certifying of the mine as zero-release. Water from the TSF was recycled and re-used in the milling process.[108] However, later amendments to Permit 11678 indicate that the mine could begin discharging effluent to the environment, contrary to initial assurances when the mine was approved.

b. The Effluent Permit Amendments

While Mount Polley was under care and maintenance between 2001 and 2005 it was permitted to disperse water into a tributary of nearby Edney Creek through an amendment of Permit 11678. Water seeped into the Main Embankment Sediment/Seepage Control Pond ("MESCP"), and was then released into the creek between 2002 and 2005.[109]

In 2009, MPMC and Minnow Environmental Inc., in consultation with KP, prepared a Technical Assessment Report. This report notes when the mine reopened in 2005, there was a "substantial accumulation of water in the TSF."[110] This resulted in the need to eliminate excess water in the mine to "maintain optimal geotechnical performance of the TSF."[111] By 2009, the mine was collecting in excess of 1.4 million m^3 of water per year.[112]

In November 2012, the permit was amended to allow the discharge of dam-filtered water into Hazeltine Creek, and no longer permitted discharge from MESCP. This discharge was to begin in

[107] *Waste Discharge Regulation,* BC Reg 87/2004.
[108]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at 1.
[109]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at 1-2, 8.
[110]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at. 2.
[111]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at. 2.
[112]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at 8. See also: Brian Olding & Associates Ltd and LGL Ltd, "Independent Review of the Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent (2009)", online: (2011) at 3

2013.[113] In June 2013, the permit was again amended to authorize further discharge of dam-filtered water from the TSF into Hazeltine Creek.[114]

The 2013 Environmental and Reclamation Report listed planned amendments for 2014. There is no publicly available documentation confirming these applications were submitted, but as more water needed to be released from the mine, we assume that they were submitted. One proposed amendment indicated an application to treat and discharge water directly into Polley Lake.[115]

c. The Water Balance Concerns

In the 2009 Annual Inspection report KP noted concern regarding water balance at the mine. KP stated the site was operating at a water surplus at the time of the report. In other words, the mine was collecting more water than was being lost.[116]

In 2010 the mine was still operating with a water surplus. KP did not review the water balance prior to the issuing of the 2010 Annual Inspection Report, apparently because MPMC was managing its own water balance.[117] KP recommended that a review and updating of the water balance be conducted with the planned stage 7 raise of the TSF. KP's concerns regarding water balance are evident in this statement:

> It is *imperative* that MPMC appropriately engage the TSF design engineer with respect to modification to the water management plan and water balance to ensure the design and operational requirements of the TSF are not jeopardized by the transfer of large volumes of water into the impoundment [118] (emphasis added).

In 2010, the surplus water was stored in the TSF, Cariboo Pit, and North East Zone Pit. MPMC was seeking permits to discharge this surplus water from the mine site.[119] However, even by 2013 it seems MPMC had not effectively implemented solutions to deal with these water balance concerns. Although authorized to discharge water into Hazeltine Creek in the beginning of 2013, "due to the late start of construction and the technical complication of the infrastructure" discharge did not start until September 2013.[120]

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[113]Mount Polley Mining Corporation, "2013 Environmental and Reclamation Report", online: (March 2014) at 2 < http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/pdf/20140929/MPMC-2013-Annual-Report.pdf >. MPMC had not discharged from MESCP since 2005.

[114]Permit 11678 amendment, June 7 2013.

[115]Mount Polley Mining Corporation, "2013 Environmental and Reclamation Report", online: (March 2014) at 3.

[116]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at at 9.

[117]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at at 12.

[118]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Executive Summary, at II of III.

[119]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at 12.

[120]Mount Polley Mining Corporation, "2013 Environmental and Reclamation Report", online: (March 2014) at at 43, 60. MPMC only discharged 208m^3 of water into Hazeltine Creek in 2013. The amount of surplus

The importance of updating a mine's water balance plan with mine growth is reflected in the best practices outlined in the federal Environmental Code of Practice for Metal Mines.[121] MPMC purports to follow this code of practice in the 2009 Technical Assessment Report outlined in the previous section. [122]This code states, "Water management plans need to be adapted as necessary to address changing conditions and new risks" by collecting comprehensive data.[123]

MPMC was certified as a zero discharge facility when its operations were first approved.[124] The mine began operating with a water surplus in 2007.[125] This situation had not been resolved by the time of the breach – seven years later. MPMC was still seeking effluent permit amendments to discharge an adequate amount of their excess water. KP's reporting from 2010 shows that MPMC was not giving proper attention to this ongoing issue at that time.

Questions for the Panel:

31. Was the major change in Mount Polley operations – from the promise of a zero-discharge mine to the granting of an effluent permit into Hazeltine Creek properly justified? Were the factors relating to this change relevant to the water balance problems that eventually led to the TSF collapse on August 4, 2014?

32. Did MPMC take steps to reverse their diversion works (ditches, etc) away from the TSF and storage facilities (where possible)? Initially, the site was set up to collect water to be stored in the seepage collection ponds and TSF for use in the Mill. After 2-3 years this practice was supposed to be unnecessary.[126]

33. Were Knight Piésold's 2010 recommendations highlighting the "imperative" that MPMC engage a TDF design engineer implemented in a timely manner?

34. Given that the water surplus situation arose in 2007, why and how was this issue perpetuated for seven years, leading to the TSF collapse of August 4, 2014? What in the regulatory process allowed this situation to continue for such a long time? Was the permit adequate? Should the federal Environmental Code of Practice for Metal Mines be made mandatory?

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water at the site had grown to 1.7 million m^3 or 1.9 million m^3 by this time (the two values are the result of a discrepancy between the two measurement techniques used).

[121]Environment Canada, *Environmental Code of Practice for Metal Mines*, Environment Candada, 2009, ch 4.4 Environmental Practices for the Mine Operations Phase, Water Management at 64. Available at: https://www.ec.gc.ca/lcpe-cepa/documents/codes/mm/mm-eng.pdf.

[122]Mount Polley Mining Corporation, Minnow Environmental Inc, "Mount Polley Mine Technical Assessment Report for a Proposed Discharge of Mine Effluent, July 2009, In support of an Application for the Discharge of Mine Effluent", at 10.

[123]Environment Canada, *Environmental Code of Practice for Metal Mines*, Environment Candada, 2009, ch 4.4 Environmental Practices for the Mine Operations Phase, Water Management at 13.

[124]Imperial Metals Corporation, *The Mount Polley Project Reclamation Plan* (1996), at 3-22, 3-23.

125 H Weldon, "Engineering Exchange: Mining Experts from Concept to Closure", Canadian Institute of Mining Metallurgy and Petroleum (August 2007) online: http://magazine.cim.org/en/August-2007/columns/Engineering-exchange.aspx.

[126]Imperial Metals Corporation, *The Mount Polley Project Reclamation Plan* (1996), at Fisheries Compensation Report, 2.0 Project Water Management Plan, at 3.

35. Are there adequate consequences for mines that fail to properly manage water balance issues?

4.6 Government Oversight and the Regulatory Regime

a. Enforcement under the *Mines Act*

The *Mines Act* has broad powers allowing for inspection, enforcement, remedial orders and other actions if an order under the *Act* is contravened. On its face these provisions appear to be quite strong in authorizing inspections and orders for occupational health, safety and environmental harm. The powers needed to correct deficiencies in the operation of Mount Polley Mine are clearly granted in the *Act*. In fact, there is even an obligation to issue orders where an inspector is of the opinion that delay would be dangerous to persons or property. The only thing lacking might be an obligation to go inspect the mine on a regular basis and form an opinion as to compliance with occupational, health, safety and environmental requirements. The powers are strong – provided someone shows up.

i. Section 15 of the Mines Act

Section 15 has broad powers of inspection and issuance of orders. Under s.15, if an inspector believes on reasonable grounds that a person has contravened or is contravening an order or a provision of the *Mines Act*, the *Code*, the regulations, or a permit, and the contravention has a "detrimental environmental impact," the inspection can order the following:

a. immediate remedial action

b. suspension of work until remedial action is taken

c. closure of the mine until remedial action is taken.[127]

If the inspector thinks a delay in remedial work would be dangerous, the inspector *must* order one of the above three options.[128] Did this happen? If not – why not?

ii. Section 35 of the Mines Act

Section 35 of the Act creates powers for the inspector to enforce compliance with the regulatory scheme. An inspector can order the mine to comply with an order under s.15, a provision of the *Mines Act*, the *Code*, regulations, or a permit.[129] If the mine refuses to comply with the Inspector's order, the inspector may apply to the Supreme Court for an order directing the mine to comply.[130]

iii. Section 37 of the Mines Act

[127] *Mines Act*, RSBC, 1996, c 293, s 15(4.1)(a)-(c).
[128] *Mines Act*, RSBC, 1996, c 293, s 15(5)(a)-(c).
[129] *Mines Act*, RSBC, 1996, c 293, s 35(1)
[130] *Mines Act*, RSBC, 1996, c 293, s 35(2).

Under section 37 of the Act, a corporation contravening the *Mines Act*, the regulations, the *Code*, or an order commits an offence.[131] The resulting penalty can be imprisonment up to a year, or a fine of up to $100,000.[132]

iv. An Inspector's Powers under the Mines Act

An inspector can order a mining company to operate in accordance with its permit, the *Act* or the *Code*.[133] An inspector under the *Mines Act* is defined as, "a person appointed by the chief inspector as an inspector of mines."[134] However, a private "professional engineer" hired by the mining company performs the annual dam inspections required by s.10.5.3 of the Code.[135] The consulting engineers who perform annual inspections can make recommendations to the mining company through their reports, but these are not orders under the *Mines Act* or the *Code*. The inspector must make an order, or incorporate the recommendation into the permit, before it will have any legal force under the *Mines Act* or the *Code*.

b. Discretion under the *Mines Act*, and Failure to Inspect

i. The Chief Inspector's Discretion in the Mines Act

The failure to place mandatory requirements on the Chief Inspector is an overarching problem with the *Mines Act*. Given the lack of enforcement in the face of ongoing issues found at the Mount Polley TSF, leaving enforcement entirely to the discretion of the Chief Inspector may be problematic. Assuming that the 2009 and 2010 annual inspection reports prepared by Knight Piésold, which were required under the terms of permit M-200, were correct, the main problem is that the engineering recommendations contained in these reports seem to hold no legal authority to require that remedial work be done. In fact, the lack of any meaningful response by MPMC and perhaps government may be why Knight Piésold decided it no longer wanted to continue as the Engineer of Record for this mine.[136]

It appears that outstanding, weighty issues remained unresolved for long periods of time leading up to the August 4 TSF failure, without statutory requirements on the Chief Inspector to follow up on reported problems and issue orders as appropriate.[137] The *Mines Act* should require the Chief Inspector to respond to deficiencies in a timely manner by issuing an order. The Inspector's enforcement powers are broad, and creating a clear regime for responses to deficiencies may have motivated MPMC to act while ensuring action from the ministry.

ii. The Reduction in Government Geotechnical Inspections

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[131] *Mines Act*, RSBC, 1996, c 293, s 37(5).
[132] *Mines Act*, RSBC, 1996, c 293, s 37(3).
[133] *Mines Act*, RSBC, 1996, c 293, s 35.
[134] *Mines Act*, RSBC, 1996, c 293, s 1.
[135] *Health, Safety, and Reclamation Code for Mines in British Columbia*, BC Reg 313/2008, s 10.5.3.
[136] Statement by Knight Piesold<http://www.knightpiesold.com/en/index.cfm/news/statement-by-knight-piesold-ltd-regarding-the-mount-polley-mining-incident/>
[137] See: 4.5.b.i: The Replacement of Instrumentation, and 4.5.b.ii: Tailings Dispersal

It is important to note that the Government's geotechnical inspection regime was reduced in the years leading up to the 2009 and 2010 Annual Reports. Only three geotechnical inspections of mines in the entire province were conducted in 2010. Only two were performed in 2011. A government inspector did not inspect Mount Polley in 2009, 2010, or 2011. This highlights another example of discretion in the legislation; although inspectors are empowered by the *Act* to enter and inspect a mine at any time, they are under no obligation to do so.

The drop in inspections may be related to the reduction in geotechnical inspection staff at the ministry. Between 2004 and 2011 there was only one geotechnical inspector on staff- a reduction from five in 2000. Again, the government inspectors, unlike consulting engineers, have the authority under the *Mines Act* to issue *legally binding* orders to the mine operator. It appears as though this component of the regulatory program was lacking capacity in the 2010-2011 period.[138]

b. Implementation and Enforcement of Recommended Changes

The 2009 and 2010 annual inspection reports demonstrate there were ongoing issues regarding the implementation of recommendations at Mount Polley. Perhaps some of the recommendations were implemented before the failure in August 2014, but any documentation that could reveal this implementation has not been made available to the public.[139] The available documents, particularly the 2009 and 2010 Annual Inspection Reports, indicate there is little recourse for consulting engineers, non-governmental organizations, or the public to enforce industry compliance with engineering recommendations.

i. The Replacement of Instrumentation

Recommendations made in the annual inspection reports appear to have no enforceability until they are adopted into the mine permit, or an order under the *Mines Act*. The recommendations made in 2009 and 2010 regarding piezometers and other instrumentation provide an example of

[138]Gordon Hoekstra, "Tailings Dam Inspections in BC Dropped Off Suddenly in 2010, 2011", *The Vancouver Sun* (14 October 2014) online: Vancouver Sun <http://www.vancouversun.com/technology/Tailings+inspections+dropped+suddenly+2010+2011/10286727/story.html>. The Sun's reporting relies on numbers provided to the paper by the Ministry of Energy and Mines. It should be noted that the number of inspectors has since increased to three. Further the number of geotechnical inspections performed in 2012 was 26, 2013 was 31, and 2014 was 33 (at Oct. 14). Mount Polley was inspected in both 2012 and 2013.

[139]Mount Polley Mining Corporation, Press Release, "Mount Polley Responds to Vancouver Sun Article Published Sept. 26, 2014" (3 October 2014) online: <http://www.imperialmetals.com/i/pdf/10-03-14-mount-polley-responds-to-sept-26-vancouver-sun-article-oct-3.pdf >. We have MPMC's response to the release of the 2010 Annual Inspection in the media post-breach. We do not have any of the supporting documentation.

this issue.[140] Both annual reports note the replacement of lost instrumentation as an "outstanding item" from the 2006 DSR.[141]

However, only on August 15, 2011 does instrument replacement become a condition in Mount Polley's permit.[142] Further, we know from Minister Bennett's statements that the only order MEM inspectors made against MPMC came in 2014. It did not deal with the instrumentation.[143] This means that there was no government action with respect to MPMC's consulting engineers' recommendations for at least a five-year period.

ii. Tailings Dispersal

The issue of tailings dispersal is first mentioned in 2008, followed by another reference in 2009, and a stronger recommendation in 2010.[144] This "deficiency" was not rectified by MPMC between the 2008 government inspection and the 2010 KP Annual Inspection Report.[145] Unlike the recommendation to replace instrumentation, a program to evenly disperse tailings beaches was never included as a condition of Mount Polley's permit. Why not?

If there is any evidence that this issue was resolved it has not been made available to the public. However, uneven tailings deposition is still visible in photographs from July 17, 2012 and July 29, 2014.[146] MPMC may have been more proactive in resolving the tailings beach concerns if the initial recommendations to evenly disperse the tailings had been enforceable.

iii. The Oliver Dam: Another Example of Failure to Implement Recommendations

It is highly important that the Panel investigate and address the government enforcement issues because they may be systemic. Over the last decade the BC Government has imposed major reductions in staff and repeatedly stated that the justification for doing so was that this was a "new era of professional reliance." Mount Polley is not the first instance of dam failure. The Ministry of Environment was aware the Testalinden Dam in Oliver, BC was at risk of failing, but

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[140]Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at 7. See also: Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Executive Summary, at II-III and 9.

[141]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Executive Summary, at II-III.

[142]Ministry of Energy and Mines,, " M-200 Permit Amendment Approving Mining the C2 and Boundary zone pits, (15 August 2011), 4. Tailings Storage Facility, d) Monitoring, ii at 6.

[143]Carolyn Grant, "Bennett, MacDonald Spar Over Mt. Polley", *The Kimberly Daily Bulletin* (10 September 2014) online: <http://www.dailybulletin.ca/breaking_news/274605391.html>. According to Minister Bennett, the government order related to the freeboard height in the TSF in the spring of 2014. The water was too high, and MPMC subsequently lowered the level in response the MEM and MoE orders. See also: note 149.

[144]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Executive Summary, at II. See also: Knight Piésold Consulting, *Tailings Storage Facility Report on 2009 Annual Inspection* (Ref No VA101-1/27-1, 2010) at 12.

[145]Knight Piésold Consulting, *Tailings Storage Facility Report on 2010 Annual Inspection* (Ref No VA101-1/29-1, 2011), at Executive Summary, at II of III.

[146]Google Earth, Mount Polley, July 17, 2012. See also: Mount Polley Mine, NASA Earth Observatory, Available:http://earthobservatory.nasa.gov/IOTD/view.php?id=84202.

took no steps to ensure remedial work was done.[147] The dam collapsed in 2010. Between 1977 and 1992, dam inspections revealed safety concerns about the dam. Yet no remedial action was taken, nor did the government warn the public about the state of the dam. [148] The Solicitor General released a report in response to the dam breach, noting, "BC's regulation requires inspections and reports to be submitted but it is not clear what powers the dam safety officers have once these reports are received."[149] It is also not clear whether all dam safety officers have the engineering skills and qualifications to review dam safety reports. The Panel should investigate whether Ministry of Energy and Mines staff reviewing annual inspection reports have the skills and training to review them competently. The Oliver Dam collapse also reflects the concern raised above, that engineering recommendations need not be implemented by dam owners when the recommendations have no legal force.

c. Recommended System of Oversight

The failure of companies to implement recommendations made by professional engineers is a significant concern. The problem is that the inspection regime is not directly linked to the powers of enforcement under the *Mines Act.* A significant portion of the regulatory regime is dependent on professional reliance. There are two potential solutions to this problem. First, the *Act* or the permits involved could contain a requirement for the CI to respond in a timely manner to deficiencies revealed by the inspection/reporting process. A regime for responses to deficiencies may have motivated MPMC to act while ensuring action from the ministry. Alternatively, a regime similar to that under the Contaminated Sites Regulation could be imported to the *Act*, which could give engineers of record greater authority to compel a mine operator to correct deficiencies.

As members of this special Investigation and Review Panel you may hear discussion of how the BC government embarked down a path of "professional reliance" over the last decade. This was used as a rationale for extensive government downsizing, and in many cases deregulation as well. What the Mount Polley experience demonstrates is that while Government reduced the ability of the civil service to inspect natural resource operations, including mining, it failed to replace that oversight through other mechanisms, such as giving authority to the private sector professionals retained to perform annual inspections to require remedial actions to address concerns they identified in the field. This is a huge issue across natural resources regulation in British Columbia – it is not limited to mining. The issues are quite complex, raising potential conflicts of interest that arise when proponents retain the consulting engineers, and numerous regulatory design issues. The Environmental Law Centre has done a significant amount of research on this issue and would be pleased to have a more extensive dialogue with the Panel if appropriate.

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[147] Solicitor General's Report, "Review of the Testalinden Dam Failure", July 2010, at 9. Available at: http://www.env.gov.bc.ca/wsd/public_safety/dam_safety/cabinet/testalinden_slide_failure_review.pdf See Also: Environmental Law Clinic, "Submission to the Information and Privacy Commissioner", online: (May 2012) at 11 < http://elc.uvic.ca/press/documents/OIPC-ELC-FOIPA-Submission_June5.2012.pdf>.
[148] Environmental Law Clinic, "Submission to the Information and Privacy Commissioner", online: (May 2012) at 12.
[149] Solicitor General's Report, "Review of the Testalinden Dam Failure", July 2010, at 9.

i. A Comparison: Contaminated Sites Regulation

BC's contaminated sites regulation also uses professionals to oversee the classification of contaminated sites. However, the Director of Waste Management (a government official) has, under the *Environmental Management Act*, the power to create a roster of qualified people to issue reports and recommendations related to the contaminated sites.[150] This creates distance between the industry company and the professional; the professional no longer reports directly to the company with its recommendations. The Contaminated Sites Approved Professional (CSAP) Society oversees competencies for qualified professionals and audits their work routinely.[151]

For example, an application for relocating contaminated soil from a site may require the recommendation of an approved professional from the roster.[152] The director *must* provide written reasons for the decision to the applicant and the related professional association if the director rejects the recommendation.[153] Therefore, where a professional recommendation is made, it will stand *unless* reasons are given.

By adopting a similar system, the Ministry of Energy and Mines could provide more assurance to the public that professional recommendations will be enforced. It would further increase the perception of independence for engineers performing annual mine inspections. Currently, the system relies heavily on professional reliance and the goodwill of industry to implement recommendations. This reliance has proved extremely costly for Imperial Metals, local residents, First Nations and the public of British Columbia.

Questions for the Panel:

36. Given the broad inspection and remedial powers in the *Mines Act*, how many inspections by Ministry of Energy and Mines inspectors occurred between 2007 and August 3, 2014?

37. As noted above, some of the problems identified in engineering inspection reports had lingered over a seven year time frame. Did both the Ministry of Energy and Mines, and the Ministry of Environment, have copies of the Knight Piésold and more recent annual inspection reports? Were they read? Were they responded to appropriately? Did the inspector issue remedial orders after learning about chronic non-compliance with engineering recommendations and outstanding issues relating to the non-functioning piezometers, tension crack, dam classification, tailings beaches and water balance? If not, why not? These are crucial questions that may have significantly contributed to the breach of August 4, 2014.

38. What steps did Mount Polley Mine Corporation take to implement the Knight Piésold recommendations found in its 2009 and 2010 annual inspection reports? Under what

[150] *Environmental Management Act*, SBC, 2003, c 53, s 42(1).See also: *Contaminated Sites Regulation*, BC Reg 375/96, s 15(5)-(7).
[151] https://csapsociety.bc.ca
[152] *Contaminated Sites Regulation*, BC Reg 375/96, s 43(2).
[153] *Contaminated Sites Regulation*, BC Reg 375/96, s 43(4).

time frame were they implemented? What recommendations remained outstanding by August 4, 2014?

39. What did the subsequent annual inspection reports say, after Knight Piésold stepped down from being the Engineer of Record for the Mount Polley Mine? Were inspection reports carried out in 2011, 2012, 2013 and 2014? Did those reports confirm Knight Piésold's expert opinion and recommendations? Did they raise any additional issues of concern? If so, did Mount Polley Mine Corporation abide by or implement these recommendations?

40. What is your expert opinion concerning an appropriate level of inspection and enforcement for a mine with the level of safety and environmental risk posed by Mount Polley? (BC has a Forest Practices Board that has a statutory mandate to audit the appropriateness of government enforcement, but that mandate is limited to forest practices, and does not extend to mining practices).

41. Does the Ministry of Energy and Mines have sufficient number of appropriately trained and qualified staff who are competent to review TSF design and annual inspection reports? Should competent experts from other ministries also be involved in reviewing these documents where they have a related mandate, such as the Ministry of Forests, Lands, and Natural Resource Operations and Ministry of Environment?

42. Should there be a greater degree of legal relationship between the MEM Guidelines, the CDA Guidelines, the Code, and the APEGBC Guidelines

5. POST-BREACH ACTIVITY

5.1 Introduction

This section addresses Ministry of Environment (MOE) activity since the tailings breach on August 4, 2014. The plans for mitigation and remediation raise a number of important issues, including a lack of specific requirements, a negotiable process for decision-making, and questions about permitting. This section also addresses the public availability of information and MPMC's compliance with the August 5 Pollution Abatement Order issued by the MOE. The analysis draws on documents publicly available from MOE's Mount Polley website and Imperial Metals Corporation's ("IMC") Mount Polley Updates website.

5.2 Mitigation and Remediation

MOE's post breach activity raises important questions about mitigation and remediation. A number of documents were released on November 24, 2014. These documents outline the current plans for short-term mitigation and long-term remediation of the tailings breach, but important questions are still left unanswered.

a. Phased Approach

In a Progress Report released November 24, 2014, the MOE outlines a phased approach for mitigation and remediation and identifies the Ministry's goals and expectations for both the long and short-term. The Impact Assessment Phase, already underway and projected to continue to August 2016, focuses on collection of information to inform long-term remediation plans. Phase 1, covering October 2014 to June 2015, focuses on mitigation and prevention of additional damage. Phase 2, beginning July 2015, focuses on remediation.[154] Appendices to this Progress Report, and other documents released on the MOE's Mount Polley Updates website on November 24, outline in more detail the three phases and include reports and detailed plans submitted by MPMC over the months following the breach.

b. Articulated Goals for Long-term Remediation

In addition to setting out the phased approach, the November 24 Progress Report sets out the MOE's goals for 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.[155]

Specific "[MOE] Expectations" are provided for Phase I: "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."[156] This degree of detail is not available for either of the remaining Phases.

The Ministry also provides that "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 [Pollution Abatement Order]."[157] The Pollution Abatement Order requires MPMC to complete and submit remediation plans, with specified requirements for these plans; however, the order does not include any specifications as to the extent of remediation that will be required. In no documents publicly available as of November 28, 2014, does the MOE specify a standard or end-point for remediation activity.

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[154] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[155] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[156] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 3 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[157] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

i. Contaminated Sites Regulation Land Use Standard Undecided

MOE has indicated the "Contaminated Sites Regulation is… the appropriate regulation to apply when evaluating the contamination levels as a result of the tailings storage facility breach."[158] Requirements under the CSR depend on the land use standard selected for the site.[159] Although testing has been done with reference to the Urban Park Land Use standard,[160] as of November 27, "no decision has been made on the applicable standard."[161]

ii. Articulated Goals do not Answer Important Questions

The MOE's articulated goals for remediation leave important questions unanswered. Affected communities, and the public generally, are not told what standard MPMC will be held to, to what extent the effected environment will be remediated, or how long remediation is expected to take. The content of the MOE's Frequently Asked Questions, updated November 23, 2014, shows that the public is in fact concerned about the requirements for remediation. In response to the question "Will you be asking the company to get these areas back to their natural state?" the MOE only provides that "long-term monitoring will determine the extent of the clean-up efforts."[162]

Furthermore, it is not clear from any publicly available documents what process the MOE will follow in deciding the standard for remediation, when the public can expect to have answers to these questions, and what considerations receive the most weight.

iii. Articulated Goals Leave Room for MPMC Influence and Negotiation

The MOE's current articulation of the remediation goals do not set any specific or enforceable requirements binding either MPMC or the MOE. The approach set out in the November 24 Progress Report identifies a cooperative approach between the MOE and MPMC:

> Throughout Phase 1 and Phase 2, the Ministry will continue to…work with MPMC to ensure longer term mitigation strategies are developed and implemented…During [Phase II of the long term plan], the Ministry will work with the company to implement longer term mitigation strategies…[163]

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[158] Ministry of Environment, "Information Bulletin, November 20, 2014, Mount Polley sediment samples in Hazeltine Creek", online: (2014) at 1. <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[159] *Contaminated Sites Regulation*, BC Reg 375/96, schedule 4.

[160] Ministry of Environment, "Information Bulletin, November 20, 2014, Mount Polley sediment samples in Hazeltine Creek", online: (2014) at 1. <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[161] Email from Hubert Bunce, A/Director Mt Polley, to Mark Haddock, UVic Faculty of Law, RE "Mount Polley Remediation Standard", November 27, 2014.

[162] Ministry of Environment, "Ministry of Environment Mount Polley Mine Tailings Breach Frequently Asked Questions November 23rd, 2014", online: (2014) at 4. <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[163] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 8 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

As discussed above the MOE also states that long-term remediation will rely on an iterative process of information-gathering to determine the appropriate standard of remediation.[164] While cooperation between MPMC and the MOE is commendable, the lack of binding and public remediation standards presents a situation where MPMC may be able to exert influence and negotiate less stringent standards. Where the MOE has set out specific requirements, it is unclear to what extent these expectations were influenced by MPMC, either directly through negotiation or indirectly through MOE's potential reliance on MPMC's technical reports.

The MOE "is responsible for regulatory oversight, and for overseeing all cleanup, remediation and restoration work" in addition to "[ensuring] a long-term environmental monitoring program is implemented by [MPMC]."[165] However, it is unclear, based on publicly available information, what degree of review was involved in MOE's approval of MPMC's remediation plan, whether appropriate professionals reviewed the submitted plans, and what the extent of MOE auditing, review, and oversight will be moving forward.

c. Required Permits

Mitigation and remediation activities have been ongoing since the breach on August 4, 2014, "[beginning] as soon as safely possible following the breach and [ongoing] while the plans [were] in development and review."[166] These activities include lake drawdown, access road construction, silt fence installation, and re-grading, landscaping, and bank stabilization.[167] It is unclear, based on the information available to the public, if this work received the necessary permits to proceed.

5.3 Public Availability of Documents

The MOE's Mount Polley incident website "contains all public information released on the incident" by the MOE.[168] MPMC submitted environmental impact assessment and action plans to the MOE on August 15, 2014.[169] Prior to November 24, 2014, however, details of ongoing remediation work were only available through IMC's Mount Polley Updates site.[170] The only

[164] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>
[165] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 1 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>
[166] Ministry of Environment, "Ministry of Environment Mount Polley Mine Tailings Breach Frequently Asked Questions November 23rd, 2014", online: (2014) at 4 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>
[167] Mount Polley Mining Corporation, "Weekly TSF Breach Monitoring Report – Week of October 22 – 28, 2014", online: (2014) <http://www.imperialmetals.com/s/Mt_Polley_Update.asp?ReportID=677021>
[168] Ministry of Environment, "Ministry of Environment Mount Polley Mine Tailings Breach Frequently Asked Questions November 23rd, 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>
[169] Ministry of the Environment, "Ministry of Environment Frequently Asked Questions: Mount Polley Tailings Breach", online: (2014) at 1 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>
[170] Imperial Metals Corporation, "Mount Polley Updates", online (2014) <http://www.imperialmetals.com/s/Mt_Polley_Update.asp?ReportID=671041>

information available to the public from the MOE was that plans had been submitted by MPMC and were being reviewed.[171] The release of documents on November 24 is an improvement and an encouraging sign for release of documents going forward; however, this three-month delay left the public relying solely on information produced by MPMC regarding remediation.

5.4 Non-Compliance with Abatement Order

On August 5, the MOE issued a Pollution Abatement Order[172] to MPMC and on September 9 followed up with a Non-Compliance Advisory Letter.[173] In the Frequently Asked Questions updated September 24, 2014, the MOE stated "failure to comply with other measures under the pollution abatement order (i.e. implementation of long-term monitoring plan, cleanup, etc.) could lead to a maximum fine of $300,000 per day and up to 6 months in jail under the Environmental Management Act."[174]

On November 24, the MOE released information indicating that MPMC was in compliance with the Pollution Abatement Order.[175] However, the MOE still expects further action from MPMC to fulfill the requirements from the Pollution Abatement Order:

> While significant progress has been made, the [MOE] still requires the following activities from [MPMC] over the short-term up-to and including freshet (breakup) 2015…The [MOE] is also requesting the following information from the company which is still outstanding…[176]

Although the MOE has concluded that MPMC is in compliance with the Pollution Abatement Order, it is unclear if this compliance is contingent on outstanding requirements or if a penalty will still be considered if future requirements are not met.

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[171] Ministry of the Environment, "Ministry of Environment Frequently Asked Questions: Mount Polley Tailings Breach", online: (2014) at 1 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[172] Ministry of Environment, "Pollution Abatement Order 107461, August 5, 2014", online (2014) <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[173] Ministry of Environment, "Non-Compliance Advisory Letter, Order 107461", online (2014) <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[174] Ministry of the Environment, "Ministry of Environment Frequently Asked Questions: Mount Polley Tailings Breach", online: (2014) at 1 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[175] Ministry of Environment, "Ministry of Environment Mount Polley Mine Tailings Breach Frequently Asked Questions November 23rd, 2014", online: (2014) at 2 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

[176] Ministry of Environment, "Mount Polley Mine Tailings Breach: Environmental Mitigation and Remediation Progress Report, November 2014", online: (2014) at 5 <http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/#updates>

5.5 Questions for the BC Ministry of Environment

43. How will the Land Use Standard be determined? What public consultation will occur with First Nations, the local community, and the general public? When will this decision be made, and when will the information be made public?

44. When will specific standards for long-term remediation be set and what factors will be taken into consideration in setting these standards?

45. Have the plans submitted to and approved by the MOE been properly vetted by appropriate professionals?

46. Has the mitigation and remediation work taking place been issued the necessary permits? When will these be made available to the public?

47. Can the public expect timely release of remediation updates from the MOE going forward?

48. Will a penalty be considered if MPMC fails to meet the outstanding requirements of the Pollution Abatement Order or fails to meet future conditions imposed by the MOE?

6.0 Concluding Remarks

We wish to thank the Mount Polley Independent Expert Engineering Investigation and Review Panel for the opportunity to make these submissions. We appreciate the opportunity to contribute to the Panel's deliberations, and hope that you find this report useful to your process.

Respectfully submitted by:

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This report was prepared in partial fulfillment of the course requirements for Law 386A – Environmental Law Clinic – Intensive Stream, with editing assistance from Mark Haddock, Assistant Teaching Professor, Faculty of Law, University of Victoria.