July 19, 2023 NWB File: 2AM-WTP1830

Nunavut Water Board
PO Box 119
Gjoa Haven, NU X0B 1J0

Re: Response to Comments on Whale Tail 2023 Modification under Water Licence 2AM-WTP1830

Dear Mr. Dwyer,

Agnico Eagle Mines Limited (Agnico Eagle) thanks the Nunavut Water Board for the opportunity to respond to the Comments received from the Kivalliq Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, and Environment and Climate Change Canada regarding the Whale Tail 2023 Modification under Water Licence 2AM-WTP1830.

As requested, please find attached Agnico Eagle's responses which are intended to address the comments and recommendations received.

Should you have any questions regarding this letter, please do not hesitate to contact the undersigned.

Sincerely,

Manon Turmel
Permitting and Regulatory Affairs Superintendent
Agnico Eagle Mines Limited

KIVALLIQ INUIT ASSOCIATION (KIVIA)

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-R-01**
Re:	**Water Balance and Water Quality Model**		

Recommendation Made by Interested Party:

In regards to section 2.9 of the Water Balance Water Quality Model (WQWBM), solubility caps for phosphorus are introduced to refine the modelling of phosphorus loading. Does the insoluble phosphorus remain in the O-WTP sludge, or does a portion of the insoluble phosphorus precipitate into the sediment bed of the receiving environment? If the latter, does the model account for mobility of the precipitated phosphorus from the sediment during the closure phases?

Agnico Eagle's Response to Recommendation:

Agnico Eagle refers the reader to Section 3.7.14 of the Whale Tail Mine Water Management Plan (v11_NWB) which notes sludge from the O-WTP is disposed within the Whale Tail Waste Rock Storage Facility where it freezes back with the waste rock; therefore, mitigating any potential remobilization during the closure phases; sludge is not released to the receiving environment.

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-R-01**
Re:	**Adaptive Management**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM:

a) Continue using GSPs per the approved Adaptive Management Plan V1.5 for managing groundwater.

b) Clarify if they have identified any situation that requires implementing Adaptive Management Levels 2 and 3 as per the approved Adaptive Management Plan V1.5.

c) Update the current Adaptive Management Plan if required and submit it to the NWB for approval.

Agnico Eagle's Response to Recommendation:
Responses a, b and c
As mining in this area of the IVR pit is completed, it is more environmentally and economically sound to use this already built and exhausted pit than blasting to build another pit (GSP) in the ground. IVR Pit would be used as a temporary storage for only 5 months under this modification. Utilizing IVR Pit would minimize additional land disturbance for this short period of time. Finally, the approved Adaptive Management Plan V1.5 already includes storing water into a mined out/exhausted pit.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-R-02**
Re:	**Storing Groundwater in IVR Pit**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM:

a) Provide evidence that groundwater storage in the IVR Pit is an environmentally equal or better alternative to the currently approved water management strategies.

b) Describe the specific circumstances that would trigger the option to store groundwater in the IVR Pit.

c) Provide an assessment of potential environmental interactions and impacts associated with storing groundwater in the IVR Pit. At a minimum, interactions and impacts should be assessed quantitatively for high amounts of contaminant in the IVR Pit.

Agnico Eagle's Response to Recommendation:
Response a)
Agnico Eagle would like to reiterate that storage of excess saline water in IVR Pit is an approved strategy under the Water Management Plan and Adaptive Management Plan V1.5. Please refer to response CIRNAC-01 for additional rationale on why Agnico Eagle is proposing to use this approved management strategy for the Whale Tail Modification.

Response b)
Agnico Eagle considers that the management strategies presented in Table 5 of the Adaptive Management Plan V1.5 summarize well the circumstances that would trigger the option to store groundwater in IVR Pit. Groundwater storage in a pit is a common operational practice at Agnico Eagle. For example, at Meliadine Mine, groundwater has been managed (stored and monitored) in Tiriganiaq Pit 02 (TIR02), since 2021.

Response c)
The following considerations were made for the Modification:

Hydrogeology

Based on the hydrogeological and thermal assessment of the IVR Pit completed in support of the 2018 FEIS, the environmental interactions and impacts associated with storing groundwater in the IVR Pit during operations are negligible. The IVR Pit is in an area of regional permafrost and therefore no flux between the pit and the underground is expected.

Water Quantity

As presented in section 2.2 of the Water Balance and Water Quality Model (Appendix B of the Water Management Plan V11), Agnico Eagle is proposing to store groundwater in the eastern lobe of IVR Pit. The eastern lobe of the IVR has an available storage volume of approximately 1.9 Mm^3.

Water Quality

Agnico Eagle will continue to monitor water at station ST-WT-18 (IVR Pit or IVR Pit Sump) during operations. It is expected that the water quality of this water will be the same or better than groundwater water quality. Furthermore, the groundwater stored in IVR Pit will not be in contact with the receiving environment.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-03
Re:	Water Management Plan		

Recommendation Made by Interested Party:

CIRNAC recommends that AEM update the Water Management Plan V11 to reflect the current Adaptive Management Plan, which indicates that the storage of groundwater in the IVR Pit is an alternative option, only to be considered when level 3 (e.g. high-risk) thresholds are met.

Agnico Eagle's Response to Recommendation:

Agnico Eagle does not agree that an update the Water Management Plan V11 is required for this application. Agnico Eagle will update the Water Management Plan as part of the next Annual Report to include flexibility in the implementation of already approved management strategies, as described in response CIRNAC-01 of this response package.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-R-04**
Re:	**Monitoring Requirements**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM clarify how it will monitor and mitigate the impact of the possible high contaminant concentration in the stored groundwater in the IVR Pit.

Agnico Eagle's Response to Recommendation:
Agnico Eagle clarifies that water quality monitoring would happen and would follow the activity listed under Water Licence Schedule D, Table 2. More specifically, Agnico Eagle will continue to monitor at station ST-WT-18 (IVR Pit or IVR Pit Sump) during operations for parameters under Group 1 (i.e., pH, turbidity, hardness, alkalinity, ammonia nitrogen, total metals [aluminum, arsenic, barium, cadmium, chloride, chromium, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, nitrite, nitrate, selenium, silver, thallium, zinc], sulphate, total dissolved solids, and total suspended solids).

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-R-05**
Re:	**Water Management Infrastructure**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM update the water management document with the correct table reference.

Agnico Eagle's Response to Recommendation:
Agnico Eagle thanks CIRNAC for pointing out this typo. There is no table 2-3 to be included in the document.

ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

Interested Party:	**ECCC**	**Rec No.:**	**ECCC-R-01**
Re:	**Water Quality Predictions**		

Recommendation Made by Interested Party:
ECCC recommends that the Proponent:

1. Provide evidence to support the Receiving Environment Model assumption that total concentrations are equal to dissolved concentrations.

2. Provide water quality predictions for both total and dissolved fractions.

3. When comparing water quality predictions against guidelines:

a. Present the same parameter fraction (i.e., total or dissolved fraction) on which the guideline is based.
b. Include relevant Federal Water Quality Guidelines in the comparison criteria

Agnico Eagle's Response to Recommendation:

Response 1)
The assumption of total equal to dissolved concentrations in the receiving environment is supported by monitoring data in Whale Tail South Basin and Kangislulik Lake. Over the years of 2014 through 2023, TSS levels are typically below the detection limit of 1 mg/L in both lakes (see time-series shown in Figures ECCC-1 and ECCC-2). During Operations, it is expected that TSS will settle out of the water column with distance from the point of effluent discharge. Hence, only dissolved constituents will be carried downstream. This assumption is consistent with the 2018 FEIS and subsequent model updates (Golder 2018, 2019).

Figure ECCC-1: Measured TSS concentrations at Whale Tail Lake South Basin (stations WTS and WTSE-1) from 2014 to 2023. Data points falling on the dashed line are below detection limit (1 mg/L).

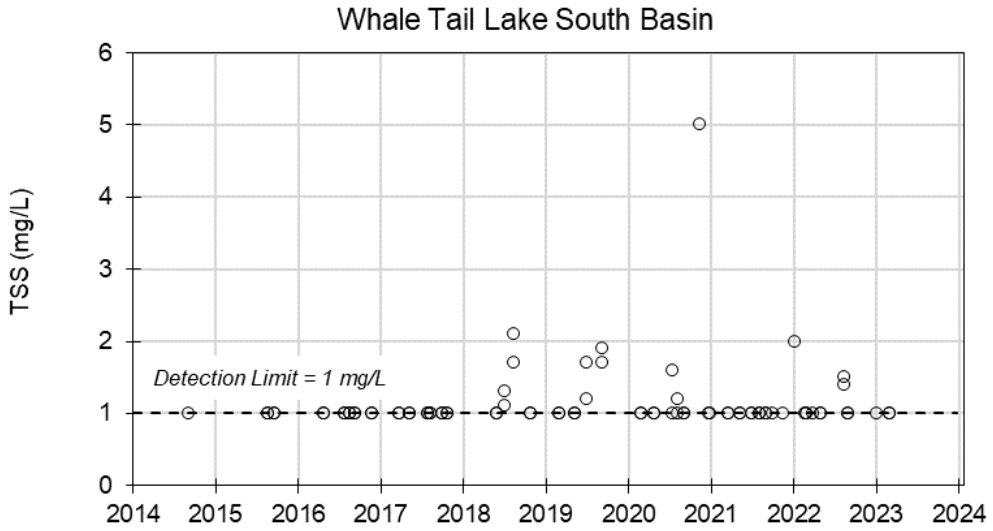
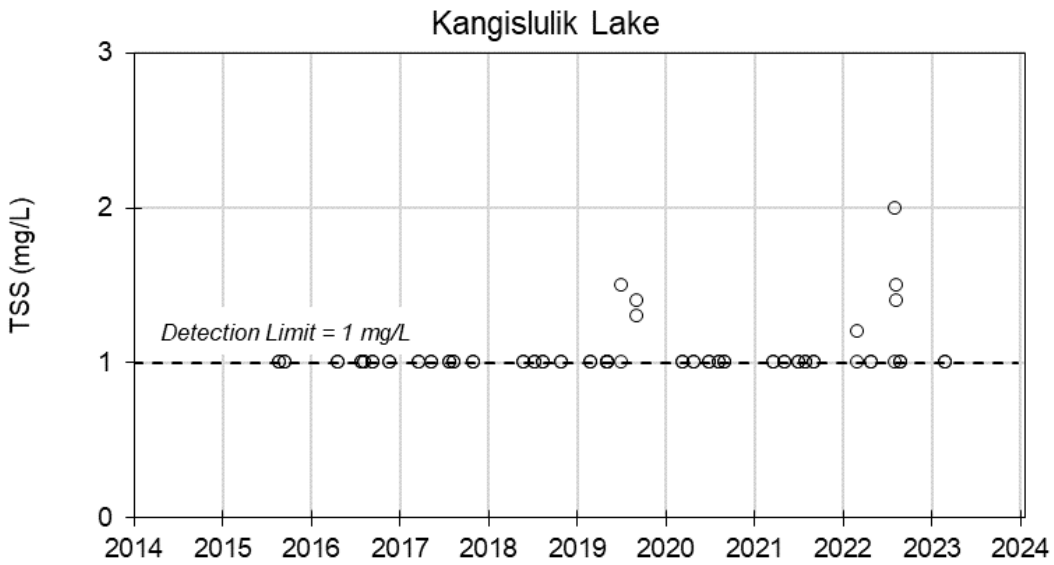


Figure ECCC-2: Measured TSS concentrations at Kangislulik Lake (station MAM) from 2014 to 2023. Data points falling on the dashed line are below detection limit (1 mg/L).



Responses 2 and 3)

The maximum monthly total and dissolved predictions at Whale Tail South Basin and Kangislulik Lake during Operations and Post-closure, compared against CCME/SSWQO/FEQG are shown in the tables ECCC-1 and ECCC-2.

Table ECCC-1: Maximum Total and Dissolved monthly predictions at the Whale Tail Lake South Basin and Kangislulik Lake during Operations

Parameter	Unit	Maximum Monthly Concentration during Approved Operations 2023-2025 (mg/L)				CCME (Dissolved Fractions)	CCME or SSWQO (Total Fractions)	FWQG (Dissolved Fractions)	FWQG (Total Fractions)
		WT Lake South Basin Dissolved	WT Lake South Basin Total	Kangislulik Lake Dissolved	Kangislulik Lake Total				
Total Dissolved Solids	mg/L	96	96	139	139	-	-	-	-
Total Ammonia (as N)[1]	mg/L	0.18	0.18	0.48	0.48	*0.58*	-	-	-
Nitrate (as N)	mg/L	0.35	0.35	1.4	1.4	*2.93*	-	-	-
Nitrite (as N)	mg/L	0.010	0.010	0.051	0.051	*0.06*	-	-	-
Chloride	mg/L	22	22	32	32	*120*	-	-	-
Fluoride	mg/L	0.072	0.072	0.10	0.10	*0.12*	-	-	-
Sulphate	mg/L	15	15	36	36	-	-	-	-
Silver	mg/L	0.0000085	0.000013	0.000013	0.000017	-	*0.00025*	-	-
Aluminum[2,3,4]	mg/L	0.011	0.077	0.017	0.08	-	*0.1*	-	*0.8*
Arsenic	mg/L	0.0030	0.004	0.013	0.014	-	*0.025*	-	-
Boron	mg/L	0.011	0.011	0.0240	0.024	-	*1.5*	-	-
Cadmium[2]	mg/L	0.0000054	0.0000057	0.0000088	0.0000091	-	*0.000091 - 0.00014*	-	-
Chromium[2,5]	mg/L	0.00042	0.0020	0.00075	0.0024	-	*0.001 - 0.0089*	-	*0.005*
Cobalt[2]	mg/L	0.00029	0.00039	0.00077	0.00087	-	-	-	*0.00077 - 0.00097*
Copper[2,3,6]	mg/L	0.00089	0.0010	0.0014	0.0015	-	*0.002*	*0.0031 – 0.0034*	-

Parameter	Unit	Maximum Monthly Concentration during Approved Operations 2023-2025 (mg/L)				CCME (Dissolved Fractions)	CCME or SSWQO (Total Fractions)	FWQG (Dissolved Fractions)	FWQG (Total Fractions)
		WT Lake South Basin Dissolved	WT Lake South Basin Total	Kangislulik Lake Dissolved	Kangislulik Lake Total				
Iron[3,4]	mg/L	0.10	0.24	0.12	0.26	-	*0.3*	-	*2.2*
Mercury	mg/L	0.0000048	0.0000048	0.0000087	0.0000087	-	*0.000026*	-	-
Manganese[2]	mg/L	0.090	0.092	0.14	0.14	*0.43 - 0.49*	-	-	-
Molybdenum	mg/L	0.0019	0.0019	0.0045	0.0045	-	*0.073*	-	-
Nickel[2]	mg/L	0.0053	0.0060	0.018	0.019	-	*0.025 - 0.087*	-	-
Phosphorus	mg/L	0.0094	0.012	0.011	0.013	-	*0.01*	-	-
Lead[3,4]	mg/L	0.000074	0.00010	0.00012	0.00014	-	*0.001*	*0.0062 - 0.0069*	-
Selenium	mg/L	0.00011	0.00011	0.00030	0.00030	-	*0.001*	-	-
Strontium	mg/L	0.13	0.13	0.21	0.21	-	-	*2.5*	-
Thallium	mg/L	0.000014	0.000015	0.000027	0.000028	-	*0.0008*	-	-
Uranium	mg/L	0.00034	0.00034	0.00067	0.00067	-	*0.015*	-	-
Vanadium	mg/L	0.0013	0.0015	0.0023	0.0025	-	-	-	*0.12*
Zinc[2,3]	mg/L	0.0026	0.0027	0.0043	0.0044	*0.0096 - 0.016*	-	-	-

Notes: CCME = Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment
FWQG = Federal Water Quality Guidelines, Environment and Climate Change Canada
SSWQO = Site Specific Water Quality Objective
[1]The CCME guideline for total ammonia conservatively assumes pH of 8 and temperature of 15°C
[2]Predicted hardness at Whale Tail Lake South Basin (average of 51 mg/L) and Kangislulik Lake (average of 88 mg/L) during Operations is used for deriving hardness-dependent guidelines, pH of 8 is conservatively assumed for both Lake.
[3]The FWQG guidelines for total aluminum, dissolved copper, total iron, and dissolved lead are dependent on DOC. The 2022 mean DOC concentration measured at stations Whale Tail South and Kangislulik Lake of 3.8 and 3.6 mg/L, respectively, are used for guideline derivation (2022 CREMP Annual Report).
[5]The CCME guidelines for Cr include both Cr(VI) 0.001 mg/L and Cr(III) 0.0089 mg/L. The FWQG guideline for Cr(VI) is 0.005 mg/L and based on more recent chronic toxicity data than CCME. Given that Cr is expected to be present primarily as Cr (III) in mine water, T-Cr predictions are compared against

the CCME Cr(III) guideline for initial screening. While complexed Cr(III) occurs naturally and is ubiquitous in the environment, the principal source of Cr(VI) in the environment is anthropogenic pollution; it rarely occurs naturally due to its affinity to react with organic matter and other reducing substances.
[6]The FWQG guideline for dissolved copper is derived using the FWQG calculator (Environment and Climate Change Canada)

Table ECCC-2: Maximum Total and Dissolved monthly predictions at the Whale Tail Lake South Basin and Kangislulik Lake during Post-Closure

Parameter	Unit	Maximum Monthly Concentration during Post-Closure 2043 onwards (mg/L)				CCME (Dissolved Fractions)	CCME or SSWQO (Total Fractions)	FWQG (Dissolved Fractions)	FWQG (Total Fractions)
		WT Lake South Basin Dissolved	WT Lake South Basin Total	Kangislulik Lake Dissolved	Kangislulik Lake Total				
Total Dissolved Solids	mg/L	59	59	152	152	-	-	-	-
Total Ammonia (as N)[1]	mg/L	0.037	0.037	0.18	0.18	*0.58*	-	-	-
Nitrate (as N)	mg/L	0.067	0.067	0.53	0.53	*2.93*	-	-	-
Nitrite (as N)	mg/L	0.00059	0.00059	0.0097	0.0097	*0.06*	-	-	-
Chloride	mg/L	13	13	32	32	*120*	-	-	-
Fluoride	mg/L	0.044	0.044	0.066	0.066	*0.12*	-	-	-
Sulphate	mg/L	4.7	4.7	18	18	-	-	-	-
Silver	mg/L	0.0000054	0.000010	0.0000081	0.000012	-	*0.00025*	-	-
Aluminum[2,3,4]	mg/L	0.0075	0.074	0.021	0.087	-	*0.1*	-	*0.8*
Arsenic	mg/L	0.00060	0.0013	0.017	0.018	-	*0.025*	-	-
Boron	mg/L	0.0054	0.0054	0.0079	0.008	-	*1.5*	-	-
Cadmium[2]	mg/L	0.0000028	0.0000032	0.0000070	0.0000073	-	*0.000055 - 0.000092*	-	-
Chromium[2,5]	mg/L	0.00022	0.00184	0.00028	0.0019	-	*0.001 - 0.0089*	-	*0.005*

Parameter	Unit	Maximum Monthly Concentration during Post-Closure 2043 onwards (mg/L)				CCME (Dissolved Fractions)	CCME or SSWQO (Total Fractions)	FWQG (Dissolved Fractions)	FWQG (Total Fractions)
		WT Lake South Basin Dissolved	WT Lake South Basin Total	Kangislulik Lake Dissolved	Kangislulik Lake Total				
Cobalt[2]	mg/L	0.00006	0.0002	0.00018	0.0003	-	-	-	*0.00060 - 0.00078*
Copper[2,3,6]	mg/L	0.00053	0.00064	0.00096	0.00107	-	*0.002*	*0.0027 – 0.0031*	-
Iron[3,4]	mg/L	0.050	0.19	0.051	0.19	-	*0.3*	-	*2.2*
Mercury	mg/L	0.0000027	0.0000027	0.0000088	0.0000088	-	*0.000026*	-	-
Manganese[2]	mg/L	0.027	0.029	0.078	0.080	*0.35 - 0.43*	-	-	-
Molybdenum	mg/L	0.00031	0.00031	0.00131	0.0013	-	*0.073*	-	-
Nickel[2]	mg/L	0.0015	0.0022	0.0067	0.0074	-	*0.025*	-	-
Phosphorus	mg/L	0.0050	0.0074	0.006	0.0079	-	*0.01*	-	-
Lead[3,4]	mg/L	0.000056	0.000083	0.000090	0.00012	-	*0.001*	*0.0054 - 0.0062*	-
Selenium	mg/L	0.000027	0.000028	0.00023	0.00023	-	*0.001*	-	-
Strontium	mg/L	0.066	0.066	0.14	0.14	-	-	*2.5*	-
Thallium	mg/L	0.0000054	0.0000064	0.0000087	0.000010	-	*0.0008*	-	-
Uranium	mg/L	0.00008	0.000086	0.00059	0.00059	-	*0.015*	-	-
Vanadium	mg/L	0.00027	0.00045	0.00071	0.00089	-	-	-	*0.12*
Zinc[2,3]	mg/L	0.0016	0.0018	0.0029	0.0031	*0.0055 - 0.0098*	-	-	-

Notes: CCME = Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment
FWQG = Federal Water Quality Guidelines, Environment and Climate Change Canada
SSWQO = Site Specific Water Quality Objective
[1]The CCME guideline for total ammonia conservatively assumes pH of 8 and temperature of 15°C
[2]Predicted hardness at Whale Tail Lake South Basin (average of 28 mg/L) and Kangislulik Lake (average of 52 mg/L) during Post-Closure is used for deriving hardness-dependent guidelines, pH of 8 is conservatively assumed for both Lake.

[3]The FWQG guidelines for total aluminum, dissolved copper, total iron, and dissolved lead are dependent on DOC. The 2022 mean DOC concentration measured at stations Whale Tail South and Kangislulik Lake of 3.8 and 3.6 mg/L, respectively, are used for guideline derivation (2022 CREMP Annual Report).

[5]The CCME guidelines for Cr include both Cr(VI) 0.001 mg/L and Cr(III) 0.0089 mg/L. The FWQG guideline for Cr(VI) is 0.005 mg/L and based on more recent chronic toxicity data than CCME. Given that Cr is expected to be present primarily as Cr (III) in mine water, T-Cr predictions are compared against the CCME Cr(III) guideline for initial screening. While complexed Cr(III) occurs naturally and is ubiquitous in the environment, the principal source of Cr(VI) in the environment is anthropogenic pollution; it rarely occurs naturally due to its affinity to react with organic matter and other reducing substances.

[6]The FWQG guideline for dissolved copper is derived using the FWQG calculator (Environment and Climate Change Canada)

References

Golder (Golder Associates Ltd.). 2018. Whale Tail Pit - Expansion Project – Appendix 6-H: Addendum Mine Site and Downstream Receiving Water Quality Predictions (2018 FEIS). 1789310-237-RPT-Rev0. Prepared for Agnico Eagle Mines Ltd. by Golder Associates Ltd. November 2018. 230 pp.

Golder. 2019. Mine Site and Downstream Receiving Water Quality Predictions Whale Tail Pit - Expansion Project. 18108905-308-RPT-Rev0. Prepared for Agnico Eagle Mines Ltd. by Golder Associates Ltd. May 2019. 229 pp.