Environment and Climate Change Canada | Environnement et Changement climatique Canada

Environmental Protection Operations Directorate
Prairie & Northern Region
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

ECCC File: 6100 000 008/015
NWB File: 2AM-WTP----

August 14, 2017

Via email: licensing@nwb-oen.ca

Karen Kharatyan
A/Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Mr. Kharatyan:

RE: AEM-WTP---- – Agnico Eagle Mines Ltd. – Whale Tail Pit Project – Final Written Submission

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board regarding the above-mentioned water licence application and is submitting the attached final written submission to NWB 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*.

Should you require further information, please do not hesitate to contact Melissa Pinto at (867) 669-4733 or Melissa.Pinto@canada.ca.

Sincerely,

Susanne Forbrich
Regional Director

Attachment: ECCC's Final Written Submission

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU)
ECCC Review Team

Environment and Climate Change Canada | Environnement et Changement climatique Canada

ENVIRONMENT AND CLIMATE CHANGE CANADA'S FINAL WRITTEN SUBMISSION TO THE NUNAVUT WATER BOARD

RESPECTING THE WHALE TAIL PIT PROJECT TYPE A WATER LICENCE APPLICATION SUBMITTED BY AGNICO EAGLE MINES LTD.

AUGUST 14, 2017

Canada

Executive Summary

Agnico Eagle Mines Ltd. (the Proponent) is proposing to develop the Whale Tail Pit Project (the Project) approximately 50 kilometers (km) northwest of the existing Meadowbank mine in the Kivalliq Region of Nunavut. The Project would consist of one open pit and associated facilities, including a camp and a haul road to Meadowbank where the gold ore will be processed and tailings deposited.

Environment and Climate Change Canada (ECCC) has participated in the Water Licence (WL) process to date, providing information requests and technical comments to the Nunavut Water Board (NWB). ECCC also attended the Technical Session (including the Pre-Hearing Conference) held in Baker Lake from April 28th to May 2nd. ECCC's participation is based on providing specialist expert information or knowledge to the NWB in accordance with the expertise that ECCC has available pursuant to the Nunavut Agreement.

This submission summarizes the results of ECCC's technical review of information provided and commitments made by the Proponent throughout the review process, additional information provided by the Proponent after the Technical Session and it reflects ongoing discussions with the Proponent. The comments and recommendations provided relate to ECCC's mandate in the context of the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act* and are intended for consideration by the NWB.

ECCC's outstanding concerns are in regards to waste rock storage facility seepage, effluent quality criteria for discharge into the receiving environment, sludge management and sediment core analyses.

Table of Contents

1.0 List of Acronyms

CEPA – *Canadian Environmental Protection Act*
CREMP – Core Receiving Environment Monitoring Program
DOE – Department of the Environment
EA – Environmental Assessment
ECCC – Environment and Climate Change Canada
EEM – Environmental Effects Monitoring
EIS – Environmental Impact Statement
EQC – Effluent Quality Criteria
MMER – *Metal Mining Effluent Regulations*
NIRB – Nunavut Impact Review Board
NPRI – National Pollutant Release Inventory
NWB – Nunavut Water Board
SSWQO – Site-Specific Water Quality Objective
TIA – Tailings Impoundment Area
TP – Total Phosphorous
TSF – Tailings Storage Facility
TSS – Total Suspended Solids
WL – Water Licence
UM – Ultramafic
WRSF – Waste Rock Storage Facility

2.0 Introduction

Agnico Eagle Mines Ltd. (the Proponent) is proposing to develop the Whale Tail Pit Project (the Project) approximately 50 kilometers (km) northwest of the existing Meadowbank gold mine. The Project consists of the construction, operation, and closure of an open pit and its associated facilities, including a camp and a haul road to Meadowbank where the gold ore will be processed and tailings deposited. Construction of the Project is proposed to last one year, with an operating life of three to four years, followed by closure and reclamation.

The Proponent submitted a Meadowbank Mine Type A Water Licence (WL) amendment application to the Nunavut Water Board (NWB) for the Project in July 2016. The Project underwent a screening which determined that a separate environmental assessment (EA), and therefore separate WL, was required in order to adequately assess the effects of the Project. The Nunavut Impact Review Board (NIRB) and the NWB decided the EA would be a coordinated process with the Type A WL review. Environment and Climate Change Canada (ECCC) has participated in the coordinated WL process to date, providing information requests (IRs) to the NWB, including in the Technical Session (including the Pre-Hearing Conference) held in Baker Lake from April 28th to May 2nd. ECCC is continuing its participation in this WL process by way of this final written submission to NWB.

ECCC is responsible for leading the implementation of the Government of Canada's environmental agenda and is committed to contributing to the realization of sustainable development in Canada's North. ECCC's mandate covers the preservation and enhancement of the quality of the natural environment, including water, air, soil, flora and fauna, as well as species at risk and migratory birds. Science plays a fundamental role in enabling ECCC to deliver on its mandate by informing environmental decision-making and regulations, and by supporting the delivery of services to Canadians. In Nunavut, ECCC provides specialist expert information or knowledge to NWB in accordance with the expertise that ECCC has available, as required under Article 13 of the Nunavut Agreement.

A brief summary of the legislation from which ECCC's mandate is derived is provided in Section 3.0. ECCC's comments on the outstanding issues are found in Section 4.0 and finally, a summary of ECCC's recommendations can be found in Section 5.0. Appendix 1 provides additional context on ECCC's legislation as well as other federal guidelines. ECCC's technical comments and recommendations are presented in this report for consideration by NWB.

3.0 ECCC's Mandate, Roles, and Responsibilities

The mandate of ECCC is determined by the statutes and regulations under the responsibility of the Minister of Environment and Climate Change. In delivering this mandate, ECCC is responsible for the development and implementation of policies, guidelines, codes of practice, inter-jurisdictional and international agreements, and related programs. ECCC's specialist advice is provided in the context of the *Canadian Environmental Protection Act* (CEPA) and the pollution prevention provisions of the *Fisheries Act*.

ECCC administers the pollution prevention provisions of the *Fisheries Act*, which prohibits the deposit of a deleterious substance into fish-bearing waters. ECCC also participates in the regulation of toxic chemicals and the development and implementation of environmental quality guidelines pursuant to CEPA. Additional information on ECCC's mandate is found in Appendix 1.

4.0 ECCC's Technical Review Comments

This final written submission summarizes the results of ECCC's technical review of the outstanding issues and additional information provided by the Proponent during the EA/WL process thus far, including information provided during meetings held with the Proponent between June and July 2017. Some issues brought up during the technical review phase were addressed and information regarding these commitments and/or resolutions was given to NWB via the Proponent.

ECCC based its analysis on the principle that the Project should be constructed, operated, and decommissioned in a manner that ensures the highest level of environmental protection so that the well-being of Canadians is enhanced and the natural environment is conserved. To that end, ECCC has undertaken a science-based review of issues within ECCC's mandate with the aim of providing expert advice on the Proponent's assessment of the Project's potential effects and proposed mitigation.

Two outstanding concerns that ECCC had at the close of the Pre-Hearing Conference, the site-specific water quality objective (SSWQO) for arsenic and treatment of arsenic and phosphorus, were resolved by subsequent information provided by the Proponent to address ECCC's concerns. The following is a summary of these resolved issues.

The SSWQO for total arsenic proposed for the Project was developed in accordance with the Canadian Council of Ministers for the Environment 2007 protocol and produced a species sensitivity distribution, which resulted initially in an objective of 28 ug/L. ECCC raised concerns with the inclusion of amphibian data and with the model selected for the curve (Normal vs Logistic). The Proponent removed the amphibian data and provided summary statistics for the models used to draw the Species Sensitivity Distributions curves and their rationale for selecting the Normal model. ECCC is of the view that the Logistic model would be more conservative, as it presented a lower A^2 statistic. However, ECCC acknowledges that there is unlikely to be a statistically significant difference between the results of the two models. In a biological/toxicological context the results are comparable and either model result would be expected to be protective of aquatic life. Therefore, ECCC accepts the revised SSWQO of 25 ug/L for total arsenic, which excludes the amphibian data.

ECCC previously raised concerns regarding implications of the water quality modeling predictions (arsenic and phosphorus) for the receiving environment, and recommended improved treatment for arsenic and phosphorus. The Proponent currently proposes treatment objectives of 0.10 mg/L for arsenic (previously 0.15 mg/L) and 1.0 mg/L for phosphorus (previously 6.0 mg/L), and

has provided updated water quality modeling for arsenic and phosphorus, based on these new objectives. ECCC accepts the treatment objectives of 0.10 mg/L for arsenic (total fraction) and 1.0 mg/L for phosphorus (total fraction).

The following comments outline outstanding concerns that ECCC has related to water quality, including seepage from the waste rock storage facility (WRSF), effluent quality criteria (EQC), sludge management and mercury.

4.1.1 ECCC#1 - North Wall Pushback of Whale Tail Pit

References:

ECCC discussion with Agnico Eagle Mines and Golder Associates on July 27, 2017

Golder Associates Technical Memorandum: Addendum to Agnico Eagle Mines Whale Tail FEIS Appendix 6-H. Sensitivity analyses on water quality modelling in support of responses to technical commitments 30, 36, 37 and 42 and intervenor comments ECCC #15 and INAC TRC #3 and #5, on the Water Licence A application to the Nunavut Water Board (July 10, 2017)

Issue:

At closure, the predictions of arsenic concentrations in the pit lake are affected by the type of rock that is exposed in the pit walls. The original Whale Tail pit design resulted in approximately 29% of the final pit shell containing exposed ultramafic (UM) rock, which has a higher potential to leach arsenic than other rock types. This UM rock is located on the north pit wall and has an arsenic loading rate of 1.1 mg/kg/month. A pushback of the north wall has been identified by the Proponent as a potential contingency measure to reduce the amount of exposed UM rock on the final pit shell by roughly half, from approximately 29% to 15%, with the intent to reduce arsenic levels within Whale Tail pit lake.

Water quality modeling under both the original pit design (the base case scenario) and the north wall pushback scenario considers the potential for arsenic diffusion from the pit walls. With respect to predicted arsenic levels, water quality modeling for the north wall pushback scenario versus the base case indicates:

- No noticeable difference in the flooded pit water quality during post-closure, assuming arsenic diffusion occurs, and a minor improvement assuming no arsenic diffusion [Figures 11 & 12]. This result is surprising, given that half of the exposed UM rock will be removed and that there will be increased dilution of arsenic due to increased pit volume.

- Modest improvement in the flooded North Whale Tail Lake water quality [Figures 11 & 12], reducing arsenic concentrations by roughly 26-29%, assuming diffusion occurs.

- Small improvement in the WRSF pond water quality during operations [Figure 10]. However, this does not benefit the aquatic receiving environment, as WRSF pond water will be discharged to the attenuation pond and treated as required during operations.

- No differences in WRSF pond water quality during closure and post-closure [Figure 10].

The environmental risks and benefits of removing approximately half of the exposed north wall UM material from the Whale Tail pit (i.e., a north wall pushback) have not been fully quantified or discussed. Given the large volume of waste rock that would be produced by a north wall pushback, which would increase the WRSF to an elevation of 95 m, together with the nominal improvements in water quality, an alternatives analysis should be conducted. This would provide greater clarity and certainty to support decision-making regarding the final pit design.

Recommendation(s):

ECCC recommends that the Proponent conduct an alternatives analysis of the pit design with and without the north wall pushback scenario, in order to assess the potential risks and benefits to the aquatic receiving environment. The alternatives analysis should consider the entire life of mine and through post-closure.

4.1.2 ECCC#2 - Sensitivity Analyses on Water Quality Modeling

References:

ECCC discussion with Agnico Eagle Mines and Golder Associates on July 27, 2017

Golder Associates Technical Memorandum: Addendum to Agnico Eagle Mines Whale Tail FEIS Appendix 6-H. Sensitivity analyses on water quality modelling in support of responses to technical commitments 30, 36, 37 and 42 and intervenor comments ECCC #15 and INAC TRC #3 and #5, on the Water Licence A application to the Nunavut Water Board (July 10, 2017)

Issue:

The Proponent has provided sensitivity analyses for a range of modeled conditions:

1. Improving treatment of arsenic and phosphorus in effluent.

2. No treatment of arsenic in the WRSF pond post-closure, with active layer thaw depths of 2 m and 4 m thickness.

3. Inclusion of UM rock (which has a higher rate of leaching of arsenic) in the waste rock cover, with cover material containing 2% and 5% UM rock (assuming 4 m thaw depth, and no treatment of contact water post-closure).

4. Use of a pushback of the north wall to remove UM rock from the exposed pit wall, reducing the amount of exposed potentially acid-generating and metal-leaching rock in the pit wall by approximately 50%.

The modeled scenarios were done in order to evaluate a range of conditions, including the "worst case" cover material composition scenarios. The effects of the north wall pushback on water quality were modeled as this was under consideration as a mitigation option.

1. Figure 2c presents the arsenic predictions modeled for the Final EIS case combined with treatment to arsenic concentrations of 0.1 mg/L in discharges from the Attenuation Pond. The concentrations of total arsenic in the WRSF pond are modeled to remain below 0.1 mg/L total arsenic at post-closure, with the assumption that it is treated. The Proponent has stated that the treatment plant will be located at the Attenuation Pond during operations and closure and that it can be moved to the WRSF pond if needed, with an 11 year window for treatment. Based on the monitoring data from Meadowbank for the waste rock sampling stations, the Proponent anticipates there will not be a need for treatment of seepage/runoff from the WRSF.

   The concentration of total phosphorus (TP) is predicted to stay at levels just above the oligotrophic range at closure and throughout post-closure (Figure 3c). It will be important to monitor actual loadings/concentrations in the receiving environment, identify trends in downstream chemistry and productivity, and track trophic status. Data can be used to update predictions during operations and closure.

2. Figures 5a and 6a show predictions for arsenic levels from the WRSF at post-closure, without treatment. In the 4 m active layer scenario, ECCC has concerns with the potential for a pulse of arsenic (runoff concentration of 2.9 mg/L) to enter Mammoth Lake when the field capacity is reached, followed by ongoing releases at up to 0.35 mg/L. This would result in exceedances of the receiving environment water quality objective in the immediate receiving zone of Mammoth Lake (up to 100 m) but not in the

main body of Mammoth Lake. The Proponent has stated that the predictions are conservative and not supported by field observations at Meadowbank. ECCC notes that it will be necessary to conduct ongoing monitoring of the WRSF conditions during operations, and to characterize seepage/runoff quality on an ongoing basis and update modeled predictions. Should the results indicate trends in arsenic concentrations, which could potentially be considered harmful, it will be necessary to plan for treatment or other mitigation to ensure the receiving environment is protected. Future data from the Meadowbank waste rock pile can also be referenced to inform of potential metal leaching in the waste rock. The Proponent has stated that there would be mitigation options (such as reducing cover permeability through use of overburden) to address active layer effects if there is indication of arsenic leaching from the WRSF.

3. Modeling of the scenario of inclusion of UM rock in the waste rock cover materials showed high concentrations of arsenic coming from the WRSF pond, assuming no treatment (Figures 7a and 8a). The Proponent has stated that there is a high degree of confidence in the ability to segregate rock types for use as cover, ensuring only non-metal-leaching rocks are used in the cover. This would be supported by ongoing testing of rocks and of seepage/runoff from the waste rock storage area. Monitoring and diligent segregation will be critical to prevent long-term environmental liability associated with arsenic-leaching materials.

4. Effects of the north wall pushback option on total arsenic in the WRSF water quality are presented in Figures 10 a and b, comparing base case to the pushback case. Minor reductions in total arsenic are predicted.

The Proponent has operational experience from the Meadowbank gold mine in testing and segregating rock types, including cover testing underway at the Meadowbank tailings facility which will provide relevant information for the Whale Tail waste rock cover. The sensitivity analyses highlight the potential for problems to arise if conditions are not as predicted.

Recommendation(s):

ECCC recommends that the Proponent submit detailed management plans to be implemented for:

- waste rock segregation and testing,
- thermal monitoring of waste rock, and
- seepage management and monitoring.

Plans should include a schedule for reporting of results and periodic updating of

predictions for the WRSF pond quality, along with proactive planning for optimal cover conditions. Contingency measures should be identified as appropriate.

Monitoring results for receiving waters should be compared to model predictions and thresholds identified for management actions should trends indicate water quality objectives may be exceeded.

4.1.3 ECCC#3 - Effluent Quality Criteria

References:

Presentation from ECCC meeting with Agnico Eagle Mines Ltd. and Golder Associates on June 7, 2017

Issue:

The Proponent has provided proposed EQC along with estimates of effluent quality for the discharge into Mammoth Lake from the Attenuation Pond treatment plant, as outlined in the table below.

PROPOSED EQG

AGNICO EAGLE

Constituent	Units	Licence A update				Proposed EQC (a)	
		Attenuation Pond (Operations, Treated)		Mammoth Lake (Operations)			
		Mean[b]	Maximum[c]	Mean[b]	Maximum[c]	Mean[b]	Maximum[c]
Conventional and Ions							
pH	-	-	-	-	-	6 - 9.0	6 - 9.0
Total suspended solids	mg/L	-	15	-	-	15	30
Nutrients							
Phosphorus, Total	mg-P/L	**0.52**[C]	**1.1**[C, E]	**0.042**[C, B]	**0.057**[C, B]	-	-
Phosphorus, Total, May 2017	mg-P/L	**0.11**	**0.26**	**0.011**	**0.020**	*0.3*	*0.6*
Total Metals							
Aluminum	mg/L	0.32[C, D]	0.32[C, D]	**0.15**[C, D, T, E, B]	**0.18**[C, D, T, E, B]	0.5	1.0
Arsenic	mg/L	0.12[C, D]	0.16[C, D]	0.015[C, D, T, E, B]	0.025[C, D, T, E, B]	-	-
Arsenic, May 2017	mg/L	0.061	0.1	0.0073	0.016	*0.1*	*0.2*
Chromium	mg/L	0.012[C]	0.019[C]	**0.0039**[C, T, E, B]	**0.0043**[C, T, E, B]	*0.02*	*0.04*
Copper	mg/L	0.0041[C]	0.014[C]	0.0014[T, B]	0.0016[T, B]	**0.1**	**0.2**
Iron	mg/L	0.94[C]	1.1[C]	**0.35**[C, T, E, B]	**0.4**[C, T, E, B]	*3.0*	*6.0*
Lead	mg/L	0.0011[C]	0.0037[C]	0.00031[B]	0.00038[B]	**0.1**	**0.2**
Nickel	mg/L	0.022	0.059[C]	0.006[B]	0.0074[B]	0.25	0.5
Zinc	mg/L	0.0067	0.017	0.0034[B]	0.0038[B]	**0.4**	**0.8**
Dissolved Metals							
Aluminum	mg/L	0.0001	0.0001	0.032[T, B]	0.043[T, B]	-	-
Chromium	mg/L	0.0021[C]	0.01[C]	0.00056[B]	0.00072[T, B]	-	-
Iron	mg/L	0.18	0.3	0.069[B]	0.081[B]	-	-
Other							
Cyanide	mg/L	-	-	-	-	**0.5**	**1.0**
Total Petroleum Hydrocarbons[d]	mg/L	-	-	-	-	3	6
Radium 226	Bq/L	-	-	-	-	0.37	1.11

ECCC has reviewed the proposed criteria, and has the following comments:

- Total aluminum and iron concentrations are associated with particulate matter (given the low dissolved fraction) and can be removed through treatment for suspended solids. Setting the limits for iron at 3.0 (mean)/6.0 (max) mg/L is high and could be reduced to reflect achievable levels.
- Proposed limits for lead and zinc are one to two orders of magnitude above predicted effluent concentrations. EQC for these parameters could be reduced to reflect achievable levels.
- Under "Other" there are proposed limits for cyanide and radium 226. These parameters are not expected to be detected at the mine. Although radium226 will be required under the *Metal Mining Effluent Regulations* (MMER), they would not have to be included in a water licence.

Project-related discharges will include all discharges of contact water, as well as the attenuation pond effluent (e.g. all contact water from water management structures or containment berms) and EQC should be developed for all discharges to surface waters.

Recommendation(s):

ECCC recommends the Effluent Quality Criteria (EQC) be set based on concentrations that are achievable and that minimize discharge levels to receiving waters. EQC should be applicable to all mine-related discharges to surface waters.

4.1.4 ECCC#4 - Sludge Management

References:

ECCC discussion with Agnico Eagle Mines and Golder Associates on July 27, 2017

Water Management Plan, Version 1 (January 2017)

Issue:

The original proposal for sludge management involved discharging sludge wastes from the water treatment plant into the Whale Tail attenuation pond. Because the attenuation pond will be located within the drained north basin of Whale Tail Lake, the pond site will ultimately become submerged within Whale Tail Lake upon re-flooding of the north basin. Disposing of sludge into the attenuation pond would therefore result in sludge waste within the lakebed of Whale Tail Lake (North Basin) in perpetuity. ECCC has previously identified a concern with disposing of sludge in this location, as there would be no way to

manage potential environmental effects, such as migration of contaminants from the sludge into Whale Tail Lake over time.

The Proponent is currently considering sludge dewatering and final placement of the thickened sludge either within the WRSF or encapsulated within the attenuation pond. ECCC reiterates the concern with placing sludge within the attenuation pond.

Recommendation(s):

ECCC recommends that sludge be disposed using methods that have been demonstrated to provide effective containment and isolation under Northern conditions. Therefore, ECCC recommends disposing of sludge into the Waste Rock Storage Facility or the Tailings Storage Facility at Meadowbank, rather than into the attenuation pond/Whale Tail Lake.

4.1.5 ECCC#5 - Mercury Study

References:

Azimuth Consulting Group Partnership Report: Predicted Changes in Fish Mercury Concentrations in the flooded area of Whale Tail Lake (South Basin), February 2017

Issue:

The Azimuth report provides a synthesis of information on mercury and methylmercury in connection with flooding of terrestrial areas. It provides a good review of the factors and tries to assign a risk level for the likelihood of increased methylmercury associated with the flooding of the area around south Whale Tail Lake. In the absence of information on conditions that are unique to this environment, conclusions are tentative and qualified.

The report notes that the authors are unaware of any other “reservoirs” created strictly within an Arctic environment, and that the Arctic is an untested environment with respect to mercury modeling for impoundment. Specifically, a number of key uncertainties are identified. In addition to the Arctic environment, uncertainties include ice rafting, tundra soils, ice cover, interrupted discharge, cold water, slow fish growth, and shortened reservoir life.

ECCC is of the opinion that conducting an investigation of these key uncertainties would contribute to understanding mercury dynamics in a Northern impoundment scenario and could improve mercury predictions for fish, other aquatic biota, sediment, and water quality.

Recommendation(s):

ECCC recommends conducting a separate study during the construction, operations, and closure of the flooded areas to address key uncertainties (Arctic environment, ice rafting, tundra soils, ice cover, interrupted discharge, cold water, slow fish growth, and shortened reservoir life) that were identified in the Azimuth report (February 2017), in order to inform mercury modeling for this Project. Adaptive management actions should be considered based on the results from this study.

4.1.6 ECCC#6 - Sediment Core Analyses

References:

Environment and Climate Change Canada's Technical Review Comments to the Nunavut Impact Review Board Respecting the Whale Tail Pit Project Proposed by Agnico Eagle Mines Ltd. (March 28, 2017)

Volume 8 Monitoring, Mitigation, and Management Plans, Appendix 8-E.2 Core Receiving Environment Monitoring Program

Issue:

ECCC has previously recommended that the Proponent collect sediment cores in 2017 as per its Sediment Core Sampling, a part of the Core Receiving Environment Monitoring Program (CREMP) sampling design and Standard Operating Procedures, before construction and mining activities begin at Whale Tail Pit, for all future-exposure and reference lakes listed in Table 2-2 of the CREMP.

The Proponent's response to this recommendation confirmed that a sediment coring event was scheduled for 2017, including the expansion of the program to include the Whale Tail Pit CREMP sampling areas. Relevant information was also provided in the Proponent's response to NIRB Technical Comment ECCC#11 and NWB ECCC#1, which included a tabular summary of the 2016 and 2017 baseline CREMP. This table, entitled Table ECCC-11-1, indicates that sediment cores will be collected and tested for metals in 2017, and continuing on a 3 year cycle.

At the Technical Session, ECCC noted that sediment core analysis was limited to metals only and requested that a full suite of testing be conducted. The Proponent responded that there was insufficient material to permit a full suite of testing and did not agree to the request for full sediment core analysis.

ECCC reiterates the recommendation that a full suite of testing be conducted on sediment cores. This would allow comparisons with Ekman data and support interpretation of benthic data. Analyses should include pH, metals, particle size, Total Organic Carbon, TP, and moisture content.

ECCC and the Proponent have agreed to discuss this issue and will attempt to resolve this matter before the final hearing.

Recommendation(s):

ECCC recommends that a full suite of testing be conducted on sediment core samples. Recommended analyses include pH, metals, particle size, Total Organic Carbon, Total Phosphorus, and moisture content.

5.0 Summary of Recommendations

ECCC#1 - North Wall Pushback of Whale Tail Pit

ECCC recommends that the Proponent conduct an alternatives analysis of the pit design with and without the north wall pushback scenario, in order to assess the potential risks and benefits to the aquatic receiving environment. The alternatives analysis should consider the entire life of mine and through post-closure.

ECCC#2 - Sensitivity Analyses on Water Quality Modeling

ECCC recommends that the Proponent submit detailed management plans to be implemented for:

- waste rock segregation and testing,
- thermal monitoring of waste rock, and
- seepage management and monitoring.

Plans should include a schedule for reporting of results and periodic updating of predictions for the WRSF pond quality, along with proactive planning for optimal cover conditions. Contingency measures should be identified as appropriate.

Monitoring results for receiving waters should be compared to model predictions and thresholds identified for management actions should trends indicate water quality objectives may be exceeded.

ECCC#3 - Effluent Quality Criteria

ECCC recommends the Effluent Quality Criteria (EQC) be set based on concentrations that are achievable and that minimize discharge levels to receiving waters. EQC should be applicable to all mine-related discharges to surface waters.

ECCC#4 - Sludge Management

ECCC recommends that sludge be disposed using methods that have been demonstrated to provide effective containment and isolation under Northern conditions. Therefore, ECCC recommends disposing of sludge into the Waste Rock Storage Facility or the Tailings Storage Facility at Meadowbank, rather than into the attenuation pond/Whale Tail Lake.

ECCC#5 – Mercury Study

ECCC recommends conducting a separate study during the construction, operations, and closure of the flooded areas to address key uncertainties (Arctic environment, ice rafting, tundra soils, ice cover, interrupted discharge, cold water, slow fish growth, and shortened reservoir life) that were identified in the Azimuth report (February 2017), in order to inform mercury modeling for this Project. Adaptive management actions should be considered based on the results from this study.

ECCC#6 – Sediment Core Analyses

ECCC recommends that a full suite of testing be conducted on sediment core samples. Recommended analyses include pH, metals, particle size, Total Organic Carbon, Total Phosphorous and moisture content.

6.0 Acknowledgements

ECCC acknowledges and appreciates the effort that the Proponent has taken to address concerns brought forward by parties throughout the coordinated WL process. ECCC would like to thank NWB for this opportunity to provide input to the WL phase of the Project and looks forward to continuing its participation.

ECCC's technical review comments and recommendations are not to be interpreted as any type of acknowledgement, compliance, permission, approval, authorization, or release of liability related to any requirements to comply with federal or territorial statutes and regulations.

APPENDIX 1: Relevant Legislation, Regulations and Guidelines

Introduction

The mandate of Environment and Climate Change Canada (ECCC) is determined by the statutes and regulations assigned to the federal Minister of Environment and Climate Change by Parliament or by the Government of Canada. Delivering this mandate requires ECCC, among other things, to develop and implement policies, guidelines, codes of practice, inter-jurisdictional and international agreements and related programs. The following lists specific legislation and national environmental policies and programs administered by ECCC that influence the content of Environmental Assessment (EA) submissions.

In EAs, ECCC generally carries out its responsibilities by providing recommendations, advice, and information within its mandate. This is provided to both the proponent and decision-makers and may be used in the development of potential conditions that may accompany an EA approval. This document is intended to summarize ECCC's mandate.

For purposes of reliability and accuracy and for interpreting and applying regulations or policy, it is recommended that the reader refer to the original document. Official versions of legislation can be found on the Department of Justice website (http://laws.justice.gc.ca/eng/).

Legislation

Department of the Environment Act

General responsibility for environmental management and protection is attributed to ECCC, through the Minister, under the *Department of the Environment Act* (DOE Act). This responsibility extends to and includes all matters over which Parliament has jurisdiction, which matters have not, by law, been assigned to any other department, board, or agency of the Government of Canada relating to:

- the preservation and enhancement of the quality of the natural environment (e.g., water, air, and soil);
- renewable resources including migratory birds and other non-domestic flora and fauna;
- water;
- meteorology; and
- co-ordination of policies and programs respecting preservation and enhancement of the quality of the natural environment.

The DOE Act requires the Minister to advise heads of federal departments, boards and agencies on matters pertaining to the preservation and enhancement of the quality of the natural environment.

Canadian Environmental Protection Act

The *Canadian Environmental Protection Act* (CEPA) is aimed at preventing pollution and protecting the environment and human health while contributing to sustainable development. CEPA shifts the focus away from managing pollution (after it has been created) to preventing pollution. CEPA provides the federal government with tools to protect the environment and human health, establishes strict deadlines for controlling certain toxic substances, and requires the virtual elimination of toxic substances, which are bioaccumulative, persistent and result primarily from human activity.

One of CEPA's major thrusts is the prevention and management of risks posed by harmful substances. CEPA manages impacts of environmental emergencies, vehicle engines and equipment emissions, fuels, hazardous wastes, disposal at sea, and other sources of pollution. Two CEPA sections are described below:

Environmental Emergencies

Part 8 of CEPA related to environmental emergencies (sections 193 to 205) provides various authorities to address the prevention of, preparedness for, response to, and recovery from environmental emergencies caused by uncontrolled, unplanned or accidental releases and to reduce any foreseeable likelihood of releases of toxic or other hazardous substances listed in Schedule 1 of the Environmental Emergency (E2) Regulations. ECCC provides advice regarding emergency plans for projects it reviews to ensure they are consistent with the requirements of CEPA.

National Pollutant Release Inventory Reporting Requirements

Under the authority of Section 46 of CEPA, the National Pollutant Release Inventory (NPRI) collects information on the quantities of certain substances that are released, disposed of or transferred off-site for recycling by industrial facilities in Canada. Facilities must report quantities of NPRI substances that are released to air, water or land; that are disposed of on- or off-site, including substances in tailings and waste rock, and that are transferred off-site for treatment prior to final disposal or for recycling. ECCC can provide advice and guidance on NPRI substances and on monitoring and reporting requirements.

Fisheries Act - Pollution Prevention Provisions

ECCC administers Section 36(3) and (4) of the *Fisheries Act*, the purpose of which is to prevent pollution by prohibiting the deposit of harmful substances into waters frequented by fish, unless authorized by regulations under the Act or other federal legislation. The “general prohibition” in this section states, in part, that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish, unless authorized by, and deposited in accordance with, regulations under the *Fisheries Act* or other federal legislation.

Meeting requirements of the *Fisheries Act* is mandatory, irrespective of any provincial or territorial regulatory or permitting system. The release of substances with the potential to be "deleterious," as identified in Subsection 34(1) of the *Fisheries Act*, from the construction, operation, reclamation or decommissioning stages of the project in any waters frequented by fish, may constitute violations of the *Fisheries Act*.

Metal Mining Effluent Regulations

Guidelines for the Assessment of Alternatives for Mine Waste Disposal

Using a natural water body frequented by fish for mine waste disposal requires an amendment to the *Metal Mining Effluent Regulations* (MMER), which is a federal legislative action. The MMER, developed under subsections 34(2), 36(5) and 38(9) of the *Fisheries Act* and enacted in 2002, are used to regulate the deposit of mine effluent, waste rock, tailings, low-grade ore and overburden into natural waters frequented by fish. Environment and Climate Change Canada administers MMER, which apply to both new and existing metal mines. MMER are available at http://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-222/.

Schedule 2 of the MMER lists water bodies designated as tailings impoundment areas (TIAs). A project proponent seeking to use a natural water body as a TIA must conduct an assessment of alternatives for mine waste disposal. The alternatives assessment must objectively and rigorously assess all feasible options for mine waste disposal. The project proponent must demonstrate through the EA and the alternatives assessment that the proposed use of the water body as a TIA is the most appropriate option for mine waste disposal from environmental, technical and socio-economic perspectives. It should also be demonstrated that the option offers the greatest overall benefit to current and future generations of Canadians, as per the Cabinet Direction on Regulatory Management. Part 2 of the guidelines describes the requirements of an assessment of alternatives.

It is strongly recommended that this assessment be undertaken during the EA to streamline the overall regulatory review process and minimize the time required to proceed with the MMER amendment process. Generally speaking, at least one of these alternatives should not impact a natural water body that is frequented by fish. It is important to note that a decision by the proponent to conduct the alternatives assessment after the EA has been completed could more than double the target timeline that has been established for the processing of Schedule 2 amendments.

Environmental Effects Monitoring

The MMER regulate the quality of effluent discharged by mines producing base metals, precious metals, iron ore, uranium, and other metals. The MMER include limits on pH and concentrations of arsenic, copper, cyanide, lead, nickel, zinc, total suspended solids and radium 226. The Regulations also require that effluent be non-acutely lethal to rainbow trout. Mines are required to conduct Environmental Effects Monitoring (EEM) to

evaluate the effects of mining effluent on the aquatic environment, specifically fish, fish habitat, and the use of fisheries resources.

EEM is a science-based performance measurement tool used to evaluate the adequacy of the MMER in protecting fish, fish habitats and the use of fisheries resources. The metal mining industry is required to meet their regulatory requirements, which include conducting:

- water quality studies
- effluent characterization studies
- sublethal toxicity testing
- biological monitoring studies in the receiving environment

These biological monitoring studies and chemical/toxicological analyses are conducted to assess and investigate the effects caused by their effluent discharges.