



November 12, 2024

NWB File: 2AM-MEA1530

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

Re: Response to Comments on the Operational Notice of the Development of Site-Specific Water Quality Objectives for Total Dissolved Solids under Water Licence 2AM-MEA1530

Dear Mr. Dwyer

Agnico Eagle thanks the Nunavut Water Board for the opportunity to respond to comments received from the Kivalliq Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, and Environment and Climate Change Canada regarding the Operational Notice of the Development of Site-Specific Water Quality Objectives for Total Dissolved Solids under Water Licence 2AM-MEA1530. Our comments are provided in the enclosed.

Should you have any questions or require further information, please contact the undersigned at your convenience.

Regards,

Jamie Quesnel
jamie.quesnel@agnicoeagle.com
Director, Permitting & Regulatory Affairs

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PREAMBLE

Agnico Eagle Mines Limited (Agnico Eagle) has noted in its review of comments from Parties that there may be confusion about the process put in place under the current Water Licence 2AM-MEA1530. In particular, Part E, Item 7 of the Water Licence which allows for the development of an appropriate site-specific guideline, subject to Nunavut Water Board (NWB) approval. A site-specific water quality objective (SSWQO) may be developed in cases where predicted re-flooded pit water quality indicates that treatment is necessary.

The request for the development of a SSWQO for Total Dissolved Solids (TDS) was initiated when Agnico Eagle notified the NWB that measured TDS concentrations in Portage Pit E and Goose Pit exceeded forecasted model predictions by over 20%. While measured concentrations were higher than what was modeled, **the request is not indicative of poor water quality, and effects to the receiving environment. For clarity, effluent is not being discharged nor proposed to be discharged through this notice.**

The applicability of Part E, Item 7 of the Water Licence is particularly relevant in the case of TDS since there are no generic or Canadian Council of Ministers of the Environment (CCME) guidelines available to assess environmental risk. The main reason for this is because TDS is comprised of naturally occurring salts in surface water and its toxicity to aquatic life is highly based on site-specific conditions relating to mineral solubilities of the geological region in question. TDS is not a measured parameter that is directly comparable across Canada or other Regions. TDS is comprised of various combinations of inorganic salts and small amounts of organic matter that are dissolved in water. The principal salts that comprise TDS include: calcium, magnesium, potassium, sodium, carbonate, bicarbonates, chloride, and sulfate.

Therefore, developing a site-specific benchmark is the most appropriate way to ensure that the receiving environment downstream of the Meadowbank Complex remains protected in closure and post-closure.

Following direction from Part E, Item 7 of the Water Licence, Agnico Eagle has undertaken a site-specific risk assessment to develop appropriate water quality criteria and objectives (effluent quality criteria [EQC] and SSWQO) for TDS. The TDS benchmarks proposed contain sufficient conservatism to be protective of aquatic life in all phases of the project and were developed following the preferred CCME methodologies that ECCC themselves apply in the derivation of water quality guidelines for the protection of aquatic life.

KIVALLIQ INUIT ASSOCIATION (KivIA)

Interested Party:	KivIA	Rec No.:	KivIA-R-1
Re:	SSWQO Development		

Request Made by Interested Party:

The KIA has reviewed the Agnico Eagle’s Operational Notice of the Development of a Site- Specific Water Quality Objective for Total Dissolved Solids, and has the following comments.

The continued exceedances of the modelled TDS in Pit E and Goose Pit suggest the models require validation and further updating in order for development of Closure Plans for the Meadowbank site.

Impacts of site-specific water quality guidelines to the receiving environment are unclear, particularly when using concentrations above CCME standards when not supported by higher than normal baseline concentrations. Further understanding of the impacts to the receiving environment would be necessary to understand the impacts of site-specific water quality guidelines to Inuit use.

Agnico Eagle’s Response to Request:

Agnico Eagle agrees, and model validation and updates for TDS are ongoing to support an updated closure and reclamation plan for the Meadowbank Complex. Based on this, the most conservative model iteration assessed in 2024 was used in the development of the interim benchmarks to ensure protection in even the highest predicted TDS concentrations.

As mentioned in the preamble above, there are no CCME or generic water quality guidelines for TDS for the protection of aquatic life. Primarily because TDS is comprised of a unique combination of naturally occurring salts in surface water and its toxicity is highly site-specific based on the mineral solubilities of the geological region in question. For these reasons, development of TDS benchmarks based on the framework designed by CCME is the best approach for assessing the true risk to aquatic life in the pit lakes and in the receiving environment (Wally Lake) at closure and post-closure.

Based on the results noted below the proposed SSQWO for TDS is protective of the receiving environment. In addition, as part of this notification, there is no discharge to the receiving environment. This SSWQO will be used to define effluent quality during closure and possibly during the later years of operations.

An assimilative capacity model was conducted to assess impacts of site-specific TDS to the receiving environment (Wally Lake). The in lake 95th percentile concentrations of TDS under the most conservative model predictions showed that TDS concentrations of 1,285 mg/L could occur at the edge of the mixing zone (EMZ). This is slightly above the current interim SSWQO of 1,000 mg/L proposed based on literature review. Site-specific chronic testing of invertebrates (*C. dubia*) and algae (*R. subcapitata*), showed no observable effects at TDS concentrations of 2,217 – 2,226 mg/L. Confirmation of chronic toxicity to fathead minnow is ongoing and the SSWQO will be finalized in November, 2024. TDS concentrations of 1,285 mg/L at the EMZ are not likely to negatively impact the most sensitive aquatic life in Wally Lake since the predicted lake wide concentrations of TDS is anticipated to be 523 mg/L (~4 times lower than the No Observable Effect Concentration).

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-1
Re:	In-Pit Tailing Deposition		

Request Made by Interested Party:

CIRNAC recommends that the NWB not allow site-specific water quality objectives for pit lakes used for in-pit tailing deposition. Instead, Agnico Eagle should be required to implement appropriate mitigation measures to achieve the post-closure pit lake water quality objectives.

Agnico Eagle’s Response to Request:

Agnico Eagle is following the process as set out under Part E, Item 7 of the Water Licence in situations where predicted pit flood water quality post-closure indicates treatment may be necessary.

As per Part E, Item 7 of Water Licence 2AM-MEA1530 (emphasis added):

*“The Licensee shall submit a Water Management Plan on an annual basis to the Board for review following the commencement of Operations. The Plan must include an updated Water Balance. The Water Management Plan shall include an action plan to be implemented if predicted re-flooded pit water quality indicates that treatment is necessary. The Licensee shall not breach dikes until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, **or appropriate site specific water quality objectives.** Subject to the Board approval, **if water quality parameters are above CCME Guidelines, a site specific risk assessment must be conducted to identify water quality objectives that are protective of the aquatic environment.**”*

Mitigation measures have already been implemented to minimize increasing TDS during Operations, but as a precautionary step, Agnico Eagle has proactively prepared an action plan to address the potential future risk of TDS to the aquatic receiving environment at closure. Since there are no available CCME guidelines for TDS and the model predictions indicate baseline conditions for TDS would not be achievable in the pit lakes, there was a need to assess the true risk to the aquatic receiving environment by completing the following risk assessments:

- Acute toxicity of TDS at the point of discharge (Appendix A of SSWQO memo provided as part of the notification to NWB)
- Chronic toxicity of TDS at the edge of the mixing zone (Appendix B SSWQO memo provided as part of the notification to NWB)
- Evaluation of the assimilative capacity of TDS in the receiving environment

Part E, Item 7 of the Water Licence allows for the development of an appropriate site-specific guideline, subject to NWB approval. An increase in a particular parameter of concern does not necessarily equate to

catastrophic environmental impacts, particularly when the parameter of concern is TDS in which the ionic composition and toxic response to aquatic organisms can differ greatly among sites.

As such, Agnico Eagle has undertaken a site-specific risk assessment to develop appropriate site-specific water quality objectives (EQC and SSWQO) for TDS.

The site-specific water quality objectives proposed contain sufficient conservatism that it would be protective of all aquatic life. The site-specific TDS EQC and SSWQO that Agnico Eagle is proposing were developed following the preferred CCME methodologies using species sensitivity distribution approaches where there are adequate primary and secondary toxicity data available to develop an appropriate guideline. The methods used for developing the EQC and SSWQO were adopted and recommended by the CCME that they themselves apply in the derivation of water quality guidelines for the protection of aquatic life (CCME 2007).

References:

Canadian Council of Ministers of the Environment (CCME). 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life 2007. In: Canadian environmental quality guidelines, Canadian Council of Ministers of the Environment. Winnipeg MB.
<https://ccme.ca/en/res/protocol-for-the-derivation-ofwater-quality-guidelines-for-the-protection-of-aquatic-life-2007-en.pdf>.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-2
Re:	Uncertainty and Potential Risks		

Request Made by Interested Party:

CIRNAC recommends that the NWB reject the proposed site-specific EQC and SSWQO for TDS due to significant uncertainty, data gaps, and risks of long-term environmental harm. Following CCME guidelines would offer a more precautionary and scientifically sound approach to ecosystem protection.

Agnico Eagle's Response to Request:

Agnico Eagle respectfully disagrees with CIRNAC's comments as Agnico Eagle is following existing conditions Water Licence that has been developed in rigor and approved by multiple parties. In addition, through this submission Agnico Eagle has presented data that provides certainty and demonstrated no long-term environmental harm. Agnico Eagle requires certainty that the Water Licence can be relied upon as a regulatory road map to meet operational needs.

There is no better precautionary and scientifically sound approach for long-term ecosystem protection available in Canada than the process that Agnico Eagle has already undertaken for TDS by following CCME protocols (2007) for the derivation of a site-specific water quality guidelines for the protection of aquatic life, particularly for a parameter such as TDS for which CCME guidelines do not exist.

As mentioned in the SSWQO technical memorandum prepared by WSP (provided as part of the notification to NWB), a very rigorous screening process was undertaken, including extensive literature review in addition to site specific toxicity testing to derive the interim benchmarks. The EQC of 4,000 mg/L was very conservative given that no acute toxicity was observed to fish or invertebrates exposed to Pit E and Goose Pit water at TDS concentrations above 10,000 mg/L. Likewise the SSWQO of 1,000 mg/L was also conservative given that we observed no chronic toxicity to invertebrates and algae (most sensitive species) at TDS below 2,200 mg/L.

References:

Canadian Council of Ministers of the Environment (CCME). 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life 2007. In: Canadian environmental quality guidelines, Canadian Council of Ministers of the Environment. Winnipeg MB. <https://ccme.ca/en/res/protocol-for-the-derivation-ofwater-quality-guidelines-for-the-protection-of-aquatic-life-2007-en.pdf>

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-3
Re:	Water Quality Parameter Exceedances		

Request Made by Interested Party:

CIRNAC recommends that Agnico Eagle investigate the causes of exceedances for all water quality parameters, not just TDS, and develop appropriate mitigation measures to ensure compliance with post-closure pit water quality objectives. This approach will help address the broader environmental risks and ensure long-term ecosystem protection.

Agnico Eagle's Response to Request:

For clarity, there is no exceedance of TDS because it is not being discharged to the environment. As per the Water Licence conditions noted in the previous responses, which defines the approach, the focus of this particular notice was specifically targeting TDS. Other parameters of concern may be assessed for risk in the same manner in the future.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-4
Re:	Closure Planning		

Request Made by Interested Party:

CIRNAC recommends that Agnico Eagle convene an annual workshop with regulators and interested parties to discuss closure planning and mitigation measures to meet post-closure pit lake water quality objectives for the Meadowbank and Whale Tail Mines.

The overall goal of the workshop is to a) ensure that all organizations (including Agnico Eagle) are fully informed of closure requirements, b) To assess the adequacy of any progressive reclamation activities undertaken by Agnico Eagle, and 3) to proactively identify critical issues such as the post-closure pit lake water quality objectives that need to be resolved on a priority basis.

Agnico Eagle's Response to Request:

Agnico Eagle acknowledges that active dialogue on closure planning is justified between the involved organizations and regulators. Agnico Eagle intends to continue providing updates on progressive closure work, closure planning and closure engineering concepts, for both Meadowbank and Whale Tail sites, through the Annual Report and the next version of the Closure and Reclamation Plan.

The next version of the Closure and Reclamation Plan is planned to be submitted in 2025 and will include details on the closure activities, progressive closure completed and planned for the remaining part of operations, as well as monitoring plan framework for closure and post-closure.

Agnico Eagle intends to present to CIRNAC and the KivIA a preliminary version of this Closure and Reclamation Plan before the end of 2024.

As per the Water Licenses (2AM-MEA1530 and 2AM-WTP1830), the Licensee shall submit the Final Closure and Reclamation Plan to the Board for approval at least twelve (12) months prior to the expected end of planned mining.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-5
Re:	Water Quality Prediction Methods		

Request Made by Interested Party:

CIRNAC recommends that Agnico Eagle revisit its water quality modelling assumptions and approaches used for the Meadowbank project to ensure all future project decisions (particularly closure) are informed by sufficiently accurate predictions.

Agnico Eagle’s Response to Request:

Agnico Eagle has produced an updated water balance and water quality model in 2024 which will be included as part of the CRP.

ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

Interested Party:	ECCC	Rec No.:	ECCC-R-1
Re:	Consideration of Mitigation and Management Options		

Request Made by Interested Party:

ECCC recommends the Proponent provide a discussion of potential mitigation or management options that could be implemented to improve water quality during operations, closure, and post-closure.

Agnico Eagle's Response to Request:

As per Part E, Item 7, the request is for the development of a SSWQO for TDS that was initiated when Agnico Eagle notified the NWB that measured TDS concentrations in Portage Pit E and Goose Pit exceeded forecasted model predictions by over 20%. While measured concentrations were higher than what was modeled, the request was not due to poor water quality. Further mitigation other than what is currently outlined in management plans is not necessary, and instead calibration of the water quality model is being completed to better predict concentrations. Mitigation measures currently in place are expected to keep TDS concentrations at acceptable levels including closure and post-closure.

Interested Party:	ECCC	Rec No.:	ECCC-R-2
Re:	Comparison to Existing Conditions and Predicted Future Effluent and Water Quality to Effluent Quality Criteria and Site-Specific Water Quality Objectives		

Request Made by Interested Party:

ECCC recommends the Proponent provide a comparison of how both measured and predicted concentrations in the pits and receiving environment compare to the proposed EQC and SSWQO, respectively.

Agnico Eagle’s Response to Request:

The reason for this notice was that measured TDS concentrations in Portage Pit E and Goose Pit exceeded forecasted model predictions by over 20%. This TDS levels measured in Pit A, Pit E and Goose Pit were provided in Table 4.1, Section 4 of the updated Meadowbank Water Management Plan V13 (2024) submitted as part of the initial TDS notification package. Predictions of the receiving environment were not provided because we are not discharging to the receiving environment. Once Agnico Eagle is ready to discharge, we will meet the EQC and SSWQO.

Interested Party:	ECCC	Rec No.:	ECCC-R-3
Re:	Effluent and Water Quality Model Update		

Request Made by Interested Party:

ECCC recommends the Proponent clarify whether an update to the effluent and water quality model has been undertaken as a result of measured concentrations exceeding predictions. If not, ECCC recommends that a model update be completed to refine source terms and predictions to address measured concentrations exceeding predictions.

Agnico Eagle's Response to Request:

Yes, Agnico Eagle has an updated effluent and water quality model that will be submitted in 2025 with the CRP. An earlier model prediction provided the basis for the toxicity work and the assimilative capacity study that applies to this notification for the development of a TDS EQC/SSWQO.

Interested Party:	ECCC	Rec No.:	ECCC-R-4
Re:	Data Inconsistencies		

Request Made by Interested Party:

ECCC recommends that the Proponent:

- 1. Provide clarification on why the observations of reduced survival referred to in Section 1-3.0 are not included in Table 1-2;*
- 2. Complete a review of Table 1-2 and Figure 1-3 for accuracy, and provided updated tables/figures, as required.*

Agnico Eagle's Response to Request:**Response to bullet 1)**

The intent of this table was to show the lethal concentration to 50% of the test organisms (LC50) at 100% concentration of TDS (%vol/vol) and that is why reduced survival was not presented in this summary table.

Response to bullet 2)

Table 1-2 does not require an update as it accurately summarizes the LC50 results of the acute toxicity testing of *D.magna* and Rainbow Trout. Figure 1-3 accurately represents the ionic composition of TDS in the various samples assessed for Acute toxicity and does not require updating.

Interested Party:	ECCC	Rec No.:	ECCC-R-5
Re:	Justification for Effluent Quality Criteria		

Request Made by Interested Party:

ECCC recommends that the Proponent provide an interpretation of the results of acute toxicity testing resulting in <100% survival.

Agnico Eagle’s Response to Request:

The testing in Attachment 1 – Section 1-3.0 refers to testing conducted by Agnico Eagle in 2022 using Mock Effluent. This information was used for background information purposes (i.e., range finding) prior to the site-specific and more definitive 2024 testing. Care must be exercised in interpreting the magnitude of response in these samples given that no response was 50% or greater:

- For rainbow trout, all samples yielded survival of 80% or greater in the maximum strength sample.
- For *Daphnia magna*, all samples but one yielded 100% survival, with the remaining sample yielding 60% survival in the maximum strength sample

The low frequency and effect sizes for these mortalities do not allow for a quantitative concentration-response analysis. The reduced survival in the 7 November 2022 sample and 7 December 2022 sample corresponded to TDS concentrations of 2,834 and 2,382 mg/L, respectively. These findings could be indicative of low-level responses due to sample chemistry but could also be influenced by other sources of variance in the Mock Effluent testing. These results were considered along with the more recent 2024 testing; the latter exhibited no acute toxicity to *Daphnia magna* or Rainbow Trout at calculated TDS concentrations of <10,233 mg/L (Attachment 2 of the SSWQO memo, submitted as part of the notification to NWB). Therefore, the cause of toxicity in the previous 2022 testing is likely not due to TDS itself, but rather another constituent in the Mock Effluent. No investigations into the cause of toxicity in those tests were conducted, as they were used as a preliminary rangefinder for additional testing, and because the low to moderate effect sizes in those two tests are not conducive to reliable toxicity identification evaluation.

Interested Party:	ECCC	Rec No.:	ECCC-R-6
Re:	Chronic Toxicity and Existing Guidelines		

Request Made by Interested Party:

ECCC recommends the Proponent:

1. *Provide additional justification for proceeding with a TDS EQC and SSWQO, rather than sulphate, given existing precedence for similar projects within Canada.*
2. *Consider a combined approach of including EQC and SSWQO for both sulphate and TDS.*

Agnico Eagle's Response to Request:

Response to bullet 1)

The preference for either TDS or sulphate as the primary basis for SSWQO development should be made on a case-by-case basis. The reliability of one or the other depends on factors such as the dominance of sulphate in the mixture, the proportions of other ions, and the degree to which the mixture is expected to remain stable over the long term.

The TDS mixture used in the 2024 testing was formulated to investigate site-specific ionic compositions. Although these mixtures were sulphate dominant, use of a TDS SSWQO accounts for other mixture components that could modify the toxicity of sulphate. The role of hardness, in particular, can influence the toxicity of sulphate, both in terms of ameliorating hardness at low to moderate levels and enhancing toxicity at higher concentrations (i.e., where either cation-specific toxicity or a more generalized osmotic stress is introduced).

Recent research suggests that individual ions, such as the sulphate ion alone, are not the sole causal factor of toxicity; rather, the toxicity can be based on dominant cations or the cumulative osmotic pressure caused by the full ionic composition of the water (Mount et al. 2016, 2018; Erickson et al. 2016a,b). For these reasons, there was value in evaluating the full effects of major ion concentrations and ratios of major ions (such as calcium-to-magnesium ratios) in a site-specific manner. Effluent projections for Meadowbank were simulated in a laboratory setting to investigate how the balance of ions may or may not cause toxicity. This allowed for the consideration of multiple major ions in a chemical solution (calcium, magnesium, potassium, sodium, chloride, sulphate, nitrate, fluoride, and total alkalinity [as CaCO₃]), and evaluated how the chemical interactions among these ions can influence toxicity in a site-specific manner.

We believe it would be redundant to generate both a TDS SSWQO and a sulphate SSWQO for this site. Sulphate measurements can be a useful surrogate measure (in some cases), however, investigating TDS as whole is a more holistic approach as it considers both individual ions and mixture effects. The interim

benchmark provided for TDS is also similar to, if not lower, than what has previously been generated for similar sulphate-dominant mixtures at other sites.

Response to bullet 2)

As indicated in the response to bullet 1, we believe it would be redundant to generate both a TDS SSWQO and a sulphate SSWQO; these values are highly autocorrelated.

References:

Erickson RJ, Mount DR, Highland TL, Hockett JR, Hoff DJ, Jenson CT, Norberg-King TJ, Peterson KN, Polaske ZM, Wisniewski S. 2016a. The Acute Toxicity of Major Ion Salts to *Ceriodaphnia dubia*: I. Influence of Background Water Chemistry. *Environmental Toxicology and Chemistry* 35(12):3039-3057.

Erickson RJ, Mount DR, Highland TL, Hockett JR, Hoff DJ, Jenson CT, Norberg-King TJ, Peterson KN. 2016b. The Acute Toxicity of Major Ion Salts to *Ceriodaphnia dubia*. II. Empirical Relationships in Binary Salt Mixtures. *Environmental Toxicology and Chemistry* 36(6):1525–1537.

Mount D, Erickson R, Forsman B, Highland T, Hockett J, Hoff D, Jenson C, Norberg-King T. (2018). Chronic toxicity of major ion salts and their mixtures to *Ceriodaphnia dubia*: Chronic toxicity of major ions to *Ceriodaphnia*. *Environmental Toxicology and Chemistry* 38. 10.1002/etc.4346.

Mount D, Erickson R, Forsman B, Highland T, Hockett J, Hoff D, Jenson C, Norberg-King T, Soucek D. 2016. Thoughts on applying existing toxicological understanding to risk assessment for major ions in fresh waters. Prairie Research Institute. Conference Publication: 7th Society of Environmental Toxicology and Chemistry World Congress/Society of Environmental Toxicology and Chemistry North America 37th Annual Meeting, 6-10 November 2016, Orlando, Florida. 73 pp.

Interested Party:	ECCC	Rec No.:	ECCC-R-7
Re:	Receiving Environment Predictions		

Request Made by Interested Party:

ECCC recommends the Proponent provide additional details on the source of the dilution factor used to generate the predictions provided in Table 1-1 and additional clarity on what this table is intended to demonstrate.

Agnico Eagle’s Response to Request:

The intention of the Table 1-1 entries was to show both the full-strength effluent predictions, and the edge of the mixing zone predictions. The dilution factor of 0.75 (1.33:1) was chosen to be a “worse-case scenario” given that the predicted minimum dilution factor for Wally Lake is estimated to be closer to 0.5 (2:1), and 0.077 (13:1) for Third Portage Lake.

Interested Party:	ECCC	Rec No.:	ECCC-R-8
Re:	Measured vs. Calculated TDS		

Request Made by Interested Party:

ECCC recommends the Proponent provide a discussion on the large differences in measured and calculated TDS that were observed on October 3 and December 2.

Agnico Eagle’s Response to Request:

Total dissolved solids concentrations can be measured (TDS_{meas}) directly by evaporating a known volume of filtered water and measuring the mass of the residue left after evaporation, known as the gravimetric method. Alternatively, TDS concentrations can be calculated (TDS_{calc}) from the summation of major ions in the sample (APHA 2012).

The TDS differences between TDS_{meas} and TDS_{calc} seen in Attachment 1 Table 1-1 (SSWQO memo provided as part of the notification to NWB), are partly due to the differences in how analytical laboratories report TDS versus how toxicologists calculate TDS (i.e., for concentration-response assessment, and standardization in publications). For consistency across all projects, as well as to interpret literature data consistently, WSP uses the APHA (2012) method, whereby:

- TDS (mg/L) is calculated as the sum of calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, alkalinity as carbonate (calculated $0.6 \times \text{total alkalinity as CaCO}_3$), and nitrate as NO₃ (calculated $4.427 \times \text{nitrate as N}$; APHA 2012).
- The October 3rd and December 7th (incorrectly labelled as December 2nd) samples were analyzed by Bureau Veritas Inc. in St-Laurent, Quebec. TDS_{meas} was reported using the MA. 115-S.D 1.0 R4 m gravimetric method (Gouvernement de Québec 2023).

This difference in using the gravimetric method and measuring the mass of residue left after evaporation for TDS_{meas}, compared to the TDS_{calc} method of summing major ion constituents, would result in two different numbers being reported. As outlined in Attachment 1, Section 1-1.1 (SSWQO memo provided as part of the notification to NWB), TDS_{calc} is preferred rather than measured because:

- Laboratory interference can reduce the accuracy of measured TDS (Evaristo-Cordero 2011). In particular, waters with high calcium, magnesium, and chloride concentrations can form hygroscopic residues that absorb water under normal laboratory conditions, potentially biasing the measured TDS higher than actual concentrations (APHA 2005; Evaristo-Cordero 2011).
- In contrast, calculated TDS is based on the major ions that can measurably contribute to TDS and is therefore not influenced by any changes that may occur from those ions being taken out of solution.

- Calculated TDS incorporates explicit consideration of the ionic composition, which is important for evaluating the toxicity of the TDS mixture.

Using the APHA 2012 method (for consistency) and preferred use of TDScalc is likely more accurate given the practical limitations in handling and measuring TDS.

References:

APHA (American Public Health Association). 2005. Standard Methods for the Examination of Water and Wastewater, 21st Edition. Washington, DC, USA.

APHA. 2012. Standard Methods for the Examination of Water and Wastewater, 22nd Edition, with updates to 2015. Washington, DC, USA.

Evaristo-Cordero, C. 2011. Senior Account Manager, ALS Laboratory Group, Edmonton, AB, Canada. Email to Tasha Hall (Golder Associates Ltd), September 2011.

Evaristo-Cordero C. 2013. Senior Account Manager. ALS Laboratory Group, Edmonton, AB, Canada. Email to Tasha Hall (Golder Associates Ltd.), February 2013.

Gouvernement de Québec. 2023. Méthode d'analyse MA. 115 – S.D. 1.0. Détermination des solides dissous totaux et volatils : méthode gravimétrique. February 2023, Version 6.

Interested Party:	ECCC	Rec No.:	ECCC-R-9
Re:	Chronic Toxicity Dataset		

Request Made by Interested Party:

ECCC recommends that the Proponent consider the development of a species sensitivity distribution to provide statistically robust justification for a proposed site-specific water quality objective.

Agnico Eagle's Response to Request:

A species sensitivity distribution (SSD) will be generated to aid in the justification for the proposed SSWQO. At the time of writing this response, Agnico is currently running a long-term fish toxicity test, which should be available by mid- to late-November 2024. These data will be included in the revised TDS report, which will also include the SSD. As stated in the Section 3.2.3 of the main report, the proposed (interim) SSWQO of 1,000 mg/L is dependent on "Confirmation of negligible chronic toxicity to Rainbow Trout [revised to Fathead Minnow] survival and development at TDS concentrations $\leq 1,000$ mg/L."

In developing the SSD, consideration will be given to the treatment of literature-based results versus site-specific toxicity results; preference will be given to site-specific testing because it accounts for the ionic composition expected to be relevant to future conditions. However, literature data will also be included because site-specific tests alone will not provide sufficient species representation to provide the species requirements for a CCME Type A derivation.

Interested Party:	ECCC	Rec No.:	ECCC-R-10
Re:	Site Reference Chemistry		

Request Made by Interested Party:

ECCC recommends the Proponent clarify the source of the site reference chemistry for major ions that is provided in Table 2-3. This should include a discussion/clarification on the discrepancies between this table and other sections of the report.

Agnico Eagle’s Response to Request:

We do not believe there are any discrepancies between Table 2-3 and the other sections of the report. However, additional details have been added to explicitly state the source of the site reference throughout. These revisions will reduce the potential for confusion or misinterpretation of findings and will be reflected in the revised report.

The source of the site reference is stated in Attachment 2, Section 2-2.2.1 (SSWQO memo provided as part of the notification to NWB) with the heading “*Source Water for Testing*”. Site water was collected from a raw drinking water intake pipe connected to Third Portage Lake (station DW-RAW-KIA) by Agnico on 27 March 2024.

It is possible that confusion arose due to the following sentence (Attachment 2, Section 2-2.2.1, SSWQO memo provided as part of the notification to NWB):

“Therefore, laboratory amendment of site waters **and laboratory-prepared synthetic waters were selected as the two viable options.** The source water used for chronic toxicity testing with the cladoceran *Ceriodaphnia dubia* and the algae *Raphidocelis subcapitata* was amended site-collected water.”

This sentence (emphasis added) was carried over from a previous version of the TDS report, which included Rainbow Trout test waters. Due to the Rainbow Trout test not being included in the report version reviewed by ECCC (due to non-availability of test organisms), the reference to laboratory-prepared synthetic waters is not relevant here. The base waters for testing should have been described as site waters only (not laboratory-prepared waters) for the *C. dubia* and *R. subcapitata* tests. This sentence may have been a source of confusion due to deferral of trout testing and will be addressed in the revised TDS report.

Attachment 2, Section 2-2.2.1 (SSWQO memo provided as part of the notification to NWB) provides rationale for why a site reference water is needed, and why it was used in the *C. dubia* and *R. subcapitata* tests as both the dilution water and a field reference. For chronic toxicity testing, it is desirable to evaluate samples that have water quality (including exposure and toxicity modifying factors) representative of the edge of the regulated mixing zone; for this purpose, and to evaluate toxicity under site-specific conditions,

it is often preferable to use site water samples (surface water). As this study evaluated future exposure conditions in the receiving environment during effluent discharge, rather than current conditions, it was not possible to directly collect fully-representative source waters for testing from the field. Instead, current field conditions are assumed to be broadly representative of future receiving environment water composition.

Interested Party:	ECCC	Rec No.:	ECCC-R-11
Re:	Report Inconsistencies		

Request Made by Interested Party:

ECCC recommends that the above noted sections are reviewed for accuracy, and clarifications provided as needed.

Agnico Eagle's Response to Request:

The revised TDS report (expected December 2024) will include applicable revisions from ECCC, including incorporation of information from these responses. Revisions and additional information from on-going testing will be reviewed for accuracy, with clarifications provided as needed.