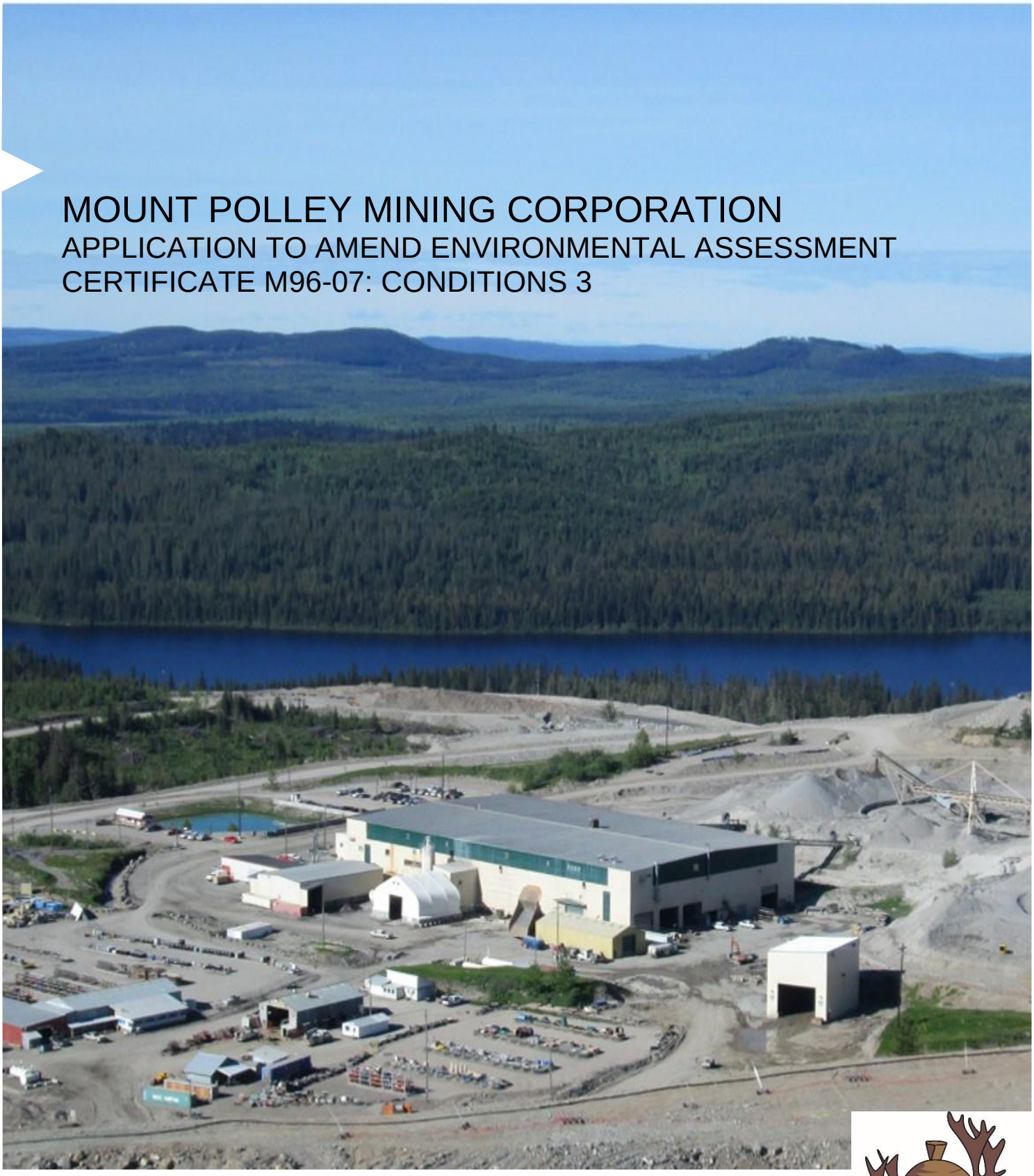
MOUNT POLLEY MINING CORPORATION

APPLICATION TO AMEND ENVIRONMENTAL ASSESSMENT CERTIFICATE M96-07: CONDITIONS 3



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an Imperial Metals company

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1.0 INTRODUCTION

The Mount Polley mine was approved in 1992, with the issuance of a Mine Development Certificate (MDC) under the *Mine Development Assessment Act* that was applicable at the time. The original MDC has continued in force, through creation and updates to the *Environmental Assessment Act*, as Environmental Assessment Certificate (EAC) M96-07. Mount Polley Mining Corporation (MPMC) is the holder of this certificate.

Related permits for mine construction, operation, changes to operation, and reclamation have subsequently been obtained from the relevant regulatory bodies. This is consistent with the MDC, which states that the Minister of Mines and Petroleum Resources (now Energy and Mines), concurrent with the Minister or Environment, Lands and Parks (now Environment), determined that potential adverse environmental impacts of the Mount Polley development could be managed through existing legislation and programs.

Following the dam breach of the Tailings Storage Facility (TSF) on August 4, 2014, MPMC submitted an application to the British Columbia (BC) Ministry of Energy and Mines (MEM) to amend their *Mines Act* Permit M-200 to allow the mine to return to restricted operations. Approval to resume restricted operations was received in July 2015, including an authorized tonnage and time period. In November 2015, MPMC applied for a return to full operations at the Mount Polley Mine; a decision on which is pending and expected in late May 2016. MPMC has also applied for an extension to the restricted operations (the "Bridging Plan") to allow continued restricted operations (i.e., authorization for additional tonnage to be milled) until such time that a decision is made on the proposed return to full operations. As part of the currently authorized restricted operations, the Bridging Plan application, and the proposed return to full operations, MPMC has been conducting engineering and environmental studies to assess the potential for environmental effects related to the revised mine plans.

Based on previous discussions and on formal guidance from the BC Environmental Assessment Office (EAO) by means of a letter dated March 11, 2016 (EAO 2016), MPMC requires:

1. An amendment to EAC M96-07 to increase the allowable milling rate[1] to greater than the 13,700 tonnes per day that is stated in the original certificate (Condition 3 of the EAC).
2. Written consent from the Minister of Energy and Mines and Minister of the Environment (the Ministers), if material alterations to the original Development (Condition 2 of the EAC) are identified.

This application has been prepared to amend EAC M96-07, related to the allowable milling rate as described in Item 1 above. The following sections provide background information on the Mount Polley mine, including the original environmental assessment (EA) as it relates to milling rate, permitted changes to the mine plan and development, and environmental effects and monitoring.

A review of alterations to the original project is in progress (related to Item 2) and will be presented to the EAO under separate cover. If material alterations are identified, the submission will also include an evaluation of effects and an application for the Ministers' consent.

[1] The EAO letter (March 11, 2016) refers to 'ore production rate'; however, the Environmental Assessment Certificate refers to "rate of milling" or "milling rate". For the purposes of this application, "milling rate" is used.

2.0 MILLING RATE AND VALUED COMPONENTS

2.1 Background

The Mount Polley copper and gold mine is located in the Cariboo region of central BC, approximately 55 kilometres (km) northeast of Williams Lake. The mine is accessed via an all-weather provincial paved road from Williams Lake to Morehead Lake (the Likely road), and then 14 km of upgraded gravel forestry road.

The mine design, as described in the original application (1990 Environmental and Socioeconomic Impact Assessment), involved total mineable reserves and resources of 51,402,000 tonnes and indicated that a number of mineralized zones were known on the property but had only been partially explored. The original proposed development included:

- Year-round mining of three (3) open pits that would ultimately merge into one pit during operations;
- Processing via crushing, grinding, and froth flotation;
- Waste rock storage in designated waste rock dumps;
- Deposition of tailings in the TSF; and
- Shipment of ore by truck to existing rail facilities.

Based on a planned milling rate of 13,700 tonnes per calendar day (t/d), or five (5) million tonnes per year (t/yr), and the available mineable reserves/resources, the anticipated mine life was 14 years.

MPMC (then Imperial Metals Corporation) continued with project engineering and refinement of design throughout the project review process, and after the project was approved and operations commenced, the *Mines Act* Permit M-200 and *Environmental Management Act* Permit 11678 were amended to account for changes to the mine development in comparison to what was included in the original application. Procurement of equipment for the process facilities and mine operations commenced in 1995, and construction started in 1996. The mill was commissioned in June 1997. The mill design was finalized based on equipment that could be sourced locally and regionally at the time. Based on locally available equipment, a process plant with a nominal production rate of 18,000 t/d (6.5 million t/yr) was constructed.

The Mount Polley mine has operated from 1997 to present with a period of care and maintenance from October 2001 to March 2005 due to economic factors, and a shutdown between August 2014 and July 2015 due to the tailings dam breach. The total operating period to date has been equivalent to about 174 months, or approximately 14.5 years. The milling rate at the mine varies seasonally, with production during the summer being higher than in the winter when temperatures below freezing have the potential to create material handling issues. During the initial years of operations prior to the period of care and maintenance, the milling rate averaged 18,000 t/d as per the nominal design production rate. Over the 2005 to 2009 period, MPMC improved the crushing and grinding processes, which resulted in a consistent production rate from 2010 until 2014 of 20,000 t/d (winter) to 22,000 t/d (summer), with annual production ranging from 7.5 to 8 million t.

The mine is currently approved for restricted operations, with authorization conditions allowing one (1) year of operation (which began in July 2015) and processing of up to four (4) million tonnes of ore. *Mines Act* and

Environmental Management Act applications, submitted in November 2015, are being reviewed for a proposed return to full operations commencing in Q2 2016. The mine plan included in the application to amend *Mines Act* Permit M-200 includes an average operational milling rate of approximately 22,000 t/d (8 million t/yr).

2.2 Project Design, Milling Rate, and Potential Effects

As discussed above, the Mount Polley mine development was modified from the project description included in the original EAC application, such that the process plant constructed in 1997 had a higher capacity than originally proposed. The actual mine milling rate was initially 18,000 t/d and, since the mid-2000s, has varied between 20,000 and 22,000 t/d (7.5 to 8 million t/yr).

A higher milling rate will result in a reduced mine life. For example, in the case of the Mount Polley mine, a milling rate of 22,000 t/d rather than the 13,700 t/d originally proposed would result in a reduced mine life by approximately five (5) to six (6) years (i.e., a total mine life of eight (8) to nine (9) years instead of the 14 years originally projected). An increased production rate may also require larger or an increased number of operating equipment, changes to water supply or management requirements, increased infrastructure disturbance area, and changes to social or economic considerations. These aspects are discussed in further detail in Section 3.

3.0 EVALUATION OF CHANGE

3.1 Scope of the Evaluation

3.1.1 Higher Milling Rate

This amendment application addresses whether the conclusions of the original EA would be different for the actual production rate, compared to the rate that was included in the EAC application.

In this application, “change” refers to a higher milling rate (e.g., 22,000 t/d) compared to the original planned production rate (13,700 t/d) that is referenced in EAC M97-06. “Change” or “higher milling rate” does not refer to an increase in milling rate over what has historically been operational at the Mount Polley mine.

This application also recognizes that mine plans are intended to evolve and, as in the case of Mount Polley, additional resources/reserves have been confirmed since the original mine development was proposed and approved in the EAC. Additional mining in the Northeast Zone and beneath the original pits was approved through amendments to applicable *Mines Act* and *Environmental Management Act* permits, and has extended the mine life beyond the original 14 years (or eight (8) to nine (9) years at the higher milling rate). As mentioned in Section 1, changes associated with revised and current mine plans and development are being reviewed, and if they are considered material alterations to the development they will be the subject of an application for the Ministers’ consent.

3.1.2 Valued Components

As discussed in Section 2.2, a higher milling rate is mostly associated with reduced mine life; however, there may also be lesser or indirect effects to other valued components (VC). Table 1 indicates where the strongest VC linkages are for the Mount Polley mine related to milling rate. The potential linkages and effects are discussed in more detail in Section 3.3.

Table 1: Valued Components Considered in the Amendment Application

Valued Component	Potential Linkage to Milling Rate	Application Section
Air Quality	Emissions from mining and processing	3.2.1
Water Balance	Water supply for mining and processing	3.2.2
Water Quality and Aquatic Health	Influence from mine contact water and runoff	3.2.3
Fish and Fish Habitat	Water supply; water quality	3.2.4
Terrestrial Resources	Process plant footprint	3.2.5
Heritage Resources	Process plant footprint	3.2.6
Employer and Supplier Procurement	Workforce requirements	3.2.7.1
Housing, Services, and Infrastructure	Workforce requirements	3.2.7.2
Road Transportation	Transport of concentrate and workforce requirements	3.2.7.3
Human Health	Air and water quality	3.2.8

VCs that are not affected by a higher milling rate were not considered in the amendment application. These include aspects related to the physical environment such as terrain, soils, groundwater, land use, and visual aesthetics. Although noise is a potential VC, it was not included in the assessment as there are limited receptors around the mine area and noise has not been raised as a concern through consultation.

3.1.3 Temporal Considerations

The Mount Polley mine processing plant has been operating at an average of 18,500 t/d since operations commenced in 1997. The evaluation of effects takes into account observed and actual conditions over this period (i.e., they are reflective of the higher milling rate). Data available from 2009 to present (after the crushing and grinding processes had been improved) are particularly relevant for understanding effects associated with the mine development and planned milling rates associated with future operations. To an extent, data from 2009 to present also reflect changes to the mine plan that have been approved since the original application (e.g., new mining areas), and which will be addressed in a separate application related to potential material alterations to the development.

3.2 Assessment of Valued Components

3.2.1 Air Quality

An increased milling rate (and by it, an increased ore production rate) has the potential to increase emissions to air since activity rates of various mining activities related to production are increased. The original project application did not assess effects to air quality, and; therefore, a direct comparison of effects was not possible. Rather, this section focusses on the change in emissions to air that could result due to the

increased milling rate, and also changes in emissions that have occurred due to improvements in dust management at the mine since the application. The emissions to air of most concern are usually fugitive particulate matter (dust), and, to a lesser extent, emissions of criteria air contaminants from mining equipment and vehicles.

If air emissions mitigation measures, controls, and management measures remain the same, a higher milling rate could result in a higher level of emissions to air. This is because emissions to air are typically estimated based on activity rates, where the level of activity is directly proportional to the emission rate as shown in the following equation:

$$E = A \times EF \times (1-ER/100) \qquad \text{[US EPA, 1995]}$$

where: E = emissions; A = Activity Rate; EF = Emission Factor; and ER = Overall Emission Reduction Efficiency (as a result of mitigation, control and management measures)

The emissions are also proportional to the emission reduction efficiency (which would result from a mitigation, control, or management measure), and it therefore follows that emission reductions can act to reduce emissions, sometimes significantly.

In the past 20 years since the original EAC was issued, industry standard practices relating to control of dust emissions have evolved, with a focus on avoiding and managing the dust before it becomes airborne and subsequently disperses. This evolution is evident at the Mount Polley mine through the following:

- Water trucks are used on haul roads and access roads around the mine site to mitigate fugitive dust, and calcium chloride is applied to the mine main access road (Bootjack Forest Service Road).
- Some diesel production drill and shovels have been replaced with electric equipment, thereby reducing overall exhaust emissions.
- A fugitive dust management plan was developed for the TSF and plug area in 2015, which was reviewed and approved by the BC Ministry of Environment (MoE). The plan involves the use of water cannons, sprinklers and turbomisters during the summer months.
- A particulate monitoring program was undertaken in 2015, which showed particulate levels consistently below ambient air quality standards, with the exception of influences attributed to forest fires in the area. The monitoring program focussed on the TSF/plug area.
- Other dust management practices are undertaken that are above and beyond what was stated in the original application. Some are targeted dust management/reduction practices, and others are the benefit of other adopted site practices:
    - Sprinklers, misters, and snow makers are used to evaporate water. These are placed on waste rock dumps and the TSF to also reduce fugitive dust.
    - Dust suppression system on fine-ore conveyor belts.
    - Scrubber system in the crusher.
    - Progressive site reclamation and vegetation of soil stockpiles according to the Mount Polley mine Sediment and Erosion Control Plan.

- Speed limits for haul trucks/site vehicles.
- Trucks loaded/unloaded in a slow and controlled manner to minimize drop heights and avoid spillage.
- Visual dust inspections.
- A dustfall monitoring program that has been undertaken by MPMC, and results reported and compared to dustfall standards.

In addition to the advancement of dust management methods at the site, since 1997, the mine has operated under *Environmental Management Act* air emissions discharge permit PA-15087 which regulates emissions to air from the mine and requires fugitive dust suppression within the operational area. MPMC is in compliance with the permit conditions, including those related to authorized discharges and dust control.

In summary, the increase in milling rate has the potential to increase emissions to air since activity rates of various mining activities related to production were increased. However, emission management practices have the potential to offset, and even possibly further reduce emissions to air. For example, a number of dust mitigation measures are now used at the mine, in addition to the measures identified within the EAC application. The net change to emissions, resulting from an increase in production rate and implementation of additional site management practices, cannot be accurately quantified; however, the overall emissionsare expected to be of similar magnitude to those associated with the original project design.

3.2.2 Water Supply

The original project application included a water balance to estimate water availability and demand for the project over its planned life. A higher milling rate would have required more volume and a higher water supply rate during startup, before enough inventory had been accumulated and then recycled to meet the processing needs. Given that the mine has been in operation for a number of years, and that there is now a positive water balance (excess water, which needs to be managed and discharged appropriately), there is no increase in water volume or supply rate required to support the higher production rate. Moreover, the mine has required less water withdrawal from Polley Lake than authorized based on previous assessments. As such, there are no negative effects of an increased mill rate associated with water supply. For the Mount Polley mine, a higher milling rate would have actually meant a lower discharge rate (if discharge had occurred or been permitted) given that more volume over a given period would have been retained with tailings and stored within the tailings facility.

3.2.3 Water Quality and Aquatic Health

The mine plan included in the original EA specified that no process effluent would be discharged to the receiving environment. The assessment therefore, did not include quantitative predictions of water quality in receiving waters, with the exception of total nitrogen (TN), and concluded that no predicted impact to surface water quality was expected. Rather, the assessment focused on other potential sources of mine influence such as pit water and runoff from rock dumps, the mill site, and other disturbed areas. A potential for inputs to

the receiving environment from these sources was identified based on an evaluation of the drainage chemistry in the EA. Based on an evaluation of nutrient loadings to the receiving environment, it was concluded in the EA that TN concentrations were predicted to be above background but lower than the nitrate water quality guideline applicable at that time for the protection of aquatic life (40 mg/L NO3 as N) in Bootjack Lake and Hazeltine Creek downstream from Polley Lake.

The EA predicted TN concentrations between 0.085 and 0.71 mg/L in Hazeltine Creek (downstream from Polley Lake) and between 0.03 and 2.3 mg/L in Bootjack Lake. It was concluded in the assessment that projected increases in TN loadings from waste rock storage and mine water settling ponds were not expected to have a significant impact on receiving water quality. No predictions were made for other nitrogen species such as nitrate, and predictions were not presented for Polley Lake or Quesnel Lake.

A key source of TN at mines is the use of ammonium nitrate fuel oil (ANFO) explosives. As discussed in Section 2.0, an increase in the milling rate would result in a reduction of the mine life of approximately five (5) years. Conceptually, this would require an increase in the ANFO explosives usage rate. To determine if the increased milling rate resulted in higher TN concentrations than predicted in the EA, predicted water qualities in the EA were compared to surface water quality monitoring results (Minnow 2014). Mean and 95th percentile values for Bootjack Lake, calculated from monitoring data collected during mine operations and reported by Minnow (2014)[2], were within the range predicted by the EA. With respect to Hazeltine Creek, mean values were within the predicted range but 95th percentile values for each operational time period (i.e., 1997 to 2008; 2009 to 2013) assessed by Minnow (2014) were one to two times higher than the predicted range. Mean and 95th percentile values for Polley Lake were within the predicted range for Hazeltine Creek (downstream from Polley Lake). Actual mean and 95th percentile TN values measured prior to the tailings dam breach were below the current nitrate water quality guideline (WQG) for the protection of aquatic life (3 mg/L NO_3 as N; BC MoE 2016a), indicating that adverse toxicity-related effects would not have been expected during operations. Although a change has been observed in the trophic conditions in Polley Lake, Minnow (2014) suggested that this was primarily the result of an increase in phosphorus concentrations over time, with nitrogen potentially playing a relatively minor role compared to phosphorus. Thus, comparison of actual and predicted concentrations suggests that the higher production rate did not result in TN concentrations in receiving watercourses to an extent that is expected to have a significant impact on receiving water quality.

Monitoring programs (Minnow 2014) in Polley Lake also support that the increased milling rate is not expected to have resulted in significant adverse effects to surface water quality and aquatic health based on reported concentrations of water quality parameters measured prior to 2014. Operational monitoring data collected by MPMC for the time periods (2001 to 2008) and (2009 to 2013) and summarized by Minnow (2014), indicate that phosphorus increased during operations from 2001 to 2013 but copper did not. Both copper and phosphorus were documented at concentrations above BC WQGs prior to mine development (BC MOE 2015a). Increases in sulphate, total dissolved solids (TDS) (and hardness), arsenic, molybdenum and strontium were evident during operations but concentrations were below those that could potentially result in adverse effects on aquatic life based on comparison to available BC WQGs[3]. Selenium concentrations in

[2] Mean value = 0.29 mg/L; 95th percentile value = 0.40 mg;L

[3] Strontium does not have a BC WQG but concentrations reported by Minnow (2014) substantially below the strontium chronic effects benchmark of 10.7 mg/L recently proposed by McPherson et al. (2014) for freshwater environments.

Polley Lake remained below the BC WQG during operations but increased temporarily between 2006 and 2009, before progressively decreasing through 2013 due to mitigation implemented by MPMC. During this time period, concentrations of other parameters also appeared to stabilize.

Water quality changes in Hazeltine Creek during operations prior to the tailings dam breach were similar to Polley Lake. Although increasing trends were documented for some parameters, concentrations of these parameters remained below available BC WQGs; i.e., major ions, sulphate, arsenic, molybdenum, selenium, strontium and uranium (BC MoE 2015a,b).

The water balance developed for the original EA indicated that there would be a water deficit during initial years of operation (startup), followed by a positive water balance for the remainder of operation. These conditions would be expected regardless of milling rate. The water balance reflected that; '*during normal operations surface runoff from the waste dump, pit and mill catchment area will be diverted to the tailings area to the maximum extent economically possible*'. The original EA documents and water balance also reflected that *'when surface runoff is greater than can be diverted to the tailings area, it will be discharged via sediment control ponds from the site*'[4]. As expected during operations, the positive water balance resulted in increasing water volumes being stored in the TSF. Permitting for water discharge in 2015 included an effects assessment that concluded the discharge would have no significant adverse impacts on aquatic life or other end uses because water quality guidelines would be met at the edge of an initial dilution zone in Quesnel Lake. Water quality monitoring at end-of-pipe and in the receiving environment has confirmed that guidelines are consistently met, and therefore there are no significant adverse effects due to the discharge of treated mine contact water.

The findings of the operational water quality assessment reported in Minnow (2014) and compared to the water quality assessment in the EA, indicated that the EA predictions and findings were verified by the operational monitoring data. Actual upper limit TN values reported by Minnow (2014) for Bootjack and Polley lakes and mean TN values for Hazeltine Creek were within the range predicted by the EA. Given that the EA did not include quantitative predictions for other water quality parameters in receiving waters, a comparison to actual concentrations was not possible. However, an assessment of water quality undertaken by Minnow (2014) reported concentrations of water quality parameters measured prior to 2014 that would not be expected to have significant adverse effects to surface water quality and aquatic health based on comparison to available BC WQGs and pre-development water quality.

In consideration of the above assessment, the higher milling rate employed at the mine during the operational time period would not have been expected to have had a significant effect on receiving water quality or aquatic health.

3.2.4 Fish and Fish Habitat

The original project application described the fisheries resources within the project area, including within Morehead, 4K, 6K, Bootjack, Hazeltine, and Edney creeks, and Morehead and Bootjack lakes. The project

[4] Page 60, Mount Polley Project, Stage 1 Environmental and Socioeconomic Impact Assessment, Responses to Comments by Agencies, January 1991.

area creeks are used by mixed populations of rainbow trout, mountain whitefish, burbot, suckers, rearing juvenile chinooks, and adult sockeye salmon.

Since there would be no process effluent discharged, no runoff water with impaired quality released to water courses, and no acid mine water drainage, no adverse effects were assessed to fisheries resources as a result of impaired water quality.

In 1996, MPMC entered into an agreement with the Department of Fisheries and Oceans (DFO) to compensate for the possible loss of 1,650m2 of rainbow trout fry habitat in upper Edney Creek tributaries. As compensation for this potential impact, MPMC constructed a plug dam on Bootjack Lake to replace the existing dam that had been constructed in the early 1900s.

On account of the water balance deficit during the initial years, as outlined in Section 3.2.2, potential make-up water sources for the reclaim system (processing feed water) were evaluated. Water supply from Polley Lake was assessed to have potential adverse effects to fisheries resources due to the restriction of fish passage over the proposed storage dam; however, a designed fish ladder was assessed to mitigate the potential effects. This fishway would have allowed passage of both adult and stream-reared juvenile rainbow trout over the storage dam, allowing them to spawn downstream of Polley Lake in Hazeltine Creek. The fishway was designed as an open flume orifice-weir type, which controls the discharge over a significant portion of the lake level range and operates over expected variation in lake levels. Flow would have been regulated in the fishway during March through November, in order to provide storage requirements for operations while supplying minimum downstream fishery flows. Final project design, however, included changes to the water management that was previously planned. Based on consultation, water withdrawal from Polley Lake was approved during freshets of the early years of operation, with the additional water stored in the TSF for use throughout the year as make-up water for the reclaim system. Since continuous or monthly withdrawals direct to the mill were no longer required, the above related Polley Lake storage dam works were not constructed.

No water was discharged to the receiving environment as a result of the higher milling rate and; therefore, no adverse effects to fisheries resources occurred as a result of the change. As described above, a higher milling rate would have required more volume and a higher withdrawal rate in terms of water supply during start up. This, however, would not have resulted in adverse effects to fisheries resources given the change in water management planning that resulted in make-up water being drawn from Polley Lake only during the freshet (when water availability and levels are high) and only in the initial years of operations.

3.2.5 Terrestrial Resources

The original project application described the terrestrial resources within the project area, including the mill site and other ancillary features, and included an assessment of potential effects to surficial geology and soils, forest resources, and wildlife.

The majority of the proposed project area within the original application had been cleared and revegetated prior to mine development, and any additional clearing required was assessed to be a temporary effect that would be mitigated by the reclamation plan. Effects to wildlife and wildlife habitat were assessed to be minor and temporary, with no major population dislocation anticipated. The assessment concluded that the only

significant areas where permanent land use changes would occur are within the pit and waste rock dump locations.

The process plant considered in the original EA included a single crusher and two-stage grinding circuit, and would have covered an area of approximately 23 hectares (ha) (including mill site, ancillary facilities, parking lot, and access road). The facility that was constructed reflects a slightly different process involving three-stage crushing and grinding, and also has a higher milling capacity. While this setup involves a larger number of pieces of equipment, the equipment is smaller and the overall plant covers a smaller area of 20 ha[5]. Based on the above, the constructed facility affects essentially the same area as the area assessed in the original project application. As such, and consistent with the results of the original EA, the higher milling rate has not resulted in any adverse effects to terrestrial resources.

3.2.6 Heritage Resources

A heritage overview assessment was conducted for the original application to determine the potential for adverse effects to heritage resources as a result of the project. The assessment included a review of heritage resources in the area, interpretation of aerial photos and topographic maps, and field reconnaissance.

The majority of the project area was assessed as having low heritage resource potential. Several isolated areas were assessed as having low-moderate potential, all of which involved narrow corridors and which had been previously disturbed. Two (2) locations were identified as having moderate heritage resource potential: an area adjacent to Bootjack Lake in the area of tailings and reclamation ponds, and the other area which involved a narrow corridor of development (transmission line).

The constructed mill site was slightly different than the assessed site; however, the overall footprint size was similar and it was not located in either of the areas where further investigation was recommended. The potential for heritage resources within the mine and mill site was assessed to be low in the original application, and therefore no adverse effects to heritage resources are expected as a result of the revised process plant.

3.2.7 Socio-economic

The original project application provided a description of socio-economic baseline conditions for employment and local economy, demographics, housing, services and infrastructure, and transportation. While a complete socio-economic assessment was not conducted for the project at that time, the potential for socio-economic effects related to a higher milling rate can be qualitatively assessed, based on anticipated changes to the workforce and supplier requirements, and copper/gold concentrate transportation requirements associated with the higher rate.

[5] In addition to the 20 ha of the plant itself, the general plant area included non-milling related infrastructure such as the warehouse and purchasing building, the truck wash building, and materials laydown, etc.

3.2.7.1 Employment and Supplier Procurement

The workforce planned as part of the original project design was estimated to be 162 people during the first five (5) years of operations, increasing to 209 persons in year seven (7), with operations expected to extend over 14 years. With current operations, the project has approximately 312 employees when operating at full capacity. A portion of the higher workforce operational requirements is due to increased workforce requirements to run the mine development that was constructed and implemented (different process than assumed in the EA), including support to both mill and mining operations.

The EA indicated that at the start-up of mining, an estimated 50% of the permanent employees were expected to be recruited locally, increasing to 75% in later years of mine life. Based on this estimate, for a 209 person operational workforce, an estimated 52 workers would potentially have been hired from outside the local area (for a 312 person operational workforce, approximately 78 workers would be hired from outside the local area).

The EA indicated economic effects were expected to be positive due to job creation, general economic stimulus and continued economic activity and that, due to it being the economic hub within the region, Williams Lake would receive a strong proportion of the economic benefits generated by the mine. Overall, a higher milling rate compared to that outlined in the original project design, would provide similar and, depending on employment and supplier requirements to support this higher milling rate, incrementally larger economic benefits locally and regionally. A higher than estimated number of direct operational workers required to support both mine and mill operations at the higher milling rate would result in an incrementally higher level of local and regional employment and income generation. More intensive supplier requirements to service the higher milling rate such as diesel fuel supply for mine operational vehicles, propane supply for mill equipment, vehicle maintenance and repair, employee bus transport and trucking of ore concentrate, would result in a higher level of local indirect jobs, and local business revenue generation for contracted suppliers, where local businesses and supplier profiles matched project requirements and where local procurement occurs. Refer to Section 3.2.7.3 for discussion related to increase in road traffic. Consumer-oriented spending associated with the wages and salaries of a higher number of employees and employees of project contractors and suppliers could further support business opportunities and economic development in the local economy. Incremental local, regional and federal tax revenues would have been generated through personal income tax associated with incremental project employment income, and through any taxes on incremental materials and supplies used for construction of infrastructure and operations at the higher milling rate.

The above projected economic effects are consistent with what has occurred during actual operations (at the higher milling rate), as evident through job availability and economic stability when the mine has operated. The potential for reduced years of operation at a higher milling rate could have resulted in a more intensive (higher) but shorter duration of direct, indirect and induced employment and economic benefits. However, the shorter duration of economic benefits has been mitigated by identifying more resources/reserves and adjusting the mine plan to extend the overall development (production volumes and years).

3.2.7.2 Housing, Services, and Infrastructure

The EA indicated that no operational camp facilities were planned at the mine site, and mine operational workers who were not local residents were to secure their own accommodation at nearby communities within

daily commuting distance to the mine site. The EA also indicated that no major influx of population was expected into the region as a result of the mine, and only minor levels of adjustment to existing levels of services and infrastructure were expected. With current mine operations, many mine operational employees live in the surrounding communities of Likely, Big Lake and Williams Lake (Imperial Metals 2016).

The effect of a higher operational workforce size on local housing, services and infrastructure associated with a higher milling rate depends on a number of factors including actual percentage of the operational workforce associated with a higher milling rate that was recruited from the local labour force (versus from outside the local area), and in which communities non-local workers decided to take up residency. Effect of in-migration on housing also depends on the availability of local temporary and permanent housing stock, and planned housing development to accommodate increased demand. Similarly, effects of in-migration on services (including healthcare, emergency, social services and education) and infrastructure (water, solid and liquid waste) depend on existing and the projected capacity to service the local residential population (inclusive of the in-migration workforce) and business base. In addition to information on the portion of the incremental workforce associated with higher milling rate and percentage of local versus non-local hiring associated with this portion of the workforce, a baseline trends analysis of the local housing market since mine operations commenced would be required to understand potential effects of a higher milling rate on local housing. However, with the implementation of MPMC's policies on local procurement, recruitment and training to local workforce (as presented in Section 3.5 of the EA), in-migration of workers to local communities associated with the higher milling rate, and by association incremental demand on, and effects to, housing availability and cost, and on services and infrastructure supply and quality in these communities would be minimized.

3.2.7.3 Road Transportation

A road transportation impact assessment was not completed for the original EA; however, the EA indicated that the copper/gold concentrate was to be transported by trucks of 20 ton capacity to the BC Rail loading point at Enterprise Siding located 105 km south of the project, with an estimated average daily shipment of concentrate from the mill being 160 tons. Based on 160 tons, an estimated number of eight (8) haul truck trips per day would have been required.

The movement of a higher amount of ore concentrate from the higher milling rate was accommodated by increasing the highway truck size from 20 to 40 tons, while maintaining the same number of daily truck movements to and from the mine site. Instead of rail transport, the ore concentrate is hauled directly to Vancouver, thereby reducing the potential for particles to become airborne and the potential for spillage that would be associated with multiple loading and unloading sites. Transportation of a larger number of mine operational workers and increased supplier requirements to service a higher milling rate would contribute to an incremental increase in road traffic volume. For example, a larger workforce of ~312 people could require an additional two (2) buses for daily transport compared to a workforce of ~209. However, adverse effects on transportation stemming from a higher milling rate have not been observed and are not anticipated.

3.2.8 Health

The original EA did not include a health assessment; however, recent work can be referenced to understand potential adverse effects associated with mine operations. While the available information was produced to

address concerns and potential health impacts associated with the tailings dam breach in 2014, it is also relevant to past operations because the sampling conducted to support the health assessment reflected conditions that existed under the higher milling rates.

A human health risk assessment problem formation has been conducted of conditions downgradient of the TSF following the tailings dam breach in 2014 (Golder 2016). Conditions following the MPMC tailings dam breach, when tailings were deposited in Polley Lake, along accessible areas of Hazeltine Creek and in the western arm of Quesnel Lake, were considered to over-estimate potential human health risks during the operational period prior to the tailings dam breach (or for future conditions associated with return to full-scale operations). A sampling and analysis plan was developed and implemented to support a multipathway exposure assessment for people who may use areas impacted by the tailings dam breach (Golder 2015). Sampling included a range of possible contaminants in soil, sediment, groundwater, surface water, plants and fish tissues and both direct contact and indirect contaminant exposure pathways. A number of potential human health exposure scenarios were evaluated, including:

- Backcountry Recreation User (Hiker/Camper)
- Subsistence and Traditional Land User
- Backcountry Recreation User (ATV/Snowmobile Users)
- Boater/Kayaker
- Sport Fisher
- Hunter/Trapper
- Quesnel Lake Resident
- Logger
- Mine/Rehabilitation Worker

No contaminants of concern were found in soil, sediment or surface water (including drinking water), for human health; therefore, human health risks are considered to be acceptable. The soil standards[6] are also considered to be protective of exposure to contaminants in dust. Concentrations of contaminants in plants were evaluated to determine if there was evidence of contamination uptake into plants that could be eaten by humans. Concentrations were found to be not different in plants within the impacted areas when compared to samples collected in unimpacted areas. Since there was no difference in metal concentrations in plants, exposure to wildlife or people consuming plants is not different as a result of the tailings dam breach, and; therefore, is inferred to hold for the higher milling rate for the reasons noted above.

Fish muscle samples from Polley and Quesnel lakes were analyzed for metals chemistry in 2014 and 2015. Only 2014 and partial 2015 results were available during preparation of the risk assessment report (Golder

[6] British Columbia *Contaminated Sites Regulation* Residential Soil Standards

2016). The data provided no evidence of metals uptake in fish muscle when compared to background. Fish tissue concentrations will continue to be monitored and compared to background conditions and guidelines for the protection of human health as part of MPMC's overall annual monitoring requirements.

The BC Ministry of Health (BC MoH) conducted an independent investigation of water, sediment and fish data collected by the MoE. The BC MoH released a public service communication notifying stakeholders that the results of these samples continue to show that there are no known risks to human health (BC MoH 2015). The BC MoH initial precautionary ban on consumption of water, flora and fauna, and recreational use of water in areas impacted by the tailings dam breach was fully rescinded in July 2015.

Air quality was monitored from June to September 2015 (i.e., the driest part of the year) in the operational area of the site where concentrations of crustal dust in air would be expected to be higher than down gradient areas. The design of this program was approved by MoE, and results indicated that particulate concentrations were consistently below ambient air quality standards, with the exception of influences attributed to forest fires in the area. The monitoring program focussed on the TSF/plug area where conditions would be expected to be worst case due to proximity to mining operations and truck traffic. Monthly results and an overall summary of the air quality monitoring program were provided to MoE.

In addition to the advancement of dust management methods at the site, since 1997 the mine has operated under *Environmental Management Act* air emissions (former *Waste Management Act*) air permit PA-15087 which regulates emissions to air from the mine (see Section 3.2.1).

Conditions following the MPMC tailings dam breach, when tailings were deposited in Polley Lake, along accessible areas of Hazeltine Creek and in the western arm of Quesnel Lake, were considered to over-estimate potential human health risks during the operational period prior to the tailings dam breach (or for future conditions associated with return to full-scale operations) during which the Mount Polley mine operated with the higher milling rates. Since human health risks have been found to be acceptable following the tailings dam breach, human health risks from exposure to potential contaminants and dust throughout the operational life of the mine are expected to be acceptable.

4.0 REGULATORY, PUBLIC & FIRST NATIONS CONSULTATION

4.1 Public Liaison Committee

A Public Liaison Committee (PLC) was first discussed in the original Mine Development Assessment process, and was proposed as a government-sponsored committee to facilitate ongoing public consultation. Upon mine start up in 1997, the MEM (formerly the Ministry of Energy, Mines and Petroleum Resources) initiated this committee, which provided ongoing liaison between MPMC, government agencies, First Nations, local governments, and the public. The committee met regularly until the mine shut down temporarily in 2001.

MPMC initiated a formal restart of the committee in late 2007, sending out invitations to participate to Provincial and Federal Agencies; First Nations (Williams Lake Indian Band, Soda Creek Indian Band, Red Bluff Indian Band); environmental groups; recreationalists; local governments; and local community groups. Meetings were held on: August 27, 2008, May 27, 2009, October 28, 2009, June 17, 2010, November 24, 2010, August 17, 2011, May 23, 2012, May 11, 2013, November 6, 2013, June 20, 2014, December 9, 2014, September 17, 2015, December 17, 2015, and February 18, 2016.

These PLC meetings were generally well attended. The meeting agendas typically included an introduction and overview of mining activities, and updates on staffing, mine life, permitting, environmental monitoring, and research. The updates were followed by a question and answer session, which was documented in the meeting minutes and distributed to all members (including those that missed the meeting).

Most of the questions at the meetings pertained to mine operation, the footprint of the mine (in general), and the number of employees. Starting in 2008, there has also been a focus on water discharge and potential water management strategies.

Specific requirements for the PLC were first added to *EMA* Permit 11678 under clause 2.7 of the November 7, 2012 amendment, formalizing the requirement for MPMC to hold annual PLC meetings. This clause (renumbered 2.9) was updated in the July 9, 2015 amendment to *EMA* Permit 11678, revising the meeting frequency to quarterly and requiring development of formal Terms of Reference for the PLC. This clause (renumbered 2.10) was again (and most recently) updated in the November 29, 2015 amendment to *EMA* Permit 11678, and the portion relating to the PLC is as follows:

> "*The Permittee [MPMC] must actively participate in and support a Public Liaison Committee which meets at least quarterly to share and receive information about mine activities and the results of monitoring programs with interested members of the public…*"[7]

MPMC submits an Annual Environmental and Reclamation report to the MoE and the MEM. Separate reports were completed in 1999 and 2000; however, since 2001, the reports are combined into a single document. There reports are also provided in hard copy to the First Nations, and are publically available at the Cariboo District Library (Likely, Big Lake, and Williams Lake).

4.2 MPMC Meetings with First Nations

MPMC signed Participation Agreements with the Soda Creek Indian Band (SCIB) and the Williams Lake Indian Band (WLIB) on May 11, 2012 and December 2020, 2011, respectively. By signing these agreements, the three (3) parties continue to work together and establish a relationship that will lead to opportunities for both the First Nations and MPMC.

Joint Implementation Committee (IC) meetings are held at a minimum quarterly, and often more frequently, between MPMC, the SCIB, and the WLIB as part of their respective Participation Agreements. These meetings are a venue for open dialogue regarding environmental, social and economic matters related to mine development, operation, reclamation and closure (i.e., mine updates, permitting, environmental protection, reclamation, employment opportunities, and potential joint ventures). These meetings provide a well-defined, constructive forum in which issues and comments relating to the present and future operations of Mount Polley Mine may be discussed, including those as identified as part of the Communication Plan required under *EMA* Permit 11678. Meeting minutes are kept and distributed to the IC members following each meeting, along with a formal action item tracking log that is managed and updated by MPMC.

[7] *Environmental Management Act* Permit 11678 issued by the BC Ministry of Environment to Mount Polley Mining Corporation. November 29, 2015 amendment.

Discussion at these meetings have included reference to the operational milling rates at Mount Polley mine through discussion of mine planning, permitting activities and regulatory compliance.

Under the Terms of References of the respective Participation Agreements, SCIB and WLIB representatives at these meetings are responsible for relaying information between MPMC and their respective Bands.

In addition to the scheduled IC meetings, site tours and information sharing sessions are held with First Nations members. As an example, in August 2013, MPMC met with a group of Elders from the SCIB and the WLIB. During this meeting the question about possible effects of dust on vegetation was brought up. MPMC described the dust monitoring program that is in place and explained that there is no indication of adverse effects on wildlife due to fugitive dust from the mine or the access roads.

4.3 Consultation related to Mine Operations

The above sections describe MPMC's overall consultation activities related current and future mine operations. Project information provided at the consultation meetings (e.g., presentation slides) and in formal written documents (e.g., in support of various regulatory applications), have consistently reflected actual mine operations involving milling rates of 20,000 to 22,000 t/d (7.5 to 8 million t/yr). The current mine plan and proposed restart to full-scale operations are also based on this rate. Although discussions and related questions have focused on the present operations, the mine plan, and future development, no questions or issues directly related to milling rate have been raised or recorded. Predominantly, issues raised relate to environmental considerations (i.e., potential effects), reclamation and closure planning, life of mine expectancy, employment opportunities and partnership opportunities. Issues raised during the review process for applications under *Mines Act* Permit M-200 and *EMA* Permit 11678 amendments are documented for consideration by the regulatory decision makers.

The Cariboo Mine Development Review Committee (CMDRC), facilitated by the BC MEM, is the formal venue for coordinating review and consultation related to MPMC's *Mines Act* Permit M-200 and permit amendment applications. Membership includes representatives from local, provincial, and federal government agencies, as well as representatives from Likely, the Cariboo Regional District, the SCIB, and the WLIB. CMDRC meetings are typically held quarterly, although the timing of meetings is adjusted to match permitting timelines. Meetings may also be cancelled at the discretion of the MEM if there are no relevant updates or discussion topics.

The CMDRC also acts as a venue for communication related to permit amendment applications under *EMA* permits, or other regulations administered by the MoE and the BC Ministry of Forests, Lands and Natural Resource Operations. While communication related to *EMA* permit amendments is conducted as per the *EMA* Public Notification Regulation, where possible, information is presented through the CMDRC to coordinate review and consultation with parallel *Mines Act* permit amendments and other updates on the Mount Polley Mine site, with the goal of making efficient use of CMDRC member's (government, First Nations, and community representatives) time.

Open public meetings are held as required for consultation on major permit amendment applications. Public tours of the mine site may also be provided for consultation purposes to provide an update on site conditions.

5.0 SUMMARY AND CONCLUSIONS

The Mount Polley mine has operated from 1997 to present, with periods of shutdown, for a total operating period of approximately 14.5 years. The mine development was originally permitted for a planned production rate of 13,700 tonnes per calendar day (t/d) (five (5) million tonnes per year) and an anticipated mine life of 14 years. Updated engineering design and equipment available during the construction period meant that the processing plant constructed in 1997 had a higher capacity than originally planned. Mine production was initially around 17,000 t/d, and following improvements to the crushing and grinding processes from 2005 to 2009, has varied between 20,000 and 22,000 t/d (7.5 to 8 million tonnes per year). Based on guidance from the BC EAO, an amendment to EAC M96-07 is required to increase the allowable milling rate to greater than the 13,700 tonnes per day that is stated in the original EAC.

The main effect of a higher milling rate is a reduced mine life; however, the associated environmental effects for a given mine plan (e.g., same open pit designs, waste rock volumes and dumps, and tailings volumes) are not expected to be significantly different than at a lower rate. In general, the overall magnitude of effects would be the same or of similar magnitude, although they could occur sooner. A higher milling rate (and by it, a higher mining rate) could also be associated with more or larger equipment, changes to water supply or management requirements, increased disturbance area, and changes to social or economic considerations.

Valued components (VCs) which have a potential linkage to milling rate were identified as:

- Air quality and noise;
- Water balance;
- Water quality and aquatic health;
- Fish and fish habitat;
- Terrestrial resources;
- Heritage resources;
- Employment;
- Community infrastructure and services;
- Transportation; and,
- Human health.

An assessment of potential effects to these VCs was conducted, considering available operational monitoring data and mitigation. Based on the results of the assessment, the changes to the project activities do not alter the conclusions of the original application, and/or are not assessed to result in significant adverse effects to environmental, social, economic, heritage, or health resources.

6.0 PROPOSED AMENDMENT

In consideration of the above information and evaluation, MPMC requests an amendment to EAC M96-07 to increase the allowable milling rate at the mine. We understand that a change to Section 3 of the EAC would be required, and are suggesting the following:

- Condition 3, in its entirety, be replaced with “The rate of milling must not substantially exceed 8.2 million tonnes per year”.

The annual milling rate at the mine in recent years has typically been just under 8 million tonnes. However, reference to a rate of 8.2 million tonnes per year would provide flexibility for when the mine is running at a very high efficiency, and would reflect the upper limit of plant production under optimal and continuous (un-interrupted) operations.

In addition to the above, the EAO may consider revising Condition 4 of the EAC given that the Certificate would not be assigned a fixed term. This is consistent with the current BC *Environmental Assessment Act*, and also acknowledges the fact that a planned mine life (in number of years) may not equate to a single period of continuous operations due to periods of care and maintenance, shut-downs, and/or approved mining of additional materials. In this case, reference to “term of the Certificate” could be removed.

Lastly, MPMC requests that the EAC be amended to reflect “Mount Polley Mining Corporation” as the holder of the certificate. This reflects the fact that Mount Polley Holding Company Limited (MPHC) amalgamated with Mount Polley Mining Corporation (MPMC) on December 31, 2005.

7.0 REFERENCES

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