Appendix 3-H

Government Agencies Issues Tracking Table

ERM

Table 3-H1. Government Agencies Issues Tracking Table (until May 16, 2014)

Issue	Pretivm Response	Issue Raised By
Human Health- Consider a food web study in Nass area to ensure impacts are captured.	Country foods are included in the human health impact assessment both for baseline conditions (Appendix 21-A of Chapter 21) and for predicted Project-related potential effects (Chapter 21). The approach for the assessment of human health due to consumption of country foods was based on Health Canada guidelines for assessing food issues in environmental impact assessment (Health Canada 2010a, 2010c, 2010b, 2010d). The country foods baseline study area was chosen based on the proposed infrastructure footprint, Project development, physical barriers, and watershed boundaries (see Appendix 21-A, Section 5). The country foods baseline LSA was adopted as the country foods effects assessment LSA. For further information on the country foods baseline study area, please refer to Appendix 21-A, Section 5. The Nass Area is to the southeast of the country foods LSA. The extent of any potential Project related changes in the quality of country foods are expected to remain within the country foods LSA. Therefore no Project related human health effects due to consumption of country foods from the Nass area are expected.	HC
Hydrogeology- Results for the mine site area to be highlighted in reporting on model calibration results.	The Numerical Hydrogeologic Model report (Appendix 9-B) documenting the development and calibration of a three-dimensional numerical groundwater flow model for the project study area, and the results of predictive simulations using that model, includes a discussion of the predicted effects of the project on groundwater elevations (i.e., on the water table) in the study area.	BC MOE
Hydrology- Consider clean water diversions for creeks flowing into Brucejack Lake.	Clean water diversions will be used to divert non-contact water around much of the mine site, including the areas of earthworks in material that is potentially acid generating. These diversions are described in section 5.10 of the Application/EIS (Chapter 5, Project Description). Clean water diversions for inflows to Brucejack Lake, in order to reduce flow through the lake, are not favoured due to operational difficulty in maintaining the channels during the winter when substantial snow accumulation and avalanches would frequently block any channel. Furthermore, based on current water quality modelling, it is expected that water quality discharge criteria can be met in the discharge from Brucejack Lake under existing hydrological regime of the lake (Chapter 13 of the Application/EIS).	EC
Hydrology- Consider how the 100-year wet and dry datasets compare to the downscaled climate models as a check and include a qualitative discussion on the influence of climate change on stream.	The sensitivity analysis for the water balance model includes an evaluation of the 100-year wet and dry datasets (annual precipitation) and also downscaled climate models for future conditions. These results will be compared and a qualitative discussion will be provided with respect to the influence on climate change on stream flows. Consideration of climate change scenarios in the water balance model is presented in Appendix 5-C.	BC MOE

Table 3-H1. Government Agencies Issues Tracking Table (until May 16, 2014)

Issue	Pretivm Response	Issue Raised By
Hydrology- Consider relocating current snow course near the BJP met station to a site further west and further into the available trees.	Pretivm will be conducting snow surveys during the 2014 winter and will review alternate sites. For long-term monitoring, consideration will also be towards a site that can been readily accessed without requiring helicopter support. A location further west and at a lower elevation may prove to be inaccessible without helicopter support.	BC MOE
Hydrology- For each sensitivity analysis, provide discussion and/or plots on the expected change in flows relative to the base case.	All sensitivity results will be compared to the base case in both tabular and figure format where warranted. A Surface Water Hydrology Predictive Study is included in Chapter 10 of the Application/EIS.	BC MOE
Hydrology- Importance of investigating the hydrological regime of the Brucejack Lake system, with climate change and glacial melt in mind.	Glacial melt is considered in the water balance model as stream flow and climate data suggest that late summer flows are augmented by an additional source (i.e. glacial melt). Glacial melt is considered as a monthly distribution, rather than a temperature index. With respect to climate change, it is expected that very significant glacial ablation will occur during the next century due to a warming climate. Thus glacial melt may no longer be a source of runoff in the future. Consideration of climate change scenarios in the water balance model is presented in Appendix 5-C.	EC
Hydrology- Include input from the East Lake catchment for a one month period - suggests May and June.	The water balance model has been set-up to allow for East Lake to drain into Brucejack Lake for either May or June in any given year of operations. A Surface Water Hydrology Predictive Study is included in Chapter 10 of the Application/EIS.	BC MOE
Hydrology- Present sensitivity results such that it is apparent which parameters the model is most sensitive to.	Sensitivity results will be presented such that it is apparent which parameters the model is most sensitive to. From a hydrologic perspective, obvious sensitive parameters include precipitation and drainage of East Lake. A Surface Water Hydrology Predictive Study is included in Chapter 10 of the Application/EIS.	BC MOE
Hydrology- Report should clearly present any methods used to develop input parameters for the model.	The BGC report on the water balance model includes a discussion of the methodology, calibration and inputs to the model. A description of the water balance model is presented in Appendix 5-C.	BC MOE
Hydrology- Request documentation on how upper and lower bound are selected.	The BGC report on the water balance model includes a discussion of the methodology, calibration and inputs to the model. This discussion includes an analysis of site and regional precipitation, and provides upper and lower bound estimates of site precipitation. A description of the water balance model is presented in Appendix 5-C.	BC MOE
Hydrology- Request for documentation of scaling of Unuk River data due to orographic effects.	Unuk River precipitation data have not been scaled to site as a result of orographic effects. There is insufficient data to support such a scaling factor, which is somewhat confounded by the assumed watershed area that reports to the stream flow gauge at site (BJL-H1). A description of the water balance model is presented in Appendix 5-C.A.	BC MOE

Table 3-H1. Government Agencies Issues Tracking Table (until May 16, 2014)

Issue	Pretivm Response	Issue Raised By
Hydrology- Vary temperature input as sensitivity and provide discussion on how temperature and snowmelt are considered in the model.	Snowmelt is based on a monthly distribution, but the user can vary this distribution for sensitivity analyses. Efforts were made to incorporate snowmelt with a temperature index into the water balance model, but no clear correlation was found between snowmelt and temperature at site with the data at hand. This result is not overly surprising in that snowmelt is also a function of radiation and wind speed. A description of the water balance model is presented in Appendix 5-C.	BC MOE
Hydrology- Whether snow melt model is based on a temperature index or a monthly distribution.	Snowmelt is based on a monthly distribution, but the user can vary this distribution for sensitivity analyses. Efforts were made to incorporate snowmelt with a temperature index into the water balance model, but no clear correlation was found between snowmelt and temperature at site with the data at hand. This result is not overly surprising in that snowmelt is also a function of radiation and wind speed. A description of the water balance model is presented in Appendix 5-C.	BC MOE
Project Closure- Preference for complete submergence of underground closure conditions.	At closure, the underground will be allowed to flood to minimize development of acid rock drainage and associated leaching of metals. The portal and vent raises will be sealed with concrete plugs. This is described in the Closure and Reclamation Plan (Chapter 30).	BC MEMNG
Tailings Management- Description of sediment dispersal events from the tailings deposition mound during operations.	A tailings system malfunction would be readily detected and rapidly responded to because of daily monitoring of outflow water quality that will allow contingency measures to be put in place within a short timeframe. Prevention measures will include instrumentation to detect pipeline ruptures and preventive maintenance to ensure pipeline integrity. Two discharge pipelines are envisaged, running in parallel, with the primary pipeline ending at the maximum depth of the lake at approximately 80 m and the secondary pipeline ending at a depth of about 60 m. This will allow the secondary pipeline to be brought into operation if the primary pipeline outfall becomes over-pressurized due to an upset condition. Detailed procedures will ensure proper operation of the system during start up and shut down, when air valves will be employed to avoid sudden flows through the tailings mound that could release suspended solids into the water column. These systems and contingencies are described in the Spill Prevention and Response Plan (Section 29.14), Tailings Management Plan (Section 29.15), and Project Description (Chapter 5, Section 5.11.2).	BC MOE
Water Quality- Characterization of sludge and sludge management plan.	Response under development. Sludge characterization is included in Section X of Chapter X or Appendix X and a sludge management plan is included in….?	BC MEMNG, BC MOE
Water Quality- Conduct baseline sampling for non fish-bearing lakes.	Baseline studies were conducted in the following non-fish bearing lakes for the Project: Sulphurets Lake, Brucejack Lake and Knipple Lake. Results of baseline investigations are presented within the Cumulative Water Quality and Aquatic Resources Baseline Reports, appended to Chapters 13 (Assessment of Potential Surface Water Quality Effects) and 14 (Assessment of Potential Aquatic Resources Effects), respectively.	BC MOE

Table 3-H1. Government Agencies Issues Tracking Table (until May 16, 2014)

Issue	Pretivm Response	Issue Raised By
Water Quality- Consider using Divide Lake as a reference lake.	Following conversations with Ministry of the Environment (MOE) in January and February of 2014, reference monitoring for Brucejack Lake is no longer required as Brucejack Lake will serve as the proposed tailings management facility for the Project and, further, that there are lakes that provide similar habitat in the Region. The outflow of Brucejack Lake will be continually monitored; the outflow of Lake 3 (L3) will serve as reference stream. The outflow of L3 has been judged as a reference candidate due to its similarity with the out flow of Brucejack Lake in terms of catchment glaciation, altitude, water quality, and sediment quality. Additional aquatic resource sampling in 2014 from L3 Lake and its outflow will confirm this judgment.	BC MOE
Water Quality- Consideration of historic data in geochemistry source term development for waste rock.	The historical Newhawk data was described and evaluated in a 2005 MEND report and is summarized in the Brucejack ML/ARD Baseline Report (BGC, 2014). The two historical sources that were discussed in the May 8th, 2014 Working Group meeting included data from the 6 humidity cells and results from waste rock padResponse under development. Sludge characterization is included in Section X of Chapter X or Appendix X and a sludge management plan is included in….?....	BC MOE
Water Quality- Continue sampling VOK Creek to monitor effects of surface exploration activity in the watershed.	Monthly water quality sampling of VOK Creek will continue through 2014 to monitor potential effects of surface exploration activity in the watershed.	BC MOE
Water Quality- Demonstrate achievability of zinc treatment.	Response under development. Zinc treatment is included in Section X of Chapter X or Appendix X.	BC MEMNG

Table 3-H1. Government Agencies Issues Tracking Table (until May 16, 2014)

Issue	Pretivm Response	Issue Raised By
Water Quality- Evaluation of the proposed dilution calculation approach.	Project related activities are not expected to directly affect surface water quality in areas outside the LSA and thus semi-quantitative assessments were performed. A dilution approach was used to assess effects on water quality in Sulphurets Creek, upstream and downs stream of Sulphurets Lake (mid- and far- field receiving environment), which were outside of the modelling domain. Discharges from Brucejack lake outlet will undergo further dilution along the flow pathway from BJ 200 m D/S (objective/assessment point) to Sulphurets Creek. Regression analysis of daily streamflows at Brucejack Creek (hydrometric station BJL-H1, corresponds to water quality station BJ 2) and at the outlet of Sulphurets Lake (hydrometric station SL-H1) did not show a strong correlation. Therefore, a deterministic dilution factor (e.g., ratio of streamflows at SL-H1 to streamflows at BJL-H1) cannot be identified with certainty. However, analysis of 1194 daily flows (recorded during 2008 to 2011; see Chapter 10, Surface Water Hydrology Predictive Study) at these stations shows that the dilution factor from lower Brucejack Creek to Sulphurets Lake varies between 1.2 and 50.7 (see Table 13.6-6m Chapter 13). The analysis also suggests a median dilution factor value of 7.1, which is consistent with the ratio of the SL-H1 drainage area to the BJL-H1 drainage area (84.2 km^2 / 11.7 km^2 = 7.2). These dilution factors were used to assess the impact of discharges from the Brucejack Lake outlet on water quality of Sulphurets Creek (Section 13.6).	BC MOE
Water Quality- Potential concern using 2013 benthic invertebrate data to characterize baseline conditions in light of high primary productivity that year as a result of exploration activities.	The 2013 benthic invertebrate data was examined in the 2013 Cumulative Aquatic Resources Baseline Report, and compared to existing baseline information from the Project area. No significant changes were observed between 2013 and earlier observations, even with the observed changes in the primary producer community. The feeding guilds of the invertebrate community were compared between 2013 and early years, and no significant changes were observed. The variation observed in the 2013 benthic invertebrate data was within the range of previous observations, and consistent with natural variation in alpine streams.	BC MOE
Water Quality- Present Brucejack Lake data in the Application/EIS.	Baseline water quality data for Brucejack Lake is presented in Section 13.3 of Chapter 13 (Assessment of Potential Surface Water Quality Effects). This includes: Data collected by Pretivm for the Project from 2009 to 2013; and, Historical data from 1988 to 2001 that was accessed from the Environmental and Socioeconomic Impact Assessment for the Sulphurets Property (Newhawk Gold Mines LTD. 1989) and MEND Report 9.1c (Price 2005; Case Studies of ML/ARD Assessment and Mitigation: Placement of the Sulphurets Waste Rock in Brucejack Lake), collected during the Newcana Joint Venture exploration and reclamation work. Results of predictive water quality modelling for Brucejack Lake are presented in Section 13.6 of Chapter 13.	BC MOE