PERMIT AMENDMENT APPLICATION

FOR AN AUTHORIZATION TO DISCHARGE WASTE

UNDER THE *ENVIRONMENTAL MANAGEMENT ACT*

PUBLIC CONSULTATION REPORT

MOUNT POLLEY MINE

LONG-TERM WATER MANAGEMENT PLAN

PREPARED FOR

THE MINISTRY OF ENVIRONMENT

PREPARED BY

MOUNT POLLEY MINING CORPORATION

FEBRUARY 28, 2017

DOCUMENT BACKGROUND

On October 20, 2016, Mount Polley Mining Corporation (MPMC) formally applied to the British Columbia Ministry of Environment (MoE) to amend *Environmental Management Act* Permit 11678, issued to MPMC by the MoE, for the Long-term Water Management Plan (LTWMP) for the Mount Polley Mine.

An Application for Authorization to Discharge Waste under the *Environmental Management Act* was submitted to the MoE for each of the two (2) discharges contemplated in the LTWMP: the discharge of mine contact water into Quesnel Lake; and the discharge of mine contact water (via groundwater) to Bootjack Lake. Together, these two (2) documents are herein referred to as the "Application".

The purpose of the Application is to receive authorization for the discharge of mine contact water from the Mount Polley Mine during its operating life, in accordance with the LTWMP. Implementation and operation of the works proposed by MPMC in the LTWMP would require: a permit amendment from the MoE under the *Environmental Management Act*; a project review from Fisheries and Oceans Canada (DFO) under the *Fisheries Act*; approval from, and notification to, the British Columbia Ministry of Forests, Lands, & Natural Resource Operations (MFLNRO) under the *Water Act*; approval from the MFLNRO under the *Lands Act*; and, notification to Environment Canada as required by the Metal Mining Effluent Regulations under the *Fisheries Act*.

In support of the Application, a Consultation Plan was submitted to the MoE on October 20, 2016. The Consultation Plan describes activities to be completed by MPMC following submission of the Application, specifically regarding the public consultation period initiated by posting of the Environmental Protection Notice (EPN). As noted in the Consultation Plan, posting of the EPN and subsequent activities do not represent the initial consultation associated with the Application. Consultation in the context of water management planning for the Mount Polley Mine site has been ongoing during the Mine's development and operation, and, more specifically regarding the Application, since the foundational failure of the Mount Polley Mine Tailings Storage Facility on August 4, 2014.

As noted in Section 4 of the Consultation Plan:

> *"MPMC will document activities and submit a final Consultation Report to the MoE upon the conclusion of consultation for the water discharge permit amendment application. This Consultation Report will include a summary of consultation activities conducted as well as present questions and comments raised during such activities and corresponding responses provided by MPMC."*

This document, *Public Consultation Report*, dated February 28, 2017, is provided by MPMC to the MoE to fulfill this requirement to document activities and submit a Consultation Report summarizing consultation activities, questions and comments, and MPMC responses.

MOUNT POLLEY MINING CORPORATION

MOUNT POLLEY MINE

LONG-TERM WATER MANAGEMENT PLAN – PUBLIC CONSULTATION REPORT

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

MOUNT POLLEY MINE

LONG-TERM WATER MANAGEMENT PLAN – PUBLIC CONSULTATION REPORT

1.0 BACKGROUND

On October 20, 2016, Mount Polley Mining Corporation (MPMC) formally applied to the British Columbia Ministry of Environment (MoE) to amend *Environmental Management Act* (*EMA*) Permit 11678, issued to MPMC by the MoE, for the Long-term Water Management Plan (LTWMP) for the Mount Polley Mine (the "Mine").

The formal application followed, and was informed by, significant dialogue and collaboration with regulators, the public, First Nations, government and stakeholders; its development and content reflects consultation in the context of water management planning completed as part of a process ongoing since the foundational failure of the Mine's Tailings Storage Facility (TSF) on August 4, 2014. MPMC would like to thank and acknowledge all those that have participated in this dialogue and collaboration.

An Application for Authorization to Discharge Waste under the *EMA* was submitted to the MoE by MPMC for each of the two (2) discharges contemplated in the LTWMP: the discharge of mine contact water into Quesnel Lake; and the discharge of mine contact water (via groundwater) to Bootjack Lake. Together, these two (2) documents are herein referred to as the "Application".

The purpose of the Application is to receive authorization for the discharge of mine contact water from the Mine during its operating life, in accordance with the LTWMP. Implementation and operation of the works proposed by MPMC in the LTWMP would require: a permit amendment from the MoE under the *Environmental Management Act*; a project review from Fisheries and Oceans Canada under the *Fisheries Act*; approval from, and notification to, the British Columbia Ministry of Forests, Lands, & Natural Resource Operations (MFLNRO) under the *Water Act*; approval from the MFLNRO under the *Lands Act*; and, notification to Environment Canada as required by the Metal Mining Effluent Regulations under the *Fisheries Act*.

The Application specifically references a document, *Mount Polley Mine Long Term Water Management Plan: Permit Amendment Application under the* Environmental Management Act*: Technical Assessment Report*, prepared for MPMC by Golder Associates Ltd. (Golder), dated October 17, 2016 and made available to the MoE (among other groups) on October 20, 2016. This document is herein referred to as the "LTWMP TAR".

The LTWMP TAR provides the details of water management planning for the Mine, including discharge quality and quantity modelling for the operations, closure and post-closure phases. The Application requests amendment of *EMA* Permit 11678 as required for the operations phase of the Mine, and is supported by the technical assessment of the effluent discharge during operations to identify whether or not receiving water uses would be impaired (included in the LTWMP TAR).

The Application is proposed such that MPMC (for the benefit of the environment, MPMC, regulators, the public, First Nations, government and stakeholders) is afforded the ability to manage surplus site contact water through a permitted discharge of treated surplus mine contact water from the Mine site. Current authorization under *EMA* Permit 11678 (as last amended September 19, 2016) allows for the discharge of treated effluent from the Mine until November 30, 2017 (Section 1.2.2), and requires that a long-term water management plan be developed and implemented (Section 2.9). No authorization currently exists for discharge of mine contact water beyond the current authorization, and the Mine site is subject to surplus water accumulation with or without continued operations at the Mine.

The effluent discharge strategy currently implemented at the Mine, commonly referred to as the Short-term Water Management Plan (STWMP), was authorized on November 29, 2015, and reflects the effluent discharge authorized by *EMA* Permit 11678 to November 30, 2017 as referenced above. The STWMP includes discharge of treated effluent to Quesnel Lake via the Hazeltine Channel, and the key objective in its development and authorization was to manage contact water that had accumulated at the Mine site following the TSF foundation failure, while allowing time to develop the LTWMP. The LTWMP TAR was initially submitted in draft form on June 30, 2016, as required under conditions of *EMA* Permit 11678. Feedback from the review and comment by the MoE, the Ministry of Energy and Mines (MEM) and First Nations (and their respective consultants) on this June 30, 2016 draft LTWMP TAR were addressed and incorporated into the final LTWMP TAR dated October 17, 2016; the latter being submitted in support of the Application on October 20, 2016.

In support of the Application, a Consultation Plan was submitted to the MoE on October 20, 2016. The Consultation Plan describes activities to be completed by MPMC following submission of the Application, specifically regarding the formal public consultation period initiated by posting of the Environmental Protection Notice (EPN). As noted in the Consultation Plan, posting of the EPN and subsequent activities do not represent the initial consultation associated with the Application; consultation in the context of water management planning specifically contemplating the Application has been part of a process ongoing since the foundational failure of the Mine's TSF on August 4, 2014.

The MoE indicated that the Application required public notice and provision of a thirty (30) day period to enable public comment, which was scheduled to conclude on November 24, 2016. It was

indicated by the MoE that MPMC would be responsible for responding to any questions related to the Application that arose during the public review period. On November 16, 2016, the MoE Director extended the public comment period to December 23, 2016.

As noted in Section 4 of the Consultation Plan:

> *"MPMC will document activities and submit a final Consultation Report to the MoE upon the conclusion of consultation for the water discharge permit amendment application. This Consultation Report will include a summary of consultation activities conducted as well as present questions and comments raised during such activities and corresponding responses provided by MPMC."*

This document, *Public Consultation Report*, dated February 28, 2017, is provided by MPMC to the MoE to fulfill this requirement to document activities and submit a Consultation Report summarizing formal consultation activities, questions and comments, and MPMC responses. The consultation carried out meets the requirement of the *Public Notification Regulation*; however, MPMC elected to undertake a considerably expanded scope of consultation than is required by that regulation. The Consultation Plan provided outlined the activities that would be undertaken regarding the MoE-regulated requirements, and the present document (the *Public Consultation Report*) captures such consultation activities and outputs. MPMC is pleased to submit a consultation report summarizing consultation activities, questions and comments and MPMC responses.

2.0 PUBLIC CONSULTATION

This Public Consultation Report (the "Report") documents consultation completed in respect to the Application to fulfill the requirements of the MoE as detailed in the Document Background and Section 1.0 (Background), and as set out in the Consultation Plan submitted by MPMC to the MoE on October 20, 2016 in support of the Application. A copy of the Consultation Plan is included as Appendix A. As noted in the Consultation Plan, formal submission of the Application and issuing of the EPN was not the initial consultation activity for many of the groups.

This document does not include detailed documentation of consultation completed as part of the Cariboo Mine Development Review Committee (CMDRC) review of the Application, which has been submitted separately to the MoE in the document, *Mine Development Review Committee Comment Tracking: Mount Polley Mine Long-term Water Management Plan Technical Assessment Report*, dated February 9, 2017.

This Report does not exhaustively document consultation completed outside of the formal requirements of the MoE; such consultation activities will be more fulsomely described in a separate information sharing summary.

2.1 Referrals

Five (5) documents were provided to the MoE by MPMC as part of the formal submission of the Application:

- a list and map of all mining claims and leases in the area;
- a Consultation Plan;
- a tracking table summarizing how the MoE's comments on the June 30, 2016 draft LTWMP TAR were addressed by MPMC in the October 17, 2016 final LTWMP TAR;
- an open letter to the local communities from the Mount Polley Mine General Manager outlining the water management strategies envisioned for the Mount Polley Mine and summarizing the Application; and,
- the LTWMP TAR, dated October 17, 2016.

The CMDRC Chair was copied on the formal submission of the Application to the MoE.

A copy of the e-mail from MPMC notifying the MoE of the formal submission of the Application was forwarded to representatives of the Williams Lake Indian Band (WLIB) and Soda Creek Indian Band (SCIB; Xatśūll First Nation) on October 20, 2016 through the Mount Polley Mine Joint Implementation Committee.

The Mount Polley Mine Public Liaison Committee (PLC) was informed of the formal submission of the Application to the MoE by MPMC on October 20, 2016, via e-mail from MPMC.

Both the Joint Implementation Committee and the PLC, via their respective correspondence, were referred to the Imperial Metals Corporation (Imperial Metals) website for access to the Application and Supporting Materials.

Copies of a letter from the Mount Polley Mine General Manager outlining the water management strategies envisioned for the Mount Polley Mine and summarizing the Application were e-mailed on October 19, 2016 to: the City of Quesnel (Mayor and Council); the City of Williams Lake (Mayor and Council) and the Cariboo Regional District (Chief Administrative Officer). A copy of the respective letters is included in Appendix B.

The City of Quesnel, the City of Williams Lake, and the Cariboo Regional District, via their respective correspondence, were referred to the Imperial Metals website for access to the Application and Supporting Materials.

Supporting Materials were made available on the Imperials Metals website for access by the MoE, the Joint Implementation Committee, the PLC, City of Quesnel, the City of Williams Lake, the Cariboo Regional District and members of the general public (notification processes for the lattermost being as described in Section 2.2). The following Supporting Materials were

made available on the Imperial Metals website on October 20, 2016 and remained available in this location until January 19, 2017:

- an open letter to the local communities from the Mount Polley Mine General Manager outlining the water management strategies envisioned for the Mount Polley Mine and summarizing the Application;
- the EPN for the LTWMP;
- the LTWMP TAR (dated October 17, 2016); and,
- a series of technical posters summarizing key components of the LTWMP TAR used to support public meeting activities
    - Technical Assessment Report Overview
    - Options Analysis for Discharge Location
    - Water Balance and Water Quality Modelling
    - Impact Assessment for Operations
    - Water Treatment for Operations
    - Water Treatment for Closure
    - Long-Term Water Discharge Monitoring

MPMC notes that the online availability of these materials extended through the full duration of the public notification period, which expired on December 23, 2016.

The CMDRC Chair formally referred the Application to the CMDRC on December 7, 2016. The CMDRC were initially referred to the Imperial Metals website for access to the Application and Supporting Materials.

2.2 Notifications

An EPN under the *EMA* (the "Notice") was drafted by MPMC for the Application: a copy of the Notice is included in Appendix B.

As noted in Section 2.1, the Notice was made available on the Imperial Metals website, in support of the Application, on October 20, 2016. The Notice was published in: the Williams Lake Tribune (October 26, 2016); the Quesnel Cariboo Observer (October 26, 2016); and the BC Gazette (October 27, 2016). A copy of the Williams Lake Tribune posting, a copy of the Quesnel Cariboo Observer posting, and a copy of the BC Gazette posting are included in Appendix B.

Copies of the Notice were posted at: the Big Lake Store, Clarke's General Store (Horsefly), the Likely Post Office, and at the Mine. Photographs of the posting of the Notices are included in Appendix B.

As an additional initiative by MPMC, the open letter included in the Supporting Materials was published in: the Williams Lake Tribune (October 21, 2016) and the Quesnel Cariboo

Observer (October 26, 2016). A copy of the Williams Lake Tribune posting and a copy of the Quesnel Cariboo Observer posting are included in Appendix B.

2.3 Public Meetings

In addition to the referral and notifications as outlined above, consultation with the public was completed prior to and throughout the Application process. Table 2.3.1 provides a summary of the public meetings held as part of the formal public consultation process for the Application during the initially contemplated public consultation period (October 20, 2016 through December 23, 2016).

Table 2.3.1 Community Meeting Log

Date	Event	Location
October 26, 2016	Quesnel Community Meeting	Quesnel (Royal Canadian Legion)
October 27, 2016	Williams Lake Community Meeting	Williams Lake (Royal Canadian Legion)
October 28, 2016	Horsefly Community Meeting	Horsefly (Horsefly Community Hall)
October 29, 2016	Big Lake Community Meeting	Big Lake (Big Lake Community Hall)
October 30, 2016	Likely Community Meeting	Likely (Likely Community Hall)
November 14, 2016	First Nations Community Meeting	Sugarcane Reserve (WLIB Gymnasium)

Community Meetings have been held prior to and throughout the Application process, and notices are made through combinations of: publication in local newspapers; posting in public locations; distribution in hard copy to post office boxes and through e-mail mailing lists; and posting on the Imperial Metals website.

The Notice of Community Meeting (Williams Lake) is provided as an example in Appendix C; copies of the Notice of Community Meeting as published in the Williams Lake Tribune (October 21, 2016; October 26, 2016) and in the Quesnel Cariboo Observer (October 21, 2016) are included in Appendix C.

2.4 Public Comments Received

As detailed in the Notice, public comments were to be provided directly to MPMC (inquiries@imperialmetals.com), with a copy to the MoE (Director of Mining Operations Mount Polley, MtPolleyMinePermit@gov.bc.ca). The MoE Director indicated, in the MoE's formal referral of the Application for public comment, that comments on the Application could also be submitted directly to the MoE (MtPolleyEnvironmental.Enquiries@gov.bc.ca).

Comments received by the MoE and the MEM were compiled by the MoE and provided to MPMC on January 24, 2017 in the form of a summary table. The MoE summary table compiled 139 comments received by the MoE and the MEM. Original copies of the comments summarized in the MoE-provided table were not made available to MPMC. A copy of the table, modified for presentation purposes by MPMC, is included in Appendix D.

MPMC received 17 comments directly. Copies of comments received directly by MPMC are included in Appendix D, and are summarized in a table thereafter. Comments received directly by MPMC were screened for duplicates against the MoE-compiled comments: of the 17 additional comments received by MPMC, five (5) were submitted only to MPMC (i.e., twelve were identified as duplicates already captured in the MoE-compiled summary table).

Table 2.4.1 summarizes the location of the commenters for the 144 combined comments received (MoE-provided comments screened for duplicates against MPMC-received comments), as available based on information included in the comments received by MPMC or the summary table provided by the MoE.

Table 2.4.1 Unique Comments (by Location)

Location	Number
Canada	111
British Columbia (BC)	102
*Local**	*60*
Rest of BC	*42*
United States of America	8
Unspecified	25
Total Unique Submissions	**144**

* 150 Mile House, Big Lake, Horsefly, Likely, Morehead/Morehead Creek, Quesnel Lake, Quesnel, Williams Lake

Of the 144 combined comments, three (3) groups of 'form letter' comments were received, which have been denoted as Form A, Form B and Form C comments . Nine (9) comments were derived from Form A; four (4) comments were derived from Form B; and five (5) comments were derived from Form C. One (1) further comment was submitted under the CMDRC review process (and subsequently responded to as part of the CMDRC process), and two (2) comments were identical (duplicates).

Following this secondary screening, 127 unique comments were identified for review and response by MPMC.

2.5 Summary of Responses to Relevant Concerns

MPMC received a number of thoughtfully worded submissions from members of the public. All public comments received by MPMC were reviewed and the comments relevant to the permit fall into seven (7) main categories: TSF foundation failure – breach response and remediation; permitting/consultation; options analysis; Quesnel Lake; proposed effluent discharge limits; proposed treatment; and, miscellaneous.

2.5.1 TSF Foundation Failure – Breach Response and Remediation

Note: Several comments were received in regards to the TSF foundation failure and resulting breach impacts. MPMC notes that a separate regulatory process, invoked by the MoE's Pollution Abatement Order, has governed the breach response and remediation, not the discharge permit that is the subject of the present application. As MPMC have frequently communicated in public, a discharge permit would have been required regardless of whether or not the failure in the glaciolacustrine layer occurred. Similarly, the breach response activities would also occur regardless of the treated discharge options being sought.

- The damage from the tailings that were deposited on the bottom of Quesnel Lake is underestimated

3D models of the lake turbidity have been developed, and they predicted that the turbidity would decline and particles of sediment would not re-suspend off the bottom. All of MPMC's monitoring work has validated these predictions. Available evidence is consistent with expectations that tailings material is not re-suspending off the bottom of the deep parts of the lake, which is where the vast bulk of the tailings were deposited as a result of the TSF foundation failure.

MPMC are presently completing a risk assessment that will inform how residual sediments from the breach will ultimately be managed; this is planned to be submitted to the MoE in 2017.

- The impact (potential or realized) of the breach is yet to be fully understood, and work should not proceed until it is

The foundation failure of the TSF has been the subject of ongoing assessment since August 2014, with information provided in a range of deliverables, including a Post-Event Environmental Impact Assessment Report (PEEIAR) and Update, and a Human Health Risk Assessment and Ecological Risk Assessment (to be submitted to the MoE in 2017).

The LTWMP TAR focussed on assessment of the proposed discharge of treated effluent from the Mine for a defined operations period. The foundation failure of the TSF in 2014 was not the focus of this assessment.

- potential impacts, specifically on fish are not yet understood

The testing that MPMC did on fish eggs and alevins showed that even the water that flowed down the Quesnel River at the Quesnel River Research Centre (QRRC), when the turbidity from the tailings breach was at its highest in the winter of 2014/2015, did not have a negative effect on the early development stages for fish. This is related to the fact that the copper in the Mine tailings is hosted in minerals that are very stable and do not break down easily or dissolve in lake water.

The negative effect of copper on the sense of smell of fish is caused by dissolved (ionic) copper, not copper in particulates (solid mineral phases). Even then, its effects are ameliorated by binding with substances present in natural waters, such as organic carbon. The levels of dissolved copper in Quesnel Lake at Hazeltine Creek and in the discharge are below known thresholds for olfactory impacts on salmon. In fact, the measured dissolved copper in Quesnel Lake even in the months immediately after the breach did not approach levels where there has been a demonstrated effect on the sense of smell of fish.

- sediments deposited from the breach, specifically those in Quesnel Lake, are bioavailable

MPMC notes that the permit application is for the discharge of treated waters and not sediments.

SRK Consultants undertook an extensive geochemical testing program that evaluated whether tailings in sediments would leach metals under a variety of environmental conditions. They found that submerged tailings are stable and not expected to leach metals in bioavailable form. These geochemical predictions are supported by some of the early data coming in from MPMC breach response studies, which are part of the Ecological Risk Assessment. The report has not yet been prepared because some of the sample results have not yet come in. However, as noted, the breach response program is a separate regulatory initiative.

2.5.2 PERMITTING/CONSULTATION

- The mine was permitted under the pretense that water would never be discharged from the site

The Mine has a positive water balance, which means that there is more yearly rainfall at the site than there is evaporation. This water surplus was forecast before the Mine started operation, and, as discussed with our neighbouring communities during the original consultations that were carried out during the 1990s, was contemplated in the (subsequently approved) Environmental Assessment application. At that time, the discharge strategy contemplated in the Environmental Assessment was to settle the surplus water in settling (sedimentation) ponds and discharge to the local lakes and creeks near the Mine.

During the early development of many mines in BC, the mines do not discharge because they require water for their process early in the mine's life. As this initial need is met, most BC mines develop a positive water balance and must have a discharge under permit. The Mount Polley Mine is no different. In the original Environmental Assessment documentation, it is indicated that treatment of site contact water would be through a sediment pond prior to distributed discharge to local watersheds. As both technology and government expectations have evolved since that time, the current permit application is based on a higher level of treatment than initially was planned, but eventual discharge was a stated part of the mine plan.

MPMC retained a team of qualified professionals to review and modernize the previous plans and make sure that MPMC are applying best practices to manage surplus site water. This work is presented as the LTWMP TAR.

- No consultation has been completed with First Nations

*The Mine is in the traditional territory of the SCIB and the WLIB. MPMC has Participation Agreements in place with both First Nations and those agreements were the first to be completed by any mining company in **BC** at a brownfields site. MPMC regularly meets with the SCIB and WLIB through its Joint Implementation Committee, which is a platform for ongoing information sharing regarding the Mine and its activities. MPMC appreciates the strong relationship and partnerships between MPMC and the First Nation communities and appreciates their collaboration in the development of this LTWMP. Dialogue has been extensive and ongoing throughout.*

2.5.3 OPTIONS ANALYSIS

- No alternatives to Quesnel Lake were considered

MPMC and their consultants evaluated over a dozen options to determine the best overall option that considers environmental, technological, social and economic factors. Of these options, three were considered viable.

1. *Distributed discharge to local waterbodies: This option is preferred, but not feasible during operations. MPMC is continuing to pursue this option so that it can be implemented in a phased approach or transition. The goal is to make that transition at closure of the Mine, though it may be sooner (or later) depending on the results of ongoing studies.*
2. *Discharge to Quesnel Lake*
3. *Discharge to Quesnel River*

Both of the latter two options are feasible, but the Quesnel Lake option was deemed better overall based on a comparison of nine of the twelve environmental, technological, social and economic factors. Please refer to LTWMP TAR Appendix G, Attachment 2. This table shows the details of the options analysis that was completed and the rankings for each of the options analyzed (including the Quesnel River option). Economic and environmental rankings are included.

The Options Analysis presented in the LTWMP TAR and the supplementary memorandum dated 20 January 2017, "Addendum to Mount Polley Mine Long Term TAR Options Analysis" (Golder; attached in Appendix E to this Report), followed extensive pre-application community, First Nations and regulatory consultation - this is a process that was maintained through the STWMP TAR development and continued between the implementation of the (current) STWMP and the development of the (proposed) LTWMP and associated TAR. MPMC are aware through that consultation that Quesnel River discharge, downstream of the community of Likely was that community's preferred option; however, that option is environmentally less favourable, as detailed in the LTWMP TAR and supplementary memorandum.

MPMC has accepted our consultants' recommendation that Quesnel Lake is the best receiving environment for treated effluent and that forms the basis of the present permit application. At the same time, MPMC are initiating a number of research projects, including designing pilot systems to test alternative discharge sites and treatment strategies on our consultants' recommendations. The main drivers for these projects and the basis for their recommendation are

environmental; however, they are also informed by input that MPMC have received from the WLIB and SCIB as well as local community members. MPMC are optimistic that we will be able to significantly reduce the amount of treated water that requires discharge into Quesnel Lake during the operating phase of the Mine and especially in the future.

- Quesnel Lake is being proposed as it is already impacted by the breach

The basis for selection of Quesnel Lake is provided in the LTWMP TAR, and detailed in the supplementary options evaluation memorandum (20 January 2017; Golder). None of the criteria used to inform selection are related to the breach. As noted above, the breach is part of a separate regulatory program from the permit, which would be required regardless of the breach.

    - baseline comparisons in Quesnel Lake are to post-breach water quality

    Baseline water quality time periods and locations were defined in Section 3.4 of the LTWMP TAR using the reference condition approach. Baseline data for Quesnel Lake were derived from measurements collected east of Cariboo Sill, so they do not include the influence of the foundation failure of the TSF or the existing discharge.

- Quesnel Lake is being proposed as it is the cheapest option

Of the five options evaluated in the Options Analysis (LTWMP TAR Appendix G), the Quesnel Lake option was the second most expensive. The Quesnel Lake option is objectively not the "cheapest" nor "easiest" option. It is, however, the most appropriate option for a number of reasons articulated in the Options Analysis in the LTWMP TAR. Cost was not a primary determinant of the option selected.

Additionally, the sensitivity analysis included in the 20 January 2017 supplementary memorandum showed that Quesnel Lake option was superior to the Quesnel River option even if all sub-criteria under Environmental, Technological, Social, or Economic pillars are discounted independently (i.e., one at a time).

- Why not Quesnel River rather than Quesnel Lake?

The Options Analysis reflects the version that was sent to multiple parties, including government, First Nations and local community representatives in May 2016. Following receipt of feedback at that time, the Options Analysis was

finalized. As shown in the Options Analysis and a supplementary memorandum dated 20 January 2017, the Quesnel Lake option was shown to be superior to the Quesnel River option in nine of twelve criteria.

The Options Analysis in Appendix G of the LTWMP TAR has weighed Science, Technology, Social Responsibility and Technology evenly. The Quesnel River option does not meet the requirements as detailed in the Options Analysis and as further detailed at the 15 December 2016 Cariboo Mine Development Review Committee meeting. At that meeting, a number of additional consequences and risk factors associated with the Quesnel River option were also highlighted and an analysis was provided of the constraints to primary objective – water management – were also detailed.

An additional significant factor that influenced this analysis is that Quesnel River is important habitat for rainbow trout, salmon and other fish species, and much of this reach of river is spawning habitat. In contrast, the diffusers in Quesnel Lake are very deep where fish do not spend a lot of time and do not spawn. The other main factor is that Quesnel River is a variable flow system whereas Quesnel Lake is not subject to variations in flow. This makes dispersal of the plume in the lake more reliable and predictable than in the river. The physical stability of the diffuser is also a consideration – the installation in Quesnel Lake is very deep, compared to in Quesnel River where it could be an obstacle to river users during low flow and it could get damaged by ice or other debris in this high-energy river. Additional factors are discussed in Appendix G of the LTWMP TAR.

The Options Analysis clearly reflects that the input from local stakeholders who have expressed a strong preference to have the discharge located downstream of where they live.

Additionally, the 20 January 2017 sensitivity analysis showed that Quesnel Lake option was superior to the Quesnel River option even if all sub-criteria under Environmental, Technological, Social, or Economic pillars are discounted independently (i.e., one at a time). The Quesnel River option is only deemed preferable if social preferences are considered at the exclusion of other considerations, including environmental factors.

2.5.4 QUESNEL LAKE

- There is not adequate baseline data for Quesnel Lake

Various time periods were used based on the available information and what has occurred in each area contemplated in the LTWMP TAR. There were insufficient pre-Mine or pre-breach water quality data for Quesnel Lake to define baseline conditions for those periods, as documented in the PEEIAR and described in the 2015 STWMP TAR. Therefore, current water quality data from outside the West Basin, which represents reference locations not influenced by the breach or the existing discharge, were used to define baseline.

- The modelling for the mixing of water in Quesnel Lake is not well understood or reliable

The results of the Cormix (nearfield mixing) model (Appendix H to the LTWMP TAR) indicated the diffusers in Quesnel Lake can be configured to attain more than 40 times dilution. A far field hydrodynamic model (Appendix J of the LTWMP TAR), accounting for stratification and seiching in Quesnel Lake also demonstrated a similar dilution factor could be achieved. Monitoring since 1 December 2015 (commencement of effluent discharge under EMA Permit 11678 for the STWMP) has confirmed that these predictions are both reliable and conservative.

A memorandum dated 25 November 2016, "Analysis of Observed Dilution in Quesnel Lake, Mount Polley Mine, BC" (Golder; attached in Appendix E to this Report), describes the verification of the near-field dispersion model.
The Quesnel Lake hydrodynamic model (LTWMP TAR Appendix J) accounts for the limnological characteristics of Quesnel Lake mechanistically. The model shows that concentrations of treated effluent constituents will not accumulate in Quesnel Lake to levels exceeding BC WQGs. The level of assessment in the LTWMP TAR, which includes this three-dimensional hydrodynamic model projecting several years into the future is a level of enhanced evaluation that is uncommon for discharge permitting studies but adds considerable confidence to the predictions that water uses will not be harmed.

- There has been a change in the colour of Quesnel Lake

MPMC are aware of reports from residents and has expended considerable efforts in pursuit of these reports. A technical memorandum, dated 9 February 2017,

"Quesnel Lake Water Colour" (Golder; attached in Appendix E to this Report), addresses Quesnel Lake colour.

- The discharge will re-suspend sediments from the bottom of Quesnel Lake

Resuspension of sediment was not pertinent to the development of the permit limits proposed in the LTWMP TAR because the diffusers were configured to preclude disrupting sediment resuspension and because total suspended solid (TSS) measurements have been consistently close to or below detection at monitoring point QUL-58 since discharge began on 1 December 2016 under the STWMP.

The permit limits proposed in the LTWMP TAR were designed to be protective of the water uses in Quesnel Lake including designing an outlet system that will not disturb sediments in Quesnel Lake. The hydrodynamic model (Appendix J of the LTWMP TAR) accounts for seiching, residence times and overturning. Therefore, influences of these processes on the dilution factor used to propose effluent permit limits have been accounted for in the model.

2.5.5 Proposed Effluent Discharge Limits

- Proposed effluent limits are greater than those currently authorized in the STWMP

The Mine has been discharging treated water into Quesnel Lake since 1 December 2015 under the STWMP. This water has been discharged into the constructed Hazeltine Channel, and carried to sedimentation ponds near Quesnel Lake, from where it flows into two buried pipes and is discharged (via diffusers) into the lake at depth.

The current EMA Permit 11678 limits were derived under the assumption that all water to be discharged would be passed through the Springer Pit, which reduces peak concentrations of all constituents and removes nearly all particulate metals and TSS. This will not be the case for the remainder of operations, nor for closure. The Springer Pit will soon be drawn down entirely and the discharge will be subject to more variability, which means occasionally higher concentrations. Hence, proposed limits in the LTWMP TAR are necessarily higher.

The Mine is also applying for higher rates of discharge for limited periods of time to be better able to manage periods of high flow (for example at spring freshet), and for higher limits for some of the elements in the discharge, to allow for some variability in flows and composition of site water. However, even with these new

permit limits, the water quality in the treated discharge will continue to be of a high quality, and the EMA Permit 11678 limits proposed in the LTWMP TAR that apply at the end-of-pipe result in concentrations at the edge of the IDZ that meet or are lower than chronic BC WQGs and will not result in acute toxicity at the end-of-pipe. Both the current and the proposed EMA Permit 11678 limits are protective of water uses in Quesnel Lake, including the protection of aquatic life and drinking water.

- The proposed discharge is toxic and/or tailings

Regular toxicity testing of the discharge since December 1, 2015 has confirmed that the water being discharged is not toxic. Discharge of toxic water is prohibited by both the federal Fisheries Act and the provincial EMA.

The Mount Polley Mine will not discharge any solid tailings or tailings slurry as part of the effluent discharge to Quesnel Lake. At no time has this been contemplated or proposed.

- The proposed discharge will cause pollution

The derivation of effluent permit limits proposed in the LTWMP TAR was based on the protection goal of attainment of BC WQGs at edge of IDZ and non-toxic at end-of-pipe. The effluent permit limits proposed in the LTWMP TAR provide enforceable limits that are protective of the environment and do not cause pollution (as per the EMA definition of pollution: "the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment").

- The proposed discharge will contain deleterious materials

As described in Section 2.4 of the LTWMP TAR, deleterious substances are defined in the Metal Mining Effluent Regulation which defines "deleterious" in the context of metal mines (this includes the Mount Polley Mine). All constituent concentrations in the Mine effluent are below Metal Mining Effluent Regulation Schedule 4 limits, and the effluent is non-toxic as predicted by chemical concentrations and confirmed by whole effluent toxicity testing. Therefore, the discharge is not "deleterious".

- Dilution is not an acceptable solution

Water quality guidelines for designated uses are specifically developed to be applied to the receiving water, outside of the IDZ which is located in the immediate area of the point of discharge. They do not apply to the point of discharge (end-of-pipe in the case of the LTWMP TAR) because the pipes are not a habitat. However, dilution is not the solution that MPMC have relied upon. MPMC have applied the MoE's Best Achievable Technology (BAT) policy. The BAT policy puts requirements on dischargers for treating effluents to a high standard and does not rely on dilution alone to mitigate potential impacts. IDZs are typically only allowed when BAT has been applied. The mixing zone concept recognizes that dilution is a normal physical process and the IDZ is a small area in which mixing occurs. A person applying for a discharge permit must demonstrate that their discharge will not cause "pollution" as defined in the EMA. The simplest application of this definition is to confirm that concentrations are lower than the applicable water quality guideline. In the assessment carried out for the Mine (the TAR), water quality guidelines, for all water uses, are met.

- Discharge should meet aquatic guidelines before dilution

As discussed in Section 6.3.1.3. of the TAR, WQGs are not intended to be applied to effluents, nor were they developed with that as their intended use. BC WQGs apply at the edge of the IDZ.

BC's WQGs represent safe levels of substances that protect different water uses, including: drinking water, recreation, aquatic life, wildlife and agriculture. The assessment used chronic BC WQGs protective of the most sensitive water use, typically the protection of aquatic life. The aquatic life guidelines used are protective of the most sensitive species and life stage indefinitely. Therefore, in the assessment, constituents were not identified to be of concern if predicted concentrations were below these safe levels that indicated adverse effects and impairment of water uses would not be expected to occur. This is a standard approach to assessing discharges within BC and elsewhere.

This topic was discussed at several community meetings throughout the development and review processes for both the STWMP and LTWMP. BC WQGs provide policy direction to those making decisions affecting water quality. They are conservative (cautionary) in nature. Provincial policy allows the derivation of higher benchmarks on a site-specific basis, supported by scientific rationale; however, the treated discharge for the Mine is of sufficient quality that generic BC

WQGs can be used in the assessments, notwithstanding the built-in conservatisms of the guidelines. By meeting BC WQGs, environmental and human uses of water are protected, with confidence. For these reasons, BC WQGs provide a cautionary and broadly accepted basis for the Effects Assessment and Water Management Plan in the LTWMP TAR. The MPMC application of water quality guidelines is correct in science, policy and (conservatively) law.

- Water needs to be as good or better than receiving environment prior to discharge

There is no scientific basis for the comparison between effluent limits and lake concentrations. This assertion is not consistent with a scientifically-based evaluation, nor is it consistent with provincial policy respecting discharge permits. Constituent concentrations have been modelled and measured to meet BC WQGs, meaning that all water uses are protected in Quesnel Lake.

- Monitoring of the proposed discharge is important

MPMC has proposed monitoring for the LTWMP TAR be incorporated into the Comprehensive Environmental Monitoring Program.

2.5.6 PROPOSED TREATMENT

- Reverse Osmosis was previously contemplated, why isn't it being used now?

Reverse osmosis is not a suitable technology for long-term water management because approximately 40% of the water treated is reject water. That amount can be reduced somewhat at the expense of greater energy use but it still results in an accumulation of large amounts of reject water that is of a worse quality than the original mine contact water and needs to be stored, which is not considered a best practice. Reverse osmosis is not considered a BAT for the Mine and would result in greater water management problems (quantity and quality) within a few years of operation. It would also require storage of large volumes of water, which is not a recommended practice.

MPMC notes that the reverse osmosis plant previously contemplated for use at the Mine was part of an interim water management plan then proposed, and that MPMC purchased this plant in advance of receiving such authorization to discharge. MPMC purchased an additional WTP as part of the STWMP, as this alternative treatment system was selected through the BAT process.

- Untreated water has been, and is proposed to be, discharged from the site to Quesnel Lake

Only water that contains constituent concentrations below the approved limits in EMA Permit 11678 (present or future) can be discharged using the passive treatment (or any) process. According to all the existing permits and regulations, and to the permit amendment that the Mine has requested as part of the LTWMP, MPMC will not be releasing untreated Mine site water to Quesnel Lake.

In 2015, MPMC applied to the MoE for a "bypass" of the WTP in case of high water flows. The original bypass authorization was intended to expedite drawing down the water levels in the Springer Pit with the objective of minimizing the volume of water stored on site. This bypass however, would only allow the Mine to bypass the WTP if the water to be bypassed met the permit limits that applied to water that had been treated. Unfortunately, there was considerable misinformation surrounding the use of this bypass authorization (which was granted); however, the Mine never had to use this bypass, so no untreated water (effluent) was released.

There are three modes of operation for the WTP. 1) active mode, in which reagents are added to the water and mechanical mixing is active. 2) passive mode, in which the chemical dosing systems and mechanical mixing are offline (not active). This mode is in operation when the influent water coming to the WTP meets the discharge criteria without the need for active treatment. 3) proposed modified active mode. In addition to the features provided for the active mode, the modified active mode would allow for more chemicals (higher PAC dosage) or other chemicals (e.g., trimercaptotriazine) to be added to the water to further reduce copper concentration in the influent water during freshet. Both the active and passive modes include passing of the waters through the WTP, including the lamella, and rely on continuous water quality monitoring (which is done with the turbidity meters installed in the inlet piping and clarifier).

The WTP has successfully operated in passive mode, notably between May 2016 and January 2017, which allowed MPMC to discharge surplus water from the site at the authorized flow rate while meeting EMA Permit 11678 water quality limits. However, the WTP only operated in passive mode when treatment (i.e., reduction in constituent concentrations to acceptable levels) had already been provided by the Springer Pit. The Springer Pit has effectively treated the water by removing particulate metals to below EMA Permit 11678 limits. In the absence of this pre-

treatment, the WTP would be operated in active mode, as is the status of the water management strategy at the time of the writing of this Report.

Bypass is not the same as passive mode; it refers to bypass of the WTP. No application is being made to entirely bypass the WTP given appropriate water quality. MPMC will be trialing passive treatment options and these may provide water that is suitable for discharge without further treatment in the WTP.

- Proposed plan does not discuss what happens post-closure

The main purpose of the LTWMP TAR is to propose effluent limits for the remaining years of Mine operations. As described in Section 1.0 of the LTWMP TAR, closure water quality predictions were provided so that the proposed water management plan was adaptable to closure and to inform the design of the passive treatment system at a conceptual level. Closure/post-closure effluent limits are not proposed as part of the LTWMP TAR and are more appropriately defined as the Mine approaches the closure stage. With regards to closure, this is part of a process covered in the Reclamation and Closure Plan (RCP).

As presented in the Section 5.2.3 of the LTWMP TAR, "the objective of the RCP is to return the areas of mining disturbance to equal or better land capability than which existed prior to the mine being developed." This includes reclaiming Mine site facilities (e.g., waste rock dumps) and returning site drainages back to their natural watersheds, to the maximum extent possible. Water quality monitoring and water quality modelling predictions indicate that several drainages may require treatment at closure. MPMC plan to treat these drainages using passive water treatment systems; however, prior to implementing these systems, they need to be designed, piloted and proven to be a feasible solution to treat water in perpetuity. If the technology cannot be proven prior to closure, additional study will be required to design a sustainable passive treatment system that can achieve the objectives of the RCP.

- Passive treatment work and distributed discharge should be pursued; why hasn't work started on this already?

Work on passive treatment and distributed discharge is already underway, and has been since the late 2000s, notably as part of a partnership with the University of British Columbia and other members of the mining industry.

As discussed in Sections 5.5.3 and 6.4 of the LTWMP TAR, only operations phase discharges are part of the present application for an amendment to EMA Permit 11678; however, closure and post-closure discharge water qualities were developed to inform the development of the LTWMP (e.g., inform the piloting of passive/semi-passive treatment designs). This conceptual information presented in the TAR has since been superseded by information provided in the RCP Update January 2017 (Mines Act Permit M-200).

MPMC is working to develop a Work Plan for continuing passive water treatment research, specifically highlighting the completed and ongoing work with Golder and Contango. This work was advanced (relative to the information contained in the Annual Environmental and Reclamation Reports and the LTWMP TAR) in the 15 January 2017 update to the RCP. There is currently lots of interesting research underway and MPMC are planning additional work; the Work Plan is anticipated to be submitted to the MoE following a decision on the LTWMP amendment application.

- Dilution is being proposed instead of the Best Available Technology

The MoE BAT policy was followed in the identification of appropriate-to-site treatment at source. Dilution is an inevitable physical process that occurs and consistent with BC environmental policy, a small zone is defined for this physical process to take place and to identify whether or not the WQG are met after that initial dilution in the near-field. This is the appropriate application of WQG.

- No change in treatment is being proposed, how is this Best Available Technology?

Attachment B of Appendix E (Proposed Water Treatment Plan for Operations Phase Water Management) of the LTWMP TAR refers to BAT assessment that was prepared for the STWMP, indicating that the BAT assessment was conducted, leading to the installation of the Actiflo system for the restricted operations phase. The same rationale used in the selection of the Actiflo system for the restricted operations applies for the operations phase, which includes a modification to the system to improve the performance of the Actiflo system (specifically for additional copper treatment).

Notwithstanding this BAT assessment, MPMC have been actively pursuing additional options to further improve our water management in a manner that our consultants have recommended as part of continual improvements. These

improvements also take into account what MPMC and our consultants have heard from First Nations and the local community with regards to their desired treatment and discharge options. These methods are not proposed because there are a variety of technological and design parameter uncertainties that MPMC are working to resolve but must resolve before we can commit to a specific method.

- The water treatment plant installed hasn't been able to treat the 0.33m^3/s proposed, how is this reliable?

The water balance and receiving water quality results are based on an assumed maximum discharge rate of 0.33 m^3/s (after 1 July 2016). The nominal design capacity of the WTP is 0.23 m^3/s. At the time the water balance model for the LTWMP TAR was developed, the WTP was still being commissioned, and the actual treatment capacity had yet to be determined (initially the WTP was operating below the nominal design capacity).

Since that time, the WTP has been operated for extended periods in "passive mode" at a rate of 0.3 m^3/s, which is the maximum allowable under current EMA Permit 11678 conditions. The maximum treatment capacity in "passive mode" is likely to be higher than 0.3 m^3/s, but cannot be verified at this time due to such verification requiring use of the discharge infrastructure to the Hazeltine Channel (which is not authorized under the existing EMA Permit 11678 conditions).

In "active mode", the WTP has been operated at a maximum of approximately 0.28 m^3/s, but it is noted that commissioning is ongoing following the return to active mode from passive mode in January 2017, and that the maximum discharge rate cannot be verified at this time due to such verification requiring use of the discharge infrastructure to the Hazeltine Channel (which is not authorized under the existing EMA Permit 11678 conditions).

Moving forward, MPMC will be trialling passive treatment options, and effluent from the passive cells may be suitable to bypass the WTP (as it will be treated passively) and 'make up' or displace a portion of the waters discharged through the WTP.

As part of the RCP, MPMC intends on diverting site water and treating it at source with a target of distributed discharge (i.e., not all flow would report to the WTP as it would be treated, as required, by independent systems). This would further reduce the average annual discharge required to be directed to the WTP. MPMC will be pursuing pilot passive/semi-passive system(s), and if successful, these could be used

to treat water during operations (in advance of targeted use in closure and post-closure). While the proving of passive/semi-passive treatment systems is occurring, treated water would be discharged to Quesnel Lake via the WTP, operating at or below the design WTP capacity of the currently installed system.

2.5.7 MISCELLANEOUS

- Precautionary Principle

Reference was made to the Canadian Environmental Assessment Act which references (without defining) the precautionary principle. In that Act (which is not part of the present process) reference to "precautionary" in implementation of decisions are that decisions should be made in a precautionary manner (S.4(1)(b,g)).

The United Nations defines the precautionary principle as "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". This same definition also occurs in other federal statutes, such as the Canadian Environmental Protection Act.

MPMC notes that the evaluation of the effluent permit has proceeded in a precautionary manner, even though the precautionary principle does not apply to EMA. Conservative assumptions have been made in the LTWMP TAR, uncertainty has been evaluated and cautionary benchmarks have formed the basis of the effects assessment. MPMC further note that this discharge has been in place since 1 December 2015, and considerable source and receiving water monitoring has taken place. In the context of the detailed technical evaluation that has been done to support the discharge permit as well as monitoring of actual discharge, there is neither a threat of serious or irreversible damage because BC WQGs will be met. There is considerable information available to provide confidence, even on a prima facie basis, that the water uses of Quesnel Lake will not be harmed. In this context, the prerequisite for application of the Precautionary Principal (i.e.,"…where there are threats of serious or irreversible damage…") is not met because the specific characteristics of the discharge scenario and water being discharged meet cautionary benchmarks. Moreover, a detailed evaluation of uncertainty has been provided in the LTWMP TAR as part of the evaluation.

3.0 JOINT IMPLEMENTATION COMMITTEE

One (1) Joint Implementation Committee meeting between the SCIB, WLIB and MPMC was held on November 9, 2016, within the initially contemplated public notification period. During the meeting, updates were provided by MPMC on, among other things: site operations and conditions; the STWMP and associated monitoring; and the LTWMP and associated planning, works, and permitting.

4.0 PLC

One (1) regularly scheduled PLC meeting was held on November 17, 2016, within the initially contemplated public notification period. During the meeting, updates were provided by MPMC on, among other things: site operations and conditions; the STWMP and associated monitoring; and the LTWMP and associated planning, works, and permitting.

An extraordinary meeting of the PLC was held on October 26, 2016, within the initially contemplated public notification period. This October 26, 2016 extraordinary meeting was specifically convened regarding the Application, and included, among other things: an overview of historic site water management within the context of the LTWMP; a description of the Application and anticipated review process; and, an overview of the information in the LTWMP TAR.

5.0 CMDRC

Review of the Application through the CMDRC was not originally contemplated by MPMC in the Consultation Plan; however, the MoE Director indicated in the MoE's formal referral of the Application for public comment that the Application would be subject to technical review by the CMDRC.

This Report does not include documentation of consultation completed as part of the CMDRC review of the Application, which has been submitted separately to the MoE in the document, *Mine Development Review Committee Comment Tracking: Mount Polley Mine Long-term Water Management Plan Technical Assessment Report*, dated February 9, 2017.

6.0 OTHER CONSULTATION ACTIVITIES

As is noted in the Consultation Plan and in this Report, and has been acknowledged by regulators, the public, First Nations, government and stakeholders, consultation on the Application has been conducted by MPMC prior to, during, and after the formal public notice period for the Application.

This Report does not exhaustively document consultation completed outside of the formal requirements of the MoE; however, such consultation activities will be more fulsomely summarized in a separate information sharing summary.

7.0 CLOSURE

This Report is provided by MPMC as per the requirements of the MoE to summarize the manner in which MPMC formally advised the local public of the proposed changes under the Application, enabled the public to comment, and, by means of this Report, provided response to any questions related to the Application that arose during the public review period. We trust that this document provides sufficient information for your present needs.

APPENDIX A

CONSULTATION PLAN

Mount Polley Mining Corporation
an Imperial Metals company
Box 12 • Likely, BC V0L 1N0 • T 250.790.2215 • F 250.790.2613

CONSULTATION PLAN FOR THE *ENVIRONMENTAL MANAGEMENT ACT* PERMIT 11678 AMENDMENT APPLICATION FOR WATER DISCHARGE

October 20, 2016

IMPORTANT NOTE

It should be noted that the consultation process is a complex and unique process for each of the identified referral groups, and that the issuing of the Environmental Protection Notice will not be the initial consultation activity for many of these groups. This Consultation Plan was developed based on the Ministry of Environment's Guidance Document that outlines the recommended activities for applicants to take prior to submitting a permit amendment application and in no way summarizes Mount Polley Mining Corporation's consultation activities in regards to the discharge permit amendment application. The final Consultation Report will detail the consultation activities in their entirety.

1 INTRODUCTION

Mount Polley Mining Corporation (MPMC) will be applying for an amendment to their *Environmental Management Act* (*EMA*) Permit 11678 to allow implementation of water discharge for the Mount Polley Mine. Effective consultation is an integral part of the amendment application process and, as such, has been initiated in advance of submitting the formal amendment application to provide opportunity for concerns and issues to be identified and addressed.

This Consultation Plan focuses on consultation with First Nations, government agencies, the public, municipalities, and stakeholders through: publication of an Environmental Protection Notice (EPN), publication of technical information supporting the amendment application, an open letter to the local communities, the Mount Polley Mine Public Liaison Committee (PLC) and public meetings.

2 REFERRALS

Mount Polley Mine and the proposed water discharge is located: within the traditional use area of two (2) First Nations; within the Cariboo Regional District; near to the communities of Likely, Horsefly and Big Lake; near the municipality of Williams Lake; and, in general proximity to the municipality of Quesnel. The following lists outline First Nations, government agencies, and public stakeholders that will be consulted.

<u>First Nations:</u>

- T'exelc First Nation (Williams Lake Indian Band)
- Xats'ull First Nation (Soda Creek Indian Band)

<u>Government Agencies:</u>

- BC Ministry of Environment (MoE)
- BC Ministry of Forest, Lands and Natural Resource Operations (MFLNRO)
- BC Ministry of Energy and Mines (MEM)
- BC Ministry of Aboriginal Relations and Reconciliation (MARR)
- BC Ministry of Agriculture (AGRI)
- Fisheries and Oceans Canada (DFO)
- Ministry of Transportation and Infrastructure (MoTI)
- Cariboo Regional District
- City of Quesnel
- City of Williams Lake

<u>Communities and Municipalities:</u>

- Big Lake
- Horsefly
- Likely
- Quesnel
- Williams Lake

3 CONSULTATION ACTIVITIES

3.1 Environmental Protection Notice

The EPN will be published and posted as follows and will meet the specifications outlined in the Public Notification Regulation under the *BC Environmental Management Act*.

Newspapers

- BC Gazette Part 1
- Williams Lake Tribune
- Quesnel Lake Observer

Hard Copy Postings

- Big Lake Store
- Clarke's General Store (Horsefly)
- Likely Post Office
- Mount Polley Mine site (billboard size)

Online

- On the Imperial Metals website

The public consultation period will run for 30 days following the last date of publication or posting (anticipated to be October 28, 2016). Any questions, comments or concerns raised will be documented and formally addressed as outlined in Section 4.

3.2 Supporting Technical Information

A copy of the Technical Assessment Report (TAR) supporting the *EMA* Permit 11678 amendment application will be voluntarily hosted online through the Imperial Metals website (https://www.imperialmetals.com/our-operations-and-projects/operations/mount-polley-mine/long-term-water-management-plan-application) during the 30-day consultation period. Additionally, a series of technical posters summarizing key components of the TAR, used to support the public meeting activities listed below, will also voluntarily be made available online during the 30-day consultation period.

3.3 Open Letter to the Local Communities

An open letter from the Mount Polley Mine General Manager to local communities outlining the water management strategies envisioned for the Mount Polley Mine and summarizing the *EMA* Permit 11678 amendment application will be circulated by e-mail, mail out, and posted in local newspapers. A copy of this letter will also be made available online through the Imperial Metals website.

3.4 Public Meetings

The following meetings are to be scheduled by MPMC during the 30-day consultation period following the last date of publication of the EPN:

- Big Lake – General Public
- Horsefly – General Public
- Likely – General Public
- Quesnel – General Public
- Williams Lake – General Public
- Williams Lake – Williams Lake Indian Band and Soda Creek Indian Band

3.5 Implementation Committee Meetings

During the 30-day consultation period, a minimum of one (1) Implementation Committee meeting will be held, including representatives of MPMC, the Williams Lake Indian Band and the Soda Creek Indian Band (Xatśūll First Nation).

3.6 Public Liaison Committee

During the 30-day consultation period, a minimum of one (1) Public Liaison Committee Meeting will be held. The PLC will serve as the venue for coordinating technical and regulatory (outside of the MoE) review on the *EMA* Permit 11678 amendment application, and responding to resulting questions and comments. All First Nations and government agencies (save for the municipality of Quesnel) listed in Section 2, as well as representation from the communities of Big Lake, Horsefly and Likely are members of the PLC. Through the PLC process, members may submit verbal and formal written questions and comments, to which MPMC will respond through presentations and formal response documents.

4 CONSULTATION REPORT

MPMC will document activities and submit a final Consultation Report to the MoE upon the conclusion of consultation for the water discharge permit amendment application. This Consultation Report will include a summary of consultation activities conducted as well as present questions and comments raised during such activities and corresponding responses provided by MPMC.

APPENDIX B

REFERRALS AND NOTIFICATIONS

APPENDIX B1

REFERRAL LETTERS TO CITY OF QUESNEL, CITY OF WILLIAMS LAKE, AND CARIBOO REGIONAL DISTRICT

MOUNT POLLEY MINING CORPORATION
IMPERIAL METALS CORPORATION

October 19, 2016

City of Quesnel
410 Kinchant Street
Quesnel BC V2J 7J5
Email: cityhall@quesnel.ca

Dear City of Quesnel Mayor and Council,

The Mount Polley Mine has a positive water balance, which means that there is more yearly rainfall at the site than there is evaporation. This water surplus was forecast before the mine started operation and was discussed with our neighbouring communities during the original consultations that were carried out, along with the Environmental Assessment process, during the 1990s. At that time, the authorized plan was to settle the surplus water in sedimentation ponds and discharge to the local lakes and creeks near the mine.

Mount Polley recently retained a team of qualified environmental professionals to review and modernize the previous plans and make sure that we are applying best practices to manage surplus site water. This work resulted in a detailed Technical Assessment Report which will shortly be posted on the Imperial Metals website (https://www.imperialmetals.com/our-operations-and-projects/operations/mount-polley-mine/long-term-water-management-plan-application).

Mount Polley is now in the process of applying to the Ministry of the Environment for a permit amendment for our water discharge and we will be holding a series of public meetings as part of the public consultation process for this permit amendment application. We would like to take this opportunity to formally invite the Quesnel Mayor or members of the Quesnel Council to attend any or all of the following public meetings:

- Wednesday, October 26, 2016: 7 to 9 pm, Quesnel Royal Canadian Legion
- Thursday, October 27, 2016: 7 to 9 pm, Williams Lake Royal Canadian Legion
- Friday, October 28, 2016: 7 to 9 pm, Horsefly Community Hall
- Saturday, October 29, 2016: 3 to 5 pm, Big Lake Community Hall
- Sunday, October 30, 2016: 3 to 5 pm, Likely Community Hall

Meetings with our First Nations partners are in the process of being scheduled.

For more information, please do not hesitate to contact me at (250) 790-2600 or dreimer@mountpolley.com

Yours sincerely,

Dale Reimer
General Manager, Mount Polley Mine

cc. Hubert Bunce, Ministry of Environment

MOUNT POLLEY MINING CORPORATION
IMPERIAL METALS CORPORATION

October 19, 2016

The City of Williams Lake
450 Mart Street
Williams Lake BC V2G 1N3

Dear City of Williams Lake Mayor and Council,

The Mount Polley Mine has a positive water balance, which means that there is more yearly rainfall at the site than there is evaporation. This water surplus was forecast before the mine started operation and was discussed with our neighbouring communities during the original consultations that were carried out, along with the Environmental Assessment process, during the 1990s. At that time, the authorized plan was to settle the surplus water in sedimentation ponds and discharge to the local lakes and creeks near the mine.

Mount Polley recently retained a team of qualified environmental professionals to review and modernize the previous plans and make sure that we are applying best practices to manage surplus site water. This work resulted in a detailed Technical Assessment Report which will shortly be posted on the Imperial Metals website (https://www.imperialmetals.com/our-operations-and-projects/operations/mount-polley-mine/long-term-water-management-plan-application).

Mount Polley is now in the process of applying to the Ministry of the Environment for a permit amendment for our water discharge and we will be holding a series of public meetings as part of the public consultation process for this permit amendment application. We would like to take this opportunity to formally invite the Williams Lake Mayor or members of the Williams Lake Council to attend any or all of the following public meetings:

- Wednesday, October 26, 2016: 7 to 9 pm, Quesnel Royal Canadian Legion
- Thursday, October 27, 2016: 7 to 9 pm, Williams Lake Royal Canadian Legion
- Friday, October 28, 2016: 7 to 9 pm, Horsefly Community Hall
- Saturday, October 29, 2016: 3 to 5 pm, Big Lake Community Hall
- Sunday, October 30, 2016: 3 to 5 pm, Likely Community Hall

Meetings with our First Nations partners are in the process of being scheduled.

For more information, please do not hesitate to contact me at (250) 790-2600 or dreimer@mountpolley.com

Yours sincerely,

Dale Reimer
General Manager, Mount Polley Mine

cc. Hubert Bunce, Ministry of Environment

MOUNT POLLEY MINING CORPORATION
IMPERIAL METALS CORPORATION

Board of Directors
Cariboo Regional District
C/O Janis Bell, Chief Administrative Officer
Email: jbell@cariboord.ca

Dear Ms. Bell,

The Mount Polley Mine has a positive water balance, which means that there is more yearly rainfall at the site than there is evaporation. This water surplus was forecast before the mine started operation and was discussed with our neighbouring communities during the original consultations that were carried out, along with the Environmental Assessment process, during the 1990s. At that time, the authorized plan was to settle the surplus water in sedimentation ponds and discharge to the local lakes and creeks near the mine.

Mount Polley recently retained a team of qualified environmental professionals to review and modernize the previous plans and make sure that we are applying best practices to manage surplus site water. This work resulted in a detailed Technical Assessment Report which will shortly be posted on the Imperial Metals website (https://www.imperialmetals.com/our-operations-and-projects/operations/mount-polley-mine/long-term-water-management-plan-application).

Mount Polley is now in the process of applying to the Ministry of the Environment for a permit amendment for our water discharge and we will be holding a series of public meetings as part of the public consultation process for this permit amendment application. We would like to take this opportunity to formally invite the members of the Cariboo Regional District to attend any or all of the following public meetings:

- Wednesday, October 26, 2016: 7 to 9 pm, Quesnel Royal Canadian Legion
- Thursday, October 27, 2016: 7 to 9 pm, Williams Lake Royal Canadian Legion
- Friday, October 28, 2016: 7 to 9 pm, Horsefly Community Hall
- Saturday, October 29, 2016: 3 to 5 pm, Big Lake Community Hall
- Sunday, October 30, 2016: 3 to 5 pm, Likely Community Hall

Meetings with our First Nations partners are in the process of being scheduled.

For more information, please do not hesitate to contact me at (250) 790-2600 or dreimer@mountpolley.com

Yours sincerely,

Dale Reimer
General Manager, Mount Polley Mine

cc. Hubert Bunce, Ministry of Environment

APPENDIX B2

ENVIRONMENTAL PROTECTION NOTICE

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment under The Provisions of the *Environmental Management Act*

We, Mount Polley Mining Corporation, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, intend to submit this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. Table 1 shows British Columbia Water Quality Guidelines that the treated water will meet at the edge of the initial dilution zone in Quesnel Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. Table 1 shows British Columbia Water Quality guidelines that the seepage water will meet at the edge of the initial dilution zone in Bootjack Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V9T 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: October 20, 2016

Mount Polley Mining Corporation Contact Number: 250-790-2215

Table 1: British Columbia Water Quality guidelines that the treated water will meet at the edge of the initial dilution zone in the receiving environment.

Parameter	Units	Maximum BC Water Quality Guidelines			Chronic BC Water Quality Guidelines	
		Aquatic Life	Drinking Water	Wildlife Water	Aquatic Life	Wildlife Water
Physical Parameters						
Dissolved Oxygen	mg/L	**5 – 9**	-	-	**8-11**	-
Total Suspended Solids	mg/L	+25 mg/L from background	-	**+20 mg/L from background**	**+5 mg/L from background**	-
Water Temperature	°C	**±1°C change from background**	15	±1°C change from background	-	-
pH (field)	pH Unit	6.5 - 9.0	**6.5 - 8.5**	-	**6.5 - 9.0**	-
Major Ions						
Chloride	mg/L	600	**250**	600	**150**	-
Sulphate	mg/L	-	**500**	-	**218**	-
Nutrients						
Ammonia	mg/L (as N)	**20.5***	-	-	**1.84***	-
Nitrate	mg/L (as N)	32.8	**10**	100	**3**	-
Nitrite	mg/L (as N)	**0.060***	1	10	**0.02***	-
Total Phosphorus	mg/L	-	**0.01**	-	**0.005 - 0.015 in lakes**	-
Total Metals						
Aluminum	mg/L	-	-	**5**	-	-
Antimony	mg/L	-	-	-	**0.009***	-
Arsenic	mg/L	**0.005**	0.025*	0.025*	-	-
Boron	mg/L	**1.2**	5	5	-	-
Chromium VI	mg/L	-	-	-	**0.001***	0.05*
Cobalt	mg/L	**0.11**	-	-	**0.004**	-
Copper	mg/L	**0.0067***	0.5	0.3	**0.002**	-
Iron	mg/L	**1**	-	-	-	-
Manganese	mg/L	**1.09***	-	-	**0.83**	-
Molybdenum	mg/L	2	0.25	**0.05**	1	-
Selenium	mg/L	-	**0.01**	-	**0.002**	0.002
Silver	mg/L	**0.0001***	-	-	**0.00005***	-
Zinc	mg/L	**0.03***	5	-	**0.0075**	-
Dissolved Metals						
Aluminum	mg/L	**0.1***	0.2	-	**0.05**	-
Antimony	mg/L	-	-	-	-	-
Cadmium	mg/L	**0.000288***	-	-	**0.000127**	-
Iron	mg/L	**0.35**	-	-	-	-

Notes:
W = working guideline; M = interim guideline
Bold indicates most conservative guideline of each maximum and chronic water quality guideline
***indicates guideline is dependent on another parameter and representative average conditions in the receiving environment were applied

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment Under The Provisions of the *Environmental Management Act*

We, Mount Polley Mining Corporation, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, have submitted this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. Table 1 shows British Columbia Water Quality Guidelines that the treated water will meet at the edge of the initial dilution zone in Quesnel Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. Table 1 shows British Columbia Water Quality guidelines that the seepage water will meet at the edge of the initial dilution zone in Bootjack Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V9T 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: October 20, 2016

Mount Polley Mining Corporation Contact Number: 250-790-2215

Table 1: British Columbia Water Quality guidelines that the treated water will meet at the edge of the initial dilution zone in the receiving environment.

Parameter	Units	Maximum BC Water Quality Guidelines			Chronic BC Water Quality Guidelines	
		Aquatic Life	Drinking Water	Wildlife Water	Aquatic Life	Wildlife Water
Physical Parameters						
Dissolved Oxygen	mg/L	**5 – 9**	-	-	**8-11**	-
Total Suspended Solids	mg/L	+25 mg/L from tbackground	-	**+20 mg/L from background**	**+5 mg/L from background**	-
Water Temperature	°C	**±1°C change from background**	15	±1°C change from background	-	-
pH (field)	pH Unit	6.5 - 9.0	**6.5 - 8.5**	-	**6.5 - 9.0**	-
Major Ions						
Chloride	mg/L	600	**250**	600	**150**	-
Sulphate	mg/L	-	**500**	-	**218**	-
Nutrients						
Ammonia	mg/L (as N)	**20.5***	-	-	**1.84***	-
Nitrate	mg/L (as N)	32.8	**10**	100	**3**	-
Nitrite	mg/L (as N)	**0.060***	1	10	**0.02***	-
Total Phosphorus	mg/L	-	**0.01**	-	**0.005 - 0.015 in lakes**	-
Total Metals						
Aluminum	mg/L	-	-	5	-	-
Antimony	mg/L	-	-	-	**0.009***	-
Arsenic	mg/L	**0.005**	0.025*	0.025*	-	-
Boron	mg/L	**1.2**	5	5	-	-
Chromium VI	mg/L	-	-	-	**0.001***	0.05*
Cobalt	mg/L	**0.11**	-	-	**0.004**	-
Copper	mg/L	**0.0067***	0.5	0.3	**0.002**	-
Iron	mg/L	**1**	-	-	-	-
Manganese	mg/L	**1.09***	-	-	**0.83**	-
Molybdenum	mg/L	2	0.25	**0.05**	1	-
Selenium	mg/L	-	**0.01**	-	**0.002**	0.002
Silver	mg/L	**0.0001***	-	-	**0.00005***	-
Zinc	mg/L	**0.03***	5	-	**0.0075**	-
Dissolved Metals						
Aluminum	mg/L	**0.1***	0.2	-	**0.05**	-
Antimony	mg/L	-	-	-	-	-
Cadmium	mg/L	**0.000288***	-	-	**0.000127**	-
Iron	mg/L	**0.35**	-	-	-	-

Notes:
W = working guideline; M = interim guideline
Bold indicates most conservative guideline of each maximum and chronic water quality guideline
*indicates guideline is dependent on another parameter and representative average conditions in the receiving environment were applied

COMMUNITY

Hospital auxiliary seeks volunteers

Gaeil Farrar
Staff Writer

The Cariboo Memorial Hospital Auxiliary has started another year of volunteering and invites interested volunteers to join them.

The auxiliary raises funds in various ways, most notably by running the hospital gift shop.

"We invite interested volunteers to drop by the hospital gift shop to pick up an application form," says auxiliary member Cynthia Wilson.

In addition to profits earned by running the hospital gift shop the auxiliary raises funds by holding raffles, silent auctions, bake sales and receiving donations.

Funds raised are used to purchase smaller pieces of equipment needed by the hospital. During the past year the auxiliary has purchased three pressure relief mattresses, seven activity boards, three neonatal stethoscopes, and two vital sign machines for the hospital.

The auxiliary also provides two $1,000 scholarships each year for young adults entering medical studies.

Some of the funds raised also help to purchase favours for patients to put on their dinner trays; supplying baby layettes for new mothers in need.

Volunteers also deliver flowers from local florists to patients.

The Cariboo Memorial Hospital Auxiliary has been operating in Williams Lake since 1923 when the first job of members was to make sheets for the hospital beds, Wilson says.

The auxiliary is currently selling tickets on their seasonal raffle. First prize is a queen-sized quilt designed and donated by Elaine Watt. Second is a framed Bateman cougar print. Third prize is a Reva Schick doll. Tickets are available at Save-On, Safeway or Walmart until Nov. 25.

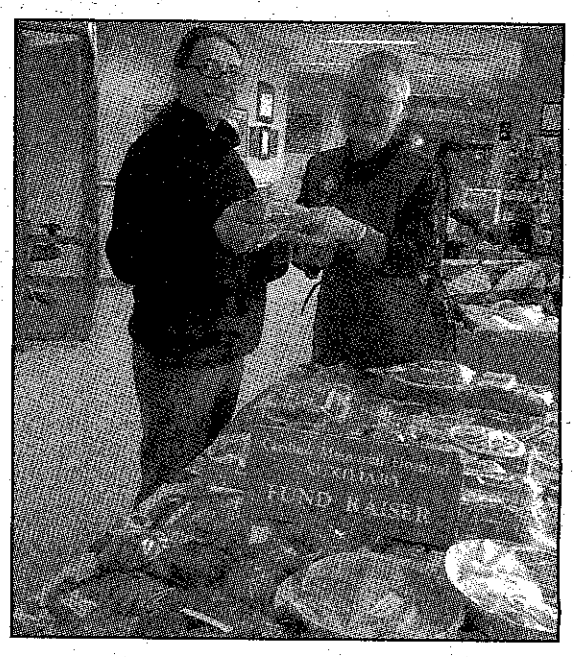


Photo submitted

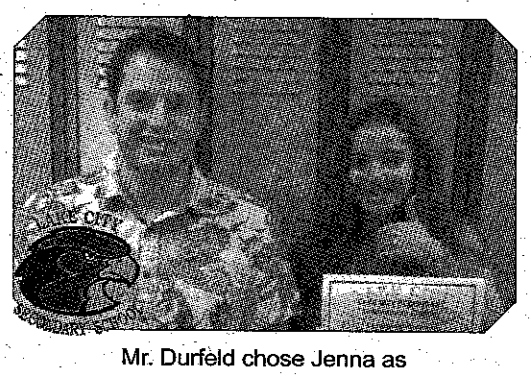
Amanda Schiemann (left) buys some baking from Cariboo Memorial Hospital Auxiliary member Judy Reid during a recent auxiliary bake sale held at the hospital.

Lake City Secondary STUDENTS OF THE WEEK

WL Campus
CHAMATH WIJESEKERA

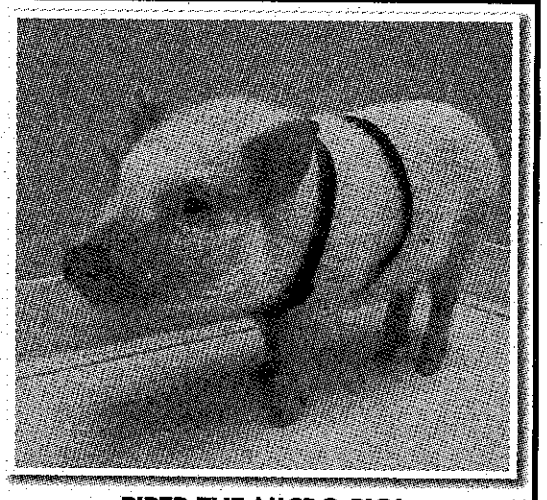
Mrs. Pritchard chose Chamath as
STUDENT OF THE WEEK
because Chamath is always willing to learn French, and for his great participation!
Congratulations Chamath!

Columneetza Campus
JENNA MIRANDA



Mr. Durfeld chose Jenna as
STUDENT OF THE WEEK
In recognition of Jenna's hard work, positive attitude and solid study habits throughout the week!
Congratulations Jenna!

MY BEST FRIEND



PIPER THE MICRO PIG!

Even miniature pigs can produce a lot of piglets in a lifetime and health risks increase for unspayed pet pigs. A pig spay is similar to a dog or cat but is more difficult when they get older. Pet pigs should also have annual health exams. Remember pet pigs should not be fed "like a pig". Call if you have questions!

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment Under The Provisions of the *Environmental Management Act*

We, Mount Polley Mining Corporation, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, have submitted this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. Table 1 shows British Columbia Water Quality Guidelines that the treated water will meet at the edge of the initial dilution zone in Quesnel Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. Table 1 shows British Columbia Water Quality guidelines that the seepage water will meet at the edge of the initial dilution zone in Bootjack Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V9T 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: October 20, 2016

Mount Polley Mining Corporation Contact Number: 250-790-2215

Table 1: British Columbia Water Quality guidelines that the treated water will meet at the edge of the initial dilution zone in the receiving environment.

Parameter	Units	Maximum BC Water Quality Guidelines			Chronic BC Water Quality Guidelines	
		Aquatic Life	Drinking Water	Wildlife Water	Aquatic Life	Wildlife Water
Physical Parameters						
Dissolved Oxygen	mg/L	**5 – 9**	-	-	**8-11**	-
Total Suspended Solids	mg/L	+25 mg/L from tbackground	-	**+20 mg/L from background**	**+5 mg/L from background**	-
Water Temperature	°C	**±1°C change from background**	15	±1°C change from background	-	-
pH (field)	pH Unit	6.5 - 9.0	**6.5 - 8.5**	-	**6.5 - 9.0**	-
Major Ions						
Chloride	mg/L	600	**250**	600	**150**	-
Sulphate	mg/L	-	**500**	-	**218**	-
Nutrients						
Ammonia	mg/L (as N)	**20.5***	-	-	**1.84***	-
Nitrate	mg/L (as N)	32.8	**10**	100	**3**	-
Nitrite	mg/L (as N)	**0.060***	1	10	**0.02***	-
Total Phosphorus	mg/L	-	**0.01**	-	**0.005 - 0.015 in lakes**	-
Total Metals						
Aluminum	mg/L	-	-	5	-	-
Antimony	mg/L	-	-	-	**0.009***	-
Arsenic	mg/L	**0.005**	0.025*	0.025*	-	-
Boron	mg/L	**1.2**	5	5	-	-
Chromium VI	mg/L	-	-	-	**0.001***	0.05*
Cobalt	mg/L	**0.11**	-	-	**0.004**	-
Copper	mg/L	**0.0067***	0.5	0.3	**0.002**	-
Iron	mg/L	**1**	-	-	-	-
Manganese	mg/L	**1.09***	-	-	**0.83**	-
Molybdenum	mg/L	2	0.25	**0.05**	1	-
Selenium	mg/L	-	**0.01**	-	**0.002**	0.002
Silver	mg/L	**0.0001***	-	-	**0.00005***	-
Zinc	mg/L	**0.03***	5	-	**0.0075**	-
Dissolved Metals						
Aluminum	mg/L	**0.1***	0.2	-	**0.05**	-
Antimony	mg/L	-	-	-	-	-
Cadmium	mg/L	**0.000288***	-	-	**0.000127**	-
Iron	mg/L	**0.35**	-	-	-	-

Notes:
W = working guideline; M = interim guideline
Bold indicates most conservative guideline of each maximum and chronic water quality guideline
*indicates guideline is dependent on another parameter and representative average conditions in the receiving environment were applied

NEWS

CONTRIBUTED PHOTO

Children enjoy playing on the Explorer Dome climbing structure in Riverside Park.

Quesnel man suing city of Kamloops

A father visiting Kamloops with his son is suing the city, claiming his child suffered injuries after he fell from playground equipment at Riverside Park.

Blake Lawlor, on behalf of his son Brock, filed a lawsuit in B.C. Supreme Court alleging a piece of equipment called the Explorer Dome is "a hazard and would be dangerous to visitors of the park."

The playground equipment features a net system suspended by arching metal tubes.

The lawsuit claims Brock suffered an arm fracture when he fell off the playground structure on April 16 this year.

That fall and broken arm resulted in anxiety and sleep disturbance, the lawsuit claims.

The Quesnel family is seeking damages and future health-care costs. The statement of claim blames the city for failing to warn of the alleged danger of the equipment with a sign and for not installing padding beneath the equipment.

It alleges the city breached the Occupiers Liability Act.

Q-City Page

A feature highlighting meetings, proposals and events important to Quesnel residents.

SALE OF SURPLUS EQUIPMENT

The City of Quesnel is disposing of five pieces of equipment and parts as follows:

Unit	Equipment
T-21	1997 Ford 1-ton flat deck truck
T-22	1997 International Dump/Sand truck
M-30	1974 Jeager air compressor
B-1	1995 Toyota Corolla
T-29	2001 Ford ¾ ton crew cab pick-up
Parts	Crate of surplus weedeater and water pump parts

All pieces will be sold on an as is where is basis. Interested buyers may view the equipment at the Public Works Office at Johnston Bridge Loop, Monday to Friday from 8:30 am until 4 pm. Sealed bids for each unit will be accepted at City Hall, 410 Kinchant Street, Quesnel, BC, V2J 7J5 until November 9, 2016 at 2 p.m. The sealed bid must be clearly marked "Surplus Equipment Bid - Unit ____". The City reserves the right to reject any or all bids, to waive defects in any bid document, and to accept any bid which it may consider to be in the best interest of the City. The lowest or any bid will not necessarily be accepted.

Enquiries may be directed to Public Works at 250-992-6330.

City Hall - 410 Kinchant Street, Quesnel, BC, V2J 7J5 T - 250-992-2111 W - www.quesnel.ca
Hours of operation are from 8:30 a.m. to 4:30 p.m., Monday to Friday (except Statutory Holidays)

Volume CLVI, No. 43 October 27, 2016	The British Columbia Gazette Published by Authority

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment under The Provisions of the *Environmental Management Act.*

We, **Mount Polley Mining Corporation**, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, intend to submit this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. British Columbia Water Quality Guidelines for all end uses will be met at the edge of the initial dillution zone. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake. For a complete list of water quality guidelines please visit the Imperial Metals website.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. British Columbia Water Quality Guidelines for all end uses will be met at the edge of the initial dillution zone. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake. For a complete list of water quality guidelines please visit the Imperial Metals website.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V9T 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: October 20, 2016.

Mount Polley Mining Corporation Contact Number: 250-790-2215. [oc27]

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment under The Provisions of the *Environmental Management Act*

We, Mount Polley Mining Corporation, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, intend to submit this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. Table 1 shows British Columbia Water Quality Guidelines that the treated water will meet at the edge of the initial dilution zone in Quesnel Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 573346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PM5 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. Table 1 shows British Columbia Water Quality guidelines that the seepage water will meet at the edge of the initial dilution zone in Bootjack Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V9T 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: October 20, 2016

Mount Polley Mining Corporation Contact Number: 250-790-2215

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit Amendment under The Provisions of the *Environmental Management Act*

We, Mount Polley Mining Corporation, 200 – 580 Hornby St., Vancouver, BC, V6C 3B6, intend to submit this amendment application to the Director to amend Permit 11678, issued May 30, 1997 and last amended September 19, 2016, which authorizes the discharge of effluent from a copper-gold mine and mill.

This permit amendment application requests that a discharge point for the discharge of treated mine contact water be modified in Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 575346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PMS 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur at depth into Quesnel Lake, adjacent to Mineral Claim 501479. The maximum rate of all water discharged from this facility will be 0.6 cubic meters per second and the maximum volume will be 10,000,000 cubic meters per year. Table 1 shows British Columbia Water Quality Guidelines that the treated water will meet at the edge of the initial dilution zone in Quesnel Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Quesnel Lake.

The permit amendment application also requests a seepage discharge for the discharge of mine contact water (via groundwater) be added to Permit 11678. The location from which the discharge originates is within Mining Leases 345731, 410495, 524068, 575346 and 933989, and Mineral Claim 514039, 514044, CB16 204475, PMS 206450, and POL2 411010, Cariboo Mining Division, Cariboo Land District. The discharge will occur from groundwater at depth into Bootjack Lake, within Mining Lease 933989, Cariboo Mining Division, Cariboo Land District. The discharge will be non-continuous, occurring only under extended contingency scenarios with no discharge from the mine. Table 1 shows British Columbia Water Quality guidelines that the seepage water will meet at the edge of the initial dilution zone in Bootjack Lake. By meeting these guidelines, end uses such as drinking water, aquatic health and recreation are protected in Bootjack Lake.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant (Mount Polley Mining Corporation, inquiries@imperialmetals.com, Box 12, Likely BC, V0L 1N0), with a copy to the Ministry of Environment Director of Mining Operations Mount Polley (MtPolleyMinePermit@gov.bc.ca, 2080 A Labieux Road, Nanaimo BC, V97 6J0). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

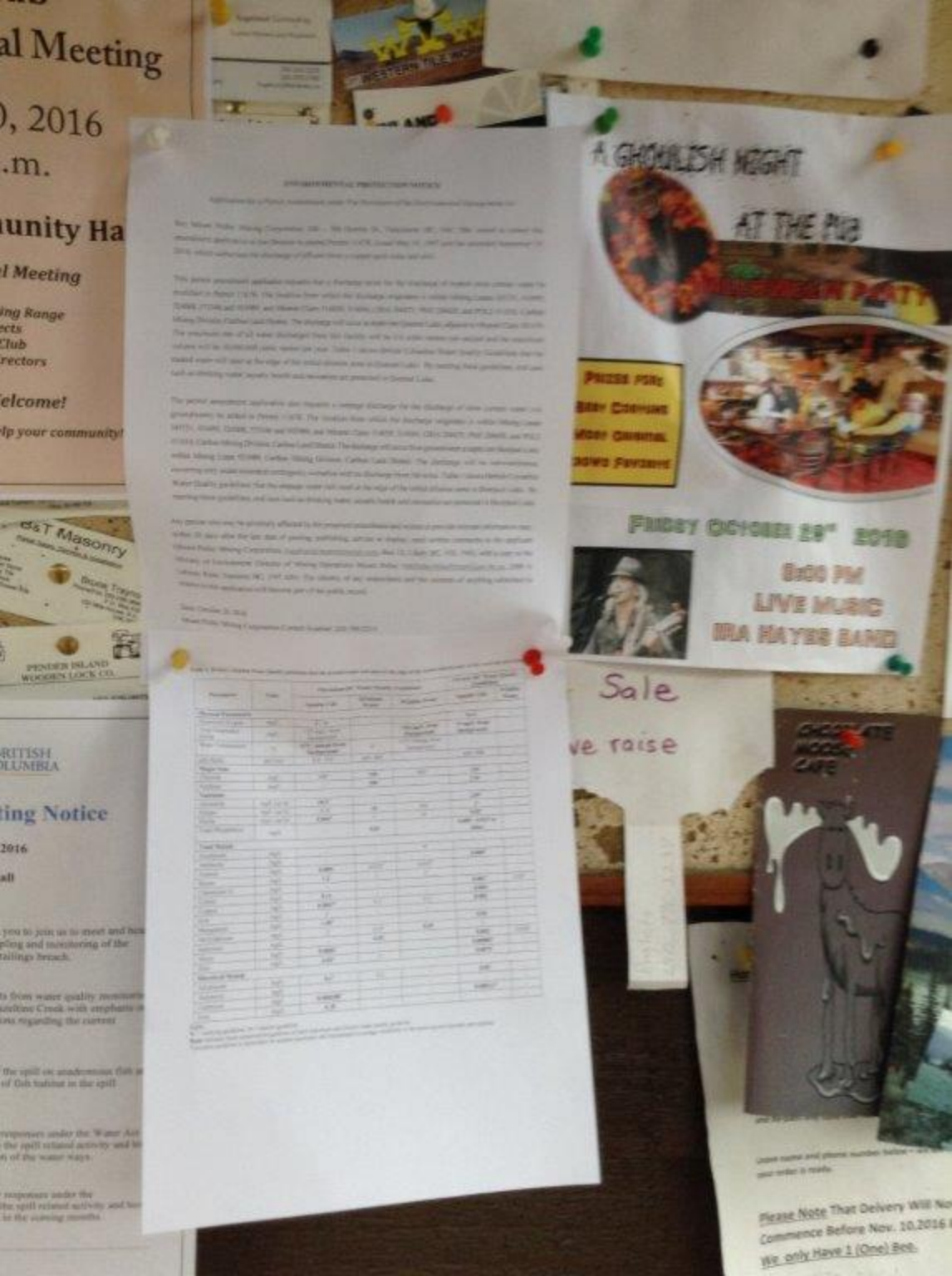
Date: October 20, 2016

Mount Polley Mining Corporation Contact Number: 250-790-2215

Table 1: British Columbia Water Quality guidelines that the treated water will meet at the edge of the *initial dilution zone* in the *receiving environment*.

Parameter	Units	Maximum BC Water Quality Guidelines			Chronic BC Water Quality Guidelines	
		Aquatic Life	Drinking Water	Wildlife Water	Aquatic Life	Wildlife Water
Physical Parameters						
Dissolved Oxygen	mg/L	**5 - 9**	-	-	**8-11**	-
Total Suspended Solids	mg/L	+25 mg/L from background	-	**+20 mg/L from background**	**+5 mg/L from background**	-
Water Temperature	°C	**±1°C change from background**	15	±1°C change from background	-	-
pH (field)	pH Unit	6.5 - 9.0	**6.5 - 8.5**	-	**6.5 - 9.0**	-
Major Ions						
Chloride	mg/L	600	**250**	600	**150**	-
Sulphate	mg/L	-	**500**	-	**218**	-
Nutrients						
Ammonia	mg/L (as N)	**20.5***	-	-	**1.84***	-
Nitrate	mg/L (as N)	32.8	**10**	100	**3**	-
Nitrite	mg/L (as N)	**0.060***	1	10	**0.02***	-
Total Phosphorus	mg/L	-	**0.01**	-	**0.005 - 0.015 in lakes**	-
Total Metals						
Aluminum	mg/L	-	-	**5**	-	-
Antimony	mg/L	-	-	-	**0.009***	-
Arsenic	mg/L	**0.005**	0.025*	0.025*	-	-
Boron	mg/L	**1.2**	5	5	-	-
Chromium VI	mg/L	-	-	-	**0.001***	0.05*
Cobalt	mg/L	**0.11**	-	-	**0.004**	-
Copper	mg/L	**0.006+***	0.5	0.3	**0.002**	-
Iron	mg/L	**1**	-	-	-	-
Manganese	mg/L	**1.09***	-	-	**0.83**	-
Molybdenum	mg/L	2	0.25	**0.05**	1	-
Selenium	mg/L	-	**0.01**	-	**0.002**	0.002
Silver	mg/L	**0.0001***	-	-	**0.00005***	-
Zinc	mg/L	**0.03***	5	-	**0.0075**	-
Dissolved Metals						
Aluminum	mg/L	**0.1***	0.2	-	**0.05**	-
Antimony	mg/L	-	-	-	-	-
Cadmium	mg/L	**0.000288***	-	-	**0.000127**	-
Iron	mg/L	**0.35**	-	-	-	-

Notes:
W = working guideline, M = interim guideline
Bold indicates most conservative guideline of each maximum and chronic water quality guideline
*indicates guideline is dependent on another parameter and representative average conditions in the receiving environment were applied


al Meeting
, 2016
.m.
unity Ha
l Meeting
ing Range
ects
Club
rectors
elcome!
lp your community!
A GHOULISH NIGHT
AT THE PUB
FRIDAY OCTOBER 28TH 2016
9:00 PM
LIVE MUSIC
IRA HAYES BAND
d&T Masonry
PENDER ISLAND
WOODEN LOCK CO.
BRITISH
OLUMBIA
ting Notice
2016
all
Sale
ve raise
CHOCOLATE
MOOSE
CAFE
Please Note That Delivery Will No
Commence Before Nov. 10.2016
We only Have 1 (One) Bee.

STOP

ENVIRONMENTAL PROTECTION NOTICE

This site is the subject of an application for a permit amendment under the *Environmental Management Act*. For further details see the application posted below.

For further information contact the Environmental Protection Program indicated on the application form.

APPENDIX B3

PUBLICATION OF OPEN LETTER TO LOCAL RESIDENTS

Upcoming forum to discuss the reality of Aboriginals doing business

Monica Lamb-Yorski
Staff Writer

A popular forum on the realities of Aboriginals doing business is coming to Williams Lake on Thursday, Nov. 17.

Open to First Nations leaders, industry, government, contractors and individuals, the Nation2Nation community forum will help address priorities for working in partnership on resource development in First Nations territories, organizer Lisa Mueller said.

Mueller is the CEO and creator of All Nations Consulting and was inspired to host community forums after participating in one in the Lower Mainland where she noticed of the 400 people in attendance, she was one of a handful of First Nations people there.

"Last year we held one in Terrace and it sold out," she said. "About 150 people maxed the room and we had people from all over

Lisa Mueller

the country and even a speaker from one of the mines was from the U.S. It made me realize that the conversation needed to take place. I've created a space for First Nations leaders to share how industry and government can better do business within their territory."

Mueller thinks the forum will benefit Williams Lake and the area.

"The forum is not just about the Tsilhqot'in title decision, it is about non-First Nation and First Nation people working together," she said. "It's not for any certain First Nation or industry it is a safe place for all of them to come in the room and have a respectful conversation on how to better do economic development and business in First Nations communities."

Speakers will include BC AFN Chief Shane Gottfriedson, Chief Derek Orr of the McLeod Lake Indian Band, Bryan Cox, vice president of Mining Association of B.C., Greg D'Avignon of the BC Business Council and Stewart Muir from Resource Works.

"I always have four people on a panel and a moderator, and I mix up the conversations," Mueller said.

Mueller said she finds there are a lot of questions in the audience at the forum but realizes it can be intimidating for non-First Nations to ask questions of First Nations because they don't want to ask the wrong questions or offend the leaders.

"Some questions never get asked so at our last forum I create an opportunity for the audience to anonymously text in a question and who they wanted to ask and then my team grabs those questions and brings them to the moderator. It has really broken down that barrier."

The forum will take place from 10 a.m. to 4:30 p.m. in the Pioneer Complex at 353 Hodgson Road, followed by a networking social from 5 to 7 p.m.

Anyone with questions can contact Mueller at 250-631-3396.

NEWS

SD28's Parent Advisory Councils to receive gaming grants

Schools in Quesnel and area will be receiving $57,980 as part of more than $11 million in B.C. government gaming grants for Parent Advisory Councils (PACs) and District Parent Advisory Councils (DPACs) working with public and independent schools throughout British Columbia.

PACs and DPACs play a key role in keeping parents connected to teachers and school administrators through positive, supportive involvement in the education provided to their children.

The grants provide support for extracurricular activities, including sports, arts, class trips and other school activities.

Why this matters:

• PACs and DPACs will share $11,121,840 in community gaming grant funding from the B.C. government this year.

• A PAC is the officially recognized collective voice of parents in their school. A PAC, through its elected officers, may advise the school board, the principal and staff on matters relating to the school and student education.

• DPACs advise the board of education on any matter relating to education in their school district. DPACs advocate for parental involvement in the education system and give input into the development of education policy and curricula.

"We are putting this money back into the community where it will help our young people the most," Cariboo North MLA Coralee Oakes said.

"Our PACs will use this funding to make this school year a great one."

"We are putting this money back into the community where it will help our young people the most. Our PACs will use this funding to make this school year a great one."
Coralee Oakes, MLA

APPENDIX C

COMMUNITY MEETINGS

Mount Polley Mining Corporation
an Imperial Metals company
Box 12 • Likely, BC V0L 1N0 • T 250.790.2215 • F 250.790.2613

Mount Polley Mine Community Meeting

When: **Thursday, October 27, 2016**

Where: Royal Canadian Legion Hall
385 Barnard Street (downstairs)

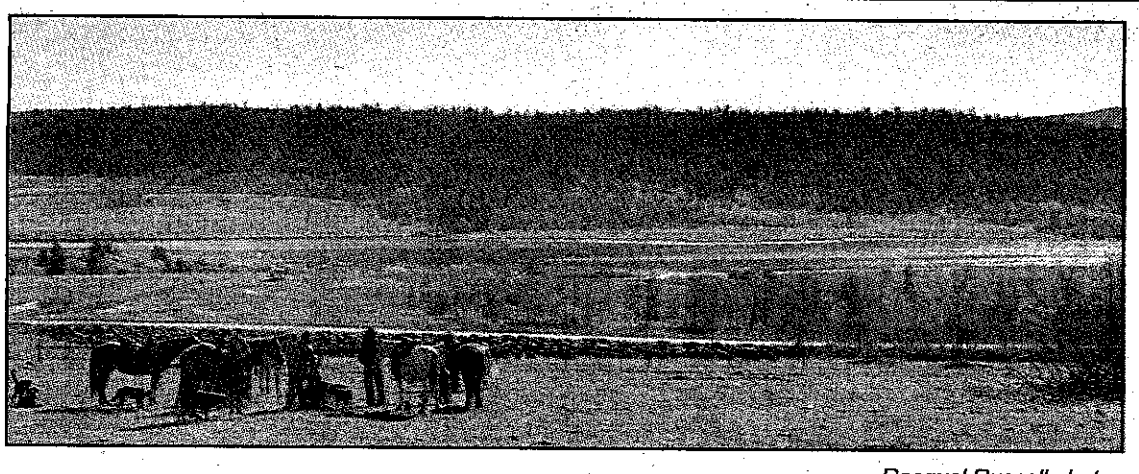
Time: 7:00pm - 9:00pm

All Williams Lake community members are welcome and encouraged to attend.

Mount Polley Mine invites Williams Lake residents to join them for an Open House with poster displays from 7 to 8 pm, followed by a presentation and Q&A session from 8 to 9 pm.

The purpose of this meeting is to provide information to and opportunities for the public to ask questions about the Mount Polley Mine proposed water discharge permit amendment.

Coffee and snacks will be served.



Racquel Russell photos

Cowboys from three ranches gather their cattle at Riske Creek in preparation for moving their herds from the Raven Lake Range across Highway 20 to Harper Meadow Range.

Round-up time in the Chilcotin

Linda-Lou Howarth
Special to Tribune/Advisor

Ranchers are approaching their busiest time of the year, rounding up cattle from the summer ranges.

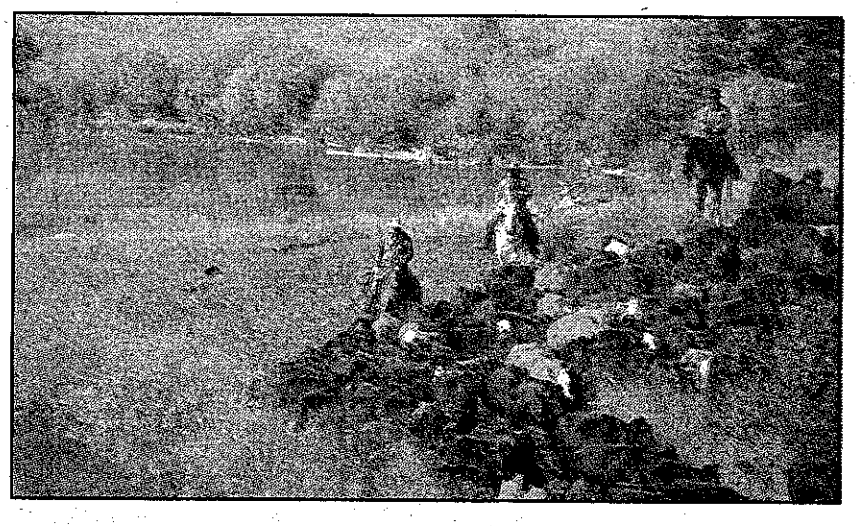
At Riske Creek the first round-up of the season involved moving cattle from the Raven Lake range across Harper Meadow, then to the Bald Mountain range for about a month.

The Douglas Lake Cotton Division Ranch, River Ranch and Wineglass Ranch all took part in this round up.

They gathered and pushed cattle, crossing Highway 20 into Harper Meadow and on up to the back of Bald Mountain where the cattle stayed for a couple weeks or so.

The riders spent quite a few days searching for the elusive cattle in a fairly large range, coaxing cows to head home.

Most cows high tail it as fast as they can to get to a different pasture, but there is always a batch that are pretty cagey at hiding on the riders.



From the left cowboys Mike Jasper and Ian Durrell from the Wineglass Ranch and Joe Roberson from the Douglas Lake Cotton Ranch Division move cattle around Harper Meadow Lake.

Still, their awesome cow dogs manage to find them and push them out.

A bit of time was spent around campfires where riders cozy up to the warm fire while waiting for others to arrive pushing their cows into the holding grounds.

Cowboys enjoy this time as they catch up on gossip, swap stories, perhaps swap some gear, and share tips on working a horse or a dog.

NEWS

Public invited to comment on Mount Polley long-term water plan

A long-term water management plan proposed for Mount Polley is now available for public comment.

"Mount Polley Mining Corporation is applying to discharge treated mine effluent to both Quesnel Lake at a depth of 40 to 50 metres, as well as to Bootjack Lake via groundwater," the ministries of environment, energy and mines, and Aboriginal relations and reconciliation said in a press release Tuesday.

The permit application will go through a 30-day public-consultation period, as well as a comprehensive technical review by the Cariboo Mine Development Review Committee.

Additionally, public consultation sessions on the long-term water management plan are scheduled for Wednesday, Oct. 26, 7 p.m. to 9 p.m., at the Royal Canadian Legion, Quesnel; Thursday, Oct. 27, 7 p.m. to 9 p.m., open house and town hall, Royal Canadian Legion, Williams Lake; Friday, Oct. 28, 7 p.m. to 9 p.m., open house, Horsefly Community Hall; Saturday, Oct. 29, 3 p.m. to 5 p.m., open house, Big Lake Community Hall and Sunday, Oct. 30, 3 p.m. to 5 p.m., open house and town hall, Likely Community Hall.

Public feedback will help inform the company's final water management plan, expected to be in place by fall 2017.

MPMC had previously submitted its draft technical assessment report for the long-term water management plan which underwent an internal government-to-government review involving the Ministry of Environment, Ministry of Energy and Mines, Williams Lake Indian Band and Soda Creek Indian Band.

The results of that review have helped inform MPMC's formal permit amendment application and supporting technical assessment report.

Final comments to the ministry on the report are due on Thursday, Nov. 24, 2016.

Please submit comments with the subject line "Comments on technical assessment report" to: MtPolleyEnvironmentalEnquiries@gov.bc.ca.

Mount Polley's permit amendment application and supporting technical assessment report can be found at: http://www.env.gov.bc.ca/epd/mount-polley/.

All information on the incident can be viewed on the ministry's dedicated webpage: http://www.env.gov.bc.ca/epd/mount-polley/.

Shot dog recuperating from surgery

Monica Lamb-Yorski
Staff Writer

Thanks to the generosity of the public, a dog at the Williams Lake SPCA is recovering from surgery to amputate his leg after he was shot.

Last Thursday, Max's story was shared with media by the BC SPCA, asking for help because bones in his leg were shattered from the elbow down exposing bone and an infected wound.

It did not take long for donations to come into the SPCA to cover the expected $1,500 cost of his medical treatment, manager Liz Dighton told the *Tribune* Monday.

"The fact that he had been shot and was hiding from the public for two weeks really struck a chord with people."

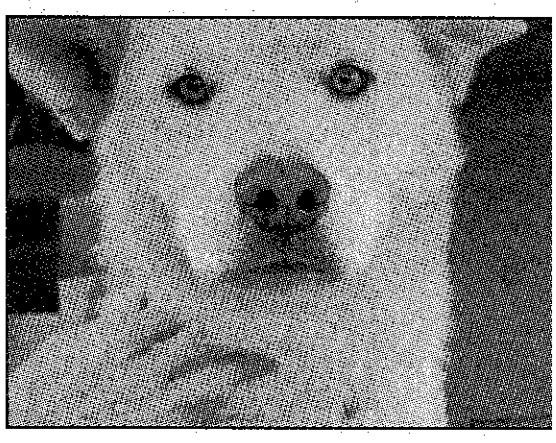
A Good Samaritan spied Max soon after he was shot, but it took some work to be able to bring him into the SPCA.

Max, who is a German Shepherd Husky mix, is recovering well and learning how to balance on three legs, Dighton said.

He will have to be moved to a branch in Vancouver because the legal requirement is that animals must undergo a behaviour assessment before they can be adopted.

The local branch is closed until Thursday, Oct. 27, because staff are dealing with an overload of animals, she added.

As a society, the SPCA relies on donations from the public to pay for surgeries.



Max the dog

SPORTS

October 23 - 29, 2016

ARIES - Mar 21/Apr 20
Aries, you will soon learn that any obstacle can be overcome if you set your mind to it. While a certain task may seem daunting right now, you won't allow it to intimidate you.

TAURUS – Apr 21/May 21
Others are paying attention to you even if they seem distracted, Taurus. Embrace the scrutiny and do your best to reciprocate any special attention coming your way.

GEMINI – May 22/Jun 21
Gemini, make an effort to be there for a loved one this week. You have a unique ability to listen and support others, and your loved one will not take your efforts for granted.

CANCER – Jun 22/Jul 22
Cancer, if your energy and attention span is a bit scattered this week, take steps to ensure all of your responsibilities are taken care of. A respite is on the horizon.

LEO – Jul 23/Aug 23
Leo, by observing others you can learn how they operate and make the most of your chances to work with them. Apply a similar approach to your personal relationships.

VIRGO – Aug 24/Sept 22
Try to tackle a financial project this week, Virgo. Select something relatively easy to begin with, and then go from there if you find yourself in a financial groove.

LIBRA – Sept 23/Oct 23
It's time to get the creative juices flowing, Libra. Tackle a project around the house, like painting or rearranging a room. Look for a new creative hobby as well.

SCORPIO – Oct 24/Nov 22
Scorpio, you have a lot of energy and a need to strive toward perfection in all that you do. Those traits will prove valuable around the office this week.

SAGITTARIUS – Nov 23/Dec 21
Keep trying to convince someone that your ideas are credible, Sagittarius. With a little more persuasion, you may win this person over and he or she will become a big supporter.

CAPRICORN – Dec 22/Jan 20
Capricorn, even if you don't want to go along with what the group is doing this week, you just may have to concede that what is best for the group trumps your personal preference.

AQUARIUS – Jan 21/Feb 18
Aquarius, financial issues may be keeping you on your toes, but it's nothing you can't handle if you stick to your plan. You may want to do some tinkering, however.

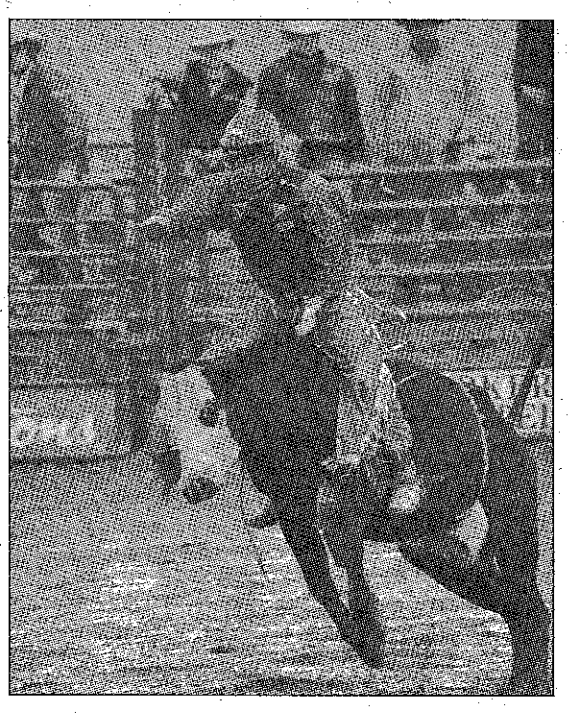
PISCES – Feb 19/Mar 20
Pisces, continue to bring the right people into your inner circle. One person in particular has your eye and might be just what you need.

FAMOUS BIRTHDAYS
OCTOBER 23 - Ryan Reynolds, Actor (40)
OCTOBER 24 - Drake, Rapper (30)
OCTOBER 25 - Adam Goldberg, Actor (46)
OCTOBER 26 - Emilia Clarke, Actress (30)
OCTOBER 27 - Simon LeBon, Singer (58)
OCTOBER 28 - Brad Paisley, Singer (44)
OCTOBER 29 - Tove Lo, Singer (28)

Quesnel riders clean up at 2016 BCRA awards banquet

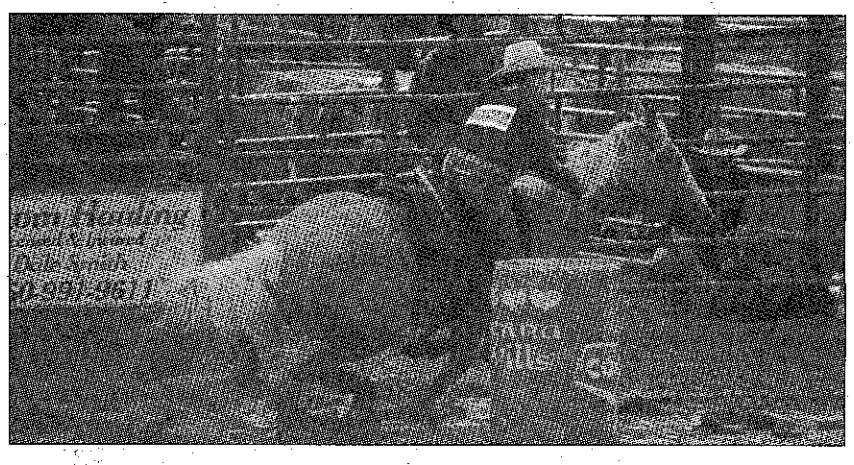
The 2016 British Columbia Rodeo Association awards banquet was held Oct. 15 with Quensel riders stealing the show.

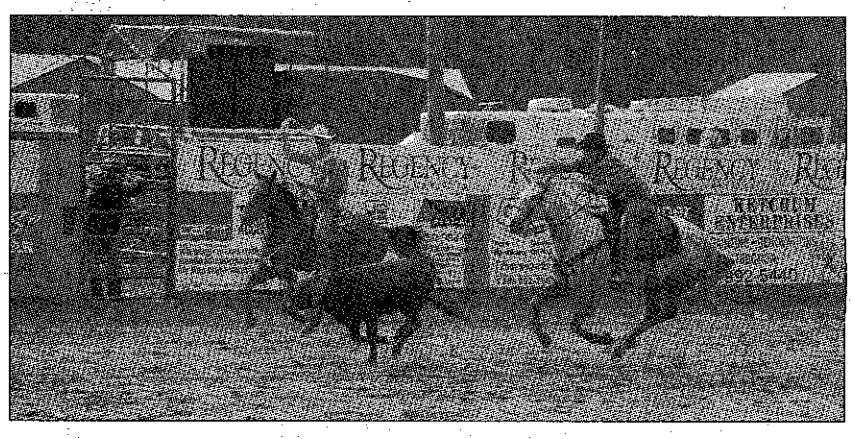
Steve Lloyd took home the Tie-Down Roping championship buckle and was named season leader, Lane Cork was named Bull Riding champion, Lane Paley won the Junior Steer Riding buckle, Ryan McNaughton won the Team Roping season leader header award, Dyson Leneve was named Junior Breakaway Roping season leader, Matt O'Flynn won the BCRA Sportsmanship award and Taylor Cherry won All Around Cowgirl and 2016 Rookie of the Year.

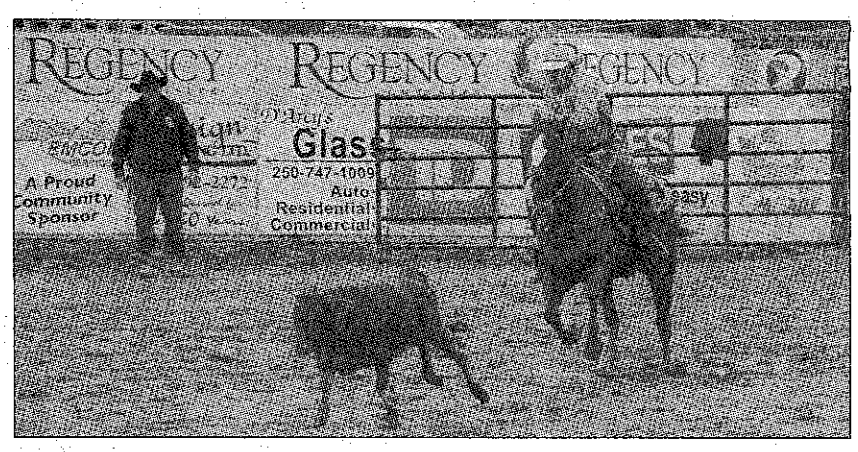


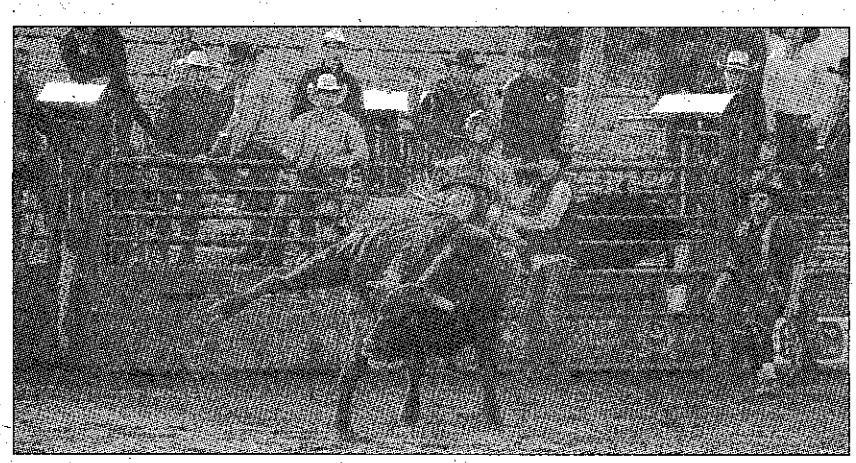
Clockwise from top right. Taylor Cherry All Around Cowgirl and 2016 Rookie of the Year. Ryan McNaughton Team Roping season leader. Dyson Leneve winner of the Junior Breakaway Roping season leader. Lane Cork Bull Riding champion. Steve Lloyd Tie Down Roping champion. Lane Paley Junior Steer Riding champion. Matt O'Flynn winner of the BCRA Sportsmanship award.

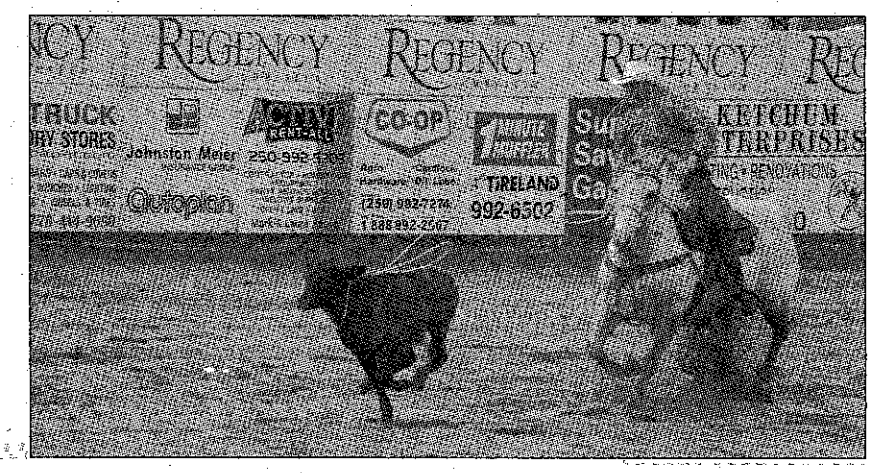
PHOTOS BY KAREN POWELL











APPENDIX D

PUBLIC COMMENT TRACKING

APPENDIX D1

MOE PUBLIC COMMENT TRACKING TABLE

	Comments from MoE Mailbox
	Comments from MEM Mailbox

Comment ID	Date	Location	Communities	In Province	Out of Province	Unknown Location	First Nations	Political Groups	Conservation Groups	Other Groups
For Permit Amendment										
1	30-Oct-16	Horsefly, BC	We attended the information meeting in Horsefly, on October 28th, for the presentation of the Discharge Permit for Mount Polley. Very informative meeting with meaningful, hands on displays of the process.Mount Polley Mine is of critical importance in the village of Horsefly. There is almost no permanent, full time jobs in the area, since the downturn of the Forest industry. There are approx 12 people who live and raise their families in Horsefly, who work at Mount Polley. That number fluctuates from time to time, but has been around that, during the years the mine has been in operation.Based on the information received about the water discharge process at the mine, and the importance of the mine to our economy, we would like to express our support of the Discharge Permit that is being discussed.							
2	08-Nov-16	Unknown				This is a follow up to the presentations that have been made regarding the application to amend the permit #11678, regarding long term water discharge by Mount Polley mine. We have had a presentation on the Technical Assessment Report and it appears that the suggested direction regarding water discharge will work. In this scenario, there is always the cause for concern that a better plan could be conceived, but how long will that take and will it actually be better in the long run. At this point, we believe that scientific thought has gone into the subject and that the professionals involved have thought through this carefully. We are prepared to support the amendment as presented and ask only that the monitoring of this discharge be given a little more scrutiny than would be normal, to ascertain that it is actually meeting or exceeding the guidelines. The sensitivity of this situation has made this operation a much higher profile than would normally be the case.				
3	20-Nov-16	Big Lake, BC	On behalf of the BLCA, we would like to acknowledge and thank the Mount Polley mine staff for their efforts to inform and communicate with our community on their long term water discharge plans. While the BLCA does not have the authority to speak on behalf of the entire community, nor do we have the expertise to comment on the technical details of this plan, we are supportive of the longevity of the mine operation. The mine is one of the largest employers within our community, so we recognize the need for a long term water solution that manages environment, social and economic aspects using the best available technologies and scientific knowledge. We will continue to advise our membership of how they can become informed, and how they may express either their concerns or support in regards to future permitting. We are appreciative of the lengths the mine has gone to in order to connect with the community throughout the ongoing permit applications process over the past couple of years, both through media releases, public meetings, local representation on the Mount Polley Liason committee and replying to individual concerns. We remain hopeful that a timely solution will be reached to meet the critical water management challenge that Mount Polley faces, regardless of its operation.							
4	20-Dec-16	Likely, BC	I have been a life long resident of Likely and a long term employee at Mount Polley Mine. I support the permit because I believe the Company , Government officials and Consultants have done a thorough analysis based on scientific facts. This is clean, tested water they are asking to transfer to the lake. Our lake is beautiful and will remain beautiful but if the mine can't operate I wonder how many of us will be able to stay in our community to enjoy the lake and surrounding areas.							
5	31-Dec-16	Big Lake, BC	As a long term resident of the Cariboo, working in every aspect of the economies of this region, I wholeheartedly support the permit amendments needed by Mount Polley for water discharge from the mine site. I have attended most of the public meetings on this matter and am convinced that mine staff, their consultants and ministry staff have done everything in their power to educate the public on this matter. Some people claim that there are too many unknowns to proceed. I, on the other hand, am convinced that we are putting too much at risk by not proceeding. I hope that this letter helps in making the right decision to go forward with approval of the proposed discharge of water from the mine site.							
Against Permit Amendment										
6	26-Oct-16	Quesnel, BC	To Whom It May Concern, NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO When the TSF and mine was first proposed these were my comments about the stupidity of such a project perched about the jewels that Quesnel Lake and watershed are. It is the rubber stampers, corporate puppeteers and biostitutes that will have the desecration of this critical watershed as their legacy for all our children to choke on. The travesty continues . . .							
7	28-Oct-16	Quesnel, BC	I recently attended Mount Polley mines information session in Quesnel presenting information on their plan for long term water management. I have some concerns. The team from Mount Polley mines seems to seriously underestimate the potential damage from the tailings that were deposited on the bottom of Quesnel Lake. These tailing contain significant levels of heavy metals. Their scientists spent much of the evening making light of this disastrous situation. I found their attitude quite troubling as there is still a lot of concern among the scientific community through out BC as to what the long term effects of this tailing spill will be. It worries myself and my neighbours that they are not taking a rigorous enough approach to the problem of protecting this once pristine water shed. The new water treatment plant sounds as though it could be part of a solution to the ongoing water management plan at Mount Polley but I am troubled by a couple of issues. Considering the gross negligence involved in the history of this company, how can we be assured that their will not be "glitches" in the system that result in effluent that does not meet the aquatic life guidelines. As this effluent goes straight into Quesnel Lake it could damage that ecosystem in the time it takes to detect and fix any system failure. That water should go into a holding area before it goes into the lake to ensure this doesn't happen. We have seen, far to often, where industrial systems fail and the environmental impact is irreparable. I am also concerned about monitoring. This company has been monitoring itself for far too long with catastrophic results. I think the Ministry should be doing all the monitoring and charging the company for these services to ensure there is no conflict or doctoring of any data. They have shown that they cannot be trusted and it is the Ministry's job to take charge of the situation. I was disappointed that their was no one available from the ministry at this presentation that was directly working with the mine to help us understand the process. In the years since the tailings pond breach we have been promised that the Conservation Officers Office is doing a comprehensive report on what went wrong and who is to be held responsible for the Mount Polley disaster. This report has missed many deadlines and I am told now it will not be out until next year. I can't believe that any of this is proceeding without that report being made public so that we can learn from what went wrong before we move foreword. I think the planning process is seriously flawed. I live in a small community on the Quesnel River at Gravelle Ferry. All the residents here are very concerned about the health of our watershed. We have also asked the ministry for updates on what is going on with the QR mine at previous public meetings but have had no updates from anyone. We were told when it opened that it would be closely monitored and we know that is not currently the case. We have heard lots of rumors of bad practices at the mine site which has changed hands several times.							
8	09-Nov-16	BC, Canada		As a citizen of BC and a person who has been directly affected by the catastrophic mine tailings pond collapse, I am shocked and appalled that this corporation is continuing to bleed effluent into the waters of Quesnel Lake. Their own sampling shows increased uptake in zooplankton throughout the summer feeding season- salmonids are eating the zooplankton and will continue to do so throughout their lifespan... Stop this contamination, please.						
9	21-Nov-16	Williams Lake, BC							The Cariboo Chilcotin Conservation Society (C.C.C.S.) is completely opposed to the M.P.M.C. proposal to discharge mining effluent directly into Quesnel Lake unless it meets aquatic life guidelines before dilution. Currently it only meets permit conditions outside the 100 metre dilution zone. Once this permit is approved this practice will likely continue until long after mine closure. A case in point is Gibraltar Mine which is discharging untreated effluent directly out of its tailings pond into the Fraser River at a rate of 5 million cubic meters per year. The cumulative effects of these discharges are totally unknown at this time with reliable results not probable for years to come. This is not the type of environmental stewardship any of us can endorse. The position of C.C.C.S. has always been that mining effluent should be treated on site either passively or via a chemical-industrial process to meet aquatic health guidelines and then naturally discharged into the surrounding watershed. Proper management strategies should be initiated at mine start up and become a part of daily operations which work towards an environmentally acceptable closure plan. C.C.C.S. has been collaborating with both Gibraltar and M.P.M.C. on passive treatment options (i.e. natural filtering of effluent through a wetland system either natural or constructed). We would like to applaud M.P.M.C. for engaging a prominent consultant, Monique Haakensen of Contango Strategies Ltd., in this regard and initiating some preliminary work. That said, we are also extremely frustrated by the snails pace approach both mines have taken in this direction. For passive treatment to be effective, work at Mt. Polley should begin immediately on the construction of a permanent wetland system. It takes several years for vegetation to be established and flow rates to be regulated and properly monitored, work that should be completed long before mine closure becomes an issue. If we took all the money Mt. Polley has spent on public meetings, political lobbying and tying up engineering staff to justify a bad practice, this work could have been done long ago and we would not be having this discussion. We need a fundamental change in thinking by mining corporate management and the Ministry of Environment regarding this issue. These mines are critical to our local economic future but not at the expense of our healthy watersheds. This practice is wrong, we all know it is wrong, so let's work together to fix it.	
10	22-Nov-16	Alaska, USA			Please deny Imperial Metal's Mount Polley Mine Corporation the ability to permanently discharge mine effluent into Quesnel Lake. I was born and raised in Alaska, Canada's neighbor to the north, and it has been tragic to see the destruction oil and mining interests have caused to the natural beauty of Canada, please do not allow it to continue. As an Alaskan I am also disturbed that Canadian mines are being allowed to pollute water that will eventually flow into Alaska. Transboundary pollution is not what a good neighbor should do. Please work with Alaska to sign an agreement that stops this from happening and start taking better care of your water and land.					
11	22-Nov-16	Unknown								It is time to stop the genocide of the First Nations People! 1. No perpetual & permanent discharge of mine effluent directlyinto Quesnel Lake: Dilution is NOT an acceptable solution. 2. Applying a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that ! the discharged water quality needs to be 'as good' or 'better' than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. 3. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term insl titutional monitoring systems. 4. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada (see here: http://fisheriesact.ca/take-action). 5. Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. 6. Proper restauration and remediesfor the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.
12	22-Nov-16	Nevada, USA						I am writing to express the opposition of the Progressive Leadership Alliance of Nevada to the current request by Imperial Metal's Mount Polley Mine Corporation to be able to permanently discharge mine effluent into the majestuous Quesnel Lake. It is one of the deepest lake in the world, home to multiple fish species, and sacred to local residents and Indigenous peoples. We do support the following recommendations: No perpetual & permanent discharge of mine effluent directly into Quesnel Lake: Dilution is NOT an acceptable solution. Applying a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada (see here: http://fisheriesact.ca/take-action). Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more.Proper restauration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.		
13	22-Nov-16	Big Lake, BC	I am writing to express my concern at the proposed permit to allow Mt Polley to discharge into Quesnel and Bootjack Lakes. While I appreciate the mine responding directly and in great detail to a long list of questions I put to them about the possible long term implications, I still feel there is not sufficient science available to be sure this will not have long term impacts on local ecosystems and food webs. They say they are confident that this will not contribute to increased copper uptake by aquatic invertebrates and ultimately move further up the food chain to fish, but I feel there is still room for doubt with phrasing of some responses, such as will 'likely have little to no negative influence on water quality or aquatic life', and suggests there is not yet enough evidence to support this position. Research is just starting to realize the effect of minute quantities of copper on chemosensory function in the benthos, zooplankton and fish. These findings are discovering effects at concentrations substantially lower than those known to induce acute toxicity, but also at much lower levels than may affect olfaction, considered the primary focus of concern until now. This suggests there may be many wide reaching effects of copper at much lower levels than have previously been considered. I have included a paragraph from the following research paper, (with the full paper attached to this e-mail): Gregory G. Pyle & Reehan S. Mirza (2007) Copper-Impaired Chemosensory Function and Behavior in Aquatic Animals, Human and Ecological Risk Assessment: An International Journal, 13:3, 492-505, DOI: 10.1080/10807030701340995. "Regardless of the proximate mechanism that disrupts chemosensory function we cannot overlook the ecological significance. The impairment of the ability to detect and utilize chemical information from the local environment may have significant consequences at the population and community levels of organization. If animals cannot locate food, identify appropriate mates, or avoid predators then drastic shifts in population numbers and species composition could result. These effects occur at all representative ecosystem levels that we tested, which suggests that metal-induced chemosensory dysfunction may be a widespread phenomenon. Current ecological risk assessments and environmental regulations have ignored metal effects on chemosensation, despite the possibility that these effects could translate into large-scale ecological perturbations." The mine suggests that this discharge will not add to copper uptake in aquatic ecosystems as they say most of the copper is not dissolved and so not bioavailable. However given the current quantity of tailings in Quesnel Lake, it would only take a tiny percentage of copper to be bioavailable to translate into a large total quantity of copper for the ecosystem to deal with currently, let alone with additional discharge. They also feel that the discharge will be deep enough in the lake to be below where most aquatic life inhabits, but we know there are microorganisms at all levels, and we also know this lake 'turns over' twice a year, which I understand brings up the lower water nutrients/minerals and potentially tailings etc to the surface. I recognize the importance of the jobs the mine brings to our region, but I also am aware that whether or not the mine is operating, there will be an issue with excess water that needs to be dealt with. This situation has been ongoing for years, long before the breach, so the Company has had no shortage of time to research and consider options. I find it frustrating that this is now portrayed as an emergency situation and presented as the only possible plan or the mine will have to close, implying people against this plan are 'anti' mine, which is just not the case. I also know there has been ongoing research into the use of passive treatment; this was brought up by Steve Robertson of Mt Polley on CBC last week as the end goal for water treatment when the mine is eventually closed. If this is being considered as the 'end goal', why has it not been pursued more aggressively before now, so the mine had a long term effective plan in place already and would not now be in the situation of needing to apply for this permit to keep operating? I would encourage that this should be the direction taken now instead of approving this permit. If water can pass through a series of wetlands before it is returned to the lake, it is one more layer of natural filtration so that water re- entering the waterways no longer depends on dilution to meet aquatic guidelines. I understand wetlands can be constructed relatively cheaply and quickly with equipment already present at the mine site. One other comment about the consultation process of the mine on this proposal. It is possible I missed earlier postings of community meetings, but the ones I did come across (in the newspaper, e-mail notifications) gave very little advance notice- one meeting was the same night the newspaper came out, others a couple of days later, which gives very little time to adjust schedules, and do research ahead. If there was poor turn out to these meetings, I don't think it can be seen as a lack of interest- I came across many people who had not heard about these meetings at all, but say they would have attended. I would suggest big printed posters at community mailboxes at least a week ahead to encourage wider participation in the future. I also noted in the local newspaper that comments were encouraged until 'the end of November', rather than the actual closing date, so you may receive some comments in late, but I think these should also be considered given this misinformation.Please consider carefully the implications of allowing this discharge, given that there seems to be a passive treatment alternative. We don't know all the science yet and so can't predict all the possible effects many years down the road. I would like to be able to believe the mine when it feels there is enough science to be sure this is safe, but I did not get that same reassurance from attending the Quesnel River Research Centre Open House. There the scientists emphasized the many unknowns. This is surely a time to apply the precautionary principle and err on the side of caution since 'we don't know what we don't know'. One day the mine and jobs will be gone, but the lake, area residents and ecosystems both locally and downstream will be here living with the results of this decision for generations to come.							
14	22-Nov-16	Ontario, CA			Based on experiences at Elliot Lake, Ontario with the mining industry, I believe it is a grave mistake to allow for the discharge mine effluent/wastes into fresh water lakes. In light of the impacts anticipated due to climate change, fresh water sources are extremely valuable and should not be compromised with chemical toxins from mining. There are alternative solutions to the disposal of mine wastes. The true costs of mining must be borne by industry. Ratepayers and the ecosystem should not bear the burden of the costs associated with mining waste disposal.					
15	22-Nov-16	Unknown					At this point in time, we cannot believe you are considering even allowing this mine to go ahead, who do you work for? The people of B.C., esp. First Nations have said NO...are you listening. Time for a fresh start in relation to our environment if there is to be a future for life on Earth.			
16	22-Nov-16	Cariboo, BC		I am a long time resident of the Cariboo in B.C. and am totally dismayed at the lack of oversight and thought that has been put into the operation of the Polley Mine near Likely, BC. It makes me wonder how many government officials have taken courses regarding sound ecological practices regarding our natural resources and responsible stewardship. It seems sad that corporate gain seems far more important than maintaining a healthy environment for our generation and future generations. We will be paying a unbelievable price if the current practices are allowed to continue as they have been.						
17	22-Nov-16	Nanaimo, BC		This mine should have been closed as soon as they finished rebuilding the dam they lost. For at least four years we will not understand how their action has damaged the fish stocks of the lakes thay polluted. The mine should be closed until we understand how these resources are being affected. Better yet, it should be closed. Allowing this mine to continue operations after their disgusting behaviour indicates the government, particularly Bill Bennett, is in their pocket. Any legal actions initiated against the mine by environmentalists and First Nations should be supported fully. The engineering companies that built and maintained the dam should also be subject to prosecution.						
18	22-Nov-16	Horsefly, BC	It is totally unresponsible and outdated to discharge mine effluent in surface water. Coming from Europe, where this would be out of the question already 40 years ago, I feel like living in an undeveloped hinterland. Please, wake up!!!							
19	23-Nov-16	Unknown		The BC Government must not allow the discharge of effluent/ toxins by Imperial Metal into Quesnel Lake. BC and Canadian Governments can no longer give approval to industry for their purpose of profit when that sacrifices water sources , one of the four basic human rights.						
20	23-Nov-16	Williams Lake, BC							The Williams Lake Field Naturalists Society (WLFN) strongly opposes the proposal by Mount Polley Mining Corporation (MPMC) to discharge excess mine water directly into Quesnel Lake as described in their recent permit application. We understand that MPMC is seeking approval to pipe treated water from the mine site directly into the lake for the life of the mine. Discharge water will only be required to meet generic BC Water Quality Guidelines. Our objections to the MPMC proposal stem primarily from the fact that BC Water Quality Guidelines do not meet water quality of the lake. That is, BC Water Quality Guidelines are not, in our opinion, the appropriate measure to use for setting water quality objectives for release into Quesnel Lake. For example, BC Water Quality Guidelines for mean total copper levels (for fresh water aquatic life) are nearly four times higher than levels in surface water of the lake in 2015, following the mine tailing facility breach. The discrepancy may have been even greater if guidelines were compared to pristine levels prior to the 2014 breach. Similarly, maximum levels for total copper in the Guidelines are greater than maximum levels recorded in the lake in 2015. The BC Water Quality Guidelines state that appropriate water quality objectives could in some cases be different than guideline levels. For example, the Guidelines state that "if the resource is unusually valuable or of special provincial significance the safety factor could be increased by using objectives which are more stringent than the guidelines." We believe that Quesnel Lake is of special provincial significance and deserves higher standards to safeguard its water quality. The application by MPMC suggests that the expected life of the mine is currently less than five years. Over this short time period, the release of mine waters meeting only generic provincial guidelines may be of less concern than if they were released over a longer term. However, we understand that it is probable that the operating life of the mine may be much longer than three or four years. In addition, a proposed passive water treatment system following mine closure would likely not be functional for several years since it is apparently still in the planning stages. It must be recognized that a passive, wetland-based system will require many years to develop the vegetation and organic rich soil necessary to function as a viable system for waste water treatment. If construction of a passive, wetland-based treatment system is started at a time near mine closure, it will not likely be ready to function at mine closure. If either mine closure or a passive water treatment system is delayed for several years, the release of excess water that meets only generic BC Water Quality Guidelines could result in degradation of water quality in Quesnel Lake. We also understand that during the current year MPMC was granted a permit to release untreated water directly into Quesnel Lake, as long as the untreated water met permit discharge quality. This approval was given to "deal with freshet flows and a bottleneck at the water treatment plant". We are very concerned that these conditions could arise again. Planning and facilities must be in place to ensure that untreated water from the mine site is not released into Quesnel Lake. MPMC's reported analyses of excess water release options do not allow for separate assessments of environmental, technological, social, and economic criteria for their selection of a preferred option. Each option needs to be evaluated separately for each of these classes of criteria. When they are not, environmental and economic criteria are confounded. We request that ratings for each class of criteria be made readily available to the public before any approval is given to release waters into Quesnel Lake. We also strongly recommend the following: 1) No water must be permitted to pass from the mine site directly into Quesnel Lake, without first passing through a treatment system. 2) If MPMC is allowed to release excess water into Quesnel Lake, water quality objectives must be developed which more closely reflect pristine water quality in Quesnel Lake and MPMC must be required to treat all water to meet those objectives, rather than only the less stringent BC Water Quality Guidelines. 3) If MPMC is allowed to release excess water into Quesnel Lake without meeting more stringent objectives than those in the BC Water Quality Guidelines, approval must not be for more than three to four years and clearly not renewable. 4) Construction of a passive wetland based water treatment system must be started as soon as possible in 2017, not at some later date as MPMC indicates. 5) If MPMC is allowed to release excess water into Quesnel Lake, quality of the water must be monitored at the outflow pipe and within a diffusion zone at least weekly by MPMC, BC Ministry of Environment, Fisheries and Oceans Canada and an independent party. Results must be widely and readily available to the public. We expect MPMC and BC Ministry of Environment to show leadership in maintaining the quality of one of the most pristine large lakes in BC. Let us all hope that Quesnel Lake continues to be part of the reason for our pride in "Super-Natural British Columbia".	
21	23-Nov-16	Unknown				I'm with Mining Watch Canada... 1. No perpetual & permanent discharge of mine effluent directly into Quesnel Lake: Dilution is NOT an acceptable solution. 2. Applying a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. 3. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. 4. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada (see here: http://fisheriesact.ca/take-action). 5. Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. 6. Proper restauration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.				
22	23-Nov-16	Big Lake, BC		Please reconsider MPMC's Permit to discharge into Quesnel Lake. As a British Columbian who has moved from the Lower Mainland to BC's Interior a short distance from the pristine one-of-a kind, Quesnel Lake, it has been brought to my attention that Imperial Mines is applying to discharge into the very same waters crews have worked so hard to clean-up. Just two years ago, the community of Likely suffered from the initial impact of the breach, enduring the subsequent uncertainty in the aftermath and clean-up. To impose yet more uncertainty by directly discharging waters into the potentially less-than-pristine-lake poses huge ramifications. From an environmental perspective, there is no evidence to rule out long term impacts on the ecological integrity of the lake as habitat for trout and salmon. Mercury has been found in the surrounding streams - remnants from the Cariboo Gold Rush over 150 years ago. Clearly bioaccumulation exists, in what form, we do not know. Potential deleterious compounds entering the food chain need on-going testing and confirmation by multiple scientific studies. From a human or community perspective, clean water is a fundamental right. If a community cannot be guaranteed a source of clean water the people who depend on the lake will once again be stressed, not unlike the fish in the lake. From a geophysical perspective, the breach at Mount Polley was recognized internationally in the mining community as a disaster. One that needs to be carefully avoided by employing the most advanced knowledge and technology available. Accumulating water-based tailings will continue to plague the mine unless there is an investment in a superior tailings facility, and a desire to fastidiously monitor the site. Although measures have been taken to address initial breach impacts, it is far too early to predict the problems that Quesnel Lake faces. I hope you will consider the voices of a concerned public. I would appreciate a response regarding the outcome of the permit application.						
23	23-Nov-16	Unknown				Quesnel Lake is a sacred site that deserves to be honoured as such. Water is above all the resource that we ALL rely on to thrive, survive and exist on this planet. That includes you, the human being who is reading this message.				
24	23-Nov-16	BC, Canada		As a citizen of Canada and resident of BC, and in the interest of public and environmental health of current inhabitants and all future generations, I ask for the following in regards to the Mt. Polley Mine: 1. No to perpetual & permanent discharge of mine effluent directly into Quesnel Lake. Dilution is not an acceptable solution. 2. Apply a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be as good or better than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. 3. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. 4. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada. 5. Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. 6. Proper restoration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.						
25	24-Nov-16	Toronto, Canada			As a Canadian citizen, I am appalled that Imperial Metals Mount Polley Mine may be allowed to discharge mine fluid directly into Quesnel Lake. This is unacceptable - dilution is not an acceptable solution! This is a violation of a the thriving ecosystem present in Quesnel Lake, a space that is sacred to Indigenous and other people. I am calling on the government of British Columbia to adopt the recommendations by Mining Watch Canada: 1. No perpetual & permanent discharge of mine effluent directly into Quesnel Lake: Dilution is NOT an acceptable solution. 2. Applying a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. 3. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. 4. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada (see here:http://fisheriesact.ca/take-action). 5. Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. 6. Proper restoration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill. Please act for the best interests of the people, not the interests of corporations like Imperial Metals!					
26	24-Nov-16	Penticton, BC		I oppose Imperial Metal's request to be able to permanently discharge mine effluent into Quesnel Lake. That lake is one of the deepest lake in the world, home to multiple fish species, and sacred to local residents and Indigenous peoples. Furthermore, • I want there to be applied a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. • I want to see a clear commitment and plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. • Canada's environmental laws must be restored and strengthened, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada. • Locally affected communities and Indigenous peoples must give free, prior and informed consent to the permitting of mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. • There must be proper restoration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.						
27	25-Nov-16	Kamloops, BC		To the officers responsible for a decision on the continued dumping of mining emissions into Quesnel Lake, from the Mt. Polley facility: The precautionary principle states that "the introduction of a new product or process whose ultimate effects are disputed or unknown should be resisted." When torrents of mining waste made its way to the deep and pristine Quesnel Lake, an experiment began. Why would we allow for more emissions to be added, when it is yet unknown what the current level of damage has truly done, or how nature will manage/correct itself? It seems to me, that there is a very real and very tragic case of "broken window syndrome" that has landed in this picture. The scar left by a mining company has signaled a green light to continue the contamination. It is almost as if once that perfect broken window appeared, all means to fight to preserve the lake from further harm flew away from view. When graffiti shows up in our City, there is a task force that will go out as soon as possible to paint over the more grotesque images, as well as those that are inappropriate, and especially those that send a message of hate, either through words or imagery. This work is done as quickly as possible - why? The answer is in how the broken window syndrome very quickly becomes a run away force all in itself. Even if people are unlikely to lift a hand to create damages of their own, time and time again, it has been shown that people will further add to destruction that was started by others. It is a strange thing in human nature, but there is a perception that where damage already exists, damage can be added without any consequence. The sentiment is "Oh well, this _____ is already ruined, so why shouldn't I just go ahead and: drop my litter here/add another painted image or two here/break another window pane or two here/smash, break anything I want, because everyone else is - and it is past the 'point of no return' anyways....". When I hear that there is a plan to continue allowing mining emissions to empty into Quesnel Lake, I wonder if this "past the point of no return" sentiment is being cast over Quesnel Lake, the fish, the animal life, the people who depend on the lake as a water source and for their livelihood. I wonder about the mental health of the people in the area who must be suffering a diminished quality of life because their sense of security has been shaken (can I drink this water, can I give this water to my children, can we eat the fish?). If people start to see themselves as the throw-away folks who have been forgotten and forsaken, they may start to treat themselves like "broken windows" too. How? Human bodies as broken windows sometime happen when people feel that their bodies are already in bad shape, so they take risks and abuse themselves further. This happens, even today, in the regions most affected by the Chernobyl Nuclear Plant melt down, where youth have cancers that are claiming them before they can marry and have children. It has been documented that their sense of despair, and just the idea that they will likely die, no matter what they do, leads many of these youth to resort to high risk sexual and substance abuse behaviours. They feel that there is no danger or harm that they could bring to themselves that will be more than what the lasting effects of radiation will cause them to suffer. Even the POSSIBILITY of getting cancer, skews their perception to the point where they figure if they're going to die, why should they care to do anything, other than be reckless --- "Why should I try to take care of my body? I'm just going to die anyway." How can the worry about water integrity which started at the time of the Mt. Polley disaster, ever be put to rest if the company is permitted to continue to pollute the water? What message does this send to the people who already wonder what effects the damaged water will have had on their health? How can the people in the Quesnel Lake area not feel that they are part of an experiment, so see how the whole thing will turn out? The despair must be very great indeed, and in this time of raised awareness around the importance of good mental health, I have to wonder if the mental health of these people are being taken care of. On CBC radio one, I listened to a gentleman who lives in the Quesnel Lake area suggest that the if mining emissions must continue to be dumped, they should be redirected to the head of the river that leaves Quesnel lake. He then went on to say that the proponent does not want to do this. Could it be that "dilution" of the mining emissions in the lake make the levels of contaminant "acceptable"? Did a calculation get done to figure out, how the great depth of the lake, will make it possible for vast amounts of emissions to be released and still safely remain within "acceptable levels"? The Quesnel Lake area resident suggested that the mining company would probably find the cost of moving their effluence pipe to be too high. The cost of not moving this pipe also has a price. Please stop the experiment on the water of Quesnel Lake. Please bring transparency to the reasons for not moving the pipe. If the contents of the effluence would not be safe to put into the much smaller body of water, such as the river leaving Quesnel Lake, then it should not be added to the Lake either. Stop the experiment before it goes any further.						
28	25-Nov-16	Unknown				I oppose Imperial Metal's request to be able to permanently discharge mine effluent into Quesnel Lake. That lake is one of the deepest lake in the world, home to multiple fish species, and is sacred to local residents and Indigenous peoples. Furthermore, • I want there to be applied a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. • I want to see a clear commitment and plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. • Canada's environmental laws must be restored and strengthened, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada. • Locally affected communities and Indigenous peoples must give free, prior and informed consent to the permitting of mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. • There must be proper restoration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill.				
29	25-Nov-16	Unknown				I just reviewed the technical assessment report for Mt. Polley Mining Company and it's ridiculous long term plan to discharge "treated" mine effluent into Quesnel Lake and Bootjack Lake. In spite of all the awesome lingo in the report, it seems clear to me that there are a lot of "uncertainties" and that these will come far underneath Imperial Metals' and the BC Government's unending drive for profit. The breach in August 2014 made my blood boil- it could have been prevented- but I hoped it would be a wake-up call and that perhaps Imperial Metals and the BC Government would team up and start trailblazing in a new, innovative, environmentally conscious and sustainable direction in the mining industry. Not so. This long-term plan reeks of a resounding unwillingness to be accountable for one of the worst environmental disasters in BC history, and of a shameless refusal to stop cutting corners in the interest of saving a buck. There is no list of alternative options in this report- not mention of dry stacking techniques or phytoremediation- nothing. Just a gross push to use Quesnel Lake as a dumping ground now that it's already been polluted. Did that breach happen on purpose? Was it allowed to happen so that the lake could be opened up as a viable place to dump effluent? Was it hoped that the people in the area would shrug and say, "Whatever, the lake is already ruined! Go for it big fat suits in high places!". It shouldn't happen. If the mine had to shut down and draw up some real plans, some plans for moving forward in an environmentally repsonsible way, I would be all for it. Innovation brings jobs too- new infrastructure would need to be built and new systems need operators and engineers. Get with the program BC Government, you suck and you environmental policy is bullshit. I am going to run to the voting stations and send this government packing when election time rolls around. And I hope Imperial Metals gets left in the dust with it's dinosaur practices and unending greed. I wish that company a big fat bankrupted future. This came back undeliverable originally, I'm sending it again one day late. Please allow my contribution to be considered. I'm attaching something written by my 12 year old daughter as well with the hope of having the voices of our next generation heard also, since our world is actually theirs and we really need to take this into account when making disastrous decisions about the environment in favor of short-term economic gains. *****See Poem				
30	29-Nov-16	Williams Lake, BC	I am writing this letter to express my strong opposition to plans to discharge mine effluent into Quesnel Lake. I am a resident of the Williams Lake area and a property owner on Quesnel Lake and I have had enough of Mt. Polley Mine and Imperial Metals' total lack of willingness to operate in a way that is respectful not only of Quesnel Lake but of this beautiful area in which we live. In my view all of the so called public consultation with this issue has been a sham and a show- there has been no genuine interest in looking at other options for dealing with mine waste, nor has there been any effort to fund more sustainable and environmentally conscious infrastructure even following the breach in 2014. This company has not been accountable in any way shape or form for the breach, which was an example of irresponsible mining practices for the whole world to see. Sure, there was a flurry of activity to at least make the breach look less impactful- and many promises were made by both the company and the province to restore Quesnel Lake to its original pristine state- and to keep researching and monitoring the impact of the breach on water quality and aquatic life for as long as it takes. And then the push to get production up and running at the mine began, and then the short-term water management plan to discharge into Quesnel Lake for the "short-term" popped up. And then the threats to close the mine if the short term plan wasn't embraced. And now a long-term plan that proposes the continuing destruction of the deepest fiord lake in the world. And oh look- there's no funding left to keep studying impacts on the lake. And wait for it- Mt. Polley wants the BC government to change its water quality standards. Brutal.This is not your world greedy BC government! This is not your part of the province! This lake belongs to our children and their children, and you have NO right to ruin Quesnel Lake for the sake of possibly five years of resource extraction, ignorant cost-cutting methods and ongoing lining of corporate and political pockets. Enough is enough. This government has no environmental or social conscience and only the people will be able to put a stop to this ongoing garbage. You know what? If Mt. Polley won't commit to protecting this area and investing in the environmental wellness of this region then it needs to pack up and get the hell out. Maybe we should put some calls out to few other more future oriented and environmentally conscious mining companies and invite them to come and work with this community instead. If this atrocious long-term management plan goes ahead BC government and Mt. Polley, expect class action because this is crap. Get with the future you moronic dinosaurs or go home. BC Government, it is your responsibility to hold corporations accountable for their actions particularly when there is such as gross drive to destroy the environment for profits. Our local area will be wrecked, and the mine will pull out- all those who really got rich from it will move on, as we'll still be here. This government has been beyond lame in addressing this. There are jobs to be had- especially if mining companies are regulated into implementing environmentally conscious and sustainable methods of extraction and water waste management. Ever heard of phyto-remediation? Dry stacking? This government and Mt. Polley Mine makes me sick. Like I said, if this goes through expect some media attention and legal ramifications. And next time you make a show of consulting with the public, clean out your ears and actually listen to what local people are saying about what is important to them.							
31	29-Nov-16	BC, Canada		I believe that the abyssal depths are the only safe place for mine waste/tailings. Developing an engineered method of placing those tailings in the depths of our fiord/lakes is definitely possible. In the depths of our lakes below sunlight levels is a vast volume of biological sink, in which no metabolism occurs, no oxidation, just anaerobic bacterial action. Lakes are only biologically active in the upper layers where sunlight penetrates. Below that, the abyss, is the perfect place for mine waste. Call me on Gabriola, if you like.						
32	29-Nov-16	Likely, BC	**Date: 2016-11-29.** I wish to express my strong objection to allowing Mt Polley Metals to discharge excess mine waste water into Quesnel Lake. Even with today's allowable standards there will be environmental pollution to the lake and down steam waterways. This may take a long time to be obvious. There are visual changes now. There should be zero tolerance of manmade foreign materials being discharged into Quesnel Lake. I am concerned that this permit is the thin edge of the wedge. Government will continue to lower the environmental standards and Mt Polley Metals will continue to ask for more. This winter/spring runoff is forecast to be a big one for this rain forest area. Mt Polley Metals must have known this area was in a rain forest with high water runoff and should have allowed for it in the design criteria. Please do not go ahead and allow this permit to proceed .**Date: 2016-12-09** I wish to say I am a member of the Likely C. Of C. And the more I become aware of how Mt Polley Metals dealing with the discharge of water into Quesnel Lake, the more discussed I become. Any responsible Company or Person; would not ask for an open ending Permit. Would not discharge pollution into the lake without knowing the ramifications. No one knows how the Lake behaves. It will be different each year. There is no way to clean up the pollution. Once it is in the Lake it is there forever. Some pollution will probably get washed downstream. Out of sight out of mind? If Polley Metals was acting in a responsible manner they would make public all pertinent related information within a timely period. Why hasn't Polley Metals installed a adequate water filter system? They have taken tens of millions of dollars (net) out the ground. There many of these Filtration Systems in operation. Several operating in B C. Again I wish to say, I strongly, object to this permit No. 1178. being allowed to proceed! **Date 2016-12-14** You may find this mail to be a copy, as I have tried several times to send my opinion those, as requested. I hope it gets to those it should.							

33	01-Dec-16	Surrey, BC		My family has been familiar with Quesnel Lake and the surrounding area since the early 1950s'. It has always held a special place in my memory and we still frequent the area so many years later.The 2014 Mount Polley environmental disaster was an alarming incident that gained worldwide attention. Since then, detailed analytical reports have shown that it could have been, and should have been avoided.One should be confident in feeling that we've learned from that experience. Sadly, that doesn't appear to be the case. On the contrary, it appears that we're taking steps backwards by relaxing conditions that a responsible mine operator should accommodate. As big a worry is the prospect that my government may be complicit in granting this operator a pardon for what he/she has done to the environment. I would urge you to reconsider the discharge permit application by strengthening the operator's requirements to assure that water quality is fully restored and maintained to its historically pristine condition.						
34	01-Dec-16	Unknown				Please leave this area alone!!!				
35	01-Dec-16	Unknown, Canada				I am writing to you as a concerned Canadian Citizen. The Concerned Citizens of Quesnel Lake are saying NO to any further discharge of toxic mine waste water into Quesnel Lake. I want you to know that I oppose Mount Polley Mine Corporation's irresponsible long term water management plan.				
36	02-Dec-16	Williams Lake, BC	Mt. Polley should clean their excess water to the level that currently is in Quesnel lake before discharging it into the environment. Do NOT use lakes or streams to dilute it to acceptable standards.							
37	02-Dec-16	Cariboo, BC		As an owner of property on the Horsefly River, I was gravely concerned this year to see that the sockeye salmon run was almost non-existent. While I know there were many contributing causes, I do believe that we as British Columbians must take every precautionary measure to ensure that all our aquatic populations can survive and thrive. There are still many unknowns concerning the long-term impacts of the 2014 tailings pond failure. Will toxins settle to the lake bottom and contaminate the food chain forever? Will they wash into the watershed and poison the oceans? Will they ever be removed from Quesnel Lake, Polley Lake and the banks of Hazeltine Creek? What will happen to tailings water after the mine closes? But there is no question in my mind that releasing untreated or inadequately treated tailings pond water and expecting Quesnel Lake to absorb poisonous chemicals is a truly terrible idea. I stand with the residents of Likely and all the Cariboo, with the people of Xats'ull, with FNWARM, and all living beings in demanding that Mt. Polley Mine NOT be permitted to discharge waste water that does not meet water quality guidelines. I also demand that a comprehensive end-of-life plan for mine waste disposal be required before any further permits are granted. You now have the opportunity to set a precedent for meaningfully responding to future environmental disasters. These are inevitable when lax enforcement and human error pervade the resource extraction industry. In denying the current application unless major improvements are made, you must make it clear that sustainability is the prevailing value in all we do, outweighing even corporate profits when they conflict. Our beautiful, "Super-Natural" British Columbia cannot withstand the alternative.						
38	02-Dec-16	Nanoose Bay, BC		I am appalled to learn that the Government of BC is likely, yet again, to give the Mt. Polley Mine permission to discharge polluted water into neighbouring watersheds. Perpetuating this type of practice is archaic, if not criminal. In an ideal world, there would be no such thing as "waste water". As the protesters' signs in North Dakota announce WATER IS SACRED. Instead of protecting the interests of mining companies, the government should be protecting the water we all need to live. By demanding that the Mt. Polley Mine produce "end of pipe water" that is safe to drink, the government will be demonstrating that it deserves to lead, and deserves our trust. Please, think very carefully about the kind of permit that you are about to allow, and then act in the best interests of all of us.						
39	02-Dec-16	Horsefly, BC	We are writing to you as very concerned Canadian Citizen and Residents of the Cariboo.The Concerned Citizens of Quesnel Lake as well as me and my family are saying NO to any further discharge of toxic mine waste water into Quesnel Lake. I want you to know that we oppose Mount Polley Mine Corporation's irresponsible long term water management plan. The tailings pond breach in August 2014 was bad enough. But now, allowing the mine to discharge their waste water into pristine lakes and waterways is just simply criminal. It looks like Mount Polley Mine actually gets awarded for having a tailings pond breach. Isn't the discharge of waste water into Quesnel Lake and/or Quesnel River what the mine wanted to do from the beginning?!? What century do we life in that our elected government is even considering such a horrible thing. I am sure there are other ways to deal with the mine's toxic waste water. Make them use modern 21st century technologies (which I am sure are available) to deal with the waste water they produce. DO NOT LET THEM DESTROY QUESNEL LAKE.							
40	02-Dec-16	Unknown, Canada				I am writing to you as a concerned Canadian Citizen. The Concerned Citizens of BC are saying NO to any further discharge of toxic mine waste water into Quesnel Lake. I want you to know that I oppose Mount Polley Mine Corporation's irresponsible long term water management plan. It was a travesty of justice that Mt Polly was able to operate without a schedules C-B on the dam for years before the breach and a clear violation of law by the mine, allowing the mine to break the law further is setting a very bad precedent to other groups bending environmental laws and looking to cut corners at the expense of the environment and people lives. Taking on the minister of environment portfolio after such a disaster has to be allot of work but I trust you will do your best in guiding the rest of the BC liberals in the right direction on the problem.				
41	02-Dec-16	Mission, BC		I am writing to voice my opposition to Mount Polley Mining Corporation's (MPMC) irresponsible long term water management plan. MPMC's initial mining permit was issued on the condition that the company was not to discharge any water into Quesnel Lake. Why are we now, 18 years later, considering a regressive environmental policy that would allow MPMC to discharge 10 million m3 of waste water under such appallingly low water quality testing standards? Judging water quality outside of a 100m "initial dilution zone" is simply unacceptable. If MPMC are as dedicated to environmental responsibility as they claim to be on their corporate website, they will ensure that all discharged water meets drinking water standards at end of pipe and not subject to any dilution zone.						
42	02-Dec-16	Unknown, Canada				I am writing to you as a concerned Canadian Citizen. The Concerned Citizens of BC are saying NO to any further discharge of toxic mine waste water into Quesnel Lake. I want you to know that I oppose Mount Polley Mine Corporation's irresponsible long term water management plan. It was a travesty of justice that Mt Polly was able to operate without a schedule C-B on the dam for years before the breach and a clear violation of law by the mine, allowing the mine to break the law further is setting a very bad precedent to other groups bending environmental laws and looking to cut corners at the expense of the environment and people lives.				
43	02-Dec-16	Unknown, Canada				I am writing to you as a concerned Canadian Citizen. The Concerned Citizens of Quesnel Lake are saying NO to any further discharge of toxic mine waste water into Quesnel Lake. I want you to know that I oppose Mount Polley Mine Corporation's irresponsible long term water management plan.				
44	03-Dec-16	Quesnel Lake, BC		Yes, we do need jobs, yes we do need natural resource extraction, and we must ensure the environment is protected. There are other alternatives to the discharge of the effluent into the lake. They may involve more investment, but MPMC has reaped financial benefits and will reap further benefits in coming years. It is not unreasonable for MPMC to make sure they have expended every effort to find the most responsible way to dispose of their mine waste. In our current post-truth, fake news, unending data flow universe, this 'human receptor' (a term taken from the TAR p.1126) appreciates having the opportunity to express the reasons she objects to granting this permit. As a long term resident of the West Arm of Quesnel Lake, I am, and will continue to be, adversely affected by this permit. While having no specific scientific training, I will rely on common sense and direct observation to try to clearly communicate why I object to further effluent discharge into Quesnel Lake. While the 1,279 pages of the TAR are focused on future discharge, it is important to understand the history of the mine's past actions. A major consideration must be the August 4th, 2014 breach in which 25million cubic meters were released via Hazeltine Creek into Quesnel Lake. This must affect present decisions because pollution of a large pristine body of water is in itself a major cause for concern. The resulting pollution from this spill has been recorded in the Government of Canada's National Pollutant Release Inventory as the largest emitter of multiple pollutants for the year of 2014. A couple of sobering examples from the NPRI: Release of 134t of Pb (lead) – 92% of total reported for all of Canada Release of 2.14t of Hg (mercury) – 94% of total reported for all of Canada.Various reports document how MPMC's poor decisions and resulting mistakes resulted in this costly environmental disaster. Mines Minister, Bill Bennett commented in the Vancouver Sun on February 5th, 2015: "Obviously if you read the report (Independent Review Panel Report), there were mistakes made. We don't know if there were mistakes the engineers are entirely responsible for, or the company is entirely responsible for, or if they are both responsible for the mistakes that were made."This is a clear admission from the Minister responsible for Mines that mistakes occurred.In the interest of clarity we should start at the beginning with the original 1997 Permit#11678. This permit designated the mine as a closed containment (zero release) facility. However, the mine had a water balance problem which led them to increase the height of the TSF and then to make the first discharge request, which was eventually granted in 2011 (over local residents, Fisheries, and First Nations objections). The mine's increased production coupled with other factors led to further requests to increase the discharge amount. Over the years the mine had also attempted to solve their water balance problem by steadily increasing the height of the TSF, but this solution had natural physical limits. As the Independent Review Panel says: "Under these conditions the Upper GLU was compressible and susceptible to undrained failure. This condition had not been recognized in the design of the TSF. The panel concluded that the dominant contribution to the failure resides in the design. The design did not take into account the complexity of the sub-glacial and pre-glacial geological environment. . . . Had the downstream slope in recent years been flattened to 2.0 horizontal and 1.0 vertical, as proposed in the original design, failure would have been avoided."The Chief Inspector of Mines also found that there was an un-filled excavation at the toe of the embankment, there was too much water in the TSF and there were inadequate tailings beaches. Moving on from the mistakes which caused the TSF failure to examples of what happened post-breach I present just one example of how a pesky fish problem was solved to MPMC's advantage.Fish, of course, were affected, especially in Hazeltine Creek. Hazeltine Creek had formerly been home to 20 different fish species (SNC-Lavalin, FFHA). Golder Assoc. concluded, in their EIA report that Hazeltine Creek "was no longer a viable habitat following the dam failure" and therefore Hazeltine Creek was designated as a non-fish bearing creek. However, there were fish attempting to survive in the creek and after a local resident reported that a large number of fish were in the creek the following solution was executed: "The use of Hazeltine Creek for the short term discharge option is predicated on the fact that the creek length used for the discharge water is not fish bearing. At the time of my earlier correspondence all indications were that there was no fish presence in Lower Hazeltine Creek. Subsequently MOE and the members of the Mount Polley environmental Working Group, including the Ministry of Forest Lands and Natural Resources and Department of Fisheries and Oceans, have been made aware that fish were present. MPMC recently applied for and received allowance from FLNR to capture and remove the fish from lower Hazeltine Creek to maintain its current status a non-fish bearing as it currently lacks adequate fish habitat to sustain fish and fish screens are in place to keep them out" (from email correspondence sent by Hubert Bunce (MOE) When the mine has exceedances in permitted levels of metal discharges they solve the problem in the following way:(Quoted from MPMC Public Liaison Committee Meeting Notes, August 18th, 2016) Question: "Regarding the request to increase the permit requirements for iron, zinc, and molybdenum, why are you asking for this and were these metals already there or are they increasing?"Answer: "Original model has now been validated against testing and some parameters are higher than modelled. We are asking for these to ensure we remain in compliance with the permit. The details will be provided with the permit amendment application."MPMC is using BC Water Quality Guidelines (BCWQG) as their goal for our lake water quality. Yet, BCWQG's have no legal standing, so are not directly enforced. They may be used as the basis for determining the allowable limits in waste discharge permits. The BCWQG may also be changed at any time. This ephemeral guideline is not sufficient to assure us of any lasting measure of water quality.The 1,279 pages of the TAR are impressive in size and content. Yet as I turn the final page I look up, glance through my window and see the reality of the dirty water in Quesnel Lake and find myself awash in a sea of uncertainty. The myriad numerals, charts, graphs and ongoing acronyms should have provided an oasis of security and certainty – yet it failed. Nowhere in all this data could I find even a hint of the paradoxical nature of the request. MPMC seems to be so reliant on science they neglect to consider visceral reality. We live in a flawed world and all need to atone for our mistakes, but first we must recognize those mistakes. On the face of it MPMC wants to discharge mine effluent into a living entity which they have already polluted to an amazing degree. If we were to ask an unbiased stranger (a child, perhaps) whether it would be acceptable to put deleterious and potentially toxic substances into his or her lake it would seem obvious that the answer would be no. It seems like such an inconceivable idea that it shouldn't even need to be asked. However MPMC has asked, and they have spent enormous amounts of time, money and human ingenuity to prepare what seems, on the surface, to be a scientifically feasible proposal. I respect the methodology as outlined by the many contributors to this report. Yet I find no consolation in the continual disclaimers found throughout this document: "where applicable, the model and input data carry inherent uncertainty, unlikely to occur, adverse effects not expected, based on predicated concentration, not expected to be acutely lethal, necessarily predictive exercised, various predictive tools, predictions are based on several inputs, all of which have inherent uncertainty". The honesty in delineating the limitations of the study is appreciated, yet raises serious concerns which make the whole enterprise questionable. One quote from p.389 of the TAR is particularly disturbing: "Hydrogeologic/hydrologic investigations and groundwater modelling are dynamic and inexact sciences . . . complicated beyond human capacity to evaluate them comprehensively in detail and we invariable do not have sufficient data to do so . . . every model is a simplification of a reality, no warranty, expressed or implied is made."How can MPMC make such a request when our own government is heading in the opposite direction? The Parliament of Canada (PRB06-26E) states that:"The virtual elimination strategy must prevent deliberate input of any additional quantities of persistent toxic substances to the ecosystem. We must continuously strive to reduce the amount entering the environment."On one hand some of us have recognized that we must stop and consider what we are doing to a finite resource. On the other hand we have a company asking to add effluent to a formerly pristine lake. I have been told by a MPMC representative that the mine effluent is not 'pollution'. I have found many credible definitions of pollution, but for this purpose I will rely on my old Oxford Latin Dictionary, p.623: "polluo , (pro+luo) – to soil, defile, foul, contaminate, desecrate", to confirm my simple observation that the lake is 'dirty'.I could continue with examples, quotes and theories, but what has emerged during this long process are the inadequacies and limitations of institutions (both business and government). A lot of well-meaning people, who were either not able to speak openly (because of non-disclosure agreements) or whose training was in such a specialized and narrow field of study that they were unable to see the myopathy of their conclusions, seemed more focused on promoting their own positions. For many of these 'experts', what began as an environmental disaster has turned into a giant science experiment, with the environment as only a small component in the process. There is no doubt that MPMC has problems. The Chief Inspector of Mines, Al Hoffman states: "Through our investigation, we determined that while the mine did not contravene any existing regulatory requirements, its management and operational practices failed in a number of areas such as water management and misplaced confidence in the TSF design.".This sort of comment only highlights why we cannot afford to let any more effluent flow into our lake. Mining is a fact of life in our area, but mining is not just an extraction process, it is also a waste creating process. While we applaud the monetary benefits provided to the shareholders, the employees and the government, we also recognize the need for all those involved to manage and regulate the waste created by mining. MPMC has a responsibility to minimize harm to the environment. Many of us are not satisfied that they have sufficiently explored other solutions to their water balance problem. There are other possibilities that would obviate the need to discharge mine effluent into Quesnel Lake. It is true that this is a big, deep lake, however it is the West Basin which, because of direction of water flow and the presence of a sill at Cariboo Island, that received the brunt of the tailings when the dam breached and will continue to receive the effluent if a pipeline is constructed to the lake. The West Basin contains only 2.4% of the water volume in the lake. This fact must be taken into account when we are contemplating the discharge of 9 million cubic meters or 2,377,548,471 (over two billion) US gallons of water a year. The small portion of the lake that will receive these billions of gallons of effluent, the West Basin, has a surface area of only 22.87 square kilometers (the whole lake has a surface area of 266 square kilometers). The volume of the 'receiving' lake water is a mere .966 cubic kilometers, whereas the total lake contains a volume of 42 cubic kilometers. (The figures above taken from Tetra Tech EBA, File: 704-WTRM030 15-01, June 27/2016) When questioned about this Jerry Vandenberg (Golder Assoc.) stated that all projections, models, etc. have been based on the area and volume of the entire lake, not the small portion of the actual West Basin. This is troubling.One could continue for pages and pages, but in the spirit of brevity my conclusion is that I do not think MPMC should be granted their permit amendment. There are other and better solutions. I trust you recognize the ongoing accommodations that have been made when MPMC has failed to meet the effluent discharge requirements is not a pattern to be continued. Albert Einstein is credited with the following definition of insanity: "Doing the same thing over and over again and expecting a different result". We find ourselves relying on you to weigh the facts and make a decision that is in the best interest of us all, please stop lowering the bar in the hope that they will clear it this time.						
45	03-Dec-16	Williams Lake, BC					I am writing to voice my very strong objections to allow Mount Polley mine to dump their waste into Quesnel Lake without being required to meet all water quality guidelines at the end of the pipe. This is absolutely unacceptable. From the government's own reports, British Columbia is riddled with close to 2000 abandoned mines – two thirds of which are still spewing pollutants into the environment. And the practice seems to be continuing with only a token regard for the environment. The Mount Polley Mine is about 50km 'as the crow flies' from my Indigenous community. Quesnel Lake area is an important salmon spawning area. Fish are born in the area and eventually go out to sea but they come home again. From the ocean they swim 600+ kilometers up the Fraser River, into the Quesnel River, through Quesnel Lake and into the Horsefly River to reach their spawning grounds. Unfortunately they have to swim through an increasing level of pollution. The government should be doing everything to protect the Fraser River because it is one of the lifelines of our province. The fact that the Fraser River has been on the list of endangered rivers for many years should be enough to strengthen the laws in regard to water. About 30 years ago our Indigenous communities started to see the changes in the fish coming up the Fraser River. At first we saw scars on them, part of their heads would be cut or the side of their bodies marked. Then we started to see worms in the fish. All of this was alarming and we reported it to the Dept. Fisheries and Oceans. "Oh that's normal", they said and dismissed our concerns but not before one DFO officer warned us not to eat the salmon eggs anymore. He said it had a concentration of a heavy metal. The fish became worse over the years and I have not fished on the Fraser River or eaten any of the fish in about 15 years. Many others in our area do not process fish because of the very poor quality of some of the salmon. We are also seeing changes in the wildlife in our area, an area that is riddled with mines, big and small. We have noticed more and more unhealthy organs in animals, some with open sores on their bodies. The first thing we do now when we get a deer or moose is to check the organs for the health of the animal. The government needs to heed the warnings of the Indigenous peoples. We are like the canaries in the mine and see these changes first. As we have experienced in my community, and seen in many others worldwide, super scale mining is insatiable. There is never enough money made and projects continue to expand well beyond their original proposals and capacity. These operations consume until they burst at the seams. Then, as we have seen at Mount Polley, they stitch themselves up and continue consuming with the permission of the governments. Now the Polley Mine has fully opened using the same Tailings Pond that breached. There have been no fines, no charges and contrary to the recommendations of the Mount Polley Report issued last year, they are carrying on business as usual. Court cases filed against Mount Polley Mining Corporation from Xat'sull First Nation, Wiliams Lake Indian Band, the Tsil'quotin National Government and Mining Watch Canada clearly demonstrate that the disaster has had major impacts in the region and beyond. There is clear dissent from First Nations and the public regarding Mount Polley Mine and its operations. The government has legal obligations that it should not ignore. AND nowhere in any of this does the fact that there are no shortages of gold or copper in the world come into play. Mining is done for the sake of mining whether or not the product is needed and at the expense of the environment. Mining companies should be required to mine in the garbage dumps before they go to pristine areas. Do the people in government not understand that when you disturb one area the destruction does not stay in that one area it affects areas far from it. You just need to connect the dots of Mining to see the wide reaching destruction. Polluted water especially does not stay in one area. I vehemently oppose the lack of laws to protect the environment. I vehemently oppose the laws in place to protect the resource extractors. I vehemently oppose allowing these short-term extraction companies to rob our future generations of a safe, clean and healthy life.			
46	03-Dec-16	Unknown				Quesnel Lake is of outmost importance as a headwater ecosystem.The Mount Polley Mining Company breach of 2014 has created an imeasurable amount of damage that demands no further mine waste, effluent nor tainted contact water adding to the mix. It is our duty to stop any further additional sources at this time to allow a complete and thorough long term study and hopeful recovery for all people and living things that rely on this watershed. It is absolutely industry's and regulatory's duty to ensure this disposing and diluting of waste into Quesnel Lake watershed does not continue past the already highly questionable actions of the short term discharge permit and associated amendments that are about to expire. With the long history of this operation, they in my belief, (and many others), have been given more than adequate time by regulatory and social licence to achieve real solutions that we yet see not in place. Protect this environment and complete the duties required by exercising alternative options, up to and including halting mine production if necessary. The questionable management and longstanding poor decisions have brought this into being, and Quesnel Lake watershed should no longer be a viable avenue to be utilised for disposing and diluting of any further mine waste. Real change is required and the reactionary, industry protective, emergency style management no longer applies. Enough is enough.				
47	05-Dec-16	Victoria, BC		I am writing to express my concern that the BC government is considering an application to allow the Mt. Polley Mine permission to discharge wastewater into Quesnel Lake. My request is that the government recognize the potential environmental devastation that would result from allowing the discharge to proceed and I urge the government to close the application in light of the unknown effects the wastewater would have on local waters, vegetation, lacustrine, animal and human health. Should the provincial government approve this application they would be displaying blatant disregard for the environment and for First Nations rights as expressed in the United Nations Declaration on the Rights of Indigenous People and elsewhere. A government that places corporate interests ahead of environmental and community health is one that I cannot and will not support. I live in Victoria, BC and would be remiss to think that the Mount Polley Mine does not affect me and my neighbours on Vancouver Island or in the lower mainland. The waters from Quesnel Lake eventually make their way into the Fraser River, which connects with the waters that surround Vancouver Island. The salmon upon which so much of our economy and identity is based could be severely affected by a decision to support the Mt. Polley Mine application. I urge you to embrace a decision that is in the interest of our collective, long term health and reject the application from the Mt. Polley Mine.						
48	05-Dec-16	Vancouver, BC		I oppose any attempt by Mt. Polley Mine to circumvent regulations on discharges and urge the government to strengthen protection of our waterways. I am also curious why the operators of Mt. Polley Mine weren't criminally charged for the damage they've caused to our environment to date. If I as an individual were to spread toxins into a shared space, could I expect no consequences? Can you think of any other jurisdiction that cares about its ecological bounty which would not only let off a known polluter, but also entertain its requests to continue the disaster?						
49	05-Dec-16	Quesnel Lake, BC	As a property owner on Quesnel Lake, I am more than alarmed and dismayed by the current state of affairs with regard to Mt.Polley Mine being allowed to continue discharging into the lake. How on earth could this be considered an acceptable solution?! Continued pollution is NOT a solution. Why is this not being stopped? Does the Government of B.C. have no backbone to stop this industry tragedy? Or have all the concerned parties been paid to look the other way? It is hard to imagine that any intelligent person would think that the original breach wasn't bad enough and to allow continued dumping into the lake would be acceptable.This is NOT acceptable at all! Please stop the madness!!!! We are directly impacted and are horrified that no good solution has been devised.							
50	05-Dec-16	Quesnel Lake, BC	Continued pollution IS NOT a solution. How could anyone even begin to think this permit is not going to further damage Quesnel Lake? The water quality is visibly affected already. More discharge is only going to reduce any possible recovery that may have been possible. Does the profit of this mining company so outweigh the public good that no one will stop this? HELP! This needs to be stopped!							
51	02-Nov-16	Quesnel Lake, BC	As a ten year , seasonal resident of Quesnel Lake, with two properties directly down lake of the discharge point, I feel VERY concerned with ANY discharge into Quesnel Lake. My concern is also financial, as we are attempting to sell one of these properties with no prospects in sight. My very real concern is that even though Polley Mine may be meeting some water quality standards, I would have to say that when a lake changes colour from it's original hue, something very wrong is being done. It is visibly OBVIOUS that the lake is being harmed! The lake used to be black at depth. Now it is green! Lakes with high mineral contents are green. How can this be okay??? I am very distressed and angered by this whole situation. What was once a world wide treasure is now merely a dumping ground for profits. How can this be allowed?!							
52	20-Dec-16	Quesnel Lake, BC	____ are saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678.Besides the following strong arguments, we would like to add that the colour of the lake has changed in the last two years, which to our mind speaks volumes to the effect the breach and continued dumping is having on a once world renown pristine lake! Our properties values have been directly impacted by this situation and our future investments very compromised. This is business too! Individual and personal, and as valid and important as any corporate interest. We simply don't have the resources to sway political decisions by any other means than this letter. Please take this into account! When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history". Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contain(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan". MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, which the Concerned Citizens of Quesnel Lake demand. It is widely known that MPMC was warned many times about the water levels in their Tailings Storage Facility (TSF). Despite this and other evidence, MPMC was found not criminally responsible for the tailings dam failure. Regardless of any legal ruling, those of us who rely on the lake as primary or recreational residences know where the fault lies and have yet to see MPMC be held responsible for their actions. We will not stand by as they attempt to undermine the very environmental standards they pledged to uphold nearly 20 years ago and we will not accept regressive policies that threaten the Quesnel Lake watershed.							
53	05-Dec-16	Unknown				I'm very disappointed with the BC government for even considering to approve the Mount Polley mine to send their effluent into the Quesnel Lake. After the last mess the Mount Polley Mine created, it is still undetermined what lasting effects their sludge, etc. will have on the lake. No one knows the long-term effects of tailings deposits on human health, resident trout, salmon nurseries, birds and wildlife in the watershed and beyond. Adding more polluted wastewater to this system does not make sense. Please consider the results of what this unnecessary drainage could do to one of the most pristine lakes in the world and stop it from happening.				
54	05-Dec-16	Williams Lake, BC	I hope innovative remediation becomes top priority of the provincial government. Mt Polley Mining Corporation, which continues to discharge mining effluent into the once pristine living waters of the Quesnel Lake and River, needs to make changes to 'business as usual.' This heart breaking breach is no less "eco-cide," then an oil spill will be on the pacific coast. These types of disasters mean "death" to fish, to plants, to animals. Death to "life." Heavy metals weigh heavily upon my heart. I am a mother. I want my children to grow up in a world where they can swim in lakes. I want them to breath clean air. I want them to drink clean water. We must hold Corporations profiting from the destruction of land and water accountable in their actions. Just as we all must become accountable. Economics alone cannot continue to dictate decisions. It is time to collaborate and support measures to ensure Mt Polley's mining waste does not continue to be dumped in our fresh water supply. I stand with water protectors in my community and across the globe to demand our voices are heard and action is taken on words. "Mni Wiconi" Lakota for " Water is LIFE." Quesnel Lake is sacred to many Secwepmec people. It is sacred to me. It is sacred to my children. It is essential for all our children. Reconciliation with indigenous people requires we take action. I am deeply ashamed of this governments lack of ability to come even remotely close to righting this fundamental wrong. Our guts know, industry practices like this must go. Listen to your heart. Be aware of that which is happening across the globe. We must do everything in our power to protect clean water. Economic based decisions are not appropriate in eco-cide situations.							
55	06-Dec-16	Quesnel Lake, BC	I have lived and owned property on the shores of Quesnel Lake for over forty years. In 2007 we decided to build a new home on our 2 acres on the Lake. Our government demanded that we install a type 3 septic system. With the digesters and ultra violet lights we were told that the end product of our septic was 100% clean and drinkable, still it had to percolate 200 feet of ground before reaching the lake. All at a cost of $60000.00. We call on, no, demand of our government to apply the same rule to MPM as they applied to us, only 100% clean and drinkable water to be discharged into Quesnel Lake and not accept dilution of any kind. We are not against mining per se but it must be done right. $60000 was hard on our pocket book, 60 Mil is chump change for MPM to build a water treatment plant. We did the right thing, now you do the right thing and apply to MPM the same rules that we as citizens had to adhere to. 0 pollutants for Quesnel Lake							
56	07-Dec-16	Fruitvale, BC		I'm not a rocket scientist.....not even a scientist....i'm a human, a mom, a grama...a very proud grama....a sister, an aunt, a friend. and as much as my credentials will probably not impress you....i can see clearly that mine tailings and clean fresh drinking water do not belong together.this is not the only soulution....yes, i know i misspelled it, but it is a cheap solution for the mining company......how sad i feel for the employees of this company, that actually work and live in the same environment. they also want whats best for the future of earth...they also care....but the fear of not having an income to support those they love, is the dilemma of truth they live every day. i'm also a cancer survivor who is grateful everyday to still be here to witness all that is beautiful in this world, and to bring my part in bringing a sustainable future for us, and all life yet to come. yes, it may cost more to bring about a reasonable method to deal with the waste mining brings, but i can visualize the pride and worth that a new way will bring to all involved. water is the sacred source of all life....when its gone....its gone. no life. please....for all....reach deeper. remember, you are life first...an employee last. let nature become the boss and the standard that you strive for.						
57	07-Dec-16	Victoria, BC		Is the Democracy Now! report accurate? If so I urge revoking the Mount Polley Mine discharge permit.						
58	09-Dec-16	BC, Canada		I do not believe the permit being applied for by Mount Polley Mine should be approved. Wastewater from the mine site should have full water treatment measures and contaminates removed. What is the rush on this permit? There is an ongoing Conservation Officer Service's criminal investigation in conjunction with the federal Department of Fisheries and Oceans into this disaster. The track record of Imperial Metals Mount Polley Mine is not the template upon which best mining practices can be built. The goverments handling of this file thus far has been abysmal. It starts with my local MLA's(Coralee Oakes) lack of genuine response to taxpayers concerns and carries on up the chain to the Minister of the Environment Mary Polak, Bill Bennett Minister of Energy and Mines along with Premier Christy Clark. Concerns that have been minimized at every turn. My questions which arose from the onset of this disaster have yet to be answered. Questions concerning chemical contaminates such as potassium amyl xanthate has yet to be addressed. Goverment regulatory oversight and enforcemet have been lacking icluding the quality of inspections. It seems that only Mount Polley Mines corporate agenda and their bottom line are being served. The public trust has been broken. A good start to begin to restore peoples faith in our current system is to do the right thing and Protect the water including everything and everyone who depends on it.There is a 9 km spillway of tailings along the landscape from the TSF and on down to Quesnel Lake via Bootjack lake. No one really knows what the long term impact will be on the environment and as such calls for the precautionary principle. This company should not be given carte blanche to dump untreated wastewater into Quesnel Lake or anywhere else for that matter. Mount Polley Mining Corporations motto of "Success with Safety" doesn't hold water. Imperial Metal's best is Not good enough. As a taxpayer and voter in British Columbia, Never mind the political stripe of government, I expect a competent government whose obligation, duty and responsibility is to take care of public safety and the health of the environment we all live in. This issue is pivotal in terms of how mining is managed or mismanged in this province. Do the right thing.						
59	09-Dec-16	Victoria, BC		I urge you to reject Mount Polley Mine's application to discharge wastewater into Quesnel Lake and into groundwater via Bootjack Lake as the solution to the Mine's long-term pollution. Mount Polley Mine must be required to meet water quality guidelines. The current application does not satisfy that requirement. I join others in the public and First Nations in demanding the Mount Polley Mine be required to meet all water quality guidelines at the end of their pipes and not resort to diluting it in Fraser River Basin waterways.						
60	09-Dec-16	BC, Canada					I am alarmed that Mount Polley has resumed operations and once again, this mine has more contaminated water on-site than it can safely store. I am demanding that Mount Polley Mine be required to meet all water quality guidelines at the end of their pipes without needing to dilute it in Fraser River Basin waterways.			
61	09-Dec-16	Horsefly, BC	As a Horsefly resident who first moved here in 1949, and has seen the landscape change dramatically in the intervening years, I am diametrically opposed to putting any discharge in the Quesnel Lake water system that I could not drink myself; no sewage, and especially not Mount Polley mines discharge unless it meets the maximum requirements of the law. You know as well as I that the sediment on the bottom of the lake in the immediate area of the breach will be sensitive to any minor disturbance for many years, and there is virtually no way to correct this other than time. There doesn't seem to be any immediate problems, however in the case of discharge from the mine, I believe the "Precautionary Principal" should be adhered to. Quesnel Lake used to be the home of the largest sockeye population in BC until recently. As a director of the Horsefly River Roundtable since inception it is my hope this will be true once again.							
62	09-Dec-16	Unknown		Water is life. The clean water we have today is essential for the future. We must stand by our fresh water resources and defend from destruction, pollution and carelessness. Our lakes and rivers are crucial for clean drinking water, recreation, fish habitat, not receiving environments for industry. How have our governments come to allow corporate interests to trump environment, tourism, cultural value and best practices? Dilution is not a solution. Regulators must raise the bar for water quality and discharge. They must take a long-term view and demand closed systems and best practices from those who are taking resources from our land. Industry must take responsibility for their wastewater. Protect this environment and complete the duties required by exercising alternative options: halt mine production. The questionable management and longstanding poor decisions have brought this into being, and Quesnel Lake watershed should no longer be a viable avenue to be utilised for disposing and diluting of any further mine waste. Real change is required and the reactionary, industry protective, emergency style management no longer applies.						
63	10-Dec-16	Likely, BC	I am writing to express my deep concern that the BC government is going to approve further contamination of Quesnel Lake by allowing MPMC to discharge mining waste water into the lake permanently. This is a worst case scenario. MPMC was aware of the problems with the dam and were informed that the dam was not being used within the scope that it was intended for. They knew since the mines inception that there were issues with water storage and that no sustainable long term solution had been established. And yet, by applying for amendment after amendment, which the BC government approved, they have been able to bully their way into doing exactly what they hoped for from the beginning, to discharge mining waste water into pristine waters. This is no way to run an industry. To have an operating plan in place, with specific policies and guidelines, only to be completely twisted around, one amendment at a time is nothing short of cheating, lying, and manipulation. It is up to the government to stand up against the bullying tactics of industry, not to enable them. BC being open for business does not mean being open for pillaging. This is a huge black mark on Quesnel Lake, the town of Likely, MCMP, the mining industry I generally, and most importantly, the governments of BC and Canada. As individuals it is time to think about what is our legacy? What have we been responsible for during our lives? Have we been responsible in enabling and being complicit in environmental degradation for the profits of shareholders, or have we been responsible for protecting the rare treasures of natural vitality that we have here in BC. There are ways to prevent further effects from the MPMC disaster, and the only obstacle is political will. The company will have to pay more, and they damn well should. Why should everybody else have to deal with their mistakes, just to save the company money? We have seen nothing from this company in terms of goodwill towards the citizens of Likely an they will do only the bare minimum of what is required of them by the government. The time for niceties is over. The mine is up and running again, and may run for many years more. There are many millions of dollars of ore still in that mountain, and it's the bloody least the government and the corporation could do to show some goodwill and protect Quesnel Lake from further potential harm. I grew up in Likely since my first breaths, I own property there, my parents have lived there for 40 years. I swim in that lake every summer, drink the water, eat the fish. To know that an immense amount of material has already washed into the waters is one thing, but to consider that an allowance could be made to continuously pollute the lake in perpetuity is a travesty. I am a scientist, I understand safe drinking water guidelines, I understand health risks. But what people don't understand is that safe is not the same as pure. That lake was nearly untouched before this mine. Every time somebody takes a drink of that water now, you know that they are thinking of drinking mining waste water. You have to shrug it off, get it out of your mind, but the poison is there, in the mind. It has been polluted. A legacy can be made here. A legacy of nobility, of making the tough choices, of keeping something pure for future generations, when so much of the world is being degraded. We have a long road ahead of us as a species, a road of survival, and accidents like this aren't making things any easier. Maybe one pipeline of water into a huge lake is not going to change anything, but millions of these kinds of decisions happening simultaneously around the world are leading us to the edge of disaster. Industry has provided great jobs, immense wealth, economic stability, but at the cost of the environment and our long term wellbeing. It is time that we collectively begin to make different types of choices that default to protecting the environment, not to protecting industry and corporations. It is all catching up to us, one Mount Polley at a time.							
64	12-Dec-16	Unknown					The globally accepted United Nations Declaration on the Rights of Indigenous People regarding Free; Prior & Informed Consent has not been followed- which states that CONSENT must be given by indigenous peoples to projects in their lands. Consent has not been granted			
65	12-Dec-16	Likely, BC	I can't believe that in 2016 I am writing to anyone saying NO to discharge of mining tailings effluent into Quesnel Lake or any other B.C. lake. What a pathetic legacy that would be for the mining corporation , the governing regulators, and our elected officials. Shame on you all if you approve this. Thanks. I didn't get into any detail in my comments due to the absolute "silent treatment" afforded to Likely residents and licensed domestic (drinking) water users of which I am one. In fact you are the ONLY respondant from letters to the mine, my MLA, government Ministers and the Premier. Thank you! So one point I would like to be made is that the 1,279 page (expensive) Golder and Assoc. discharge application for dilution of the mine tailings effluent into Quesnel Lake to B.C. Drinking Water Standards totally ignores the previous pristine water quality of that lake. I see turbidity, algae growth and discoloration that were never there before the 2014 tailings assault on the lake. I believe the UNBC research station could put numbers to my empirical observations. So in summary allowing mining companies to use ANY B.C. lake as a convenient dump is totally unacceptable when there are so many other options available. An approved application willbe like winning the lottery for Mount Polly Mining Corporation.Thank you again for your work on this problem.							
66	20-Dec-16	Likely, BC	A resounding NO to any discharge of mine tailings effluent into Quesnel Lake or any other B.C. lake. There are several other viable options for their water problems. You know that. This is the cheapest one for the company and an approval would be like winning the lottery for this VERY profitable mine.							
67	13-Dec-16	Unknown, Canada								KAIROS Canadian Ecumenical Justice Initiatives unites ten Canadian churches and church-related organizations in advocating for social and ecological justice. Collaboration with Indigenous and women's organizations concerned with the impacts of resource extraction projects on their lives and communities is a focus of our work. First Nations Women Advocating for Responsible Mining (FNWARM) has been a very important partner in this work. We were extremely troubled by the August 2014 spill of millions of cubic metres of mine waste and water from the Mount Polley mine into surrounding rivers and lakes given the grave consequences for the health and well-being of the populations of the surrounding communities. Now that an application has been filed for the discharge of wastewater from the Mount Polley mine into Quesnel Lake and to ground water via Bootjack Lake, we have a renewed concern for the impact on the downstream communities and the salmon populations on which they rely. We are concerned that discharges into the lake do not meet with water quality guidelines and pose a long-term threat to fish populations. In this case the requirement to obtain free, prior and informed consent from the Indigenous peoples affected as required by the UN Declaration on the Rights of Indigenous Peoples has not been upheld. Furthermore the Supreme Court of Canada has also established that the "full consent" of Indigenous peoples is required on "very serious issues," such as those raised by the prospect of further contamination of Indigenous peoples' sources of drinking water and sustenance. We strongly urge you to deny this discharge permit until at a minimum the Mount Polley mine meets all water quality guidelines and the rights of impacted communities to free, prior and informed consent are respected. We recognize that there are numerous outstanding issues surrounding the Mount Polley mine including an ongoing criminal investigation into the August 2014 disaster; however, this demand for strong environmental protection of clean water is time sensitive and urgent. In the words of our partner FNWARM, "our collective future and that of our children depend on it".
68	13-Dec-16	Newlands, BC		I have recently been informed that Mount Polley Mine is proposing to continuously dump partially treated wastewater into Quesnel Lake. As a resident of the Fraser River watershed and a person who lives on the bounty of fish and wildlife of the Fraser River to survive, I am deeply concerned about the possibility of ingesting contaminated fish and wildlife due to this. I emplore you to seek an alternative to this method of dilution. The 1970's mantra of dilution is the solution to pollution is not factual nor is safe. Haven't we come a long way from the 1970's mindset?						
69	14-Dec-16	Tofino, BC							I am writing this letter on behalf of Clayoquot Action, a nonprofit conservation society based in Tofino, British Columbia, in Tla-o-qui-aht First Nations unceded territory. The situation at Mount Polley is relevant to us because Imperial Metals is exploring the possibility of opening two mines here in the Clayoquot Sound UNESCO Biosphere Reserve. One of these, the Catface Mine in unceded Ahousaht First Nations territory, has been described as being very similar to Mount Polley, with a tailings impoundment proposed for the floodplain of the Cypre River. We are opposed to the BC government granting a water discharge permit for the Mount Polley Mine for a number of reasons. First, Quesnel Lake has been polluted by the tonnes of toxic tailings which have been deposited in Polley Lake, Hazeltine Creek, and the Lake itself. These tailings have not been cleaned up, nor is there a plan to do so. This is already more than enough ongoing pollution into such a critical ecosystem, home to one quarter of the Fraser River sockeye population. It is too early to know the long-term impacts of the Mount Polley breach, but further damage to the ecosystem before the impacts of the disaster are even understood, let alone mitigated, is unacceptable. The Mount Polley Mine was originally planned to have zero discharge. Just because Imperial Metals has completely missed that goal with their breach in 2014 is no reason to throw standards to the wind. The discharge at the end of the pipe does not even meet water quality standards. The plan is to use Quesnel Lake to dilute the discharge—this defeats the purpose of having water quality standards by which to measure discharge. There must be full treatment of any discharge from the Mount Polley Mine in perpetuity. I hope the BC government will look at the bigger picture, and realize this is not just about Mount Polley, but the future of mining in this province. As FNWARM Chair Bev Sellars recently stated, ""The disaster that was the Mount Polley tailings pond collapse is not over for those of us who live and depend on the lands and waters, and particularly on the salmon that have always sustained us. Nor is it over for those living in the shadows of other existing and planned mines across BC...".	
70	14-Dec-16	Quesnel Lake, BC	As a full time Quesnel Lake (water access only) resident, I have spent over 10,000 days on the lake. Polley mine presents many models of the proposed discharge into Quesnel Lake, but in my experience if the model the mine puts foreword does not work, an amendment is asked for, and often it is approved. Why would MOE want to approve any discharge into a watershed as pristine as our lake, if it is based on a educated guess at best? Lake residents are required to have "no discharge" into the lake, therefore we "must insist" the mine do the same. The original mine proposal was zero discharge. When water became a problem, Mount Polley should have been required, at the very least to treat the the effluent to the original water quality of Quesnel lake before it was released. A formally recognized body, The Likely Chamber of Commerce, has stated their position, no effluent discharge into Quesnel Lake. At a recent meeting thirty members were present, twenty- four voted for No DISCHARGE of effluent into Quesnel Lake. The mine and the shareholders have the GOLD we have the SLUDGE!							
71	14-Dec-16	Quesnel Lake, BC	_______ is saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and I strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. This permit is the ultimate insult from a company that not only employs my family members, but to whom I have previously supported and trusted. To underpin the respect and love my family have of Quesnel lake, exactly nine hours prior to the breach, my brother and I spread the ashes of my father in the lake just in front of our family cabin-less than six km of where the breach dumped into Q. Lake. It is something we cannot undo, but sincerely wish we could as my father was an outspoken critic of all polluters and abusers of the environment. I also recognize that the permit will be rejected or accepted by your Ministry (the Provincial Gov.), however if this permit is allowed, it will make a complete mockery of the polluter pays legislation of the Federal government which was designed to discourage polluters, not reward them. See the following excerpt from -Environment and Climate Change Canada's- website;-The Environmental Damages Fund (EDF) follows the Polluter Pays Principle to help ensure that those who cause environmental damage or harm to wildlife take responsibility for their actions- The following portions of this letter are from a template that others may have used - it does clearly state my opposition and present viewpoint; When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4,2014 resulting in the "worst disaster in Canadian mining history".' Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as " ...contain(ing) important habitat for fish species which support a host of species ... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan".2 MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow3 at stake, MPMC has the resources available to implement							

72	14-Dec-16	Williams Lake, BC	I feel it is necessary to review the history of this project in order to place the August 4, 2014 disaster and the current application to continue discharging effluent into Quesnel Lake in the proper context. I didn't live in this area at the time this mine was approved so I don't have any first hand knowledge of what happened. Fortunately, a submission to the Mount Polley Independent Expert Engineering Investigation and Review Panel by the Environmental Law Center from the University of Victoria includes a comprehensive documentation of the approval of the Mount Polley Mine. According to this submission, 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 ponds or pits. No effluent discharge was a key condition of mine approval and Imperial Metals 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. In a letter to local First Nations communities, dated October 13, 1989, the President of Imperial Metals Corp. stated that the mill would operate "within a closed, zero discharge system" and that "zero discharge also applies to tailings supernatant which will be recirculated". The current plan to discharge water from the Tailings Storage Facility and Springer pit seems inconsistent with this commitment. I realize that a water surplus may have been forecast before the mine started operation but I doubt that intentional discharge of effluent into Quesnel Lake was discussed with neighbouring communities at that time. I can't help but wonder about the sincerity and/or the feasibility of this commitment to zero discharge.Any approval of discharge from this mining operation would not be legitimate without support or acceptance by local First Nations and other impacted communities and it is not clear that this general support exists.It is hard not to be cynical about this current public consultation exercise. Government approved this discharge on a temporary basis, the infrastructure is in place and it doesn't appear that the public has been provided with any assessment of alternative water management plans. I can't help but wonder whether the decision hasn't already been made.I feel strongly that Mount Polley Mines shouldn't be allowed any additional untreated or partially treated discharges into the environment. They have used more than their share of the natural environment's ability to absorb pollution and it would be a travesty if they were permitted to continue adding to the damage! This mine was approved on the basis of no discharge from tailings ponds or pits. Using Quesnel Lake to "treat" effluent by dilution is not acceptable. Another important consideration relating to this application is the credibility of the applicant. There was evidence suggesting negligence as a contributing factor to failure of the TSF embankment and there are outstanding investigations. I think the public is reluctant to share any additional risks with this company and is expecting someone to be held accountable for the existing damage.							
73	14-Dec-16	Quesnel Lake, BC							The Concerned Citizens of Quesnel Lake (CCQL) are saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history".1 Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contain(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan".2 MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow3 at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, which the Concerned Citizens of Quesnel Lake demand. It is widely known that MPMC was warned many times about the water levels in their Tailings Storage Facility (TSF). Despite this and other evidence, MPMC was found not criminally responsible for the tailings dam failure. Regardless of any legal ruling, those of us who rely on the lake as primary or recreational residences know where the fault lies and have yet to see MPMC be held responsible for their actions. We will not stand by as they attempt to undermine the very environmental standards they pledged to uphold nearly 20 years ago and we will not accept regressive policies that threaten the Quesnel Lake watershed.	
74	14-Dec-16	BC		The current and proposed water management plan for Mt Polley is not acceptable. We arrived at this situation because neither Imperial Metals nor the Government of BC showed due diligence. Quesnel Lake and river is part of BC's lifeline- the Fraser River. To discharge water from Mt Polley into Quesnel Lake or river, that is not treated to the fullest extent technically possible, will only compound present and future problems. I know the lake and river. I have seen the damage, the water filters and the change in water quality. The time to act is now, not in the future, when you realize you have made yet another mistake.						
75	14-Dec-16	150 Mile House, BC	As a resident of the Cariboo I have come to know Quesnel Lake as an amazing body of water. This inland Fiord Lake needs to be protected against big business who would pollute it without conscience. If Mount Polley cannot operate and deal with their tailings in an environmental manner then they should not be able to operate. I am sure that if Imperial Metals were forced to find new ways, new technology to deal with their tailings, they would do so a lot quicker than if our Government allows them to continue dumping this less than pristine water back into this Lake and water system. Please we beg that you take action against Imperial Metals and help keep this Lake and river as pristine as it's intended to be.							
76	14-Dec-16	Unknown		It verges on the criminally negligent to allow the mining company to discharge partially treated wastewater into Quesnel Lake which still has pollutants from the original dam collapse. Likewise it is unconscionable to allow discharge of wastewater to Bootjack Lake which will undoubtedly pollute groundwater. As a voter and taxpaying member of the public, I am outraged at the government's refusal to pay attention to the recommendations of the committee who examined the Mt. Polley dam collapse and recommended against wet tailings storage. I am equally outraged that no significant penalties were given to the company for its wilful decision to exceed capacity guidelines for the dam. The application for continued discharge of pollutants into Quesnel Lake and Bootjack are a slap in the face to the people who live in this area and have continually expressed their concerns regarding the safety of their drinking water and the viability of the fish stock and water quality in the area. It is also a clear indication of the company's faith that the government will approve anything they put in front of them. The application for further discharge of partly treated wastewater into Quesnel Lake and Bootjack Lake must be refused.						
77	14-Dec-16	Likely, BC	I would like to express my disgust with the way the BC Government has dealt with this situation. I lived in Likely many years ago and still have property there to which I was hoping to retire. It is a beautiful place and the people who have chosen to make their lives in that community deserve to be treated with respect. When the spill destroyed Hazeltine Creek and compromised beautiful Quesnel Lake, my heart was broken. When the premier showed up for her photo op, I was cynical. When third party investigators exposed the many ways in which the mining company skirted around safety issues, when former employees noted that their concerns were dismissed or ignored, when the water of Quesnel Lake started to turn a strange green colour that comes and goes, I held out faint hope that the government would be shamed into doing what is right and follow through with fines and whatever measures necessary to get that mess cleaned up. Then a convenient report came out that the company couldn't have known about the type of foundation the mine was built on - and that shifts in the glacial soil caused an unanticipated event which resulted in the spill. That is pure nonsense. If a proper geological survey of the area had been done, if First Nations stories about the area had been listened to, if the government had done its job and had independent third party geologists confirm the safety of the site in the first place, perhaps this email wouldn't be necessary. If management had reacted to concerned employee reports and if the government had inspected rigorously, perhaps the spill would have at least been lessened. It is time to hold the mining company and the geotechnical engineers accountable. Require them to pay to restore Quesnel Lake and Hazeltine Creek to their former state. Oh, wait. What's that I hear? Election time? Maybe lip service will be paid... no. Guess that won't happen because the donations to the Liberal Party coffers will far outweigh the whining of local citizens and those of us further afield who care about this province. The Liberal government has an appalling record when it comes to the environment. Hopefully the tide will turn.							
78	14-Dec-16	Unknown				At minimum, Mount Polley Mine's long-term water management plan should meet all water quality guidelines at the end of pipe, without needing to dilute it in the waterways of the Quesnel Lake/Bootjack Lake/Fraser River watershed. We do not have unlimited water resources and once lost cannot be regained.				
79	15-Dec-16	Quesnel Lake, BC	As with every other waterfront owner, I am completely opposes to the long term "water" discharge proposed by Mount Polley Mine!! Our Lodge has drawn water from Quesnel Lake since the early1920's. Pre Breach, our water filters in our four submersible pumps would not have to be changed for up to two years and I now have to change filters between 7 to 14 days. How can ANYONE state that the water is fine. Meeting "Canadian Drinking Water Standards" is NOT acceptable to waterfront owners. Both Government and Industry are aware of our contaminated filters and neither party has stepped forward to sample our filters??? Why do I now have to purchase our own filters??? We did not contaminate Quesnel Lake!!! Our business has been destroyed!!! Where were any of you??? Where are you now??? The aquatic life in Quesnel River is dying because of the brownish/green slime that has blanketed the river bed. The 2015 Stonefly Hatch was approximately 50% of the pre-breach hatch and the 2016 Hatch was approximately 20% of a pre-breach hatch for the 15 miles of Quesnel River we fish.There is no connection to weather/climate, etc as the Cariboo River has experienced normal, prolific hatches as always, right down to the confluence of the Quesnel and Cariboo Rivers. From this point downstream this sensitive aquatic life has been all but wiped out. We ask this Government to show some integrity and not approve the proposed discharge and allow this once pristine Lake a chance to heal. STOP the pollution!!! PURE WATER ONLY DISCHARGE!! A proper water treatment plant that will process ALL discharged water bringing the water quality to the same purity as pre-breach Quesnel lake water is the ONLY acceptable solution for the proposed pollution.							
80	15-Dec-16	Kamloops, BC		Hello. I object strongly to the proposal to allow the Mount Polley Mine to release wastewater into quesnel lake and ANY groundwater or freshwater sources that has not been treated to meet all relevant water quality guidelines before release. This is madness, reckless and irresponsible. We are witnessing the collapse of ecosystems due to reckless human behaviours. In this day and age it is absolutely time to stop these outdated behaviours. Stop selling the environment out to industry. Please look further down the timeline than the next election.						
81	15-Dec-16	Victoria, BC		In a truly "free market" economy, companies would be responsible for cleaning their waste, not dumping into almost pristine water to "dilute" it. At minimum, Mount Polley Mine's long-term water management plan should meet all water quality guidelinesat the end of pipe, without needing to dilute it in the waterways of the Quesnel Lake/ Bootjack Lake/Fraser River watershed.						
82	15-Dec-16	Quesnel Lake, BC	The public and elected officials of this Province cannot allow MPMC to discharge waste water directly into Quesnel Lake. When MPMC applied for the original permits to operate, no waste water was to be discharged directly into Quesnel Lake. These conditions must continue to be abided by as they are part of the original permit granted to the mine to operate and one of the reasons among others it had public support and was approved. If the "engineers" who designed this disaster did not realize that when every tree is cut and all vegetation removed from a large area such as this mines' foot print, water is going to be a problem. MPMC is not the first open pit mine ever constructed in British Columbia and these problems should have been recognized early in the design stage, by both the engineers and the government officials. MPMC should rectify this problem in a manner that is environmentally sound and acceptable to the public for future generations. Dumping directly into Quesnel Lake is not this solution. This water problem did not happen overnight and should have been foreseen by government officials and MPMC, proper preparations for dealing with waste water should have been addressed many years ago.We have to protect our water and environment NOW, for future generations or we will not have any "good clean water" left. The government must require the mine to find an alternate option of dealing with their 'surface water problem'. With today's technology this can be done and the mine can continue to operate. It's time these corporations give more of their profits back to the land; it's the cost of doing business in today's world. We have owned our property on Quesnel Lake for 37 years. It is located 4 kms downstream from Hazeltine Creek on the west arm. We personally know how unspoiled and beautiful Quesnel Lake was prior to Aug 4, 2014. The lake water is no longer crystal clear. There is slime on the rocks along the shoreline and lake bottom that was never there prior to the disaster. The Government and elected officials cannot allow MPMC to hold it 'hostage', by threatening to "close the mine down", if the requested permits are not forthcoming from government. Yes, the mine is important to the economics of the Likely/Williams Lake area. BUT AT WHAT COST? At the cost of destroying the environment even more? By polluting Quesnel Lake for at least the next 20 - 30 years, long after the mine has shut down? That price is too much to pay. Once again we reiterate: Do not allow Mount Polley Mine to dump their spoils into Quesnel Lake. This lake needs all the help it can get from us to recover from the disaster of August 2014. Quesnel Lake is a long long way from recovering, continued discharge of waste water into it cannot continue if we expect this lake to return to its previous pristine state.							
83	15-Dec-16	Lake Country, BC		We are appalled at hearing about the possibility of allowing Mount Polley Mine to continuously dump partially treated wastewater into Quesnel Lake - which still contains mine waste from the dam collapse - and into groundwater via Bootjack Lake as their long-term water management plan. In our view, this is allowing the company to use B.C.'s precious clean water to clean up its dirty mess. At minimum, Mount Polley Mine's long-term water management plan should meet all water quality guidelines at the end of pipe, without needing to dilute it in the waterways of the Quesnel Lake/Bootjack Lake/Fraser River watershed. The Government of B.C. cannot allow business case interests to over-ride stewardship of our waterways.						
84	15-Dec-16	Unknown				Let the B.C. Ministry of Environment know that, at minimum, Mount Polley Mine's long-term water management plan should meet all water quality guidelinesat the end of pipe, without needing to dilute it in the waterways of the Quesnel Lake/Bootjack Lake/Fraser River watershed.				
85	15-Dec-16	Unknown				Please stop this horrific mining operation from doing even more damage. Do the right thing. Make them stop polluting our waters.				
86	15-Dec-16	Bozeman, MT								*** See letter - very technical. The Center for Science in Public Participation provides technical advice to public interest groups, nongovernmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially with those issues related to water quality impacts, reclamation bonding, and tailings dam safety. GENERAL COMMENTS Through the Technical Assessment Report (TAR) the Mount Polley Mining Company (MPMC) is asking the Ministry of Environment to significantly increase the discharge limits for Environmental Management Act Permit 11678 that was modified on September 19, 2016, to in part authorize the use of Quesnel Lake for dilution of mine effluent. The September permit also increased the discharge limits for copper, molybdenum, selenium and sulfate, and the criteria for cadmium eliminated. Quesnel Lake water is cleaner that in Hazeltine Creek, even before the accident. The Initial Dilution Zone (IDZ) and lack of additional would allow MPMC to increase the amount of discharge of metals, over the amount allowed under the increased limits of the September 16, 2016 permit, by 724% for arsenic, 264% for chromium, 175% for copper, 809% for iron, 611% for zinc, 217% for ammonia, 251% for nitrate, and 54% for sulfate (270% over the June 7, 2013 permit). The fundamental rationale for granting a discharge into Quesnel Lake at increased permit limits seems to be two-fold: (1) that an IDZ, a zone of mixing where water quality standards are exceeded, is standard operating procedure and should be granted the mine; and, (2) that the present treatment systems meets or exceed Best Available Technology requirements, and need not be improved. Neither of these arguments should be taken at face value, and will be addressed in the section-specific comments. Treatment of the mine effluent to meet water quality standards is easily technologically achievable, and arguably should be required to minimize further damage to Quesnel Lake. In essence, asking for a dilution zone in Quesnel Lake is adding insult to injury. Thank you for the opportunity to comment on the Technical Assessment Report. If you have any questions on my comments, please feel free to call at any time.
87	15-Dec-16	Quesnel Lake, BC	To whom it may concern, My husband & I have been fishing in Quesnel Lake every fishing season for the last 8 years, we own a spot at Plato Island Resort where we go almost every weekend from May to October, we love going there and have never seen a more beautiful lake, the water is crystal clear, the fish are fresh tasting and abundant, we are very much opposed to any more toxic waste going into our lake. The disastrous spill of 2014 should never of happened in this day in age of technology and no one can truly say that it will never happen again. We were fishing by Cariboo Island the morning of the spill and saw the strange bubbly stream of waste making its way down the lake only to find out that evening what it actually was and couldn't believe it. No more toxic waste should be dumped into Quesnel Lake!!!!!							
88	15-Dec-16	Nanaimo, BC		I am saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history".1 Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contain(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan".2 MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow3 at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, which the Concerned Citizens of Quesnel Lake demand. It is widely known that MPMC was warned many times about the water levels in their Tailings Storage Facility (TSF). Despite this and other evidence, MPMC was found not criminally responsible for the tailings dam failure. Regardless of any legal ruling, those of us who rely on the lake as primary or recreational residences know where the fault lies and have yet to see MPMC be held responsible for their actions. We will not stand by as they attempt to undermine the very environmental standards they pledged to uphold nearly 20 years ago and we will not accept regressive policies that threaten the Quesnel Lake watershed.						
89	16-Dec-16	Williams Lake, BC					Please find the attached TAR Review comments for Williams Lake Indian Band and Xatśūll First Nation (Soda Creek Indian Band). These address Mount Polley Mine's Long Term water Management Plan. This TAR review was completed by December 9, 2016. Also please note that we received the Golder review comments for the GW Solutions comments on the earlier draft of the TAR. While we cannot address Golder's comments within the current report, we appreciate receiving the comments and do look forward to a meeting between GW Solutions and Golder in the New Year to review the comments together. **Very long, see file.			
90	17-Dec-16	Vancouver, BC		I am writing from B.C. after reading about another disaster waiting to happen to our waterways that will impact so much life. I am in full support of water treatment measures before waste water is discharged. Always and forever. Anything that might mitigate this crime						
91	17-Dec-16	Quesnel Lake, BC	This letter is to express my strong objection to this Application. My family have owned property on Quesnel Lake for nearly seventy years. We have two lots, 11509 and 11510, located on the west side of Quesnel Lake about four miles downstream from the mouth of Hazeltine Creek. These are recreational properties which have been enjoyed by four generations of our family. We have been deeply disturbed by what has gone on in the past few years. Firstly, the dam failure should never have occurred and was the result of the Provincial Government not doing their job, and the mining company taking advantage of that. Secondly , the mining company were allowed to resume operations and to dispose of their effluent using Quesnel Lake as a sewer. The result of these actions is that a large, pristine body of fresh water has been badly compromised , the effects of which are as yet largely unknown. This indicates that the B.C. Government has little or no regard for the environment and are willing to sacrifice it for the fast buck, a sorry situation indeed. In conclusion, the permit amendment should be rejected and the mine should be shut down until an environmentally acceptable operating process is in place. Quesnel Lake and my great-grandchildren are depending on you.							
92	19-Dec-16	Morewood, ON			I recently became aware of the open application by the Mount Polley Mine to discharge wastewater into the already seriously impacted Quesnel Lake and to groundwater via Bootjack Lake. I oppose this application (and any future applications to discharge wastewater) due to the long and short term negative impacts it will have on the health of people, land, water and plant life.Based on what I have read, there does not appear to be a system in place for water treatment from this mine after it closes and that is alarming and shows severely poor management. And I believe that the ongoing criminal investigation of the August 4, 2014, disaster and multiple papers being filed to sue Mount Polley and the BC government is further reason to deny this application. I do not live immediately in the region that will be negatively impacted should this application be approved - but eventually we are all impacted when environmental degradation happens.					
93	19-Dec-16	Smithers, BC							Northern Confluence is an initiative based out of Smithers that focuses on land-use decisions in northern B.C., including mining development. We are working with First Nations on resource policies and striving for more responsible mineral development in the province. We recommend that the Ministry of Environment (MOE) reject Imperial Metals' application to discharge significant volumes of wastewater into Quesnel Lake, and into groundwater via Bootjack Lake. We commissioned the Center for Science in Public Participation to do a technical analysis for us on the application. Dr. David Chambers submitted their comments directly to MOE on December 16, 2016. Northern Confluence fully endorses their submission. Mt Polley is requesting a significant increase in a number of the permit limits to essentially discharge the existing effluent from the water treatment plant (which is not designed to treat metals). It appears as though they are striving for the cheapest option (at present, not longterm) in wake of their own disaster having polluted once pristine waters. How does their current plan honour the commitment of the BC Government to use Best Available Technologies and Practices (that arose out of the Mount Polley mining disaster)? To date, we still do not know the long-term impacts from the tailings disaster, nor any on-going plans to remove mine tailings deposited into Quesnel Lake, Polley Lake and along Hazeltine Creek as a result of the August 4, 2014 disaster. It would be scientifically premature to add more polluted wastewater to this system that drains into the invaluable Fraser watershed. The discharge into Quesnel Lake to dilute the wastewater appears to be a violation of the Fisheries Act, which is currently undergoing a review. Until it is complete, there should be a pause before any long-term water discharge permit is approved for mine effluent in B.C. into fish bearing waters.In addition, it is not clear how the application to discharge into groundwater is in violation or compliance with BC's new Water Sustainability Act. With the Act finally dealing with groundwater, how does this application meet the objectives set out by the new Act? How will MOE monitor groundwater impacts if they approve this plan? The discharge permit request states a 4-year operating period, but an expansion plan exists to operate the mine for ten or more years (M200 permit). Will the discharge numbers and cumulative impact be even higher in the expansion scenario? If so, how is MOE factoring this potential into account as part of this permitting process? How is risk being assessed? Whatever long-term water treatment plan is approved for the Mount Polley mine, we urge the Ministry of Energy and Mines to update their bonding requirement and ensure greater financial assurances to cover the risks associated with water treatment in perpetuity. Lastly, we support the communities who are raising their voices against this long-term water management plan. As the recent Tsilhqot'in Supreme Court decision made clear, consent is required from First Nations communities in the region before permitting that has the potential to impact on their way of life and future generations. Already the Mount Polley mining disaster has prevented many local First Nations from fishing either in Quesnel Lake or the Fraser River for fear of contamination and unknown long-term impacts. Overall, the water management plan for the Mount Polley mine is really a short-term, economically cheap option for the company, and a long-term, high-risk option for the environment and communities. We recommend that a more robust water-treatment be developed that uses Best Available Technology and Practices, and does rely on dilution or dumping into fish-bearing waters.	
94	20-Dec-16	Victoria, BC								Like all British Columbians, we deeply regret the loss of the pristine waters in Quesnel Lake due to the tailings dam failure that led to catastrophic collapse at Mt. Polley in 2014. We regret that Imperial Metals has not been held accountable for the biggest mining disaster in modern Canadian history: 25 million cubic meters of toxic waste spilled! In spite of on-going monitoring, the long-term effects to the habitat and the local economies are still incalculable. Unfortunately the government's own reports indicate that similar failures can be expected in the future wherever tailings ponds were built on the same vulnerable model. We feel it is entirely reckless to give any consideration to the current proposal to dump partially-treated wastewater into Quesnel Lake and/or Bootjack Lake and/or the Fraser River. Surely the Environment Ministry cannot find acceptable such a farcical solution to the problem of pollution! It seems that the idea that "dilution is the solution to pollution" is an out-dated joke in every setting except in B.C.'s antiquated mining laws which seriously need revision in order to protect waterways. Why isn't the government demanding that Imperial Metals fully fund the remediation? We feel that taxpayers and local communities should NOT have to continue to pay the price for corporate failures, especially in this particular clear incident of neglect and mismanagement. It is our view that the government is misguided in trying to provide the "least cost" to the mining corporation rather than to the public. The government can't be serious about reconciliation with First Nations while at the same time ignoring the stated wishes of those who take stewardship of the area seriously. The province of British Columbia is legally obliged to consult with First Nations on land and resource decisions that could impact their inherent rights. We urge you to listen to those who have local knowledge, those who have been already seriously affected by the Mt. Polley catastrophe. We would be happy to see the current proposal rejected as being without any merit as we feel that approval would set a dangerous precedent for future mining "accidents". We do not wish for this company to think that this may be a "solution" which can be applied to future disasters.
95	20-Dec-16	Likely, BC	It is incomprehensible to me that the Ministry of Environment is considering the continued pollution of Quesnel Lake. I have lived on and near Quesnel Lake for over 40 years and have always felt more than safe drinking the water directly from the lake as well as it being our only domestic source of water,, until now.I also find it unbelievable that as citizens we have to fight our own Government to try and protect our environment and only source of drinking water.I have been to countless meetings on this subject and the only thing that Imperial Metals and the Government of BC has accomplished is to entrench a complete distrust of Industry and Government in regards to this situation. So until you can give us a trusted person to work on our behalf and speak for us you are wasting your breath. Ministry of Environment and The BC Liberal Government are only enabling this Company to continue operating, at any cost to the environment, in order to maintain employment. As has been stated at every meeting that I've attended, the community of Likely in general supports the continued operation of the Mt Polley Mine but only in an environmentally responsible manner using best available technology. This is not the case. Imperial Metals Corp has insisted on using the cheapest way out, which caused this breach in the first place. They continued to build the dam higher with no regard to safety. If it was built properly it would not have failed no matter the underlying geology. It is my understanding that Best Available Technology is to be used to treat any effluent prior to release to the environment. This is not happening. The current sediment filter system is not good enough. Effluent should be properly treated to ensure that discharge to the environment is of the same or better quality as the receiving environment not just BC Water Quality guidelines. Furthermore release to Quesnel Lake is not acceptable. If any release is to be made it should be to the Quesnel River where it can be flushed out of the local environment not left to circulate in Quesnel Lake in perpetuity. Any discharge should be tested at end of pipe not, relying on dilution in the IDZ to meet water quality. The only thing Mt Polley seems to be testing for(rarely if ever)is the metals, which is important but is not the only component of the effluent. I live about 6 km from Hazeltine Creek on Quesnel Lake and the only boat I see out there doing any measuring is the UNBC QRRC research vessel WH Mathews. I have volunteered on this boat taking samples and have trust in the work they are doing but it will take years of study to determine the full impacts of this disaster. You are not even waiting for the results of these current tests (ie metals uptake in plankton, consolidation of sediments and re-suspension tests) to make a decision. Our (local)residents) observations on changes in the lake have been ignored and dismissed by Mt Polley and your Ministry. I have been here all of my adult life and I can tell you, it has changed. If this had happened on Shuswap or Okanagan Lake would this permit be approved?? I don't think it would have even been considered. Because we are relatively remote and few in number we are being considered collateral damage. With the millions or billions of dollars worth of raw resources taken from this area in the past and the Millions or Billions of dollars yet to be made by Mt Polley, I think we deserve better than that. If not just for the sake of the environment and preservation of this pristine environment.							
96	20-Dec-16	Likely, BC	I am astonished and appalled that there could be a possibility of continued pollution into Quesnel Lake by the very corporation that has made the many mistakes that have led to the devastating disaster that pored 25 thousand cubic meters of mine waste into a once pristine Quesnel Lake. As a long term resident of Likely (42 years), and knowing Quesnel Lake for both work and leisure, I have been sickened by a) the disaster itself and b) the Mount Polley Mining Corporation's continued push to pollute even further. No one knows the long term effects of this disaster and won't for years to come, especially on aquatic life. MPMC continually talks about "best practices" and yet the TAR is full of disclaimers (eg: unlikely to occur, adverse effects not expected to be acutely lethal, all of which have inherent uncertainty etc.) which tells anyone who reads it that they simply don't know what will happen. How can it possibly be best practices when the consequences, based on a model, are actually unknown. I absolutely oppose the discharge of any more mine waste going into Quesnel Lake. My hope is that the mine will treat the mine waste before releasing it into the local receiving environment.							
97	20-Dec-16	Williams Lake, BC	Please do not deposit treated mine waste water from Mount Polley Mine into Quesnel Lake.							
98	20-Dec-16	Likely, BC	Hello.This letter is regarding polley mine and quesnel lake.I lived in likely for 8 years. I attended meetings, to express concern, and learn about about mount polleys application for a permit to discharge into quesnel lake. There was a lot of community resistance. Then they got that permit. Shortly after that the breach of the tailings pit happened. Polley mine originally got the permission to operate by agreeing to be a closed system. No where in original plan was dumping waste water into the lake.... not till later.It amazes me that a mine can be permitted to work this way. Also that it would even be considered to allow a for-profit industry to pollute a lake and river system. especially after the massively damaging breech. why? how is water not more important then any mineral being pulled out of that mine? jobs money... there are many tourism jobs directly related to having a healthy lake and river system. Its not that i think the mine should close, just that they should deal with their own waste. Without using the river as a dumping system, that is such an old fashioned way to mine. Cant they do better then that? I belive we really need to get our priorities straight. water it life.							
99	20-Dec-16	Unknown				Please make sure there is no further danger of a mine spill before you issue a further permit to Mt. Polley. The people of Likely cannot drink polluted water. Protect their watershed!				
100	20-Dec-16	Unknown				Suffice to say that not only am I frustrated and angry at the inertia shown by your office and the provincial government in general, but so are my Social Studies 8 classes when they were informed that virtually nothing has occurred to hold anyone accountable, nor have any real steps been taken to ensure a disaster like the Mt Polley tailings dam never happens again. I am sure that your replies to anyone else like me who have corresponded with you lately will contain meaningless platitudes 'thanking' us for voicing our concerns and 'ensuring' us that processes are in play and you are working very hard to mitigate the damage already done...Be sure that many are paying attention and many will never vote for your government again. I rarely, if ever, attempt to sway the people in my classroom toward any particular point of view, mainly in a desire to engender the critical thinking process in the students in my care. But the temptation to do so is strong indeed, especially in the face of the stunned expressions shown by many of the students who spend time on Quesnel Lake. Having spent a year recently working in a school on the shores of Shawnigan Lake, I find myself living in the aftermath of a disaster yet again here in Williams Lake. You may hide behind legislation and legal processes but be sure that eventually this will catch up with you. It would be naive of me to think that British Columbia cannot move along without resource extraction. That is moot. What is not moot is the constant obfuscation to which you and your corporate backers rely on to avoid doing anything about the mess you have allowed to be made.				
101	20-Dec-16	Likely, BC	I am writing the Provincial Government to voice my complete opposition to the MPMC's application to discharge mine waste water into Quesnel Lake for the following reasons: 1. Best Available Technology (BAT): The MPMC is providing basic dilution as the BAT remedy to achieve water quality guidelines in Quesnel Lake. This is simply a misrepresentation of the best available technology utilized throughout the world and indeed in British Columbia at operating mining sites. Water at Mount Polley that doesn't meet water quality guidelines should be treated at the site before being released into the surrounding watersheds. BAT includes water treatment plants that can be designed to treat water issues at Mount Polley and BAT is a recommendation from the Province as a result of the TSF disaster that occurred on August 4, 2014. A current example of such practice is now underway at several locations in North America including BC is the Teck Resources water treatment facility at Elk Valley. This facility is treating a much larger water quality problem than is evident at Mount Polley yet this company has recently invested $120 million dollars to achieve their goals as a responsible mining company. http://www.teck.com/responsibility/our-sustainability-strategy/water/water-quality-in-the-elk-valley/ In view of the MPMC mining disaster of 2014, BAT at this mine should be the installation of a water treatment plant that achieves water quality guideline levels at the end of the pipe and not rely on an already impacted Quesnel Lake as a subsidy for this company. Their promises of a suitable passive treatment system in the future has never been proven out in spite of their assurance of its potential and their work on site to date. In view of this inadequacy it is quite possible that a pipeline to Quesnel Lake for site water dilution could be utilized in perpetuity and to me this is unacceptable. Quesnel Lake has suffered enough due to the MPMC operational neglect and poor mining practices. It is time for the BC MoE to stand up for BATs that are genuinely helpful to the environment. We all have a collective responsibility to leave the environment in as good as or better condition than we found it......it is simply irresponsible to do otherwise. 2. The Precautionary Principle: This principle should be applied to the TAR related to the long term discharge plan of contaminated MPMC site water into Quesnel Lake. The full effects of the August 4th 2014 disaster on Quesnel Lake will not be understood for years to come. The addition of contaminated site water on an already impacted receiving environment does not consider the long term potential impacts to fish and fish habitat. There is not an aquatic or fisheries scientist in the world who will state with confidence that all is well with Quesnel Lake in the long term. In fact UNBC scientist Dr. Ellen Petticrew who undertakes related collaborative research on Quesnel Lake with numerous other scientists since the disaster occurred concluded "While dilution effects and remediation efforts underway as part of the MPMC cleanup process may reduce the observable impact on the lake's ecosystem, tailings and scour materials are and will continue to be transported throughout the lake. Also, twice annually (spring and autumn) the West Basin will experience isothermal conditions and overturn, potentially reentraining settled tailings and scour material into the water column. The nature of waste materials now present in Quesnel Lake presents a potential hazard to the metal content of aquatic food webs and the growth, survival, and behavior of important fish species". http://www.unbc.ca/sites/default/files/sections/quesnel-river-research-centre/petticrew2015.pdf The precautionary principle should be applied in this decision by the Province of BC and all mine waste water should be treated on site to meet all water quality guidelines.. 3.Premier Clarke's Statement: Premier Clark addressed the community of Likely on August 7th 2014 and provided the following on a Global TV report "This is one of the clearest pristine lakes anywhere in the world.........and we want to find a way to get it back to its previous pristine state". Continuing to use Quesnel Lake as a dumping ground for the MPMC waste water does not address the Premier's statement in any way, shape or form and we expect the Province of BC to deny the discharging of waste water into a Quesnel Lake dilution zone. Highly qualified Dr. David Chambers of the Centre for Science in Public Participation in his related submission stated "Treatment of the mine effluent to meet water quality standards is easily technologically achievable, and arguably should be required to minimize further damage to Quesnel Lake. In essence, asking for a dilution zone in Quesnel Lake is adding insult to injury". I couldn't agree more. To allow the continued use of Quesnel Lake as a receptor for the MPMCs waste water is not an environmentally sound idea and further puts the aquatic health of Quesnel Lake at risk. In summary I do not approve of their long term water treatment plan.							
102	20-Dec-16	Alaska, USA							Rivers Without Borders (RWB) is a nonprofit conservation organization working in both Canada and the U.S. to raise awareness of the outstanding ecological values of the British Columbia – Alaska transboundary watersheds and promoting ecosystem based stewardship to sustain those values. The Mount Polley Mining Company (MPMC), through the Technical Assessment Report is seeking to significantly increase the discharge limits for Environmental Management Act Permit 11678, which was modified on September 19, 2016, to authorize the use of Quesnel Lake as a mixing zone for dilution of mine effluent. The requested Initial Dilution Zone (IDZ) and lack of additional treatment would allow MPMC to increase the amount of discharge of metals over the amount allowed under the limits of the September 16, 2016 permit which had already increased the discharge limits for copper, molybdenum, selenium and sulfate, and eliminated the discharge criteria for cadmium. The increases in metals discharge above the September 19 permit that would be allowed under the MPMC request would range from 54% for sulfate at the low end to over 800% for iron at the upper end of the range. It appears that the primary justifications for granting mine effluent discharge into Quesnel Lake at increased permit limits are that an IDZ, a zone where water quality standards are exceeded, is standard operating procedure and simply should be granted and; that the present water treatment systems meet or exceed Best Available Technology requirements and do not need to be improved. RWB believes that the treatment of mine effluent to meet water quality standards is technologically achievable and should be required and that Quesnel Lake, which has already been contaminated by the 2014 TSF dam failure, should simply not be used as a convenient mine waste dump so that MPMC can avoid the expense of doing things right. The Quesnel Lake watershed, a tributary of the Fraser River, has one of the largest spawning populations of sockeye in B.C. and contributes to subsistence, sport and commercial fisheries in B.C., Washington State and Alaska. Considering that the overall effects of the Mount Polley disaster are not yet known, allowing additional mine effluent discharge into the Quesnel Lake ecosystem would not only be adding insult to the injury already foisted upon the fisheries resources and the people who depend on those resources but likely will be adding further injury as well. B.C. mining in the transboundary region has become extremely controversial over the past few years. Although Mount Polley is not a transboundary mine, people in the transboundary region look to mines like Mount Polley (and the abandoned acid-spewing Tulsequah Chief) as examples of how B.C. does mining and are very concerned. Allowing Mount Polley to dump more mine waste into Quesnel Lake will certainly be seen as an example of B.C. choosing mine company economics over public health and safety. In conclusion, RWB respectfully asks that the request by MPMC to allow an IDZ in Quesnel Lake in association with increased mine effluent discharge be denied.	
103	21-Dec-16	Cranbrook, BC		I recently had the opportunity to fish up in the Quesnel Lake area while filming a TV series. Because we'd rented helicopters and floatplanes to shoot segments of the series, we flew over the Mount Polley disaster site and noticed the environmental scar that exists two years after the incident. As a result, I was very surprised to hear of Mount Polley's application to discharge wastewater into an already disrupted ecosystem. In my mind the application is concerning to say the least. The fact Polley Mine is already responsible for so much destruction and now wants to add further waste to an affected system, is overtly worrisome for the various fish species that depend on unpolluted water for survival and for the aquatic insects they depend on as a food source. I'm also concerned for the residents and business owners who live near (and down-lake) from the proposed wastewater dump area. Their lives, their wellbeing, and in some cases, their livelihood depends on unpolluted water. I urge you uphold their concerns above that of the Polley wastewater application. What I mean by this is that I urge you to find a solution that's best for all concerned. The wastewater application is in the best interest of Mount Polley Mine, but definitely not in the best interest of the residents or the ecosystem. Please endeavor to facilitate a solution, even if it is more costly to Polley Mine, that ensures wastewater be fully treated before it enters the lake. In short, I am in opposition to the wastewater discharge proposal by Mount Polley Mine. I strongly advise that measures be taken requiring Mount Polley Mine to fully treat wastewater before any is discharged.						
104	21-Dec-16	Cranbrook, BC		I recently had the opportunity to fish up in the Quesnel Lake area while filming a TV series. Because we'd rented helicopters and floatplanes to shoot segments of the series, we flew over the Mount Polley disaster site and noticed the environmental scar that exists two years after the incident. As a result, I was very surprised to hear of Mount Polley's application to discharge wastewater into an already disrupted ecosystem. In my mind the application is concerning to say the least. The fact Polley Mine is already responsible for so much destruction and now wants to add further waste to an affected system, is overtly worrisome for the various fish species that depend on unpolluted water for survival and for the aquatic insects they depend on as a food source. I'm also concerned for the residents and business owners who live near (and down-lake) from the proposed wastewater dump area. Their lives, their wellbeing, and in some cases, their livelihood depends on unpolluted water. I urge you uphold their concerns above that of the Polley wastewater application. What I mean by this is that I urge you to find a solution that's best for all concerned. The wastewater application is in the best interest of Mount Polley Mine, but definitely not in the best interest of the residents or the ecosystem. Please endeavor to facilitate a solution, even if it is more costly to Polley Mine, that ensures wastewater be fully treated before it enters the lake. In short, I am in opposition to the wastewater discharge proposal by Mount Polley Mine. I strongly advise that measures be taken requiring Mount Polley Mine to fully treat wastewater before any is discharged.						
105	21-Dec-16	BC, Canada		I am totally disgusted with the government allowing the continual dumping of mine waste into Quesnel Lake. I truly believe this was what Mt. Polley envisioned all along with the "accident ". The no penalty and no fault dump and now the free pass to continue to dump into a once pristine lake points to a totally corrupt partnership between the mine and government. Shame on you for taking the citizens of this provinces legacy and selling yourselves for money and greed. Our government should have more integrity. I am tired of the argument that we need jobs when the technology exists to mine safely. A mine will never use these more expensive programs unless governments deny the permits that destroy our environment.Please do the right thing and deny the continued ability for industry to poison our precious lakes, rivers and oceans. Time is running out for your grandchildren as well.						
106	21-Dec-16	Unknown		It shocks me that not only is the mine reopened but that the company has hardly paid for its mistakes or changed its behaviour since the disaster. I worked in Likely and Horsefly with the Holmes treeplanting and monitoring the Sockeye run in 2014 after the spill. I felt a connection with this place and such a sadness and anger when the disaster happened, and its all been downhill since with the B.C government seemingly taking order from imperial metals, serving the corporations rather than supporting the people, shame. I stand with the people on likely in demanding that there be harsher penalties for Imperial Metals and extractive corporations that contaminate our environments both of the lake, land and skies. Tax the richest corporations like imperial metals who have the worst environmental and social abuses, to fund a renewable and regenerative economy ! enough is enough ! when will these patterns of destruction, abuse and greed end ? Governments are there to support the majority of the people, to be the voice of the majority in the face of the oppressive plutocratic classes. Reign in the capital from these environmental criminals and support a real clean up and real lasting community development initiatives of local agriculture and energy production.						
107	21-Dec-16	Unknown			I am writing to you as a Canadian citizen, disappointed and somewhat discouraged by recent actions of the Canadian government in regards to the protection of our beautiful earth and essential waters. Whilst I feel that voting for a particular candidate in an election is a waste if time, perhaps writing heartfelt communications to real people might be more fruitful. I am hoping that the importance of a human beings words can reach the hearts of those reading it, more so than a check mark on a ballot. It's time for us humans to step into our role of protecting our home, the health of Mother Earth is essential to our survival and the health of our water is paramount to life. Mining disasters such as the one at mount polley should be clear indicators that we are on the wrong path and governments should use this information to steer our people towards a better way of living. It is time for governments to focus on their job of protecting the people and their homes. It is time to reduce our mining capacity and seek alternative ways of living. Mount polley MUST be permanently closed and heavily fined for the damage caused. It must not operate again and it must be forced to upgrade all of its existing mines to be safe. It must also be stopped from building any more mines as it can not be trusted. I hope you can assist in taking the future in the right direction.					
108	21-Dec-16	Cranbrook, BC		Please accept this letter as my sanding with the community of Likely, BC in order that they receive environmental protection from mining operations - specifically the Mt. Polley Mine operations.It appears that our government has forgotten that the Ministry of Environment is titled that for a reason - to protect our environment, and not allow our water sources to be polluted and continuously contaminated by mining and other industrial activities that jeopardize the very element required for life. This was once a pristine, glacier-fed lake, home of salmon and infinite life that has been abused by the worst mine spill in BC history.						

109	21-Dec-16	150 Mile House, BC	____________ of 150 Mile House, BC, is saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. My Family has a cottage on Quesnel Lake for 30 years and I find the discharge in Quesnel Lake disgusting and an affront to my enjoyment of this beautiful lake. I can not fish Quesnel lake, as I do not trust the health of the fish When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history". Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? When Imperial Metals first proposed this mine they should have posted a 500 million dollar bond for a Water Treatment Plant to be in operation during and after the mine closed. It is well known that fact that Mount Polley will need a water treatment plant for the next 1000 years. This water treatment plant will need to be operational 24/7. Year after year for 1000 years! You are leaving our children to pay for this outrage. At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contain(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan". MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, which the Concerned Citizens of Quesnel Lake demand. It is widely known that MPMC was warned many times about the water levels in their Tailings Storage Facility (TSF). Despite this and other evidence, MPMC was found not criminally responsible for the tailings dam failure. Regardless of any legal ruling, those of us who rely on the lake as primary or recreational residences know where the fault lies and have yet to see MPMC be held responsible for their actions. We will not stand by as they attempt to undermine the very environmental standards they pledged to uphold nearly 20 years ago and we will not accept regressive policies that threaten the Quesnel Lake watershed. ◻							
110	21-Dec-16	Quesnel Lake, BC	We are writing to voice our grave concerns about Mount Polley's proposed and current permit to discharge into Quesnel Lake. We have a home on Quesnel Lake. My husband spent his childhood years in Likely on a pristine lake and we have chosen to move back to that pristine lake. When we built our most recent home in 2012 there were very strict regulations and rules that our septic system had to meet and be permitted for. We find it incomprehensible that the government issued a permit that allows Mount Polley to discharge all kinds of crap into the lake. This discharge has caused problems and has the potential to cause more problems for one of the most beautiful lakes in BC. This has affected the habitat and biodiversity of the lake, as well as residents and local businesses in the area. We strongly oppose any plan to discharge any "effluent" into Quesnel Lake. There are other options that are available and need to be further investigated. It seems the primary deciding factor for Mount Polley's permit application is the cost of the options of the discharge plan and not the impacts on the environment or the residents of Quesnel Lake. We feel it is the job of the Minister of Environment, your job, to protect our environment from industry and industrial waste. Quesnel Lake was a pristine lake and to permit any discharge at depth or not, is wrong. Please give the lake a chance to try to repair itself and say no to any discharge permit into Quesnel Lake.							
111	22-Dec-16	Williams Lake, BC								Dear Sir, Regarding the application by Imperial Metals Corp. and Mt. Polley Mines to discharge effluent into Quesnel Lake, the members of the local chapter of the Council of Canadians wish to register their opposition to any addition of mine effluent into the lake. This previously pure fjord lake is now seriously polluted with heavy metal tailings from the breach of their tailings facility two and one half years ago. Any further dumping of effluent, treated or untreated, into this body of water, is unacceptable to us. I would quote from a memorandum from Imperial Metals Corp. dated October 13th. 1989 states that "the nature of the ore-bearing rock at Mt. Polley is such that it can be processed using a standard flotation mill operating within a closed, zero discharge system. ZERO DISCHARGE ALSO APPLIES TO THE TAILINGS SUPERNATENT, WHICH WILL BE RE-CIRCULATED. This letter was sent to the four chiefs of the Shuswap territory that would be affected by this mine, in response to a letter that they had sent to then-Premier Bill Van Der Zalm expressing their concerns about possible environmental impacts of the proposed Mt. Polley Mine. Their concerns proved to be very real and were vindicated by the disastrous breach of August 4th 2014. Any discharge of surface water or supernatant would be in direct contradiction of the promises/assurances given by Imperial Metals to these chiefs and their bands. Related to this issue, the placement of the tailings pond or facility should have been of utmost priority when the mine was first proposed, because the main priority in planning and design should have been to protect Quesnel Lake from any possibility of contamination from mine wastes. This lake was a national treasure, with the purest water found anywhere in North America. The pollution of the west arm of this lake with toxic heavy metals was a true disaster. For Imperial Metals to continue their operation without an investigation, fines, or penalties, is unbelievable, and to add further effluent to this lake is like adding insult to injury. The tailings facility for mine wastes should have been located on the other side of Mt. Polley, as far as possible from Quesnel Lake, with virtually no chance that any of the wastes would ever get near this body of water. The exact opposite was the case, with the tailings facility in a direct line with the lake, where any breach would have been disastrous. That Imperial Metals would not have spent the money to reinforce their dam, when it became known to them that there was the possibility of a breach, is inexcusable. We vehemently oppose any further pollution of this lake, and request that the company do everything possible to return Quesnel Lake to it's previous pristine state. First Nations people and many residents of this interior rainforest are very angry and bitter about what has happened. And the bottom line for Imperial Metals is money, as always. What has happened is shameful. ◻
112	22-Dec-16	New Denver, BC							The Valhalla Wilderness Society is categorically opposed to allowing Mount Polley Mining Corporation (MPMC) to discharge further toxic mine wastewater into receiving surface waters of Hazeltine Creek and Quesnel Lake, and surface and groundwater of Bootjack Lake. These water bodies are part of the Fraser River watershed, the major fishery river in British Columbia and, as such, are all critically important to the environmental, cultural, and economic future of millions of British Columbians, as well as all the life—plant and animal—that the watershed supports. Currently, MPMC has a temporary permit to discharge toxic mine wastewater into the receiving environment. Under "normal" circumstances, this would be a contravention of BC's Environmental Management Act. We demand that the BC Ministry of Environment reject MPMC's application to amend their permit under this Act (permit #11678). In support of its initial mine permits, MPMC said they would not discharge any mine effluent into the receiving environment. However, when MPMC's tailings dam failed on August 4, 2014, resulting in the "worst disaster in Canadian mining history", over 20 million cubic metres of contaminated mine waste spewed into Hazeltine Creek and downstream into Quesnel Lake. To add insult to that injury, the company is now seeking permission to dump up to 10,000,000m3 per year of toxic mine waste into Quesnel Lake. If your ministry approves this permit amendment application, not only will it set a dangerous precedent for all mining and other industrial activities in the province, it signals the government's willingness to put this—and all watersheds in BC—in jeopardy. Clean water is a basic human right. We do not believe the BC government should allow any additional pollution to be dumped into this watershed. At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks has described as "...contain[ing] important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan". Quesnel Lake is unique, both in North America (3rd deepest) and in the world (deepest fjord lake). It is home to the largest sport fishery in the Cariboo region, with record-sized rainbow trout and many other important salmonids, including sockeye and chinook salmon, and bull trout. In its spectacular ecosystems, one can find black and grizzly bears, moose, and BC's endangered mountain caribou. Unlogged pristine regions form part of the magnificent Interior Rainforest such that our Society has been working with First Nations and local residents on a large conservancy proposal for the north and east arm areas of Quesnel Lake. The discharge of toxic mine wastewater, particularly over time and in the face of climate change, raises the spectre of accumulating toxicity that has potential to damage this increasingly rare ecosystem. A Ministry of Environment Inspection Record signed on 17 November 2016 (of an inspection carried out on 12 August 2016), indicates, among other things, that MPMC's wastewater is out of compliance on Total Suspended Solids (TSS) and copper. High TSS is clearly harmful to fish. Copper concentration is detrimental to most fish species, as well as to algae, higher plants, invertebrates, amphibians, some avian species, and mammals, particularly some ungulates (notably sheep). To allow this contamination to continue, and ultimately to accumulate over time, is clearly harmful to the biota of this watershed. MPMC is attempting to pass off the least costly long-term water management plan as being the most environmentally responsible and socially acceptable solution. It is neither. With over $500 million of net positive cash flow at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, and which we believe the BC government has a duty to require, and one that we, along with other organisations, including the First Nations Women Advocating Responsible Mining (FNWARM), the Concerned Citizens of Quesnel Lake (CCQL), and other agencies demand. It is widely known that MPMC was warned many times about the water levels in their Tailings Storage Facility (TSF). Despite this and other evidence, MPMC was found not criminally responsible for the tailings dam failure. Regardless of any legal ruling, those of us who rely on the lake as primary or recreational residences, including as our source of drinking water, know where the fault lies and have yet to see MPMC be held responsible for their actions. We will not stand by as the company attempts to undermine the very environmental standards they pledged to uphold nearly 20 years ago and we will not accept regressive policies that threaten the Quesnel Lake watershed. One of the most egregious aspects of this situation is for the BC Ministry of Environment and Imperial Metals to expect civil society to review MPMC's Technical Assessment Report (TAR) of 1,279 pages (220 megabytes) in order to comment on the company's application for an amended water management permit. The bottom line in this issue is, as so eloquently stated by the Concerned Citizens of Quesnel Lake, "Contaminated water diluted with clean water is still contaminated." Please, do not approve MPMC's permit application to further pollute the Quesnel Lake watershed.	
113	22-Dec-16	Washington, DC							We are writing to express our opposition to Imperial Metal's plan to permanently discharge mine effluent into Quesnel Lake. Disposing mine waste into water bodies is not an acceptable solution to the problems the company is handling with its Mount Polley mine. It is an irresponsible practice that should have been phased out worldwide a long time ago.Mining companies have a history of dumping mine waste into Canadian lakes, with disastrous consequences: from contamination of fish in Yew Lake in Saskatchewan to outright destruction of water bodies, including a pond and tributary by Teck's Duck Pond mine in Newfoundland and Labrador. Quesnel Lake, described by Premier Christie Clarke as a "pristine resource for everybody," should not be a permanent dumping ground for mine waste. Instead, we support the solutions proposed by MiningWatch Canada: 1. Applying a 'non-degradational' principle to any discharge of effluent into fish-bearing waters, meaning that the discharged water quality needs to be 'as good' or 'better' than the receiving waters. This requires passive (much preferably) or active treatment technologies or practices that can be sustained effectively in perpetuity. 2. A clear commitment & plan for a long-term, dry closure of the Mount Polley Mine's tailings site, as well as strong financial securities and long-term institutional monitoring systems. 3. Restoring & strengthening Canadian environmental laws, including the Fisheries Act, prior to emitting any new long-term 'permanent' water discharge permit for mine effluent in BC or elsewhere in Canada (see here: http://fisheriesact.ca/take-action). 4. Consent of locally affected communities and Indigenous peoples prior to permitting mine effluent discharge into waters that sustain their livelihoods, culture, economy, quality of life, and more. 5. Proper restoration and remedies for the ecosystems and communities that were, and still are, affected by the 2014 massive mine spill. The current MPMC application does not address these conditions.	
114	22-Dec-16	Yale, BC								This letter is to address our concerns and opposition to allow the discharge of waste water into the Quesnel watershed from the Mount Polley Mine. Our company has been offering tours on the Fraser River for over 30 years. In that time we have been fortunate to meet many people in the communities along this amazing river system. The government of British Columbia must ensure only the most stringent requirements for industry to comply with when it concerns one of the largest salmon spawning rivers in the world. There are many people in this province that know and understand the importance of the Fraser watershed however there are many people that don't know. We can only hope that the people that are in the position to make decisions know the importance and make the right decisions that will make their grandchildren proud. The Fraser system has many demands on it and we need to decrease them not increase.
115	22-Dec-16	Williams Lake, BC					I am writing to you today to express my deep concern and opposition to the current Mount Polley Mine Corporation's Long Term Water Management Plan.I would like to raise items of concern regarding this comment period itself. The only method for receiving comments from the public was to submit an e-mail to you with the subject line "comments on technical assessment report" by December 23, 2016. This limits comments to technical issues only, ignoring the myriad of other concerns not addressed in their current application. Also, this process limits comments to people with access to a computer, Internet, and the technical knowledge of how to use them to submit comments. Your method for receiving public comments excludes many First Nation and public citizen comments in this region and beyond. In direct response to this limited comment process, First Nations Women Advocating Responsible Mining (FNWARM), a BC-based coalition, along with with members from both Xat'sull First Nation and Williams Lake Indian Band, organized a door-to-door petition to raise awareness about the issues at hand (including many outstanding and unaddressed issues at the mine), and to gather signatures in person regarding this current mine application. You will find attached 204 signatures to the petition that reads: To Whom It May Concern: I do not support Mount Polley Mine in its application to discharge mine wastewater to Quesnel Lake and Bootjack Lake as proposed in their current Long Term Water Management Plan. This plan depends on partial water treatment onsite, and extensive dilution by clean water sources to meet BC Water Quality Guidelines. I support FULL WATER TREATMENT for all mine water leaving the Mount Polley Mine.Including my signature below, I am submitting 205 comments, (nearly all First Nation citizens) via this letter, against the current MPMC long-term water management plan. In addition to our concerns regarding this plan and comment period, and the 205 signatures calling for no dilution as part of the plan, we also received copies numerous letters and emails that were sent to you in opposition to the current MPMC application in question, including excellent technical report submitted by the highly esteemed Dr. Dave Chambers, of the Center for Science in Public Participation. I am sure you have already received Dr. Chamber's assessment, but I include it here with our submission for your reference. Further outstanding issues include, but are not limited to: • NO CONSENT granted from First Nations to reinstate Mount Polley Mine operations • No plan for removing the tailings from Polley Lake, Quesnel Lake, and the forest on either side of Hazeltine Creek • No financial assurance for monies to address full remediation and future disasters • No proven water management plan for closure (only a promise to try to figure it out) • Outstanding and ongoing criminal investigation into the Mount Polley Mine disaster • And, for your information, the Technical Assessment Report was not available on the Ministry of Environment website (broken link). FNWARM will continue to reach out to the other concerned groups, including the public and First Nations within the Fraser River watershed to raise awareness about the many unresolved issues at Mount Polley Mine, and will publicly track the issues to promote transparency, awareness and improved public engagement in these critical issues. The post-disaster precedents being made with each decision at Mount Polley Mine are critical and deserve critical attention. I look forward to hearing back from you about this comment period as part of the consultation process, and also how you plan to address the concerns raised. ◻			
116	23-Dec-16	Williams Lake, BC					Thank you for the opportunity to comment on the Environmental Management Act permit amendment application (permit #11678) from Mount Polley Mining Corporation, to allow for discharge of tailings effluent into Quesnel Lake via pipeline. The Tsilhqot'in National Government has previously objected to the discharge of tailings effluent into Quesnel Lake, including the "temporary" permit amendment. You can find additional comments in our letter dated September 18, 2015. Many of our comments remain unchanged. The Tsilhqot'in community of ?Esdilagh relies heavily on Quesnel salmon stocks for their food, social and ceremonial harvesting ("FSC"). These are recognized Aboriginal rights subject to an AFS agreement with the Department of Fisheries and Oceans. The decline of this stock in recent years has had a significant negative impact on ?Esdilagh members' FSC fishery, and subsequently, their Aboriginal fishing rights. In addition, due to the unknown nature of the effects of the Mount Polley spill and potential liability, TNG was forced to cancel its commercial fishery in 2014 resulting in significant financial losses. Many Tsilhqot'in did not fish for food out of fear for contamination. None of these impacts have yet to be addressed by either the Provincial government or the Mount Polley Mining Corporation. With regards to the current permit amendment application, and the technical assessment report, TNG advocates that the principle of non-degradation should be strictly enforced for review of the application, and to determine what constitutes "best available technology". TNG opposes the use of an "initial dilution zone" which ultimately means that Mount Polley would be permitted to degrade the water quality in Quesnel Lake to some degree.We submit that the discharge should only be permitted if and when the discharge water quality meets or exceeds the water quality of receiving waters. We understand that through this permit application, Mount Polley is applying to significantly weaken the permit limits, enabling the company to discharge significantly increased levels of heavy metals. For example, arsenic is proposed to have a permit limit that is 8 times the current permit limit. For copper, 3 times the current permit limit; for iron, 9 times the current permit limit; for zinc, 7 times the current permit limit, and for sulphate, 2 times the current permit limit. Given the already enormous impacts that have occurred from the tailings disaster, and the uncertainty relating to long-term impacts to the Quesnel Lake ecosystem, there is absolutely no reason to not require the company to treat its effluent using more sophisticated technologies to achieve better water quality outcomes. In many cases this does not mean uncommon or unwieldy technology – lime treatment could be used to help lower copper levels, for example. The bottom line is that Quesnel Lake is an important salmon rearing habitat and it should be treated as such. MOE should demand better water treatment technologies if any effluent discharge is to occur.			
117	23-Dec-16	Quesnel Lake, BC	We are completely opposed to further discharge of any toxic mine waste water in Quesnel Lake by Mount Polley Mine. We strongly urge the Ministry of Environment to be protective of Quesnel Lake and give this once pure water a chance to heal an NOT grant Mount Polley Mine their proposed amendment to permit 11678. Quesnel lake is green again for the third consecutive winter since the Breach. We have lived on Quesnel Lake, just one km South of Cedar Point Park for over 50 years and have never witnessed this ugly green colour prior to the Mount Polley Tailing Pond Breach. We, as well as ALL our neighbours are disgusted that this proposal is even being considered by our Government.Please show regard for our sensitive Lake and do not approve this amendment to permit 11678. ◻							
118	23-Dec-16	Unknown				I am writing to express my opposition to the current plan for wastewater discharge at the site of the Mt. Polley tailings. The deficiencies in the plan are well known and have been brought up in community meetings with local First Nations who depend on healthy waterways for their subsistence. Rather than relying—without scientific proof that it is adequate—on natural dilution and filtration of contaminants through dispersal in Quesnel Lake, wastewater should be adequately treated to meet water quality standards before it is released into the lake. Furthermore, until the current water quality problems are addressed, the Mt. Polley mine shoud not be given further permits to continue operations that will produce more wastewater. Abandoned mines already cost Canadian taxpayers hundreds of millions of dollars; I am deeply concerned that Mt. Polley may join the ranks of such abandoned mines, and we will be paying for it, both in cash and in loss of fish stocks, clean water, and other environmental goods, for decades to come.				
119	23-Dec-16	Victoria, BC		Arrowsmith Gold Inc. is a consultancy firm that provides health and safety services to: • communities in British Columbia, Canada that are associated with the resource development sector; • international financial institutions that lend money to major extractive sector projects around the globe; • private sector clients owning and operating extractive sector projects in developing nations; and • local, regional and national governmental institutions around identifying and managing risks associated with private sector and nationally led large-scale projects. We are currently conducting a health impact assessment associated with the Mount Polley Tailings Dam breach on behalf of the First Nations Health Authority as well as a Cultural Impact Assessment on behalf of the Williams Lake Indian Band. Through the Technical Assessment Report (TAR) the Mount Polley Mining Company (MPMC) is requesting the Ministry of Environment to increase the discharge limits for Environmental Management Act Permit 11678 that was modified on September 19, 2016, to in part approve the use of Quesnel Lake for the dilution of mine effluent. The September permit also increased discharge limits for copper, molybdenum, selenium and sulfate. The criteria for cadmium was also eliminated. I am in this email providing an email link to documented evidence of significant and ongoing health risks for vulnerable Indigenous populations associated with this tailings dam breach. http://www.fnha.ca/about/news-and-events/news/mount-polley-health-impact-assessment. In our work, we highlight evidence of: • Emotional Stress shared among 22 First Nations. Increased levels of emotional stress are linked to the severity of the event itself, how impacts and risks were and are presently perceived and the amount of uncertainty and trust in the information provided following the breach. • Direct impacts to traditional territory of three First Nations – Xat'sull, T'exelcemc and Lhatko Dene First Nation. Impacts were immediate and ongoing. Access has been lost to sacred land and territory, traditional food sources and medicine. • A decrease in individual fishing practice was reported by almost all communities. This has resulted in changes to diet composition, physical activity and cultural practices. • Impacts to commercial fisheries were reported in six communities. This has resulted in reduced economic income and employment opportunities for community members. The assessment to the impacts on people associated with this event is still ongoing and it is generally standard international best practice to allow for the completion of these works prior to consideration and approval of such a permit. In this work, I have shockingly and unfortunately observed cultures on the brink of extinction. There is no doubt that by allowing this mine to operate in sub-standard industry conditions will continue to have a devastating impact on area First Nation men, women, children and elders. We ask the Ministry of Environment to consider the continued health impacts to people associated with approval of such a permit.						
120	23-Dec-16	Juneau, Alaska							Salmon Beyond Borders is a campaign driven by sport and commercial fishermen, community leaders, tourism and recreation business owners and concerned citizens, in collaboration with Tribes and First Nations, united across the Alaska and British Columbia border to defend and sustain our transboundary rivers, jobs and way of life. In regards to the Mount Polley Technical Assessment Report, Salmon Beyond Borders endorses the referenced and attached submission by Dr. David Chambers of CSP2, commissioned by Northern Confluence Initiative (in summary): Through the Technical Assessment Report (TAR) the Mount Polley Mining Company (MPMC) is asking the Ministry of Environment to significantly increase the discharge limits for Environmental Management Act Permit 11678 that was modified on September 19, 2016, to in part authorize the use of Quesnel Lake for dilution of mine effluent. The September permit also increased the discharge limits for copper, molybdenum, selenium and sulfate, and the criteria for cadmium eliminated. Quesnel Lake water is cleaner that in Hazeltine Creek, even before the accident. The Initial Dilution Zone (IDZ) and lack of additional would allow MPMC to increase the amount of discharge of metals, over the amount allowed under the increased limits of the September 16, 2016 permit, by 724% for arsenic, 264% for chromium, 175% for copper, 809% for iron, 611% for zinc, 217% for ammonia, 251% for nitrate, and 54% for sulfate (270% over the June 7, 2013 permit). Treatment of the mine effluent to meet water quality standards is easily technologically achievable, and arguably should be required to minimize further damage to Quesnel Lake. Salmon Beyond Borders respectfully asks that the request by MPMC to allow an IDZ in Quesnel Lake in association with increased mine effluent discharge be denied.	
121	23-Dec-16	Quesnel Lake, BC	I am writing this letter in opposition against MPMC having the ability to dump waste into quesnel lake. This saddened me deeply to even have to write such a thing. This is no way to operate a mine ever. There were issues on the mine site regarding waste water and dam integrity from its inception. Yet these problems were pushed aside while the mine operated seemingly unchecked. MPMC had even tabled ideas regarding very expensive waste water treatment seeking the right to dump, let me be absolutely clear, mining waste into the quesnelle lake water shed. Not having been givin the permissions to dump mine waste into the quesnelle river watershed, pushed on. I live down stream across from Hazeltine and can see it easily. There are days here approaching this christmas, years later, where water visibility has been as low as three feet. A green turbidity. Words that had never been previously associated with quesnelle lake. Yet the mine poullutes more. With pipes under groud dumping at 40ft below surface claiming all is well and good. I was born and raised on this lake, drank the water, ate the fish, marveled in its pristine beauty. This has been taken from me. Although the lake is still here, full of mining debris, its like looking onto a grave of a dear loved one. My mind has been polluted. For I feel pain and saddness looking out onto what used to be one of my best friends. Even now at night the yard is bright with light pollution from the mine. The continuous moan, rumble, and other noltibly loud sounds disturb endlessly into the night. I remember a time on this lake when night was dark as can be and quiet enough one could hear a sparrows fart. No one is sure of the longterm effects of this disaster here but to perpetually poullute indefinitely is not the way to protect and co habit our habitat. This is not just the environment this is our home. MPMC has just crapped on the front porch. And without apology gave themselves the right to continue pooping. This is not the kind of house guests id entertain. Please put a stop to the continual degredation of our lake. Its seen enough.							
122	23-Dec-16	BC, Canada		Please oversee the protection and clean up of our affected fresh water from the destruction of mt. Polley , red criss mines. these things we ask of you we are paying you to do.						
123	23-Dec-16	Juneau, Alaska							The membership of the South East Alaska Conservation Council (SEACC) includes commercial fishermen, Alaska Natives, small-scale timber operators and value added wood product manufacturers, tourism and recreation business owners, hunters and guides, and Alaskans from many other walks of life that make up the many communities in SE Alaska. These communities depend on the maintenance and restoration of water quality in fresh and marine waters and the abundant aquatic life its supports. Many of these waters originate in British Columbia. SEACC has an interest and duty to its membership to see that British Columbia utilizes the best science and technology available to protect all waters. GENERAL COMMENTS: Scope of analysis is narrow and arbitrary. In the Technical Assessment Report (TAR) the Mount Polley Mining Company (MPMC) is asking the Ministry of Environment to significantly increase the discharge limits for Environmental Management Act (EMA) Permit 11678 that was modified after a catastrophic failure of the tailings management facility significantly altered the receiving environment. The TAR only considers conditions post failure. There is no consideration of conditions prior to the tailings facility failure. This is unacceptable. Basing discharge quality on post-failure conditions is adding insult to injury. The goals of the various rehabilitation projects for Hazeltine Creek and Quesnel Lake is to restore these water bodies to pre-failure conditions. Using post-failure data creates a sliding baseline and assumes a static, non-improving environment contrary to the goal of rehabilitation efforts. SEACC's recommendation is to base effluent quality concentrations on the basis of restoring conditions in the receiving waters to a pre-failure levels rather than just maintaining post-failure levels regardless of the water quality criteria. MPMC should not benefit from the destruction caused by the failure of its tailings impoundment structure. A 4-yearlong "Long Term Water Management Plan is inadequate to account for the described timelines of up to 100 years' post-closure and the possibility of active water management on site for perpetuity. The Short-term Water Management Plan was granted in November of 2015 and expires in November of 2017, a duration of two years. The key objectives of the 29 November EMA Permit 11678 amendment were to manage contact water that had accumulated on site since the TMF foundation failure, while allowing time to develop a Long-Term Water Management Plan. It was recognized by the MPMC, the MoE, and the MEM that the short-term water management plan was developed within the scope of the short term water quality objectives and did not reflect the preferred long term treatment and discharge options. See TAR Section 1.1 at 4. One condition of the 29 November EMA permit was to submit a Long-Term Water Management Plan for the mine that incorporates monitoring to provide details of the discharge quantity and quality primarily for the operational phase of the mine. Four years is based on the four-year mine plan detailed in the Return to Full Operations Permit Application (MPMC 2015a). See TAR 2.1 at 2. Closure and post-closure life-of-mine periods are also considered as part of the Long Term Water Management Plan. See TAR Executive Summary at ii. Post-Closure is considered to start in 2020, only 4 years into the Long Term Water Management Plan. However Imperial Metals' website currently describes the operational life-of-mine period extending until the year 2025.1 The TAR also notes that closure may be postponed if the 4-year mine plan is extended. See Section 2.1.3 at 8. Post-closure conceptually runs until the year 2100. See TAR 2.1 at 3. A four year "Long-term Water Management Plan" is inadequate to account for possible changes in the conditions of either the effluent due to adjustment in production rates or the environment over a time frame of 83 years. Restricting the Long-term Plan to 4 years and the baseline conditions to only those found post-failure ignores the dynamic nature of the receiving environment and the minerals market itself. Incrementally planning in 4 year periods compartments scientific review and becomes self-sustaining, leading to new and illusory boundaries and subtly framing the receiving environment as a collection of conditions disconnected over time. Repeatedly evaluating the conditions and planning only for short periods increases the potential danger of not meeting constantly moving protective thresholds. It also impedes the holistic understanding of the receiving environment and its relation to human health. SEACC recommends that the TAR assess and plan for a wide range of reasonable foreseeable conditions in both the receiving environment and the mine plan that are likely to occur between 2017 and 2100. SECTION SPECIFIC COMMENTS 3.4 Surface Water Quality. As noted above, existing conditions since the tailings impoundment failure are used to form the baseline in Hazelton Creek and Quesnel Lake instead of utilizing available baseline data prior to the failure. This is an example of a sliding baseline where mine activities have altered the receiving environment that then 1 See "Quick Facts" available at: https://www.imperialmetals.com/our-operations-and-projects/operations/mount-polley-mine/overview becomes a new baseline. There is nothing in the TAR that prevents this from happening again after the term of this proposed permit. As the loading in the receiving waters increases overtime, will this also become a new baseline? The TAR uses an arithmetic mean rather than the 85-99th percentile to define baseline conditions in the receiving waters because of the small data set available since the tailings impoundment failure. The choice of the arithmetic mean concentration as the appropriate measure for estimating conditions over the long term where extreme outliers in data results are moderated by large data sets and the data itself conforms closely to a bell-shaped curve. This is not appropriate for a small data set. SEACC recommends that the 95-99th percentile of pre-baseline data be used to determine the water quality goals in Quesnel Lake to account for uncertainty in the data, err on the side of precaution, and to assure the pre-failure conditions are restored. 5.2.1.2 Treatment Plant Operation at 113 The water treatment system installed at the mine has a maximum treatment capacity of 0.23M3/s. The proponent is seeking to increase the discharge by 10% to 0.33M3/s. As stated in the TAR, this increased discharge rate is only possible by operating the system in the passive mode where "coagulant/polymer is not added and mechanical mixing is not active." In this operating mode the treatment plant is essentially reduced to a slightly modified settling pond. The data backing up the performance of the treatment plant at these increased volumes is based on an undefined time frame "Between July, 2016 and August, 20162, while operating in the passive treatment mode, the average effluent discharge rate is 0.28M3/s (approximately 93% of the maximum authorized discharge rate) and the Springer Pit water level was lowered by 8.5 meters from its peak elevation." See 5.2.1.1 at 90. The operational efficiency of the water treatment plant at the proposed flow rate for the discharge to Quesnel Lake of 0.33m3/s is unproven. Table 5-5 (at 101) lists the estimated annual discharge of mine water during closure and post-closure for all years listed (2025-2050). This table demonstrates that even considering only the projected mean rate of flow, the design capacity of the treatment system will be exceeded in every year. SEACC recommends that the quantity and flow rate effluent discharge be limited to 85% of the design capacity of the water treatment plant to account for overflow conditions, uncertainty in effluent quality and plant performance. If this volume is insufficient to handle the volume of water necessary to maintain the water balance, SEACC recommends 2 "Between July, 2016 and August, 2016" is an undefined time frame. It could be anywhere from July 1 to August 31 (62 days) or the smallest increment of time measureable on the standard clock in Boulder, Colorado when July 31 becomes August 1, 2016 at midnight. Either way, it is insufficient to provide reliable data on a system that could have to operate for 100 years. that MPMC employ one of the many commonly available treatment technologies that would produce an improved effluent quality.	
124	23-Dec-16	BC						We are writing concerning Mount Polley Mining Corporation (MPMC) and its application for an amendment to its water discharge permit into Quesnel Lake. The August 2014 Tailings Storage Facility (TSF) breech at Mount Polley mine and the resulting 25 million cubic meters of tailings and debris spilling into Quesnel Lake has shown how much this government has failed the public and the mining and exploration industries in BC. Government oversight must provide confidence for the public, industry and investors. The Mount Polley disaster shook the confidence of each of those groups. It is crucial that going forward, that the Province addresses the water concerns in Quesnel Lake, and not add to the lake s compromised water quality. The plan must consider cumulative impacts, including those from the initial disaster and any new water entering the lake. Since the long term effects of potential metal contamination, turbidity and nutrients released in the TSF breech are not known, we must ensure the water released from the TSF does not contribute to or compound the long term health of Quesnel Lake and ultimately the Fraser River system; anything less may exacerbate the problems begun by the initial catastrophic breech. Last year MPMC requested and received a (temporary) treated water discharge permit for levels the ministry knew were 25% higher than the capacity of the water treatment unit. The excess untreated water went into Hazeltine Creek and Quesnel Lake. Permit 11678 -2- December 23, 2016 The new permit application would allow for water quality testing 100 meters from the pipe releasing tailings water into Quesnel Lake at depth. This Initial Dilution Zone will allow the tailings water to meet BC Water Quality Guidelines when tested 100 meters away from the end of the pipe. Given the uncertainty about the cumulative impacts of the initial spill, and the impacts of new tailings water entering the lake, it seems far more advisable to require the water coming from the Mount Polley TSF to meet BC Water Quality Guidelines (BCWQG) before it enters the lake, not 100 meters after. There surely must be better solutions for consideration than the proposed 100 meter Initial Dilution Zone, given that the stated intention of the current provincial government after the Mt Polley disaster is for the Best Available Technology (BAT) to be the required minimum standard. We urge the government to engage industry and the public alike, consider a long term plan for recovery, and ensure that all water entering the lake meets BC Water Quality Guidelines. In so doing, the government will provide assurance to the public that there is a recovery plan in place, it will provide industry with stability, and investors with confidence. Any long term water discharge permit should enable a recovery plan and the consideration of all who depend upon the clean water in Quesnel Lake and the Fraser River system, from people to salmon. For the mining and exploration sectors to thrive in BC, the Province must ensure that the public can trust in government oversight on the environmental risks involved. This means enforceable regulations are required and must be maintained with the best technology. Our mining and exploration sectors depend upon this, fish and wildlife depends on this and the people of BC demand this.		
125	23-Dec-16	Quesnel Lake, BC	I am ABSOLUTELY OPPOSED to the further discharge of your contaminated mine waste effluent into Quesnel Lake. For the past seventy four years I and my family have enjoyed the wonders of the LAKE and its environs. However this ALL CHANGED with the disastrous MPMC's tailings dam failure on Aug. 4, 2014.This failure has been amplified by the lack of credible action with regard to the monstrous pollution deposited over large segments of the lake bottom and the CONTINUING DUMPING OF MINE EFFLUENT INTO THE LAKE! I am profoundly insulted by MPMC's dumping of their GARBAGE into my front yard. This is SIMPLY WRONG and I strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. I quote: "When applying for their initial operating permits in the 1990's, Mount Polly Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history".1 Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Queerness Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line?" Past performance does NOT lead one to conclude that this massive (over 2.5 BILLION GALLONS) discharge of waste will NOT be compromised upwards; NOR that EQUIPMENT failures WILL NOT occur, as in the past, resulting in INCREASED DISCHARGES or EVEN HIGHER LEVELS OF CONTAMINENTS being discharged. It seems as though MPMC alway has an "excuse" for each of their failures, however a FAILURE IS NEVER EXCUSABLE AND QUESNEL LAKE MUST NOT BE THE VICTIM! QUESNEL LAKE MUST NOT, UNDER ANY CIRCUMSTANCE, BE THE RECEIVING BODY OF ANY WATER/FLUID DISCHARGE FROM MPMC. Rational used in presenting the conclusion of Quesnel Lake as the most viable option for discharging MPMC effluent is SERIOUSLY FLAWED and the OPTIONS ANALYSIS portrayed as the driver for this decision, open to multiple interpretation, DEPENDING ON HOW ONE MIGHT WANT TO MANIPULTE IT! Further: "We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contan(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan".2 MPMC is attempting to pass off the least costly long-term water management solution as being the most environmentally responsible and socially acceptable. With over $500 million of net positive cash flow3 at stake, MPMC has the resources available to implement a truly responsible long-term water management plan, which the Concerned Citizens of Quesnel Lake demand. " There is a RIGHT WAY to do things, and most rational people recognize the RIGHT FROM WRONG; there is much at stake here and our economy needs jobs but long after the MINE is depleted and the jobs have gone, QUESNEL LAKE WILL REMAIN.... IT HAS BEEN DRAMTICALLY COMPROMISED and to even consider that "solutions" currently being presented WILL NOT NEGATIVELY IMPACT what QUESNEL LAKE WOULD HAVE OTHERWISE BECOME INTO IT'S FUTURE is simply denying REALITY... this is not logical and must not happen. Past failures of MPMC's operations are simply their doing! I CAN NOT TOLERATE THE COMPROMISES THEY ARE PROPOSING ... THEIR SOLUTIONS MUST NO LONGER COMPROMISE THE LAKE AND ITS ENVIRONMENT. OVER FOUR SUPER TANKERS 600 feet long with a draft of 40 feet and carrying over 14 million gallons of mine waste effluent							
126	23-Dec-16	Quesnel Lake, BC	This is a picture of the beach at Quesnel Lake, December 18, 2016, above Cedar Point Park, five kilometres from Hazeltine Creek...Imperial Metals pollution dilution zone. Once crystal clear to depths of fifty feet in the bay above Cedar Point Park, is today murky with materials at five to ten feet. Kind of browny green. From shore to shore. Yes, not in my backyard, however not in anyones back yard! NIABY! A call to action.. We can do better than this I am certain. Mount Polley knows better. Shareholders, government, take the hit, just as the environment and people have. Our governments request to reply to the mines plan of action...directly dumping toxic mining waste with minimal treatment into the Quesnel Lake water shed appears futile. I'm not certain when we created laws or deregulated laws to find ourselves here. When did education and law become the exclusive tool of industry? Here in the Likely community hall, December 2013, Mount Polley proposed a $350 million water treatment facility...if the reverse osmosis treatment into Polley Lake failed to meet standards. Not only did it fail, but the lack of response to an abundance of water on the mountain blew out the sand castle called a gold and copper Tailings Storage Facility. Pretty basic. Pristine and virginal, never again. Restored, recovered and in balance, YES! Do it right! This sets a precedence for all that comes next! The opposite principal of dilution is accumulation.After twenty five years observing this company, my personal estimation is that Imperial Metals' and Mount Polley's track record falls ◻							

127	23-Dec-16	Likely, BC	As a concerned citizen, and resident of Likely, I am writing to register my comments on the technical assessment report (TAR) submitted by Mount Polley Mining Corporation (MPMC) regarding long-term water management. To begin, this TAR exemplifies the problems that industry and regulators have created within society, in which decision making removes socio-economic and socio-cultural values from permit amendment rules. The report displays a callous attitude toward the ways in which a mining disaster affects a community, a watershed and its animal life, and long-term effects of millions of tons of waste that are unsettled at the bottom of Quesnel Lake. A decision that favours adding more pollution to this sensitive and disturbed receiving environment would prove that 'environmental protection' has become 'environmental roulette'. Best Available Technology (BAT) would see MPMC treat its waste water on site, ensuring that any and all parameters are removed before entering the surrounding watershed, which does not belong to MPMC alone, but to all British Columbians and the resident creatures great and small. Veolia Water Technologies, which currently supplies the treatment system for suspended solids, etc. at MPMC, has ample technology to eliminate all the parameters that are in excess to water quality guidelines. I have no doubt that many comments have pointed out that Quesnel Lake water quality is and most certainly was, before breach, much higher than current standards. For MPMC to argue that dilution solves the issue of treating parameters in excess again shows the public that industry claims ownership on the environment around their already large and damaging footprint. One need not look far to discover how crucial conservation is becoming, in a world of finite resources and extreme pollution. British Columbia's freshwater resources are worth protecting, especially as drinking water scarcity arises locally and around the world. If each point source of pollution is considered alone, in a bubble, then the bigger picture of accumulation will never be seen. Stop MPMC from adding minimally-treated wastewater by insisting that their water is treated. Better yet, insist that MPMC choose another method for dealing with their mine affected water away from Quesnel Lake. Cost should not come into play for a mine that has done so much damage to the environment already. If there is to be no accountability for the breach, then at very least MPMC must be ordered to treat their water on-site to eliminate all excessive parameters. Let's not forget that nobody has claimed responsibility for the dam failure itself. Imperial Metals has accepted the responsibility in so much as the event happened at their mine. Imperial Metals is currently in court with both engineering firms that provided the Engineer of Record for the dam construction and management, namely Knight Piesold and AMEC. No single party has accepted the fault as theirs. It may be revealed at some later date that MPMC is responsible in some way for the failure of the dam. The issuance of mining and environmental permits under such circumstances would be a disservice to the populace and irresponsible by the regulator. The prolonged discharge of mine affected water into Quesnel Lake will likely confound further understanding of the effect of the tailings breach into the west arm of Quesnel Lake. The expected plume of discharge water will linger for months at unpredictable depths within the water column prior to mixing with the lake water. Water chemistry and localized sediment chemistry may be affected. Wind is one of the primary mechanism by which mixing occurs within the water column in Quesnel Lake, temperature being the other. Site specific wind data cannot have been collected to determine plume modeling because there are no weather stations on the shores of Quesnel Lake. Any modeling data must not be taken at face value and will likely come with a disclaimer stating such. David M. Chambers has submitted a very thorough commentary on the TAR via the Centre for Science in Public Participation. In this report, very clear and concise points are made highlighting the problems contained in MPMC TAR. What is most notable in Dr. Chamber's report are the arguments made against changing water quality standards to accommodate MPMC and Golder Assoc. view that the province's guidelines need to be adjusted. Should industry begin to dictate in such matters, I cannot imagine that the slippery slope to a free-for-all is a long way off. If we are to base these decisions on science alone (a view I feel limits the full picture of such a complex situation as a breach of this scale), then please heed the valuable study made by the Centre for Science in Public Participation. Whereas I feel MPMC likes to characterize dissent to any of their proposals as biased and reactive, I should like to point out that a great many TAR Commentary letters that I have had the good fortune to read are based on sound science, the precautionary principle and a deep love for the local environment which we all live and work in. Should the community's dissent be continuously overlooked, how can the province claim that consultation is meaningful? When decisions are consistently made in favour of industry, the citizenry begin to see and feel that backroom deals and political fundraising rule the day. If MPMC's breach disaster is to be treated with such a casual and inconsiderate plan as stated in the TAR, then it is up to our knowledgeable and educated regulators to seize the day and do the right thing for the environment and future generations.							
128	23-Dec-16	Nanaimo, BC		I, __________ am writing to say "NO" to the further discharge of any toxic mine waste water into Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. When applying for their initial operating permits in the 1990's, Mount Polley Mining Corporation (MPMC) specified that no effluent would be discharged into the receiving environment. That promise was unceremoniously broken when MPMC's tailings dam failed on August 4, 2014 resulting in the "worst disaster in Canadian mining history". Now, in what appears to be a massive bait-and-switch scheme, MPMC has the audacity to ask for permission to dump up to 10,000,000m3 per year of toxic mine waste into the once pristine waters of Quesnel Lake. Think about the kind of precedent this sets; are we the kind of society that lets corporate interests double down their mistakes for the sake of their bottom line? At the very minimum, any water discharged into Quesnel Lake should be fully treated to match the receiving water quality. We do not accept the proposal by MPMC that only measures effluent discharge against BC Water Quality Guidelines (BC WQG) after it has been diluted in a massive volume of water. Contaminated water diluted with clean water is still contaminated. Measuring water quality only outside a 100m Initial Dilution Zone is unacceptable for a body of water that BC Parks described as "...contain(ing) important habitat for fish species which support a host of species... streams, shores and wetlands of the park have been designated ... as critical habitat for salmon and bull trout as part of the Cariboo-Chilcotin Land Use Plan".						
129	23-Dec-16	Juneau, Alaska								The Alaska Trollers Association (ATA) is concerned about Mount Polley Mining Company's (MPMC) proposal to continue using Quesnel Lake as a mixing zone for mine effluent, in addition to the company's request to significantly increase its allowable discharge of contaminants. Our concerns relate to the health of the people and salmon that utilize the Fraser River watershed, and precedent with regard to water quality criteria that might be established for mining operations near fish bearing water bodies. Our association recently learned of this proposal, so has not had much time to review available materials. This is particularly true given my inability to download the large 170 MB Technical Assessment Report (TAR) at my current location in a rural community; there is no time to request a paper version. While I was able to get some information and key pages of the report from colleagues, the only source materials I could access online included a one page poster-style 'overview' of the report and a presentation, which, while probably helpful to those in the room with the presenter, was difficult to follow without reading the actual report. I mention this because many people in small Canadian communities might have similar issues gathering the information necessary to make meaningful comments. Given that Canada is currently reviewing its Environmental Assessment Process and aims to make it more transparent and inclusive, this seems relevant. I would suggest that substantial proposed permit alterations, such as this one, be subject to any new terms of reference the Canadian government establishes for the assessment process. Finally, we hope that British Columbia and Canada would discuss with the State of Alaska any modifications to water quality criteria that could ultimately impact salmon and wildlife resources in the transboundary area. The recent Memorandum of Understanding signed by the state and province could be a good vehicle to address such consultations. ATA represents a fleet of commercial hook and line salmon fishermen who fish for Chinook, coho, and chum salmon off the coast of Southeast Alaska. Many of our members also fish for other species that rear near local rivers. There are over 2,000 troll permits and about half are fished each year. The Fraser River, Nass, Skeena, and Transboundary watersheds all provide an important component of the season's harvest for fishermen along the Alaska and British Columbian coastline. The troll fleet is known for delivering fine quality salmon from pristine watersheds. Any degradation of water quality and the critical habitat that supports resident and anadromous fish populations has significant implications for sport, commercial, and subsistence fisheries, as well as markets for both Alaska and British Columbia seafood. Healthy salmon equates to thousands of jobs each year for families in West Coast fishing communities. ATA is an active participant in both state and federal resource management arenas and Pacific Salmon Treaty negotiations relative to the salmon shared by our nations. The US and Canada put a tremendous amount of money and energy into researching salmon stocks and managing fisheries, both domestically and under the auspices of the Pacific Salmon Commission. This commitment should be supported by sound habitat decisions on each side of the border, in order to maintain a sustainable environment for fish and wildlife and those who live, work, and recreate in the region. Maintenance of water quality is crucial to attaining that objective. The MPMC is requesting significant increases in the amount of contaminants it will be allowed to discharge; levels range from 2-9 times above the current permit, which was modified in September 2016, and many more times beyond levels allowed for some substances under MPMC's 2012 permit. It is not clear whether or not MPMC intends to treat all of its discharged water using the Best Available Technology (BAT). To liberalize this company's permit criteria, particularly given problems that have already occurred at this site as a result of operator error, seems inconceivable. We believe MPMC should be held to strict standards and uphold previous commitments to the area residents, and the government of Canada, regarding discharge sites and treatment. Our understanding is that the original mine plan did not include effluent discharge into Quesnel Lake and until quite recently MPMC used different water bodies, such as Hazelton Creek. Also, prior to the Mt. Polley breach, mine water was treated with BAT (e.g. reverse osmosis), as opposed to the settling process currently in use. While the need to utilize Quesnel Lake on a short term basis may have been justifiable for a period of time after the breach, it does not make sense as a long term plan, especially since there appear to be other available options. Mt. Polley unleashed 25 million cubic meters of water and tailings materials into the watershed that includes Quesnel Lake; it will probably be many years until we understand the full impact of that event. Since Quesnel Lake was not previously planned as a mixing zone, we question whether adequate baseline water quality studies were ever conducted and if the ministry can reliably estimate any impacts on the lake a result of the tailings dam breach. There is no question that the impact could have been significant and anecdotal information suggests residents have seen changes to the lake environment. What were the actual water quality values prior to the breach, what are they now and what will they be if more mining effluent is injected into the system? What is the impact of Hazeltine Creek and its degraded status, and are long term impacts anticipated as a result of that system recently exceeding its averages for suspended solids and mineral contaminants? Sampling has revealed that zooplankton is exhibiting higher than normal selenium levels, albeit for unknown reasons, but adding to the selenium load certainly won't help. How will the proposed discharge and reduced water quality criteria impact the invertebrate community and the rest of the food chain? Given the many outstanding questions regarding the impact of the Mount Polley breach and current efforts to rehabilitate the area, allowing permit modifications to lessen standards and establish Quesnel Lake as a permanent discharge site seems imprudent. We suggest that the ministry explore other options if MPMC is in need of additional discharge sites, and that the mine operator be required to treat all discharged water using BAT. The people of our region are connected by our reliance on and respect for the land and resources that we are fortunate enough to utilize. It is our hope that Alaska and British Columbia residents and governments will work together to ensure robust fish and wildlife resources for future generations. Hopefully you will accept our association's comments and consider ATA's perspective in the permit planning process. Thank you.
130	23-Dec-16	Unknown				__________ are are saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. We cannot believe that this dramatic action has been taken. It is unconscionable that this company should continue further its devastating actions to pollute the water in Quesnel Lake, not to mention the Fraser River's vulnerable species - despite their already catastrophic mistakes with waste management. This is not acceptable and we join the growing number of outraged citizens who cannot understand government permitting such assaults on our valuable resources. It's a real shame that industry cannot operate within some basic environmental parameters. Mount Polley should be required to use the most effective treatment process at the very minimum to filter and clean the water they wish to dispose of. There is no excuse for industry to pollute to this extent the rare clean water available for future generations. B				
131	23-Dec-16	Ottawa, ON							**Submission to BC Ministry of Environment: Mount Polley Mine Permit Application for Long Term Water Management Plan & Discharge into Quesnel Lake MiningWatch Canada ***See Letter** MiningWatch Canada is very concerned about Mount Polley Mining Corporation's (MPMC) application for a long-term permit to discharge not-fully treated mine waste water into Quesnel Lake.We recommend that the BC Ministry of Environment (MOE): 1. reject this permit application and require MPMC to propose alternative options to its long-term water management plan, including full treatment of mine effluent and possible discharge points into less sensitive waters; 2. require a 'dry closure' to reduce risks and ensure long-term stability, as recommended by the Independent Expert Panel report2 on the 2014 Mount Polley dam breach and spill; 3. strengthen current MPMC's financial securities to eliminate long-term public liability for site closure, clean-up, maintenance, and perpetual care;3 4. obtain clear support and consent from all of the locally affected communities, First Nations, and organizations for a proposed long-term water management and closure plan—including proper remedies for the people that were, and still are, affected by the 2014 mine spill. This submission focuses primarily on the rationale behind our Recommendation #1.	
132	27-Dec-16	Quesnel Lake, BC	It deeply saddens me that today, in 2016, we must protest to our governments in regards to keeping Quesnel Lake from further discharge of mining effluent from Mount Polley Mines. In August of 2014 one of the worst mining disasters in the country occurred due Mount Polley mines tailing pond breaching and dumping over 10 million cubic meters of mining effluent into our beautiful, pristine, Quesnel Lake. We were assured this was an accident and the government and Mt Polley would do everything they could to return our lake to it's previous state. Here we are two years later fighting this application to permit Mt Polley to use Quesnel Lake as their new tailings pond. HOW IS THIS POSSIBLE??? I also find it difficult to believe that we, the people, the mine and the government could not come to an environmentally, sustainably solution for everyone, the Lake, the jobs and the Mount Polley Mines. Instead, it seems like this application is just being shoved down our throats!! Quesnel Lake needs time to heal and return to its original pristine state, like promised in August of 2014 by Premier Christy Clark. I am not sure what the alternative resolution is, but I think we need to invest and explore in other options, such as a larger water treatment plant and perhaps discharge to Quesnel River. I can't help thinking that if this was a new mine seeking a water discharge permit, would this option even be considered? I have been a property owner on this beautiful Quesnel Lake since 1992. We purchased on this lake due to its natural beauty and crystal clear water. Our dream is to be able to pass our cabin onto our children and grandchildren. At this point, we are not so confident they will want it for this purpose. In closing we hope you give this permit careful consideration and come up with a solution that would be sustainable for all parties to co-exist harmoniously. PLEASE SAVE QUESNEL LAKE!							
133	30-Dec-16	Morehead Creek, BC	__________ is saying "NO" to the further discharge of any toxic mine waste water in Quesnel Lake and we strongly urge the Ministry of Environment to reject the proposed amendment to permit 11678. The 2014 spill was and remains the worst environmental mining disaster in Canadian history. Mount Polley mine tailings pond took 12 hours to pour into the depths of Quesnel Lake; one of the deepest fjord lakes in the world. Transforming the once six-foot-wide Hazeltine Creek bed to a 490-foot-wide fan of mud and limbless timber. Although the Mount Polley Mining Corporation, owned by Imperial Metals, has since spent an estimated $67 million ($51 million USD) on cleanup efforts to remediate Hazeltine Creek, none of the material—containing mercury, copper, arsenic, selenium, and other heavy metals—that made its way into Quesnel Lake has since been recovered. Quesnel Lake, IS a source of drinking water for the town of Likely, British Columbia, and home to an estimated quarter of the province's sockeye salmon. It is truly frustrating and disappointing that BC's Ministry of Environment thinks that "significant progress" has been made in the last year to mitigate and remediate the impacts of the spill. The province published progress reports in which it lists the containment of tailings, water treatment, and the protection of fish as "complete or suitably initiated." These statements couldn't be further from the truth and are blatant insults to those of us that are still struggling with the blowout of the disaster. Moreover it is this self-congratulatory attitude that is condemning Lake Quesnel's fate as a dumping ground for Mount Polley Mine, a corporations that will forever be notorious for causing the worst environmental mining disaster in Canadian history. If the proposed amendment to permit 11678 is approved it would seal the fate of Likely BC as toxic town, that is known only for its legacy of mining activities that have been undertaken with little concern for the environment.Mount Polley Mining Corporation has a track recorded of NOT obeying the regulations that protect both people and the environment from the potential adverse effects of mining. Prior to the tailings dam failure on August 4, 2014 Mount Polley Mining Corporation had pumped toxic tailing into the surrounding watershed multiple times, an act that violate the initial operating permits in the 1990's that specified NO effluent would be discharged into the receiving environment. It is clear Mount Polley Mining Corporation is a liability to the communities and environments health as they demonstrated pattern of willful violations resulting in irreparable damage to the environment and they cannot be trusted to uphold moral, ethical or legal standards of operation. I personally ________ call for an order to cease all operations by Mount Polley Mine Corporation as they are knowingly depositing of substances into waters frequented by fish. This is strictly prohibited by The Fisheries Act and therefore Mount Polley Mining Cooperation is in direct transgression with the law. The Fisheries Act has a very relevant purpose and seeks to conserve and protect Canada's fisheries resources, including fish habitat. The act establishes four overarching requirements and prohibitions: • Prohibits the deposit of substances into waters frequented by fish. • Prohibits the harmful alteration, disruption, or destruction of fish habitat. • Prohibits the killing of fish by means other than fishing. • Requires the provision of sufficient flows below obstructions for the descent and safety of fish. It is clear just by taking a single look at Hazleton Creek and Polley Lake that Mount Polley Mining Corporations operations have resulted in the harmful alteration, disruption, and destruction of fish habitat. And they should not receive authorization from Fisheries and Oceans Canada to continue mining. Mount Polley Mining Corporation poses "serious harm" and fit the respected definition of "death of fish or any permanent alteration to, or destruction of, fish habitat." I plead that they face the proper and justified punishment and cease all effluent discharge into Quesnel Lake. Moreover Mount Polley Mining Corporation is not using the best available technology as effluent is not being fully treated to match the receiving water quality, causing noticeable amounts of toxic chemicals to enter the lake and therefore the ecosystem and web of life. Evidence that Mount Polley Mining Corporation is and will continue to create an imminent danger to the health and safety of the public and will continue to create and cause significant, imminent environmental harm to land, air or water resources. Furthermore I write to express my continuing concerns about potential effects on water quality in the lakes and creeks that flow adjacent to the Mount Polley Mine. The mine is positioned on a ridge dividing the Polley Lake/ Hazeltine Creek and Bootjack Lake/ Morehead Creek watersheds, both of which are tributaries of the Quesnel River. My interests in particular concern the Bootjack Lake and Morehead Creek watershed, as I am the owner of property located at the tributary of Morehead Creek and Quesnel River. Morehead Creek flows west-northwest into Quesnel River about 85 km upstream of the Quesnel and Fraser River confluence. Morehead Creek contains three tributaries; Little Lake (160-4155-127) and Warren creeks (160-4155-294) are located in the lower reaches of Morehead Creek, and Trio Creek (160-4155-689) is located in the headwaters of the sub-basin. Morehead Lake is the major lake in the system. Little, Prior Trio and Bootjack lakes are also part of the Morehead sub-basin. An artificial barrier that maintains the water flow from Bootjack Lake toward the Morehead Creek drainage. Drainage patterns in Bootjack Creek have been altered by development activities about 90 years ago. The dam was constructed to provide water for mining activity in the Morehead Creek drainage. Water flow from Bootjack Lake drains toward Morehead Creek sub-basin via a dredged channel. Bootjack Lake now forms the headwaters of Morehead Creek, while spring waters form Bootjack Creek. Both systems support rainbow trout.This means the headwaters for my beloved Morehead Creek are parallel to the worst mining disaster in history. A fact that haunts me every day as I pray that the earth will be stronger then the will of man. If you are looking for physical evidence of harm caused by the Mount Polley Mining Corporation look no further. I am an example; a proud college student studying Biology: Evolution, Ecology and Conservation brought to a panic attack for fear of my fathers health neglecting my studies because I must instead attempt to sort through nearly 2000 pages of information that couldn't be presented any less conveniently. The land and the beauty is what brought us to Likely and prior to the 2014 disaster I never would of thought that I was going to be so directly effected by what people call the worst environmental disaster in Canadian history but there is no taking back what has happened and I can only do my best to help restore what was taken from me and hope that my own children will one day have what I once did as well; clean water and a life spend in nature without fear carcinogens. I can only hope that I will one day get to tell them stories of this, as they will not be able to imagine that the lake was once filled with toxic chemicals because we did what was right and we stood up for what we believed in. I have always known that my upbringing in Likely was to take care of, to serve, to honor, to protect and watch over the earth because I known the true value of stewardship with compassion and will not sell my convictions to a corruption. I hope whomever comes to read my letter remembers that we are connected and this world is far more delicate and interact then we like to believe. So stand up against the short sighted destruction of man and fight for a world that is healthier then the one I was born into. I have begun to think of the property as a sanctuary for myself and nature. On 202 acres not many neighbors come around but the few that do I cherish dearly. With crown land on either side, I consider the area a wildlife preserve and don't take the fact that steps away from my doorstep I have endless miles of exploration for granted. I am currently working on restoring and enhance the habit within my property especially the creek head as the Chinook salmon spawn in the lower reaches of Morehead Creek but much of the stream bed has been altered by mining activities, and possible road-related migration obstructions. I cant imagine that much would stop me from achieving my goals besides Mount Polley Mining Corporation making the water unsafe for contact and unhealthy for the fish to swim in.							
134	13-Dec-16	Morehead Creek, BC	I oppose any industrial activity that threatens the community of Likely BC and their most significant asset Quesnel Lake. Therefore I would like to express my strong disdain Mt. Polley Mining Corporation's applications to amend Environmental Management Act Permit 11678. The lake lays claim to being the deepest fjord lake in the world. In 2015 a research paper titled The impact of a catastrophic mine tailings impoundment spill into one of North America's largest fjord lakes: Quesnel Lake, British Columbia, Canada documents the physical and chemical characteristics, location, and extent of a sediment plume within Quesnel Lake was published for the first time since a mine tailings pond breach in August 2014, and discusses the initial and potential long term effects of the breach on the Quesnel Lake ecosystem. They reported various findings of great concern, such as the physical limnology of this large fjord lake, specifically, seiche events transferred suspended particles both up-lake, against the flow regime, and down-lake into the Quesnel River. Upon the Mount Polley tailings pond breach samples of lake water and bottom sediment taken from the impacted area show elevated levels of total metals and other elements, which may have important ecosystem implications in this watershed. They reported that the retention of metals, nutrients, and bacteria on these very small and mobile particles provides a potential vector for event-associated contaminant mobilization [Horowitz, 1991] throughout the lake as well as into food webs as sediment-ingesting organisms, which are relied upon by anadromous and resident fish, constitute a route of metal bioaccumulation [Luoma and Rainbow, 2008]. Post breach sediments collected from near the tailings pond, along Hazeltine Creek, and from within the West Basin exceed provincial freshwater sediment quality guidelines for total arsenic, copper, iron and manganese [BCMoE, 2014a, 2014b; MPMC, 2014f]. While the bioavailability of the suite of metals that was currently in the lake and river was not yet evaluated by the authors, the literature from other ecosystems identifies several potential pathways for biotic incorporation of sediment - associated and dissolved metals including uptake by biofilm, plankton, and benthos, transference by benthic-pelagic coupling [Farag et al., 1998, 1999], and direct exposure to organisms in the sediments and the water column [Luoma and Rainbow, 2008]. This is very important because potential ecological implications of metals such as dissolved copper include latent or delayed effects on fish growth, survival and homing, which may be a concern for both resident fish and anadromous salmonids (i.e., juvenile Sockeye and Chinook Salmon) [Johnson et al., 2007; Lürling and Scheffer, 2007; Pyle and Mirza, 2007; McIntyre et al., 2008]. They stated it was to be expect that some spill-related metals in Quesnel Lake will be subject to bioaccumulation and/or biomagnification through aquatic food webs to planktivorous fish (i.e., Sockeye Salmon and Kokanee) and top predator fish species (i.e., Rainbow Trout and Lake Trout) over time. Furthermore in late September 2014 hydroacoustic and trawl surveys conducted in Quesnel Lake indicated an abnormal spatial aggregation of juvenile Sockeye Salmon in the West Basin relative to data collected over the period 1982–2012. Spatial variation consistent with historical patterns of diurnal vertical migration was also observed in late September 2014, suggesting the juveniles likely entered the turbid bottom waters and were exposed to materials associated with the mine spill for substantial periods each day. Concluding that this potential for pervasive abiotic and biotic contamination in Quesnel Lake and Quesnel River warrants studies to measure and evaluate contaminant mobility and entry into food webs, food web transfer and biomagnification, and subsequently, long-term trends in metals of concern in resident and migratory fish species. The impact of a catastrophic mine tailings impoundment spill into one of North America's largest fjord lakes: Quesnel Lake, British Columbia, Canada concluded by saying the natural lake processes, including seiching, contributed to the spread of the turbidity plume upstream into the main body of the lake and downstream into Quesnel River. While dilution effects and remediation efforts underway as part of the MPMC cleanup process may reduce the observable impact on the lake's ecosystem, tailings and scour materials are and will continue to be transported throughout the lake. Also, twice annually (spring and autumn) the West Basin will experience isothermal conditions and overturn, potentially reentraining settled tailings and scour material into the water column. The nature of waste materials now present in Quesnel Lake presents a potential hazard to the metal content of aquatic food webs and the growth, survival, and behavior of important fish species. This is not something that should be taken lightly the breach of the mine has eroded the faith people have in the government of British Columbia because, in the last decade, the provincial government has heavily supported resource extraction. They are not being responsible stewards of the land and the fact that Mt. Polley Mining Corporation's applications to amend Environmental Management Act Permit 11678 is even being considered keeps me up at night haunted by fear that I will one day have to tell my children that they cannot play outdoors as the long-term environmental effects have made it to dangerous. Mt. Polley Mining Corporation has a long track recorded of haphazard operations and needs to be stopped before it's to late.							
135	23-Nov-16	Morehead Creek, BC	I wish to convey to you my strong opposition against the proposed temporary permit amendment and I also disapprove of any water being discharge by the Mount Polley Mine (MPM) into Quesnel Lake (QL). I am frustrated in the mine's disregard for water quality in QL as the plan only includes meeting the BC Water Quality Guidelines (BCWQG), and does not include returning QL back to the pristine water body it was prior to the 2014 dam breach. The QL and the Quesnel River of which it flows into, are far more then a mere dumping ground for Mount Polley Mine. I have researched the proposed discharge of effluent into QL and have concluded that the plan is haphazard at best and adds further proof of the corporation's preexisting record of poor practices, standards, and lack of due diligence. For example, if the MPM truly was to take "...responsibility to our community and the environment..." they would also have been using reverse osmosis, a true Best Available Technology, and not the simple settling for the technology they are using now.I am dismayed that MPM has reopened as it is clearly at the expense of continued degradation of QL even though the community was promised by Imperial Metals in the first public meetings in the 1990s, there was to be no direct discharge of mine water into QL. With this in mind, the present temporary discharge into QL was agreed to by locals as an interim measure only, to assist the mine in handling a water problem of their own making. It is atrocious that the MPM would even consider adding further insult to the injury, as if it was not bad enough their spilling millions of cubic meters of toxic water and tailings into QL, home to one quarter of the Fraser River sockeye salmon. In my opinion, Imperial Metals is a criminal organization and broke two sections of the Fisheries Act by "depositing deleterious substances into fish habitat" and "causing serious harm to fish" including permanent destruction of fish habitat.Furthermore, the MPM technical report is a flawed document in that it does not differentiate discharge options between the present ("interim" as MPM describes) it mine operation phase, and the final Closure and Reclamation phase. Lets be realistic QL cannot be returned back to its pre-breach pristine condition as quickly as possible if as it is still trying to recover from the effects of the 30 million m3 dam breach, as an additional 10 million m3/year of mine waste water is being added over an additional 3-4 years before starting an expected 2 year transition to the closure plan but it is well known that MPMC has long-term ore reserves that will extend operations 10 to 20 years or more into the future.Effluent discharge is not a viable option during any of the operational phases and the QL watershed should not be condemned with the legacy of Canada's worst environmental disaster. Imperial Metals must take responsible action and steward the land in a sensible manner to minimize environmental effects and risks today and for the future generations.Mount Polley Mine's twenty years of mining is leaving the Stake Holders of Quesnel Watershed a hundred year legacy of environmental degradation.							
136	04-Jan-17	150 Mile House, BC	I am writing this letter regarding Mt. Polley Mining Corporation's long term plan to discharge mine water into Quesnel Lake. I am a life long resident of the Cariboo and live at 150 Mile House. I have been going to Quesnel Lake since 1958. I spend about 6-8 weekends a year boating & fishing on the lake. I am also a self employed contractor and am not a anti-mining or antidevelopment person, in fact my son works as a contract mechanic at the mine. I understand the need to get the mine back up and running and a temporary fix to discharge water into the lake. I also know that there has been a study done pertaining to creating a wetland marsh system to naturally filter the water that has been done by one of the leading experts in this field. It is my opinion that the water must be dealt with in its' natural watershed and not piped to Quesnel Lake or the Quesnel River. I also think there needs to be a more stringent monitoring system of what is actually discharged and not left up to the mine to do this. It should be done by a government agency. The general public and myself certainly don't trust the mining corporation to be in charge of this. Quesnel Lake is a jewel, it has a world class fishery. This plan to discharge into the lake should not even be an option.							
137	05-Jan-17	Nanaimo. BC		See letter, cannot copy into here						
138	10-Jan-17	Lac La Hache, BC		I do not support Mount Polley Mine in its application to discharge mine wastewater to Quesnel Lake and Bootjack Lake as proposed in their current Long Term Water Management Plan. This plan depends on partial water treatment onsite, and extensive dilution by clean water sources to meet BC Water Quality Guidelines. I support FULL WATER TREATMENT for all mine water leaving the Mount Polley Mine.						
Suggestions										
139	25-Oct-16	Courtenay, BC		I have one very simple suggestion. Have MPMC take out an insurance policy for the full amount of any accident. Insurance companies tend to be very good at assessing risk and if they are willing to back the company fully (no limit on time or money - companies come and go, but environmental disasters tend to hang around until fixed), then we should be quite comfortable in doing the same. Our provincial government has already proven that it's inspectors are not up to the task and they are risking our tax money. Let MPMC and their insurance company risk their money if they are so sure of themselves. We have already spent too much tax money cleaning up after old mining situations. If Lloyds of London considers the risk too great, then the Province of BC should agree with them.						

APPENDIX D2

MPMC-RECEIVED PUBLIC COMMENTS

From: Wendy Hart [mailto:wendylhart1@gmail.com]
Sent: Wednesday, November 2, 2016 12:11 PM
To: Inquiries <I@imperialmetals.com>
Cc: MtPolleyMinePermit@gov.bc.ca
Subject: Permit Amendment

As a ten year , seasonal resident of Quesnel Lake, with two properties directly down lake of the discharge point, I feel VERY concerned with ANY discharge into Quesnel Lake. My concern is also financial, as we are attempting to sell one of these properties with no prospects in sight.
My very real concern is that even though Polley Mine may be meeting some water quality standards, I would have to say that when a lake changes colour from it's original hue, something very wrong is being done. This may not be technical but it is visibly OBVIOUS that the lake is being harmed! The lake used to be black at depth. Now it is green! Lakes with high mineral contents are green. How can this be okay???
I am very distressed and angered by this whole situation. What was once a world wide treasure is now merely a dumping ground for profits. How can this be allowed?!
very concerned citizen,
Wendy Hart
Quesnel Lake property owner

From: Jenny Howell <jhowell@xplornet.ca>
Sent: November 20, 2016 1:09 PM
To: MtPolleyEnvironmental.Enquiries@gov.bc.ca
Cc: inquiries@imperialmetals.com; Bee Hooker; Jack Darney
Subject: Permit application
Attachments: Mt Polley letter Nov 20 2016.docx

Please find attached a letter from the Big Lake Community Association.

Thanks-

Jenny Howell, Secretary for the BLCA

Big Lake Community Association
P.O. Box 68, Big Lake Ranch, B.C.
V0L 1G0

Nov 20 2016

.
To Mount Polley Mine,

On behalf of the BLCA, we would like to acknowledge and thank the Mount Polley mine staff for their efforts to inform and communicate with our community on their long term water discharge plans.

While the BLCA does not have the authority to speak on behalf of the entire community, nor do we have the expertise to comment on the technical details of this plan, we are supportive of the longevity of the mine operation. The mine is one of the largest employers within our community, so we recognize the need for a long term water solution that manages environment, social and economic aspects using the best available technologies and scientific knowledge.

We will continue to advise our membership of how they can become informed, and how they may express either their concerns or support in regards to future permitting. We are appreciative of the lengths the mine has gone to in order to connect with the community throughout the ongoing permit applications process over the past couple of years, both through media releases, public meetings, local representation on the Mount Polley Liason committee and replying to individual concerns. We remain hopeful that a timely solution will be reached to meet the critical water management challenge that Mount Polley faces, regardless of its operation.

Yours, on behalf of the Big Lake Community Association;

Bee Hooker, BLCA President
Marianne Woods, BLCA Vice President
Jack Darney, BLCA Past President
Kelly Burnham, BLCA Treasurer
Jenny Howell, BLCA Secretary

From: Fred McMechan <fred_mcmechan@telus.net>
Sent: November 23, 2016 11:15 AM
To: MtPolleyEnvironmental.Enquiries@gov.bc.ca
Cc: Lyn Anglin; Hugh Bunce; Al Hoffman
Subject: comments on technical assessment report
Attachments: Williams Lake Field Naturalists Comments on Mt Polley Water Management Application Nov 2016.pdf

To the Ministry of Environment:

RE: comments on the Mount Polley Mining Corporation's application for amendment to allow the long-term discharge of mine effluent into Quesnel Lake.

The attachment contains the comments from the Williams Lake Field Naturalists on this issue.

Thank you for your consideration of our comments.

Fred McMechan, president
Williams Lake Field Naturalists

WILLIAMS LAKE FIELD NATURALISTS

1305A Borland Road
Williams Lake, BC
V2G 5K5

November 22, 2016

BC Ministry of Environment
Victoria, B.C.
Submitted to: MtPolleyEnvironmental.Enquiries@gov.bc.ca

Dear Sir/Madam:

RE: Comments on Mount Polley Mining Corporation's application for amendment to allow long-term discharge of mine effluent into Quesnel Lake.

The Williams Lake Field Naturalists Society (WLFN) strongly opposes the proposal by Mount Polley Mining Corporation (MPMC) to discharge excess mine water directly into Quesnel Lake as described in their recent permit application. We understand that MPMC is seeking approval to pipe treated water from the mine site directly into the lake for the life of the mine. Discharge water will only be required to meet generic BC Water Quality Guidelines.

Our objections to the MPMC proposal stem primarily from the fact that BC Water Quality Guidelines do not meet water quality of the lake. That is, BC Water Quality Guidelines are not, in our opinion, the appropriate measure to use for setting water quality objectives for release into Quesnel Lake. For example, BC Water Quality Guidelines for mean total copper levels (for fresh water aquatic life) are nearly four times higher than levels in surface water of the lake in 2015, following the mine tailing facility breach. The discrepancy may have been even greater if guidelines were compared to pristine levels prior to the 2014 breach. Similarly, maximum levels for total copper in the Guidelines are greater than maximum levels recorded in the lake in 2015.

The BC Water Quality Guidelines state that appropriate water quality objectives could in some cases be different than guideline levels. For example, the Guidelines state that "if the resource is unusually valuable or of special provincial significance the safety factor could be increased by using objectives which are more stringent than the guidelines." We believe that Quesnel Lake is of special provincial significance and deserves higher standards to safeguard its water quality.

The application by MPMC suggests that the expected life of the mine is currently less than five years. Over this short time period, the release of mine waters meeting only generic provincial guidelines may be of less concern than if they were released over a longer term. However, we understand that it is probable that the operating life of the mine may be much longer than three or four years. In addition, a proposed passive water treatment system following mine closure would likely not be functional for several years since it is apparently still in the planning stages. It must be recognized that a passive, wetland-based system will require many years to develop the vegetation and organic rich soil necessary to function as a viable system for waste water treatment. If construction of a passive, wetland-based treatment system is started at a time near mine closure, it will not likely be ready to function at mine closure.

If either mine closure or a passive water treatment system is delayed for several years, the release of excess water that meets only generic BC Water Quality Guidelines could result in degradation of water quality in Quesnel Lake.

We also understand that during the current year MPMC was granted a permit to release untreated water directly into Quesnel Lake, as long as the untreated water met permit discharge quality. This approval was given to "deal with freshet flows and a bottleneck at the water treatment plant". We are very concerned that these conditions could arise again. Planning and facilities must be in place to ensure that untreated water from the mine site is not released into Quesnel Lake.

MPMC's reported analyses of excess water release options do not allow for separate assessments of environmental, technological, social, and economic criteria for their selection of a preferred option. Each option needs to be evaluated separately for each of these classes of criteria. When they are not, environmental and economic criteria are confounded. We request that ratings for each class of criteria be made readily available to the public before any approval is given to release waters into Quesnel Lake.

We also strongly recommend the following:

1) No water must be permitted to pass from the mine site directly into Quesnel Lake, without first passing through a treatment system.
2) If MPMC is allowed to release excess water into Quesnel Lake, water quality objectives must be developed which more closely reflect pristine water quality in Quesnel Lake and MPMC must be required to treat all water to meet those objectives, rather than only the less stringent BC Water Quality Guidelines.
3) If MPMC is allowed to release excess water into Quesnel Lake without meeting more stringent objectives than those in the BC Water Quality Guidelines, approval must not be for more than three to four years and clearly not renewable.
4) Construction of a passive wetland based water treatment system must be started as soon as possible in 2017, not at some later date as MPMC indicates.
5) If MPMC is allowed to release excess water into Quesnel Lake, quality of the water must be monitored at the outflow pipe and within a diffusion zone at least weekly by MPMC, BC Ministry of Environment, Fisheries and Oceans Canada and an independent party. Results must be widely and readily available to the public.

We expect MPMC and BC Ministry of Environment to show leadership in maintaining the quality of one of the most pristine large lakes in BC. Let us all hope that Quesnel Lake continues to be part of the reason for our pride in "Super-Natural British Columbia".

Respectfully Yours,

Fred McMechan, President,
Williams Lake Field Naturalists

Cc: Lyn Anglin, Chief Scientific Officer, Imperial Metals: langlin@imperialmetals.com
Cc: Al Hoffman, Chief Inspector of Mines, Ministry of Energy and Mines: al.hoffman@gov.bc.ca
Cc: Hugh Bunce, Operational Director, Mt Polley, Environmental Protection, Min. of Environment: Hubert.Bunce@gov.bc.ca

From: amy sandy <estkwelalnik@gmail.com>
Date: November 30, 2016 at 6:30:10 PM PST
To: MtPolleyEnvironmentalEnquiries@gov.bc.ca
Subject: Public comment

I am opposed to mt polley dumping your treated water in Quesnel Lake. The company is destroying a beautiful natural resource that is better suited to tourism. Additionally your company is destroying First Nations territory. Too cheap to use dry stacking or reusing your waste water. It is shameful.

Sent from my iPhone

From: Nadene Guiltner <nguiltner@gmail.com>
Sent: December 3, 2016 7:38 AM
To: MtPolleyMinePermit@gov.bc.ca
Cc: inquiries@imperialmetals.com
Subject: re: Permit Amendment to Permit 11678
Attachments: November 28 mine permit oppositiom.docx

Please find attached my response to the Polley Mine permit application.
Nadene Guiltner

Mount Polley Mine Company

Box 12

Likely, B.C.

V0L 1N0

(inquiries@imperialmetals.com)

And

Ministry of the Environment

2080A – Labieux Road

Nanaimo, B.C.

V9T 6J0

(MtpolleyMinePermit@gov.bc.ca)

November 28, 2016

Reference #1411734-162-R-ReVD-16000

RE: Permit 11678 Amendment Application under the Environmental Management Act: Technical Assessment Report (TAR) prepared by Golder Associates and submitted on October 17, 2016, in support of Mount Polley Mine Company's (MPMC) intention to discharge mine effluent into Quesnel Lake via a pipeline until mine closure and possibly in perpetuity.

Yes, we do need jobs, yes we do need natural resource extraction, and we must ensure the environment is protected. There are other alternatives to the discharge of the effluent into the lake. They may involve more investment, but MPMC has reaped financial benefits and will reap further benefits in coming years. It is not unreasonable for MPMC to make sure they have expended every effort to find the most responsible way to dispose of their mine waste.

In our current post-truth, fake news, unending data flow universe, this 'human receptor' (a term taken from the TAR p.1126) appreciates having the opportunity to express the reasons she objects to granting this permit. As a long term resident of the West Arm of Quesnel Lake, I am, and will continue to be, adversely affected by this permit. While having no specific scientific training, I will rely on common sense and direct observation to try to clearly communicate why I object to further effluent discharge into Quesnel Lake. While the 1,279 pages of the TAR are focused on future discharge, it is important to understand the history of the mine's past actions. A major consideration must be the August 4th, 2014 breach in which 25million cubic meters were released via Hazeltine Creek into Quesnel Lake. This must affect present decisions because pollution of a large pristine body of water is in itself a major cause for

concern. The resulting pollution from this spill has been recorded in the Government of Canada's National Pollutant Release Inventory as the largest emitter of multiple pollutants for the year of 2014. A couple of sobering examples from the NPRI:

Release of 134t of Pb (lead) – 92% of total reported for all of Canada

Release of 2.14t of Hg (mercury) – 94% of total reported for all of Canada.

Various reports document how MPMC's poor decisions and resulting mistakes resulted in this costly environmental disaster. Mines Minister, Bill Bennett commented in the Vancouver Sun on February 5th, 2015:

"Obviously if you read the report (Independent Review Panel Report), there were mistakes made. We don't know if there were mistakes the engineers are entirely responsible for, or the company is entirely responsible for, or if they are both responsible for the mistakes that were made."

This is a clear admission from the Minister responsible for Mines that mistakes occurred.

In the interest of clarity we should start at the beginning with the original 1997 Permit#11678. This permit designated the mine as a closed containment (zero release) facility. However, the mine had a water balance problem which led them to increase the height of the TSF and then to make the first discharge request, which was eventually granted in 2011 (over local residents, Fisheries, and First Nations objections). The mine's increased production coupled with other factors led to further requests to increase the discharge amount. Over the years the mine had also attempted to solve their water balance problem by steadily increasing the height of the TSF, but this solution had natural physical limits. As the Independent Review Panel says:

"Under these conditions the Upper GLU was compressible and susceptible to undrained failure. This condition had not been recognized in the design of the TSF. The panel concluded that the dominant contribution to the failure resides in the design. The design did not take into account the complexity of the sub-glacial and pre-glacial geological environment. . . . Had the downstream slope in recent years been flattened to 2.0 horizontal and 1.0 vertical, as proposed in the original design, failure would have been avoided."

The Chief Inspector of Mines also found that there was an un-filled excavation at the toe of the embankment, there was too much water in the TSF and there were inadequate tailings beaches.

Moving on from the mistakes which caused the TSF failure to examples of what happened post-breach I present just one example of how a pesky fish problem was solved to MPMC's advantage.

Fish, of course, were affected, especially in Hazeltine Creek. Hazeltine Creek had formerly been home to 20 different fish species (SNC-Lavalin, FFHA). Golder Assoc. concluded, in their EIA report that Hazeltine Creek "was no longer a viable habitat following the dam failure" and therefore Hazeltine Creek was designated as a non-fish bearing creek. However, there were fish attempting to survive in the creek

and after a local resident reported that a large number of fish were in the creek the following solution was executed:

"The use of Hazeltine Creek for the short term discharge option is predicated on the fact that the creek length used for the discharge water is not fish bearing. At the time of my earlier correspondence all indications were that there was no fish presence in Lower Hazeltine Creek. Subsequently MOE and the members of the Mount Polley environmental Working Group, including the Ministry of Forest Lands and Natural Resources and Department of Fisheries and Oceans, have been made aware that fish were present. MPMC recently applied for and received allowance from FLNR to capture and remove the fish from lower Hazeltine Creek to maintain its current status a non-fish bearing as it currently lacks adequate fish habitat to sustain fish and fish screens are in place to keep them out" (from email correspondence sent by Hubert Bunce (MOE)

When the mine has exceedances in permitted levels of metal discharges they solve the problem in the following way:

(Quoted from MPMC Public Liaison Committee Meeting Notes, August 18th, 2016)

Question: "Regarding the request to increase the permit requirements for iron, zinc, and molybdenum, why are you asking for this and were these metals already there or are they increasing?"

Answer: "Original model has now been validated against testing and some parameters are higher than modelled. We are asking for these to ensure we remain in compliance with the permit. The details will be provided with the permit amendment application."

MPMC is using BC Water Quality Guidelines (BCWQG) as their goal for our lake water quality. Yet, BCWQG's have no legal standing, so are not directly enforced. They may be used as the basis for determining the allowable limits in waste discharge permits. The BCWQG may also be changed at any time. This ephemeral guideline is not sufficient to assure us of any lasting measure of water quality.

The 1,279 pages of the TAR are impressive in size and content. Yet as I turn the final page I look up, glance through my window and see the reality of the dirty water in Quesnel Lake and find myself awash in a sea of uncertainty. The myriad numerals, charts, graphs and ongoing acronyms should have provided an oasis of security and certainty – yet it failed. Nowhere in all this data could I find even a hint of the paradoxical nature of the request. MPMC seems to be so reliant on science they neglect to consider visceral reality. We live in a flawed world and all need to atone for our mistakes, but first we must recognize those mistakes. On the face of it MPMC wants to discharge mine effluent into a living entity which they have already polluted to an amazing degree. If we were to ask an unbiased stranger (a child, perhaps) whether it would be acceptable to put deleterious and potentially toxic substances into his or her lake it would seem obvious that the answer would be no. It seems like such an inconceivable idea that it shouldn't even need to be asked.

However MPMC has asked, and they have spent enormous amounts of time, money and human ingenuity to prepare what seems, on the surface, to be a scientifically feasible proposal. I respect the methodology as outlined by the many contributors to this report. Yet I find no consolation in the continual disclaimers found throughout this document:

"where applicable, the model and input data carry inherent uncertainty, unlikely to occur, adverse effects not expected, based on predicated concentration, not expected to be acutely lethal, necessarily predictive exercised, various predictive tools, predictions are based on several inputs, all of which have inherent uncertainty".

The honesty in delineating the limitations of the study is appreciated, yet raises serious concerns which make the whole enterprise questionable. One quote from p.389 of the TAR is particularly disturbing:

"Hydrogeologic/hydrologic investigations and groundwater modelling are dynamic and inexact sciences . . . complicated beyond human capacity to evaluate them comprehensively in detail and we invariable do not have sufficient data to do so . . . every model is a simplification of a reality, no warranty, expressed or implied is made."

How can MPMC make such a request when our own government is heading in the opposite direction? The Parliament of Canada (PRB06-26E) states that:

"The virtual elimination strategy must prevent deliberate input of any additional quantities of persistent toxic substances to the ecosystem. We must continuously strive to reduce the amount entering the environment."

On one hand some of us have recognized that we must stop and consider what we are doing to a finite resource. On the other hand we have a company asking to add effluent to a formerly pristine lake. I have been told by a MPMC representative that the mine effluent is not 'pollution'. I have found many credible definitions of pollution, but for this purpose I will rely on my old Oxford Latin Dictionary, p.623: "polluo , (pro+luo) – to soil, defile, foul, contaminate, desecrate", to confirm my simple observation that the lake is 'dirty'.

I could continue with examples, quotes and theories, but what has emerged during this long process are the inadequacies and limitations of institutions (both business and government). A lot of well-meaning people, who were either not able to speak openly (because of non-disclosure agreements) or whose training was in such a specialized and narrow field of study that they were unable to see the myopathy of their conclusions, seemed more focused on promoting their own positions. For many of these 'experts', what began as an environmental disaster has turned into a giant science experiment, with the environment as only a small component in the process. There is no doubt that MPMC has problems. The Chief Inspector of Mines, Al Hoffman states: *"Through our investigation, we determined that while the mine did not contravene any existing regulatory requirements, its management and operational practices failed in a number of areas such as water management and misplaced confidence in the TSF design.".*

This sort of comment only highlights why we cannot afford to let any more effluent flow into our lake. Mining is a fact of life in our area, but mining is not just an extraction process, it is also a waste creating process. While we applaud the monetary benefits provided to the shareholders, the employees and the government, we also recognize the need for all those involved to manage and regulate the waste created by mining. MPMC has a responsibility to minimize harm to the environment. Many of us are not satisfied that they have sufficiently explored other solutions to their water balance problem. There are other possibilities that would obviate the need to discharge mine effluent into Quesnel Lake. It is true that this is a big, deep lake, however it is the West Basin which, because of direction of water flow and the presence of a sill at Cariboo Island, that received the brunt of the tailings when the dam breached and will continue to receive the effluent if a pipeline is constructed to the lake. The West Basin contains only 2.4% of the water volume in the lake. This fact must be taken into account when we are contemplating the discharge of 9 million cubic meters or 2,377,548,471 (over two billion) US gallons of water a year. The small portion of the lake that will receive these billions of gallons of effluent, the West Basin, has a surface area of only 22.87 square kilometers (the whole lake has a surface area of 266 square kilometers). The volume of the 'receiving' lake water is a mere .966 cubic kilometers, whereas the total lake contains a volume of 42 cubic kilometers. (The figures above taken from Tetra Tech EBA, File: 704-WTRM030 15-01, June 27/2016) When questioned about this Jerry Vandenberg (Golder Assoc.) stated that all projections, models, etc. have been based on the area and volume of the entire lake, not the small portion of the actual West Basin. This is troubling.

One could continue for pages and pages, but in the spirit of brevity my conclusion is that I do not think MPMC should be granted their permit amendment. There are other and better solutions. I trust you recognize the ongoing accommodations that have been made when MPMC has failed to meet the effluent discharge requirements is not a pattern to be continued. Albert Einstein is credited with the following definition of insanity: "Doing the same thing over and over again and expecting a different result". We find ourselves relying on you to weigh the facts and make a decision that is in the best interest of us all, please stop lowering the bar in the hope that they will clear it this time.

Nadene Guiltner

Box 120

Likely, B.C.

V0L 1N0

From: Amber Sherwood-Robinson <sherwooa@mail.uoguelph.ca>
Sent: January 5, 2017 5:17 PM
To: inquiries@imperialmetals.com
Subject: Fwd: Comments on technical assessment report

---------- Forwarded message ----------
From: "Amber Sherwood-Robinson" <sherwooa@mail.uoguelph.ca>
Date: Dec 10, 2016 00:24
Subject: Comments on technical assessment report
To: <MtPolleyEnvironmental.Enquiries@gov.bc.ca>
Cc:

To whom it may concern,

Water is life. The clean water we have today is essential for the future. We must stand by our fresh water resources and defend from destruction, pollution and carelessness.

Our lakes and rivers are crucial for clean drinking water, recreation, fish habitat, not receiving environments for industry. How have our governments come to allow corporate interests to trump environment, tourism, cultural value and best practices?

Dilution is not a solution. Regulators must raise the bar for water quality and discharge. They must take a long-term view and demand closed systems and best practices from those who are taking resources from our land. Industry must take responsibility for their wastewater.

Protect this environment and complete the duties required by exercising alternative options: halt mine production.

The questionable management and longstanding poor decisions have brought this into being, and Quesnel Lake watershed should no longer be a viable avenue to be utilised for disposing and diluting of any further mine waste.

Real change is required and the reactionary, industry protective, emergency style management no longer applies.

Enough is enough.

Yours truly,
Amber Sherwood-Robinson

From: nhudson [mailto:nhudson1@xplornet.com]
Sent: 2016-11-29 12:17 PM
To: gov.bc..ca (MtPolleyMinePermit@gov.bc.ca); Imperial Metals (inquries@imperialmetals.com)
Subject: Mt. Polley Mines Permit Application

Ref: Permit No. 11678

Date: 2016-11-29.

To whom it may concern.

I wish to express my strong objection to allowing Mt Polley Metals to discharge excess mine waste water into Quesnel Lake.
Even with today's allowable standards there will be environmental pollution to the lake and down steam waterways. This may take a long time to be obvious. There are visual changes now.
There should be zero tolerance of manmade foreign materials being discharged into Quesnel Lake. I am concerned that this permit is the thin edge of the wedge. Government will continue to lower the environmental standards and Mt Polley Metals will continue to ask for more. This winter/spring runoff is forecast to be a big one for this rain forest area. Mt Polley Metals must have known this area was in a rain forest with high water runoff and should have allowed for it in the design criteria.

Please do not go ahead and allow this permit to proceed.

Thank you
Norm Hudson
Ph 1-250-296-4414.

Date: 2016-12-09

I wish to say I am a member of the Likely C. Of C. And the more I become aware of how Mt Polley Metals dealing with the discharge of water into Quesnel Lake, the more discussed I become. Any responsible Company or Person; would not ask for an open ending Permit. Would not discharge pollution into the lake without knowing the ramifications. No one knows how the Lake behaves. It will be different each year. There is no way to clean up the pollution. Once it is in the Lake it is there forever. Some pollution will probably get washed downstream. Out of sight out of mind?
If Polley Metals was acting in a responsible manner they would make public all pertinent related information within a timely period. Why hasn't Polley Metals installed a adequate water filter system? They have taken tens of millions of dollars (net) out the ground. There many of these Filtration Systems in operation. Several operating in B C.

Again I wish to say, I strongly, object to this permit No. 1178. being allowed to proceed!

Thank you
Norm Hudson

From: Nadene/ Lionel <nguiltner@gmail.com>
Sent: December 14, 2016 7:42 PM
To: inquiries@imperialmetals.com
Cc: MtpolleyMinePermit@gov.bc.ca
Subject: Permit 11678 Amendment application

As a full time Quesnel Lake (water access only) resident, I have spent over 10,000 days on the lake.

Polley mine presents many models of the proposed discharge into Quesnel Lake, but in my experience if the model the mine puts foreword does not work, an amendment is asked for, and often it is approved.
Why would MOE want to approve any discharge into a watershed as pristine as our lake, if it is based on a educated guess at best?

Lake residents are required to have "no discharge" into the lake, therefore we "must insist" the mine do the same.
The original mine proposal was zero discharge. When water became a problem, Mount Polley should have been required, at the very least to treat the the effluent to the original water quality of Quesnel lake before it was released.

A formally recognized body, The Likely Chamber of Commerce, has stated their position, no effluent discharge into Quesnel Lake. At a recent meeting thirty

members were present, twenty- four voted for No DISCHARGE of effluent into Quesnel Lake.

The mine and the shareholders have the GOLD we have the SLUDGE!

Lionel Guiltner L.T.L.R.

Sent from my iPad

From: Pat <patsytt@hotmail.com>
Sent: December 15, 2016 8:49 PM
To: inquiries@imperialmetals.com
Subject: Long term water management permit

I am an employee at Mount Polley Mine. I have been working there since 2007, one of the luckier ones who manage to stay working when some were laid off. I also live at Morehead so I spend time in Likely. I also want to say that I do not support Doug Watt and his following.

Imperial Metals has gone above and beyond since the breach happened. The cleanup that has been done is nothing short of amazing. For anyone to say that Imperial Metals is not doing their best, is asinine.

The long term water management plan is a good one. Quesnel Lake is as beautiful today as it was the day before the breach. When the water that is being released is free of toxins, how can that damage the lake. I don't understand how you can have so many Biologist saying that the water is fine yet you have a chosen few radicals speaking out as if they know better.
You just have to read the bill board they have erected on the way into Williams Lake to know that they don't have any idea what they are talking about.

Releasing water into Quesnel Lake makes the most sense. It should be released as close to the source as possible. If you are concerned with the environment you try to put things back as close to natural as possible. To transfer it all the way to Quesnel river is ridiculous.
The only reason these people want it reverted to Quesnel River is so it takes the perceived problem out of their back yards.

Thank you

Pat Pokeda/Steve Cook

Sent from my iPad

From: CHAZ M <chazm@shaw.ca>
Sent: December 17, 2016 3:13 PM
To: Mount Polley Mine Company
Cc: Ministry of the Environment
Subject: reference # 1411734-162-R-ReVD-16000 Permit 11678 Amendment Application

This letter is to express my strong objection to this Application.

My family have owned property on Quesnel Lake for nearly seventy years. We have two lots, 11509 and 11510, located on the west side of Quesnel Lake about four miles downstream from the mouth of Hazeltine Creek. These are recreational properties which have been enjoyed by four generations of our family.

We have been deeply disturbed by what has gone on in the past few years. Firstly, the dam failure should never have occurred and was the result of the Provincial Government not doing their job, and the mining company taking advantage of that. Secondly , the mining company were allowed to resume operations and to dispose of their effluent using Quesnel Lake as a sewer.

The result of these actions is that a large, pristine body of fresh water has been badly compromised , the effects of which are as yet largely unknown. This indicates that the B.C. Government has little or no regard for the environment and are willing to sacrifice it for the fast buck, a sorry situation indeed.

In conclusion, the permit amendment should be rejected and the mine should be shut down until an environmentally acceptable operating process is in place.

Quesnel Lake and my great-grandchildren are depending on you.

Yours truly, C.H. Morrison

From: dolly potter <dollypotter123@live.ca>
Sent: December 20, 2016 9:38 AM
To: MtPolleyMinePermit@gov.bc.ca
Cc: Colleen Hughes
Subject: Support of Mount Polley Permit

I have been a life long resident of Likely and a long term employee at Mount Polley Mine. I support the permit because I believe the Company , Government officials and Consultants have done a thorough analysis based on scientific facts. This is clean, tested water they are asking to transfer to the lake. Our lake is beautiful and will remain beautiful but if the mine can't operate I wonder how many of us will be able to stay in our community to enjoy the lake and surrounding areas.

Dolly O'Sullivan

From: Bunce, Hubert ENV:EX <Hubert.Bunce@gov.bc.ca>
Sent: December 20, 2016 8:48 AM
To: Reiner, Mike J ENV:EX; Yamelst, Brian H ENV:EX; Barnes, Samuel ENV:EX
Cc: Luke Moger
Subject: FW: Comments on Technical Assessment Report (Mt. Polley)
Attachments: Permit to flush through lake Dec 2016 rev3.doc; ATT00001.txt

FYI

Hubert Bunce
A/Director, Mount Polley
Environmental Protection, Regional Operations
ph (250) 751-3254 fax (250) 751-3103
2080A Labieux Road
Nanaimo BC V9T 6J9

EP Mount Polley Website ***http://www.env.gov.bc.ca/eemp/incidents/2014/mount-polley/***

From: Jane P. Brett [mailto:jbrett@shaw.ca]
Sent: Tuesday, December 20, 2016 12:03 AM
To: Mt Polley Environment Enquiries ENV:EX
Cc: Bunce, Hubert ENV:EX
Subject: Comments on Technical Assessment Report (Mt. Polley)

Please find attached
Comments on the Mt. Polley Technical Assessment Report
from the Mining Justice Action Committee

Thank you

To: MtPolleyEnvironmental.Enquiries@gov.bc.ca

Comments on Technical Assessment Report
Re: Mt. Polley Permit 11678

Like all British Columbians, we deeply regret the loss of the pristine waters in Quesnel Lake due to the tailings dam failure that led to catastrophic collapse at Mt. Polley in 2014. We regret that Imperial Metals has not been held accountable for the biggest mining disaster in modern Canadian history: 25 million cubic meters of toxic waste spilled! In spite of on-going monitoring, the long-term effects to the habitat and the local economies are still incalculable. Unfortunately the government's own reports indicate that similar failures can be expected in the future wherever tailings ponds were built on the same vulnerable model.

We feel it is entirely reckless to give any consideration to the current proposal to dump partially-treated wastewater into Quesnel Lake and/or Bootjack Lake and/or the Fraser River. Surely the Environment Ministry cannot find acceptable such a farcical solution to the problem of pollution! It seems that the idea that "dilution is the solution to pollution" is an out-dated joke in every setting except in B.C.'s antiquated mining laws which seriously need revision in order to protect waterways.

Why isn't the government demanding that Imperial Metals fully-fund the remediation? We feel that taxpayers and local communities should NOT have to continue to pay the price for corporate failures, especially in this particular clear incident of neglect and mismanagement. It is our view that the government is misguided in trying to provide the "least cost" to the mining corporation rather than to the public.

The government can't be serious about reconciliation with First Nations while at the same time ignoring the stated wishes of those who take stewardship of the area seriously. The province of British

Columbia is legally obliged to consult with First Nations on land and resource decisions that could impact their inherent rights. We urge you to listen to those who have local knowledge, those who have been already seriously affected by the Mt. Polley catastrophe.

We would be happy to see the current proposal rejected as being without any merit as we feel that approval would set a dangerous precedent for future mining "accidents". We do not wish for this company to think that this may be a "solution" which can be applied to future disasters.

Very sincerely yours,

Jane Brett, Gena Kirkman, Heather Tufts, Margie Noonan
on behalf of the Mining Justice Action Committee
info@mjacvictoria.ca

22 December 2016

cc
Hubert Bunce, Assistant Director, Mt. Polley Environmental Protection Division, Ministry of Environment < Hubert.Bunce@gov.bc.ca>

From: Richard Holmes <carenvir@wlake.com>
Sent: December 20, 2016 8:54 PM
To: Dale Reimer; Don Parsons; Brian Kynoch
Cc: Colleen Hughes; Lyn Anglin; Luke Moger; inquires@imperialmetals.com
Subject: FW: Permit 11678

From: Richard Holmes <carenvir@wlake.com>
Date: Tuesday, December 20, 2016 at 1:35 PM
To: <MtPolleyEnvironmental.Enquiries@gov.bc.ca>
Cc: "Bunce, Hubert ENV:EX" <Hubert.Bunce@gov.bc.ca>
Subject: Permit 11678

Please acknowledge receiving the following message :

I am writing the Provincial Government to voice **my complete opposition** to the MPMC's application to discharge mine waste water into Quesnel Lake for the following reasons:

1. **Best Available Technology (BAT):** The MPMC is providing basic dilution as the BAT remedy to achieve water quality guidelines in Quesnel Lake. This is simply a misrepresentation of the best available technology utilized throughout the world and indeed in British Columbia at operating mining sites. Water at Mount Polley that doesn't meet water quality guidelines should be treated at the site before being released into the surrounding watersheds. BAT includes water treatment plants that can be designed to treat water issues at Mount Polley and BAT is a recommendation from the Province as a result of the TSF disaster that occurred on August 4, 2014. A current example of such practice is now underway at several locations in North America including BC is the Teck Resources water treatment facility at Elk Valley. This facility is treating a much larger water quality problem than is evident at Mount Polley yet this company has recently invested $120 million dollars to achieve their goals as a responsible mining company. http://www.teck.com/responsibility/our-sustainability-strategy/water/water-quality-in-the-elk-valley/ In view of the MPMC mining disaster of 2014, BAT at this mine should be the installation of a water treatment plant that achieves water quality guideline levels at the end of the pipe and not rely on an already impacted Quesnel Lake as a subsidy for this company. Their promises of a suitable passive treatment system in the future has never been proven out in spite of their assurance of its potential and their work on site to date. In view of this inadequacy it is quite possible that a pipeline to Quesnel Lake for site water dilution could be utilized in perpetuity and to me this is unacceptable. Quesnel Lake has suffered enough due to the MPMC operational neglect and poor mining practices. It is time for the BC MoE to stand up for BATs that are genuinely helpful to the environment. We all have a collective responsibility to leave the environment in as good as or better condition than we found it……it is simply irresponsible to do otherwise.

2. The Precautionary Principle: This principle should be applied to the TAR related to the long term discharge plan of contaminated MPMC site water into Quesnel Lake. The full effects of the August 4th 2014 disaster on Quesnel Lake will not be understood for years to come. The addition of contaminated site water on an already impacted receiving environment does not consider the long term potential impacts to fish and fish habitat. There is not an aquatic or fisheries scientist in the world who will state with confidence that all is well with Quesnel Lake in the long term. In fact UNBC scientist Dr. Ellen Petticrew who undertakes related collaborative

research on Quesnel Lake with numerous other scientists since the disaster occurred concluded **"While dilution effects and remediation efforts underway as part of the MPMC cleanup process may reduce the observable impact on the lake's ecosystem, tailings and scour materials are and will continue to be transported throughout the lake. Also, twice annually (spring and autumn) the West Basin will experience isothermal conditions and overturn, potentially reentraining settled tailings and scour material into the water column. The nature of waste materials now present in Quesnel Lake presents a potential hazard to the metal content of aquatic food webs and the growth, survival, and behavior of important fish species".** http://www.unbc.ca/sites/default/files/sections/quesnel-river-research-centre/petticrew2015.pdf
The precautionary principle should be applied in this decision by the Province of BC and all mine waste water should be treated on site to meet all water quality guidelines..

3.**Premier Clarke's Statement:** Premier Clark addressed the community of Likely on August 7th 2014 and provided the following on a Global TV report **"This is one of the clearest pristine lakes anywhere in the world…….and we want to find a way to get it back to its previous pristine state".** Continuing to use Quesnel Lake as a dumping ground for the MPMC waste water does not address the Premier's statement in any way, shape or form and we expect the Province of BC to deny the discharging of waste water into a Quesnel Lake dilution zone.

Highly qualified Dr. David Chambers of the Centre for Science in Public Participation in his related submission stated **"Treatment of the mine effluent to meet water quality standards is easily technologically achievable, and arguably should be required to minimize further damage to Quesnel Lake. In essence, asking for a dilution zone in Quesnel Lake is adding insult to injury".** I couldn't agree more.

To allow the continued use of Quesnel Lake as a receptor for the MPMCs waste water is not an environmentally sound idea and further puts the aquatic health of Quesnel Lake at risk. In summary I do not approve of their long term water treatment plan.

Best regards,
Richard Holmes M.Sc., R.P.Bio., Q.E.P.
Cariboo Envirotech Ltd.
PO Box 174
6267 Prior Road
Likely, BC
Canada V0L 1N0

From: whenke@thelakebc.ca
Sent: December 20, 2016 8:42 AM
To: MtPolleyEnvironmental.Enquiries@gov.bc.ca
Cc: Inquiries
Subject: Comments on Mt PolleyLong Term Water Management Plan

Ministry of Environment
Dec 20, 2016
2080 A Lebieux Road
Nanaimo BC V9T 6J0
MtPolleyMinePermit@gov.bc.ca

It is incomprehensible to me that the Ministry of Environment is considering the continued pollution of Quesnel Lake. I have lived on and near Quesnel Lake for over 40 years and have always felt more than safe drinking the water directly from the lake as well as it being our only domestic source of water,, until now.

I also find it unbelievable that as citizens we have to fight our own Government to try and protect our environment and only source of drinking water.

I have been to countless meetings on this subject and the only thing that Imperial Metals and the Government of BC has accomplished is to entrench a complete distrust of Industry and Government in regards to this situation. So until you can give us a trusted person to work on our behalf and speak for us you are wasting your breath.

Ministry of Environment and The BC Liberal Government are only enabling this Company to continue operating, at any cost to the environment, in order to maintain employment. As has been stated at every meeting that I've attended, the community of Likely in general supports the continued operation of the Mt Polley Mine but only in an environmentally responsible manner using best available technology. This is not the case. Imperial Metals Corp has insisted on using the cheapest way out, which caused this breach in the first place. They continued to build the dam higher with no regard to safety. If it was built properly it would not have failed no matter the underlying geology.

It is my understanding that Best Available Technology is to be used to treat any effluent prior to release to the environment. This is not happening. The current sediment filter system is not good enough.
Effluent should be properly treated to ensure that discharge to the environment is of the same or better quality as the receiving environment not just BC Water Quality guidelines. Furthermore release to Quesnel Lake is not acceptable. If any release is to be made it should be to the Quesnel River where it can be flushed out of the local environment not left to circulate in Quesnel Lake in perpetuity. Any discharge should be tested at end of pipe not, relying on dilution in the IDZ to meet water quality.

The only thing Mt Polley seems to be testing for(rarely if ever)is the metals, which is important but is not the only component of the effluent. I live about 6 km from Hazeltine Creek on Quesnel Lake and the only boat I see out there doing any measuring is the UNBC QRRC research vessel WH Mathews. I have

volunteered on this boat taking samples and have trust in the work they are doing but it will take years of study to determine the full impacts of this disaster. You are not even waiting for the results of these current tests (ie metals uptake in plankton, consolidation of sediments and re-suspension tests) to make a decision.
Our (localresidents) observations on changes in the lake have been ignored and dismissed by Mt Polley and your Ministry. I have been here all of my adult life and I can tell you, it has changed.

If this had happened on Shuswap or Okanagan Lake would this permit be approved?? I don't think it would have even been considered. Because we are relatively remote and few in number we are being considered collateral damage.

With the millions or billions of dollars worth of raw resources taken from this area in the past and the Millions or Billions of dollars yet to be made by Mt Polley, I think we deserve better than that. If not just for the sake of the environment and preservation of this pristine environment.

Wayne Henke
5909 Cedar Creek Road
Likely BC
V0L 1N0
250 790 2487
whenke@thelakebc.ca

From: Hill, Robert <Robert.Hill@leg.bc.ca>
Sent: December 23, 2016 2:04 PM
Subject: Re: Amendment to Permit 11678
Attachments: 20161223140042.pdf

To Whom it May Concern,

Please see the attached letter from George Heyman, Official Opposition Spokesperson for Environment, and Doug Donaldson, Official Opposition Spokesperson for Energy and Mines.

The letter is re: Amendment to Permit 11678.

Hard copies will be mailed out as soon as possible.

Kindly yours,

Robert Hill | Legislative Assistant | John Horgan's New Democrat Official Opposition | **P:** 250.387.3614
Robert.Hill@leg.bc.ca | www.bcndpcaucus.ca

Follow John Horgan on Facebook | Twitter | Instagram
Subscribe to John's weekly e-newsletter

Help save paper - do you need to print this email?

Legislative Office:
Room 201, Parliament Buildings
Victoria, B.C. V8V 1X4
Phone: 250 387-3655
Fax: 250 387-4680

Community Office:
642 West Broadway
Vancouver, B.C. V5Z 1G1
Phone: 604 775-2453
E-mail: george.heyman.mla@leg.bc.ca

Province of
British Columbia
Legislative Assembly

George Heyman, MLA
(Vancouver - Fairview)

December 23, 2016

Ministry of Environment
Director of Mining Operations – Mount Polley
2080-A Labieux Road
Nanaimo, B.C.
V9T 6J9

Mount Polley Mining Corporation
PO Box 12
Likely, B.C.
V0L 1N0

Re: Amendment to Permit 11678

To whom it may concern,

We are writing concerning Mount Polley Mining Corporation (MPMC) and its application for an amendment to its water discharge permit into Quesnel Lake.

The August 2014 Tailings Storage Facility (TSF) breech at Mount Polley mine and the resulting 25 million cubic meters of tailings and debris spilling into Quesnel Lake has shown how much this government has failed the public and the mining and exploration industries in BC. Government oversight must provide confidence for the public, industry and investors. The Mount Polley disaster shook the confidence of each of those groups.

It is crucial that going forward, that the Province addresses the water concerns in Quesnel Lake, and not add to the lake's compromised water quality.

The plan must consider cumulative impacts, including those from the initial disaster and any new water entering the lake. Since the long term effects of potential metal contamination, turbidity and nutrients released in the TSF breech are not known, we must ensure the water released from the TSF does not contribute to or compound the long term health of Quesnel Lake and ultimately the Fraser River system; anything less may exacerbate the problems begun by the initial catastrophic breech.

Last year MPMC requested and received a (temporary) treated water discharge permit for levels the ministry knew were 25% higher than the capacity of the water treatment unit. The excess untreated water went into Hazeltine Creek and Quesnel Lake.

.../2

The new permit application would allow for water quality testing 100 meters from the pipe releasing tailings water into Quesnel Lake at depth. This Initial Dilution Zone will allow the tailings water to meet BC Water Quality Guidelines when tested 100 meters away from the end of the pipe.

Given the uncertainty about the cumulative impacts of the initial spill, and the impacts of new tailings water entering the lake, it seems far more advisable to require the water coming from the Mount Polley TSF to meet BC Water Quality Guidelines (BCWQG) before it enters the lake, not 100 meters after.

There surely must be better solutions for consideration than the proposed 100 meter Initial Dilution Zone, given that the stated intention of the current provincial government after the Mt Polley disaster is for the Best Available Technology (BAT) to be the required minimum standard.

We urge the government to engage industry and the public alike, consider a long term plan for recovery, and ensure that all water entering the lake meets BC Water Quality Guidelines. In so doing, the government will provide assurance to the public that there is a recovery plan in place, it will provide industry with stability, and investors with confidence.

Any long term water discharge permit should enable a recovery plan and the consideration of all who depend upon the clean water in Quesnel Lake and the Fraser River system, from people to salmon.

For the mining and exploration sectors to thrive in BC, the Province must ensure that the public can trust in government oversight on the environmental risks involved. This means enforceable regulations are required and must be maintained with the best technology. Our mining and exploration sectors depend upon this, fish and wildlife depends on this and the people of BC demand this.

Sincerely,

George Heyman
MLA for Vancouver-Fairview
Spokesperson for Environment

Doug Donaldson
MLA for Stikine
Spokesperson for Energy and Mines

From: Cherrie Carr <cherrie@lumenwl.ca>
Sent: January 10, 2017 3:05 PM
To: inquiries@imperialmetals.com
Subject: comment/feedback

Hello,

I was invited to make a statement directly to Imperial Metals after submitting comments to the BC Ministry of Environment following the application/amendment process for MT. Polley Mine to continue using Quesnel Lake as a place to dump mine effluent. As a resident of Williams Lake I believe that myself, my family and all the people living in and around Williams Lake will be impacted adversely by the use of Quesnel Lake in this way. Water really is life, and Quesnel Lake is unparalleled in terms of what it has to offer not only in terms of natural beauty and as an ecosystem for all the fish and wildlife that call it home, but also for the human beings that come to its shores to fish, camp, live or commune with the natural world.

For the people who live here, this area is not a sacrifice zone. It is home, and there is not enough money in the world to ask that we all turn our backs on this area in the interest of corporate gain for the very few. Let's be real- the higher ups in your company will never settle in this area, therefore it is easy to use it as a dumping ground. Even if they loved it here, if shoddy cost-cutting mining practices left the land and waters poisoned, they would likely have enough capital to relocate to a more desirable place. The people your company pays to do it's dirty work (laborers, equipment operators, even ticketed tradespeople) do not have that same luxury. The least Imperial Metals could do is feign interest in the area it is plundering and spend some of that crazy profit on implementing more environmentally respectful and sustainable mining practices. We know these methods are out there (phytoremediation, dry-stacking? Even putting it into a moving river is likely a better option and the company knows it but is too cheap to even look at these possibilities) , and by rights we should be inviting companies willing to respect this area and truly invest in the future of the planet to come in and Imperial Metals should get the hell out and out of the way of the future. People are eventually going to realize that there are a lot of jobs in doing things the right way, and when they do Imperial Metals will be a dinosaur. Can you say "divestment"?

Imperial Metals had an opportunity to be a world-leader and trail-blazer in accountability and implementation of mining practices that promote stewardship over the land rather than classic old rape and plunder. The breach was an epic fail (but perhaps orchestrated to speed up the process of using QL as a dumping ground? Who knows…but look your nose is growing), but Imperial Metals' response could have put the company at the forefront of future mining. It could have gotten the attention of those green billionaires who are frothing at the mouth to invest in addressing climate change and environmental stewardship but who want to make a profit doing it. But instead Imperial Metals teamed up with the BC Gov, which let's face it is currently headed by a corporate prostitute (no offense to prostitutes of course) and stuck your heads in the sand. History called, and Imperial Metals didn't answer. What a shame.

Do not put the effluent into Quesnel Lake. Stop being greedy, stop gouging, and put yourselves in the shoes of the local people who yes, need to work but are also entitled to have one of the deepest bodies of fresh water in the world protected. This is not even your world, Imperial Metals suits-at-the-top. It belongs to our children and grandchildren and their grandchildren, and you are robbing them of a future. Shame on you Imperial Metals.

Cherrie

Email: cherrie@lumenwl.ca

From: Projects <Projects@bcwf.bc.ca>
Sent: February 3, 2017 2:38 PM
To: Hubert Bunce (Hubert.Bunce@gov.bc.ca); MtPolleyEnvironmental.Enquiries@gov.bc.ca
Cc: Minister Mary Pollak (env.minister@gov.bc.ca); Luc Lachance (Luc.Lachance@gov.bc.ca); inquiries@imperialmetals.com; President - Jim Glaicar (jim.glaicar@gmail.com); Al Martin (External); Past President , George Wilson; Director - Carl Gitscheff (cowboy@pris.ca); Operations
Subject: Letter from BC Wildlife Federation to H Bunce, MOE
Attachments: 02.03.17 Ltr to H Bunce MOE re Mt. Polley.pdf

Dear Mr. Bunce,

Please see attached letter from BC Wildlife Federation President, Jim Glaicar regarding Mount Polley.

Yours in conservation,

Michelle Galang
Special Projects Coordinator
BC Wildlife Federation
T 604-882-9988 ext. 224 | E projects@bcwf.bc.ca
F 604-882-9933

101-9706 188th Street
Surrey, BC V4N 3M2
TF 1-888-881-2293
www.bcwf.bc.ca

Please consider the environment before printing this email

Facebook | Twitter

Click Here to Become a BCWF Member Today!

February 3, 2017

Hubert Bunce
A/Director for Mt. Polley, Environmental Protection
Ministry of Environment
2080 A Labieux Road
Nanaimo BC
V9T 6J0

Dear Mr. Bunce,

The BC Wildlife Federation is non-profit non-partisan organization committed to the sustainability of fish, wildlife and their habitats and have 50,000 members through our province. We have worked with the Ministry of Environment and provided input into the Water Sustainability Act and its regulations.

The BC Wildlife Federation is very concerned about Mount Polley Mining Corporation's (MPMC) application for a long-term permit to discharge not-fully treated mine waste water into Quesnel Lake. We understand that the public comment period is closed but comments provided by us to the statutory decision maker on this permit may be considered in his decision.

We have also provided a copy of this letter to Imperial Metals owners of MPMC.

We support the submission to BC Ministry of Environment titled: Mount Polley Mine Permit Application for Long Term Water Management Plan & Discharge into Quesnel Lake made by the Mining Watch Canada December 23, 2016 and their following four points:

1. reject this permit application and require MPMC to propose alternative options to its long-term water management plan, including full treatment of mine effluent and possible discharge points into less sensitive waters;

2. require a 'dry closure' to reduce risks and ensure long-term stability, as recommended by the Independent Expert Panel report2 on the 2014 Mount Polley dam breach and spill;

3. strengthen current MPMC's financial securities to eliminate long-term public liability for site closure, clean-up, maintenance, and perpetual care;

4. obtain clear support and consent from all of the locally affected communities, First Nations, and organizations for a proposed long-term water management and closure plan—including proper remedies for the people that were, and still are, affected by the 2014 mine spill.

In addition we recommend:

5. Establish enforceable water quality objectives under the Water Sustainability Act for Quesnel Lake to maintain this unique ecosystem and the fish and wildlife they support.

Yours sincerely,

Jim Glaicar
President
BC Wildlife Federation

Cc: Hon. Mary Polak, Minister of Environment
Luc LaChance, Authorizations Section Head, Mining Operations (Nanaimo)
Imperial Metals – Mount Polley Mining Corporation
George Wilson, BC Wildlife Federation Past President & Co-Chair Mining Committee
Carl Gitscheff BC Wildlife Federation Co-Chair Mining Committee

APPENDIX D3

MPMC PUBLIC COMMENT TRACKING TABLE

	Duplicate from MoE/MEM Comments
	Unique comment

Comment ID	Date	Author	Location	Communities	In Province	Out of Province	Unknown Location	First Nations	Political Groups	Conservation Groups	Other Groups
For Permit Amendment											
1 (#3 from MoE/MEM tracking)	20-Nov-16	Bee Hooker, BLCA President Marianne Woods, BLCA Vice President Jack Darney, BLCA Past President Kelly Burnham, BLCA Treasurer Jenny Howell, BLCA Secretary	Big Lake, BC	On behalf of the BLCA, we would like to acknowledge and thank the Mount Polley mine staff for their efforts to inform and communicate with our community on their long term water discharge plans. While the BLCA does not have the authority to speak on behalf of the entire community, nor do we have the expertise to comment on the technical details of this plan, we are supportive of the longevity of the mine operation. The mine is one of the largest employers within our community, so we recognize the need for a long term water solution that manages environment, social and economic aspects using the best available technologies and scientific knowledge. We will continue to advise our membership of how they can become informed, and how they may express either their concerns or support in regards to future permitting. We are appreciative of the lengths the mine has gone to in order to connect with the community throughout the ongoing permit applications process over the past couple of years, both through [illegible]							
2	15-Dec-16	Pat Pokeda Steve Cook	Morehead, BC	I am an employee at Mount Polley Mine. I have been working there since 2007, one of the luckier ones who manage to stay working when some were laid off. I also live at Morehead so I spend time in Likely. I also want to say that I do not support Doug Watt and his following. Imperial Metals has gone above and beyond since the breach happened. The cleanup that has been done is nothing short of amazing. For anyone to say that Imperial Metals is not doing their best, is asinine. The long term water management plan is a good one. Quesnel Lake is as beautiful today as it was the day before the breach. When the water that is being released is free of toxins, how can that damage the lake. I don't understand how you can have so many Biologist saying that the water is fine yet you have a chosen few radicals speaking out as if they know better. You just have to read the bill board they have erected on the way into Williams Lake to know that they don't have any idea what they are talking about. Releasing water into Quesnel Lake makes the most sense. It should be released as close to the source as possible. If you are concerned with the environment you try to put things back as close to natural as possible. To transfer it all the way to Quesnel river is ridiculous. [illegible]							
3 (#4 from MoE/MEM tracking)	20-Dec-16	Dolly Potter	Likely, BC	I have been a life long resident of Likely and a long term employee at Mount Polley Mine. I support the permit because I believe the Company , Government officials and Consultants have done a thorough analysis based on scientific facts. This is clean, tested water they are asking to transfer to the lake. Our lake is beautiful and will remain beautiful but if the mine can't operate I wonder how many of us will be able to stay in our community to enjoy the lake and surrounding areas.							
Against Permit Amendment											
4 (#51 from MoE/MEM tracking)	November 2, 2016	Wendy Hart	Quesnel Lake, BC		As a ten year , seasonal resident of Quesnel Lake, with [illegible] My very real concern is that even though Polley Mine [illegible] high mineral contents are green. How can this be okay? [illegible] I am very distressed and angered by this whole situation [illegible] very concerned citizen, Wendy Hart Quesnel Lake property owner						
5 (#20 from MoE/MEM tracking)	22-Nov-16	Fred McMechan, President Williams Lake Field Naturalists	Williams Lake, BC							[illegible]	
6	30-Nov-16	Amy Sandy	Unknown					[illegible]			
7 (#44 from MoE/MEM tracking)	03-Dec-16	Nadene Guiltner	Likely, BC	Yes, we do need jobs, yes we do need natural resource extraction, [illegible]							
8	10-Dec-16	Amber Sherwood-Robinson	Unknown				Our lakes and rivers are crucial for clean drinking water, recreation, fish habitat, not receiving environments for industry. [illegible]				
9 (#32 from MoE/MEM tracking)	11-Dec-16	Norm Hudson	Likely, BC	Date: 2016-11-29. I wish to express my strong objection to allowing Mt Polley [illegible] Please do not go ahead and allow this permit to proceed. Date: 2016-12-09 I wish to say I am a member of the Likely C. Of C. And the [illegible] Again I wish to say, I strongly, object to this permit No. 11[illegible]							
10 (#70 from MoE/MEM tracking)	14-Dec-16	Lionel Guiltner	Quesnel Lake, BC	Polley mine presents many models of the proposed discharge [illegible] Why would MOE want to approve any discharge into a wa[illegible]							
11 (#91 from MoE/MEM tracking)	17-Dec-16	C.H. Morrison	Quesnel Lake, BC				This letter is to express my strong objection to this Application. [illegible]				
12 (#94 from MoE/MEM tracking)	20-Dec-16	Jane Brett Gena Kirkman Heather Tufts Margie Noonan (on behalf of the Mining Justice Action Committee)	Victoria, BC								[illegible]
13 (#101 from MoE/MEM tracking)	20-Dec-16	Richard Holmes	Likely, BC	I am writing the Provincial Government to voice my compl[illegible] 1. Best Available Technology (BAT): The MPMC is providing [illegible] 2. The Precautionary Principle: This principle should be app[illegible] The precautionary principle should be applied in this decisi[illegible] 3.Premier Clarke's Statement: Premier Clark addressed th[illegible] Highly qualified Dr. David Chambers of the Centre for Scien[illegible] to injury". I couldn't agree more. [illegible]							
14 (#95 from MoE/MEM tracking)	20-Dec-16	Wayne Henke	Likely, BC	It is incomprehensible to me that the Ministry of Environm[illegible] I also find it unbelievable that as citizens we have to fight [illegible] I have been to countless meetings on this subject and the [illegible] Ministry of Environment and The BC Liberal Government [illegible] It is my understanding that Best Available Technology is t[illegible] The only thing Mt Polley seems to be testing for(rarely if e[illegible] If this had happened on Shuswap or Okanagan Lake would [illegible]							
15 (#124 from MoE/MEM tracking)	23-Dec-16	George Heyman, MLA for Vancouver-Fairview, Spokesperson for Environment Doug Donaldson, MLA for Stikine, Spokesperson for Energy and Mines	BC, Canada						We are writing concerning Mount Polley Mining Corporation (MPMC) and its application for an amendment to its water discharge permit into Quesnel Lake. The August 2014 Tailings Storage Facility (TSF) breech at Mount Polley mine and the resulting 25 million cubic meters of tailings and debris spilling into Quesnel Lake has shown how much this government has failed the public and the mining and exploration industries in BC. Government oversight must provide confidence for the public, industry and investors. The Mount Polley disaster shook the confidence of each of those groups. It is crucial that going forward, that the Province addresses the water concerns in Quesnel Lake,and not add to the lake s compromised water quality. The plan must consider cumulative impacts, including those from the initial disaster and any new water entering the lake. Since the long term effects of potential metal contamination, turbidity and nutrients released in the TSF breech are not known, we must ensure the water released from the TSF does not contribute to or compound the long term health of Quesnel Lake and ultimately the Fraser River system; anything less may exacerbate the problems begun by the initial catastrophic breech. Last year MPMC requested and received a (temporary) treated water discharge permit for levels the ministry knew were 25% higher than the capacity of the water treatment unit. The excess untreated water went into Hazeltine Creek and Quesnel Lake. The new permit application would allow for water quality testing 100 meters from the pipe releasing tailings water into Quesnel Lake at depth. This Initial Dilution Zone will allow the tailings water to meet BC Water Quality Guidelines when tested 100 meters away from the end of the pipe. Given the uncertainty about the cumulative impacts of the initial spill, and the impacts of new tailings water entering the lake, it seems far more advisable to require the water coming from the Mount Polley TSF to meet BC Water Quality Guidelines (BCWQG) before it enters the lake, not 100 meters after. There surely must be better solutions for consideration than the proposed 100 meter Initial Dilution Zone, given that the stated intention of the current provincial government after the Mt Polley disaster is for the Best Available Technology (BAT) to be the required minimum standard. We urge the government to engage industry and the public alike, consider a long term plan for recovery, and ensure that all water entering the lake meets BC Water Quality Guidelines. In so doing, the government will provide assurance to the public that there is a recovery plan in place, it will provide industry with stability, and investors with confidence. Any long term water discharge permit should enable a recovery plan and the consideration of all who depend upon the clean water in Quesnel Lake and the Fraser River system, from people to salmon. For the mining and exploration sectors to thrive in BC, the Province must ensure that the public can trust in government oversight on the environmental risks involved. This means enforceable regulations are required and must be maintained with the best technology. Our mining and exploration sectors depend upon this, fish and wildlife depends on this and the [illegible]		
16	10-Jan-17	Cherrie Carr	Williams Lake, BC	I was invited to make a statement directly to Imperial Metals [illegible] For the people who live here, this area is not a sacrifice zone [illegible] Imperial Metals had an opportunity to be a world-leader [illegible] Do not put the effluent into Quesnel Lake. Stop being greedy [illegible]							
17	03-Feb-17	Jim Glaicar, President BC Wildlife Federation	BC, Canada							The BC Wildlife Federation is very concerned about Mount Polley Mining Corporation's (MPMC) application for a long term permit to discharge not fully treated mine waste water into Quesnel Lake. [illegible] decision. We have also provided a copy of this letter to Imperial Metals owners of MPMC. [illegible]	

APPENDIX E

SUPPLEMENTAL INFORMATION TO SUPPORT PUBLIC COMMENT RESPONSES

TECHNICAL MEMORANDUM

DATE 20 January 2017 **REFERENCE No.** 1662612-073-TM-Rev0-33283

TO Luke Moger
Mount Polley Mining Corporation

CC Don Parsons (MPMC) and 'Lyn Anglin (IMC)

FROM Jerry Vandenberg and Lee Nikl **EMAIL** Jerry_Vandenberg@golder.com; Lee_Nikl@golder.com

ADDENDUM TO MOUNT POLLEY MINE LONG TERM TAR OPTIONS ANALYSIS – MOUNT POLLEY MINE

1.0 INTRODUCTION

This memorandum has been prepared in response to a letter from the Government-to-Government Working Group (G2G) to Luke Moger, Mount Polley Mining Corporation (MPMC), dated 22 December 2016. The letter follows up on information presented by MPMC and Golder Associates Ltd. (Golder) at the Cariboo Mine Development Review Committee (CMRDC) meeting of 15 December 2016. This 15 December 2016 CMDRC meeting was convened to discuss the Long-term Water Management Plan (LTWMP) for the Mount Polley Mine, and, specifically, the ongoing regulatory review of MPMC's associated *Environmental Assessment Act* (EMA) Permit 11678 amendment application. MPMC and Golder are pleased to receive the feedback included in this 22 December 2016 G2G letter that this CMDRC meeting was helpful in advancing a better understanding of options analysis and selection of the preferred option as proposed in MPMC's LTWMP.

The above-noted G2G letter requests "an estimate of the total cost associated with development, implementation and operation of the Quesnel River and Quesnel Lake discharge options over the life of the discharge" be provided by MPMC to the CMDRC membership by 20 January 2017. It is noted in the letter that, "both Ministry of Environment and the Williams Lake and Soda Creek Indian Bands are receiving numerous requests from the public and band members for a cost comparison between the Quesnel River and Quesnel Lake discharge options". The purpose for the provision of a cost estimate, as stated in the letter, is to, "help in the public's understanding of the choices MPMC is making relative to the future operations of the mine".

The discharge referred to in that letter is described in the LTWMP Technical Assessment Report (TAR; Golder 2016) for the Mount Polley Mine. Appendix G of the TAR provides an Options Analysis that was used to select the discharge location. By considering environmental, technological, social and economic criteria, the Options Analysis indicated that Quesnel Lake was the selected option and this is the option that forms the basis of MPMC's EMA Permit 11678 amendment application. The issuance of this EMA Permit 11678 amendment, for that option and in advance of spring melt, is a critical path requirement to enable MPMC to responsibly manage site water, with or without operations at the Mount Polley Mine.

Golder Associates Ltd.
Suite 200 - 2920 Virtual Way, Vancouver, BC, V5M 0C4
Tel: +1 (604) 296 4200 Fax: +1 (604) 298 5253 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

2.0 COST ANALYSIS

As further discussed below, in keeping with the established process for completing an Options Analysis, detailed engineering, including cost estimation, has not been completed for those options that were found not to provide satisfactory, reliable and resilient environmental performance. In such cases, cost was not a determining factor – environmental performance was the driving reason. The cost analysis that is sought in the 22 December 2016 G2G letter has therefore not been carried out. If we had such a cost estimate derived, Golder would have been pleased to have provided this to the Ministry of Environment and Xatśūll First Nation and Williams Lake Indian Band through MPMC. We appreciate that the G2G letter represents questions from public and band membership and we appreciate the importance of providing answers for these parties. Unfortunately, no such cost analysis is available and there are substantial costs that would be incurred just to develop the cost estimate. We therefore hope that the following explanation of the decision process will provide a better understanding of the options analysis. We also provide further considerations below to provide some dimension to costs.

When undertaking an Options Analysis, it is sufficient to know that one option costs more than another, without knowing exactly what those costs are. This relative scoring is applicable to any criteria considered in an Options Analysis. In the event that two options were evaluated to be close together (in terms of score), then more detailed cost analyses would be required to differentiate between the options. In the case of the two options noted in the G2G letter, Quesnel Lake and Quesnel River, it was known that, at a rudimentary level, the cost will be driven primarily by the length of the pipe, which is considerably longer for the Quesnel River option. While this rather simple comparison is sufficient for the Options Analysis, some of the factors that would come to play with regards to cost include (but are not limited to) the items below. The determination of the costs that would apply, even for Class C or D cost estimates, would require further engineering analysis and study for an option that has been found to not satisfy the environmental needs. Again, it is noted that the descriptions below are related only to cost (i.e., the Economic criteria), with more information regarding the Environmental, Technological and Social criteria considerations detailed in the TAR.

- Distance—while for the purposes of options analysis, we assumed distance implications to be the same between options. However, it may be more expensive per metre of pipe to build to the river. Our engineers advise that the pipe may need to be steel rather than HDPE because of hydraulic pressure implications of a river discharge.
- Steel Pipe—some of the implications of the need for a steel pipe would mean increased construction material costs and different construction methodology. While the HDPE pipe can be fused using local equipment and expertise, steel pipe would require specialized equipment and Red Seal certified welding contractors that may not be locally available.
- Terrain and construction implications of that terrain—the pipe run to Quesnel Lake is a fairly simple terrain over which to construct. The terrain that the pipe crosses on the way to Quesnel River is more complex, resulting in the possibility that there is a greater construction cost per linear distance. This detailed evaluation has not been carried out.
- Pumping stations—there may need to be pumping booster stations. These are typically expensive not only because of the types of pumps required but also because of the need to provide power to those stations.
- Capital and operating costs of an in-river diffuser—this is a dynamic section of river, and a mid-channel diffuser structure would be subjected to considerable design, inspection and maintenance challenges as it would be subject to fluctuating flow regimes, ice and bedload movement in the form of large rocks/boulders.

The Quesnel River option would also require additional studies such as a fish habitat survey to identify non-fish spawning areas for an initial dilution zone.

The Options Analysis is not sensitive to a change in any single criterion, including cost. As outlined in the original Options Analysis, of the twelve secondary criteria listed, nine favour Quesnel Lake over Quesnel River, two are tied, and one favours Quesnel River. Furthermore, as described in the following section of this memorandum, removing any of the four pillars of the Options Analysis entirely does not change the outcome of the analysis. In other words, even if costs are completely ignored, the Quesnel Lake option remains a better overall option compared to the Quesnel River option—cost was not the determining factor. Returning to the purpose of completing the costing as requested in the G2G letter (to help public's and band membership's understanding of the MPMC's choices), it is the sentiment of both Golder and MPMC that understanding the above is key in satisfying this purpose, and advocate that, conversely, provision of more detailed costing does not best serve this purpose.

In the context of providing as much information as we are able to, based on what is available, we have provided additional detail on the sensitivity analysis below.

3.0 SENSITIVITY ANALYSIS

A common technique for determining the robustness of a decision that is supported by an Options Analysis is to perform a sensitivity analysis on the final table. This is done by changing the weighting or scores in a transparent manner to understand how the decision might change under "what-if" scenarios. In this case, the "what-if" scenario to be evaluated is "what if costs are ignored entirely". This scenario can be evaluated by setting the weighting of all Economic criteria to zero and multiplying the non-economic weightings by 4/3 to arrive at equivalent overall scores. This has been done individually for each of the four "pillars" of the Options Analysis (Environmental, Technological, Social and Economic).

The resulting matrices are presented in Attachment 1, and the results are summarized in Table 1. A copy of the original Options Analysis is included as Attachment 2 for reference. Because the majority of comments received since the submission of the EMA Permit 11678 amendment application have focused on the evaluation of Quesnel Lake versus Quesnel River, this memorandum focuses exclusively on those two options. As shown in Table 1, the Quesnel Lake option is superior to the Quesnel River option regardless of which pillar is removed.

What this illustrates is that no single criterion would change the outcome of the Options Analysis, whether that criterion were ignored or incorrectly assessed. So while cost was not the determining factor, neither was any other single factor. The Quesnel Lake option is superior in terms of environmental, technological and economic considerations.

Table 1: Scores and Ranks of Sensitivity Analysis

Sensitivity Analysis	Quesnel Lake		Quesnel River	
	Score	Rank	Score	Rank
No Environmental Criteria	392	1	333	2
No Technological Criteria	367	1	337	2
No Social Criteria	408	1	253	4
No Economic Criteria	408	1	337	2
Original Options Analysis	*394*	*1*	*315*	*4*

4.0 CLOSURE

The reader is referred to the Study Limitations, which follows the text and forms an integral part of this memorandum.

Although we do not have available the information requested in the 22 December 2016 G2G letter, we trust that this letter provides at least some of the basis of cost comparisons that would be factored into development of a cost estimate. We would further add that the engineering studies needed to develop the cost estimate of options that are not the subject of MPMC's application would take additional time and resources and could potentially delay a critical path item. The consequences of delayed permits would be accumulation of surplus water on site—the very outcome that water management planning is seeking to avoid.

Importantly, it is also the sentiment of both Golder and MPMC that understanding the inputs and use of an Options Analysis is key in satisfying the purpose as stated in the G2G letter, namely to "help in the public's understanding of the choices MPMC is making relative to the future operations of the mine". While MPMC and Golder did consider costs as part of their Options Analysis for water management at the Mount Polley Mine, and have endeavoured to provide additional information as to the considerations for the Quesnel River option (as compared to the Quesnel Lake option) in this memorandum, it is advocated that understanding the Options Analysis process, and the reasons for which detailed costing is not required for the considerations for this application, is important in fulfilling such purpose.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Jerry Vandenberg, MSc, PChem
Principal, Environmental Chemist

ORIGINAL SIGNED

Lee Nikl, MSc, RPBio
Principal, Aquatic Scientist

JV/LN/it/cmm

Attachments: Study Limitations
Attachment 1: Options Analysis with Each of the Four Pillars Excluded
Attachment 2: Original Options Analysis from October 2016 Technical Assessment Report

\\golder.gds\gal\burnaby\final\2016\3 proj\1662612 mpmc_tailingsenviroeng_bc\1662612-073-tm-rev0-33283\1662612-073-tm-rev0-33283-ltwmp_option_20jan_17.docx

REFERENCE

Golder (Golder Associates Ltd.). 2016. Permit Amendment Application under the Environmental Management Act: Technical Assessment Report. Submitted to Dale Reimer, Mount Polley Mining Corporation, Golder Doc. No. 1411734-162-R-Rev0-16000. 17 October 2016.

STUDY LIMITATIONS

Golder Associates Ltd. (Golder) has prepared this document in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this document. No warranty, express or implied, is made.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, has been prepared by Golder for the sole benefit of Mount Polley Mining Corporation (MPMC). It represents Golder's professional judgement based on the knowledge and information available at the time of completion. Golder is not responsible for any unauthorized use or modification of this document. All third parties relying on this document do so at their own risk.

The factual data, interpretations, suggestions, recommendations and opinions expressed in this document pertain to the specific project, site conditions, design objective, development and purpose described to Golder by MPMC, and are not applicable to any other project or site location. In order to properly understand the factual data, interpretations, suggestions, recommendations and opinions expressed in this document, reference must be made to the entire document.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder. MPMC may make copies of the document in such quantities as are reasonably necessary for those parties conducting business specifically related to the subject of this document or in support of or in response to regulatory inquiries and proceedings. Electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore no party can rely solely on the electronic media versions of this document.

ATTACHMENT 1
Options Analysis with Each of the Four Pillars Excluded

Primary Criteria																				
Criteria		**Description**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
Environmental		Does not cause adverse impacts to aquatic, terrestrial or human	✓			✓			✓			✓			✓			✓		
Legal		Complies with all applicable provincial and federal policy and law	✓			✓			✓			✓			✓			✓		
Secondary Criteria																				
Criteria		**Description**	**Weighting**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
				Rank	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**
Environmental	Assimilative Capacity	Minimum of 10x dilution, >100x dilution preferred	0	1	0	Low dilution at point of discharge	5	0	High predicted and measured dilution	1	0	Low dilution at point of discharge	3	0	>10x dilution, large IDZ required at low flows	4	0	Effluent distributed to multiple locations	2	0	Benchmarks and treatment tailored to receiving environment
	Aquatic Effects	Minimize receiving effects on receiving environment	0	1	0	Prevents or prolongs rehabilitation	5	0	All WQG met at IDZ	2	0	Incomplete restoration of Hazeltine Creek	3	0	IDZ may impinge on fish spawning habitat	3	0	Discharge distributed but into unimpacted water body	4	0	Benchmarks would be derived to minimize aquatic effects
	Terrestrial Effects	Minimize disturbance (land clearing, construction area, linear disturbance)	0	5	0	Minimal pipeline and infrastructure required	2	0	Use of existing infrastructure; some new linear disturbance	4	0	Minimal pipeline along disturbed corridor	1	0	Additional linear disturbance and diffuser construction	3	0	Low terrestrial disturbance	5	0	Minimal pipeline and infrastructure required
	Long Term Sustainability	Ensure location will be viable for long term	0	1	0	Short-term solution	3	0	Suitable for long term but not permanent	2	0	Allows progressive rehabilitation	3	0	Suitable for long term but not permanent	5	0	Viable permanent solution that restores pre-mining flows	4	0	Viable permanent solution
Technological	Risk and Consequence of Failure	Minimize likelihood of failure and potential effect of failure	8.333	1	8.3333	Risk of uncontrolled release to Quesnel Lake	5	41.667	Deep diffuser in low traffic area	1	8.3333	Risk of uncontrolled release to Quesnel River	2	16.667	Diffuser located in shallow flow	3	25	Distributed flows disperse risk	4	33.333	Low risk of failure; minimal infrastructure
	Complexity	Prefer lower complexity	8.333	3	25	Low complexity of system; high complexity of flow management	4	33.333	Single pipeline and use of existing diffuser	3	25	Low complexity of system; high complexity of flow management	2	16.667	Long pipeline; river diffuser	1	8.3333	Most complex drainageand discharge systems	5	41.667	Low complexity
	Flexible Design	Adaptable and scalable	8.333	1	8.3333	No flexibility - current system is already limited	5	41.667	Readily adaptable to higher flows	1	8.3333	No flexibility - current system is already limited	4	33.333	Some flexibility but may be limited seasonally	3	25	Limited scalability; readily adaptable	2	16.667	Difficult to scale
	Risk of Non-compliance	Prefer higher reliability	8.333	1	8.3333	Requires highly managed flows	5	41.667	Lowest variability in receiving environment	1	8.3333	Requires highly managed flows	2	16.667	Dilution impacted by variable flow rate in receiving environment	4	33.333	Lake systems less variable than lotic	3	25	Dependent upon derivation
Social	Restoration of Fish Habitat	Preference to restore more habitat in Hazeltine Creek sooner	16.67	1	16.667	Prevents or prolongs rehabilitation	5	83.333	Allows complete restoration	2	33.333	Partial restoration Short timeline	5	83.333	Allows complete restoration	3	50	Allows complete restoration but in longer time frame	3	50	Allows complete restoration but in longer time frame
	Acceptance of Option	Stated preference of stakeholders	16.67	1	16.667	Not favoured by any stakeholder	2	33.333	Allows restoration of Hazeltine Creek but entails discharge upgradient of Likely	1	16.667	Not favoured by any stakeholder	5	83.333	Preferred by Likely residents	4	66.667	Stated preference of some stakeholders	2	33.333	Anticipated low acceptance
Economic	Capital Cost	Lower capital cost	16.67	5	83.333	No capital cost	2	33.333	Higher cost of pipeline installation	3	50	Short pipeline required	1	16.667	Higher cost of pipeline installation	4	66.667	Multiple discharge locations, all nearby	4	66.667	Low infrastructure cost; additional studies required
	Operating Cost	Lower operating cost	16.67	1	16.667	High management and monitoring effort	5	83.333	Minimize maintenance and monitoring locations	1	16.667	High management and monitoring effort	4	66.667	Long pipeline and river diffuser to maintain	2	33.333	Long-term monitoring at multiple locations	3	50	Long-term monitoring
Final Scoring																				
Environmental			0	Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0	
Technological			33.3	Subtota	50		Subtota	158.33		Subtota	50		Subtota	83.333		Subtota	91.667		Subtota	116.67	
Social			33.3	Subtota	33.333		Subtota	116.67		Subtota	50		Subtota	166.67		Subtota	116.67		Subtota	83.333	
Economic			33.3	Subtota	100		Subtota	116.67		Subtota	66.667		Subtota	83.333		Subtota	100		Subtota	116.67	
TOTAL SCORE			100	**TOTAL**	**183.33**	**not ranked**	**TOTAL**	**391.67**	**Rank: 1**	**TOTAL**	**166.67**	**Rank: 5**	**TOTAL**	**333.33**	**Rank: 2**	**TOTAL**	**308.33**	**Rank: 4**	**TOTAL**	**316.67**	**Rank: 3**

Primary Criteria																				
Criteria		**Description**		**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
Environmental		Does not cause adverse impacts to aquatic, terrestrial or human		✓			✓			✓			✓			✓			✓		
Legal		Complies with all applicable provincial and federal policy and law		✓			✓			✓			✓			✓			✓		
Secondary Criteria																				
Criteria		**Description**	**Weighting**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
				Rank	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**
Environmental	Assimilative Capacity	Minimum of 10x dilution, >100x dilution preferred	6.667	1	6.6667	Low dilution at point of discharge	5	33.333	High predicted and measured dilution	1	6.6667	Low dilution at point of discharge	3	20	>10x dilution, large IDZ required at low flows	4	26.667	Effluent distributed to multiple locations	2	13.333	Benchmarks and treatment tailored to receiving environment
	Aquatic Effects	Minimize receiving effects on receiving environment	13.33	1	13.333	Prevents or prolongs rehabilitation	5	66.667	All WQG met at IDZ	2	26.667	Incomplete restoration of Hazeltine Creek	3	40	IDZ may impinge on fish spawning habitat	3	40	Discharge distributed but into unimpacted water body	4	53.333	Benchmarks would be derived to minimize aquatic effects
	Terrestrial Effects	Minimize disturbance (land clearing, construction area, linear disturbance)	6.667	5	33.333	Minimal pipeline and infrastructure required	2	13.333	Use of existing infrastructure; some new linear disturbance	4	26.667	Minimal pipeline along disturbed corridor	1	6.6667	Additional linear disturbance and diffuser construction	3	20	Low terrestrial disturbance	5	33.333	Minimal pipeline and infrastructure required
	Long Term Sustainability	Ensure location will be viable for long term	6.667	1	6.6667	Short-term solution	3	20	Suitable for long term but not permanent	2	13.333	Allows progressive rehabilitation	3	20	Suitable for long term but not permanent	5	33.333	Viable permanent solution that restores pre-mining flows	4	26.667	Viable permanent solution
Technological	Risk and Consequence of Failure	Minimize likelihood of failure and potential effect of failure	0	1	0	Risk of uncontrolled release to Quesnel Lake	5	0	Deep diffuser in low traffic area	1	0	Risk of uncontrolled release to Quesnel River	2	0	Diffuser located in shallow flow	3	0	Distributed flows disperse risk	4	0	Low risk of failure; minimal infrastructure
	Complexity	Prefer lower complexity	0	3	0	Low complexity of system; high complexity of flow management	4	0	Single pipeline and use of existing diffuser	3	0	Low complexity of system; high complexity of flow management	2	0	Long pipeline; river diffuser	1	0	Most complex drainageand discharge systems	5	0	Low complexity
	Flexible Design	Adaptable and scalable	0	1	0	No flexibility - current system is already limited	5	0	Readily adaptable to higher flows	1	0	No flexibility - current system is already limited	4	0	Some flexibility but may be limited seasonally	3	0	Limited scalability; readily adaptable	2	0	Difficult to scale
	Risk of Non-compliance	Prefer higher reliability	0	1	0	Requires highly managed flows	5	0	Lowest variability in receiving environment	1	0	Requires highly managed flows	2	0	Dilution impacted by variable flow rate in receiving environment	4	0	Lake systems less variable than lotic	3	0	Dependent upon derivation
Social	Restoration of Fish Habitat	Preference to restore more habitat in Hazeltine Creek sooner	16.67	1	16.667	Prevents or prolongs rehabilitation	5	83.333	Allows complete restoration	2	33.333	Partial restoration Short timeline	5	83.333	Allows complete restoration	3	50	Allows complete restoration but in longer time frame	3	50	Allows complete restoration but in longer time frame
	Acceptance of Option	Stated preference of stakeholders	16.67	1	16.667	Not favoured by any stakeholder	2	33.333	Allows restoration of Hazeltine Creek but entails discharge upgradient of Likely	1	16.667	Not favoured by any stakeholder	5	83.333	Preferred by Likely residents	4	66.667	Stated preference of some stakeholders	2	33.333	Anticipated low acceptance
Economic	Capital Cost	Lower capital cost	16.67	5	83.333	No capital cost	2	33.333	Higher cost of pipeline installation	3	50	Short pipeline required	1	16.667	Higher cost of pipeline installation	4	66.667	Multiple discharge locations, all nearby	4	66.667	Low infrastructure cost; additional studies required
	Operating Cost	Lower operating cost	16.67	1	16.667	High management and monitoring effort	5	83.333	Minimize maintenance and monitoring locations	1	16.667	High management and monitoring effort	4	66.667	Long pipeline and river diffuser to maintain	2	33.333	Long-term monitoring at multiple locations	3	50	Long-term monitoring
Final Scoring																				
Environmental			33.3	Subtota	60		Subtota	133.33		Subtota	73.333		Subtota	86.667		Subtota	120		Subtota	126.67	
Technological			0	Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0	
Social			33.3	Subtota	33.333		Subtota	116.67		Subtota	50		Subtota	166.67		Subtota	116.67		Subtota	83.333	
Economic			33.3	Subtota	100		Subtota	116.67		Subtota	66.667		Subtota	83.333		Subtota	100		Subtota	116.67	
TOTAL SCORE			100	**TOTAL**	**193.33**	**not ranked**	**TOTAL**	**366.67**	**Rank: 1**	**TOTAL**	**190**	**Rank: 5**	**TOTAL**	**336.67**	**Rank: 2**	**TOTAL**	**336.67**	**Rank: 3**	**TOTAL**	**326.67**	**Rank: 4**

Primary Criteria																				
Criteria		**Description**		**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
Environmental		Does not cause adverse impacts to aquatic, terrestrial or human		✓			✓			✓			✓			✓			✓		
Legal		Complies with all applicable provincial and federal policy and law		✓			✓			✓			✓			✓			✓		
Secondary Criteria																				
Criteria		**Description**	**Weighting**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
				Rank	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**
Environmental	Assimilative Capacity	Minimum of 10x dilution, >100x dilution preferred	6.667	1	6.6667	Low dilution at point of discharge	5	33.333	High predicted and measured dilution	1	6.6667	Low dilution at point of discharge	3	20	>10x dilution, large IDZ required at low flows	4	26.667	Effluent distributed to multiple locations	2	13.333	Benchmarks and treatment tailored to receiving environment
	Aquatic Effects	Minimize receiving effects on receiving environment	13.33	1	13.333	Prevents or prolongs rehabilitation	5	66.667	All WQG met at IDZ	2	26.667	Incomplete restoration of Hazeltine Creek	3	40	IDZ may impinge on fish spawning habitat	3	40	Discharge distributed but into unimpacted water body	4	53.333	Benchmarks would be derived to minimize aquatic effects
	Terrestrial Effects	Minimize disturbance (land clearing, construction area, linear disturbance)	6.667	5	33.333	Minimal pipeline and infrastructure required	2	13.333	Use of existing infrastructure; some new linear disturbance	4	26.667	Minimal pipeline along disturbed corridor	1	6.6667	Additional linear disturbance and diffuser construction	3	20	Low terrestrial disturbance	5	33.333	Minimal pipeline and infrastructure required
	Long Term Sustainability	Ensure location will be viable for long term	6.667	1	6.6667	Short-term solution	3	20	Suitable for long term but not permanent	2	13.333	Allows progressive rehabilitation	3	20	Suitable for long term but not permanent	5	33.333	Viable permanent solution that restores pre-mining flows	4	26.667	Viable permanent solution
Technological	Risk and Consequence of Failure	Minimize likelihood of failure and potential effect of failure	8.333	1	8.3333	Risk of uncontrolled release to Quesnel Lake	5	41.667	Deep diffuser in low traffic area	1	8.3333	Risk of uncontrolled release to Quesnel River	2	16.667	Diffuser located in shallow flow	3	25	Distributed flows disperse risk	4	33.333	Low risk of failure; minimal infrastructure
	Complexity	Prefer lower complexity	8.333	3	25	Low complexity of system; high complexity of flow management	4	33.333	Single pipeline and use of existing diffuser	3	25	Low complexity of system; high complexity of flow management	2	16.667	Long pipeline; river diffuser	1	8.3333	Most complex drainageand discharge systems	5	41.667	Low complexity
	Flexible Design	Adaptable and scalable	8.333	1	8.3333	No flexibility - current system is already limited	5	41.667	Readily adaptable to higher flows	1	8.3333	No flexibility - current system is already limited	4	33.333	Some flexibility but may be limited seasonally	3	25	Limited scalability; readily adaptable	2	16.667	Difficult to scale
	Risk of Non-compliance	Prefer higher reliability	8.333	1	8.3333	Requires highly managed flows	5	41.667	Lowest variability in receiving environment	1	8.3333	Requires highly managed flows	2	16.667	Dilution impacted by variable flow rate in receiving environment	4	33.333	Lake systems less variable than lotic	3	25	Dependent upon derivation
Social	Restoration of Fish Habitat	Preference to restore more habitat in Hazeltine Creek sooner	0	1	0	Prevents or prolongs rehabilitation	5	0	Allows complete restoration	2	0	Partial restoration Short timeline	5	0	Allows complete restoration	3	0	Allows complete restoration but in longer time frame	3	0	Allows complete restoration but in longer time frame
	Acceptance of Option	Stated preference of stakeholders	0	1	0	Not favoured by any stakeholder	2	0	Allows restoration of Hazeltine Creek but entails discharge upgradient of Likely	1	0	Not favoured by any stakeholder	5	0	Preferred by Likely residents	4	0	Stated preference of some stakeholders	2	0	Anticipated low acceptance
Economic	Capital Cost	Lower capital cost	16.67	5	83.333	No capital cost	2	33.333	Higher cost of pipeline installation	3	50	Short pipeline required	1	16.667	Higher cost of pipeline installation	4	66.667	Multiple discharge locations, all nearby	4	66.667	Low infrastructure cost; additional studies required
	Operating Cost	Lower operating cost	16.67	1	16.667	High management and monitoring effort	5	83.333	Minimize maintenance and monitoring locations	1	16.667	High management and monitoring effort	4	66.667	Long pipeline and river diffuser to maintain	2	33.333	Long-term monitoring at multiple locations	3	50	Long-term monitoring
Final Scoring																				
Environmental			33.3	Subtota	60		Subtota	133.33		Subtota	73.333		Subtota	86.667		Subtota	120		Subtota	126.67	
Technological			33.3	Subtota	50		Subtota	158.33		Subtota	50		Subtota	83.333		Subtota	91.667		Subtota	116.67	
Social			0	Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0	
Economic			33.3	Subtota	100		Subtota	116.67		Subtota	66.667		Subtota	83.333		Subtota	100		Subtota	116.67	
TOTAL SCORE			100	**TOTAL**	**210**	**not ranked**	**TOTAL**	**408.33**	**Rank: 1**	**TOTAL**	**190**	**Rank: 5**	**TOTAL**	**253.33**	**Rank: 4**	**TOTAL**	**311.67**	**Rank: 3**	**TOTAL**	**360**	**Rank: 2**

Primary Criteria																				
Criteria		**Description**		**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
Environmental		Does not cause adverse impacts to aquatic, terrestrial or human		✓			✓			✓			✓			✓			✓		
Legal		Complies with all applicable provincial and federal policy and law		✓			✓			✓			✓			✓			✓		
Secondary Criteria																				
Criteria		**Description**	**Weighting**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
				Rank	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**
Environmental	Assimilative Capacity	Minimum of 10x dilution, >100x dilution preferred	6.667	1	6.6667	Low dilution at point of discharge	5	33.333	High predicted and measured dilution	1	6.6667	Low dilution at point of discharge	3	20	>10x dilution, large IDZ required at low flows	4	26.667	Effluent distributed to multiple locations	2	13.333	Benchmarks and treatment tailored to receiving environment
	Aquatic Effects	Minimize receiving effects on receiving environment	13.33	1	13.333	Prevents or prolongs rehabilitation	5	66.667	All WQG met at IDZ	2	26.667	Incomplete restoration of Hazeltine Creek	3	40	IDZ may impinge on fish spawning habitat	3	40	Discharge distributed but into unimpacted water body	4	53.333	Benchmarks would be derived to minimize aquatic effects
	Terrestrial Effects	Minimize disturbance (land clearing, construction area, linear disturbance)	6.667	5	33.333	Minimal pipeline and infrastructure required	2	13.333	Use of existing infrastructure; some new linear disturbance	4	26.667	Minimal pipeline along disturbed corridor	1	6.6667	Additional linear disturbance and diffuser construction	3	20	Low terrestrial disturbance	5	33.333	Minimal pipeline and infrastructure required
	Long Term Sustainability	Ensure location will be viable for long term	6.667	1	6.6667	Short-term solution	3	20	Suitable for long term but not permanent	2	13.333	Allows progressive rehabilitation	3	20	Suitable for long term but not permanent	5	33.333	Viable permanent solution that restores pre-mining flows	4	26.667	Viable permanent solution
Technological	Risk and Consequence of Failure	Minimize likelihood of failure and potential effect of failure	8.333	1	8.3333	Risk of uncontrolled release to Quesnel Lake	5	41.667	Deep diffuser in low traffic area	1	8.3333	Risk of uncontrolled release to Quesnel River	2	16.667	Diffuser located in shallow flow	3	25	Distributed flows disperse risk	4	33.333	Low risk of failure; minimal infrastructure
	Complexity	Prefer lower complexity	8.333	3	25	Low complexity of system; high complexity of flow management	4	33.333	Single pipeline and use of existing diffuser	3	25	Low complexity of system; high complexity of flow management	2	16.667	Long pipeline; river diffuser	1	8.3333	Most complex drainageand discharge systems	5	41.667	Low complexity
	Flexible Design	Adaptable and scalable	8.333	1	8.3333	No flexibility - current system is already limited	5	41.667	Readily adaptable to higher flows	1	8.3333	No flexibility - current system is already limited	4	33.333	Some flexibility but may be limited seasonally	3	25	Limited scalability; readily adaptable	2	16.667	Difficult to scale
	Risk of Non-compliance	Prefer higher reliability	8.333	1	8.3333	Requires highly managed flows	5	41.667	Lowest variability in receiving environment	1	8.3333	Requires highly managed flows	2	16.667	Dilution impacted by variable flow rate in receiving environment	4	33.333	Lake systems less variable than lotic	3	25	Dependent upon derivation
Social	Restoration of Fish Habitat	Preference to restore more habitat in Hazeltine Creek sooner	16.67	1	16.667	Prevents or prolongs rehabilitation	5	83.333	Allows complete restoration	2	33.333	Partial restoration Short timeline	5	83.333	Allows complete restoration	3	50	Allows complete restoration but in longer time frame	3	50	Allows complete restoration but in longer time frame
	Acceptance of Option	Stated preference of stakeholders	16.67	1	16.667	Not favoured by any stakeholder	2	33.333	Allows restoration of Hazeltine Creek but entails discharge upgradient of Likely	1	16.667	Not favoured by any stakeholder	5	83.333	Preferred by Likely residents	4	66.667	Stated preference of some stakeholders	2	33.333	Anticipated low acceptance
Economic	Capital Cost	Lower capital cost	0	5	0	No capital cost	2	0	Higher cost of pipeline installation	3	0	Short pipeline required	1	0	Higher cost of pipeline installation	4	0	Multiple discharge locations, all nearby	4	0	Low infrastructure cost; additional studies required
	Operating Cost	Lower operating cost	0	1	0	High management and monitoring effort	5	0	Minimize maintenance and monitoring locations	1	0	High management and monitoring effort	4	0	Long pipeline and river diffuser to maintain	2	0	Long-term monitoring at multiple locations	3	0	Long-term monitoring
Final Scoring																					
Environmental			33.3	Subtota	60		Subtota	133.33		Subtota	73.333		Subtota	86.667		Subtota	120		Subtota	126.67	
Technological			33.3	Subtota	50		Subtota	158.33		Subtota	50		Subtota	83.333		Subtota	91.667		Subtota	116.67	
Social			33.3	Subtota	33.333		Subtota	116.67		Subtota	50		Subtota	166.67		Subtota	116.67		Subtota	83.333	
Economic			0	Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0		Subtota	0	
TOTAL SCORE			100	**TOTAL**	**143.33**	**not ranked**	**TOTAL**	**408.33**	**Rank: 1**	**TOTAL**	**173.33**	**Rank: 5**	**TOTAL**	**336.67**	**Rank: 2**	**TOTAL**	**328.33**	**Rank: 3**	**TOTAL**	**326.67**	**Rank: 4**

ATTACHMENT 2
Original Options Analysis from October 2016 Technical Assessment Report

TECHNICAL MEMORANDUM

DATE 17 October 2016 **REFERENCE No.** 1411734-164-TM-Rev0-16000

TO Dale Reimer, General Manager
Mount Polley Mining Corporation

FROM Janis Drozdiak and Jerry Vandenberg **EMAIL** Janis_Drozdiak@golder.com; Jerry_Vandenberg@golder.com

OPTIONS ANALYSIS FOR MOUNT POLLEY MINE LONG-TERM WATER MANAGEMENT PLAN

1.0 INTRODUCTION

Mount Polley Mining Corporation (MPMC) has developed a Long-Term Water Management Plan per Section 2.9 of British Columbia *Environmental Management Act* Permit 11678. One component of the Long-Term Water Management Plan is an options analysis, which considered potential discharge locations for treated effluent. The primary goal of the options analysis was to identify discharge options for the long-term water management strategy, which will be suitable for the remainder of Mount Polley Mine operations, closure, and post-closure. This document presents an introduction to the process that was used to screen, evaluate, and select options. It includes a list of options for discharge locations, as well as the weighting and ranking of these options.

2.0 OPTION EVALUATION METHOD

The Kepner-Tregoe (K-T) process was used to evaluate the discharge location for the long-term water management strategy. This method comprises the following steps:

1) **Identify and define potential options**—For the discharge location, a number of options are available. At this stage, all potentially viable options are included in a list, without assigning any preference or likelihood to any given option. A “do nothing” option is included for comparative purposes. A description is included for each option.

2) **Identify and define primary screening criteria**—Primary criteria, also called non-compensatory criteria, are those that have pass/fail or absolute minimum or maximum requirements. Primary criteria are intended to screen an initial list, which may include many options, down to a few options that can be evaluated in more detail.

3) **Identify and define the secondary criteria**—Secondary criteria are those that need to be weighed and evaluated against each other. They are often competing or conflicting demands that make a decision more difficult and less obvious to parties with different priorities. Secondary criteria are often categorized according to the “triple bottom line”: environmental, social, and economic factors; a fourth factor, technical feasibility, is sometimes also included as a separate category, as was done in this case. A description of what constitutes a better or worse option should be included so that options can be objectively ranked against each other. Only criteria that can differentiate options should be included.

Golder Associates Ltd.
Suite 200 - 2920 Virtual Way, Vancouver, BC, V5M 0C4
Tel: +1 (604) 296 4200 Fax: +1 (604) 298 5253 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

4) **Agree on the rules for weighting and ranking**—Certain rules must be followed to make an objective and transparent decision. The following rules were applied in this options analysis:

   - Total weighting must equal 100.
   - Major categories (e.g., social, environmental, economic, technical) are assigned equal weighting.
   - Rankings are from one to five; the lowest score (i.e., least preferable) must be one and the highest must be five; intermediate ranks need not be evenly or linearly spaced.
   - Two options may tie on a given criterion, but all options may not tie evenly.
   - Final scores are non-binding because the options analysis is completed in advance of detailed engineering and scientific evaluation. The options analysis supports, but does not bind, a decision. If a leading option is later rejected, justification will be provided for its rejection.

5) **Arrange options and criteria**—In a spreadsheet, a matrix is arranged with options in a row at the top and criteria down a column on the left.

6) **Assign weightings to each criterion**—The weightings reflect the importance or priority of each criterion, with the most important criteria having higher weight. These weightings should be somewhat linear (i.e., a criterion that is twice as important as another criterion should be weighted approximately twice as heavily) because, upon completion of the process, they will directly affect a numerical score that indicates the optimal option.

7) **Apply the primary criteria**—Potential options are screened and options to be subjected to detailed evaluation are shortlisted. Options that fail primary criteria are not considered or evaluated further.

8) **Rank each option**—Moving through one criterion at a time, each option is ranked.

9) **Score each option**—Scores are calculated by multiplying each weighting by each ranking, and summing the products. The preferred option(s) are selected based on overall rankings.

10) **Conduct a sensitivity analysis**—In the case of either lack of consensus, or uncertainty regarding weightings or rankings, individual weightings and rankings can be adjusted to see if it would change the highest ranked option. A sensitivity analysis can also be done to explore “what if” scenarios to evaluate changing conditions.

Input for the each of the steps listed above was gained from previous options analyses (listed in the following section) as well as Water Workshops held by MPMC in Likely, BC and the MPMC Public Liaison Committee meeting at the Mine on 12 May 2016. Electronic copies of the options analysis (a blank version and a completed version) were distributed to MPMC’s Public Liaison Committee for input in advance of a public meeting in Likely on 25 May 2016, during which additional feedback was gathered.

3.0 OPTIONS ANALYSIS – DISCHARGE LOCATION

3.1 Previous Analyses

Previous options analyses have been completed as part of the short-term *Technical Assessment Report in Support of an Effluent Permit Amendment* (Golder 2015) and the *Alternative Discharge Design and Construction Plan* (Golder 2016). Through these analyses, ten options were originally screened, feedback was obtained from interested parties, and five options were shortlisted as the most viable or popular options for the detailed analysis described herein.

3.2 Option Description

Five potential discharge locations and a “status quo” option have been identified, as described in Table 1.

Table 1: Description of Potential Discharge Location Options

Option	Title	Description
1	Pipeline to Quesnel Lake	Using pipeline to convey discharge to Quesnel Lake.
2	Relocating Hazeltine Creek discharge	Locating the point of discharge further downstream to allow rehabilitation of fish habitat in the upper reach of Hazeltine Creek and connection to Polley Lake.
3	Pipeline to Quesnel River	Using pipeline to convey discharge to Quesnel River.
4	Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek	Distributing flows to multiple waterbodies, preferably in proportion to pre-development flows.
5	Science-based environmental benchmarks	Developing science-based environmental benchmarks, in accordance with provincial guidance, and discharging to the assimilative capacity of Hazeltine Creek while rehabilitating the creek to fish habitat.
6	Status quo	“Do nothing” option, evaluated for comparative purposes only. Not considered as a viable option beyond permitted date of November 2017.

3.3 Option Comparison

The major advantages and disadvantages of the potential discharge location options are listed in Table 2.

Table 2: Advantages and Disadvantages of Potential Discharge Location Options

Option	Title	Advantages	Disadvantages
1	Pipeline to Quesnel Lake	■ High predicted and measured dilution ■ Deep diffuser in low traffic area ■ Allows complete rehabilitation of Hazeltine Creek	■ High cost of pipeline installation
2	Relocating Hazeltine Creek discharge	■ Minimal pipeline along disturbed corridor ■ Short pipeline required	■ Low dilution at point of discharge ■ Risk of uncontrolled release to Quesnel Lake ■ Requires highly managed flows
3	Pipeline to Quesnel River	■ Stated preference of many Likely residents ■ Allows complete rehabilitation of Hazeltine Creek	■ Additional linear disturbance and diffuser construction ■ Large initial dilution zone required that may impinge fish spawning areas ■ Dilution variable with flow ■ Higher cost of pipeline installation due to distance

Option	Title	Advantages	Disadvantages
4	Distributed flows to Bootjack Lake, Polley Lake, Hazeltine Creek	■ Viable permanent solution that restores pre-mining flows ■ Stated preference of some stakeholders and First Nations	■ Most complex drainage and discharge systems ■ Long-term monitoring at multiple locations
5	Science-based environmental benchmarks	■ Minimal pipeline and infrastructure requirements ■ Low technological complexity	■ Difficult to scale flows ■ Anticipated low public acceptance ■ Long-term monitoring
6	Status quo	*Not evaluated*	*Not evaluated*

3.4 Primary Option Screening

A primary screening of discharge location options was carried out with the criteria listed below:

- **Environmental**—does not cause adverse impacts to aquatic, terrestrial, or human receptors
- **Legal**—complies with all applicable provincial and federal policy and law

The primary screening did not remove any options, but the criteria were maintained as requirements so that if any options were subsequently modified during detailed studies, they must adhere to these criteria.

3.5 Detailed Evaluation

Secondary criteria were applied to differentiate options, as presented in Table 3.

Table 3: Evaluation Criteria for Discharge Locations

Environmental	
Assimilative capacity	Minimum of 10× dilution; >100× dilution preferred
Aquatic effects	Minimize effects on receiving environment
Terrestrial effects	Minimize disturbance (land clearing, construction area, linear disturbance)
Long-term sustainability	Location should be viable for long term, preferably for the remainder of operations and through to post-closure
Technological	
Risk and consequence of failure	Minimize likelihood of failure and potential effect of failure
Complexity	Prefer lower complexity
Flexible design	Prefer adaptable and scalable
Risk of non-compliance	Prefer higher reliability
Social	
Restoration of fish habitat	Preference to rehabilitate more habitat in Hazeltine Creek sooner
Acceptance of option	Stated preference of stakeholders
Economic	
Capital cost	Prefer lower capital cost
Operating cost	Prefer lower operating cost

3.6 Option Weighting and Ranking

The evaluation criteria described in Table 3 were used in the K-T analysis of discharge location options. Weights were assigned to the criteria based on the relative importance of each specific criterion. Quantitative ratings were assigned to each option using the numeric values 1 to 5 (5 being the most preferable, 1 the least preferable). Rankings for each option were multiplied by the relative weighting for each criterion. These weighted scores were summed to determine the total score for each option.

Where possible, quantitative analyses were completed to rank the proposed discharge options.

3.6.1 Noted Considerations for Assimilative Capacity

The assimilative capacity of the discharge location was assessed to determine the following:

- The minimum dilution factors as outlined in Table 3.
- The length of the mixing zone required to achieve the target dilution range.
- Likelihood that the proposed dilution zone impinges on fish spawning habitat.

Calculations of the dilution factors for discharges to Quesnel Lake (Appendix H of the TAR), Quesnel River (Attachment 1 of this Appendix) and Hazeltine Creek (Golder 2015) indicated the following:

- A greater than 40 times dilution can be achieved in Quesnel Lake at the edge of a 100 metre initial dilution zone – for most modelled scenarios a greater than 100 times dilution was achieved.
- For a centreline discharge to the Quesnel River, a 91x dilution factor can be achieved during the 7Q2 low flow and the site generally provides sufficient dilution to achieve equal to or greater than 100x dilution at the edge of a 100 metre mixing zone (see Attachment 1).
- There are periods when the minimum dilution of 10x will not be achievable in Hazeltine Creek.

The Quesnel Lake discharge was ranked over the Quesnel River option since the modelling work considered a centreline discharge. In reality, the discharge from the Mine would be at the edge of the river, which would reduce the modelled dilution by half or, the mixing zone length would have to be doubled to 200 metres to achieve the same dilution. The Hazeltine Creek option was given the lowest ranking due to the lack of dilution.

3.6.2 Noted Considerations for Aquatic Effects

As noted above, the quantitative analysis was also completed to determine if the mixing zone length would impinge on fish spawning habitat. The Quesnel Lake option is considered favorable to both the Quesnel River and Hazeltine Creek discharge options in this context, since the diffusers could be located at depth and away from the shore allowing the discharge to be designed in a manner that would not impinge on fish spawning habitat (in this instance, in the lake). A description of habitat considerations for Quesnel River is included below.

The upper mainstem of the Quesnel River provides valuable spawning habitat for numerous fish species (Pederson 1998). Kokanee salmon utilize the Narrows of Quesnel River near the town of Likely for spawning (Pederson 1998). A large portion of the Interior Fraser coho salmon population spawns in Quesnel River between Quesnel Lake and the UNBC Quesnel River Research Centre (Pederson 1998). Chinook salmon spawn in the Narrows and at the bridge near Likely (Pederson 1998). Dolly Varden spawn in Quesnel River from the Likely Bridge downstream to the UNBC Quesnel River Research Centre (Pederson 1998). The Quesnel River has also been identified as critical habitat for Quesnel Lake rainbow trout, which are believed to spawn in the river. The spawning habitat in the upper mainstem is not continuous but it is widely distributed and it will be determined by the presence of suitable depth, velocity and substrate conditions that are appropriate for the needs of each individual species.

As noted above, the Quesnel River would require a mixing zone of approximately 200 metres to achieve a similar dilution to the achievable dilution in Quesnel Lake. Although, fish spawning habitat is discontinuous in Quesnel River, discharge to this waterbody was given a lower ranking in comparison to Quesnel Lake due to the increased likelihood of the long mixing zone (e.g., 200 metres long and one-quarter river width) coming into contact with fish habitat.

4.0 RESULTS

A populated matrix is included as Attachment 2, and Table 4 shows the total final score for each option. The results indicate that, to balance environmental, technological, social, and economic criteria, the pipeline to Quesnel Lake is the best overall option for the Long-Term Water Management Plan.

Table 4: Options Analysis Final Results

Option	Title	Score	Overall Rank[(a)]
1	Pipeline to Quesnel Lake	393.75	1
2	Relocating Hazeltine Creek discharge	180	5
3	Pipeline to Quesnel River	315	4
4	Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek	321.25	3
5	Science-based environmental benchmarks	332.5	2
6	Status quo	182.5	-

[(a)] For the overall rank, the lowest number indicates the most preferred overall option

Science-based environmental benchmarks (SBEBs) were ranked as the second most viable option based on the criteria employed in the current options analysis. After the options analysis was completed, MPMC discussed SBEBs with the MoE, and based on the outcomes of these discussions, MPMC will not be considering SBEBs at this time in the proposal of the Long-Term Water Management Plan. SBEBs are, however, left in this options analysis to maintain the information that has been presented to community members and to provide a comprehensive overview of the options that have been considered in the development of the Long-Term Water Management plan.

With the exclusion of SBEBs from this analysis, the option of distributed flows becomes the second most preferable option. MPMC continues to pursue this option in the context of closure and post-closure water management.

4.1 Sensitivity Analysis

As part of the analysis, a number of perspectives were sought to evaluate whether the analysis is sensitive to a particular discipline or lens through which it is viewed. The analysis was first completed by an environmental scientist for an environmental perspective, second by a design engineer for a technical perspective, and third by MPMC for an operator perspective. Each of these perspectives came to the same conclusion on the overall rankings, with little variation in numerical scores. Finally, the options analysis was distributed to MPMC's Public Liaison Committee and other interested members of the public in May 2016 for the social perspective. The feedback received indicated that, if environmental, technological, social, and economic factors are weighted evenly, the overall rankings are not sensitive to any particular lens or perspective.

5.0 CLOSURE

We trust this memorandum meets your current requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Janis Drozdiak, PEng
Associate, Senior Pipeline Engineer

ORIGINAL SIGNED

Jerry Vandenberg, MSc, PChem
Principal, Senior Environmental Chemist

Attachments: Study Limitations
Attachment 1: Preliminary Analysis of Hydrological Capacity and Initial Dilution Zone Mixing for the Quesnel River Discharge Option
Attachment 2: Options Analysis Matrix

o:\final\2014\1421\1411734\1411734-164-tm-rev0-16000\1411734-164-tm-rev0-16000-mt polley options analysis 17oct_16.docx

REFERENCES

Golder (Golder Associates Ltd.). 2015. Technical Assessment Report in Support of an Effluent Permit Amendment. Prepared for Mount Polley Mining Corporation. Golder Doc. No. 1411734-030. May 29, 2015.

Golder. 2016. Alternative Discharge Design and Construction Plan. Prepared for Mount Polley Mining Corporation. Golder Doc. No. 1411734-115. January 27, 2016.

Pedersen. R., 1998. Overview Report. Quesnel River Study Area. Fish Habitat Assessment Procedure. Prepared for Weldwood of Canada Ltd. March 1998.

STUDY LIMITATIONS

Golder Associates Ltd. (Golder) has prepared this document in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this document. No warranty, express or implied, is made.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, has been prepared by Golder for the sole benefit of Mount Polley Mining Corporation. It represents Golder's professional judgement based on the knowledge and information available at the time of completion. Golder is not responsible for any unauthorized use or modification of this document. All third parties relying on this document do so at their own risk.

The factual data, interpretations, suggestions, recommendations and opinions expressed in this document pertain to the specific project, site conditions, design objective, development and purpose described to Golder by Mount Polley Mining Corporation, and are not applicable to any other project or site location. In order to properly understand the factual data, interpretations, suggestions, recommendations and opinions expressed in this document, reference must be made to the entire document.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder. Mount Polley Mining Corporation may make copies of the document in such quantities as are reasonably necessary for those parties conducting business specifically related to the subject of this document or in support of or in response to regulatory inquiries and proceedings. Electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore no party can rely solely on the electronic media versions of this document.

ATTACHMENT 1
Preliminary Analysis of Hydrological Capacity and Initial Dilution Zone Mixing for the Quesnel River Discharge Option

TECHNICAL MEMORANDUM

DATE 17 October 2016 **REFERENCE No.** 1411734-201-TM-Rev0-16000

TO Luke Moger
Mount Polley Mining Corporation

FROM Shouhong Wu, Robert Millar and Jerry Vandenberg **EMAIL** Shouhong_Wu@golder.com; Robert_Millar@golder.com; Jerry_Vandenberg@golder.com

PRELIMINARY ANALYSIS OF HYDROLOGICAL CAPACITY AND INITIAL DILUTION ZONE MIXING FOR THE QUESNEL RIVER DISCHARGE OPTION

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Mount Polley Mining Corporation (MPMC) to undertake a preliminary analysis of the hydrologic capacity and initial dilution zone (IDZ) of the Quesnel River Discharge Option. This location is being considered as a potential long-term option for discharge of treated mine water from the Mount Polley Mine (the Mine). The approximate location of the proposed discharge site (the site), as considered in the Quesnel River Discharge Option, is 4.2 km downstream of the Likely Bridge (Figure 1).

MPMC is applying for an amendment of *Environmental Management Act* (EMA) Permit 11678 for a maximum annual discharge rate of 10 million metric metres (Mm^3). A discharge rate of 0.33 cubic metres per second (m^3/s) reflects the constant rate required to discharge the maximum annual volume of 10 Mm^3, which would be sufficient to manage water under the 99.5 percentile wet-year scenario (i.e., 199 years out of 200) based on hydrologic analysis found in Appendix B of this Technical Assessment Report. However, to balance larger flows during freshet, MPMC is also applying for a maximum instantaneous discharge rate of 0.6 m^3/s. This would allow for increased operational capability to manage water levels in the Springer Pit and peak flows during freshet: minimizing the volume of surplus water required to be stored on site.

The approach presented below represents a desktop analysis using general equations and parameter values from the literature. Additional field measurements would be required to refine or confirm the results.

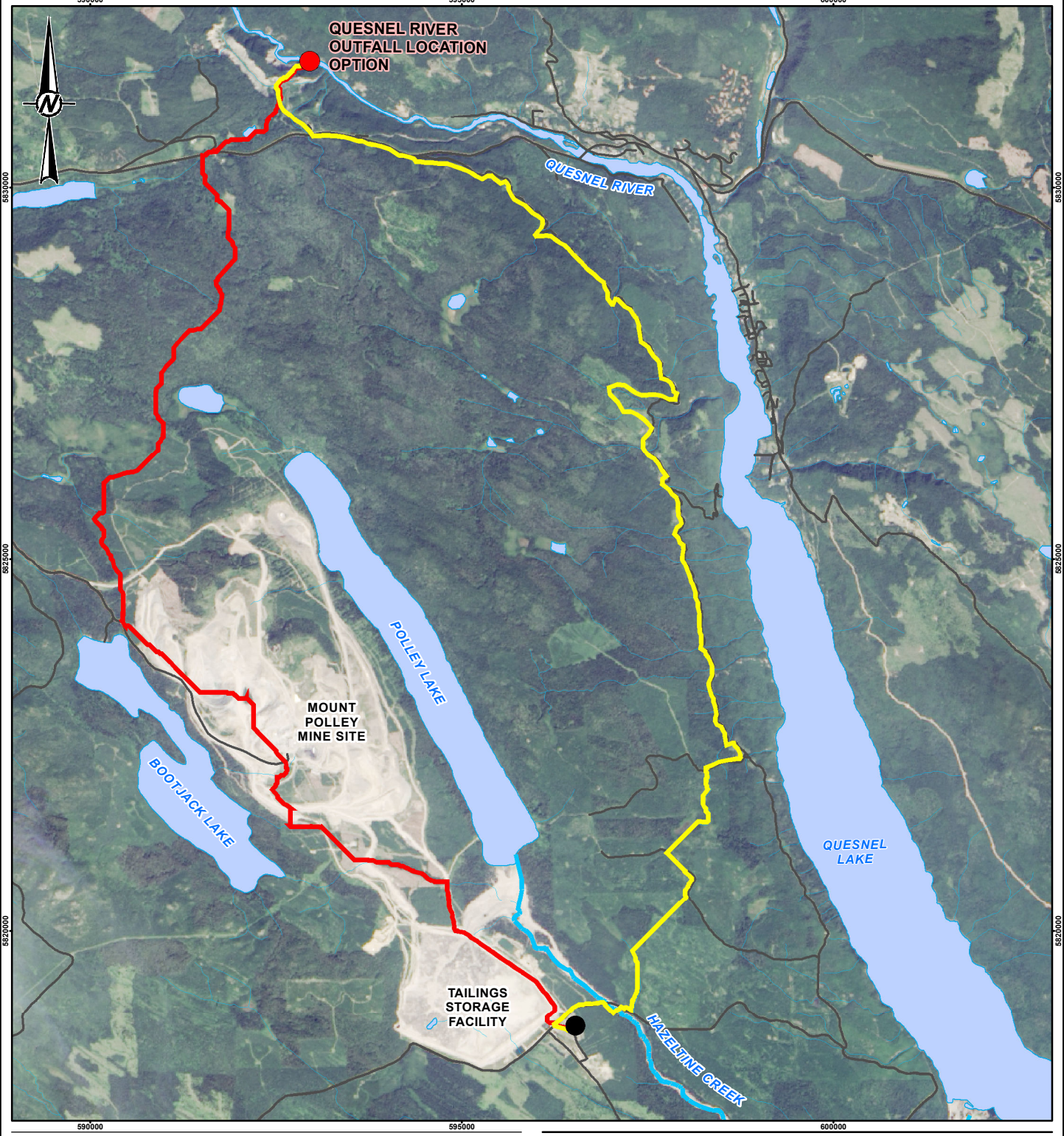
2.0 HYDROLOGICAL CAPACITY AND FAR FIELD DILUTION RATIOS

The average far-field hydrologic capacity at the site can be determined by the ratio of the mean annual discharge (MAD) at the site divided by the effluent discharge rate. This provides the average dilution ratio. The hydrology in the Quesnel River is well established, with an Environment Canada flow gauge (08KH001) installed near the Likely Bridge. The flow gauge has been in operation since 1924, with continuous data since 1948.

The 2010 annual hydrograph for Quesnel River near the Likely Bridge, together with the mean, minimum, and maximum recorded flows for the period of record, are shown in Figure 2. The MAD is 130 m^3/s; the mean seven-day low water flow (7Q2) is 30 m^3/s; and the mean annual peak flow (mean annual flood) is 394 m^3/s.

In general, a dilution ratio greater than 100:1 is desired under the EMA regulations. Dilution ratios as low as 10:1 may be acceptable with additional assessment, but are likely not acceptable. The average dilution ratio for the design effluent discharge is 394:1 (130/0.33). For the mean seven-day mean low water (7Q2), the dilution ratio is 91:1 (30/0.33).

Based on the hydrology, after complete mixing, the Quesnel River discharge site would generally provide sufficient far-field dilution (greater than 100:1) for all flows, although the minimum dilution for the 7Q2 low flow (91:1) is slightly less than the desired 100:1. However, these dilution ratios are based on complete mixing in the Quesnel River flow. Additional analysis is required for the near-field, or IDZ, which is discussed below.



LEGEND

- SOURCE LOCATION
- LONG-TERM OUTFALL LOCATION

LONG-TERM QUESNEL RIVER PIPELINE ROUTE OPTIONS

- OPTION QR-C
- OPTION QR-D
- ROAD
- WATERCOURSE
- WATERBODY

0 1.5 3

1:75,000 KILOMETRES

REFERENCE(S)

1. WATERCOURSE AND LAKE DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. ORTHOPHOTO OBTAINED FROM NASA 20140217
3. PROJECTION: UTM ZONE 10; DATUM: NAD 1983

CLIENT
IMPERIAL METALS
MOUNT POLLEY MINING CORPORATION

PROJECT
MOUNT POLLEY MINE
TECHNICAL ASSESSMENT REPORT

TITLE
QUESNEL RIVER OUTFALL LOCATION OPTION

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-09-19
DESIGNED	RM
PREPARED	CD
REVIEWED	RM
APPROVED	JV

PROJECT NO.	CONTROL	REV.	FIGURE
1411734	16000	0	1

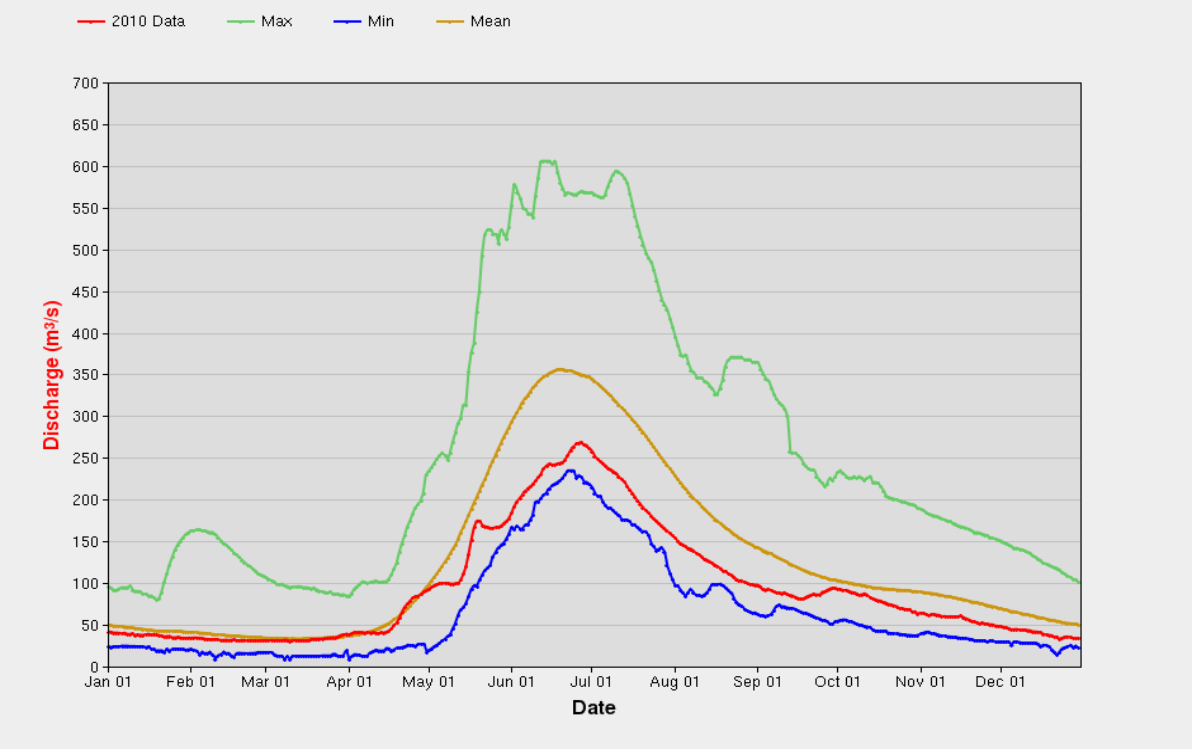


Figure 2: Annual Hydrograph for the Quesnel River at Likely (1924-2010)

3.0 INITIAL DILUTION ZONE

Under the *BC EMA, Municipal Wastewater Regulation* (Government of British Columbia, 2012), the length and width of the IDZ for streams and rivers are defined from mean low water (7Q2):

1) The width, perpendicular to the path of the stream, is the lesser of:

    a. 100 m

    b. 25% of the width of the stream

2) The length, parallel to the path of the stream, is the distance between a point 100-m upstream and a point that is the lesser of:

    c. 100 m downstream

    d. a distance downstream at which the width of the effluent plume equals the width determined under paragraph (1)

For mean low water, the width of the flow is estimated to be approximately 33.3 m (which is approximately half the bankfull width of 65.1 m), and therefore the width of the plume must be less than 8.3 m.

Based on the above, the IDZ for the Quesnel River site is defined as a zone that is 8.3 m wide, and within 100 m downstream of the discharge location (Figure 3). The desired minimum dilution at the boundary of the IDZ is 100:1.

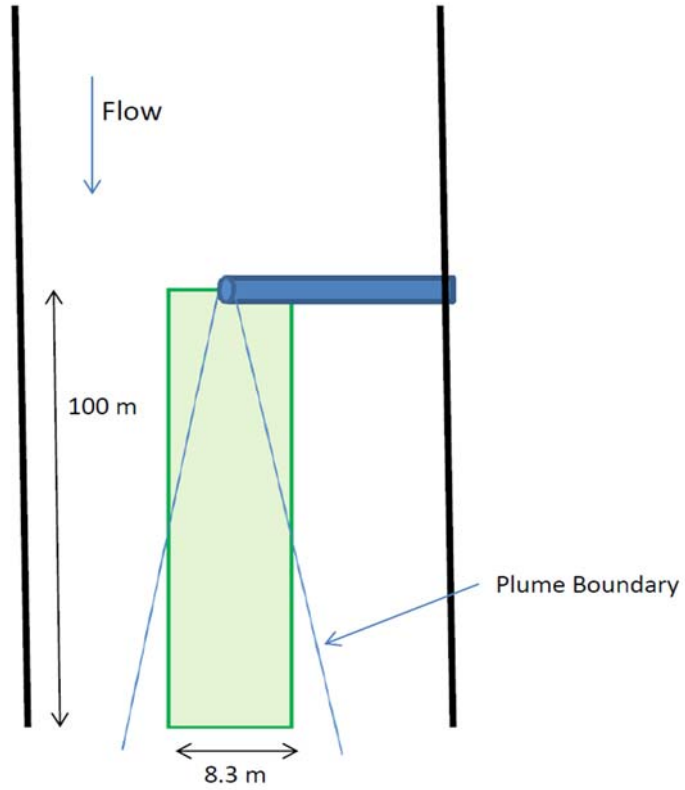


Figure 3: Definition Sketch for the IDZ for a Centreline Discharge

3.1 IDZ Dimensions for Quesnel River

The estimated IDZ for the site has been estimated through a two-dimensional advection-dispersion mixing analysis (see Attachment 1). The mixing parameter values have been assumed from literature values (Fischer et al. 1979). The variation in width, depth, and velocity with discharge have been estimated using hydraulic geometry relations (Leopold and Maddock, 1953). Details of the analysis are provided in Attachment 1.

3.1.1 Results

The key results for a single-point, centreline discharge with no diffuser are summarized in Table 1.

The minimum dilution ratios at the boundary of the IDZ for the design effluent discharge of 0.33 m^3/s under a range of Quesnel River flows are provided in column 5. For the design effluent discharge of 0.33 m^3/s, the minimum dilution rate of 100:1 at the boundary of the IDZ could only be achieved when flow in the Quesnel River was 119 m^3/s or greater. At mean low water (30 m^3/s), a minimum dilution ratio of 30:1 was estimated.

For each Quesnel River flow assessed (column 1) the corresponding maximum effluent discharge that would achieve a minimum dilution ratio of 100:1 at the boundary of the IDZ was also estimated (column 6). For the 7Q2 mean low flow (30 m^3/s), an effluent discharge of 0.1 m^3/s or less would achieve a minimum dilution ratio of 100:1 at the boundary of the IDZ. For flows in Quesnel River greater than 237 m^3/s, the minimum dilution of 100:1 would be achieved for the discharge of 0.6 m^3/s (column 6).

Table 1: Summary of IDZ Results for a Single-point, Centreline Discharge

Quesnel River Flow (m^3/s)	River Top Width (m)	Water Depth (m)	Flow Velocity (m/s)	Minimum Dilution Ratio ([a])	Maximum Effluent Discharge to Meet 100:1 Dilution (m^3/s)
[1]	[2]	[3]	[4]	[5]	[6]
30	33.3	0.78	1.16	30	0.10
50	37.9	0.96	1.38	47	0.16
119	**47.5**	**1.35**	**1.85**	**100**	**0.33**
150	50.4	1.48	2.01	122	0.40
237	56.7	1.78	2.34	182	0.60
264	58.4	1.86	2.43	200	0.66
400	65.1	2.20	2.80	287	0.95

Note: (a) At the boundary of the IDZ for the design effluent discharge of 0.33 m^3/s.

A single bank discharge point and multiple point discharges were also assessed (see Attachment 1). The single bank discharge resulted in lower dilution ratios (0.5 times those in Column [5]). The diffuser length was constrained by the plume width, and a two-port diffuser at the channel centreline provided a modest (+5%) increase in the maximum effluent discharge values (Column [6]).

4.0 ANNUAL EFFLUENT DISCHARGE

Based on the maximum effluent discharges that achieved a minimum dilution ratio of 100:1 at the boundary of the IDZ (Table 1 Column [6]), it is possible to determine the annual discharge volume that satisfies the near-field dilution requirements. To do so, discharge of treated effluent from the Mine was adjusted daily up to the maximum rate of 0.6 m^3/s based on real-time water levels recorded by Environment Canada at flow gauge 08KH001 near the Likely Bridge[1].

Annual discharge capacity estimates are provided based on historical Quesnel River daily flows (1948 through 2010) for maximum discharge rates of 0.33 m^3/s and 0.6 m^3/s (Table 2). For a maximum discharge rate of 0.33 m^3/s, the average annual discharge capacity is 7.5 Mm^3 (0.24 m^3/s). For a maximum instantaneous discharge rate of 0.6 m^3/s, the average annual discharge capacity is 9.8 Mm^3 (0.31 m^3/s). To achieve a discharge of 10 Mm^3 under 1:200-yer wet conditions, the maximum instantaneous discharge of 0.6 m^3/s would be required.

Table 2: Annual Effluent Discharge Capacity

Scenario	Maximum Discharge 0.33 m^3/s		Maximum Discharge 0.6 m^3/s	
	Mm^3	m^3/s	Mm^3	m^3/s
99.5% (Wet)	8.9	0.28	11.6	0.37
Average	7.5	0.24	9.8	0.31
0.05% (Dry)	6.1	0.19	7.7	0.24

[1] https://wateroffice.ec.gc.ca/report/report_e.html?type=realTime&stn=08KH001

5.0 CONCLUSIONS

The following conclusions are based on the above analysis (for a single-point centreline discharge port):

1) For an effluent discharge rate of 0.33 m^3/s the Quesnel River site generally provides adequate capacity to provide far-field dilution ratio of greater than, or equal to 100:1; although for mean 7Q2 low flow the dilution is 91:1.

2) The near-field dilution in the IDZ is limiting when flow in the Quesnel River is less than 119 m^3/s, which occurs on about 227 days per year (62%), on average.

3) To achieve a dilution ratio of greater than or equal to 100:1 at the boundary of the IDZ, the effluent discharge rate would need to be reduced below 0.33 m^3/s when the flow in the Quesnel River is less than 119 m^3/s.

4) A diffuser length would be limited by the mixing zone width, and would increase centreline dilution by approximately 5%.

5) Subject to a minimum dilution ratio of 100:1 at the boundary of the IDZ, the maximum instantaneous discharge rate of 0.6 m^3, requested by MPMC in the EMA Permit 11678 amendment application, would be required to provide 10 Mm^3 annual discharge capacity for 99.5% (1:200-year) wet conditions. Under this scenario, effluent flow rates would need to be continuously managed such that effluent flow is reduced or curtailed in response to changing river discharge rates.

6.0 CLOSURE

We trust that the information presented in this memo is sufficient for your present requirements. If you have any questions or concerns, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Shouhong Wu, PhD, PEng
Senior Water Resources Engineer

ORIGINAL SIGNED

Robert Millar, PhD, PEng
Associate, Senior Hydrotechnical/Water Resources Engineer

ORIGINAL SIGNED

Jerry Vandenberg, MSc, PChem
Principal, Senior Environmental Chemist

SW/RGM/JV/kp

Attachment : Mixing Calculations

o:\final\2014\1421\1411734\1411734-201-tm-rev0-16000\1411734-201-tm-rev0-16000-quesnel river mixing 17oct_16.docx

REFERENCES

Fischer HB, EJ List, RCY Koh,J Imberger, NH Brooks. 1979. "Mixing in Inland and Coastal Waters", Academic Press, Inc., San Diego, California, 92101.

Government of British Columbia. 2012. *Environmental Management Act*, Municipal Wastewater Regulation, B.C. Reg. 87/2012. Queen's Printer, Victoria, British Columbia, Canada.

Leopold LB, T Maddock. 1953. "The Hydraulic Geometry of Stream Channels and Some Physiographic Implications", U.S. Geological Survey Professional Paper 252, United States Government Printing Office.

ATTACHMENT 1
Mixing Calculations

TECHNICAL MEMORANDUM

DATE 17 October 2016 **REFERENCE No.** 1411734-204-TM-Rev0-16000

TO Luke Moger
Mount Polley Mining Corporation

FROM Shouhong Wu and Robert Millar **EMAIL** Shouhong_Wu@golder.com; Robert_Millar@golder.com

MIXING CALCULATIONS

1.0 INTRODUCTION

The two-dimensional advection-dispersion analysis is based on the following assumptions.

- The 7Q2 (mean annual low flow) of the Quesnel River is 30.3 m³/s.
- River bankfull width is 65 m.
- Bankfull flow is 400 m³/s.
- The maximum, average, and minimum effluent discharge are, respectively, 0.3, 0.2, and 0.1 m³/s.
- River bed slope S_o = 0.0075.

2.0 CALCULATION OF TOP WIDTH AND WATER DEPTH FOR DIFFERENT RIVER FLOW RATES

The river top width and water depth for different flow rates were estimated by the regime equations from Leopold and Maddock (1953):

$$\begin{cases} W = aQ^{0.26} \\ H = bQ^{0.40} \end{cases} \quad [1]$$

where Q is river flow; W and H are, respectively, top width and water depth (m); and a and b are coefficients to be calibrated. The coefficient a has a value of 13.7 that is obtained using the provided bankfull top width and flow rate. A value of 0.2 was used for b that resulted in reasonable values for Manning's roughness n.

The estimated W, H and n values corresponding to different flow rates are listed in columns 2, 3 and 5 of Table A1 respectively.

Golder Associates Ltd.
500 - 4260 Still Creek Drive, Burnaby, British Columbia, Canada V5C 6C6
Tel: +1 (604) 296 4200 Fax: +1 (604) 298 5253 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

3.0 CALCULATION OF TURBULENT MIXING COEFFICIENT

The turbulent mixing coefficient ε_t was calculated based on the equation by Fischer et al. (1979):

$$\varepsilon_t = 0.6Hu^* \quad [2]$$

where 0.6 is assumed for irregular natural rivers, and *u** is shear velocity:

$$u^* = \sqrt{g * H * S_0} \quad [3]$$

and g is gravitational acceleration. The calculated *u** and ε_t values corresponding to different discharges are listed in columns 6 and 7 of Table A1, respectively.

4.0 FULL DEPTH MIXING ASSUMPTION

Table A1 indicates that the water depth ranges from 0.78 m to 2.2 m for discharges ranging from 30 m³/s to 400 m³/s, and the mean velocity (listed in column 4 of Table A1) varies from 1.2 m/s to 2.8 m/s. A full depth mixing was assumed because of the shallow river depth and high velocity.

Table A1: Lowest Dilution Factor at Edge of IDZ for Maximum Effluent Discharge (Centreline or Bank)

River Flow	Width	Water Depth	Flow Velocity	Manning's Roughness	Shear Velocity	Mixing Coefficient	Froude Number	Minimum Dilution [(a)]		Maximum Effluent Discharge [(b)]		
								Single-point Discharge at Centreline	Single Bank Discharge Point	Single-point Discharge at Centerline	Single Bank Discharge Point	Maximum IDZ Width for q_{m1}
Q (m^3/s)	W (m)	H (m)	V (m/s)	n	u* (m/s)	ε_t (m^2/s)	Fr	S_{m1}	S_{m2}	q_{m1}(m^3/s)	q_{m2} m^3/s)	L (m)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
30.3	33.3	0.78	1.16	0.063	0.240	0.113	0.420	30	15	0.100	0.050	5.4
50.0	37.9	0.96	1.38	0.061	0.265	0.152	0.451	47	24	0.155	0.078	5.7
119	47.5	1.35	1.85	0.057	0.315	0.256	0.509	100	50	**0.330**	0.165	6.4
150.0	50.4	1.48	2.01	0.056	0.330	0.294	0.526	122	61	0.404	0.202	6.6
236.5	56.7	1.78	2.34	0.054	0.362	0.386	0.560	182	91	0.600	**0.300**	7.0
264	58.4	1.86	2.43	0.052	0.372	0.413	0.569	200	100	0.661	0.330	7.1
400.0	65.1	2.20	2.80	0.052	0.402	0.530	0.603	287	144	0.948	0.474	7.5

Notes

(a) At the boundary of the IDZ for the design effluent discharge of 0.33 m^3/s.

(b) To have dilution factor of 100 at edge of the IDZ.

5.0 CALCULATION OF THE LOWEST DILUTION FACTOR S_M AT THE EDGE OF INITIAL DILUTION ZONE FOR CENTRELINE EFFLUENT DISCHARGE

Let us first assume that the effluent is discharged into the river by a single point directly at the river centreline. At any cross section downstream of the discharge point, a constituent concentration is calculated by the equation from Fischer et al. (1979):

$$C = \frac{qC_0}{VH\sqrt{\frac{4\pi\varepsilon_t x}{V}}}\exp\left(-\frac{Vy^2}{4\varepsilon_t x}\right) \quad [4]$$

where x and y are the longitudinal and lateral distances from the effluent, q is effluent discharge (m^3/s), C_0 is effluent's initial constituent concentration (mg/L). Eqn. [4] is valid for x in a range where the plume edge will not reach the river bank. By Eqn. [4], at any cross section downstream of the centreline discharge point, the highest concentration occurs at the river centreline (y=0). Because dilution factor $S=C_0/C$ we can evaluate the lowest dilution factor S_m at any downstream cross section by:

$$S_m = \frac{HV}{q}\sqrt{4\pi\varepsilon_t x/V} \quad [5]$$

Eqn. [5] was used to evaluate the lowest dilution factor corresponding to the maximum effluent discharge of 0.3 m^3/s and at the edge of initial dilution zone (IDZ), which has a length of x=100 m (Government of British Columbia 2012), and the results are listed in column 9 of Table A1. This column indicates that for 7Q2 in the Quesnel River, the dilution factor at the edge of the IDZ is as low as 30:1 (Column 9).

For effluent discharge at bank, the lowest dilution factor at any downstream cross section occurs at bank, and its value equals to half of the value calculated by Eqn. [5]. Column 10 of Table A1 lists the lowest dilution factor corresponding q = 0.33 m^3/s and at the edge of IDZ. This column indicates that for 7Q2 on the Quesnel River, the dilution factor at the edge of IDZ is as low as 15. Table A1 also indicates that the allowable effluent discharge at bank is 0.474 m^3/s when river discharge equals bankfull discharge of 400 m^3/s.

6.0 CALCULATION OF THE ALLOWABLE MAXIMUM EFFLUENT DISCHARGE

Under the *Environmental Management Act, Municipal Wastewater Regulation* of BC (2012) at the edge of IDZ, the dilution ratio ≥ 100:1 is preferred. This dilution ratio can be achieved by controlling the effluent discharge. In Eqn. [5] when H, V and ε_t are known, if given x and S_m values, a corresponding q value can be calculated. In Table A1, column 11 shows the calculated q values for centreline discharge by setting x =100 m and S_m = 100 in Eqn. [5]. This column indicates that when the river flow is less than approximately 119 m^3/s, the allowable effluent discharge is less than 0.33 m^3/s. The maximum allowable discharge (to meet the criterion of S>=100) at the bank are listed in column 12 of Table A1. This column indicates that when the river flow is less than about 264 m^3/s the allowable effluent discharge is less than 0.33 m^3/s. The variations of the allowable maximum allowable discharge, centreline and at the bank, with river flow are shown in Figure A1.

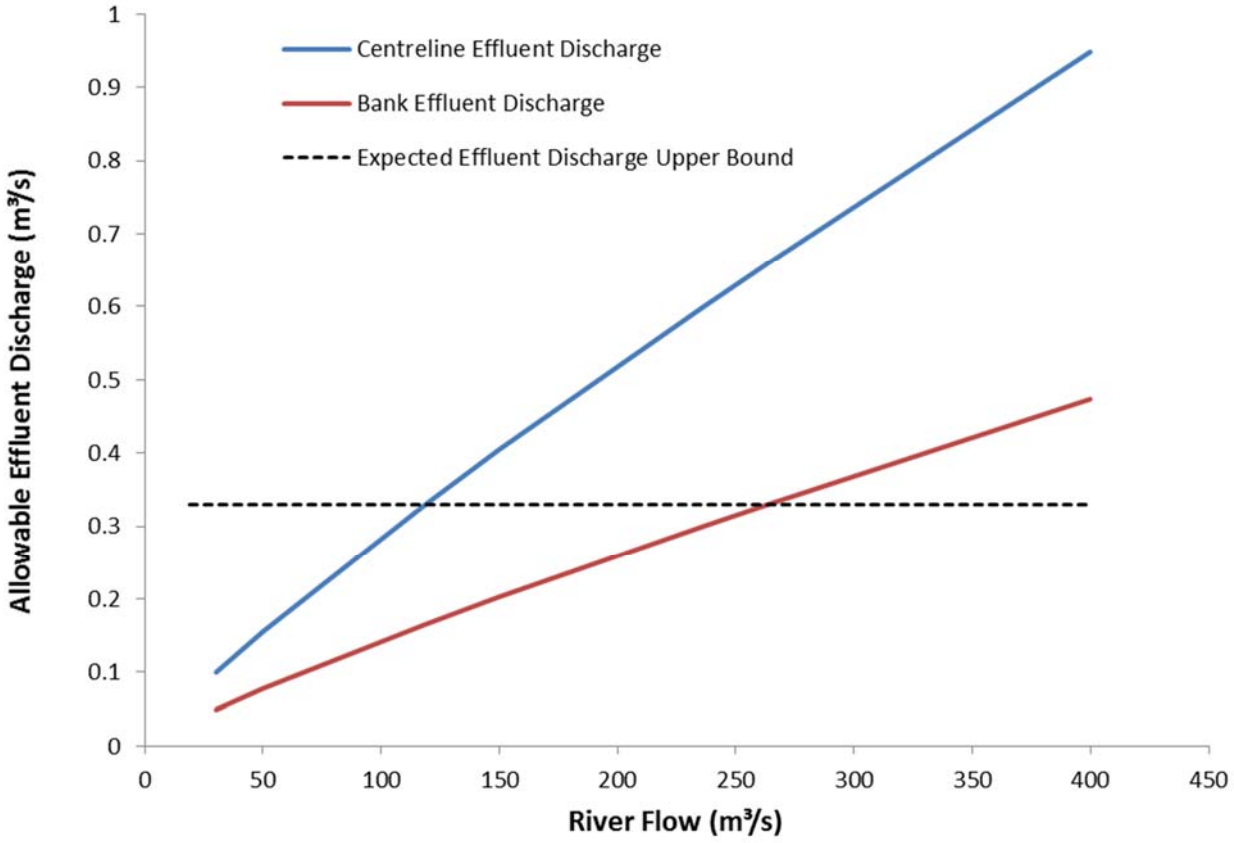


Figure A1: Variation of Allowable Effluent Discharge with River Flow to Meet Dilution Factor no less than 100 at Edge of IDZ

7.0 MAXIMUM WIDTH OF IDZ

To solve y² as a function of x from Eqn. [4]:

$$y^2 = \frac{Bx}{2} ln(\frac{A^2}{x}) \quad [6]$$

where

$$A = \frac{qC_0/C}{H\sqrt{4\pi\varepsilon_t V}} \quad \text{and} \quad [7]$$

$$B = \frac{4\varepsilon_t}{V} \quad [8]$$

Eqn. [6] can be used to plot the contour for a given dilution factor S and Figure A2 shows an example.

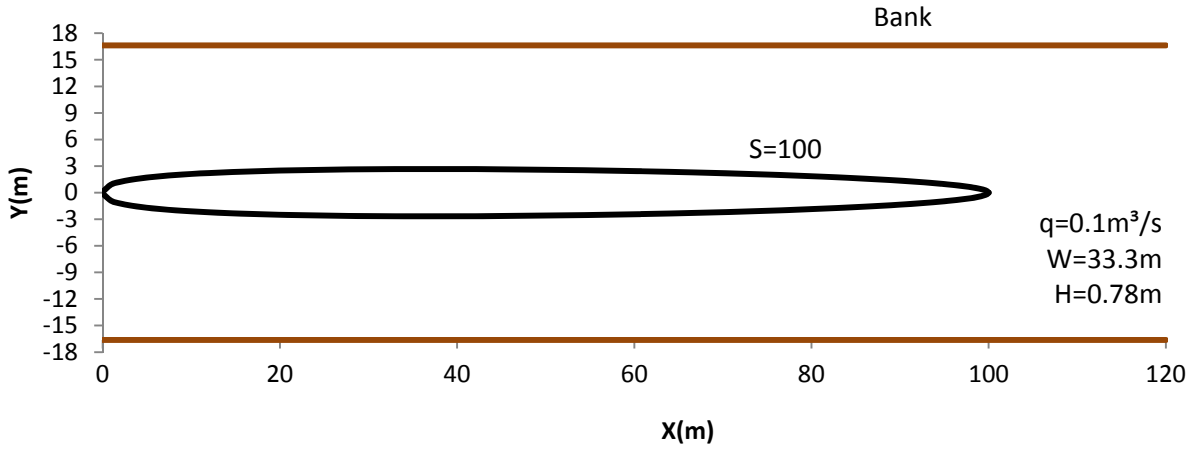


Figure A2: IDZ Boundary Contour for q=0.1 m³/s

It can be proved that y² has maximum value at x= A²/e (where *e* is natural log constant [2.7183]) and the maximum width L for a constant C contour is:

$$L = 2y = A\sqrt{2B/e} \qquad [9]$$

In Table A1, column 13 lists the *L* values for the different controlled *q* values listed in column 11. Column 13 indicates that for 7Q2 river flow, the maximum IDZ width is 5.4 m for controlled effluent discharge, which is about 16% of the river width of 33.3 m, and that for a bank discharge, the maximum IDZ width is 7.5 m, which is about 12% of the river width of 65.1 m.

8.0 DIFFUSER WITH MULTIPLE PORTS

If a diffuser with multiple ports is used, the discharge will be fully mixed across the diffuser length in a short downstream distance from the diffuser, and this will improve dilution. For a diffuser across the river and positioned at the river centerline, Eqn. [10] is used to estimate the constituent concentration at the center of a cross section *x* metres downstream of the diffuser:

$$C = \frac{\frac{q}{n} * C_0}{VH\sqrt{\frac{4\pi\varepsilon_t x}{V}}} \sum_{i=1}^{N} \exp\left(-\frac{V y_i^2}{4\varepsilon_t x}\right) \qquad [10]$$

where N is number of diffuser ports and y_i is the distance between port i centreline and the river centerline. The concentration calculated by Eqn. [10] will be lower than actual concentrations because Eqn. [10] is the result of superimposing the constituent concentration profiles of N independent plumes.

The Government of British Columbia (2012) specifies that the width of IDZ at its downstream extent is less than 25% of the river width, which is approximately 8.0 m wide for 7Q2 river flow. The maximum IDZ width is 5.4 m for single-point centreline discharge, and therefore the diffuser length should be less than approximately 2.6 m.

If a 2.6-m diffuser with two ports is used, for 7Q2 flow of 30.3 m³/s, the allowable effluent discharge via the river centreline can be increased by approximately 5% from 0.1 m³/s to 0.105 m³/s.

9.0 CLOSURE

We trust that the information presented in this memo is sufficient for your present requirements. If you have any questions or concerns, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Shouhong Wu, PhD, PEng
Senior Water Resources Engineer

ORIGINAL SIGNED

Robert Millar, PhD, PEng
Associate, Senior Hydrotechnical/Water Resources Engineer

SW/RGM/kp

o:\final\2014\1421\1411734\1411734-204-tm-rev0-16000\1411734-204-tm-rev0-16000-mixings calculations 17oct_16.docx

ATTACHMENT 2
Options Analysis Matrix

Primary Criteria																							
Criteria		**Description**		**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
Environmental		Does not cause adverse impacts to aquatic, terrestrial or human		✓			✓			✓			✓			✓			✓		
Legal		Complies with all applicable provincial and federal policy and law		✓			✓			✓			✓			✓			✓		
Secondary Criteria																							
Criteria		**Description**	**Weighting**	**Status Quo (for comparison only)**			**Option 1 - Pipeline to Quesnel Lake**			**Option 2 - Re-locating Hazeltine Creek Discharge**			**Option 3 - Pipeline to Quesnel River**			**Option 4 - Distributed to Bootjack Lake, Polley Lake, Hazeltine Creek**			**Option 5 - Science based environmental benchmarks**		
				Rank	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**	**Rank**	**Score**	**Comments**
Environmental	Assimilative Capacity	Minimum of 10x dilution, >100x dilution preferred	5	1	5	Low dilution at point of discharge	5	25	High predicted and measured dilution	1	5	Low dilution at point of discharge	3	15	>10x dilution, large IDZ required at low flows	4	20	Effluent distributed to multiple locations	2	10	Benchmarks and treatment tailored to receiving environment
	Aquatic Effects	Minimize receiving effects on receiving environment	10	1	10	Prevents or prolongs rehabilitation	5	50	All WQG met at IDZ	2	20	Incomplete restoration of Hazeltine Creek	3	30	IDZ may impinge on fish spawning habitat	3	30	Discharge distributed but into unimpacted water body	4	40	Benchmarks would be derived to minimize aquatic effects
	Terrestrial Effects	Minimize disturbance (land clearing, construction area, linear disturbance)	5	5	25	Minimal pipeline and infrastructure required	2	10	Use of existing infrastructure; some new linear disturbance	4	20	Minimal pipeline along disturbed corridor	1	5	Additional linear disturbance and diffuser construction	3	15	Low terrestrial disturbance	5	25	Minimal pipeline and infrastructure required
	Long Term Sustainability	Ensure location will be viable for long term	5	1	5	Short-term solution	3	15	Suitable for long term but not permanent	2	10	Allows progressive rehabilitation	3	15	Suitable for long term but not permanent	5	25	Viable permanent solution that restores pre-mining flows	4	20	Viable permanent solution
Technological	Risk and Consequence of Failure	Minimize likelihood of failure and potential effect of failure	6.25	1	6.25	Risk of uncontrolled release to Quesnel Lake	5	31.25	Deep diffuser in low traffic area	1	6.25	Risk of uncontrolled release to Quesnel River	2	12.5	Diffuser located in shallow flow	3	18.75	Distributed flows disperse risk	4	25	Low risk of failure; minimal infrastructure
	Complexity	Prefer lower complexity	6.25	3	18.75	Low complexity of system; high complexity of flow management	4	25	Single pipeline and use of existing diffuser	3	18.75	Low complexity of system; high complexity of flow management	2	12.5	Long pipeline; river diffuser	1	6.25	Most complex drainage and discharge systems	5	31.25	Low complexity
	Flexible Design	Adaptable and scalable	6.25	1	6.25	No flexibility - current system is already limited	5	31.25	Readily adaptable to higher flows	1	6.25	No flexibility - current system is already limited	4	25	Some flexibility but may be limited seasonally	3	18.75	Limited scalability; readily adaptable	2	12.5	Difficult to scale
	Risk of Non-compliance	Prefer higher reliability	6.25	1	6.25	Requires highly managed flows	5	31.25	Lowest variability in receiving environment	1	6.25	Requires highly managed flows	2	12.5	Dilution impacted by variable flow rate in receiving environment	4	25	Lake systems less variable than lotic	3	18.75	Dependent upon derivation
Social	Restoration of Fish Habitat	Preference to restore more habitat in Hazeltine Creek sooner	12.5	1	12.5	Prevents or prolongs rehabilitation	5	62.5	Allows complete restoration	2	25	Partial restoration Short timeline	5	62.5	Allows complete restoration	3	37.5	Allows complete restoration but in longer time frame	3	37.5	Allows complete restoration but in longer time frame
	Acceptance of Option	Stated preference of stakeholders	12.5	1	12.5	Not favoured by any stakeholder	2	25	Allows restoration of Hazeltine Creek but entails discharge upgradient of Likely	1	12.5	Not favoured by any stakeholder	5	62.5	Preferred by Likely residents	4	50	Stated preference of some stakeholders	2	25	Anticipated low acceptance
Economic	Capital Cost	Lower capital cost	12.5	5	62.5	No capital cost	2	25	Higher cost of pipeline installation	3	37.5	Short pipeline required	1	12.5	Higher cost of pipeline installation	4	50	Multiple discharge locations, all nearby	4	50	Low infrastructure cost; additional studies required
	Operating Cost	Lower operating cost	12.5	1	12.5	High management and monitoring effort	5	62.5	Minimize maintenance and monitoring locations	1	12.5	High management and monitoring effort	4	50	Long pipeline and river diffuser to maintain	2	25	Long-term monitoring at multiple locations	3	37.5	Long-term monitoring
Final Scoring																							
Environmental			25	Subtotal	45		Subtotal	100		Subtotal	55		Subtotal	65		Subtotal	90		Subtotal	95	
Technological			25	Subtotal	37.5		Subtotal	118.75		Subtotal	37.5		Subtotal	62.5		Subtotal	68.75		Subtotal	87.5	
Social			25	Subtotal	25		Subtotal	87.5		Subtotal	37.5		Subtotal	125		Subtotal	87.5		Subtotal	62.5	
Economic			25	Subtotal	75		Subtotal	87.5		Subtotal	50		Subtotal	62.5		Subtotal	75		Subtotal	87.5	
TOTAL SCORE			100	**TOTAL**	**182.5**	**not ranked**	**TOTAL**	**393.75**	**Rank: 1**	**TOTAL**	**180**	**Rank: 5**	**TOTAL**	**315**	**Rank: 4**	**TOTAL**	**321.25**	**Rank: 3**	**TOTAL**	**332.5**	**Rank: 2**

TECHNICAL MEMORANDUM

DATE 25 November 2016 **REFERENCE No.** 1662612-023-TM-Rev0-32100

TO Colleen Hughes and Luke Moger
Mount Polley Mining Corporation

CC Don Parsons and Shouhong Wu

FROM Paul Beddoes and Jerry Vandenberg **EMAIL** pbeddoes@golder.com; jvandenberg@golder.com

ANALYSIS OF OBSERVED DILUTION IN QUESNEL LAKE, MOUNT POLLEY MINE, BC

1.0 INTRODUCTION

Mount Polley Mining Corporation (MPMC) operates the Mount Polley Mine (the Mine) which is located approximately 56 km northeast of Williams Lake, BC. Discharge of treated effluent from the Mine is conveyed by Hazeltine Creek channel and is discharged from the upper sedimentation pond by gravity through two pairs of submerged diffusers in Quesnel Lake. Dilution characteristics of this discharge were predicted as part of the Short-term (Golder 2015) and Long-term Water Management Plan - Technical Assessment Reports (TARs) (Golder 2016a).

To verify those predictions, this assessment evaluated monitoring data to estimate actual dilution at the edge of the Initial Dilution Zone (IDZ) in Quesnel Lake, defined as a 100 m radius from the diffusers. In the context of Environmental Effects Monitoring (EEM), dilution at 250 m was also assessed.

The following objectives are addressed in this memorandum:

- Summarize predicted dilution at 250 m from the diffusers using the previously completed modelling.
- Compare predicted dilution to calculated dilution based on observed water quality in Quesnel Lake as a post-audit of near-field modelling. This comparison was completed for predicted and measured values at 100 m from the diffusers where monitoring is conducted as per requirements of BC *Environmental Management Act* Permit 11678.

2.0 PREDICTED DILUTION

The dilution of the mixed effluent plume in the receiving environment was predicted using the Cornell Mixing Zone Expert System (CORMIX) (Doneker and Jirka, 2007) to estimate dilution ratios at the edge of the IDZ under a variety of seasonal and wind driven conditions. Mixed effluent refers to the combination of water treatment plant effluent and Hazeltine Creek flows. The water treatment plant effluent is expected to be fully mixed within Hazeltine Creek before discharge from the sedimentation pond.

2.1 Dilution at 100 m

Modelling completed as part of the Short-term Water Management Plan TAR (Golder 2015) predicted the dilution from single-port temporary diffusers to be located near Hazeltine Point. Sixteen model simulations were completed to evaluate a range of receiving environment conditions. A description of this analysis and the modelling approach can be found in Golder (2015).

Dilution at the edge of the IDZ (100 m) was predicted to be greater than 52 times (x) in all simulations, and greater than 100x in 13% of simulations (Table 1).

Table 1: Predicted Plume Centerline Dilution Factors at 100 m (Golder 2015)

Current Velocity	5th Percentile (0.001 m/s)	Maximum (0.048 m/s)
Minimum	54	52
Median	73	69
Maximum	75	>100

Near-field modelling was updated as part of the Long-term Water Management Plan TAR (Golder 2016a) to assess dilution performance of the as-built Y-shaped diffusers. Input parameters were updated to reflect as-built configuration and current velocity at as-built depths. A total of 240 CORMIX simulations were completed to evaluate a range of receiving environment conditions.

In the updated model, predicted dilution at the edge of the IDZ ranged from 37x to over 100x at 100 m (Table 2). Predicted dilution was greater than 40x in 94% of simulations, and greater than 100x in 25% of simulations.

Near-field modelling results from Golder (2015) and Golder (2016a) found dilution performance at 100 m was primarily influenced by:

- Lake current velocity: dilution can be higher or lower when the current velocity is low compared to the cases when the current velocity is high. This is because the higher the lake current, the more ambient mixing, which increases dilution, but reduces the time before the plumes reach the IDZ boundary.
- Stratification: dilution is typically higher under well-mixed conditions because the vertical mixing depth is limited by the thermocline when the lake is stratified.

Table 2: Predicted Plume Centerline Dilution Factors at 100 m (Golder 2016a)

Current Velocity[1]	5th Percentile (0.001 m/s)	Maximum (0.042 m/s)	
Hypolimnion Depth	**15 m**	**20 m**	**15 m**
Minimum	64	55	37
Median	81	87	45
Maximum	>100	>100	>100

2.2 Dilution at 250 m

To support biological monitoring studies under Section 11(a) in Schedule 5 of the Metal Mining Effluent Regulations (MMER), previous modelling results were evaluated to assess dilution performance at 250 m. A subset of the 240 simulations from Golder (2016a) was rerun and dilution assessed at 250 m. Predicted dilution ranged from 43x to over 250x at 250 m (Table 3). Predicted dilution at 250 m was above 100x in 56% of the simulations that were evaluated. Similar to the dilution performance at 100 m, dilution at 250 m was influenced by lake current velocity and hypolimnion depth. Although dilution was greater than 100x in 56% of the scenarios, most scenarios represent combinations of variables that are intended to capture worst-case conditions that occur infrequently. Therefore, dilution is expected to exceed 100x most of the time.

Table 3: Predicted Plume Centerline Dilution Factors at 250 m

Current Velocity	5th Percentile (0.001 m/s)	Maximum (0.042 m/s)	
Hypolimnion Depth	**15 m**	**20 m**	**15 m**
Minimum	120	64	43
Median	133	99	52
Maximum	>250	140	139

3.0 POST-AUDIT OF NEAR-FIELD MODEL

Water quality monitoring of the mixed effluent, Quesnel Lake at the edge of the IDZ, and ambient Quesnel Lake provide data to calculate observed dilution. Water quality data were received from MPMC for effluent monitoring between February 2016 and September 2016, including data at the following stations:

- HAC-12: Water quality in Hazeltine Creek upper sedimentation pond prior to discharge to Quesnel Lake (i.e., “mixed effluent”)
- QUL-58: Water quality at 100 m from the diffuser (i.e., “IDZ”)
- QUL-120a: Water quality in the east basin of Quesnel Lake (i.e., “ambient”)

A post-audit of the near-field modelling presented in Golder (2015) was completed by calculating dilution based on these monitoring data and comparing against model predictions. Since the QUL-58 station is approximately 100 m from the diffuser discharge, dilution calculated using HAC-12 data to represent mixed effluent water quality can be compared directly to predicted dilution at 100 m. When the plume is detected, QUL-58 is sampled from the plume centreline at approximately 100 m from the diffuser. However, logistical constraints in detecting the plume and maintaining a consistent sample location mean samples collected at QUL-58 may not be along the centreline.

Observed dilution at the IDZ boundary was calculated from these data using Equation 1 for dates where data were available at all stations. Although monitoring was not always conducted at all sites on the same day due to logistical constraints, samples were collected within one or two days and effluent quality had low variability during this period because the feed water was drawn from a pit lake with a large residence time. Rapid changes along Hazeltine Creek due to runoff or rainfall events may cause discrepancies between data collected within one or two days.

$$D = \frac{(C_{eff} - C_{amb})}{(C_{IDZ} - C_{amb})}$$ Equation 1

Where: D = calculated dilution at the IDZ boundary
C_{eff} = observed concentration in the effluent
C_{IDZ} = observed concentration at the IDZ boundary
C_{amb} = observed ambient concentration

The monitoring data included measurements for 85 different parameters. Dilution calculations focussed on those parameters with the greatest relative difference in concentrations measured in the mixed effluent and the IDZ. Six parameters were selected for these calculations based on relative differences of over 50 in the mixed effluent versus the IDZ: sulphate, nitrate, total manganese, total molybdenum, and total selenium. Although relative difference of TDS concentrations between the mixed effluent and the IDZ were below 50x, this parameter was used to calculate observed dilution because it has been identified as a key parameter in previous work (Golder 2016b). Copper has been identified as a key parameter in previous work (Golder 2016b); however, the relative difference between treated effluent and IDZ concentrations was too low to provide reliable predictions of dilution. Note that the relative difference between mixed effluent and ambient concentrations is a purely mathematical metric that does not imply potential effects to aquatic health; potential ecological effects are assessed elsewhere (Golder 2015, 2016a).

Where ambient concentrations were above IDZ concentrations, or IDZ concentrations were above mixed effluent concentrations, the plume was assumed to be non-detectable, which equates to infinite dilution. Where multiple measurements were available at QUL-58 (i.e., bottom, mid, and surface), the maximum concentration was assumed to represent the plume and was therefore used to calculate dilution.

A mean ambient water concentration based on QUL-120a was used in calculations since similar monitoring dates were not available at this location. Measured concentrations of parameters used to calculate dilution generally did not vary by more than 10% over the post-audit period between February 2016 and September 2016. This assumption induces uncertainty into the calculation when dilution factors are high because this equation becomes sensitive to concentrations where C_{IDZ} approaches C_{amb}. Measured concentrations at HAC-12 were used to represent effluent (C_{eff}), which aligns with modelling assumptions and provides an “apples-to-apples” comparison.

Dilution calculations based on Equation 1 assume that all parameters behave conservatively within the IDZ (i.e., settling, sorption, and redox reactions are negligible). These processes are likely not significant within the IDZ because the residence time within the IDZ is short and the effluent is low in particulate matter.

3.1 Estimated Dilution

Calculated dilution for selected parameters is provided in Table 4 and Figure 1. Calculated dilution ranged from 30 to >1,000; median dilution calculated for each date ranged from 89 to 611. Dilution based on a single parameter is subject to considerable uncertainty; however, the median values on a given date provide a reasonable estimate of the overall plume behaviour on that day.

Table 4: Calculated Dilution Factors at the IDZ

Date	Total Dissolved Solids	Sulphate	Nitrate	Total Manganese	Total Molybdenum	Total Selenium	Median Dilution
2/22/2016	247	289	∞	927	285	275	287
3/29/2016	157	213	1604	349	168	333	273
4/11/2016	∞	141	∞	744	135	477	611
5/5/2016	∞	124	204	108	171	202	187
5/10/2016	151	310	727	344	449	590	397
5/17/2016	102	114	136	30	138	165	125
5/24/2016	329	208	313	152	234	270	252
6/20/2016	62	103	109	165	110	107	108
6/27/2016	84	365	403	172	500	692	384
7/6/2016	39	339	343	91	321	316	318
8/2/2016	37	138	109	64	114	123	111
9/6/2016	70	92	79	101	97	86	89

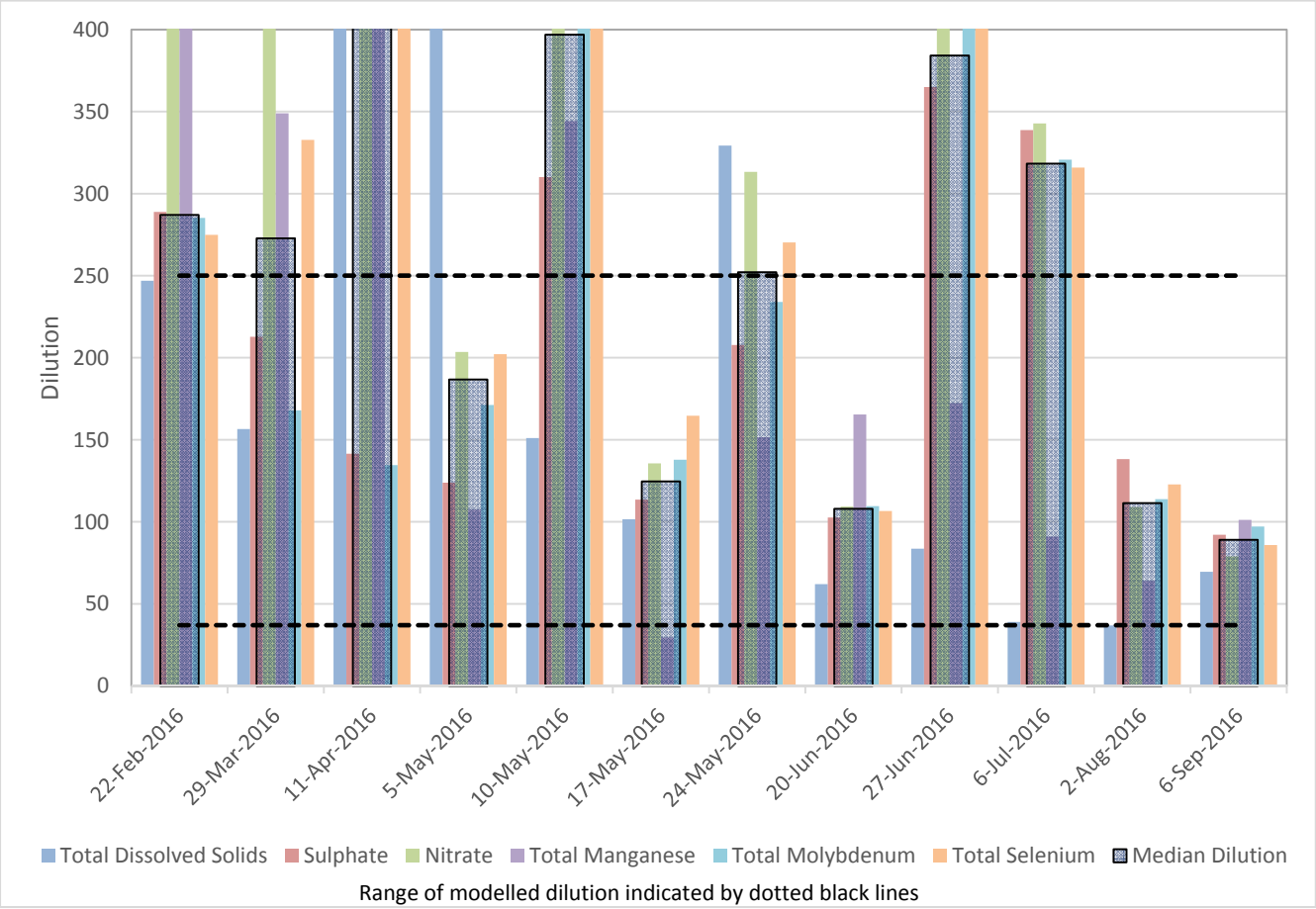


Figure 1: Calculated Dilution Factors in the IDZ using HAC-12 Observations

In general, dilution calculated from observed water quality is within the range predicted by the near-field model, or higher. It is expected that observed dilution would exceed predicted dilution because:

- The near-field model incorporates conservative assumptions, which tend to result in under-estimation of dilution at the edge of the IDZ.
- The specific climate and wind conditions leading to minimum dilution predictions may not have been encountered in the post-audit data.
- The minimum dilution predicted by the near-field model is along the plume centreline; if sampling at QUL-58 is not along the centreline, the calculated dilution will be over-estimated.
- Similarly, if all samples are not collected at exactly the same point, there will be differences in the dilution factor calculated for each set of parameters. This is a logistical limitation of the post-audit because samples are collected by Kemmerer sampler from a boat situated 50 m above and 100 m away from the diffusers. Sample locations are determined in the field by measuring in-situ profiles to detect the plume. Separate casts are required to collect adequate sample volumes for ions, metals and nutrients. Consequently, each subsample will have been collected at a slightly different distance off the plume centreline due to movement of the boat, as well as drift of the Kemmerer, during sampling.

Given the sampling constraints described above, this analysis focuses on the median dilution calculated for any given date rather than on results for individual parameters.

Dilution calculated based on observed concentrations is generally higher at the beginning of the post-audit period (February to May 2016) and decreases toward the end of the post-audit period (June to September 2016) (Figure 1). A corresponding decrease in wind speed is also observed over this period based on monitoring at weather stations #1 (Tree Plots) and #2 (Tailings Storage Facility) (Figure 2). Measured wind speed was as low as 0 m/s on the dates with lowest observed dilution. Since lake current velocity is a function of wind speed, this is consistent with the results of near-field dilution modelling which found dilution is affected by lake current.

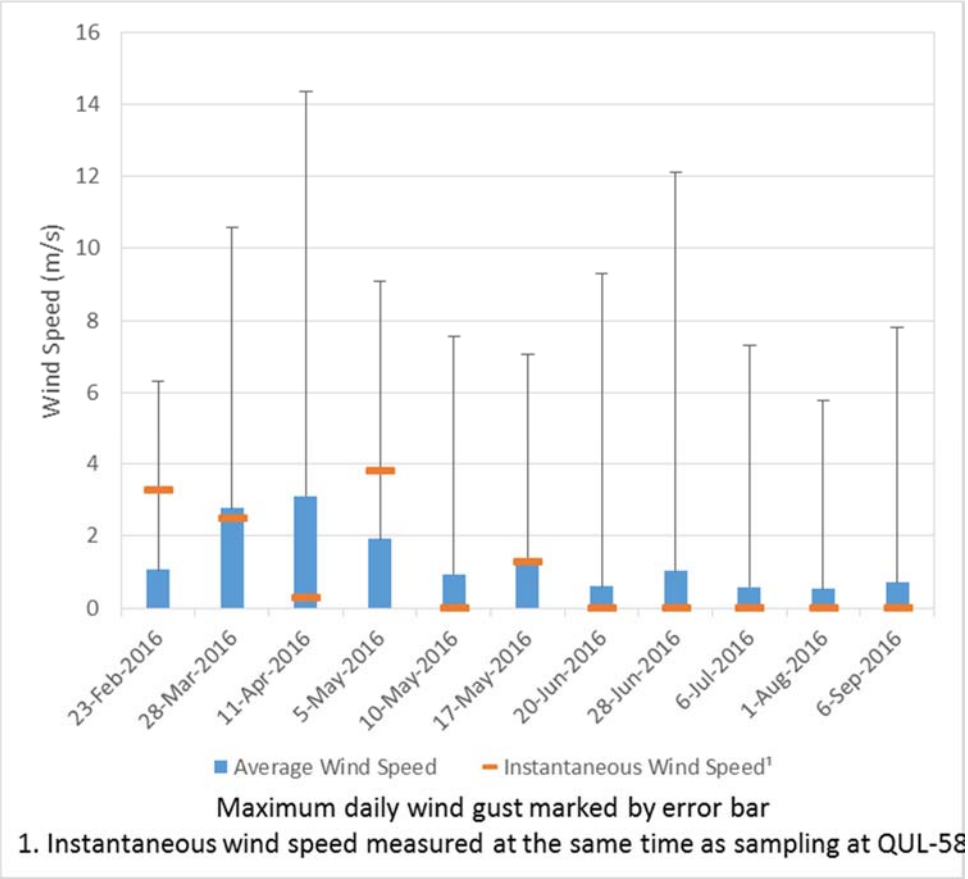


Figure 2: Observed Wind Speed

In addition to the lower instantaneous wind speed, lake profile measurements show the development of stratification in the lake on about 17 May 2016 (Figure 3, Table 4). Lower calculated dilution corresponds with dates when the lake was stratified (Figure 1). This is consistent with the predictions of near-field dilution modelling as described in Section 2.1.

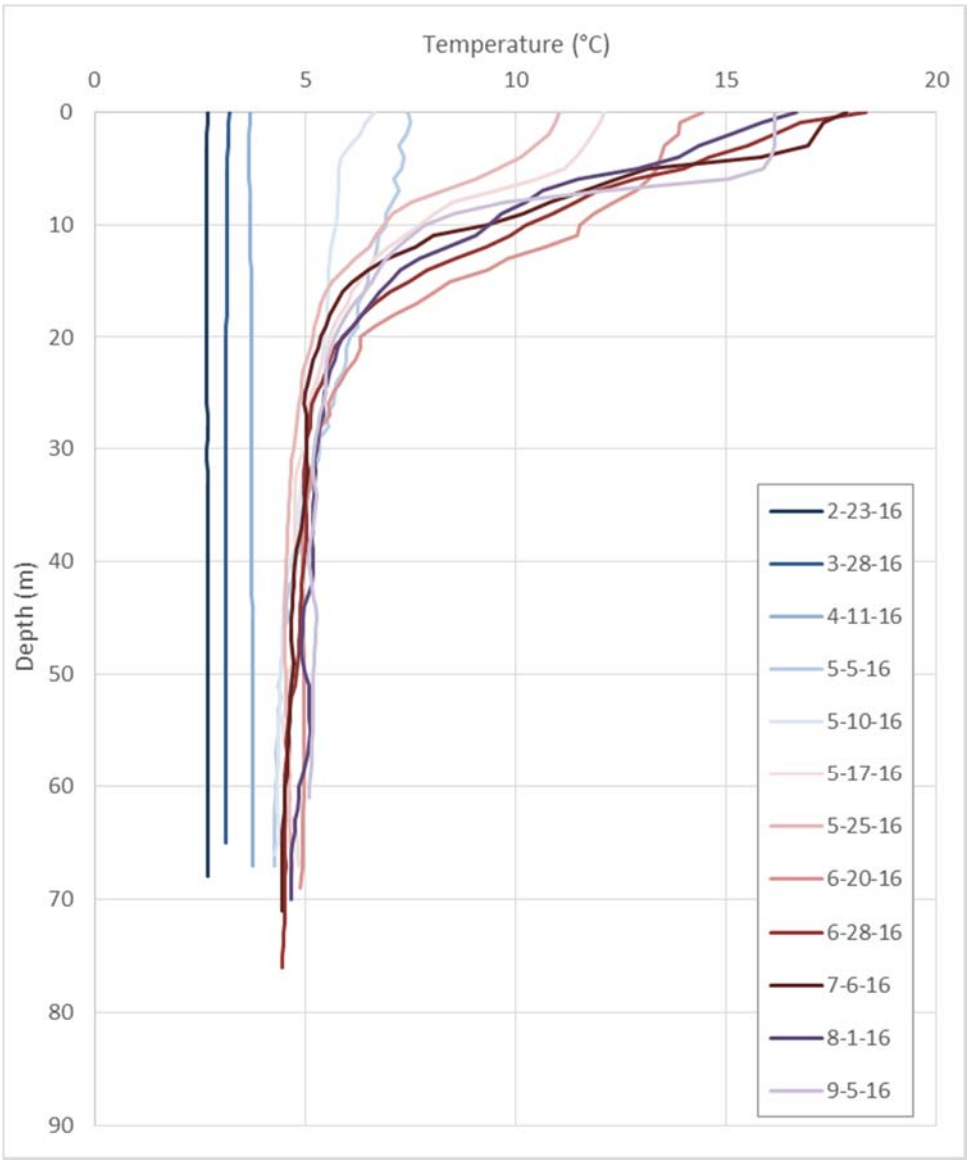


Figure 3: Quesnel Lake Profile Data for the Post-Audit Period (QUL-58)

Table 5: Approximate Thermocline Depth at QUL-58

Date	Hypolimnion Depth (m)
2/23/16	-
3/28/16	-
4/11/16	-
5/05/16	-
5/10/16	-
5/17/16	8
5/25/16	10
6/20/16	15
6/28/16	16
7/06/16	13
8/01/16	13
9/05/16	10

4.0 SUMMARY

Near-field dilution model predictions for the discharge to Quesnel Lake were re-evaluated to assess dilution at 250 m horizontal distance from the diffuser. These predictions are based on modelling completed as part of the Short-term and Long-term Water Management Plan TARs (Golder 2015, 2016a). Most predictions at 250 m exceeded 100x dilution (Table 3). Minimum dilution at 250 m (43x) occurred when the highest lake current velocity was assumed, similar to predictions at 100 m (Table 1). Lower dilution predictions are associated with the highest lake velocity because there is less time for mixing before the plume reaches the IDZ boundary (Golder 2016a).

Monitoring of effluent and IDZ water quality has continued since completion of near-field modelling and commencement of discharge. These data provided the basis to calculate observed dilution at the 100-m IDZ boundary and to perform a post-audit of the near-field modelling. Dilution performance of the diffuser was calculated using measured concentrations of TDS, sulphate, nitrate, total manganese, total molybdenum, and total selenium (Table 4). Calculated dilution was generally higher than predicted dilution, which is expected given the conservative assumptions used in modelling, and the logistical challenges associated with sampling directly in the plume centreline.

Calculated dilution was generally higher at the beginning of the post-audit period (Figure 1). The lower dilution calculated at the end of the post-audit period corresponds to dates with low wind speed during sampling in the lake (Figure 2) and with the development of stratification in the lake (Figure 3). These findings are consistent with the results of near-field modelling which found that dilution was affected by both lake current speed and hypolimnion depth.

5.0 CLOSURE

We trust that this technical memorandum satisfies your current requirements. If you have any questions, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Paul Beddoes, MSc, RPBio, GIT
Environmental Scientist

ORIGINAL SIGNED

Jerry Vandenberg, PChem
Principal, Senior Environmental Chemist

PAB/JV/pn/kp

o:\final\2016\3 proj\1662612 mpmc_tailingsenviroeng_bc\1662612-023-tm-rev0-32100\1662612-023-tm-rev0-32100-dilutionqlake_25nov_16.docx

REFERENCES

Doneker, R. L., G. H. Jirka. 2007. *CORMIX User Manual: A Hydrodynamic Mixing Zone Model and Decision Support System for Pollutant Discharges into Surface Waters*. Report EPA-823-K07-001, U.S. Environmental Protection Agency, Washington, DC.

Golder Associates Ltd. (Golder). 2015. *Technical Assessment Report in Support of an Effluent Permit Amendment – Mount Polley Mine*. Appendix E: Conceptual Design of Diffuser in Quesnel Lake. Submitted to Mount Polley Mining Corporation (MPMC): May 2015.

Golder. 2016a. *Long-term Water Management Plan Technical Assessment Report – Mount Polley Mine*. Appendix H: Dilution Performance Review of As-Built Temporary Diffusers in Quesnel Lake. Submitted 17 October 2016.

Golder. 2016b. *Long-term Water Management Plan Technical Assessment Report – Mount Polley Mine*. Appendix D: Water Quality Modelling Report. Submitted 17 October 2016.

Mount Polley Mining Corporation (MPMC). 2016. *Quesnel Lake Dilution*. Email from Colleen Hughes. 3 October 2016.

TECHNICAL MEMORANDUM

DATE 9 February 2017 **REFERENCE No.** 1662612-103-TM-Rev0-22313

TO Luke Moger
Mount Polley Mining Corporation

CC Don Parsons (MPMC)

FROM Jerry Vandenberg and Michael Herrell **EMAIL** Jerry_Vandenberg@golder.com; Michael_Herrell@golder.com

QUESNEL LAKE WATER COLOUR

1.0 INTRODUCTION

Mount Polley Mining Corporation (MPMC) has heard concerns from local residents that Quesnel Lake has taken on a green hue. Therefore, MPMC and Golder Associates Ltd. (Golder) have evaluated potential causes of green colouration through monitoring and analysis since December 2015.

The current hypothesis is that Quesnel Lake has historically taken on a green hue in certain locations, at certain angles, and during certain seasons. Green colour in natural lakes is not uncommon in BC. Heightened awareness to the lake water quality and view is likely revealing a green hue that was occasionally present but never noticed before 2014. The following text describes the lines of evidence that support this hypothesis.

2.0 CHEMICAL CONSTITUENTS

The chemical makeup of water can affect its colour in a number of ways that are well understood. These mechanisms form the basis of spectrometry and colourimetry, which are branches of analytical chemistry. Chemicals that are dissolved or suspended in the water can transmit different colours, depending on the concentrations of the constituents, the path length through the water and the strength and wavelength of incoming radiation. The application of spectral chemistry to water colour is described mathematically by Environment Canada researchers[1]. In a companion paper[2], the same researchers used spectral chemistry to classify rivers in BC as: Type 1, dominantly snowmelt or glacial melt, perceived as blue to turquoise to green; Type 2, dominantly snowmelt and groundwater fed, perceived as green to brown; and Type 3, with high concentrations of total suspended solids or chlorophyll or dissolved organic matter, perceived as brown.

Pure water in a white or transparent vessel will transmit blue when unfiltered sunlight enters the water surface. The ultraviolet (UV) waves within the sunlight transmit the blue. If the UV waves are filtered through clouds, the remaining light energy is insufficient to transmit blue. Lakes also take on a blue hue when they reflect the blue sky above. These two factors combine to give the usually recognized blue lake colour. Divers know that this blue fades as one descends into water and the blue wavelengths are absorbed by the water above.

[1] Jerome et al. 1994. Colours of natural waters: 1. Factors controlling the dominant wavelength. Northwest Science. 68(1):43-52.

[2] Jerome et al. 1994. Colours of natural waters: 2. Observations of spectral variations in British Columbia Rivers. Northwest Science. 68(1):53-60.

Depending on the water clarity, the water can take on other shades or other colours entirely. Organic carbon impinges the well-known brown colour in many BC lakes, generally near the headwaters. Other chemicals, notably copper, tend to give the water a green or turquoise hue. Therefore, copper concentrations were examined to evaluate whether dissolved or suspended copper could be leading to the perceived green hue.

Copper concentrations were elevated in Quesnel Lake following the breach (as documented in the Post Event Environmental Impact Assessment) and increased during fall turnover in 2014. These concentrations are shown in Figure 1 and Figure 2, along with the subsequent decline to below BC Water Quality Guidelines for Aquatic Life. The water was below the copper guideline after December 2014 in Quesnel Lake and thereafter was only measured above this concentration in a few samples near the mouth of Hazeltine Creek. Since April 2015, copper has remained below all applicable BC Water Quality Guidelines at all points in Quesnel Lake (Figure 3).

The Mount Polley Mine has been discharging water within the conditions and limits in *Environmental Management Act* Permit 11678. Since discharge began on 1 December 2015, copper concentrations in Quesnel Lake have remained below guidelines, at 100 m from the diffusers and beyond.

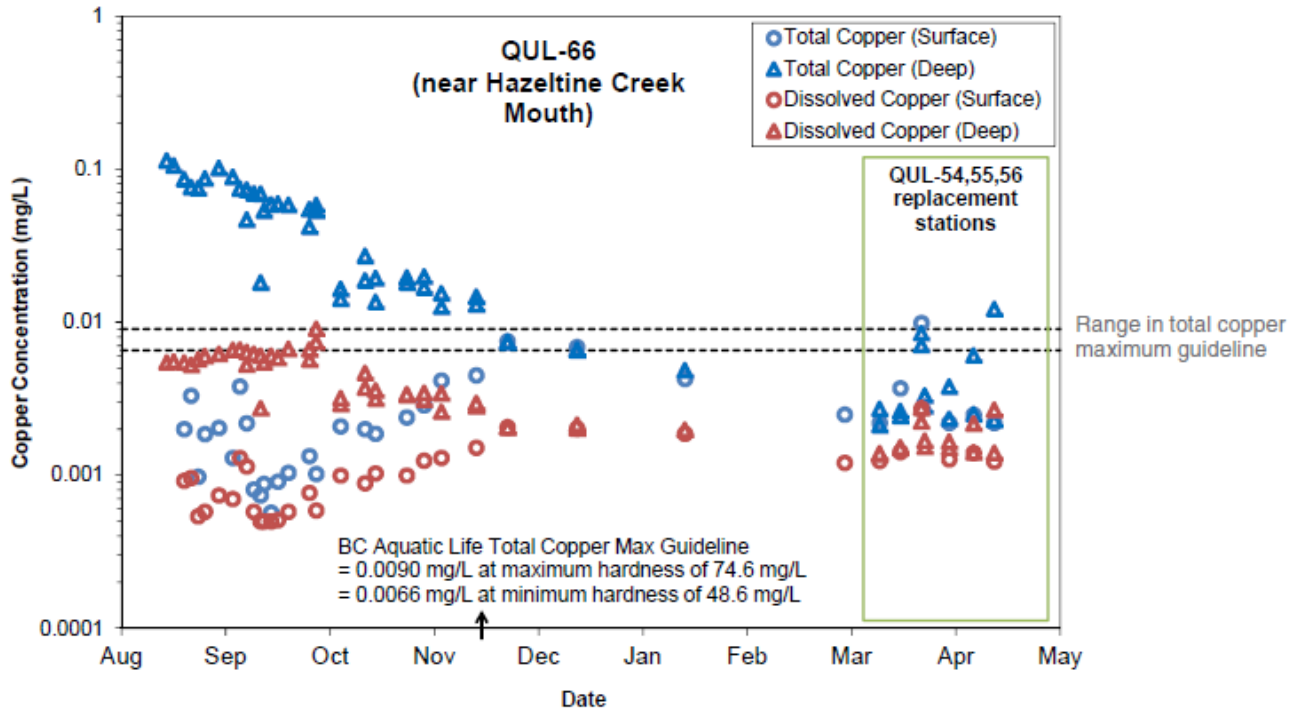
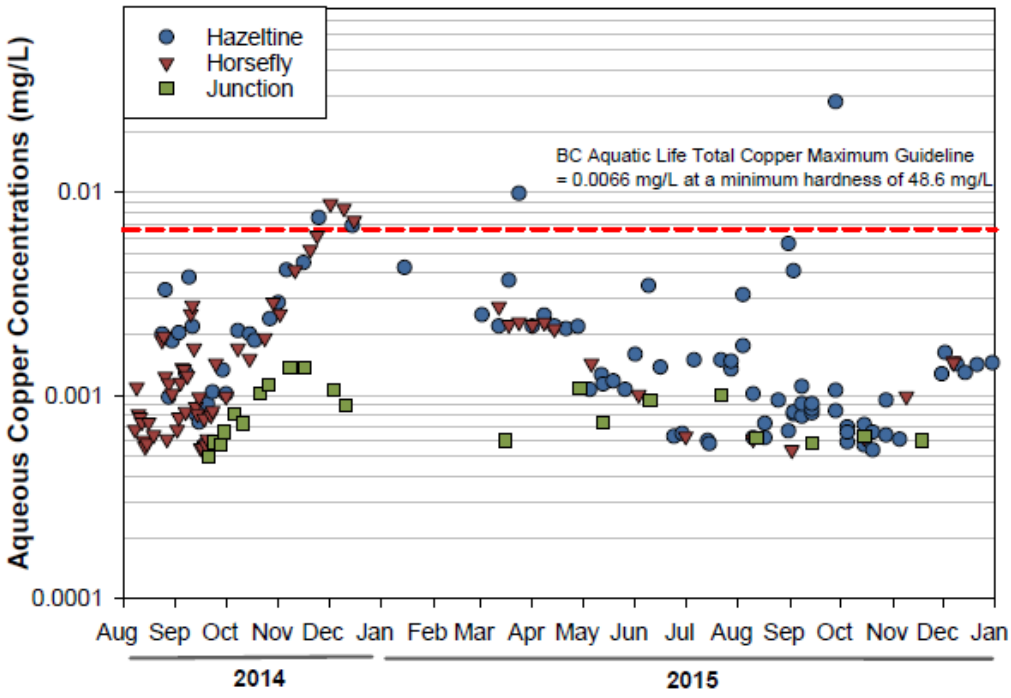


Figure 1: Total and Dissolved Copper Concentrations at Surface and Deep Site in Quesnel Lake, August 2014 to May 2015



Note: Potentially anomalous value observed in Hazeltine in May 2015.

Figure 2: Total Copper Concentrations at Surface Stations in Quesnel Lake, 2014 and 2015

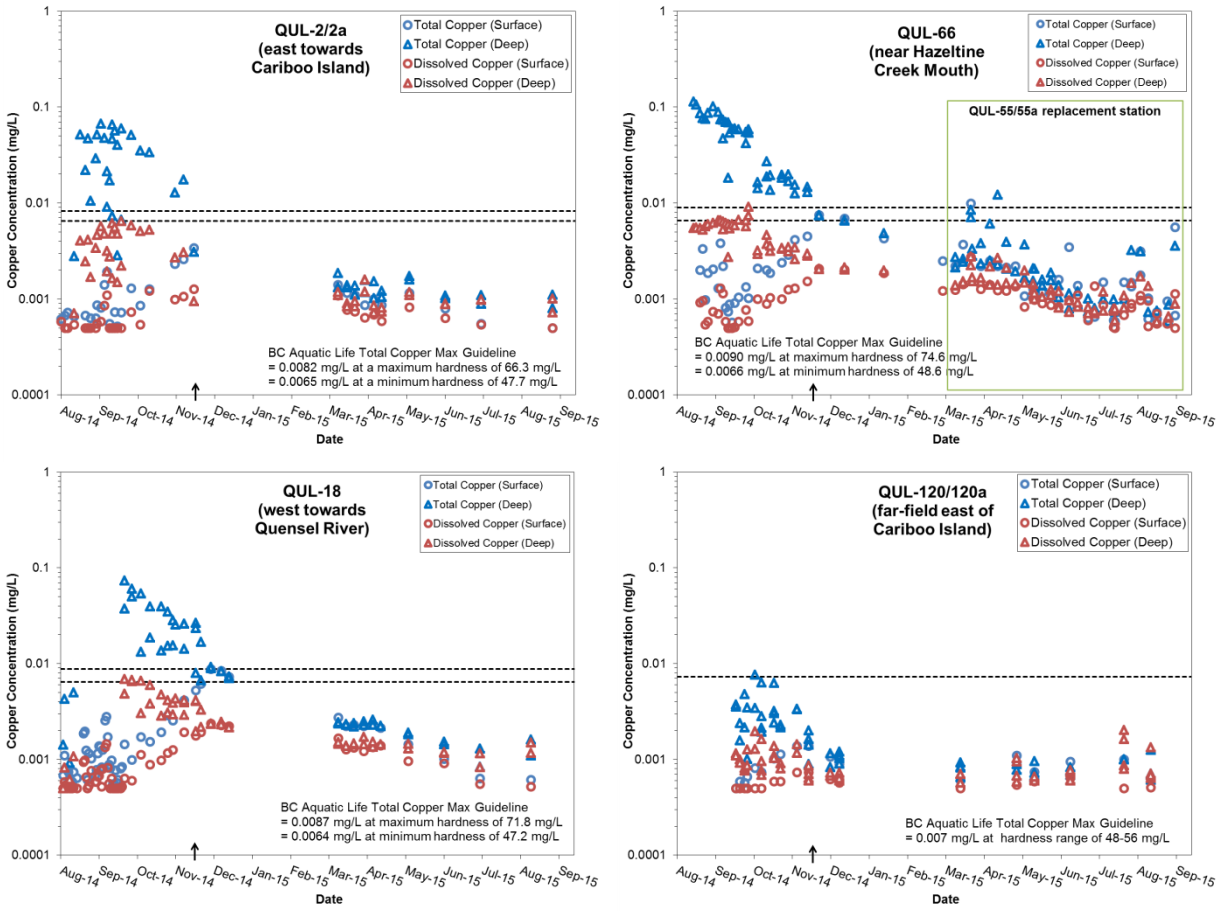


Figure 3: Copper Concentrations at Four Points in Quesnel Lake, August 2014 to September 2015

Note: Arrow represents the approximate timing of mid-November turnover in Quesnel Lake.

3.0 PLANTS AND ALGAE

Eutrophication is a well-known process that results from excessive nutrient inputs, including nitrogen and other macronutrients, but especially phosphorus. Eutrophication leads to green lake colour due to increases in phytoplankton and plant growth, which may give off different shades of green depending on the size and abundance of the phytoplankton, which include microscopic species. Eutrophication also tends to make the surface of the lake turbid, as phytoplankton scatter light.

Quesnel Lake is an oligotrophic system, meaning that phosphorus and phytoplankton concentrations are low. Similar to copper, phosphorus concentrations increased near the mouth of Hazeltine Creek at times in 2015, but elsewhere in the lake the concentrations remained well below guidelines throughout 2015 (Figure 4). This means that the green colour in the lake was likely not related to algae or other biota.

During the evaluation of nutrient concentrations in Quesnel Lake in December 2015, limnologists at the Ministry of Environment (MoE) and primary productivity specialist biologists at Golder were consulted, and they confirmed this interpretation.

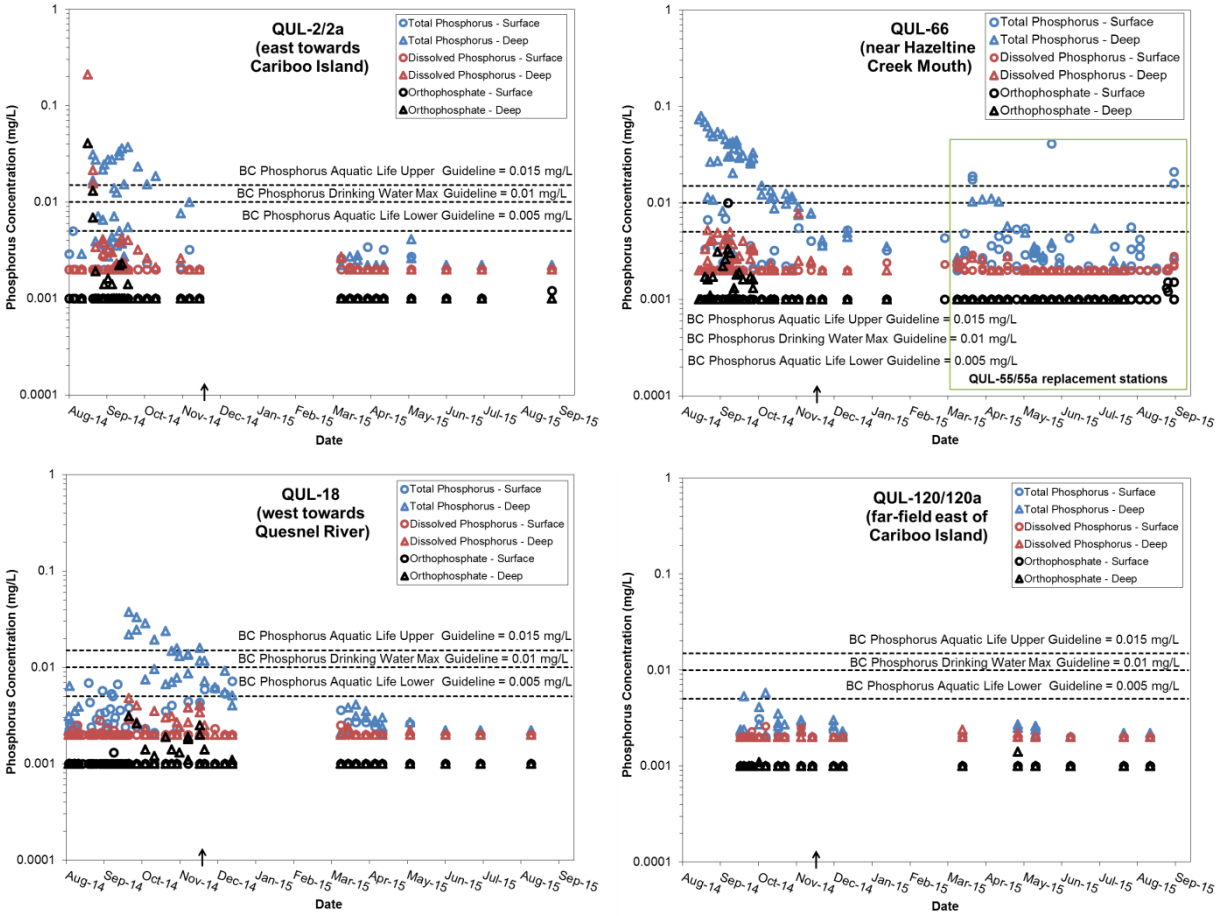


Figure 4: Phosphorus Concentrations in Quesnel Lake, August 2014 to September 2015

Note: Arrow represents the approximate timing of mid-November turnover in Quesnel Lake.

4.0 PHOTO RECORD

Aerial and satellite photographs were examined to determine whether there were discernible changes in colour from year to year or season to season in the past, but the resolution of the photos was insufficient to discern any colour change. GIS techniques were attempted to detect colours but no algorithm detected any difference.

Photos were provided in the MoE memorandum dated 17 December 2015[3]. The MoE has also investigated the green colour; the memorandum provides information in addition to what is listed here.

The MoE memorandum noted the difference in lake colour between fall of 2014 and 2015, which is evident in Photos 1 to 4. In 2014, a temporary glacial green colour was evidently due to suspended tailings material and native till mixture that was deposited in Quesnel Lake and carried downstream during and after fall turnover, coincident with the increases in copper noted above. In the 2015 photos, the water is most green where the evergreen trees are directly reflecting off the lake surface – the outline of the trees is evident around the green section.

[3] BC Ministry of Environment. 2015. Quesnel River at Likely, Green Colour Observations in the late Fall of 2015. 7 December 2015. 7pp.

The MoE memorandum noted that:

- *The 2014 and 2015 photo comparison shows a vast difference in colour and clarity of the water in the Quesnel River. In 2014 the colour was milky green (like glacial water) with limited visibility. In December 2015 the water appears green in the deeper part of the water but clear in the shallow foreshore. While the colour of the Quesnel River was green in late November/December of 2015, it was considerably different from the glacial green appearance of the water in the fall of 2014*

The MoE memorandum also included two photos (Photos 5 and 6) that were taken from the Likely Bridge. The photos show a different shade of green in the two photos, which appears to be due to the angle of the photograph. The lake appears blue in the section where the blue sky is reflecting over the hill. The memorandum notes that turbidity in the lake during this time was “very low”, at 0.5 NTU and remained below water quality guidelines throughout the 2015 fall turnover period.

Quesnel River; take upstream, off the Likely Bridge (one year apart)

Photo 3. Dec 10, 2014 (8.6 NTU)

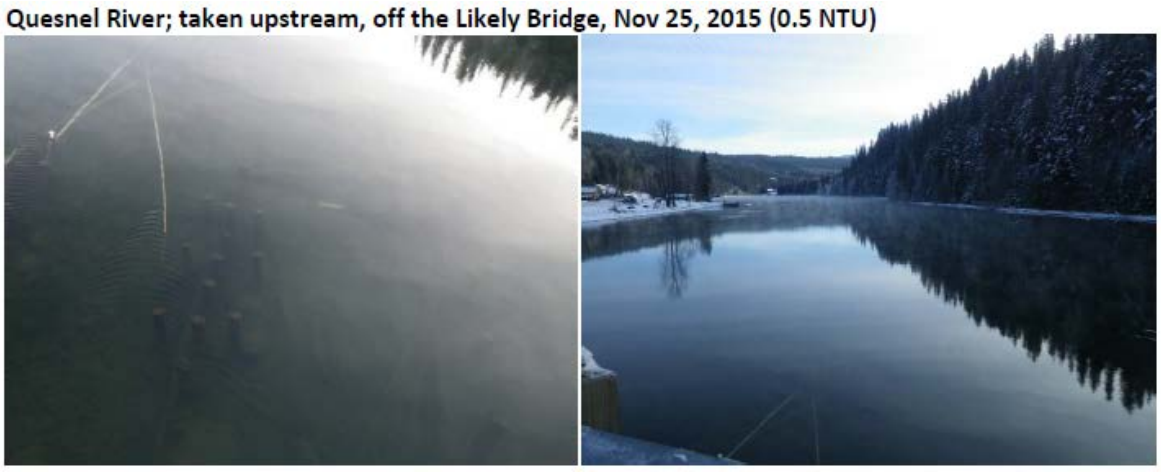
Photo 4. Dec 10, 2015 (0.5 NTU)

Quesnel River across from the Likely dock (one year apart)

Photo 5. Dec 10, 2014 (8.6 NTU)

Photo 6. Dec 10, 2015 (0.5 NTU)

Photos 1 to 4: Green Colour Apparent in Quesnel Lake in 2014 and 2015 (MoE 2015)



Photos 5 and 6: Two Shades of Quesnel Lake in Photos Taken at Different Angles from Same Location (from MoE 2015)

The milky green colour in 2014 corresponded to elevated turbidity readings throughout the West Basin of Quesnel Lake (Figure 5). The turbidity was limited to the deep stations until fall turnover in 2014, which brought turbid waters to the surface and toward Quesnel River. Internal seiches led to both of these phenomena at times between August and December 2014.

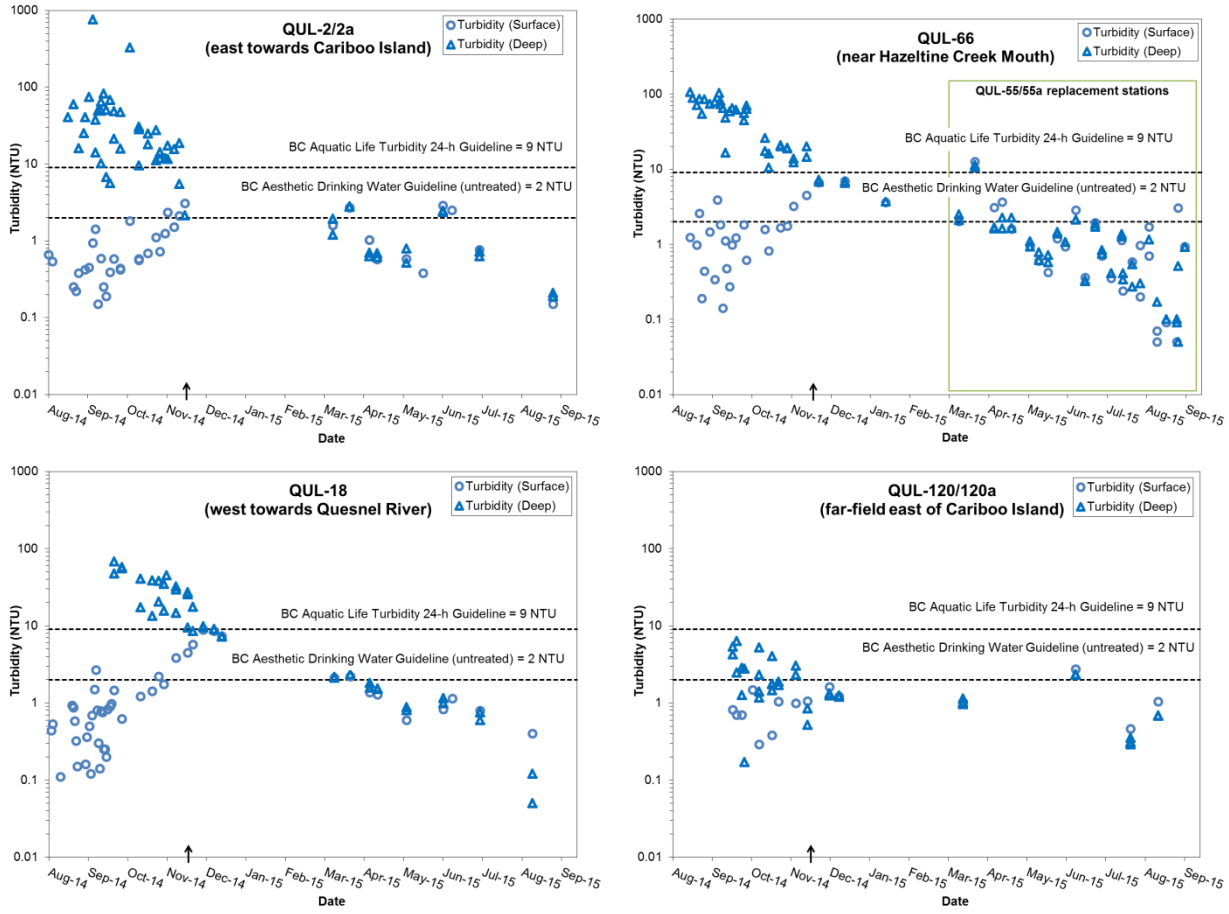


Figure 5: Turbidity Values in Quesnel Lake, August 2014 to September 2015

Note: Arrow represents the approximate timing of mid-November turnover in Quesnel Lake. Background assumed equal to 1 NTU.

The MoE memorandum also provided photographs taken by the Ministry of Transportation before 2014. In the 2013 photograph (Photo 7), Quesnel Lake appears forest green as it reflects off the forest behind.

In summary, the green colour observed in 2015 appears most prominently in areas where it reflects the forest in the background. The green is similar in shade to the lake in 2013 and unlike the milky green that occurred in 2014.

Photo 7: Quesnel Lake near Likely in August 2013 (from MoE memo)

5.0 CHRONOLOGY

Concern around the green colour in Quesnel Lake was recorded in the minutes for the 27 November 2015 Environmental Working Group. The MoE memorandum noted the first mention of this concern as 28 November 2015. This time corresponded with fall turnover in the lake, approximately one year after the first post-breach lake turnover. These stated concerns pre-date the beginning of the discharge to the lake (within the conditions and limits in *Environmental Management Act* Permit 11678) on 1 December 2015. Therefore, it is not possible that the permitted discharge could have caused the green hue.

6.0 HUMAN PERCEPTION

Water colour is an important aesthetic metric for members of the public; not just in BC, but world-wide[4]. In a study of public perception of water colour and clarity of rivers and lakes in New Zealand, researchers posed a series of questions to members of the public who were recreating around rivers and lakes. Not surprisingly, respondents favoured clear, blue water over a green hue, and green over yellow or brown. Waters were thought to be suitable for bathing and aesthetics if they exceeded 30 on the Munsell colour scale – this includes blue, blue-green, green, and green-yellow. Yellow and brown waters were only rated as suitable when the respondents knew that the yellow or brown was caused by natural factors such as humic acids.

[4] Smit et al. 1995. Human perception of water appearance. 1. Clarity and colour for bathing and aesthetics. New Zealand Journal of Marine and Freshwater Research. 29: 29-43.

7.0 CONCLUSIONS

Multiple lines of evidence support the hypothesis that Quesnel Lake has appeared green at times before 2014 but that the green hue was never noticed before the breach. Perceptions became more heightened after the breach, and the green colour was noticed more frequently than before. In the past year, the internal green colour of the lake has not changed, which means that the factors controlling light are external to the lake (e.g., reflection, cloud cover, sun angle, viewer angle, background). The green colour observed in 2015 was similar in hue to pre-2014 water.

At no time since 1 December 2015 has the Mine released any quantity of any substance that would be likely to impart a green colour on the lake. Frequent monitoring throughout the lake has confirmed that concentrations of substances that could cause a green hue are low in Quesnel Lake. The proposed discharge will also not release sufficient quantities of any substance that would impart a green colour on the lake, which can be confirmed by ongoing monitoring.

8.0 CLOSURE

The reader is referred to the Study Limitations, which follows the text and forms an integral part of this memorandum.

We trust the above meets your present requirements. If you have any questions or requirements, please contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Jerry Vandenberg, MSc, PChem
Principal, Senior Environmental Chemist

ORIGINAL SIGNED

Michael Herrell, MSc, PGeo
Associate, Senior Geochemist

JV/MH/ef/it

Attachment: Study Limitation

\\golder.gds\gal\burnaby\final\2016\3 proj\1662612 mpmc_tailingsenviroeng_bc\1662612-103-tm-rev0-22313\1662612-103-tm-rev0-water_colour_quesnel_09feb_17.docx

STUDY LIMITATIONS

Golder Associates Ltd. (Golder) has prepared this document in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this document. No warranty, express or implied, is made.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, has been prepared by Golder for the sole benefit of MPMC. It represents Golder's professional judgement based on the knowledge and information available at the time of completion. Golder is not responsible for any unauthorized use or modification of this document. All third parties relying on this document do so at their own risk.

The factual data, interpretations, suggestions, recommendations and opinions expressed in this document pertain to the specific project, site conditions, design objective, development and purpose described to Golder by MPMC, and are not applicable to any other project or site location. In order to properly understand the factual data, interpretations, suggestions, recommendations and opinions expressed in this document, reference must be made to the entire document.

This document, including all text, data, tables, plans, figures, drawings and other documents contained herein, as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder. MPMC may make copies of the document in such quantities as are reasonably necessary for those parties conducting business specifically related to the subject of this document or in support of or in response to regulatory inquiries and proceedings. Electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore no party can rely solely on the electronic media versions of this document.