Based on the discussion we had with Environment and Climate Change Canada (ECCC) on May 13, 2018. Please see below updated responses to ECCC's Technical Comments.

4.1.8 Post-Audit of Water Quality Modelling

Although, an agreement was met during the NIRB Hearing with a commitment by TMAC in regards to model re-calibration, details on frequency of this re-calibration was left for the water licencing stage. Since we are in the water licencing stage now (or at least the beginning of it), it would be good to come to an agreement of the frequency. As previously noted, ECCC is looking for a re-calibration every 3-5 years to consider this issue resolved.

TMAC Response:

The water and load balance prepared for the DEIS and updated in the FEIS process is a predictive tool to assess the long-term concentrations and impacts of the project. The primary use of the tool is to inform operational, closure and post-closure water management strategies for the project, and to ensure that sufficient mitigation measures are applied. TMAC proposes to revisit and calibrate as necessary this model over the life of the project when key project changes occur that drive the operational, closure and post-closure water management. Therefore, the proposed triggers for water and load balance updates are listed below with the rationale for each:

1. ***Two years after initial processing of Madrid Ore***: The geochemistry of Madrid ore is different from the Doris ore and the model should be reassessed once the Madrid ore is incorporated in the processing circuits (and subsequent Doris water management circuit). The two-year period was selected to ensure that the process plant had reached a steady state and there would be sufficient data to see the signature in the Doris Tailings Impoundment Area. Based on current mine scheduling, this is expected to occur by approximately 2021, or 3 years from now.
2. ***Two years after commissioning of the Boston Process Plant***: Once the Boston process plant is fully operational, the key water and load balance inputs from the Boston processing can be verified with actual operational data. The two-year period was selected to make sure that the process plant had reached a steady state and there would be sufficient data to see the signature in the Boston water management circuit. Based on current mine scheduling, this is expected to occur by approximately 2025, or 4 years after the first recalibration.
3. ***Two years before closure***: The model will be reassessed as a part of the final closure design. Based on current mine scheduling, this is expected to occur by approximately 2031, or 6 years after the second recalibration.

4.1.9 Mitigation and Monitoring for in water works

ECCC appreciates the commitment that was made for the in-water works of the cargo dock construction at the NIRB Hearing. We are wondering if the Environmental Management Plan

could be extended to include any in water works that involve the Freshwater Environment, even if these works are to my understanding smaller in nature than the cargo dock. This could be done through a sedimentation management plan included as a separate plan or in the general Water Management Plan. The goal here is the essentially expand the cargo dock in water works commitment to the freshwater environments as well.

TMAC Response:

TMAC will develop an Environmental Management Plan (EMP) prior to the initiation of in-water construction activities. The EMP will include, though not exclusively, mitigation measures for managing total suspended solids and turbidity, monitoring procedures, as well as proposed limits and trigger values, to satisfy all applicable requirements during construction activities.

4.1.10 Tailings Pipeline Catch Basins

We acknowledge the design and rationale for the tailings catch basins, however two of them seem to be in close proximity (less than 20m) to a water body (Document P5-22, Figure MN-MTR-06). We are seeking clarity on the distance of these two tailings pipeline catch basins and if they can be located elsewhere (farther from the water)

TMAC Response:

TMAC acknowledges that the preliminary designs for the tailings catch basins as presented in Package P5-22 Hope Bay Project: Madrid North-Tailings Impoundment Area All-Weather Road Preliminary Design are within the required waterbody offset distance of 31 m. TMAC can confirm that in detailed design stages the tailings catch basins will be correctly designed outside of the waterbody offset distance of 31 m. Further, if practical the tailings catch basins will be located at a distance of 50 m or greater from water bodies as requested by the Kitikmeot Inuit Association. This will be reflected in the updated drawings when issued for construction.

ECCC 4.1.14 – Nitrite

We acknowledge the conservatism that was used in order to model Nitrite concentrations in the combined effluent, but ECCC is concerned by these numbers, especially from an end-of-pipe toxicity standpoint. Ideally, this issue could be resolved by modelling a realistic scenario (instead of a conservative one) or by providing an ammonia management plan, as to our understanding nitrite loadings in the effluent would come mainly from ammonia from blasting residues and sewage. We would also like to clarify that the water quality guideline proposed by TMAC is listed as 10 mg/L while the correct water quality guideline is 0.06 mg/L.

TMAC Revised Response

The reference to a 10 mg/L water quality guideline by TMAC is an error. TMAC agrees with ECCC that the correct guideline value is 0.06 mg/L.

Concern around meeting end of pipe toxicity testing for the Boston combined effluent was expressed by ECCC based on the predicted effluent concentrations. The majority of nitrite

loading in the Boston combined effluent originated from the sewage and process plant effluents, which used a nitrite concentration of 30 mg/L based on a supplier reference. It is expected that actual effluent nitrite concentrations would be much lower and end of pipe toxicity testing would not be a concern.

The 2014 study conducted by Mine Environment Neutral Drainage (MEND) listed active aerobic biological oxidation as the best available technology economically achievable (BATEA)for ammonia removal in the precious metal sector. The individual speciation of nitrogen compounds is not reported, however, a total effluent nitrogen concentration would be <2 mg-N/L. The two proposed biological treatment plants at Boston would utilize this nitrification process. A 2015 study conducted by Veolia, tested MBBR performance of a synthetic solution down to temperatures of 4°C. Effluent nitrite concentrations below 0.1 mg-N/L were achieved when treating an influent with ammonia and nitrate concentrations of 8 mg-N/L and 30 mg-N/L, respectively.

Through the example provided above, the effluent nitrite concentrations from the sewage and process plant effluent are expected to be below 0.1 mg-N/L. ECCC also expressed an intent for the water and load balance to be rerun with lower nitrite concentrations. This is not required as the maximum end of pipe nitrite concentration would be the effluent concentration of 0.1 mg-N/L. This is because there are periods when only the sewage and process plant effluent are discharged to the environment. Nitrite concentrations were not an issue in the receiving environment, therefore the lower the value would not change the outcome of the effects assessment.

References:
[MEND] Mine Environment Neutral Drainage. 2014. Study to Identify BATEA for the Management and Control of Effluent Quality from Mines. MEND Report 3.50.1. Prepared by Hatch. September 2014.
Mudder, T.; M. Botz, and A. Smith. 2001. Chemistry and Treatment of Cyanidation Wastes – Second Edition. Mining Journal Books Ltd. London. June 2001.
Veolia. 2015. Wastewater treatment using MBBR in cold Climates. Paper presented at the Mine Water Solutions in Extreme Environments. June 2015.