

SLAVE MÉTIS ALLIANCE

PO Box 2301 Yellowknife, NT X1A 2P7



July 4, 2019

Mackenzie Valley Review Board
200 Scotia Centre, 5102-50th Ave
Yellowknife, NT X1A 2N7

To: Kate Mansfield & Catherine Fairbairn

Re: Review Board Information Requests to Parties for Diavik EA1819-01

As requested for the Diavik Environmental Assessment (EA1819-01), the Mackenzie Valley Environmental Impact Review Board (Review Board) issued two information request to several parties, including the North Slave Métis Alliance. This letter specifically addresses

Information Request 1: Potential impacts to cultural use of Lac de Gras Area

1. *Please describe how your group used the Lac de Gras area culturally (including the hunting, fishing, trapping, gathering, and travel) before mining started there.*

As this question pertains to the land use prior to the development of Diavik Diamond Mine, this information was collected and provided to the regulators during the initial environmental assessment of the mine. Please see the attached “Appendix A: Can’t Live Without Work” by North Slave Metis Alliance (1999).

2. *Please describe how your group would use and feel about the Lac de Gras area under the following scenarios:*
 - a) *reconnecting empty pits and underground mine workings with Lac de Gras at closure (that is, Diavik’s current closure plan for the mine),*
 - b) *putting processed kimberlite into the pits and underground mine workings before reconnecting them to Lac de Gras (that is, the proposed activities for this environmental assessment),*
 - c) *putting processed kimberlite into the pits and underground mine workings and not reconnecting them with Lac de Gras.*

During a community meeting, NSMA members expressed that their interest was to have the Diavik mine site (not just the pits) return to pre-development condition as much as practicable, in such a way that the area would be the cleanest and safest environment possible for humans and wildlife.

Members also agreed that storing processed kimberlite in the underground workings and pits would reduce the surface footprint of the site post-closure and that it would lead to safer and

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cleaner post-closure environment (on the surface) that is closer to the pre-development condition. In that sense, NSMA supports the storing of the processed kimberlite materials in the underground mine workings and empty pits.

Given that the key interest of NSMA members is to have a safe and clean environment for humans and wildlife that is as close to pre-development condition as possible, NSMA is agreeable to the proposed closure approach (scenario in question “b”), so long as suitable closure criteria (see our response to IR #2 below as well as our Information Request submitted to the Review Board on June 20, 2019) are met at the time of closure and expected to stay stable in the future. Having that said, NSMA has no objection to the scenario “c”, as long as comparable closure criteria are applied.

Information Request 2: Closure Options

- 1. When determining if the pits should be reconnected to Lac de Gras at closure, is water quality in the pit lake the only criteria that should be considered?*
- 2. If not, please describe what additional criteria for re-connection should be considered.*

For the Diavik mine closure, the North Slave Métis Alliance prioritizes returning the Lac de Gras area to a state that is safe for people and wildlife, both for presence on the land as well as the certainty that wildlife and natural resources are safe to harvest.

NSMA agrees that water quality is the primary criteria in determining the pits’ suitability for reconnection to Lac de Gras. Water quality parameters such as total dissolved solids, total suspended solids, general chemistry, nutrient concentrations, trace metal concentrations, dissolved oxygen, and ammonia (listed in Table 4-1 of the Summary Impact Report as measurable parameters for assessment of effects on water quality) are all necessary in determining if the pits are suitable for fish and fish habitat. However, water quality should not be the sole criteria considered.

NSMA suggests the following criteria as necessary components to determining the pits’ suitability for reconnection to Lac de Gras, specifically in regards to fish and fish habitat:

- Water quantity & permafrost thaw;
- Littoral zone substrate makeup; and,
- Chlorophyll concentration.

Water quantity & Permafrost thaw

The full impacts of climate change on the environment in the Northwest Territories remains unclear. Through conversations with NSMA members as well as members of other NWT communities, we have heard of observed gradual decrease in water level of prominent lakes and

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rivers in their traditional harvesting areas, notably in the Dehcho and South Slave regions. In contrast, effects of climate change are also predicted as increased drainage due to thawing permafrost (Bonsal *et al.*, 2019). In either event, both evaporation and dilution would impact water quality, primarily in the concentration of metals, erosion rate of the pit walls, and availability of littoral zone habitat for fish species (Bartram & Balance, 1996). Adding water quantity to pre-dyke breach criteria would also ensure monitoring of pit water seepage to underground workings or the watershed.

Littoral zone substrate makeup

A benefit of flooding the pits and underground mine workings and reconnecting them to the Lac de Gras area is to create fish habitat. The ICRP has already identified the most prominent habitat types in the Lac de Gras area, including:

- boulder shorelines;
- bedrock outcrops surrounded by boulder and cobble leading to a mixture of large boulders and sand; and,
- sandy areas with some interspersed boulders (Diavik ICRP, version 4, section 3.4.4.1.1).

The ICRP describes how these different types of habitats are suitable for different fish species. If the substrate type, size, and relative placement in the littoral zone affects the species of fish that will inhabit that area, the littoral zone substrate makeup should be a required criteria for pit water suitability prior to reconnection to Lac de Gras (Diavik ICRP, version 4, section 9.2.4.4.).

The Summary Impact Statements has identified “a change in littoral habitat area” in the Lac de Gras or Coppermine River as a potential event for fish mortality, resulting in “the death of fish or eggs due to ice scour or dewatering” (Summary Impact Statement, section 6.1.3); the same assumption should be extended to the flooded pits. Monitoring water quantity in the flooded pits (e.g., flood or drainage), in addition to littoral substrate, will ensure pit edges are suitable for fish habitat prior to dyke breaching.

Eutrophication indicators

AEMP lists Phosphorus, Nitrogen, Chlorophyll α and Zooplankton Biomass as Indicators of Eutrophication (Table 3.5-1: Summary of the AEMP Design Plan Version 4.1). The planned monitored variables for Water Quality (according to Table 4.3-1 of the AEMP) include nitrogen and phosphorous, but do not appear to include chlorophyll α and zooplankton biomass. Chlorophyll α is a necessary component to a healthy freshwater environment. The Summary Impact Statement report states the importance of chlorophyll α in the Lac de Gras system: “average summer chlorophyll α concentration, a measure of photosynthetic pigment abundance, is $<0.5\mu\text{g/L}$. This low standing crop of algae, in turn, limits the annual production of zooplankton, benthic invertebrates and fish” (Section 6.2.2.1).

Diavik mine has had an impact on the concentration of chlorophyll α in near-field and mid-field sites (Summary Impact Statement, section 6.2.2.2), and plankton abundance typically drops in

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heavy metal contaminated pit lakes (Gammons *et al*, 2009). With this cascading effect up the food chain in mind, monitoring chlorophyll α in the flooded pits is crucial to ensure proper concentrations suitable for not only fish species, but a healthy aquatic environment as a whole.

We thank you for the opportunity to provide additional input in to the process. We hope this proves useful.

Sincerely,

A handwritten signature in blue ink, appearing to read "Shin Shiga". The signature is fluid and cursive.

Shin Shiga
Manager, Environment

CC: Gord Macdonald, DDMI

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References

Bartram, J., Ballance, R. (1996). Water quality monitoring: a practical guide to the design and implementation of freshwater quality studies and monitoring programs (Chapter 2 – Water Quality). United Nations Environment Programme and the World Health Organization.

Bonsal, B.R., Peters, D.L., Seglenieks, F., Rivera, A., and Berg, A. (2019). Changes in freshwater availability across Canada; Chapter 6 in Canada's Changing Climate Report, (ed.) E. Bush and D.S. Lemmen; Government of Canada, Ottawa, Ontario, p. 261–342.

Gammons, C. H., Harris, L.N., Castro J.M., Cott, P.A., and Hanna, B.W. 2009. Creating lakes from open pit mines: processes and considerations - with emphasis on northern environments. Can. Tech. Rep. Fish. Aquat. Sci. 2826: ix + 106 p.

North Slave Metis Alliance. (1999): Can't Live Without Work. Yellowknife NT.