New Prosperity Gold-Copper Mine Project
Federal Review Panel

Canadian Environmental Assessment Agency, 160 Elgin Street, 22nd Floor, Ottawa, ON K1A 0H3, Tel: 1-866-582-1884
NewProsperityReview@ceaa.gc.ca

December 10, 2012

Ms. Katherine Gizikoff
Director, Environment and Government Affairs
Taseko Mines Limited
15th Floor, 1040 West Georgia St.
Vancouver, BC
V6E 4H1

Sent by e-mail: <email address removed>

Subject: Deficiency Statement – Request for Additional Information – Various Topics – New Prosperity Gold-Copper Mine Project Environmental Impact Statement

Dear Ms. Gizikoff:

The Federal Review Panel (the Panel) responsible for reviewing the New Prosperity Gold-Copper Mine project has completed its review of the Environmental Impact Statement (EIS) submitted by Taseko Mines Ltd. (Taseko) on September 26, 2012. The Panel also reviewed and considered all comments received from the various participants as part of the 45-day public review and comment period.

Based on its own review and on the comments received, the Panel has determined that additional information is required to support and supplement the information provided in the EIS and to fulfill the requirements of the EIS Guidelines issued in March 2012. Attached to this letter is a list of information requests and the rationale for the requested information. This list of information requests is in addition to the information request on cumulative effects assessments (IR 1) submitted by the Panel on November 26, 2012. The Panel requests that Taseko provide the requested information in a complete and timely manner. For planning purposes, the Panel would also appreciate receiving an indication of the time you expect will be required to respond to all the information requests.

The Panel is of the view that the additional information requested is necessary for the Panel to determine if the EIS is sufficient to proceed to public hearing. Once all the requested information is submitted, the Panel will determine whether there is a need to provide a 15-day public comment period based on the additional information provided, or to proceed to scheduling the public hearing.

Please note that the time required by Taseko to respond to any information requested by the Panel is not included in the timeline remaining for the Panel to complete its review.

If you have any questions or concerns, please do not hesitate to contact Livain Michaud, Panel Manager at 613-948-1359 or at NewProsperityReview@ceaa-acee.gc.ca.

Sincerely,

<original signed by>

Bill Ross
Chair

cc: Mr. Brian Battison, Taseko Mines Limited

Attach.

Information Requests

from the Federal Review Panel to Taseko Mines Ltd.

Regarding the Environmental Impact Statement

for the

New Prosperity Gold-Copper Mine Project, British Columbia

December 10, 2012

Table of Contents

Information Requests

IR 1 – Cumulative Effects Assessment

Note: This information request was submitted to Taseko on November 26, 2012. See CEAR # 303.

IR 2 – Open Pit Development

References:

EIS Guidelines, Sections 2.7.2.1 and 2.2.3
EIS, Section 2.6.1.1
EIS Appendix 2.2.4-A (Preliminary Pit Slope Design)

Related Comments:

CEAR # 283 (BC Ministry of Energy, Mines and Natural Gas)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The location and design of the open pit are unchanged. However the development of the open pit now has the potential to affect other features associated with the project that have changed, such as maintaining Fish Lake, the Fish Lake water control dams, the non-PAG waste rock dump, ore stockpile crusher and conveyor. As such, the potential effects of the open pit on these re-located facilities are within the scope of changes to the project.

The BC Ministry of Energy, Mines and Natural Gas has noted the importance of maintaining an adequate buffer between the pit crest and surface facilities. Similarly, Appendix 2.2.4-A, p.27 notes that, with respect to pit stability:

> *It is indicated that the proposed slope angles for the New Prosperity Pit are generally comparable to the slope angles achieved in other deep pits. This comparison highlights the importance of developing and maintaining good controlled blasting practices, effective groundwater depressurization measures and geotechnical data collection. It is also noted in these case studies, that adverse structural conditions have had a major impact on pit slope stability.*
>
> *In addition, it is important to note that almost all of these large open pit operations, including porphyry copper mines, have all encountered slope stability problems in some areas of the mine.* ***The experiences at most of the large open pits suggest that there is a possibility that some areas of the pit slope will require flattening during operations in response to slope movement. Therefore, the mine plans should remain flexible so that extra stepouts/buttresses can be maintained in critical areas of the pit until the end of the mine life when lower factors of safety can be tolerated.*** (emphasis added)

In this regard, it is possible that the final pit outline will be larger than that indicated in the EIS documents and the ultimate pit crest could encroach on or affect other project facilities and Fish Lake.

Information Requested:

The Panel requests that Taseko:

a. Provide a sensitivity analysis that evaluates potential geotechnical, slope stability and hydrogeological conditions that:
   i. could reasonably be expected during open pit development;
   ii. could result in the need for flattening; and
   iii. affect Fish Lake or other features or the viability of the mine.

IR 3 – Mine Development – Site Investigation

References:

EIS Guidelines, Sections 2.2.4 and 2.2.5
EIS, Section 2.2.5
EIS Appendix 2.2.4-C (2012 Geotechnical Site Investigations Factual Data Report)

Related comments:

CEAR # 272 (Natural Resources Canada)

Rationale:

Resulting from a Supreme Court of British Columbia injunction awarded to the Tsilhqot'in National Government in December 2011, a number of exploration drill holes and test pit sites for the proposed 2011 program were not carried out. This resulted in several of the proposed test pit sites being removed from the program as well as several test pit sites being relocated within the project area.

The design and performance of the embankments of the tailings storage facility depends on the knowledge of the foundation properties and materials on which embankments will rest. Therefore any limitations in the required information on the foundation materials and assessment of their properties may have consequences for the design of the embankments and predictions for seepage below the embankments.

Information Requested:

The Panel requests that Taseko:

a. Provide information on how the limitations of the proposed 2011 work program identified by Knight-Piésold affect the quality and quantity of the geotechnical data.

b. Describe how the limitations may impact the design and expected seepage through and below the TSF embankments.

IR 4 – Alternatives to Mine Waste Disposal

References:

EIS Guidelines, Section 2.4.3.1
EIS, Section 2.4
EIS, Table 2.4.3.1-1 (Pre-Screening Criteria)
EIS Appendix 2.4.3.1-A, Table 6.2 (Project Economic Indicators)
EIS Appendix 2.4.3.1-A (Assessment of Alternatives for Mine Waste Disposal)

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)
CEAR # 292 (Environment Canada)

Rationale:

The Proponent argued during the 2009 review that the Mine Development Plan (MDP T2 - Fish Creek South) option was not economically feasible. Therefore the cost information on which the new project plan is based is important. Of the 15 alternatives, two options were identified for more detailed assessment, which are described as MDP T2 (Fish Creek South) and MDP T6 (Tête Angela Creek). All other options were fatally flawed based on pre-screening criterion 4F; *the cost of an alternative exceeds a reasonable threshold by >$500 Million.*

According to Environment Canada, for each of the economic indicators used in the Multiple Accounts Analysis, the Proponent has not provided information on the breakdown of the costs for MDPs T2 and T6. Environment Canada indicated that having a breakdown of costs is important to better understand the basis for the cost estimates, particularly since the estimated costs presented in Table 6.2 vary by many orders of magnitude from those presented in August 2009.

Information Requested:

The Panel requests that Taseko:

a. Provide additional information for those alternatives that were eliminated due to economic 'fatal flaw' in order to support the conclusion that it was appropriate to exclude these alternatives from further analysis. The Panel requests that current financial information be used to substantiate the Proponent's conclusions, including references to relevant sources.

b. Justify why an economic threshold of $500 Million was used compared to the $1 billion figure that was used in the 2009 EIS.

c. Provide additional information on the breakdown of estimated costs of MDPs T2 and T6, to assist the Panel to understand the basis for the cost estimates presented in Table 6.2.

d. Clarify how mitigation costs have been accounted for in the alternatives assessment.

e. Provide a rationale for why estimated fish habitat compensation costs for MDP T6 are assumed to be “equivalent or greater” than estimated fish habitat compensation costs for MDP T2.

f. Provide information to support a conclusion that MDP T6 would be more costly than MDP T2.

g. Provide information to support the conclusion that MDP T6 would require a significantly higher volume of construction material for the tailings dams compared to MDP T2.

IR 5 – Assessment of Alternative Mine Development Plan

References:

EIS, Section 2.4.3.1
EIS, Section 2.7.2.5
EIS Appendix 2.4.3.1-A (Assessment of Alternatives for Mine Waste Disposal), Section 6.1 and 7.1

Related Comments:

CEAR # 277 (Fisheries and Oceans Canada)
CEAR # 292 (Environment Canada)

Rationale:

The assessment of alternatives examines two different mine development plans (MDP) in detail: the MDP T6 (Tête Angela Creek) and MDP T2 (Fish Creek South). Despite the fact that the two alternatives are described in Section 6.1 as MDPs, for many Multiple Accounts Analysis (MAA) indicators described in Section 7.1, it is not clear whether the alternatives have been assessed on the basis of the MDPs as a whole, or on the basis of the characteristics of the TSFs associated with each MDP. The project layout for the two MDPs is different and potentially affects the assessment of these two MDPs against many of the indicators used in the MAA, particularly indicators in the environmental and technical accounts.

Information Requested:

The Panel requests that Taseko:

a. Revise the MAA so that the MDPs can be properly compared and the validity of the MAA outcomes established. All indicators used in the MAA should be applied to reflect a consistent consideration of the MDPs as a whole, not just the TSF. Alternatively, a justification should be provided for the approach used in the EIS.

b. Provide the following information for each of the following indicators and sub-accounts:
   i. Sub-Account: Aquatic Habitat - The presence or absence of fish in the comparison of permanent and ephemeral streams directly and indirectly affected by each MDP and compare the value of the habitat affected;
   ii. Indicator: Number of Watersheds Affected – Clarify which watersheds are likely to be affected by each of the MDP options;
   iii. Indicator: Traditional Land Use - Provide a definition of what constitutes an “activity” in relation to the indicator traditional land use by aboriginal peoples as measured by the number of activities and provide a reference of where the data have been obtained;
   iv. Indicator: Potential Impacts to Water Quality - An assessment of the potential impacts of the MDPs on water quality using an appropriate measure for the assessment rather than related to the type of water treatment facility and the duration of treatment;

v. Indicator: Ability to Limit Impacts to Taseko River - Clarify how the metric for this indicator was measured, in particular: clarify whether potential impacts from groundwater discharges were taken into account, and if not, why;
vi. Clarify whether potential impacts associated with releases of surface drainage and seepage into Wasp Lake and Beece Creek from the TSF for MDP T2 were taken into account, and if not, why?;
vii. Sub-Account: Water Quality - Include an indicator to assess the impacts of MDPs T2 and T6 on water quality in Fish Lake, using a metric appropriate to the assessment of potential effects on water quality;
viii. Sub-Account: Terrestrial Habitat - Provide a rationale for why the MAA only includes an indicator for Barrow's Goldeneye, and not for other migratory bird species identified as Key Indicator Species;
ix. Indicator: Potential for Dust Emission - The metric for this indicator only refers to potential dust emissions from haul roads, and does not consider potential dust emissions from the exposed tailings. Potential dust emissions from tailings in assessing the potential dust emissions from MDPs T2 and T6 should be taken into account;
x. Indicator: Wetlands - The range of impact for the wetland indicator descriptor is <100ha to >500ha, but a rationale for this range is not provided. Provide a rationale for the surface area range used for the metric to assess impacts on wetlands with a rationale for the surface area ranges used for the metric to assess other Terrestrial Ecology indicators;
xi. Indicator: Rare Plants - Clarify how the field counts enumerated in Table 6.1 were determined. The clarification should be accompanied by a map showing areas searched in and around MDPs T2 and T6 as well as a map of occurrences of all rare plants found in and around MDPs T2 and T6;
xii. Sub-Account: First Nations Impacts - Confirm that MDPs T2 and T6 are equal in terms of their impacts on the Tsilhqot'in National Government, An indicator that would support an assessment of the impacts of MDPs T2 and T6 on First Nations cultural values should ideally be developed and applied;
xiii. Indicator: Number of Users - The metric used is number of individuals using the land for traditional purposes - The basis for the scoring for number of users of land should be provided for the sub-account First Nations Impacts;
xiv. Sub-Account: Recreational and Commercial Use - Given the differences between MDPs T2 and T6, it is likely that there would be differences in terms of accessibility and associated safety for anyone choosing to use Fish Lake during mine operations. The quality of that experience would also be determined in part by the locations of key components of the mine infrastructure, which differ between MDPs T2 and T6. An additional indicator to assess the impacts of MDPs T2 and T6 on those using Fish Lake during the mine life, including accessibility safety, and quality of the experience should be developed and applied.

IR 6 – Geochemisty – Metal Leaching / Acid Rock Drainage Characterization

References:

EIS Guidelines, Sections 2.2.5, 2.7.2.1 and 2.8.1
EIS, Section 2.7.2.1

Related comments:

CEAR # 272 (Natural Resources Canada)

Rationale:

According to Natural Resources Canada (NRCan), metal leaching/acid rock drainage (ML/ARD) resulting from the proposed project operations is not expected to cause significant impacts, provided that the Proponent is committed to:

- Applying criteria put forward for the separation of PAG and non-PAG materials (i.e. (NP-10)/AP < 2); and
- Executing planned adaptive management measures upon observing upsetting monitoring results.

However, NRCan notes that the determination of carbonate-NP and time of onset for acid generation is not clearly presented. In particular, the calculation of the inorganic carbon contained in calcium and magnesium carbonate minerals (IC_{CaMg}), as an indicator of effective carbonate neutralization potential involves what NRCan considers questionable assumptions.

NRCan further notes that the development of the equation for delay to ARD onset (p. 487) is not clearly described, and the assumption of a direct linear relationship between oxidation rate and sulphur content is not satisfactorily substantiated. These should be addressed.

Information Requested:

The Panel requests that Taseko:

a. Justify assumptions made in Section 2.7.2.1 of the EIS regarding the calculation of the inorganic carbon contained in calcium and magnesium carbonate minerals, as an indicator of effective carbonate neutralization potential.

b. Clarify development of the equation to determine the delay to ARD onset and the assumption of a direct linear relationship between oxidation rate and sulphur content.

IR 7 – Geochemistry – Metal Leaching / Acid Rock Drainage Characterization: Water Quality Source Term Development

References:

EIS Guidelines, Section 2.7.2.1
EIS, Section 2.7.2.1
EIS, Table 2.7.2.1-21 (Component Inputs, Outputs, and Source Terms)
EIS Appendix 2.7.2.1-E (Mine Rock Source Term Inputs to Water Quality Predictions)
EIS Appendix 2.7.2.1-H (Tailings Source Term Inputs to Water Quality Predictions)
EIS Appendix 2.7.2.1-I (Water Quality Prediction Results)

Related comments:

CEAR # 283 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The BC Ministry of Mines, Energy and Natural Gas (BC MEMNG) and Tsilhqot'in National Government (TNG) have requested additional information on the description of source terms. Specifically:

a. The EIS states that maximum concentrations from saturated tailings and waste rock columns were used as source terms for saturated PAG waste rock. Thus it is unclear why predicted source term concentrations for a number of variables (including CI, Cd and Ni) have decreased since the last assessment for the proposed Prosperity Mine. Further explanation on the derivation of these source terms is requested to be able to fully evaluate the water quality predictions.

b. Source terms for the Non-PAG Tertiary and Quaternary overburden are stated to have used shake flask data; however the methodology of how these data were used to generate source terms has not been included.

c. Pit wall loadings/water quality source terms are not provided.

d. Arrhenius corrections (i.e. temperature corrections for chemical reaction rates) using average annual baseline temperatures have been applied to all variables for non-PAG waste rock, unsaturated PAG waste, ore stockpile, plant site, crusher pad and road construction source terms. However, loading rates for most variables in a large pH-neutral dump are unlikely to be controlled by temperature-dependent primary oxidation rates. To fully evaluate the water quality predictions for the project, further explanation and justification of the Arrhenius corrections is needed.

e. The tailings beach run-off source term was assessed using maximum concentrations in the columns. Further explanation on the development and conservatism of this source term is needed, as the tailings humidity cells were producing higher concentrations.

f. The tailings beach infiltration source term was set to the maximum concentration of the porphyry analog data base for waste rock seepage or tailings column data. An explanation of how the waste rock seepage data compares to tailings infiltration data is required so as to provide justification for the term used in the water quality modeling.

g. A source term for residual blasting agents was not previously assessed for the project and has now been included in the EIS using the methods of Ferguson and Leask (1988). The approach appears to be potentially non-conservative as the proposed powder factor of 0.28 seems low compared to other mines and for the rock characteristics anticipated at the New Prosperity site. The assumption of 100% ANFO use also appears to be optimistic. Additional information is required to demonstrate that the source terms developed for nitrogen species from blasting are appropriate and conservative. Information to support assumed leaching and attenuation rates is requested to fully assess whether nitrogen loadings from explosives can be effectively managed and kept below the levels predicted for the downstream receiving environment. Also, the full reference for Matts et al. (2007) is needed.

h. A mine dust source term was not previously assessed for the project and has now been included in the EIS. It is noted that the soluble load from dust has been normalized to dust particle surface area. Given that this calculation is very sensitive to the fine fraction present, further explanation is needed as to how the surface area of the humidity cell samples was measured and how the proportion of dust in the particulate matter size fractions PM10 and PM2.5 has been determined.

i. There is no available field scale data for source term derivation and confirmation for this project. Thus comparisons of the drainage predictions for the non-PAG dump and ore stockpile to data from other relevant analog porphyry copper sites in British Columbia are required to confirm the validity and reasonableness of these inputs to the water quality modeling.

j. Further information is required on whether the loadings from the main tailings embankment dam have been appropriately incorporated into the modeling. Detailed methodology of how the TSF embankment source term was derived is required, including an explanation of how baseline concentrations for non-PAG overburden have been incorporated with non-PAG waste rock loads. Information on the predicted drainage concentrations from the embankment is also needed along with the runoff coefficient applied, to enable a determination of the appropriateness of the predicted loads from the embankment.

Information Requested:

The Panel requests that Taseko provide the following information:

a. Further explain the derivation of source terms for chlorine, cadmium nickel, Non-PAG Tertiary, and Quaternary overburden source terms.

b. Describe the methodology used to generate source terms for the Non-PAG Tertiary and Quaternary overburden.

c. Further explain and justify the use of Arrhenius corrections, using average annual baseline temperatures.

d. Provide pit wall loadings/source terms entered into the model, the rationale for their development, and the estimated concentration of the runoff.

e. Further explain the development and conservatism of the tailings beach runoff source term.

f. Explain how the waste rock seepage data compares to tailings infiltration data.

g. Clearly demonstrate that the source terms developed for nitrogen species from blasting are appropriate and conservative and provide additional information to support assumed leaching and attenuation rates. In addition, provide the full reference for Matts et al. (2007).

h. Further explain how the surface area of the humidity cell samples was measured and how the proportion of dust in the particulate matter size fractions PM_{10} and $PM_{2.5}$ has been determined.

i. Validate ARD/ML predictions for the proposed non-PAG dump and ore stockpile by comparing drainage predictions for the proposed non-PAG dump and ore stockpile with data from other relevant analog porphyry copper mines sites in British Columbia.

j. Clearly describe the methodology concerning how the TSF embankment source term was derived; explain how baseline concentrations for non-PAG overburden have been incorporated with non-PAG waste rock loads; and provide information on the predicted drainage concentrations from the embankment, along with the runoff coefficient applied.

IR 8 – Acid Rock Drainage / Metal Leaching Prediction

References:

EIS Guidelines, Section 2.7.2.1
EIS, Section 2.7

Rationale:

The EIS (p. 539-541) states that:

Waste Rock:

- "…potential for ARD typically varies over the scale of tens of metres with local zones of smaller scale variation between PAG and non-PAG rock. This indicates that waste management by segregation of PAG and non-PAG rock is a practical approach for the Project, and that operational monitoring will be important for appropriate waste classification."
- "The delay to onset of ARD [will be] decades to centuries before the majority of the PAG rock transitions from neutral to acidic weathering conditions. Since Taseko plans to flood PAG rock within 2 years of placement, it is expected that pH neutral weathering conditions will be maintained within the PAG waste rock."

Tailings:

- "Tailings characterization showed that a single bulk tailings product is expected to be non-PAG, and that tailings seepage [from the TSF] will be pH neutral."

Pit Water:

- "Pit water will remain pH neutral indefinitely, and pit water chemistry will be dominated by surface inflow from Fish Lake, by discharge of collected TSF seepage, and by seepage from the non-PAG waste rock storage facility. Loadings from the pit high wall are predicted to be lower than cumulative loadings from these other sources."

Information Requested:

With respect to the ML/ARD Prediction and Prevention Plan referred in the EIS, the Panel requests that Taseko provide the following information:

Waste Rock:

a. How will the identification and segregation of PAG and non-PAG waste rock be carried out within the pit (pre- and post-blasting)?

b. What operational testing and monitoring programs will be implemented to ensure accurate, on-going segregation of PAG and non-PAG waste rock?

c. Should ARD/ML predictions prove to be inaccurate and acid runoff is generated from the non-PAG waste rock pile; how will this unanticipated ARD be addressed?

Tailings:

d. What operational testing and monitoring programs will be implemented to ensure that ARD/ML predictions for materials in the TSF are accurate (i.e., that they will be non-acid generating)?

e. Should ARD/ML predictions prove to be inaccurate and acidic seepage is generated from the TSF; how will this unanticipated effect be addressed?

Pit Water:

f. Upon closure, what testing and monitoring programs will be implemented to ensure that ARD/ML predictions for pit water are accurate?

g. Should ARD/ML predictions prove to be inaccurate and acidic discharge is generated; how will this unanticipated effect be addressed?

IR 9 – Atmospheric Environment: Determination of Significance of Residual Effects

References:

EIS Guidelines, Section 2.7.2.2
EIS, Table 2.7.2.2-7 (Project Residual Effects Assessment Summary for Criteria Air Contaminant (CACs) for New Prosperity)
EIS, Table 2.7.2.2-8 (Summary of Effects Assessment for Atmospheric Environment)

Related comments:

CEAR # 265 (Health Canada)

Rationale:

The EIS Guidelines require the Proponent to use appropriate Air Quality Dispersion Models to assess the potential effects on human health at sensitive and other receptors.

Table 2.7.2.2-7 summarizes project residual effects for CACs and the corresponding text (p. 561) notes that "particulate matter is predicted to exceed the applicable objectives or standards". Table 2.7.2.2-8 concludes that no significant residual effects are predicted.

One of the key objectives of maintaining Fish Lake is to preserve existing recreational pursuits, including fishing. It can be assumed that using Fish Lake for this purpose will include using all areas of the lake, including the north end where emissions are expected to exceed regulatory objectives. It can also be assumed that recreational fishing and fishing for traditional purposes will frequently involve overnight use, sometimes for extended periods of time.

Taseko's conclusion of "no residual effects" does not appear to take into account prolonged periods of inversions or other adverse weather conditions and potential impacts on Fish Lake users who remain at the Lake for extended periods of time.

Information Requested:

The Panel requests that Taseko:

a. Discuss how the conclusion of "no significant residual effects" would change under periods of inversions or other prolonged adverse weather conditions.

IR 10 – Groundwater Interactions between Fish Lake and Open Pit.

References:

EIS, Section 2.7.2.4
EIS Appendix 2.6.1.4 D-A (Baseline Groundwater Hydrology Assessment)
EIS Appendix 2.7.2.4 A-A (Lake Level Fluctuation Predictions for Fish Lake)
EIS Appendix 2.7.2.4 A-B (Water Management Report)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrologic Analysis)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 272 (Natural Resources Canada)

Rationale:

As part of site investigations for the original Prosperity Mine Project, the Proponent conducted a pump test in 1994 on wells immediately north of Fish Lake for the purpose of evaluating the use of wells for pit dewatering (Appendix 2.6.1.4D-A, p. 7). The test yielded estimates of hydraulic conductivity in hydrogeologic units between the proposed pit and Fish Lake that were considered unrealistically high, possibly due to problems with the testing procedure (Appendix 2.6.1.4D-A, Table C-5). Results from the test were therefore considered unreliable and discounted. Since that time, it appears that the Proponent has not undertaken any further site investigation work aimed at confirming the original pump test results or at better characterizing groundwater interactions between the proposed open pit and Fish Lake. Currently, for pre-development conditions, the Proponent estimates groundwater baseflow discharge to Fish Lake at 446-493 m_3/day and lakebed seepage at 0 m_3/day (Table 2.7.2.4A-14, p.642). The Panel notes that NRCan considers these estimates to be very low.

The Panel acknowledges that NRCan and the Proponent's consultant (BGC) have previously recommended the Proponent undertake further site investigations adjacent to Fish Lake aimed at better characterizing hydraulic conductivities in the area and thereby improving confidence in predictions of pit dewatering effects on groundwater interactions with Fish Lake (Appendix 2.7.2.4A-C, p.14).

The Panel recognizes the difficulty in undertaking new site hydrogeological studies. Nevertheless, given the importance in preserving Fish Lake in its present state during and after mining operations, the Panel believes that it is critical to have better data and understanding of the groundwater connection and the groundwater flow system between Fish Lake and the overburden and the permeable bedrock above the gypsum line at the proposed pit.

Information Requested:

The Panel requests that Taseko:

a. Undertake additional sensitivity analysis for modeling the hydraulic conductivity between the proposed pit and Fish Lake to assess the predicted effects of hydraulic conductivity on water quality in Fish Lake. This work should

incorporate existing data, including data obtained from the 1994 pump test (discounted high flow results), and any new data collected. Specifically, Taseko should run a model based on the highest hydraulic conductivity values measured in the area.

b. Provide further rationale why the pump test data from wells 94-154, 94-157 and 94-159 were not relied on by BGC Engineering and were not used for the purposes of the Baseline Groundwater Hydrology Assessment (Appendix 2.6.1 4D-A).

IR 11 – Pit Dewatering Rates

References:

EIS, Section 2.7.2.4
EIS Appendix 2.2.4-A (Preliminary Pit Slope Design)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrogeologic Analysis)

Related Comments:

CEAR # 272 (Natural Resources Canada)

Rationale:

The Proponent has performed both 2D cross-sectional and 3D numerical groundwater flow modeling analyses to determine dewatering requirements for the proposed 545 m deep pit and the effects of this dewatering on Fish Lake (Appendix 2.2.4-A). According to Natural Resources Canada (NRCan) these modeling exercises represent Fish Lake as a constant-head boundary condition in which the lake level is fixed at an elevation of 1457 m. In NRCan's view, this numerical representation of Fish Lake implicitly assumes that there is an infinite amount of recharge water available with which to maintain the level of the lake during pit dewatering and post-closure infilling. Because the level of Fish Lake is fixed a-priori at the pre-mining elevation, the Proponent's numerical groundwater flow analyses are, in the view of NRCan, incapable of predicting whether or not this level will change in response to pit dewatering.

The Panel would like to better understand the opposing views of NRCan and Taseko on these matters.

Information Requested:

The Panel requests that the Taseko:

a. Undertake, and report on, additional 3D numerical groundwater flow modeling aimed at determining the amount of recharge required to maintain the pre-mining water level in Fish Lake during all phases of the project.

b. Compare this amount to the amount of flow supplementation proposed for Fish Lake. For this analysis, the 3D numerical groundwater flow model should be revised to incorporate a more refined representation of hydrostratigraphic units between the proposed pit and Fish Lake, including the more permeable bedrock above the gypsum line and the overlying thick-inter-stratified overburden deposits between Fish Lake and the proposed pit.

IR 12 – Tailings Hydraulic Conductivity

References:

EIS Guidelines, Section 2.7.2.4.2
EIS, Section 2.7.2.4
EIS Appendix B of 2.2.4-D (Report on the Preliminary Design of the Tailings Storage Facility)
EIS Appendix 2.6.1.4 D-A (Baseline Groundwater Hydrology Assessment)
EIS Appendix 2.7.2.4 A-B (Water Management Report)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrogeologic Analysis)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 272 (Natural Resources Canada)
CEAR # 290 (Tsilhqot'in National Government)
CEAR # 292 (Environment Canada)

Rationale:

For the post-closure period, the Proponent estimates seepage through the base of the Tailings Storage Facility (TSF) to be approximately 9 L/s (Section 2.7.2.4, p.663; Appendix 2.7.2.4A-C, p.17). This estimate was obtained by assuming that the hydraulic conductivity of tailings was 1E-08 m/s (Appendix 2.7.2.4A-C, p.10).

Natural Resources Canada (NRCan) noted that Knight-Piésold Ltd. (KPL 2007) reports a hydraulic conductivity value of 5E-07 m/s measured on a sample by a falling head test after a drained settling test. The KPL (2010) reports an average value of 4.5E-08 m/s measured on a sample using the same procedure. Knight-Piésold Ltd (2010) also reports hydraulic conductivity values for the same material based on a consolidation test. Measured values for this test range between 1.3E-07 m/s and 6.1E-06 m/s whereas back calculated values range between 1.8 E-08 m/s and 4.4E- 09 m/s. The authors of the report considered that measured values were too high and likely erroneous.

NRCan expressed concern that the Proponent has characterized the tailings seepage rate by using only two samples with measurements of hydraulic conductivity on these samples ranging over three orders of magnitude depending on the test methodology used. The value used by the Proponent for numerical groundwater flow modeling and estimates of TSF seepage (1E-08 m/s) is at the low end of this range and cannot, according to NRCan, be considered conservative.

The seepage rate estimate was derived using a 3D MODFLOW numerical groundwater flow model in which the TSF was represented using the "River Package" (Appendix 2.7.2.4A-C, p.10, p. 15, p. 23). This approach represents the TSF as a Cauchytype boundary condition rather than as an explicit part of the model flow domain. The boundary condition is determined through a specified head value that accounts for the water level in the impoundment and a conductance value that accounts for the hydraulic conductivity of the tailings.

The 3D MODFLOW model contrasts with the 2D SEEP/W modeling presented in Appendix B of Appendix 2.2.4-D in which the TSF is an explicit part of flow model domain. In NRCan's view, this approach does not account for flow patterns within the TSF impoundment and does not yield estimates of seepage from the TSF that can be accepted as reliable. The Panel would like to better understand these matters.

Information Requested:

The Panel requests that Taseko:

a. Provide the rationale used to select the tailings conductivity value of 1E-08 m/s for numerical groundwater flow modeling and to estimate TSF seepage rather than 5×10^{-8} m/s (the mean hydraulic conductivity of all glacial tills in the project area) in the model for predicting seepage rates from the TSF.

b. Develop, and report on, a 3D numerical groundwater flow model for the purpose of estimating seepage through the embankments and base of the TSF. The model should feature the TSF as an explicit part of the model domain rather than as a boundary condition. Materials within the TSF include PAG waste rock and tailings of varying degrees of compaction and textural coarseness should be used and be assigned realistic values for their hydraulic properties.

c. Conduct a sensitivity analysis of the seepage model using a higher hydraulic conductivity for glacial till should be undertaken with a "worst case" scenario using the highest hydraulic conductivities for all geologic materials included in the model.

IR 13 – Tailings Hydraulic Conductivity – Seepage Estimates

Reference:

EIS Guidelines, Section. 2.7.2.4.2
EIS, Section 2.7.2.4
EIS Appendix 2.6.1.4 D-A (Baseline Groundwater Hydrology Assessment)
EIS Appendix 2.7.2.4 A-B (Water Management Report)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrogeologic Analysis)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 292 (Environment Canada)

Rationale:

The modeling described in Appendix B of 2.2.4-D relates to the PAG waste rock that would be disposed of within the TSF. In the EIS (p.1390) the Proponent states that: "The tailings discharged into the impoundment will, once the impoundment is well developed beyond the first few years of operation, serve to limit the rate of seepage through the foundation soils. This will be of particular benefit in any areas where the natural glacial till blanket is discontinuous and there is direct communication between the upper and lower aquifers."

Figure 8.1 of Appendix 2.2.4-D appears to demonstrate that roughly one-third of the footprint of the TSF would be composed of PAG waste rock, and this waste rock would have a much higher hydraulic conductivity than that estimated for tailings. There is no indication that the presence of PAG waste rock in a significant portion of the TSF has been taken into account in the seepage model. This could mean that the model has underestimated the amount of seepage that would be released from the TSF, and therefore underestimated the amount of seepage that could reach surface waters.

According to the BC Ministry of Mines, Energy and Natural Gas, flooded PAG waste rock stored in the tailings management facility presents a greater seepage risk than tailings due to the greater particle size and permeability of the waste rock. In addition, the permeability of the waste rock would not decrease over time due to compaction, as it would for tailings. Hence the presence of a low permeability till cover below the PAG waste rock was noted by the Ministry as being critical for limiting seepage from the TSF.

Information Requested:

In order to better understand seepage estimates and assess the Proponent's predictions of potential impacts on water quality, the Panel requests that Taseko:

a. Predict and describe the results for how seepage rates would change when the seepage model accounts for the significant amount of high permeability PAG waste rock in the TSF.

IR 14 –Tailings Storage Facility Seepage - Mitigation

References:

EIS Guidelines, Sections 2.7.1.1 and 2.7.2.1
EIS, Sections 2.7.2.4 and 2.8.2.12
EIS Appendix 2.2.4-D (Report on the Preliminary Design of the Tailings Storage Facility)
EIS Appendix 2.6.1.4 D-A (Baseline Groundwater Hydrology Assessment)
EIS Appendix 2.7.2.4 A-B (Water Management Report)
EIS Appendix 2.7.2.4 A-C (Numerical Hydrogeologic Analysis)

Related Comments:

CEAR # 292 (Environment Canada)
CEAR # 276 (BC Ministry of Mines, Energy and Natural Gas)
CEAR # 272 (Natural Resources Canada)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The EIS Guidelines state that the assessment shall describe the environmental effects of the Project, the proposed mitigation measures and an assessment of the effectiveness and any areas of uncertainty associated with the measures.

The EIS Guidelines also require, where mitigation measures are proposed and there is little experience or uncertainty as to their effectiveness, a description of the potential risks to the environment and the means to address them.

The Proponent describes mitigation measures for seepage recovery that will prevent seepage from the main embankment of the TSF from reaching the surrounding watershed. The combined efficiency of these seepage recovery measures was determined to be 93% (Appendix 2.2.4-D, p. B-4). Natural Resources Canada (NRCan) believes that: "the Proponent's overall estimate of seepage mitigation efficiency is over-optimistic given the highly heterogeneous nature of overburden units beneath the TSF and the potential for rapid contaminant transport along preferential groundwater flow paths that bypass interception wells (Appendix 2.2.4-C)". Without mitigation measures, the Proponent estimates that undiluted tailings pore water would reach Fish Lake tributaries by year 50 (Appendix 2.7.2.4 A-C, p.28).

There appears to be inconsistencies in the EIS regarding the proposed mitigation measures to control and capture seepage from the TSF. For example, the Proponent states (p. 599) that any water from the groundwater depressurization and seepage recovery wells would continue to be pumped back to the Main Embankment seepage ponds and the Main Embankment seepage pond water would continue to be pumped to the open pit until year 47, while elsewhere in the EIS (Appendix 2.7.2.4A-C, p.28). The same mitigation is proposed beyond year 47. Furthermore, the Proponent states (p.1391) that if deemed necessary groundwater recovery wells may be installed with water being pumped to the TSF. It is therefore unclear if the proposed mitigation measures are planned to operate in perpetuity.

No discussion is apparent in the EIS to evaluate the effectiveness of these measures to control potential effects on downstream water quality from seepage under temporary or early closure scenarios as required in the EIS Guidelines, Section 2.7.2.4.2.

Information requested:

Given the heterogeneous nature of overburden units beneath the TSF and the potential for contaminant transport along preferential groundwater flow paths that bypass interception wells the Panel requests that Taseko:

a. Provide the basis for estimates presented for the effectiveness of measures that would be implemented to control and collect seepage from the TSF.

b. Provide evidence through further analysis to support estimates of TSF seepage recovery efficiencies for the various mitigation measures that are proposed to protect water quality in Fish Lake.

c. Provide an assessment of the effectiveness of water management measures proposed for temporary or early closure scenarios to control potential effects on water quality in Fish Lake, Wasp Lake, and Big Onion Lake.

The Panel requests that Taseko:

d. Provide additional information regarding the proposed seepage collection and recycle ponds, the depressurization wells and the groundwater recovery wells. Taseko is requested to provide information at a level of detail that will facilitate a better understanding of the proposed measures, specifically:
    i. The number of groundwater recovery wells the Proponent anticipates installing;
    ii. An approximate indication of where the groundwater recovery wells would be installed;
    iii. Where the groundwater recovery wells would be finished (*e.g.* bedrock, the basalt, overlying unconsolidated overburden); and
    iv. If any groundwater recovery wells would be installed below the south embankment.

IR 15 – Water Quality

References:

EIS, Table 2.9-1 (Table of Commitments)
EIS, Table 2.7.2.4B-38 (Summary of water quality effects assessment for Fish Lake)
EIS, Table 2.7.2.4B-40 (Summary of water quality effects assessment in adjacent streams and rivers)

Related Comments:

CEAR # 276 (BC Ministry of Mines, Energy, and Natural Gas)

Rationale:

The Proponent concludes that the water quality for Fish Lake, Fish Lake tributaries and adjacent lakes and streams could be adversely affected (p. 793-795). The Proponent proposed to implement monitoring during operations to confirm the original predictions of adverse effects, and to implement active water treatment, if required. It is unclear, given the explanation, how the Proponent arrived at a conclusion of 'no significance' (p. 793-795).

It is also unclear if the water treatment facility is an integral part of the design for mine site water management or if it will be built only "if necessary" as an adaptive management option (p. 1514).

Information Requested:

The Panel requests that Taseko:

a. Confirm its commitment to build a water treatment facility.

b. Discuss how Taseko will determine when such treatment would be required for the treatment of TSF effluent and pit water prior to discharge to the receiving environment would be required.

c. Provide clarification on the pH and chemical composition of the effluent and pit water that would need to be treated prior to discharge to the receiving environment from both the tailings impoundment area and from Pit Lake.

d. Provide a discussion on how Taseko determined 'no significance' based on the fact there will be adverse environmental effects on water quality prior to applied mitigation.

e. Discuss and evaluate the effectiveness of the proposed mitigation measures.

IR 16 – Water Quality Model

References:

EIS Guidelines, Section 2.7.2.4.2
EIS, Section 2.7

Related Comments:

CEAR # 292 (Environment Canada)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The Proponent indicates (p.706) that: "Complete details of the stochastic water quality model used to predict water quality in Fish Lake, Fish Creek Reach 8, Fish Lake Tributary 1, TSF Lake, and the Pit Lake can be found in Appendix 2.7.2.1-I." It appears that this information is missing from the Appendix; only tables and figures are provided and those tables and figures are not fully detailed. Environment Canada indicated that there is insufficient information provided to assess whether the mitigation proposed will adequately address impacts on water quality to a reasonable level of confidence. No key describing the five graphed lines is presented in the Appendix, and while the EIS describes seven scenarios graphed, it is unclear which of the seven are actually presented.

Information Requested:

The Panel requests that Taseko:

a. Provide details of the stochastic water quality model used to predict water quality in Fish Lake, Fish Creek Reach 8, Fish Lake Tributary 1, TSF Lake, and the Pit Lake to enable a determination of whether the mitigation proposed will adequately address water quality issues to a reasonable level of confidence.

IR 17 – Pit Lake and Fish Habitat

References:

EIS Guidelines, Section 2.7.2.4.2
EIS, Section 2.7.2.4
EIS Appendix 2.7.2.1-I (Water Quality Prediction Results)

Related Comments:

CEAR # 277 (Fisheries and Ocean Canada)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In conducting the effects assessment for water quality and aquatic ecology, the EIS Guidelines state that the EIS shall include an evaluation of water quality in Pit Lake including consideration of the effects of pit depth in relation to mixing and anoxic conditions, release of metals from pit walls, and acid production, and to include an assessment of the degree of uncertainty associated with these predictions.

The EIS states that upon cessation of mining activities, the open pit will fill to its designed spill elevation over a period of approximately 28 years, releasing water into lower Fish Creek in year 48 (p. 138). The Proponent notes (p. 1465) that "there will be no capability for fishing in the Pit Lake predicted at this time" (*i.e.* post-closure).

Information Requested:

The Panel requests that the Taseko:

a. Provide an assessment of the suitability of Pit Lake for fish at post-closure including consideration of the effects of Pit Lake depth in relation to mixing and anoxic conditions and an assessment of the degree of uncertainty associated with these predictions.

b. Describe the ability for fish to access Fish Lake and the anticipated timelines for the use of Pit Lake as fish habitat, if appropriate.

IR 18 – Lake Productivity – Climate Change

References:

EIS Guidelines, Section 2.7.2.4
EIS Appendix 2.7.2.4A-A (Lake Level Fluctuation Predictions for Fish Lake)

Related Comments:

CEAR # 277 (Fisheries and Oceans Canada)
CEAR # 302 (Canadian Science Advisory Secretariat)
CEAR # 292 (Environment Canada)

Rationale:

Fisheries and Ocean Canada (DFO) has indicated that the future effects to water availability from climate change on the nutrient status, thermal regimes, and productivity of Fish Lake has not been adequately assessed in the climate change assessment. According to DFO, the climate change assessment has negated any impacts of climate change on the Fish Lake watershed in the past century by referencing temperature and precipitation time series from the meteorological records at Barkerville, British Columbia. DFO has questioned the representativeness of the Barkerville station data for characterizing the climatic conditions at Fish Lake, as it is located approximately 230 km northeast of Fish Lake and is within the Sub-Boreal Ecoprovince, a biogeoclimatically-distinct region from the Central Interior Ecoprovince, where Fish Lake is situated.

DFO also noted that the Proponent did not consider changes in seasonal temperature patterns in its analysis, despite the critical influence of changing seasonality on lake stratification and ice cover, which are key drivers of lake and fisheries productivity in northern-temperate lakes

Information Requested:

To gain a better understanding of the possible effects of climate change, the Panel requests that Taseko:

a) Provide additional information on the current and future impacts of climate change and increased seasonal variability on the hydrology and hydrochemistry of the Fish Lake watershed to fully assess the adequacy of the habitat and fish productivity and water quality and quantity models.

b) Provide a rationale why climate data from a closer meteorological station was not used (e.g. Nemiah Station).

In order to assess the effects on lake and fisheries productivity, the Panel requests that Taseko:

c) Consider changes in seasonal temperature patterns given the critical influence of changing seasonality on lake stratification and ice cover, key drivers of lake and fisheries productivity in northern-temperate lakes. Regional climate models should be incorporated into the estimations of water quantity and quality, and projected beyond the life of the mine.

IR 19 – Lake Productivity – Eutrophication

References:

EIS Guidelines, Section 2.7.2.5 and 2.7.2.4
EIS, Table 2.7.2.5-24 (Summary of Predicted Fish Lake TP Concentrations (µg/L) during all Project Phases)
EIS Appendix 2.7.2.4B-A (Effects of Reduced Inflow on Fish Lake Trophic Status Using the Mass Balance Approach)

Related comments:

CEAR # 277 (Fisheries and Oceans Canada)
CEAR # 302 (Canadian Science Advisory Secretariat)
CEAR # 292 (Environment Canada)
CEAR # 276 (BC Ministry of the Environment)

Rationale:

The EIS Guidelines state that the Proponent shall address issues such as habitat, nutrient and chemical cycles, food chains, productivity and climate information, to the extent that they are appropriate to understanding the effect of the Project on ecosystem health and integrity. Section 2.7.2.5 of the Guidelines includes evaluating changes in nutrients and dissolved oxygen as a result of the project effects for fish and fish habitat.

Taseko has characterized Fish Lake as a P-limited system in the EIS and fish biomass models have been applied that are based upon an underlying P limitation assumption. The MOE noted that the modeling of Fish Lake phosphorus does not include the hypolimnion. This cooler water, which is high in phosphorus, would be drawn from the lake and then reintroduced via the creeks to the epilimnion which could cause a shift in the trophic status if algal blooms result in anoxic conditions.

In addition, the characterization of Fish Lake as a P-limited system has been disputed by DFO Science Advisory Branch in the 2009-2010 review process and in the review of the draft EIS.

It is, therefore, unclear to the Panel if the current limnological characterization of Fish Lake and the predictions based upon chronic food web phosphorus limitation are accurate.

Information Requested:

In order for the Panel to better understand habitat and fisheries changes in Fish Lake associated with the proposed altered hydrology and associated variations in trophic status, the Panel requests that Taseko:

a. Discuss the validity of the models presented in the EIS.

b. Provide predictions of Total Nitrogen, particularly epilimnetic concentrations and the impacts on fish productivity and lake habitat using appropriate water quality

models that characterize and incorporate real food web limitation conditions in Fish Lake.

c. Discuss how the recirculation of Fish Lake will impact nitrogen cycling within the watershed and affect lake productivity.

In addition, the Panel requests that Taseko:

d. Discuss the impact the loss of wetland area immediately upstream of Fish Lake could have on the nutrient balance and other ecological characteristics of the lake and the lower watershed.

e. Provide more information on phosphorus loading in Fish Lake through the combined effect of direct deposition of phosphorus from dust emissions on the Upper Fish Creek / Fish Lake watershed and from recycling of water from the Fish Lake outlet to Upper Fish Creek.

IR 20 – Baseline Riparian Characteristics Calculations

References:

EIS, Sections 2.6.1.5 and 2.7.2.5

Related Comments:

CEAR #277 (Fisheries and Ocean Canada)

Rationale:

The EIS calculated the baseline riparian habitat by methods described in the Riparian Management Area Guidebook (MOF, 1995) and Riparian Areas Regulations (RAR, 2004) which estimated riparian habitat at approximately 1.92 M m^2, most of which (93%) is associated with streams (Table 2.6.1.5-2).

The EIS (p. 290) also states that within British Columbia, there are two pieces of legislation that address riparian buffers: the *Forest and Range Practices Act* (FRPA) and Riparian Areas Regulation (RAR) of the *Fish Protection Act*. Each piece of legislation has a different focus with FRPA governing the activities of forest and range licenses in British Columbia and setting the requirements harvesting, road building and grazing, while the RAR is focused on development near aquatic habitats.

Although the RAR is not routinely applied in the Cariboo Region, the Proponent considered it an appropriate means of determining riparian buffer widths for those reaches that otherwise would have no buffer under FRPA.

Table 2.7.2.5-6 (p. 844) illustrates the widths of the "zone of sensitivity" (ZOS) for large woody debris and bank stability as specified under the RAR of the *Fish Protection Act,* which range from 5 m to 30 m depending on the channel type and nature of woody debris.

As part of their submission during the 2009 panel hearings, Fisheries and Oceans Canada utilized a standard 30 m setback to calculate riparian loss effects.

Information Requested:

The Panel requests that Taseko:

a. Provide a rationale for why the standard 30 m setback used to calculate riparian loss effects has not been used in the assessment.

IR 21 – Little Fish Lake

References:

EIS Guidelines, Section 2.7.2.5
EIS, Section 1.2.3, 2.6.1.5, and 2.7.3.2
EIS Appendix 2.7.2.5-A (Fish and Fish Habitat Compensation Plan)

Related Comments:

CEAR # 277 (Fisheries and Oceans Canada)

Rationale:

Section 2.7.2.5 (p. 48) of the EIS Guidelines requires the Proponent to include an analysis on the productive capacity of aquatic resources and an assessment of all water bodies that may experience changes to Aboriginal, commercial and/or recreational fisheries resources.

In the EIS (p.10) the Proponent states that Little Fish Lake does not contain a biologically distinct body of fish, as it is not capable of sustaining fish throughout the winter, and instead fish move between that area and other habitat.

Section 2.6.1.5 illustrates that Little Fish Lake has 6.6 ha fish habitat, all of which is less than 6 m in depth (littoral habitat; maximum depth of 4.4 m). As a result, Little Fish Lake would potentially be subject to periodic winter kill. However, as an adult Rainbow Trout was captured in the lake, absolute winter kills (i.e. 100% mortality) are likely infrequent.

Fisheries and Oceans Canada (DFO) noted that the Fish Habitat Compensation Plan (Appendix 2.7.2.5-A, p. 1), states: “since Little Fish Lake does not support documented fishing effort, the Project will also not affect fishing opportunities in the watershed.” However the Panel notes that at the 2009 panel hearings, evidence of fishing in Little Fish Lake was presented.

Information Requested:

The Panel requests that Taseko:

a. Clarify the fisheries values and fish habitat in Little Fish Lake.

b. Assess the overall effects to the local fisheries resources and associated tributaries resulting from the loss of Little Fish Lake.

IR 22 – Fish Populations

References:

EIS Guidelines, Section 2.7.2.5
EIS, Section 2.6.1.5
EIS Appendix 2.7.2.5-A (Fish and Fish Habitat Compensation Plan)
EIS Appendix 2.7.2.5-B (MMER Schedule 2 Compensation Plan)

Related Comments:

CEAR # 277 (Fisheries and Oceans Canada)

Rationale:

In Section 2.7.2.5, the EIS Guidelines require the Proponent to include an analysis of the potential effects on immediate fish habitat of the Fish Creek watershed.

Table 2.6.1.5-11 (p. 302) illustrates that fish populations are estimated at approximately 85,000 for Fish Lake and 79,945 for associated tributaries and Little Fish Lake. In the Fish and Fish Habitat Compensation Plans (Appendix 2.7.2.5-A and 2.7.2.5-B) and elsewhere in the EIS, considerations regarding fish populations are limited to the population in Fish Lake.

Fisheries and Oceans Canada (DFO) have expressed concerns regarding the additional 79,945 fish in the associated tributaries and Little Fish Lake (p. 7). DFO has asked it be included in all habitat considerations, impact assessments and biomass calculations, population predictions, spawning requirement predictions, and compensation calculations.

Information Requested:

The Panel requests that Taseko:

a. Include the additional 79, 945 fish in the associated tributaries and Little Fish Lake in all habitat considerations, impact assessments and biomass calculations, population predictions, spawning requirement predictions, and compensation calculations.

IR 23 – Blasting Effects on Fish

References:

EIS, Section 2.7.2.5
EIS Appendix 2.6.1.4D-A (Baseline Groundwater Hydrology Assessment) (Figures 3.1, 7.4 and 8.1)

Rationale:

The Proponent has provided the distance between the maximum pit rim and Fish Lake inconsistently throughout the EIS. For example, some figures show the open pit at approximately 700 m from the outlet of Fish Lake, whereas other figures (Appendix 2.6.1.4D-A) shows the open pit at approximately 400 m from the lake. The EIS states that at its closest point, Fish Lake will be 373 metres from the edge of the pit (p.862), and 300 m from Fish Lake outlet (p.1177).

Noise impacts on potential fish receptors and potential mitigation measures must be assessed as per the EIS Guidelines. The EIS also illustrates that there will be no in stream fish habitat between the pit and the lake or downstream of the pit.

Information Requested:

To help the Panel better understand blasting and its effect on fish populations in Fish Lake, the Panel requests that Taseko provide:

a. A detailed map (1:10,000 scale or more detailed) that accurately portrays the location of the coffer dams, the distance between the coffer dams and Fish Lake and between the coffer dams and ultimate pit edge.

b. Information on the closest distance between pit blasting and fish habitat and what year in the mining cycle blasting near this location is expected to occur.

c. Information on any known spawning habitats that will be preserved between Fish Lake and the coffer dams.

d. A discussion on the potential effects of blasting on physiology and behavior patterns of the fish populations with particular reference to effects on spawning grounds habitat at the north end of Fish Lake in proximity to the pit and how Taseko proposes to deal with any possible effect of blasting on fish and fish larvae.

e. Information on the approximate blasting schedule including the expected frequency of blasting planned and number of blasts per week when the mine is operating normally.

f. Information on the expected maximum charge weight per delay and the number of holes in a typical blast, as well as the range of the blast size anticipated for the different geological domains in the pit.

g. Information on the design, construction and foundations of the coffer dams. Also provide a discussion of the effects that pit blasting will have on these impoundments over the life of the mine

IR 24 – Fish Lake Control Dams

References:

EIS Guidelines, Sections 2.2.3
EIS, Section 2.7.3.2
EIS Appendix 2.2.5-A (Conceptual Design of Fish Lake Control Dams)

Rationale:

The EIS Guidelines (p. 14) require the Proponent to describe components and activities of the Project that have changed due to the implementation of proposed commitments or recommendations made as part of the provincial and federal 2009/2010 review process. In addition the Proponent is to provide sufficient detail to be able to identify which components are likely to have a high failure consequence during construction, operation, closure and post-closure and where monitoring efforts will be required for the purposes of risk analysis.

With respect to Fish Lake Control Dam construction, Appendix 2.2.5-A states that:

- Site specific geotechnical data are not available for the Fish Lake Control Dams for this conceptual level of design. (p. 2)
- The expected site conditions have been developed based on drill hole and test pit data available within the general vicinity of the proposed Fish Lake Control Dams. (p. 2)
- Select fill embankments are to be comprised of a homogenous low permeability earth fill, making up the bulk of the embankment (p. 3)
- Prior to the detailed design and construction of the Fish Lake Control Dams, a site investigation and soils testing program will be required to validate conceptual design parameters.(p. 3)
- The Fish Lake Control Dams will be designed to accommodate an Inflow Design Flood of a 1:1,000 year 24-hour event, and an Earthquake Design Ground Motion event with a 1:1,000 year return period. (p. 5)
- Prior to the commencement of construction, a detailed design report and drawing package shall be commissioned by the Owner to include the technical design intent and associated construction drawings. (p.6)

While providing for isolated occurrences such as flood and earthquake noted in the 5th bullet above, there is no mention of the proximity of control dams to the pit, and the possible progressive impacts that a long term (17 years) blasting program may have on the integrity of the control dams, particularly given that much of the construction materials will include earth fill situated below the water surface, as illustrated in Figure 1.3 in Appendix 2.2.5-A.

Information Requested:

The Panel requests that Taseko:

a. Discuss what potential effects pit blasting may have on the Fish Lake control dams over the life of the mine and how the eventual design and construction will address these potential effects.

IR 25 – Lake Productivity- Mitigation Measures

References:

EIS, Section 2.6.1.5
EIS Appendix 2.7.2.4-B-A (Effects of Reduced Inflow on Fish Lake Trophic Status Using the Mass Balance Approach)
EIS Appendix 2.7.2.5-A (Fish and Fish Habitat Compensation Plan)
EIS Appendix 2.7.2.5-B (MMER Schedule 2 Compensation Plan)

Related Comments:

CEAR # 277 (Fisheries and Oceans Canada)
CEAR # 302 (Canadian Science Advisory Secretariat)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In the EIS (Appendix 2.7.2.4B-A, p. 19), the Proponent states that: "In general, the trophic status of Fish Lake will remain largely unchanged with the reduced flow and re-circulated flow, at least in the short term, from the current meso-trophic status".

Model analyses for the construction and operational phases of the Project, and the accompanying flow and loading regimes, show that the trophic status of Fish Lake could change from the current baseline meso-eutrophic condition to a more productive, eutrophic state during the life of mine and beyond.

The EIS further indicates that mitigation measures will be implemented for the protection of water quality to buffer any increases in lake phosphorus concentrations and impacts on Fish Lake productivity if considered necessary.

The Proponent refers to phosphorus levels that, once exceeded, would trigger active mitigation. Based upon a reported range in baseline P conditions (15-42 µg/L P), the Proponent has determined critical concentrations requiring mitigation to be 22-63 µg/L. The reported trigger level, however, is broad, and transcends multiple trophic state classifications as presented in the EIS (Appendix 2.7.2.5-B, p. 45). It is unclear what critical P concentration would precipitate mitigation actions, particularly as baseline conditions overlap with the predicted threshold range.

Given the Proponent's conclusion that a more productive Fish Lake will result in algal proliferation with potential negative implications for overall water quality and lake biodiversity, more detail on the evaluation of trophic status and the threshold for initiating mitigation efforts is needed to accurately evaluate the efficacy of the proposed approaches to protect Fish Lake and the effects of eutrophication.

Information Requested:

The Panel requests that Taseko:

a. Clarify what critical P concentration would precipitate mitigation actions, particularly as baseline conditions overlap with the predicted threshold range.

b. Clarify what fraction of P is being used in the analysis or if total phosphorus (TP) is the metric being considered.

c. Discuss the likelihood of Fish Lake experiencing acute seasonal N-limitation in the surface water and the decisions to monitor and implement mitigation measures.

d. Provide information regarding what other important lake water quality variables will be monitored to assess the need for mitigation against eutrophication (e.g. measures of nutrient limitation such as TN:TP, POC:PON).

e. Provide an assessment of potential impacts of changes in ecosystem productivity that could occur in conjunction with changes in hydrology, physio-chemical inputs (such as turbidity, nutrients, temperature, chlorophyll), as well as the synergistic impact of the dissolved metals likely to enter the system.

f. Provide a discussion on the potential effects of aeration as a mitigation measure on the lake system as well as the effectiveness of the mitigation measures proposed in the EIS, including any documented success of this mitigation measure.

g. Provide a clarification on the length of time that re-circulation of flows to Fish Lake would be required.

h. Provide a discussion of the temporal and spatial scale for monitoring and maintenance of flow augmentation in order to maintain spawning habitat in the tributaries and maintain Fish Lake water balance and trophic status.

The Panel also requests that Taseko:

i. Provide details of the adaptive management goal for Fish Lake along with adaptive management options available that would ensure Fish Lake and its tributaries remain a biologically functioning ecosystem. Taseko is requested to consider Fish Lake at the ecosystem level and not simply provide the details for each VEC separately. Specifically, discuss which elements of the Fish Lake ecosystem would be monitored and potentially require mitigation in the long-term.

j. Describe the thresholds that have been established for adaptive management of Fish Lake and provide a rationale on how these thresholds were determined.

IR 26 – Fish Habitat Compensation Plan

References:

EIS Guidelines, Sections 2.7.1.3 and 2.7.2.5
EIS Appendix 2.7.2.5-A (Fish and Fish Habitat Compensation Plan)
EIS Appendix 2.7.2.5-B (MMER Schedule 2 Compensation Plan)

Related comments:

CEAR # 276 (BC Environmental Assessment Office)
CEAR # 277 (Fisheries and Oceans Canada)

Rationale:

The EIS Guidelines state that to compensate for any loss or altered fish habitat, the Proponent shall present a compensation program that complies with Fisheries and Oceans Canada's (DFO) policies and any other Government of Canada policies related to fisheries and is based on technical, economic and biological feasibility. DFO has indicated that information is missing in the EIS to support technical and biological feasibility of the fish and fish habitat compensation program on whether the fish and fish habitat compensation plan has adequately offset the impacts to fish, fish habitat and fisheries.

The following issues are raised by DFO and the BC Ministry of the Environment:

- The Proponent states that there is further information required prior to moving forward with the Haines Creek Diversion and Berm Construction compensation option (Appendix 2.7.2.5-A, page 36); The Proponent lists the feasibility and baseline data collection that is outstanding for the Off-channel Rearing Habitat Compensation option (Appendix 2.7.2.5-B) including: determining land tenure, conducting groundwater assessments, topographic/LIDAR/geodetic surveys and an archaeological assessment.
- A biological rationale was not provided to restore fish passage off the mine site as a compensation option as requested by the EIS Guidelines.
- The two fish habitat compensation plans (*Fisheries Act* and *Metal Mines Effluent Regulations*) do not address the extent to which the compensation measures have effects on existing fish populations and fish habitat, recreation values *(e.g.,* recreational fishing), and the habitat of species at risk.
- The Proponent does not take into consideration the intrinsic value of existing fish habitat where compensation is being proposed.

Information Requested:

The Panel needs to better understand the effectiveness of these fish habitat mitigation measures, and thus requests that Taseko:

a. Provide additional information that relates to the technical feasibility (*e.g.* suitability of the location) and the biological feasibility of the fish and fish habitat compensation options.
b. When evaluating the existing fish habitat and values, provide a rationale for how the proposed measures offset fisheries values impacted by the Project should

be provided. The fish habitat quality, fish use, and fish density of the existing stream should be compared with the predicted outcome post improvements to support the habitat compensation rationale.

When determining compensation the Panel requests that Taseko:

c. Describe the net increase in the value of the habitat as a result of the enhancements proposed in existing habitat (e.g. barrier removals that provide fish access to existing habitats and alterations to existing floodplain habitats).

IR 27 – Disturbance of Contaminated Soils

References:

EIS Guidelines, Section 2.7.2.6
EIS, Sections 2.7.2.6 and 2.7.3.3
EIS, Table 2.7.2.6-13 (Recommended Soil Quality Guidelines for Metal Concentrations)
EIS, Table 2.7.3.3-6 (Changes in Soil Quality at Worst Case Site (North Shore of Fish Lake) as a Result of Project Activities to Assess Human Health Risk)

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)
CEAR # 264 (Ehrhart-English)

Rationale:

In Section 2.7.2.6 (p.50), the EIS Guidelines require the Proponent to include "details of soil sample analysis completed and the QA/QC program followed."

This element of the Guidelines is relevant to the assessment of the environmental effects of the project as it contributes to the determination of soil contamination and reclamation suitability, in addition to other potential effects on components of the environment.

In the EIS Section 2.7.2.6 (p. 940), using Table 2.7.2.6-9 the Proponent indicates that there are natural elevated metals in some of the topsoil and elevated metals and sodicity in overburden which may result in soil contamination.

The EIS provides data in Table 2.7.2.6-13 (p. 946) illustrating the recommended soil quality guidelines for metal concentrations using the standards prescribed in the Canadian Council of Ministers of the Environment (CCME) Guidelines and the British Columbia, Contaminated Sites Regulation (BC CSR) soil quality guidelines. Based on the results of the topsoil and soil samples taken in the mine footprint, Section 2.7.2.6 (p. 959) of the EIS states that arsenic, copper, nickel, selenium and zinc were found to exceed the recommended CCME guidelines.

Table 2.7.3.3-6 (p. 1198) of the EIS compares the baseline conditions and the predicted maximum increases in the concentrations of these metals over baseline around Fish Lake with the CCME Soil Quality Guidelines.

Table 2.7.3.3-6 illustrates that the predicted maximum increase in the concentrations of all metals due to project activities are minimal and are not expected to increase above baseline concentrations in the soils surrounding Fish Lake.

The table also demonstrates that arsenic concentrations at baseline (99.9 mg/kg) and the maximum predicted increase after 20 years (99.903 mg/kg) are respectively well above the recommended CCME Soil Quality Guidelines (12 mg/kg). The EIS states that a metal for which the baseline or background concentration exceeds its respective CCME guideline is not considered to be an environmental concern because the local

environment (human and ecological) is considered to have adapted to the elevated presence of the metal.

The Tsilhqot'in National Government expressed concerns and raised questions specific to the baseline presence of certain metals and contaminants of concern in soil concentrations which exceed the CCME Guidelines.

Despite the natural exceedances, the Panel would like to better understand the risks of exposure to arsenic.

Information Requested:

The Panel requests that Taseko:

a. Assess the potential effects and outcomes associated with disturbing the arsenic contaminated soils.

b. Determine whether the disturbance of the contaminated soils (arsenic) has a potential effect on the following environmental components:
   i. Air quality
   ii. Water quality
   iii. Fish and fish habitat
   iv. Soils
   v. Vegetation
   vi. Wildlife
   vii. Human health

c. Determine the significance of these effects and the mitigation measures to be implemented to reduce or minimize these effects.

d. Consider the recent studies referenced by the Tsilhqot'in National Government that suggest higher soil ingestion by Aboriginal people in the area and discuss how the inclusion of these studies would change the predictions of effects on human health.

IR 28 – Species at Risk

References:

EIS Guidelines, Sections 2.7.2.7 and 2.7.2.8
EIS, Section 2.7.2.8

Related Comments:

CEAR # 292 (Environment Canada)

Rationale:

In Sections 2.7.2.7 and 2.7.2.8, the EIS Guidelines state that in conducting its environmental assessment, the Proponent shall pay particular attention in its EIS to species at risk and their habitats. Section 2.7.2.8 also states that it will include the identification and assessment of any changes to Schedule 1 of the SARA and their habitats and COSEWIC- listed species since the 2009/2010 review and postings of any recovery strategies.

In the EIS (Table 2.7.2.8, p. 1059), Taseko states that additional species at risk that have been designated since the previous assessment "were previously identified at the provincial level as being species at risk and were addressed within the March 2009 EIS/Application."

This element of the Guidelines is relevant to the assessment of environmental effects of the Project because, although the Project would occur on provincial lands, the Panel needs to determine the effects on federally listed species as listed in subsections 79(1) and 79(2) of the *Species at Risk Act.*

Environment Canada stated that the status of several wildlife species has changed since the previous review and that it is not clear that these have been taken into account in the New Prosperity EIS. The list of wildlife species which has changed since the submission of the 2009 EIS, includes the following bird species:

- Lewis Woodpecker (*Melanerpes lewis*): up-listed from Special Concern to Threatened (Schedule 1)
- Barn Swallow (*Hirundo rustica*): Threatened (COSEWIC)
- Common Nighthawk (*Chordeiles minor*): Threatened (Schedule 1)
- Bobolink (*Dolichonyx oryzivorus*): Threatened (COSEWIC)
- Peregrine Falcon, spp anatum (*Falco peregrinus anatum*): down-listed from
- Threatened to Special Concern (Schedule 1)
- Olive-sided Flycatcher (*Contopus cooperi*): Threatened (Schedule 1)
- Rusty Blackbird (*Euphagus carolinus):* Special Concern (Schedule 1)
- Short-eared Owl (Asio flammeus): Special Concern (Schedule 1)

Information Requested:

In order to appropriately determine the significance of environmental effects on all species at risk (including those newly designated), the Panel requests that Taseko:

a. Provide a discussion on how disturbance of habitat for listed species under the *Species at Risk Act* was factored into the determination of significance.

b. Clarify how species at risk have been assessed and provide an explanation of how listed species were treated differently from non-listed species in the assessment. Include a discussion about how recent changes to the status of species potentially impacted by the Project have been factored into the environmental assessment, taking into account the available species management information.

c. Discuss any impact of new recovery strategies developed for American badger, Great Basin gopher snake, and the flammulated owl.

IR 29 – Loss of Old Forest along the Transmission Line and its Impacts on Species at Risk Habitat

References:

EIS Guidelines, Section 2.7.2.7
EIS, Section 2.6.1.8, and 2.7.2.7
2009 EIS, Sections 5.3.1.5 and 5.3.1.6; Sections 6.3.7, 6.3.18, 6.3.14, 6.3.15, and 6.3.16

Related comments:

CEAR # 292 (Environment Canada)

Rationale:

In Section 2.7.2.7 (p. 51), the EIS Guidelines require a "detailed assessment of baseline vegetative communities, species groups or ecosystems that have intrinsic ecological or social value, are representative of overall ecosystem condition and are sensitive to project activities", including old forests.

This element of the Guidelines is relevant to the assessment of the environmental effects of the project because old forests play an essential role in the overall ecosystem, providing food and habitat for several species, including species at risk.

Section 2.7.2.7 (p. 1003) of the EIS indicates that project effects to old forest in the transmission line and access road are predicted to be the same as in the 2009 EIS, specifically Sections 5.3.1.5 and 5.3.1.6 in Volume 5.

These aforementioned sections outline potential effects to wildlife species, which includes a detailed assessment on six key indicator species listed on Schedule 1 of the *Species at Risk Act*—American badger (endangered), yellow-breasted chat (special concern), long-billed curlew (special concern), Lewis's woodpecker (threatened), short-eared owl (special concern), and flammulated owl (special concern). Sections 5.3.1.5 and 5.3.1.6 contain analyses which are generally focused on potential effects to wildlife species associated with vegetation removal, ground disturbance, nesting habitat, pole placements and potential line strikes.

Environment Canada noted that the status of some species had changed since the previous review and also expressed concerns that an assessment along the transmission line and access road had not been completed for newly designated species at risk (see IR 28 for the species identified).

Information Requested:

With regards to the effects related to the loss of old forest along the transmission line, the Panel requests that Taseko:

a. Provide additional information associated with the effects of potential habitat loss of species at risk.

b. Assess and indicate the habitat suitability (residences) for species at risk.

c. Indicate which measures will be implemented specifically to mitigate or avoid effects of habitat loss of species at risk.

d. Indicate any relevant recovery strategies or action plans and how they will be respected and/or administered.

IR 30 – Wetlands Habitat for Species at Risk

References:

EIS Guidelines, Section 2.7.2.7
EIS, Section 2.7.2.7

Rationale:

In Section 2.7.2.7 (p. 51), the EIS Guidelines stipulate that the Proponent "assess the potential effects of the project on wetlands habitat and functions for wetlands in the project area with consideration of wildlife habitat for migratory birds, SARA-listed species, COSEWIC-listed species and climate."

In the EIS, Section 2.7.2.7 (p. 1015), the Proponent states that amphibian wetland habitat may be lost due to site clearing or lowering of the groundwater table.

The mitigation measures proposed to protect and conserve wetlands in close proximity to the mine footprint, as stated in Section 2.7.2.7 (p. 1041), include minimizing disturbance, avoiding vegetation loss, mitigating against invasive species and maintaining natural drainage patterns as per Commitment 12.2.

Information Requested:

With regards to the loss or reduction of amphibian wetlands habitat, the Panel requests that Taseko:

a. Provide an assessment of the effects on amphibians and their habitat, namely on the:
    i. Western Toad (*Anaxyrus boreas)- SARA* listed Schedule 1 species of special concern; and
    ii. Great Basin Spadefoot toad (*Spea intermontana*) – SARA listed Schedule 1 threatened species.

b. Indicate how the Legal Protection and Habitat Conservation and Identified Wildlife Provisions afforded to these species under the *Forest and Range Practices Act*, the *Wildlife Act* and the *Species at Risk Act* will be respected.

IR 31 – Wetlands Directly and Indirectly Affected by the Project

References:

EIS Guidelines, Section 2.7.2.7
EIS, Section 2.7.2.7

Related comments:

CEAR # 292 (Environment Canada)

Rationale:

In Section 2.7.2.7 (p. 51), the EIS Guidelines stipulate that the proponent "assess the potential effects of the Project on wetland habitat and functions for wetlands in the project area with consideration of hydrology, biochemical cycling, wildlife habitat for migratory birds, SARA-listed species, COSEWIC-listed species, and climate"

This element of the Guidelines is relevant to the assessment of the environmental effects of the project as the wetland functions assessment is important for establishing a baseline from which to assess any future restoration (habitat compensation) success.

Section 2.7.2.7 of EIS (p. 1006-1016) provides a general overview of wetlands functions; however, it does not provide any specific information regarding habitat functions of the Project-area wetlands. The EIS broadly describes the wetlands functions in the mine site using three categories:

- Hydrological
- Biogeochemical, and
- Habitat.

According to Environment Canada the lack of specific information regarding habitat function is of particular importance in areas where, for example, the Wetland Policy goal of no-net-loss applies. A more detailed assessment of impacts to wetland functions should be achievable given the availability of baseline field data.

Information Requested:

With regards to project specific wetlands habitat function assessment, the Panel requests that Taseko:

a. Provide a more detailed project-specific habitat functions assessment, along with a description of the methodology applied. The assessment should focus on wetlands directly and indirectly affected by the Project, making use of field data to identify, for migratory birds and species at risk, specific species' use (breeding, staging, moulting) of the different wetland types.

With regards to the wetlands hydrological function and the capacity of wetlands to store, moderate, and release water in a watershed, the Panel requests that Taseko:

b. Explain the project effects on wetlands hydrological functions within the Fish Lake ecosystem, including an assessment of the significance of the effects and proposed mitigation measures.

IR 32 – Habitat Compensation Plan

References:

EIS Guidelines, Section 2.7.1.3
EIS, Section 2.7

Related Comments:

CEAR # 292 (Environment Canada)

Rationale:

In Section 2.7.1.3 (p. 34), the EIS Guidelines require the Proponent to "include a draft habitat compensation plan which will serve to ensure long-term protection of wildlife habitats, functions, and population. The Proponent should consult with Environment Canada during the preparation of the habitat compensation plan."

In the EIS (Section 2.7, p. 1117), the Proponent states that "a draft *Habitat Compensation Reference Document* was developed in 2010" and indicates that it will be revisited in 2012. The Guidelines notes that Taseko should consult with the provincial and federal regulators and other interested parties on the further development of this document"

The Panel has determined that the framework document, while helpful, does not meet the expectations of the EIS Guidelines; it is a framework but not a draft plan. Environment Canada also noted that the EIS does not include a draft habitat compensation plan as required by the Guidelines and stated that in order to complete a habitat compensation plan, a wetland functions assessment that considers all Project-specific interactions would be required. The Panel has requested the wetland functions assessment in IR 31 of this document.

Information Requested:

The Panel requests that Taseko:

a. Provide a draft habitat compensation plan.

IR 33 – Baseline Data for the SARA Listed Rusty Cord Moss and the Alkaline Wing-nerved Moss

References:

EIS Guidelines, Section 2.7.2.7
EIS, Section 2.7.2.7
2009 EIS, Section 5.3.5.3

Related comments:

CEAR # 292 (Environment Canada)

Rationale:

In Section 2.7.2.7 (p. 51), the EIS Guidelines require a "detailed assessment of baseline vegetative communities, species groups or ecosystems that have intrinsic ecological or social value, are representative of overall ecosystem condition and are sensitive to project activities", including rare plants.

In the EIS, Section 2.7.2.7 (p. 1029), the Proponent indicates that there are no rare plants identified in, or potentially occurring in, the Project study area which are listed on Schedule 1 of the *Species at Risk Act* (SARA).

In its review of the EIS, Environment Canada indicated that the following two federally-listed species may have been missed:

- Rusty Cord moss (*Entosthodon rubiginosus*) - endangered
- Alkaline Wing-nerved moss (*Pterygoneurum kozlovii*) – threatened

Information Requested:

With regards to project activities that may have a potential effect on rare plants the Panel requests that Taseko:

a. Provide baseline information for the following SARA listed species:
   i. Rusty Cord moss (*Entosthodon rubiginosus*) - endangered
   ii. Alkaline Wing-nerved moss (Pterygoneurum kozlovii) – threatened

b. Provide an assessment of the habitat suitability (potential residences) for the above mentioned SARA listed species in the study area.

IR 34 – Mitigation Measures for Rare Plants and Ecological Communities of Conservation Concern

References:

EIS Guidelines, Section 2.7.2.7
EIS, Sections 2.7.2.7 and 2.8.3
2009 EIS, Section 5.3.5.3

Rationale:

In Section 2.7.2.7 (p.51) of the EIS Guidelines requires a "detailed assessment of baseline vegetative communities, species groups or ecosystems that have intrinsic ecological or social value, are representative of overall ecosystem condition and are sensitive to project activities". These should include:

- rare plants;
- ecological communities of conservation concern (e.g. Red and Blue listed ecological communities tracked by the BC Conservation Data Centre).

Additionally, the EIS Guidelines require the Proponent to document efforts to avoid sensitive communities and to develop mitigation strategies and measures to minimize or eliminate project effects on vegetation and ecosystem function.

In the EIS, Section 2.7.2.7 (p. 1029), the Proponent indicates that the Project has the potential to affect the following two rare plant species (Blue listed as per BC Conservation Data Centre):

- three occurrences of the birdfoot buttercup (Ranunculus pedatifidus ssp. affinis), and
- one occurrence of the blue moss (*Schistidium heterophyllum).*

The EIS, in Table 2.7.2.7-19 (p. 1033) lists the two ecological communities of conservation concern within mine Regional Study Area (RSA):

- Blue-listed - Hybrid white spruce/horsetails-western meadowrue, and
- Red-listed - Lodgepole pine/trapper's tea/crowberry (also within mine Local Study Area (LSA).

Additionally, Table 2.7.2.7-20 (p. 1035) identifies that the following two rare ecological communities are within the Transmission Line RSA:

- Blue Listed - Hybrid white spruce – Prickly rose – Palmate coltsfoot, and
- Red Listed – Baltic Rush – Common silverweed.

The vegetation mitigation measures listed in Section 2.7.2.7 (p. 1041) of the EIS, include specific procedures for the blue moss (*Schistidium heterophyllum)*, which involve movement of the boulders on which it grows. The EIS, however, does not include any specific mitigation measures pertaining to the other Blue and Red listed rare plants and ecological communities of conservation concern.

Taseko does indicate that it will: "Mitigate residual effects of mining with respect to wildlife habitat, at risk plant communities, and the habitat of species at risk through reclamation approach as described in the decommissioning plan (Commitment 13.5)".

The EIS Section 2.8.3 (p. 1498) also states that monitoring for shifts in vegetation communities and soil moisture will be conducted in new sensitive ecosystems.

Furthermore, in the 2009 EIS (Section 5.3.5.3, p. 5-181), Taseko states it will “wherever practicable, avoid loss of identified rare plant populations through environmentally sensitive construction practices”.

Information Requested:

With regards to the rare plant species and ecological communities of conservation concern identified in section 2.7.2.7 of the EIS, the Panel requests that Taseko:

a. Provide additional information on mitigation measures or strategies to avoid or minimize the effects on the:
   i. rare plant species, and
   ii. ecological communities of conservation concern

b. Describe the practicable, environmentally sensitive construction practices that will be adopted and implemented in order to avoid the loss of identified rare plant populations.

IR 35 – Comparison of the Project to Current Baseline Conditions

References:

EIS Guidelines, Section 2.3.6
EIS, Section 2.7.2.8

Rationale:

In Section 2.3.6 (p. 22), the EIS Guidelines state that the spatial boundaries "shall also indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented. The Proponent is not required to provide a comprehensive baseline description of the environment at each scale, but shall provide sufficient detail to address the relevant environmental effects of the Project and alternative means."

This element of the Guidelines is relevant to the assessment of environmental effects of the Project because the Panel is required to assess the environmental effects of the Project (using information provided in the previous assessment).

In the EIS (Table 2.7.2.8-5, p. 1073), Taseko identifies available habitat in the regional study area at maximum disturbance between the Prosperity Project and the New Prosperity Project for key indicators with TEM-based habitat models. Taseko has noted that this table identifies the amount of habitat available in the maximum disturbance area corrected for updated logging and pine beetle infestations.

Information Requested:

The Panel requests that Taseko:

a. Clarify that the 2009 wildlife local study area (LSA) has not changed with the new project design.

b. If the 2009 wildlife LSA has not changed with the new project design, provide:
   i. the amount of effective habitat in the LSA at maximum disturbance for all key indicators with TEM-based habitat models corrected for updated logging and pine beetle infestations
   ii. the amount of effective habitat in the LSA at current baseline for all key indicators with TEM-based habitat models corrected for updated logging and pine beetle infestations
   iii. a comparison of the amount of effective habitat between part i.. and part ii. described above

c. With respect to habitat availability between the New Prosperity Project and current baseline conditions adjusted for logging and mountain pine beetle infestation, Taseko is asked to provide:
   i. the amount of effective habitat in the regional study area (RSA) at baseline for all key indicators with TEM-based habitat models corrected for updated logging and pine beetle infestations
   ii. a comparison of the amount of effective habitat between available habitat in the RSA at maximum disturbance identified in table 2.7.2.8-5 and part i. described above
   iii. a discussion of the significance of the change in habitat availability between the baseline and the Project in the RSA for all key indicators with TEM-based habitat models.

IR 36 – Impacts to Wildlife in the Mine Development Area

References:

EIS, Section 2.7.5
EIS, Table 2.7.5-1 (Effects Tracking Table and Aboriginal Issues of Concern)
EIS, Table 2.7.5-2 (Comparison of 2009 and 2012 Mine Development Areas (MDA) for Trapping Areas)

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The EIS (p. 1277) states that "as a result of less hectares being proposed for disturbance in the New Prosperity project relative to the 2009 proposal, less impact on local wildlife populations is expected, which is relevant to those species historically targeted for trapping in the Fish Lake watershed… with the preservation of the Fish Lake area, trapping areas for all species assessed by Ehrhart-English are less impacted; with the exception of the cougar trapping…"

The EIS (Table 2.7.5-2, p. 1277) shows that, compared to the trapping area previously identified, the New Prosperity mine development area will impact anywhere from 4.4% to 100% of that area for certain species. It also shows that 5 of the 12 species listed: coyote, wolverine, fisher, bobcat, and cougar would have their affected area increased or remain the same compared to the 2009 mine development area.

The EIS (Table 2.7.5-1, p. 1234) states that "it is now possible for wildlife to physically move between the open pit and TSF, although sensory disturbance from adjacent operations and the TSF access road will still reduce wildlife use of this area."

The Tsilhqot'in National Government (p.51) state that "the company does not consider the impact of 'reduced wildlife use of this area' on Tsilhqot'in hunting and trapping activities, although it is clearly a critical factor." The Panel wishes to better understand the nature of impacts to wildlife used by First Nations and their significance.

Information Requested:

With regards to the impacts to wildlife in the mine development area, the Panel requests that Taseko:

a. Provide an assessment of the sensory disturbance that wildlife would experience in the mine development area along with the predicted impact on local abundance and availability for each species.

IR 37 – Wildlife Maximum Disturbance Area

References:

EIS Guidelines, Section 2.3.6
EIS, Sections 2.7; 2.7.2.7, and 2.7.2.8

Related Comments:

CEAR # 276 (BC Ministry of Forests, Lands and Natural Resources Operations)

Rationale:

In Section 2.3.6 (p. 22), the EIS Guidelines require the Proponent to define "new local and regional boundaries for those aspects of the Project that have changed or are new from the previous project proposal". The Guidelines state that these boundaries shall be based on the extent of the potential effects of the Project.

In the EIS (Section 2.7 p. 1067), the Proponent indicates that "the wildlife MDA is the same as the 2012 vegetation mine site local study area (LSA), except that the boundary has been modified to exclude Fish Lake and Wasp Lake which will not be physically disturbed."

The BC Ministry of Forestry, Lands and Natural Resources Operations noted that some potentially impacted wildlife habitat had been excluded from the study area. These areas include the habitat contiguous with the Fish Creek drainage between the north end of Fish Lake and the main embankment of the TSF as well as a portion of all of the Beece Creek drainage. The Proponent has also excluded the area between the TSF and the existing road on the east valley wall. It was also noted that Middle Fish Creek habitat would be impacted by the potential post-closure scenarios identified after the 2009 EIS was submitted.

The Ministry stated that wildlife using habitats of Beece Creek and its wetlands (including the margins of Wasp Lake) may be impacted and modeled changes to water quality as a result of planned discharge have not been discussed with respect to wildlife. It was also noted that the wildlife and vegetation habitats excluded from the analysis may be impacted by removing the seepage and stream drainage inputs as a result of constructing the ditch adjacent to the road.

Information Requested:

With regards to the assessment of effects of the Project on wildlife and their habitats, the Panel requests that Taseko:

a. Complete, for the areas discussed above, complete an assessment on wildlife and their habitats, with a focus on the possible impacts identified such as impacts from changes to water quality as a result of planned discharge and the removal of seepage and stream drainage inputs as a result of constructing the ditch adjacent to the road.

b. Complete an assessment on Middle Fish Creek habitat that may be impacted by the potential post-closure scenarios.

IR 38 – Mitigation for Effects on Grizzly Bear

References:

EIS Guidelines, Section 1.3.1
EIS, Sections 2.7.2.8 and 2.9

Related Comments:

CEAR # 294 (Fish Lake Alliance)
CEAR # 301 (Wilderness Committee)
CEAR # 257 (Denny Wagg)

Rationale:

In Section 1.3.1 (p. 7), the EIS Guidelines state that "in assessing the environmental effects of the Project, it is essential to explain how the Project addresses the findings of the previous panel regarding significant adverse environmental effects, in particular, effects on"... "cumulative effects on the Southern Chilcotin grizzly bear population...".

This element of the Guidelines is relevant to the assessment of environmental effects of the Project because the Proponent is required to address the significant environmental effects determined by the previous panel in its report.

In the EIS (Section 2.9, p. 1507), Taseko indicated that it is "committed to participating in the provincial government bear population monitoring program as well as work with the provincial government to increase public education and awareness around preserving grizzly bear populations". Taseko also notes (Section 2.7.2.8, p. 1091) that "with the implementation of proposed mitigation measures (e.g. minimization of clearing areas, reforestation of reclaimed areas, avoidance of non-pine forest types and wetlands), the residual loss of grizzly bear feeding habitat is predicted to be not significant".

The Panel notes that the current EIS does not explain how the mitigation measures proposed would help this population.

Information Requested:

With regards to proposed mitigation for grizzly bear, the Panel requests that Taseko:

a. Describe to what extent the proposed mitigation measures for grizzly bear will minimize the cumulative effects on the South Chilcotin Ranges Grizzly Bear Population Unit.

b. Clarify and/or describe Taseko's stated participation in provincial monitoring programs.

c. Describe any plans to compensate for grizzly bear core habitat loss or the feasibility of such compensation if not already planned

IR 39 – Bat Baseline Program

References:

EIS Guidelines, Section 2.7.2.8
2009 EIS, Sections 6.1.3.1, 6.2.2.2, and 6.2.3.4

Related Comments:

CEAR # 292 (Environment Canada)

Rationale:

In Section 2.7.2.8 (p. 52), the EIS Guidelines require the Proponent to "address wildlife issues for the areas potentially affected by the Project and will include, but not be limited to: bats…". In addition, the Guidelines state that the Proponent should pay particular attention to species at risk and their habitats.

In the 2009 EIS (Section 6.1.3.1, p. 6-20), the Proponent indicates that wildlife habitat features are considered in the assessment. The list of features includes bat hibernacula. The Proponent also states in Section 6.2.2.2 that bat surveys were completed in 2006, that no bats were captured in the mine site LSA and that eight species were confirmed in the transmission line LSA. It was noted that of the detected bats, only the fringed myotis is considered a conservation concern.

Environment Canada stated that other listed species of bat have been recorded in the Project area. These species include species listed as endangered (little brown bat and northern myotis) and species of special concern (Keens long-eared bat, spotted bat, and fringed bat). It was noted that although a bat survey was conducted, it is not clear that the bat baseline program included an assessment for hibernacula within the mine site LSA.

Information Requested:

With regards to the bat baseline program, the Panel requests that Taseko:

a. Provide a map showing mist net and anabat survey locations.

b. Confirm the provisions used to assess the presence of hibernacula.

IR 40 – Access to Fish Lake

References:

EIS Guidelines, Section 2.7.5
EIS, Section 2.7.5

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In Section 2.7.5 (p. 60), the EIS Guidelines require the Proponent to identify "any effects of alterations to access into the area on Aboriginal groups".

In the EIS (Section 2.7.5, p. 1278), the Proponent states that "access to Fish Lake will be provided during construction and operations, enabling opportunities for trapping in the immediate area of Fish Lake and the adjacent meadows during all phases of mining".

In Section 2.7.5 (p. 1291) of the EIS, the Proponent also mentions that "with access to Fish Lake preserved through all phases of mining, opportunities for gathering, teaching can be maintained; while the experience may be altered from the traditional gatherings previously conducted on site, there may be other opportunities provided for teaching and engaging youth in with regards to environmental management and monitoring".

The Tsilhqot'in National Government (p.48) noted that "the EIS provides only vague and incomplete information of the 'access' that the Proponent envisions for Aboriginal groups. For example, the EIS states there would be access for fishing and for 'small mammal trapping' but makes no mention of hunting in or around the Project area." The EIS (Section 2.7, p.1291) also states that "use of the area for recreation, teachings and gatherings will be modified with New Prosperity in light of adjacent mine operation activities and local effects on noise and aesthetic values."

The Panel believes that additional information on access will be necessary to assess the environmental effects of the Project on Aboriginal people.

Information Requested:

With regards to traditional gatherings previously conducted on site, the Panel requests that Taseko:

a. Provide a description and an assessment of the degree to which Aboriginal use of lands around Fish Lake and related experiences while doing so may be altered during all phases of the Project.

In order to understand how Taseko plans to provide access to Aboriginal groups and the public, the Panel requests that Taseko:

b. Describe where and how access would be provided to the public and Aboriginals during each phase of the Project. Specifically, what access

protocols would need to be followed or taken by users? Would overnight stays be permitted, and what safety risks would be assumed for visitors? Would users utilize a check point? How would users be contacted in the event of an emergency at the mine site? Identify any potential for access limitations, interruptions or closures- at all areas outside of the maximum disturbance area and at all times- for all traditional activities, including hunting, plant harvesting, fishing, and cultural gatherings.

c. Provide a map that illustrates the proposed access route for all users of Fish Lake.

IR 41 – Impacts on Resource Users Related to Hunting and Trapping

References:

EIS Guidelines, Section 2.7.3.1
EIS, Sections 2.7.5, 2.8.3, and 2.7.3.

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)
CEAR # 282 (Esketemc Nation)

Rationale:

The EIS Guidelines (Section 2.7.3.1, p. 55) state that "with respect to hunting, trapping and guiding, provide an assessment of the effects of all phases of the Project on these activities. In addition, the EIS will:

- assess the importance of the areas affected relative to overall area traplines and guiding territories and, to the extent possible, quantify the effect on guide outfitters and trappers;
- propose mitigation measures for diminished wildlife and wilderness values of the guide outfitter territories and registered traplines affected, where appropriate; and
- identify potential effects on recreational hunting opportunities in the immediate and adjacent areas".

This information is required by the Panel to properly assess the impacts to resource users, specifically those who engage in hunting, trapping, and guiding. The Tsilhqot'in National Government (p. 49) requests further delineation on "the anticipated or potential range of the 'no hunting zone' around the MDA". It also raises concerns about how the Health, Reclamation and Safety Code might impact access or use of the Fish Creek watershed. Additionally, the Esketemc Nation (p.11) raises concerns that while "the Proponent briefly notes that the Secwepemc Nation identified adverse impacts to rights to hunt... there is no further discussion of these".

The EIS (p.1386) notes that "there have been issues raised around the potential for the transmission line to further increase public access by linking open logged areas..." In Section 2.8.3 of the EIS (p. 1440), the Proponent, in discussing its proposed mitigation measures for increased human presence in the area and the effect on wildlife for hunting or trapping, states that "mitigation measures to be implemented during construction and operational phases will include the creation of policies to limit human activities in and around the project operations and camp areas as well as no-hunting and no-recreation policies for employees while on their work rotation". The Proponent also states in Section 2.7.3 of the EIS (p. 1160) that "a hunting ban for mine employees during the construction and operations phases of the mine would avoid any related increase in hunting pressure in the LSA".

The EIS also states, in Section 2.7.5 (p. 1309), that "the original panel noted that the established Tsilhqot'in rights to hunt and trap in the mine site area would be directly affected as they would no longer be able to exercise those rights until after the mine closed and the land was reclaimed. Even then, the restored landscape would be permanently altered. The Tsilhqot'in stated that they would likely not use the area to

exercise their Aboriginal rights due to the perception of contamination. The original panel determined that the effect of the Project on the established Tsilhqot'in Aboriginal rights would be irreversible. The original panel has also considered Taseko's proposed mitigation measures including the establishment of a no hunting zone for the Project area. The original panel stated that "this proposed mitigation would limit the ability of First Nations to practice their established Aboriginal right to hunt and trap in the Project area and may impact their Aboriginal rights to hunt and trap in other areas within the territory due to increased pressures on wildlife populations elsewhere".

Information Requested:

With regards to the no-hunting policy for workers on rotation, the Panel requests that Taseko:

a. Provide further detail on the ability of mine employees to hunt when not on rotation and if the no-hunting ban would still apply. Specifically, indicate whether opportunities to hunt in the mine development area would be available to mine employees when not on rotation or to other users. Also include further detail on the area around the mine development area that would be anticipated to be subjected to the no-hunting ban.

b. Assess the impact of a potential increase in hunting pressure in the immediate and adjacent areas of the mine development area on Aboriginal rights to hunt and trap in these areas if hunting is permitted by mine employees who are not on rotation or by other users.

Related to the affected area of the traplines and guiding territories, the Panel requests that Taseko:

c. Provide an assessment of the importance of the areas affected relative to the overall area in non-monetary terms and, to the extent possible, quantify the effect on guide outfitters and trappers. This should include impacts to lifestyle and culture.

d. Provide details on how the Health, Reclamation and Safety Code will be used to provide access and use. Explain what specific conditions, restrictions, or limitations could be expected by users.

e. Clarify how the policy will be enforced. Provide any research results that indicate the success of this approach as used elsewhere.

With regards to the proposed mitigation measures for the potential increase in access to the mine area and along the transmission line, the Panel requests that Taseko:

f. Provide additional information and/or examples from the field or literature where these mitigation measures have been used.

IR 42 – Health Effects in the Local Study Area

References:

EIS Guidelines, Sections 2.7.3.3 and 2.7.2.3
EIS, Section 2.7.3.3
2009 EIS, Section 6.3.1.2

Related Comments:

CEAR # 265 (Health Canada)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In Section 2.7.3.3, the EIS Guidelines require the Proponent to determine the effect of the Project on air quality around the mine site for all receptors, including worker camps and in the broader study area where human receptors may be present. It also directs the Proponent to use appropriate Air Quality Dispersion Models to assess the potential effects on human health at sensitive and other receptors.

In the 2009 EIS (Section 6.3.1.2, p. 6-19), Taseko states that the community of Nemaiah was assessed for air quality impacts because it was the closest receptor to the Project. No other human receptors were explicitly identified.

Health Canada Guidance on *Human Health Preliminary Quantitative Risk Assessments* states that exposure calculations should be performed for all potential human receptors and receptor age groups for which exposure is anticipated. Health Canada stated that the EIS does not contain information on the potential human receptors at Fish Lake, their proximity to all Project activities or the use of the road between the mine site and the TSF. Tsilhqot'in National Government also requested that the Proponent re-assess air quality impacts from all phases of the Project using new 'key receptors' to include human and other biological receptors.

The EIS Guidelines (Section 2.7.3.3, p. 57) instruct the Proponent to provide an evaluation of the severity of predicted changes in noise levels and how they may affect human health including for users of Fish Lake. It is stated that the study must include impacts of blasting activity on human receptors. In addition, the Guidelines state that noise impacts on Aboriginal cultural and spiritual activities in the Project area and Fish Lake in particular shall be identified and assessed.

With respect to the noise assessment, Taseko used the Health Canada guidelines for *Evaluating Human Health Impacts in Environmental Assessment: Noise (April 2011) and* determined no significant overall effects. The determination was prepared under the assumption that effects need be assessed during the daytime period only. This assumption excludes persons camping overnight, possibly for extended periods of time. The Tsilhqot'in National Government (p. 26) state that "it is well established that Teztan Biny and environs are used by the Tsilhqot'in (and others) for overnight occupation."

The Panel would like to better understand the potential health effects that may result from the Project in order to determine the significance of effects on human health to

human receptors in the area of the Project. As one of the key objectives in maintaining Fish Lake is to preserve the lake for existing recreational pursuits, including fishing, the effects of short, intense noise emissions such as blasting and its effect on Fish Lake (day and overnight users) users and nearby backcountry users should also be assessed.

Information Requested:

With regards to the conduct of a human health and ecological risk assessment, the Panel requests that Taseko:

a. Provide a map showing all sensitive human receptors in the local and regional study areas and the distance to these receptors from specific project activities.

b. Assess the health effects of the Project on workers who would reside in the project area; on residents of Taseko Lake Lodge; on transient people visiting the project area for recreational purposes (short term and longer term); and on Aboriginal people who would relate to a subsistence lifestyle or who are conducting cultural and spiritual activities at Fish Lake.

With respect to the noise impact assessment conducted, the Panel requests that Taseko:

c. Describe how a change in the key assumption that “occupied periods” including continuous (daytime/night-time) and extended periods, rather than daytime periods only, would affect modeling results.

d. Assess noise impacts for potential users of the Project area identified in part b. above. The noise impacts assessment should include estimates for blasting activity frequency, blasting activity intensity and a consideration of blasting effects.

IR 43 – Country Foods

References:

EIS Guidelines, Section 2.7.3.3;
EIS, Section 2.7.3.3

Related Comments:

CEAR # 265 (Health Canada)

Rationale:

In Section 2.7.3.3, the EIS Guidelines require the Proponent to provide a quantification of the human health risk from contaminated country foods.

The Proponent indicates in the EIS (Section 2.7.3.3, p. 1209) that "the [hazard quotients] calculated for toddler and adult receptors are shown in Table 2.7.3.3-12." For adults, the indicated toxicity reference value in the table is 0.1 mg/kg-day for all metals that were assessed.

Health Canada acknowledged the models used by the Proponent do predict metal deposition in soils and assess risk from consumption of country foods; however, it noted that the predicted soil concentration model used needs to be both conservative and appropriate. In order to be so, the hazard quotients should be derived as the ratio of the estimated exposure to the tolerable daily intake for each contaminant of potential concern and then summed to determine total dietary exposure. Hazard quotients used in the Human Health and Ecological Risk Assessment done by the Proponent are not calculated based on total dietary exposure.

Health Canada also notes that no reference is provided for the 0.1 mg/kg/d used for adults for all contaminants of potential concern. Health Canada does not consider this an appropriate method to assess human health risks from country food consumption and suggests specific toxicity reference values be employed, when available, for the characterization of potential health risks.

Information Requested:

With regards to the assessment of country food consumption in the Human Health and Ecological Risk Assessment, the Panel requests that Taseko:

a. Reassess the potential risks to human health from the consumption of country foods using hazard quotients that are calculated based on total dietary exposure to contaminants of potential concern.

b. Reassess country foods contaminant exposure using chemical-specific toxicity reference values.

IR 44 – Assumptions of the Human Health Risk Assessment

References:

EIS Guidelines, Section 2.7.3.3
EIS, Section 2.7.3.3
2009 EIS, Section 6.3.1.6

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In Section 2.7.3.3, the EIS Guidelines state that the Proponent will include both quantitative and qualitative risk assessment methods to assess the Project impacts on the health of receptors such as recreational users, local residents and communities, worker camps, users of Fish Lake, and users of the area for the consumption of country foods (including Aboriginal people as a sub-population).

The Proponent relies on the human health and ecological risk assessment in the 2009 EIS for a description of the effects of the Project on human health. In the EIS (Section 2.7.3.3, p. 806), Taseko provides an update to the assessment and identifies several assumptions used in conducting its human health and ecological risk assessment. One such assumption is that the consumption of fish from Fish Lake would occur 60 days per year. Another assumption is that the Canadian Council for Ministers of the Environment (CCME) Guidelines for soil ingestion are the most appropriate for this type of assessment.

The Tsilhqot'in National Government (p. 46) stated that studies have shown that the traditional foods consumption rate of the Xeni Gwet'in is much higher than the assumptions made in the 2009 EIS. It also noted that recent scientific investigations have concluded that the CCME Guidelines for soil ingestion do not accurately estimate intake levels of soil by those who consume traditional foods and in this regard is not precautionary. In addition, the Tsilhqot'in National Government pointed out several gaps in the analysis including an assessment of dust generated from all sources of the Project, the effects of exposure to particles finer than soil, and increased level of exposure due to the use of Fish Lake.

Information Requested:

With regards to the Human Health and Ecological Risk Assessment, the Panel requests that Taseko:

a. Identify the assumptions made in the risk assessment calculations including food consumption rates, soil ingestion rates, transport of contaminants, soil particle size and pathways of exposure to sensitive receptors and discuss how these assumptions represent conservatism.

b. Describe the process by which assumptions were validated.

c. Describe any consultation activities that were undertaken with land users and other stakeholders to justify assumptions associated with potential exposure to contaminants.

IR 45 – Soil Metal Concentrations Modelling

References:

EIS Guidelines, Section 2.7.3.3;
EIS, Section 2.7.3.3
2009 EIS, Section 6.3.1.6;

Related Comments:

CEAR # 265 (Health Canada)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In Section 2.7.3.3, the EIS Guidelines require the Proponent to conduct a human health risk assessment and include consideration of the potential effects of all project phases (*i.e.* construction, operation, closure and post-closure).

In the 2009 EIS (Section 6.3.1.6, p. 6-29), the Proponent predicted that soil chemistry would not be altered from baseline conditions through construction. However, it stated that large increases in soil metals concentration were predicted through use of the "2.5 micron model" due to dust deposition, in particular copper concentrations would exceed the agricultural guidelines prior to the end of operation. Table 6-10 on page 6-30 noted that copper would increase from 43 mg/kg in the baseline to 287 mg/kg after 19 years of operation and references the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines to determine exceedances in this scenario. The 2012 EIS used the "TSP model" and does not predict the same increase. Taseko re-evaluates copper at a maximum increase of 0.65% above baseline for the New Prosperity Project (Table 2.7.3.3-6, page 1198).Taseko notes that the difference between the two assessments was due to the model chosen.

Health Canada noted that considering the sizable difference in predictions of the models, a discussion of the limitations of the models would be useful. Because these modeled results were used in the risk assessment for assessing the risk from consumption of country foods, Health Canada states that it is important to support confidence in the modeled results and to ensure that the predicted soil concentration model used is conservative and appropriate. The Panel would like to understand these differences better.

The Tsilhqot'in National Government stated that recent scientific investigations undertaking with Xeni Gwet'in have stated that the CCME Guidelines for soil ingestion do not accurately estimate intake levels of soil by those who consume traditional foods and in this regard is not precautionary.

Information Requested:

With regards to the atmospheric modelling in the 2009 EIS and the EIS, the Panel requests that Taseko:

a. Provide a discussion on the applicability of the “2.5 micron model” in the current assessment versus the “TSP model” in the previous assessment.

b. Provide a discussion of the limitations of the models in this context

c. Provide a rationale as to why the CCME Guidelines are appropriate for modeling contaminant intake by the sensitive receptors as well as any uncertainties with the use of those Guidelines.

IR 46 – Exclusion of Polycyclic Aromatic Hydrocarbons

References:

EIS Guidelines, Section 2.7.3.3
EIS, Section 2.7.3.3
2009 EIS, Section 6.3.1.6

Related Comments:

CEAR # 265 (Health Canada)

Rationale:

In Section 2.7.3.3, the EIS Guidelines require the Proponent to conduct a human health risk assessment and include consideration of the potential effects for all project phases (*i.e.* construction, operation, closure and post-closure).

In the 2009 EIS (Section 2.1.3, p.2-12), the Proponent identifies measurable variables for the air quality assessment which are subsequently used in predicting project effects on human health. Measurable variables include: respirable particulate matter ($PM_{2.5}$); inhalable particulate matter (PM_{10}), total suspended particulates (TSP); dustfall; oxides of nitrogen (NOx); carbon monoxide (CO); sulphur dioxide (SO_2); lead (Pb); carbon dioxide (CO_2); methane (CH_4); and nitrous oxide (N_2O).

Health Canada noted that the human health impact assessment did not provide information on the potential for the generation of potentially carcinogenic polycyclic aromatic hydrocarbons from heavy equipment activities and associated effects on human health. It was noted that this exclusion could under-estimate cancer causing effects of Project activities.

Information Requested:

With regards to the air quality assessment, the Panel requests that Taseko:

a. Provide an assessment on potentially carcinogenic polycyclic (polynuclear) aromatic hydrocarbons from heavy equipment operations or a rationale as to why these were excluded from the analysis.

b. Provide an assessment of the effects of exposure to potentially carcinogenic polycyclic (polynuclear) aromatic hydrocarbons on the health of identified sensitive receptors.

IR 47 – Traditional Use

References:

EIS Guidelines, Section 2.7.5
EIS, Section 2.8
EIS, Table 2.7.5-1 (Effects Tracking Table and Aboriginal Issues of Concern)

Related Comments:

CEAR # 264 (Ehrhart-English)
CEAR # 289 (Roger William)
CEAR # 290 (Tsilhqot'in National Government)

Rationale:

The EIS Guidelines (p. 59) states that "the Proponent shall provide an assessment of the potential environmental effects on the current use of lands and resources for traditional purposes by Aboriginal persons, and associated impacts to potential or established Aboriginal rights or title and, where appropriate, other issues of concern to Aboriginal groups." The EIS Guidelines (p. 60) also require that the Proponent identify "measures to avoid, mitigate, or accommodate effects on the current use of lands and resources for traditional purposes by Aboriginal peoples".

The Tsilhqot'in National Government, Roger William, Cindy Ehrhart-English, and others emphasize that traditional uses in the maximum disturbance area have been practiced extensively in the past and continue at present.

The EIS (p.1291) states that "use of the area for recreation, teachings and gatherings will be modified with New Prosperity in light of adjacent mine operation activities and local effects on noise and aesthetic values." The EIS (p.1465) also states that "trapping opportunities for beaver, muskrat, and river otter will be lost from the wetland areas under the TSF, which will not be reclaimed to suitable wetland and marsh habitats for these species… there will also be no capability for fishing in the Pit Lake predicted at this time." The mitigation measures provided in the EIS (Table 2.7.5-1, p. 1263) include that "Taseko remains open to discussing further mitigation measures that may resolve outstanding issues for Aboriginal people, such as: building new or improving existing access to harvesting and hunting areas within the territory to compensate for the loss of opportunity in the Fish Lake watershed during mining."

Information Requested:

The Panel requests that Taseko:

a. Provide additional information on the effects of noise, light, and dust from all sources on the current use of lands and resources for traditional purposes by Aboriginal peoples near Fish Lake.

b. Provide support or example(s) of the proposed mitigation measures being effective.

IR 48 – Accidents and Malfunctions

References:

EIS Guidelines, Section 2.7.6
EIS, Section 2.7.6
2009 EIS, Section 6.2.7

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)
CEAR # 257 (Denny Wagg)
CEAR # 295 (MiningWatch Canada)
CEAR # 276 (BC Environmental Assessment Office)

Rationale:

In the EIS (Section 2.7.6, p. 1325), the Proponent indicates that "the EIS describes potential accidents and malfunctions that might occur during the life of the Project. The primary objectives of this section are to determine the potential range of environmental effects that might occur in the unlikely event of an accident or malfunction."

In Section 2.7.6 (p. 60), the EIS Guidelines require the Proponent to "identify the probability of potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, potential consequences (including the potential environmental effects), the worst case scenarios and impacts". The EIS has examined several lower risk scenarios, but fails to examine some notable worst case scenarios. The EIS Guidelines (p.60) also state that the accidents and malfunctions assessment EIS shall include an "evaluation of worst case scenarios (e.g. tailings impoundment structural failure, accidental explosion, earthquake, or landslide into the tailings impoundment)".

In the 2009 EIS (Section 6.2.7, p. 6-15), Taseko identified several failures that had a higher likelihood of occurrence relative to the previous option for the Prosperity Project. These failures are: seepage through foundations; embankment instability; insufficient PAG waste rock submergence; excessive sedimentation in the TSF during construction and operation; release of ARD from PAG outside the TSF; instability; excessive sedimentation in waste rock storage areas (construction and operation); water pipeline rupture; water pump station failure; tailings pipeline rupture; tailings distribution failure; and excessive make-up water requirements.

Several participants stated concerns with dam failure. The BC Environmental Assessment Office (p.6) mentions that while the "failure of the tailings embankment dams is considered remote based on good engineering design, construction practices and monitoring, the consequence of a failure would be *Very High.* Worst case scenarios need to be identified for accidents and malfunctions in the EIS. Thus embankment failure needs to be fully considered and discussed..." The Tsilhqot'in National Government (p.64) state that "embankment failure should be described in a 'worst case' scenario in sufficient detail that downstream impacts and risks are properly understood." In addition, Denny Wagg (p.2) states that he is "very concerned about the impact on Fish Lake and downstream salmon habitat in the event of a tailings dam failure… if that embankment

gave way in the event of an earthquake etc. it would result in a catastrophic pollution event that would have a significant adverse environmental impact on fish and fish habitat in Fish Lake".

MiningWatch Canada (p.10) comments that the "likely scenarios should include more than a general statement of probability but an analysis of the frequency of these types of events and or the conditions that contribute to these events".

Information Requested:

With regards to failures identified above (seepage through foundations; embankment instability; insufficient PAG waste rock submergence; excessive sedimentation in the TSF during construction and operation; release of ARD from PAG outside the TSF; instability; excessive sedimentation in waste rock storage areas (construction and operation); water pipeline rupture; water pump station failure; tailings pipeline rupture; tailings distribution failure; and excessive make-up water requirements, tailings embankment failure, abrupt escape of water into the open pit from Fish Lake, and failure of the water control dams), the Panel requests that Taseko:

a. Provide a risk assessment in light of changes made to the project design in the New Prosperity Project

b. Conduct an assessment of these failures as potential accidents or malfunctions. In the response, include:
   i. an identification of the probability of these failures;
   ii. a description of the sensitivity of receptors in the project area to these failures;
   iii. an explanation of the magnitude of these failures, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the malfunction and/or accidental event;
   iv. an identification of the capabilities, resources and equipment available to safely respond to these failures;
   v. a description of the planned response to these failures;
   vi. a description of the environmental effects, contingency plans, clean-up or restoration work that would be required should these failures occur; and
   vii. an identification of the notification and rescue communication plan and process to be used if it were required.

IR 49 – Adaptive management

References:

EIS Guidelines, Section 2.8.3
EIS, Section 2.8.3

Related Comments:

CEAR # 290 (Tsilhqot'in National Government)

Rationale:

In Section 2.8.3 (p. 65), the EIS Guidelines state that "the EIS shall outline a follow-up and effects monitoring program, designed to verify the accuracy of the conclusions of the environmental assessment and to determine the effectiveness of the measures implemented to mitigate the adverse environmental effects of the Project. The follow-up and effects monitoring program will also support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects."

In the EIS (Section 2.8.3, p. 754), Taseko notes that "adaptive management will be adopted for the Project and is considered a useful and integral component of managing uncertainty while identifying and implementing corrective and mitigation measures." The Panel is of the opinion that an adaptive management approach should include the identification of thresholds and then the implementation of corresponding actions. In order for adaptive management to be an effective tool, thresholds, such as metal concentrations in soil, water seepage rates, etc., should be determined in advance.

The Tsilhqot'in National Government (p.68) considers that "the EIS treatment of adaptive management is theoretical, trivially considered, and simply unacceptable."

This element of the Guidelines is relevant to the assessment of environmental effects of the Project because the Panel is required to determine the significance of effects after mitigation measures are applied. The Panel requires more information on the Proponent's plans for adaptive management to determine the significance of effects after the proposed adaptive mitigation.

Information Requested:

With regards to VECs where adaptive management has been proposed, the Panel requests that Taseko:

a. Describe what mitigation measures are feasible and available to Taseko as part of adaptive management processes.

b. Provide example(s) of where these measures have been successful in the past.

IR 50 – Surface Water Management and Sediment Control

References:

EIS Guidelines, Section 2.8.1
EIS, Section 4.8
EIS Appendix 2.2.4-B (Waste Dumps and Stockpiles – Preliminary Design)

Related Comments:

CEAR # 292 (Environment Canada)

Rationale:

In the EIS (Appendix 2.2.4-B, p.16) the Proponent states that: "The collection of seepage from the toe of the waste dumps will be required. Contact water from seepage and runoff from the waste piles will be directed to water collection ponds for transfer into the TSF. Surface runoff from the flat dump crest will be permitted to infiltrate the waste piles and naturally drain down gradient into the water collection ponds."

The EIS (Appendix 2.2.4-B, p.16) also states that: "The water collection ponds for the waste rock storage area will be developed at the lowest point of the waste rock storage area. Diversion ditches will direct water to the water collection ponds, the water collected in the water collection ponds will be used in the mill circuit or pumped into the TSF, as required."

In Environments Canada's view, the Proponent has not provided enough detail on these proposed measures to control and collect seepage and surface drainage from the waste rock storage area and the low grade ore stockpile, nor has the Proponent provided sufficient information on the anticipated effectiveness of these measures.

Information Requested:

Given the close proximity of the proposed low grade ore stockpile to Fish Lake the Panel requests that Taseko:

a. Describe at a conceptual level of detail along with a quantitative assessment of the anticipated effectiveness of the measures proposed to control and collect surface drainage and seepage from the non-PAG waste rock, and the low-grade ore stockpile.

The Panel also requests that Taseko:

b. Provide the design parameters for the ditches and associated collection ponds, including:
    i. in terms of the maximum precipitation event that they would be designed for and the amount of seepage they would be designed to collect;
    ii. the depth that the ditches need to be based on these design parameters; and
    iii. how far the ditches would be from the toes of the stockpiles, and how far down slope would they be located.