MEMORANDUM

To: Stk'emlupsemc te Secwepemc Nation **Date:** 7 November 2016

From: KGHM Ajax Mining Inc.

CC: B.C. Environmental Assessment Office, Canadian Environmental Assessment Agency

Subject: Response to Ajax Project Application/EIS Panel Report: KGHM Ajax Mine Project Environmental Assessment Application Review by Brian Arquilla and Eric Miller

1. INTRODUCTION

The KGHM Ajax Project Environmental Assessment Application/Environmental Impact Statement (the Application/EIS) for a Comprehensive Study was formally submitted for review to the BC Environmental Assessment Office and the Canadian Environmental Assessment Agency on January 18, 2016. The Stk'emlupsemc te Secwepemc Nation (SSN) provided KGHM Ajax (KAM) with comments associated with reports prepared by technical experts and provided to SSN in support of the SSN Panel Hearings which occurred May 2, 2016 through May 6, 2016. This memorandum provides a response for specific recommendations SSN-MM and NN.

2. RECOMMENDATIONS FOR RESPONSE

This memo addresses the recommendations submitted by the SSN that are based upon the following report:

- *KGHM Ajax Mine Project Environmental Assessment Application Review, Mountain Pacific Environmental Consultants Limited, April 20th, 2016*

The specific recommendations of the SSN are as follows:

Report Specific Recommendation SSN-MM: SSN requests that KGHM review and respond to technical concerns raised by Mountain Pacific (2016) to facilitate informed decision-making by the SSN Panel.

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Report Specific Recommendation SSN-NN: Flow analysis on Peterson Creek should include real-time hydrometric data collected directly from potentially effects macroreaches (1, 3-4) and use methods described in Lewis et al. 2004; this is especially important considering the lower macroreaches of Peterson Creek support rainbow trout, coho and chinook species.

3. RESPONSES

The report completed by Mountain Pacific consultants includes commentary related to valued component selection, assessment spatial boundaries, terrestrial ecosystem mapping, baseline sampling and methods, cumulative effects assessment, the proposed wetland compensation plan and Application/EIS conclusions.

KAM has provided the following supplemental submissions to EAO/CEAA that are relevant to the recommendations and concerns raised:

- *0706_KAM_Fish Habitat and Fishery Offsetting Plan*: includes proposed habitat enhancement for Coho salmon in Lower Peterson Creek
- *0707_KAM_EphemeralWetlands*: includes quantification of ephemeral wetlands in the LSA, those lost to the Infrastructure Footprint (IF) and a commitment to include the additional 3.5 ha of ephemeral wetlands in the Wetland Compensation Plan
- *0720_KAM_Mitigation Hierarchy and Offsetting:* includes additional grassland offsetting measures and areas and mitigation for species of conservation concern, the Appendix of the memo is a revised Wildlife Management Plan
- *0725_KAM_Federal Policy on Wetlands:* identifies wetlands where the federal policy on wetland conservation applies, provides rationale for wetland compensation ratios and identifies and commits to additional field work specific to identification of wetland function

In addition to these supplemental submissions to EAO/CEAA, KAM has received similar comments and is responding to the public in the Public Comment Response Report.

KAM has reviewed the Mountain Pacific (2016) report with particular attention to perceived inadequacies and concerns for lack of data or improper study design or data collection methodology. KAM and its consultants completed the assessment of potential effects on fish and fish habitat, wildlife and vegetation using proven, reproducible and defendable methods. The methods used for the assessment meet the requirements of the Application Information Requirements / Environmental Impact Statement Guidelines (AIR/EIS Guidelines) approved by the BC Environmental Assessment Office and the Canadian Environmental Assessment Agency and issued as final on July 22, 2015. The conclusions of the assessment were made by Professional Biologists registered in British Columbia by the College of Applied Biology (RPBio) hired by KAM. Therefore, KAM has a high degree of confidence in the conclusions presented in the Application/EIS. The Mountain Pacific (2016) report is not organized by valued component, SSN area of concern or Application/EIS section references; however, the following section provides a response to individual items of concern as listed in order from the report for consistency.

A number of the comments raised by Mountain Pacific in their memo have been logged as responses to Round 1 technical comments through the working group review process. KAM has provided

responses to these comments, and they are available in the SSN Tracking Table. Those responses are not repeated here, but new comments are addressed. Please see the table below that provides cross references to topics of concern from the Mountain Pacific report and Round 1 comment response provided by KAM.

Mountain Pacific Report (2016) Concern/Issue/Assertion	Related Round 1 Comment Response ID
Valued Component Selection	SSN-883 (terrestrial invertebrates)
Project Spatial Boundaries	SSN-291, SSN-478
Terrestrial Ecosystem Mapping	SSN-285
Sampling Design and Methodology	SSN-293 (sharp-tailed grouse, Nevada skipper, amphibians, snakes)
Sensory Disturbance Assessment	SSN-294, SSN-297, SSN-357
Tailings Storage Facility and Avian Abatement	SSN-295, SSN-361
Cumulative Impacts Assessment	SSN-301, SSN-305
Compensation Plan	SSN-287
Habitat Suitability Models	SSN-296

SSN-MM: Valued Component Selection

- The report criticizes the Application/EIS and Project as follows "*The Project has neglected to address a number of valued components used by Stk'emlupsemc te Secwepemc Nation as country foods, cultural significance and economic importance were not included in the biophysical assessment (i.e. subsistence harvest, The Trout Children Stseptékwll wildlife, medicinal plants, furbearers). The lack of inclusion of the valued components is not in keeping with either Canadian Environmental Assessment Act (CEAA) and British Columbia Environmental Assessment Act (BCEAA) mandate or Project objectives*".

KAM is aware that SSN disagrees with the general methodology used for the Environmental Assessment. The assessment and selection of Valued Components follows BC Environmental Assessment Office (EAO) guidelines — including the Application Information Requirements (AIR) Template and the Guideline for Selection of Valued Components and Assessment of Potential Project Effects — and focuses on measurable parameters as opposed to subjective values. The process of updating the AIR included consultation with the SSN and incorporation of their feedback. See the letter from the BC EAO office dated July 23, 2015 (http://bit.ly/2e3GGgA) which includes an overview of how SSN comments on the AIR were taken into account.

To address additional concerns from SSN, additional assessments were conducted and presented as Addenda to the Application/EIS on Day 60 of the Technical Review Phase. The Addenda include assessments of Project effects to Aboriginal Economies, Governance and the Trout Children Story.

Addendum #3 Trout Children Story assesses the Trout Children Stseptékwll (Story), which embodies a worldview, provides guidance, and is at the heart of ceremony and spiritual connectedness that are fundamental to the continuance of SSN culture. The assessment presented in Addendum #3 considers project effects to five cultural elements of the Trout Children Story: ritual fasting, offerings, prayers, the chickadee song, and root digging. Potential effects assessed include the following: potential change, disturbance, alienation, and/or loss of land or water in the Pípsell

area that may subsequently affect SSN's ability to engage in the spiritual, ceremonial, and cultural aspects of the five cultural elements. Project effects could include a decrease in the quality and quantity of experiences; an increase in restrictions and obstructions to Project area access; and an alteration or loss of connection to Pípsell due to the change in the experience of traditional activities (e.g., caused by an increase in noise and a decrease in air quality and visual serenity). The assessment of effects on the Trout Children Story is informed in a holistic fashion by the assessment of biophysical, socioeconomic, heritage and health Valued Components presented in the Application/EIS.

SSN values, principles, and laws have been considered in the assessment of the SSN Trout Children Story and related areas as applicable. KAM has worked with SSN to develop a process for engagement, collection and review of additional data, as well as a framework for assessment. KAM have worked collaboratively with SSN to develop the approach for the SSN Trout Children Story assessment, has received feedback from SSN on additional secondary sources to be consulted, and has provided SSN with assessment frameworks for review. As described in Section AD 1 Introduction of Addendum #3 Trout Children Story, on December 17, 2015, SSN provided an approach document to assist KAM in developing an appropriate approach for the Trout Children Story Addendum to the Application/EIS. The approach developed for this Addendum considers the input provided by SSN in that letter; guidance from Canadian Environmental Assessment (CEA) Agency provided in letters dated August 4, August 19, and November 24, 2015; input collected through consultation activities between KAM and SSN; and baseline reviews conducted for the Application/EIS. The approach for this assessment evolved, and subsequent versions were shared by KAM with SSN and the CEA Agency in December 2015 and January 2016.

Issues raised by SSN were considered to inform the VC assessments presented in the Application/EIS. While the Application/EIS has already been submitted, and the Technical Review Phase is on-going, issues raised by SSN are continuously tracked and responded to as outlined in the First Nations Consultation Plan (Appendix 15-C of the Application/EIS). This process also provides the opportunity for KAM to provide additional information, address issues, and update the conclusions of the assessments where needed. Under direction from BC EAO, KAM is currently preparing a Technical Review Phase First Nations Consultation Report to be submitted on Day 120 of the Technical Review Phase. This consultation report will present an update on the status/resolution of the issues raised by SSN in relation to the Project. SSN will have the opportunity to comment on the status of resolution of outstanding issues before the Technical Review First Nations Consultation Report is finalized. The Pípsell Impacts and Infringement Report was provided by SSN in October 2016 and the information from this report will be considered by KAM as the Project proceeds.

Regarding the selection of valued components and species for the assessment of potential effects, each valued component section of the Application/EIS includes a sub-section entitled "rationale" which provides a description of the scoping process used to identify the valued component for inclusion in the assessment. For valued components such as rare plants, rare and sensitive ecological communities, grasslands, terrestrial invertebrates, amphibians, reptiles, migratory birds, raptors, non-migratory gamebirds and mammals, sub-sections entitled "Selection of Indicators" are included in the Application/EIS that provide the rationale for the selection of species for the assessment.

We believe that the process of selection which included consideration of SSN concerns, values and input is substantiated and forms the basis of a sound assessment of potential effects for each valued component.

The rationale for the choice of amphibian indicators is explained in Section 6.12.1.2 of Chapter 6 Amphibians and additional information is found in Appendix 6 of Appendix 6.8-A. Both western toads and northern pacific treefrogs were included in the assessment, despite having overlap in habitat requirements, due to regional concern for the northern pacific treefrog (Appendix 6 of Appendix 6.8-A) and feedback from the Ministry of the Environment (Section 6.12.1.2). The same rationale explains the inclusion of Columbia spotted frog as well. The long-toed salamander and northern alligator lizard were not considered as an indicator species for reptiles as they are provincially yellow listed and priority was given to blue and red-listed species as explained in Sections 6.12.1.2 and 6.13.1.2. As explained in Section 6.13.1.2., the two species of garter snake observed in the Local Study Area (LSA) were not included as indicator species since they are provincially yellow-listed. The four snake species that were included in the assessment were chosen based on their status as species at risk and the presence of suitable habitat in the LSA as explained in Section 6.13.1.2 and Appendix 6 of Appendix 6.8-A, despite potential overlaps in habitat use.

SSN-MM: Project Spatial Boundaries

- The report criticizes the Local Study Areas presented in the Application/EIS as follows: "*The Project's Environmental Assessment provides an inadequate study design to assess species impacts at required spatial scales as the LSA does not account for patch size of target vectors. It remains to be explained how the selected spatial boundaries were determined for assessing potential impacts to valued components. It is necessary to define and use ecologically relevant spatial boundaries for sampling that can accurately describe potential effects from the Project. Appropriate selection of spatial boundaries is critical as individuals, populations, and communities all respond differently to potential impacts*".

The rationale for the spatial boundaries is presented in Sections 5.2.3.1 and 8.5.3.1 Spatial Boundaries of the Application/EIS. The Local Study Area (LSA) is the area within which Project effects are expected to occur and considers the middle and lower sub-catchments of Peterson Creek. As defined, the LSA encompasses components of Pípsell (Jacko Lake & surrounding area], Hunting Blind, Goose Lake, Prayer Tree, X7ensq't, Peterson Creek). Pípsell was identified by the SSN as a cultural keystone place. The LSA was selected in consideration of how water bodies within the Peterson Creek catchment are interconnected and the pathways of effects between the Project components, activities and current uses of land and resources in these areas. Middle Peterson Creek is the area where the mine infrastructure will be developed and where the intensity of effects of the Project will be greatest. Lower Peterson Creek also has the potential to experience changes to streamflow, which relates to fishing; therefore, it is also included in the LSA. Finally, the LSA includes the linear developments (i.e., fresh water pipeline and power line) with applied buffers around the proposed right-of-way to capture effects extending beyond the area where the linear facilities will be developed. The upper portions of Peterson Creek, including Jacko Creek, were excluded from the LSA, because they are located upstream of the Project and not affected by mine infrastructure. However, upper Peterson Creek is included in the RSA and therefore is considered by the effects assessment.

- The report criticizes the Fish and Fish Habitat effects assessment LSA in that it does not include the lower reaches of Peterson Creek (macroreaches 1-4). Further, the report states that "*the City of Kamloops was not considered in the RSA despite downstream aquatic habitat being directly influenced by effects that occur upstream*".

The methods used for the selection of spatial boundaries meet the requirements of the Application Information Requirements / Environmental Impact Statement Guidelines (AIR/EIS Guidelines) approved by the BC Environmental Assessment Office and the Canadian Environmental Assessment Agency and issued as final on July 22, 2015.

The Local Study Area (LSA) is the area within which the potential Project interactions and physical, visual, and auditory effects are expected to occur. The LSA for the purpose of the Fish and Fish Habitat effects assessment is defined as the mine site and infrastructure and surrounding area within which there is a reasonable potential for immediate direct and indirect effects on fish, fish habitat, and aquatic resources. Because it was not deemed reasonable that immediate direct and indirect effects would be expected to fish and fish habitat in macroreaches 1-4, these reaches were not part of the LSA. However fish and fish habitat throughout the entire length of Peterson Creek was assessed as part of the RSA. Additional work is ongoing to collect baseline data from lower Peterson Creek including fish sampling, habitat mapping and flow monitoring via new hydrometric stations on Peterson Creek.

SSN-MM: Terrestrial Ecosystem Mapping

- The Mountain Pacific report states that "*inappropriate methodology has been applied to Terrestrial Ecosystem Mapping (TEM) of the Project Study Area; the TEM is incomplete, inadequate and overall flawed*."

We respectfully disagree with the assertion made by Mountain Pacific regarding the Terrestrial Ecosystem Mapping methods employed for the assessment. Professional biologists registered in BC with the College of Applied Biology followed the Standard for Terrestrial Ecosystem Mapping prepared by the Ecosystems Working Group Terrestrial Ecosystems Task Force Resources Inventory Committee (RIC 1998) – the TEM Standards Manual to conduct the TEM for the Project assessment. As such, survey plot locations, number, and type considered the spatial boundary, survey intensity level (SIL), and survey detail required for the Project. Plots were established throughout the Project area with the exception of private property and areas where access restrictions existed and in areas where the greatest Project effects were anticipated (the mine site).

Stratified, random sampling is not commonly used for TEM as the population distribution is not known and as the principle purpose of the field plots is to inform typing and attributing of the TEM polygons. Unusual and rare ecosystems and those that are more difficult to accurately interpret from aerial photographs are preferentially sampled over more common and easily interpreted ecosystems (RIC 1998). This helps increase the accuracy of the TEM. Importantly, stratified random sampling is not recommended in the TEM Standards Manual (RIC 1998).

As per RIC 1998: the most commonly used method of sampling in ecosystem mapping projects is the establishment of field inspections along transects. The transects can be randomly located, but are more often selected to cover the greatest number and variety of polygons in the least amount of field

time. Sample points can be established systematically, at set distances along a transect but are generally established subjectively. The ratio of full plots : ground inspection : visual plots is similar to what is recommended in the guidelines in the Resource Inventory Standards (RIC 1998), which recommends 5% full plots, 20% ground plots, and 75 % visual plots (it was 3%, 32%, and 65% for the Project or 3:32:65). TEM plot ratios as per the TEM standards manual are likely to be the main form of sampling for wetlands, alpine, and other non-forested ecosystems (RIC 1998). Full inspections are intended for the classification of site series (in the absence of a classification system) or the description of new ecosystems (RIC 1998). Visual plots are the least detailed plot type and the easiest and least expensive to collect. The increase in the use of ground plots reflects the utility in these plots for recording relevant ecological and site data as well as vegetation community composition. Ground plots contain data suited to informing invasive species management, soil management and reclamation and closure planning.

SSN-MM: Sampling Design and Methodology

The Mountain Pacific report asserts that the sampling design and methods applied for the assessment of effects are inadequate for a variety of valued components.

- Specific to fish and fish habitat the report states, *"…transects should be reassessed providing they are located on appropriate habitat types. A detailed analysis should be completed to determine impacts on fish and fish habitat as per "Assessment Methods for Aquatic Habitat and Instream Flow Characteristics in Support of Applications to Dam, Divert, or Extract Water from Streams in British Columbia" by Lewis et al. 2004".*

The instream flow related impacts of the Ajax Project on lower Peterson Creek were re-assessed and described in supplementary memorandum 0706_KAM_Peterson Creek Instream Flow Requirements. Pre-mine conditions at PC-02 on Peterson Creek just upstream of Highway 5A show the highest stream flows occur from April to August (see Figure 1). Sustained minimum flows occur from September to February, with Mean Monthly Discharge (MMD) ranging from 3%-6% of Mean Annual Discharge (MAD). Minimum flows of 3%-6% of MAD are below flow thresholds widely considered limiting to fish. MAD at PC-02 is 227 m^3/hr. Predicted flow reductions at the end-of-mine development are estimated to be 2 m^3/hr (0.6 l/s or 0.9% MAD) during most of the winter low flow period. Average annual operations flows at the end-of-mine are reduced by 18% from 227 m^3/hr to 200 m^3/hr. This difference represents a volume of approximately 235,000 m^3/yr. Residual flows from April to August are well above MAD and not considered limiting to fish. MMD flows in March are reduced from 63 m^3/hr to 40 m^3/hr (28% MAD to 18% MAD). The conclusion from the assessment was that the magnitude of these flow reductions presents very low risk to fish and fish habitat in Peterson Creek considering the baseline setting.

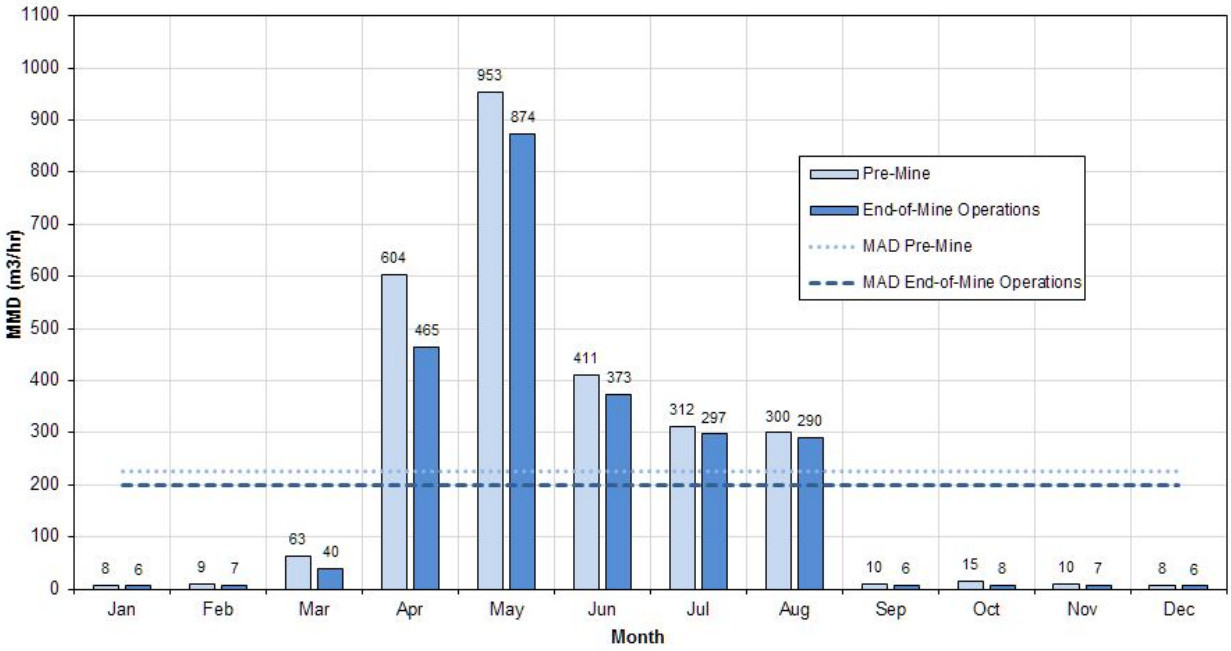

Figure 1 Pre-Mine and End-of Mine Operations Hydrograph on Peterson Creek at PC-02

The suggestion to undertake a transect based habitat suitability study in lower Peterson Creek is not warranted since the magnitude of flow changes are too small (from September to February) to accurately model changes in fish habitat (within modelling uncertainties) and inform decision making. Further, the approach suggested by Lewis et al. (2004) is a two tiered approach, where potential impacts are first compared to the flow threshold criteria. If the predicted reductions exceed the threshold criteria, detailed analysis should be completed. Supplementary memorandum 0706_KAM_Peterson Creek Instream Flow Requirements indicates that predicted flow reductions are comparable to the threshold criteria and that detailed studies are likely not warranted.

The methods undertaken to assess the instream flow related impacts on Peterson Creek are sufficient to conclude it is unlikely there will be adverse impacts to lower Peterson Creek. However, as the thresholds are flow based criteria it is agreed that streamflow gauging should be conducted on lower Peterson Creek to accurately define pre-mine conditions and that naturalized flows are explicitly assessed. These works are scheduled and pending a permit under the Water Sustainability Act. The works include additional habitat transects and installation of a continuous flow monitoring station in lower Peterson Creek pending required approvals and consultation between FLNRO and the SSN.

Potential mitigation, if required for streamflow reductions have been proposed in the form of flow augmentation by acquiring existing water licences, modifying storage on Jacko Lake, adding storage in the upper Peterson watershed, improving irrigation efficiency, or providing additional flow from an acceptable alternative water source is potentially feasible considering the magnitude of flow reductions is small.

A suggested approach is to continue to assess potential mitigation options and accept the level of assessment provided with the condition that ongoing data collection is implemented as part of a

monitoring study to confirm the streamflow reduction predictions. The scope of the study would include fish, hydrology, invertebrates, and physical measurements of fish habitat.

- The report states "*The Project's Environmental Assessment Application has not provided a description of habitat suitability polygons including what these areas are, where they are, why they are ranked high/moderate, what aspects were considered, where they are in the LSA, and how much of the area this entails".*

Regarding concerns related to habitat suitability polygons, Appendix 9 in Appendix 6.8-A includes background information on the life requisites of species for which habitat suitability modelling was conducted as well as the assumptions and rationale that were used to rate habitat. The results of the habitat suitability modelling are presented in the text, tables, and figures of Appendix 6.8-A.

- The report states that *"Assessment of cumulative Project impacts on wildlife valued components does not include sensory disturbance considerations"…*

With respect to comments regarding the assessment of cumulative effects on wildlife valued components and lack of sensory disturbance considerations, each wildlife chapter includes a section titled "Methods to Estimate Sensory Disturbance". Consideration of sensory disturbance focused on noise due to the availability of noise modelling for the Project. For the cumulative effects assessment, sensory disturbance primarily considered noise effects from other projects. Due to the lack of availability of noise modelling for future projects or recreational and other land use activities, a qualitative approach was used for determining the effect of sensory disturbance in the cumulative effects assessments of wildlife VCs. Sensory disturbance was considered a potential cumulative effect for raptors, non-migratory gamebirds, and mammals because it was characterized as a residual effect for these VCs. It was not carried forward as a potential cumulative effect for other VCs since after mitigation it was not identified as a residual effect.

Finally, the Mountain Pacific report recommends that the Application/EIS assess the effects of open tailings ponds to migratory and wintering birds. Potential effects of the tailings pond on migratory birds can be found starting on page 6.14-57 of the Application/EIS in the chemical hazards section. Mitigation related to the potential chemical hazard effect of the tailings pond for migratory waterbirds is outlined on pages 6.14-71 and 6.14-72 of the Application/EIS. This includes monitoring and adaptive management of use of the tailings storage facility by migratory birds. Further mitigation and monitoring details will be developed during the *Mines Act* permitting process.

SSN-MM: Cumulative Impacts Assessment

The Mountain Pacific report suggests that the spatial boundaries used for the cumulative effects assessment are lacking for a number of terrestrial wildlife valued components.

KAM appreciates that it is necessary to define and use ecologically relevant spatial boundaries for the cumulative effects assessment. Thus the local and regional study areas for wildlife VCs were developed during the AIR scoping process and included input from the EAO, CEAA, public, Aboriginal Groups, and the technical working group. The LSA for the majority of wildlife species is defined as the area of disturbance associated with all Project facilities, buffered by a minimum of 500 m. The Regional Study Area was defined for each VC as the area in which cumulative effects

would be expected and includes portions of the South Kamloops Landscape Unit and Campbell Landscape Unit, including areas south of the Thompson River and west of Highway 97 (Figure 6.12-3). Landscape units were selected for the RSA as they are the geographical framework within which sustainable forest management regimes to maintain biodiversity are implemented. For many VCs, the RSA also includes local watershed basins and is 158,415 ha in size. See Figure 6.8-1 in the AIR for the Terrestrial Biosphysical Effects Study Area which was approved for use in the Application/EIS. Further details regarding assessment boundaries are provided within the "Assessment Boundaries" sections for each VC. For the evaluation of the sensory disturbance of noise, areas outside the IDA were taken into account. See Sensory Disturbance analyses in the wildlife chapters.

- The report also states "*Potential additional effects on water quality, water quantity, climate change (flow reduction), and aquatic habitat loss (fish, benthics, periphyton) should all be assessed throughout the drainage below Jacko Lake (specifically downstream of Highway 5A). Residual cumulative effects may pose risk to the Peterson Creek aquatic environment including salmon and trout species*".

The cumulative effects assessment for lower Peterson Creek was updated in response to several information requests and comments concerning the effects of urban runoff on water quality. This assessment is detailed in 0706_KAM_Water Quality Downstream Cumulative Effects. The water quantity and water quality changes incurred by the Ajax Project are accounted for at PC-02. The suggestion to add more modelling nodes downstream of PC-02 is not warranted considering the inherent uncertainty attempting to model urban runoff and effects from water licence diversions both of which are unknown and out of the control of KAM. Ongoing data collection in lower Peterson Creek will be implemented to gain an improved understanding of the effects of urban runoff and water licence diversions to support future monitoring programs. The scope of the study will be expanded to include fish, invertebrates, and physical measurements of fish habitat within appropriate study timing windows.

SSN-MM: Compensation Plan

- The report states "*…It is imperative that compensation efforts mimic the ecological function provided by small ephemeral systems as opposed to deep lake water systems or riparian areas. Given this, what is the Project's Rare and Sensitive Ecosystem Compensation Plan? There is little certainty regarding the potential for the successful reclamation of bunchgrass and ponderosa pine grasslands unique to the Thompson-Nicola region. There is tangible concern that the loss of native grasslands, including Red and Blue listed communities, cannot be mitigated and may result in significant cumulative and trophic impacts*".

In response to concerns from stakeholders that were received during the first round of working group comments, additional quantification of ephemeral wetlands was conducted and can be found in the memo *0707_KAM_EphemeralWetlands.* Ephemeral wetlands lost to the infrastructure footprint will be compensated for as described in the Wetland Compensation Plan. Additional fieldwork will also be conducted to determine wetland functions as described in *0725_KAM_Federal Policy on Wetlands*. Similarly, additional grassland mitigation has been identified on over 2,000 ha of Sugarloaf Ranch lands. The details of this are provided in the memo *0720_KAM_Mitigation Hierarchy and Offsetting.*

SSN-MM: Environmental Assessment Application Conclusions and Inferences

- The Mountain Pacific report states a concern regarding the consideration of a rocky outcrop as a snake hibernaculum based solely on the nearby presence of a single shed snake skin and a single live snake.

This information can be found in Appendix 6.8-A on page 103. As explained on page 102 of Appendix 6.8-A of the Application/EIS, potential hibernacula were classified as either candidate or confirmed I – III based on field surveys and expert determination. The rocky outcrop in question was assigned a status of Confirmed II which is "good structure with snakes observed in vicinity" as opposed to Confirmed I which is "snakes observed in feature at appropriate time of year". Therefore we submit that the consultant's claim of study inadequacy is incorrect and unjustified.

- The report also raises a concern related to spadefoot metamorphosis - specifically regarding the amount of time cited in the Application/EIS it takes the Great Basin Spadefoot to reach metamorphosis.

The Application cited 36 days after hatching while the information in the memo indicates this may occur in as little as two weeks after hatching. This information was stated on page 113 of Appendix 6.8-A. We appreciate the information and request the associated reference of scientific literature in order to use this information in future planning. Regardless, the duration of metamorphosis does not change the conclusions of the Application/EIS with respect to effects of the Project on spadefoots.

- The report states that "*Discussions that omit fish habitat downstream of LSA/macroreach 5 are misleading. This information provided should note that a small recreational fishery does exist downstream of the LSA and it supports rainbow trout (macroreaches 3 and 4 of Peterson Creek). The Peterson Creek fish population is reliant on downstream migration of fish from Jacko Lake during freshet or flood flows. It is planned that fish will not pass downstream of the proposed dam and diversion structure at the outlet of Jacko Lake as the dam structure will not have a spillway. This plan will result in isolation of the resident population of trout located in macroreaches 3 and 4 of Peterson Creek. Good habitat exists downstream of Jacko Lake within macroreach 4 that can support a resident trout population with population supplementation input from Jacko Lake. Therefore, it is inherent that habitat and fish movement is maintained or improved upstream of macroreach 4 in order to ensure that fish can pass from Jacko Lake down to macroreach 4 in order to support the existing resident fish population. Further, the lower reaches of Peterson Creek (macroreaches 1-4) are not ephemeral as described in the Project application*".

Resident rainbow trout occur in Reaches 3 and 4 of Peterson Creek, and thus have the potential to support a small recreational fishery. We are not aware of these reaches supporting an Aboriginal fishery. We are not aware of a productive, popular or readily accessible recreational fishery in Reaches 3 and 4 of Peterson Creek. These reaches have limited public access due to steep terrain and private property along each bank. The indication from baseline studies is that this resident population may be self-sustaining, and does not require annual re-seeding from Jacko Lake to persist as an artificial stocked population.

The proposed plan to divert a portion of Peterson Creek through a 3 km pipe during the mine operations phase and potentially block downstream fish movements may or may not have a negative

effect on the resident population. Due to this uncertainty, long term monitoring of rainbow trout populations in Peterson Creek is recommended, along with a commitment to implement artificial stocking from hatchery populations if a negative effect on abundance is detected through monitoring. The appropriate context is that fish in Peterson Creek are limited by existing impacts to fish habitat from urbanization, licensed water withdrawal, September to February low flows, and the potential negative consequences of climate change to water supply, water temperature, and the hydrological regime.

- The report states: "*The Environmental Assessment Application concludes that flows in Peterson Creek are low and the difference from reduction by the mine is minor and will have negligible effect on fish. This is an assumption as effects are based on predicted flows from directly below the mine with a few physical on site measurements. A decrease in water quantity could result with impacts on the fish population within the mid portion of Peterson Creek, especially between the dam site and Highway 5A where there are gentle stream gradients (1-3%). A further reduction in water quantity coupled with other effects, including exceedances in water quality, could impact downstream resident fish and other aquatic biota. Further assessment is required using methods described in Lewis et al. and supported by hydrometric data collected within potentially effected reaches (macroreaches 1-4)*".

Mine site water balance modelling is calibrated to data collected at PC-02, which is located just upstream of Highway 5A. Fish use between the dam and Highway 5A occurs seasonally as the result of fish moving downstream from Jacko Lake during spring freshet. There is no evidence of a self-sustaining resident rainbow trout population between Jacko Lake and Highway 5A. Beaver dams and ponds are extensive between Jacko Lake and Highway 5A, and stream sections are down cut with few riffle sections, gravel bars, and gravel-cobble bed material. The dominant mesohabitat types are less sensitive to flow reductions than a typical low gradient riffle-pool stream with coarse bed material. The approach suggested by Lewis et al. (2004) is a two tiered approach, where potential impacts are first compared to the flow threshold criteria. If the predicted reductions exceed the threshold criteria, detailed analysis should be completed. Predicted flow reductions are comparable to the threshold criteria and that detailed studies are not warranted.

Furthermore, KAM is required to mitigate stream flow reductions for the protection of existing water rights held on Peterson Creek. Potential mitigation measures for the reduction of stream flow are described in supplementary memorandum 0629_KAM_Peterson Creek Streamflow Mitigation_BGC_014. This memorandum discusses potential mitigation strategies to minimize the predicted reduction in streamflows on Peterson Creek (Lower). The strategies outlined in this draft memorandum are intended to provide a framework for discussion with regulators and stakeholders. Because KAM is required to mitigate these predicted impacts to water rights in Peterson Creek, the application of the selected mitigation measure or combination of measures will effectively mitigate potential flow related impacts to fish in Peterson Creek downstream of the Project.

- The report states: "*Indirect habitat loss in Peterson Creek downstream of the Project area from flow reduction associated with Project footprint and contact water" is rated as "Not Significant (minor)" is not based on sufficient data. Real time hydrometric monitoring must be collected within downstream reaches of Peterson Creek in order to accurately estimate downstream reach flow levels and potential flow reduction impacts on rainbow trout, salmon, invertebrates and primary productivity*".

The water quantity and water quality changes incurred by the Ajax Project are accounted for at PC-02. Ongoing data collection in lower Peterson Creek prior to and during the Project will improve an understanding of the effects of urban runoff and water licence diversions to support future monitoring programs. The scope of the study will be expanded to include fish, invertebrates, and physical measurements of fish habitat within appropriate study timing windows.

- *Direct fish and aquatic habitat loss in Peterson Creek and Jacko Lake rated as "Not Significant (minor)" is inaccurate. This is not factual. This is a significant effect for both Peterson Creek and Jacko Lake. The potential impact will cause serious harm to a recreational and aboriginal fishery. Residual effects on fish habitat in Jacko Lake and Peterson Creek will be significant and major.*

The characterization of residual effects to fish and fish habitat is well documented in the Application/EIS and follows the methods prescribed by the AIR. Significant effects for the Fish and Fish Habitat VC are defined as residual effects that have high magnitude; have regional or beyond regional geographic extent; are chronic; and occur at all frequencies. Residual effects on the Fish and Fish Habitat VC could potentially result in structural and functional changes in populations, communities, and ecosystems. KAM believes that after consideration of mitigation measures such as monitoring to determine the accuracy of effects predictions and implementing the Fish Habitat and Fishery Offsetting Plan, that residual effects will not be deemed significant.

The following residual effects were characterized starting on page 6.7-79 of the Application/EIS:

1. Direct Habitat Loss in Northeast Arm of Jacko Lake and in Peterson Creek from Open Pit Development
    a. Significance characterization: the magnitude of change to Jacko Lake and Peterson Creek after offsetting measures and diversion design changes are considered are anticipated to be Minor therefore no significant effect is anticipated.
2. Indirect Habitat Loss in Peterson Creek downstream from the Project Area related to Flow Reduction
    a. Significance characterization: the magnitude of change in flow reductions are anticipated to be Minor therefore no significant effect is anticipated. Importantly this significance conclusion is made prior to consideration of streamflow mitigation measures which KAM assumes to be mandatory for the protection of water rights.
3. Fish Mortality in Jacko Lake from Open Pit Development (Blasting) or installation of sheet pile wall in Jacko Lake
    a. Significance characterization: the magnitude of change (fish mortality) is anticipated to be Minor therefore no significant effect is anticipated. It is predicted that the potential risk to fish mortality can be successfully mitigated and that if the predictions are not correct, operations such as blasting and pile driving can be adjusted to prevent the death of fish.
4. Sub-lethal Effects on Fish in Peterson Creek Downstream from the Project Area related to Changes in Primary Productivity
    a. Significance characterization: the magnitude of change in flow reductions are anticipated to be Minor therefore no significant effect is anticipated. Importantly this significance conclusion is made prior to consideration of streamflow mitigation

measures which KAM assumes to be mandatory for the protection of water rights. Regarding changes in water quality in Peterson Creek, the resiliency of the primary producers (periphyton) is characterized as Neutral, since the degree to which community composition changes with thermal input depends on the initial ambient temperature, with increases in temperature in environments near 25°C to 30°C typically causing greater changes in community structure than in environments less than 25°C.

The appropriate context of the impact assessment conclusions was that direct fish and aquatic habitat loss would not reduce the size of the fish population (i.e., numbers of fish) in Peterson Creek or Jacko Lake, and that fish habitat losses would be offset by constructing new fish habitat. The revised Fish Habitat and Fishery Offsetting Plan seeks to address these concerns and proposes the creation of new habitat on Jacko Lake and restoration of habitat in Lower Peterson Creek. Impacts to aboriginal and recreational fisheries have been identified as the result of multiple social, cultural, and environmental factors that include fish habitat loss.

Importantly, KAM has requested Aboriginal fishery data and solicited feedback on the proposed fish habitat and fishery offsetting concepts before and after submitting the Application/EIS. To date, KAM has not received information to help quantify Aboriginal fishing effort on Peterson Creek or Jacko Lake. In addition, the SSN has provided limited comments on proposed offsetting concepts other than objection to concepts as proposed and an overarching rejection to offsetting as a whole. However SSN staff has stated interest in restoration of a historical spring trout fishery on Upper Peterson Creek immediately upstream of Jacko Lake. KAM appreciates this information and has committed to restoration of a reach of Peterson Creek in the revised Fish Habitat and Fishery Offsetting Plan.

SSN-MM: Uncertainty Due to Lack of Information in the Environmental Assessment Application

Regarding the statement from the report that states there is a lack of information in the Application/EIS related to noise/vibration disturbance from pit excavation, the fish and fish habitat assessment considers sub lethal effects to fish behaviour and to invertebrate production by default via fisheries productivity. Page 6.7-61 of the Application/EIS acknowledges the potential effect – "Anthropogenic noise can result in avoidance behaviour and increased stress, which may affect fisheries productivity; the ecological significance of such effects is typically low, except where reproductive activity is involved (Fisheries and Oceans Canada 2014)". Most of the effects are expected to be short-term, with the duration of the effect less than or equal to the duration of the sound exposure; there are no documented cases of population scale impacts of sound on productivity of commercial, recreational, or Aboriginal fisheries (Fisheries and Oceans Canada 2014). In addition to the information presented in the Application/EIS, KAM has revised the Conceptual Fish Habitat Offsetting Plan that includes supplementary information regarding the potential sub-lethal effects of noise and vibration on fish behavior and invertebrate production. Please see section 5.4.3 of the revised offsetting plan (0706_KAM_Fish Habitat and Fishery Offsetting Plan) for details.

We realize that there is limited information available in the literature on the effects of sub-lethal effects to fish from blasting near fish bearing waters. For this reason we agree that additional investigation is required and we have committed to a comprehensive monitoring program to detect

any changes in fish habitat productivity or behavior as a result of Project operations including sheet pile wall installation in Jacko Lake or blasting in the open pit near Jacko Lake. Monitoring results will indicate if additional mitigation measures are required which may include a revision to blast designs, change in blasting procedures or pile driving. Please see supplementary memo 0706_KAM_Instream works for additional information regarding effects from sheet pile wall installation and additional mitigation measures.

The Mountain Pacific report states that the rating presented in the Application/EIS for indirect habitat loss/sub lethal effects on fish and primary productivity in Peterson Creek downstream of the Project area from flow reduction associated with Project is "Not Significant (minor)", is based on insufficient information and recommends additional hydrometric monitoring in lower Peterson Creek. Flow reduction related impacts will be mitigated through measures required to preserve stream flows for existing water licence holders on Peterson Creek. Nonetheless, to satisfy this request, we have planned to install an additional continuous flow monitoring station in lower Peterson Creek pending FLRNO approval for changes in and about a stream. Our understanding is that the application for this approval to install the station requires Crown consultation with the SSN prior to issuing a decision to allow us to begin data collection.

The Mountain Pacific report requests information regarding the prescribed mitigation strategies within the Environmental Management System to protect terrestrial and aquatic resources interacting with the Project's pit lake. Section 11.28 provides a summary of the Reclamation and Closure Plan for the Project. The plan describes the long-term water level in the Open Pit is predicted to remain approximately over 200 m below the pit rim which will restrict a number of terrestrial species from accessing the pit lake. In addition the pit lake perimeter will be void of soil and adequate growing conditions for vegetation that would attract non-migratory birds. Access for ungulates to the Open Pit will be prevented by constructing a rock barrier (berm) around the perimeter. Access to the pit lake for monitoring purposes will be required and controlled by a locked gate.

A detailed Reclamation and Closure plan will be prepared as part of the application for permit under the Mines Act. This plan will detail how access to the pit lake will be restricted for wildlife and humans long term. Closure and post closure monitoring of the pit lake will indicate whether water quality is harmful to wildlife, the degree of lake usage by wildlife that are able to access it (e.g. waterfowl, migratory birds) and whether additional mitigation measures are required to prevent access.

- Mountain Pacific requests that KAM explain rationale and certainty of the following statement: "*The pit lake model potentially over-estimates water quality as it does not account for attenuation mechanisms common in natural lakes that have a high rate of biological activity. Biological productivity can be enhanced by organic additions and fertilization and potentially reduce metal concentrations in surface waters." Without a lack of site-specific data for this treatment scenario in the Project location, this finding is an assumption.*

Water quality inputs to the pit lake model were obtained from the site wide water quality model which was developed using conservative assumptions and incorporates data from the existing pit lakes. The statement that 'without a lack of site-specific data for the treatment scenario is

an assumption' is correct, but it is supported by successful application at facilities with similar pit lakes (Martin et al. 2003). This assumption was not incorporated into the pit lake model, but was merely a suggestion for potential options for increasing the level of productivity and associated attenuation processes of the pit lake should monitoring results indicate the need.

SSN-NN: Recommendation for Additional Baseline Hydrometric Data

- The SSN has requested that: *flow analysis on Peterson Creek should include real-time hydrometric data collected directly from potentially effects macroreaches (1, 3-4) and use methods described in Lewis et al. 2004; this is especially important considering the lower macroreaches of Peterson Creek support rainbow trout, coho and chinook species.*

KAM recognizes the SSN concern for flow related impacts to lower Peterson Creek with importance to rainbow trout, coho and chinook species. We have planned and begun additional stream monitoring efforts that include additional habitat transects to better understand the fish habitat during low flows, fish sampling and installation of a continuous data logger that will provide streamflow data for the lower macroreaches. Fish sampling is currently awaiting the approval for fish collection via permit that was applied for in May 2016 but on hold due to SSN concerns voiced to government. Installation of the data logger is pending approval for changes in and about a stream under the *Water Sustainability Act* which will also require SSN/Government consultation. We appreciate your concerns and hope that you recognize our efforts to augment our data per your request.

4. CONCLUSION AND PROPOSED PATH FORWARD

We hope that the information provided in this letter addresses the recommendations, concerns and/or issues noted in Section 2. We understand that the depth and breadth of material presented in the Application/EIS provides a challenge to review pertinent information regarding specific topics of concern. Many of our responses to the concerns from the Mountain Pacific report provide a reference to or minor clarification of material provided in the Application/EIS. In some cases we provide further clarification or cross reference to new material submitted as part of the Environmental Assessment Process.

We continue to appreciate the comments received directly from SSN and look forward to continued collaboration with staff, Chief and Council.

References

Lewis, A., T. Hatfield, B. Chilibeck and C. Roberts. 2004. Assessment methods for aquatic habitat and instream flow characteristics in support of applications to dam, divert, or extract water from streams in British Columbia.

Martin A.J., NcNee J.J., Crusius J, Pieters R., Dunbar D. 2003. Field-scale assessment of bioremediation strategies for two pit lakes using limnocorrals. In: International Conference on Acid Rock Drainage, Cairns, Australia, July 2003.

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