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May 08, 2015

Michelle Carr
A/Executive Director
Assistant Deputy Minister, Environmental Assessment Operations
Environmental Assessment Office
PO Box 9426 Stn Prov Govt
Victoria BC V8W 9V1

Dear Ms. Carr:

Reference: Concluding Response on Mount Polley Panel Recommendation Review

As per your letter dated April 17, 2015, attached is Pacific Booker Minerals (PBM)'s response, prepared by Klohn Crippen Berger Ltd. to the First Nations responses to PBM's submission regarding the Report of the Independent Expert Engineering Investigation and Review Panel Report into the failure of the Mount Polley tailings pond.

Also, attached is a letter from PBM's President & CEO, John Plourde, stating PBM's commitment to First Nations.

Yours truly,

Erik Tornquist

Executive VP & COO

Pacific Booker Minerals Inc.

E. Tomquit

cc: Honourable Bill Bennett, Minister of Energy and Mines

Honourable Mary Polak, Minister of Environment

Lisa Walls, Regional Director, Pacific and Yukon Region, Canadian Environmental Assessment Agency





May 8, 2015

Pacific Booker Minerals Inc. 1166 Alberni Street Suite 1103 Vancouver, British Columbia V6E 3Z3

Mr. Erik Tornquist Executive VP and COO

Dear Mr. Tornquist

Morrison Copper/Gold Project
Environmental Assessment Application
Concluding Response on Mount Polley Panel Recommendation Review

## 1 INTRODUCTION

#### General

This letter is in response to the letter from Ms. Michelle Carr, A/Executive Director from the Environmental Assessment Office (EAO), dated April 17, 2015. The EAO letter provides the responses from the First Nations, with respect to the recent submission (March 27, 2015) from Pacific Booker Minerals. Pacific Booker has been given the opportunity to respond to the First Nation letters.

First Nation communities have a strong interest in the Morrison Project and their outstanding concerns are documented in the following letters:

- Lake Babine Nation, email dated April 17, 2015, which includes a Technical Memorandum from Source Environmental Associates, dated April 17, 2015.
- Gitanyow Hereditary Chiefs, dated April 16, 2015.
- Gitxsan Chiefs' Office, dated April 17, 2015.
- Letter, dated March 16, 2015, from Skeena Fisheries Commission to The Gitxsan Chiefs' Office and Gitanyow Hereditary Chiefs.

## Background

The Morrison Project has been in the EA process for an extended period of time, in part, to respond to legitimate technical concerns that the First Nations have with the project. Until the Mount Polley dam failure, these concerns were primarily related to the potential for water quality impacts to Morrison Lake.

SEBEST MANAGED COMPANIES The project changes that were incorporated to address these concerns included:

- The tailings were separated in the process plant to remove the sulphides, which results in two tailings streams. The rougher tailings stream, approximately 90% of total tailings, is not potentially acid generating and is used for dam construction and to form the beaches of the impoundment. The remaining potentially acid generating (PAG) tailings is placed near the water pond and kept saturated. Prior to mine closure the PAG tailings are placed in the bottom of the open pit and the tailings impoundment is completely covered with non-acid generating tailings. This process allows the tailings impoundment to be closed with a minimum or non-existent water pond.
- Potentially acid generating waste rock was to be placed on land adjacent to the open pit and covered with a low permeability soil. First Nations had a concern that the acidic drainage water could, over time impact Morrison Lake. To address this concern, Pacific Booker changed the project to place all of this rock back into the open pit on closure, which will keep the rock saturated and stop the oxidation process. The surface would be reclaimed with a wetland and pond. This measure eliminates the long term risk of acid rock drainage associated with the rock dumps on surface.
- There was a concern that the seepage control measures that were incorporated into the Feasibility Study design did not adequately mitigate the potential for groundwater seepage from the tailings impoundment to migrate into Morrison Lake. To address this concern, Pacific Booker changed the project to include lining of the impoundment with a geomembrane liner, which effectively reduces the potential for seepage.
- There was a concern that the discharge of treated water into Morrison Lake would degrade the water quality in the lake and not meet BC water quality guidelines for aquatic life for various upper bound conditions. These concerns were addressed in the "EAC Application – Response to Final Comments from the Working Group, May 2014)", which indicated that, even under a range of upper bound conditions, the BCWQGs would be met.

A summary of the chronological history of the regulatory process and reports that have been provided to address potential concerns with the project is summarized in Table 1.

Table 1 Summary of EAC Application Reports – Pre-Mount Polley

Date	Title	Size	Scope	Project Changes
Sept. 2009	EAC Application	Extensive		
June 2010	EAC Application Addendum	Extensive	Addressed Morrison Lake effects, detailed water management plans, aquatic baseline, ARD/ML and other data gaps	
Nov. 2010	EAC Review Response	58 pages	Response to issues raised by the Working Group	
June 2011	Review Response Report – Rev. 2	804 pages	Comprehensive report that included all new data and updated effects assessment and Morrison Lake modeling and groundwater	1.PAG waste rock to be placed in open pit and submerged on closure 2.PAG and non-PAG tailings to be managed separately 3.Overburden storage area moved off Morrison Point
Jan. 2012	3 <sup>rd</sup> Party Review Response	310 pages	Comprehensive report that addressed uncertainties with groundwater inflows, water balance and Morrison Lake effects	
April 2012	3 <sup>rd</sup> Party Review Response Report – Addendum 1	92 pages	Revised groundwater modeling, effects assessment and water balance based on lining the TSF	Geomembrane liner for the TSF and small water pond on TSF at closure
Oct. 2012	EAC Rejection Response	13 pages	Unsolicited report clarifying KCB opinion on reasons for rejection of the EAC Application	
March 2014	EAC Decision Response	195 pages	Comprehensive report that addressed the 5 main items of potential concern identified by the EAO: ARD/ML, Geomembrane Liner, Morrison Lake water quality effects, economic benefits, and First Nation and potential for effects on salmon	
May 2014	Response to Final Comments from the Working Group	40 pages	Addressed potential concerns with: Lake water quality, Morrison River effects, tailings and PAG rock management and First Nation	

KCB recognize that the Morrison Copper/Gold Project is located in a sensitive aquatic habitat environment and, therefore, that the potential for project effects and potential uncertainties required that extensive dialogue, review and technical assessments were required to demonstrate that the project does not have a risk of significant environmental effects.

## Scope of this Letter

Subsequent to the regulatory review process, and just prior to receiving a decision on the EAC Application, the Mount Polley tailings dam failed. The dam failure highlighted the importance of ensuring the safety of the tailings storage facility (TSF). A report addressing the Mount Polley panel

recommendations as they applied to the Morrison Project was provided by KCB, for Pacific Booker, on March 19, 2015.

In response to that letter, the outstanding concerns with respect to the Mount Polley dam failure, which are summarized in the recently received letters from First Nations, include three main areas of concerns, which are discussed in the following sections:

- the use of wet tailings storage versus filtered tailings storage;
- water balance; and
- Dam design and site investigations.

Outstanding technical issues have been identified in a Technical Memorandum from Source Environmental Associates Inc. (SEA), which included:

- SEA -1: KCB's responses did not reflect the spirit of the panel recommendations.
- SEA-2: KCB has overstated drawbacks and understated benefits of filtered tailings as they
  relate to the Project.
- SEA-3: KCB indicates that climate is potential drawback; however, this can be accounted for with proper design of the dry stack.
- SEA-4: KCB has not evaluated ways to reduce costs associated with filtered tailings.
- SEA-5: Proposed closure strategies to limit oxidation of PAG tailings do not comply with BAT principles.
- SEA-6: Water management associated with filtered tailings is potentially no more a drawback than water management associated with conventional tailings facilities.
- SEA-7: KCB should expand the assessment of potential failure modes.
- KCB-8: The glaciolacustrine unit was detected in one hole along the North Dam and further drilling is required.

# 2 FILTERED TAILINGS AND BAT PRINCIPLES

The conceptual layout of a filtered tailings alternative was included in the Pacific Booker March 19, 2015 response to illustrate the challenges in applying the technology to the Morrison Project. <u>Pacific</u> Booker does not propose to use filtered tailings for the Morrison Project.

The following sections address the issues raised by Source Environmental Associates regarding filtered tailings.

## SEA-1

The Panel report states that "surface storage using filtered tailings technology is a prime candidate for BAT" and "the overarching goal of BAT is to reduce the number of tailings dams subject to failure". It is not feasible for the mining industry in British Columbia to unilaterally move to filtered tailings for all new tailings facilities in order to reflect "the spirit of the panel recommendations". It is fair to say that Panel references to the "path to zero" recognizes that zero risk is not achievable, but that measures need to be taken to reduce risk. KCB are in full agreement with this approach. The "spirit of the panel", therefore, is reflected in the Morrison design that incorporates components that lower the risk of failure.

#### SEA-5

The Morrison design does <u>not</u> require a water cover on closure. The TSF design provides the ability to significantly reduce the size of, or eliminate, the water pond on closure. Prior to closure the PAG tailings in the tailings impoundment will be covered with neutral tailings, which will allow the PAG tailings to stay saturated without a free water pond. The water balance currently indicates that the water pond on closure could be approximately 200,000 m<sup>3</sup> and, could be potentially eliminated. This elimination of a large water pond on closure complies with BAT principles.

The cleaner tailings at Morrison could have a sulphide content on the order of 40% and placement of this material in the filtered tailings pile will require special controls and, ultimately, may not be acceptable to MEM.

## **SEA-2, SEA-3, SEA-4, SEA-6**

While KCB agree that there may be no fatal flaws with filtered tailings, there are significant cost and physical constraints with construction and environmental concerns that need to be managed. One of the larger cost items is the transport and placement of the filtered tailings. It would not be advisable, nor possible, to safely place the material near the process plant and adjacent to Morrison Lake and, therefore, the site selected is on the east side of the proposed tailings impoundment area, which has favourable topography. The conceptual layout reduces the volume of structural tailings fill material required and provides an area to construct the water attenuation/storage pond. The placement costs are also increased by: (1) the requirements for placing material in cold weather (heated boxes, snow removal, removal of tailings that froze prior to compaction, etc.); (2) placement of PAG tailings requires co-placement with non- PAG tailings to ensure that spontaneous ARD does not occur and

that the PAG tailings stay saturated; and (3) zonation requirements that include integration of the zones in concert with material production/placement.

The distance to the tailings storage area, the climate, and PAG tailings management directly affect the cost of placement of filtered tailings, and the cost of filtered tailings quoted by Others, even with optimization of the filtered tailings design, are simply not achievable for Morrison.

KCB agree with SEA that water management of either filtered tailings or conventional tailings requires careful control. The filtered tailings option is focused on controlling surface runoff from the filtered tailings pile.

## 3 WATER BALANCE

The water balance of the project has evolved over the permitting process to incorporate uncertainties in water inflows expressed by the technical reviewers for the project. As a result, the TSF is scheduled to only operate as a "zero discharge" facility for the first four years of operations (3<sup>rd</sup> Party Review Report and Addendum 1) and, accordingly, the environmental effect scenarios for Morrison Lake have been developed on the basis of treating water during operations. The potential for effects also considers the Upper Bound case for water inflows.

Storage of water in the TSF is provided to manage the spring freshet and, towards closure, allow for saturation of the PAG rock that will be placed back into the open pit. On closure, the TSF water pond could be eliminated.

#### 4 DAM DESIGN

KCB agree with many of the comments provided and these include:

- retention of an independent geotechnical review board;
- increased development of the risk assessment matrix and risk management plan (SEA-7); and
- use of a factor of safety of 1.5 for all stages of construction and operation.

The use of a geomembrane results in negligible seepage through the dam, which results in a very low hydraulic gradient in the dam, and after closure, the dam would be a fully drained structure.

The site investigations carried out for the Feasibility Study appropriately quantify the foundation conditions for the dam. The design considered both the undrained and drained strengths of the foundation soils and these were utilized in the analysis. KCB agree that additional site investigations are required, however, we do not agree that carrying them out at this stage of the project is appropriate (SEA-8). Detailed site investigations will be carried out for the permitting stage. If weak soil layers are identified, these can be accommodated with flatter dam slopes. The Feasibility design has slopes of 3H:1V (versus 1.3H:1V for the Mount Polley TSF).

# 5 SUMMARY

This letter responds to review comments from the First Nations. We are respectful of the review comments and committed to integrating the concerns into the design of the Morrison TSF as the project proceeds. The use of an independent review board and risk assessment are important components of ensuring that the risk of failure is reduced to as low as possible.

This letter is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of Pacific Booker Minerals Inc.(Client) for the specific application to the Morrison Copper/Gold Project. The letter's contents may not be relied upon by any other party without the express written permission of Klohn Crippen Berger. In this letter, Klohn Crippen Berger has endeavoured to comply with generally-accepted professional practice common to the local area. Klohn Crippen Berger makes no warranty, express or implied.

Yours truly,

KLOHN CRIPPEN BERGER LTD

Harvey McLeod, P.Eng., P.Geo.

Principal

НМ: јср



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May 8, 2015

Honourable Mary Polak, Minister of the Environment PO Box 947, Stn Prov Govt Victoria, BC V8W 9E2 Via email to: ENV.Minister@gov.bc.ca

#### And

Honourable Bill Bennett, Minister of Energy & Mines PO Box 9060, Stn Prov Govt Victoria, BC V8W 9E2 Via email to: MEM.Minister@gov.bc.ca

# Dear Ministers;

As Chief Executive Officer and a director of Pacific Booker Minerals Inc. (PBM), I wish to communicate that the board of directors unequivocally confirms our commitment to engage and consult with Lake Babine Nation and other First Nations to ensure environmental protection, to enhance the economic benefits from the Project and to provide opportunities for business development, training and employment.

We appreciate that you are aware of the challenges facing the mining industry today, which include increased scrutiny following the Mount Polley tailings dam failure, and the development of opportunities for including and supporting First Nations in the environmental and economic enhancement of our projects.

We recognize that the Project is located in a culturally sensitive area and, therefore, the Morrison project has incorporated unprecedented measures to reduce risk that include placing PAG rock back into the open pit, lining of the tailings facility and closure of the tailings facility without a large water pond. Our commitment to independent reviews and risk management provide assurance of oversight of the Project.

We are committed to minimizing the environmental impact of the Project and to protecting cultural values of importance to First Nations. We will continue to consult with First Nations to update and affirm our previous Memorandum of Understanding with Lake Babine Nation and work with Lake Babine Nation, Gitxsan and Gitnayow to develop and implement Environmental Management Plans prior to permitting.



The Project will be implemented in accordance with responsible mining practices that comply with sustainable development standards using best available technologies and practices.

PBM looks forward to working with the First Nations, and BC and Federal Governments to bring the Project into production, providing employment opportunities for residents of north-western BC.

Sincerely,

John Plourde

President & CEO

cc:

Michelle Carr, A/Executive Director, Assistant Deputy Minister, Environmental Assessment Operations

Lisa Walls, Regional Director, Pacific and Yukon Region, Canadian Environmental Assessment Agency