Table of Contents

Abbreviations and Acronyms

ABA	acid base accounting
AP	acid potential
ARD	acid rock drainage
CCME	Canadian Council of Ministers of the Environment
CWQG	Canadian Water Quality Guidelines
EIS	environmental impact statement
FAL	freshwater aquatic life
MEND	mine environment neutral drainage
ML	metal leaching
MWQSOG	Manitoba Water Quality Standards, Objectives and Guidelines
NP	neutralization potential
PAG	potentially acid generating
RAA	regional assessment area
SAR	species at risk
SFE	shake flask extraction
VC	valued component

QUESTION IAAC-05

EIS Guideline Reference: 7.1.2 Geology and Geochemistry

EIS Reference: 6.3.2.2 Geology Overview; 6.3.3 Project Interactions with Geology and Soils

Context and Rationale

The EIS Guidelines require the geochemical characterization of blast and excavated materials such as waste rock and/or soils, and potential construction materials (e.g., borrow materials) in order to predict and mitigate metal leaching and acid rock drainage. It also requires baseline assessment of contaminants of concern that include, but are not limited to, selenium, sulphate, cadmium, nitrate and calcite.

Geochemical assessment in the EIS is limited to desktop studies regarding potential sulphide. There has not been an assessment (desktop or otherwise) on borrow/quarry materials that may be used for construction.

The EIS states the Project will not have interactions with geology; however, quarry material will be used to construct the project. While the EIS indicates the limestone formations in which quarries will be located, no project-specific geochemical analysis has been completed.

Information about the characteristics of excavated and construction materials is required because associated metals leaching can adversely affect areas of federal jurisdiction, including fish and fish habitat and wildlife including migratory birds, Species at Risk (SAR) such as amphibians (northern leopard frog), and species of cultural importance.

Information Requests

a) Provide a detailed assessment for acid rock drainage and metals leaching for each formation considered as source material for construction.

   i. Provide a baseline assessment of contaminants of concern.

   ii. Provide a sampling program that will be used to assess the suitability of quarry material for use in constructing the project. The program should outline and provide rationale for the metals suite that is used, the thresholds that are acceptable, the sampling intensity, and how waste rock will be managed and stored.

   iii. Complete an assessment on how source material for construction may interact with the environment, including potential pathway of effects to all VCs. Present mitigation measures, including a discussion criteria for source material selection that could mitigate effects, and assess significance of residual effects. Discuss associated monitoring and follow up

Question IAAC-05

Response IAAC-05

a) Bedrock in the regional assessment area has low potential for acid rock drainage/metal leaching (ARD/ML) due to an abundance of carbonates and localized occurrences of sulphides based on the desktop assessment (Volume 2, Section 6.3.2.2; Figure 6.3B-3). Therefore, sources of construction rock in this area will also have low potential for ARD/ML. Processes for identifying, testing, and mitigating ARD/ML are well known and there are established protocols for addressing potential issues. The program necessary to establish baseline conditions of selected quarries and to develop site-specific mitigation measures is described here.

   i. The baseline assessment for contaminants of concern will be completed for each quarry location following the process described in (ii) and (iii) below.

   ii. Each quarry location and source (existing and proposed) will be subject to a field program that includes a visual assessment of quarry walls and cores to identify presence and locations of sulphides in specific lithologies or strata (e.g., beds). Samples of rock and contact water (e.g., seeps from stockpiles, if present) will be collected. Sampling frequency will be based on the Mine Environment Neutral Drainage (MEND) guidance (Price 2009). Rock samples will be tested for acid base accounting (ABA) to assess ARD potential. To evaluate ML potential, shake flask extracts (SFE) from rock samples will be analyzed for the suite of trace elements listed in:

      - Canadian Water Quality Guidelines (CWQG) for the Protection of Freshwater Aquatic Life (FAL) by Canadian Council of Ministers of the Environment (CCME 2018).
      - Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG, MWS 2011).

      The assessment of test results will be done using MEND criteria to define potentially acid generating (PAG) rock and materials with high ML potential. Rock sample will be classified as PAG if acid potential (AP) is higher than neutralization potential (NP). Metal leaching criteria will be based on contact water chemistry with CWQG and MWQSOG thresholds and baseline concentrations in the receiving environment (e.g., surface water). If a parameter in contact water exceeds the baseline concentrations and acute CWQG and MWQSOG thresholds, the material will be assigned high ML potential. The management of the materials is discussed in the response to (iii) below.

      The procedures proposed above may change if better procedures become available (e.g., new testing technology, etc.) Also, if the contractor wants to use a different procedure, they will have to provide MI with a justification that the proposed procedure meets the need for identification of ARD/ML, and MI must approve the change request before the contractor can proceed. Use of other procedures need to be approved by MI and the provincial permitting body. MI will only approve changes where appropriate to do so.

Question IAAC-05

The timing of the field program is dependent on finalizing the construction schedule; however, these surveys will be done in advance and in support of evaluating quarry options and development of the overall construction execution plan.

iii. Volume 1, Appendix 3F Project Environmental Requirements, Volume 1, Section 2.12.1.5 states that before developing a quarry, Manitoba Infrastructure will assess the potential for acid rock generation. This includes the commitment that "Sites found to contain acid generating rock shall not be developed or used." Therefore, potential effects related to ARD when developing new and using existing quarries, including related effects on other valued components (VCs), will not occur. In the regional assessment area (RAA) it is unlikely to find high ML in a quarry with low ARD potential, because both ARD and ML are generally related to oxidation of sulphide minerals. The current strategy for mitigation of ML is avoidance - if an existing or potential quarry is found to have high ML potential, the quarry will not be used or developed, and therefore will also not have any effects on related VCs.

References

Canadian Council of Ministers of the Environment (CCME). 2018. Canadian water quality guidelines for the protection of aquatic life: Summary Table. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg, MB. Accessed from http://st-ts.ccme.ca/en/index.html in January 2020.

Manitoba Water Stewardship (MWS). 2011 Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG).

Price, W.A. 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials, Report prepared for MEND. Report 1.20.1, p. 1-579.