



February 3, 2021

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Sent by email to: veronique.lalande@canada.ca

Re: Comments from Natural Resources Canada Concerning the Analysis of the Environmental Impact Statement of the Rose Lithium-Tantalum Mining Project

Natural Resources Canada (NRCan) participated in the analysis of the Environmental Impact Statement (EIS) of the Rose Lithium-Tantalum Mining Project. In the context of our departmental mandate, NRCan's review focused on the geochemical characterization of the waste rock and tailings, and the hydrogeological characterization necessary for the development of a model of contaminant transport in groundwater, contaminant transport in surface water, and the risks associated with the aquatic environment. The environmental risks in the surface water, the seismic hazards and the geochemical characterization then were used to determine the acceptability of the waste rock and tailings management measures on the site.

Also, under the *Explosives Act*, NRCan examined the applicable federal authorizations pertaining to its regulatory role, necessary to allow the project to be carried out. As identified in the EIS and Information Request 1 (IR1), the mixing and pumping of explosives constitute manufacturing within the meaning of section 53 (c) of the Explosives Regulations, 2013. To allow the project to be carried out, the proponent will require a factory licence issued by NRCan's Explosives Safety and Security Branch, under subsection 7 (1) of the *Explosives Act*, to manufacture explosives.

After reviewing the information provided by the proponent, NRCan determined that the seismic hazard will be taken into account correctly, and NRCan finds that the conclusions presented by the proponent related to the hydrogeological effects seem reasonable in relation to the level of information used in this Statement.

NRCan also raised some issues regarding geochemistry, specifically the risk of acid drainage and the risk of tantalum contamination. To reduce these risks, NRCan recommends the following measures:

- 1- The Agency could coordinate a discussion regarding the establishment of a research program in collaboration with the proponent and the responsible government departments to derive a water and sediment quality criteria and thus better understand the fate of tantalum in the receiving aquatic environment and develop effluent treatment technologies.
- 2- The waste rock management plan should stipulate how the waste containing sulphurized minerals will be managed, in order to avoid placing these materials on the edges or on top of the waste rock pile, where it may create local acid rock drainage pockets. The monitoring of the waste rock pile should include a visual inspection for acid rock drainage, and the mitigation plan should include the measures to be taken if acid rock drainage were generated. Moreover, waste rock containing sulphurized minerals should not be used for construction purposes.



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- 3- Overburden tests for acid rock drainage potential, including tests adapted to the soil (TDPAS, i.e., test for determining the acid-generating potential of soil), should be performed before using overburden for construction.

The reasons for these recommendations are discussed in the attached appendix, in response to the questions asked by the Agency and the Grand Council of the Crees in their letter of January 13, 2021. These answers are considered to be NRCan's final opinion for this environmental assessment. If you have any questions, feel free to contact me by email at peter.unger@canada.ca.

Cordially,

<Original signed by>

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APPENDIX 1 – Questions for Natural Resources Canada Existing Environment and Basic Conditions Before the Project

- 1) Has the proponent presented adequately and sufficiently described and documented information on the existing environment and the basic hydrogeological conditions and seismic risks? Please explain your answer and specify the deficiencies or the aspects for which uncertainty may persist. Explain whether these deficiencies and uncertainties can influence your opinion and if so, to what extent.

Yes, the proponent has presented adequately and sufficiently described and documented information on the existing environment and the basic hydrogeological conditions and seismic risks. NRCan asked questions regarding the hydrogeological modelling and agrees with the conclusions up to this stage of the project. NRCan has no further comments on the subject of hydrogeological modelling or seismic risks.

Changes Caused by the Project

- 2) Have the potential changes to groundwater caused by the project been identified and documented adequately by the proponent? Please explain your answer and specify the deficiencies or the aspects for which uncertainty may persist. Please describe the changes that were poorly identified or not identified.

NRCan asked questions related to the risks of tantalum contamination. Although tantalum is poorly soluble (Filella *et al.* 2018; 2019), it seems to be fairly hazardous, because its toxicity is at the $\mu\text{g/L}$ level (Borgmann *et al.* 2005) A recent study also suggests that tantalum has the potential to bioaccumulate and even amplify in the aquatic food web (Espejo *et al.* 2018) The proponent answered the questions adequately in view of the limited scientific knowledge on the fate, toxicity and treatment technologies of effluent containing tantalum.

Because the environmental impact assessment originally contained little information on the tantalum content in the waste rock and tailings, the answers by Critical Elements allow a conservative *a priori* estimate of the tantalum in its mining waste. The leaching tests also give conservative estimates of the tantalum content in the effluent and the mine drainage coming from the waste rock and tailings. This information will allow the mine operator to predict tantalum concentrations in the ground water, surface water and sediments. This approach is considered sufficient at this stage.

There is a lack of information on the acid-generating potential for overburden. The Lamont report (2018) provides total metals results (MA200) for 10 overburden samples and they are used to assess the risk under Quebec's Directive 019. However, the acid-generating potential of this material was not assessed. An acid-base titration analysis is recommended in the MEND (2009) Directives for all materials disturbed by mining activities, before using overburden for



construction. Overburden could present an acid rock drainage risk and should be tested by means of an acid-base titration analysis and by tests adapted to the soil (TDPAS).

The waste rock geochemical characterization program has not sufficiently assessed the long-term acid rock drainage potential of waste containing sulphurized minerals, because the potentially acid-generating rocks (with a higher sulphurized mineral content) have not been assessed by means of kinetic tests. Although the deposit generally contains low concentrations of sulphurized minerals, Critical Elements provided an assessment of the distribution of sulphurized minerals indicating that they were observed in isolated areas in concentrations ranging from traces to over 5%. Due to the low buffering capacity of the waste rock provided by the alumino-silicate minerals, it is possible that localized acid rock drainage pockets may form in the waste rock pile. Sulphurized waste rock must not be placed on top or on the edge of the waste rock pile, where it is exposed to atmospheric conditions. Moreover, waste rock containing sulphurized minerals should not be used for construction purposes.

- 3) Has the proponent adequately identified and documented the seismic changes and risks the project could induce in the construction and operating phases, both in the terrestrial and aquatic environments? Please explain your answer and specify the deficiencies or the aspects for which uncertainty may persist. Please describe the changes or risks that were poorly identified or not identified.

Yes, NRCAN has determined that the seismic hazard will be correctly taken into account.

Mitigation Measures

- 4) Are the proponent's proposed measures adequate and sufficient to mitigate the changes to water resources and reduce the seismic risks? If not, please explain and propose other measures.

The proponent also proposes a runoff water collection system to route the runoff water to the mine effluent treatment plant. Critical Elements undertakes to measure the total tantalum in the mine effluents and not to increase the tantalum concentrations in the receiving environment beyond the natural levels once the mine is in operation. In fact, the proponent undertakes to adopt an action level of 0.1 µg/L of total tantalum in the mine effluent. If the tantalum concentrations released into the environment led to concentrations higher than the background levels, it would be appropriate to study the possibility of reducing the quantity of suspended solids (SS) released into the receiving environment by modifying the treatment system. To do this, Critical Elements must therefore undertake to determine the background levels in the groundwater, surface water and sediments, as requested by the Agency.

For the acid rock drainage (ARD) risk of the overburden, it is possible that the proposed measures will not be necessary, but the proponent should verify the acid potential of these materials to show that the overburden is low risk according to Quebec's Directive 019 before using it for construction. The proponent indicates that the acid rock drainage potential for waste rock is low, despite the sporadic presence of sulphurized minerals in



the waste rock. The waste rock management plan should specify how the waste containing sulphurized minerals will be managed, particularly to avoid placing this material on the edges or on top of the waste rock pile. The monitoring of the waste rock pile should include a visual inspection for ARD, and the mitigation plan should include the measures to be taken if ARD were generated. Moreover, waste rock containing sulphurized minerals should not be used for construction purposes.

- 5) Among the measures proposed by the proponent to mitigate the changes to water resources and reduce the seismic risks, please identify those you consider key measures. Please propose corrective actions (as needed) or recommend any other measures you consider essential.

NRCan suggests that the responsible departments work together to develop water and sediment quality criteria for tantalum. Critical Elements has not undertaken to participate in deriving a tantalum quality criterion for groundwater and sediments and has not provided justification as requested by the Agency. Critical Elements instead favours the wastewater treatment improvement approach in the event of tantalum enrichment in the environment. This is acceptable *a priori*. However, if Environment and Climate Change Canada's (ECCC) Environmental Effects Monitoring program for mine effluents identifies impacts over two successive cycles, the causes of the impacts will then be investigated. Information on toxicity and bioaccumulation of tantalum will then be necessary. The Agency could coordinate discussions regarding the establishment of a research program with the proponent and the responsible government departments to derive a water and sediment quality criterion and thus better understand the fate of tantalum in the receiving aquatic environment and develop effluent treatment technologies. NRCan recommends that the Agency communicate with ECCC, NRCan and other responsible government departments to look for a solution.

Regarding the acid drainage risk, NRCan recommends that the overburden should be tested by means of an acid-base titration analysis and by tests adapted to the soil (TDPAS). The test should be conducted under the program this summer for all samples representing overburden areas that will be disturbed by mining operations or used for construction. The waste rock management plan should stipulate how the waste containing sulphurized minerals will be managed, in order to avoid placing this material on the edges or on top of the waste rock pile, where it may create local acid rock drainage pockets. The monitoring of the waste rock pile should include a visual inspection for acid rock drainage, and the mitigation plan should include the measures to be taken if acid rock drainage were generated. Moreover, waste rock containing sulphurized minerals should not be used for construction purposes.

NRCan has determined that the seismic hazard will be correctly taken into account and has no other recommendation for this subject.

Monitoring and Follow-up Program

- 6) In the monitoring program, please identify the essential measures to verify and



control the deployment of the mitigation measures and to ensure they are appropriate to reduce, avoid or mitigate the seismic risks and changes to water resources. Please propose corrective actions (as needed) or recommend any other measures you consider essential.

To reduce the acid rock drainage risk, monitoring of the waste rock pile should include a visual inspection for acid rock drainage.

- 7) Please identify the follow-up program's measures that will allow determination of the effectiveness of the measures deployed to mitigate the changes to water resources and reduce the seismic risks. Please propose corrective actions (as needed) or recommend any other measures you consider essential.

Effects of Environmental Conditions on the Project

- 8) Does NRCan have concerns regarding the effects that the environment⁴ could have on the project? In particular, has the proponent adequately documented the seismic risks inherent in the project site and considered these risks appropriately in the design of its project? Where applicable, please explain your concerns and identify the deficiencies or the aspects for which uncertainty may persist.

The project is located in a region where the seismic hazard is relatively low, and the proponent correctly took it into account. Therefore, NRCan has no concerns regarding the seismic risks related to this project.