Environment and Climate Change Canada | Environnement et Changement climatique Canada

Environmental Protection Operations Directorate (EPOD)
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September 14, 2018

ECCC File: 6100 000 010/034
NWB File: 2AM-DOH1323

Richard Dwyer
Manager of Licensing
P.O Box 119
Nunavut Water Board
Gjoa Haven Nu,
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via email: licensing@nwb.com

Dear Mr. Dwyer

RE: 2AM-DOH1323 – TMAC – Doris North Gold Mine – 2017 Annual Monitoring Report

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board regarding the above-mentioned annual report and is submitting comments via email. ECCC's specialist advice is provided based on our mandate, in the context of the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*

The following comments are provided:

1. Water Quality Sampling Summary

Reference: Section 5.1 (Water Use and Waste Disposal – Doris)

Issue: Section 5.1 indicates which sampling stations were analyzed during 2017; however it does not provide any details on the results of that analysis. While the water quality results are presented in appendix D.1, identification and discussion of any exceedances or unexpected results should be included in this section of the annual report.

Recommendation:

ECCC recommends that the water quality sampling summary include a discussion of water quality sampling results in comparison to established benchmarks, and a discussion of any unexpected results.

2. Aquatic Effects Monitoring Program

Reference: Section 7.0 Aquatic Effects Monitoring Program (AEMP)

Issue: The AEMP summary in the annual report provides only a very high-level summary of the sampling undertaken as part of the AEMP and a discussion of the results from the AEMP is not provided. Table 7-1 provides a summary of the results and indicates that a low action level was triggered for benthic invertebrate density and a possible water quality effect for TSS and total molybdenum but that no action level was triggered. While it is understood that just a summary of the AEMP results is required in the overall annual report, additional discussion of the results and their interpretation should be provided.

Recommendation:

ECCC recommends that future annual reports include a more robust discussion of the results of the AEMP. Significant results should be provided and discussed, including action level exceedances, possible effects, and subsequent analysis and studies that may be undertaken based upon results.

3. Waste Rock Seepage

Reference: Section 9.0 (Geochemical Seepage Surveys)

Issue: The report indicates that, “waste rock toe seepage samples were elevated in arsenic, copper, iron, nickel, and selenium compared to screening criteria and historical data” and “seepage from areas impacted by waste rock had elevated levels of chloride, nitrate, and ammonia.” TMAC goes on to state that, “continued monitoring will establish trends in concentrations” and that “the majority of seepage is captured and directed to the TIA.” The statement that the “majority” of seepage is captured is concerning, as it is unclear how much seepage is not captured and therefore has the potential to enter the aquatic environment. In addition, there is no discussion on how elevated the concentrations of these parameters are compared to screening criteria. TMAC attributes the elevated chloride to drilling brines and nitrate and ammonia to blasting residues, but if concentrations of these (or any other variables) are sufficiently elevated in seepage from the waste rock pile, additional management mitigation measures be required.

Recommendations:

- ECCC recommends that TMAC provide a discussion on the quantity of seepage captured from the waste rock pile compared to total seepage

volumes. This should include a description of where any seepage that is not captured may discharge to.
- ECCC recommends that TMAC evaluate waste rock pile seepage quality compared to screening criteria and discuss potential mitigation measures if necessary.

4. Water Quality Predictions

Reference: Appendix E (Doris Mine Annual Water and Load Balance Assessment)

Issue: The comparison of actual water quality in the Doris TIA to modelled water quality concentrations indicates several parameters for which the water quality model has under-predicted concentrations. TMAC attributed these higher than expected concentrations to challenges experienced during start-up of the process plant and states that the model will be re-evaluated once a steady-state is achieved. However, no discussion is provided on the nature of the "challenges" with the process plant, and subsequent effluent, or when a "steady-state" is anticipated to be achieved.

A 20% difference between the modelled water quality and measured water quality has been established to trigger source identification and re-calibration of the water quality model. Based on the graphical analysis provided, several parameters look to be significantly higher than the 20% difference benchmark, but the differences between modelled and measured concentrations have not been quantified. In addition, while all parameter differences are attributed to the process plant challenges, each parameter that exceeds modelled predictions should be assessed separately to ensure that the process plant is the factor causing higher concentrations or if other factors need to be considered.

Recommendations:

- ECCC recommends TMAC provide a discussion of the challenges encountered with the process plant and identify the measures being taken to increase the quality of the effluent.
- ECCC recommends that TMAC quantify the difference between the modelled water quality and measured water quality for those parameters that are greater than modelling predictions.
- ECCC recommends TMAC assess the parameters which exceed modelled water quality predictions and confirm that these high concentrations are due to the process plant and not external factors.

5. Comparison of TIA data to MDMER Limits

Reference: Appendix E, Table 3-2

Issue: Table 3-2 (Appendix E) compares the median 2017 Doris TIA concentrations to the MDMER maximum authorized Monthly Mean Concentration as support for potential discharge from the TIA. ECCC notes that this is not an

accurate comparison to MDMER discharge limits as it is comparing the median concentration over an entire year, to the monthly mean MDMER limit.

Recommendation:

ECCC recommends that TMAC provide monthly maximum averages and maximum grab sample concentrations (rather than the 2017 median concentrations) for comparison of water quality to MDMER limits.

6. Aircraft de-icing management plan

Reference: 2017 annual report: Section 12
Hope Bay Project Aircraft de-icing management plan (December 2017)
Landfarm Management and Monitoring Plan (January 2017)

Issue: The aircraft de-icing management plan is a newly established plan since the 2016 annual report review (drafted December 2017). This plan (Section A2.3) indicates that all fluid will report to a sump that is routinely collected with the use of a vac-truck and deposited into the existing landfarm. The plan also indicates that "water disposed of at the sump will be managed as per the existing Type A water licence." If all de-icing fluid and runoff that comes into contact with the sump is to be managed through the landfarm, TMAC should ensure that the existing landfarm has sufficient capacity to manage the volume of water collecting in the de-icing sump. In addition, while there are criteria for the sampling and discharge of the landfarm sump (ST-4), there is no SNP station associated with the aircraft de-icing fluid sump so it is unclear what is meant by "managed as per the existing Type A water licence."

Recommendations:

- ECCC recommends that TMAC estimate the volumes of glycol contaminated water to be managed through the landfarm and provide a discussion on the capacity of the existing facility to manage the increased volumes.
- ECCC recommends that the landfarm management plan be updated to acknowledge that it is now being used for remediation of glycols.
- ECCC recommends that glycols be added to the list of monitored parameters at SNP station ST-4.

6. Tailings Management

Reference : Appendix F - 2017 Waste Rock, Quarry and Tailings Monitoring Report,Doris Mine, Hope Bay Project, Section 7.4 Flotation Tailings Slurry and Detoxified Tailings

Issue: The proponent states that "There is no analytical method for cyanate and thiocyanate for solid-phase samples, as specified in the monitoring program for TL-7 in Schedule J (Table 2) of the Water Licence. WAD cyanide was also specified for TL-7 with levels below analytical detection with the exception of the samples in April (0.11 ppm). There is no regulatory limit for WAD cyanide in

tailings. SRK suspects that the inclusion of cyanate, thiocyanate and WAD cyanide monitoring for the detoxified tailings solids (TL-7) may be a typographical error."

Recommendation:

ECCC recommends that the proponent confirm with the NWB that these parameters were included in error.

7. Stack Testing Results

Reference: Section 6.1.1 (Camp Incinerators)

Issue: ECCC notes that the incinerator stack test results presented for Polychlorinated Dibenzodioxins and Dibenzofurans (PCDD/PCDF) measured at 4.23 are well above the Canada wide standards of 0.080.

Recommendation:

ECCC recommends that the proponent investigate and discuss these high measured levels and consider implementing mitigation measures to address them.

Should you require further information, please do not hesitate to contact me at (867)669-4707 or Bradley.Summerfield@canada.ca

Sincerely,

[original signed by]

Bradley Summerfield
Senior Environmental Assessment Coordinator

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU), PNR-EPOD