July 15th, 2020

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Subject: Comments on 2AM-MEL1631 Design Report for Saline Effluent Treatment Plant (SETP) Upgrade and Operation & Maintenance Manual

Dear Mr. Dwyer,

Please find attached Agnico Eagle Mines Limited (Agnico Eagle)'s response to Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Environment and Climate Change Canada (ECCC)'s comments on the Design Report for Saline Effluent Treatment Plant (SETP) Upgrade and Operation & Maintenance Manual..

Agnico Eagle remains available to further discuss these comments if required.

Kind regards,

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Environment Superintendent, Meliadine
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Comment 1 ECCC: Ammonia and TDS Targets

The proponent has not specified the parameter treatment targets for Total Dissolved Solids (TDS) and ammonia. The proponent just states that the targets will be set to be non-acutely toxic for the three-spined stickleback. ECCC notes that the marine invertebrate test using Acartia tonsa will also be a requirement effective June 2021, and that the proponent should plan to use it as a target.

It does not appear that the Saline Effluent Treatment Plant (SETP) will reduce TDS levels. The proponent should identify what treatment will be used to consistently reduce TDS concentrations prior to discharge to Melvin Bay.

ECCC recommends that:

- the treatment target for non-acutely lethality include passing the marine invertebrate test using Acartia tonsa.
- ECCC recommends that the proponent specify the targets for TDS and ammonia as a numerical range or maximum.
- ECCC recommends that the proponent provide information on how they will achieve TDS reductions in the effluent.

Agnico Eagle Answer:

- *Agnico Eagle thanks ECCC for bringing this to our attention and we will start to plan for inclusion of this test when this requirement comes into force in June 2021. Meanwhile, Agnico Eagle will also review ECCC's requests for comments regarding this new test species as per the email dated June 17th 2020.*
- *The maximum operational target for TDS will be 39 600 mg/L which is the maximum guideline established by Golder (2019) to not increase more than 10% the chloride concentration of seawater at the discharge location at a flow rate of 1600 m3/day. The Golder report is presented in the approved Saline Effluent Discharge to Marine Environment Design report (6528-680-132-REP-001) approved in 2019.*

  The maximum operational target for ammonium concentration will be derived from the MDMER limit based on un-ionized ammonia at 0.5 mg/L (expressed as nitrogen N) for the Maximum Authorized Monthly Mean Concentration and 1.0 mg/L (expressed as nitrogen N) for the Maximum Authorized Concentration in a Grab Sample.
- *The TDS reduction will be achieved as presented in section 3.6 of the report. (6526-680-132-REP-001), which follows the same approach as described in the approved SETP Design Report from 2019. Figure 1 (below) presents the conceptual flowsheet of the SETP including the TDS adjustment reactor.*

  It should be noted that the modifications to the SETP described in the report under review (6526-680-132-REP-001, May 2020) do not relate at all to how TDS is

adjusted but rather relate to upgrades to SETP. The key changes in the SETP as compared to 2019 are the following:

- *Improve TSS removal by retrofitted the Multiflo unit (classical lamella clarifier) to an Acitflo unit (sand ballasted lamella clarifier)*
- *Increase in capacity for breakpoint chlorination (improve ammonia removal)*
- *Additional granular activated carbon (GAC) filters for higher dichlorination*
- *Supplemental reagent dosing capacity and control for improved treatment performance*
- *Upgrade of pumping capacity to manage a higher throughput to meet the approved target of 1,600 m^3/d discharge to sea*

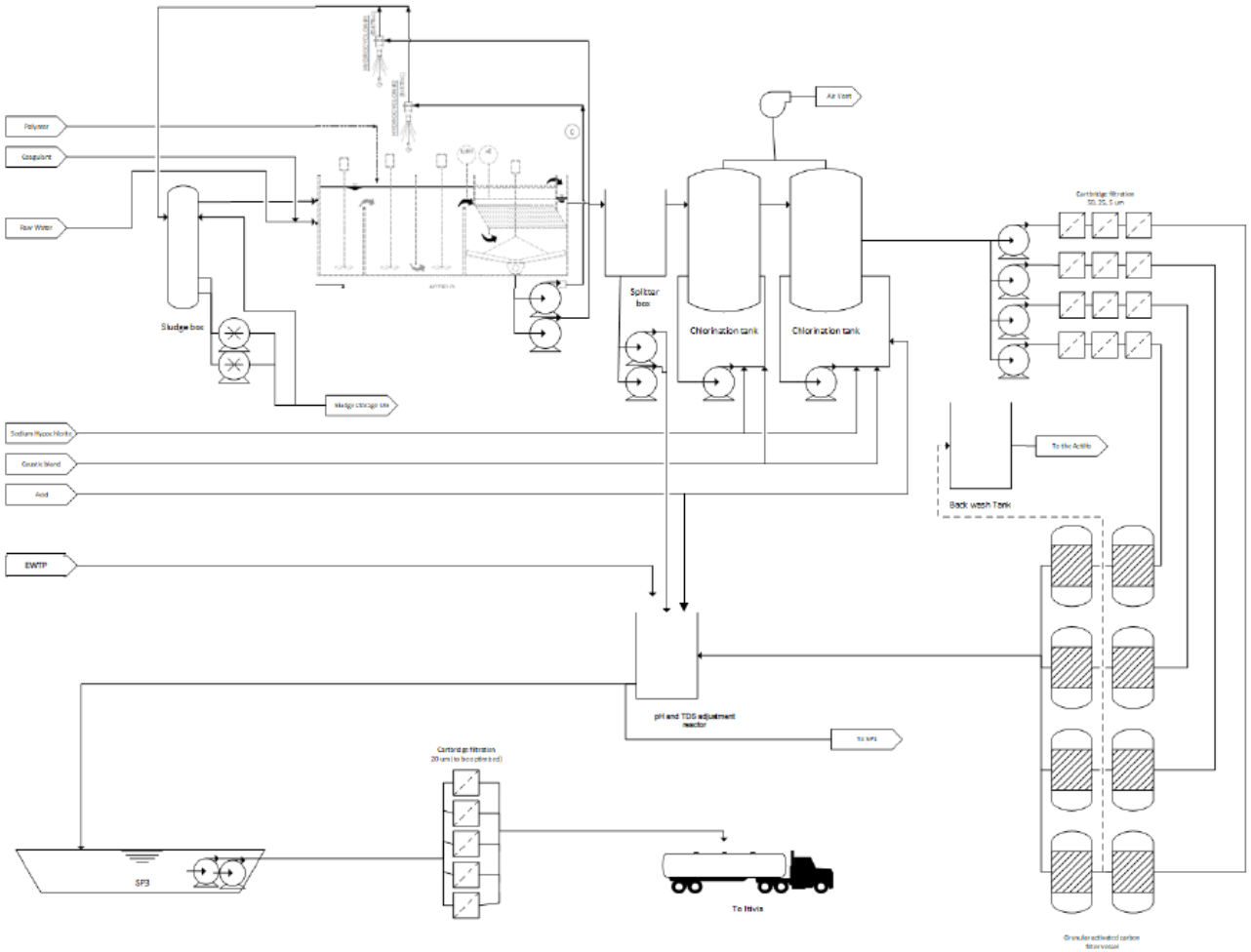

Figure 1: SETP Conceptual Flowsheet

Comment 1 CIRNAC: Treatment Objectives of SETP: pH

Table 1 of the design report listed the effluent treatment objectives for the following three parameters: pH (6 to 9), acute toxicity on marine species (Non-Toxic) and total suspended solids (15 mg/L).

Although a pH value between 6 and 9 is appropriate for the freshwater aquatic ecosystem in general, pH of the marine environment, including coastal zones, is normally above 7. pH is a critical parameter for the health of the marine ecosystem, particularly the coastal habitat where marine mollusc species (e.g., shellfish) thrive and the *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture* recommends a pH range between 7.0 and 8.7 for the protection of mollusc embryo development in marine water.

CIRNAC recommends that the effluent treatment objective for pH be revised from between 6 and 9 to between 7.0 and 9.0, unless it can be demonstrated that the lower pH will not have a significant negative impact on the marine ecosystem.

Agnico Eagle Answer:

- *Agnico Eagle commits to respecting MDMER for the pH of the treated water between 6 and 9 as presented in the previous design report of the SETP, which was approved in 2019. Furthermore, the Modelling Assessment of Groundwater Discharge into the Melvin Bay Marine Environment, Rev B (Appendix D of the approved SETP Design Report 6528-680-132-REP-001, Golder 2019) show that the mixing at the discharge location is high and parameters such as TDS and chloride concentrations, reach the baseline concentration +10% within a few meters distance from the diffusor. Therefore, we expect that the impact of having a pH below 7 will have a very low impact on the marine environment.*
- *The pH behaviour in the mixing zone will be further characterized this discharge season during the sampling that will occur in the receiving environment as per the MDMER.*

Comment 2 CIRNAC: Treatment Objectives of SETP: Total Dissolved Solids

The design report states that the total dissolved solids (TDS) and ammonia concentration targets will be set to be non-acutely toxic for the three-spined stickleback. CIRNAC notes that although the treatment for ammonia is described in detail in the design report, the methodology and the design of effluent TDS treatment is not provided.

Given that effluent TDS treatment may be required, CIRNAC recommends that the licensee include the methodology and the design of effluent TDS treatment in the design report.

Agnico Eagle Answer:

- *The TDS reduction will be achieved as presented in section 3.6 of the report. (6526-680-132-REP-001), which follows the same approach as described in the approved SETP Design Report from 2019. Figure 1 (below) presents the conceptual flowsheet of the SETP including the TDS adjustment reactor.*

  It should be noted that the modifications to the SETP described in the report under review (6526-680-132-REP-001, May 2020) do not relate at all to how TDS is adjusted but rather relate to upgrades to SETP. The key changes in the SETP as compared to 2019 are the following:
  - *Improve TSS removal by retrofitted the Multiflo unit (classical lamella clarifier) to an Acitflo unit (sand ballasted lamella clarifier)*
  - *Increase in capacity for breakpoint chlorination (improve ammonia removal)*
  - *Additional granular activated carbon (GAC) filters for higher dichlorination*
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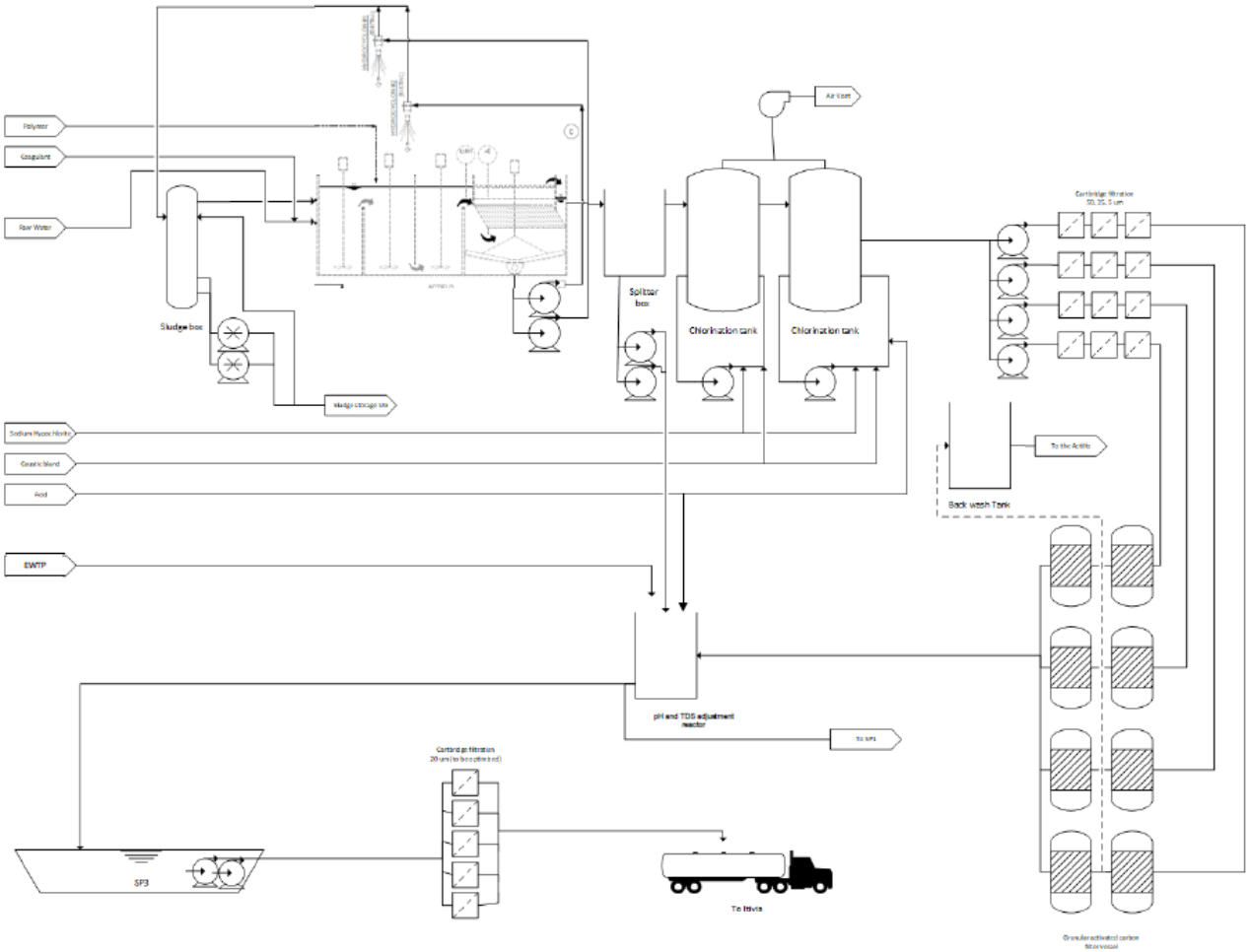

Figure 1: SETP Conceptual Flowsheet