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Mark Cliffe-Phillips
Executive Director
Mackenzie Valley Environmental Impact Review Board
P.O. Box 938
Yellowknife, NT X1A 2N7

27 September 2019

Dear Mr. Cliffe-Phillips:

Subject: DDMI Response to LKDFN's Comments on Supplemental IR Responses for the Environmental Assessment of the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01)

Diavik Diamond Mines (2012) Inc. (DDMI) is pleased to provide the Mackenzie Valley Environmental Impact Review Board (MVEIRB or the Board) with the attached responses to Lutsel K'e Dene First Nation's (LKDFN) Comments on DDMI's Responses to MVEIRB's Supplemental Information Requests and also provide general clarifications about the Proposal as part of the Review of the Processed Kimberlite to Mine Workings Proposal (PKMW).

We thank the MVEIRB for the opportunity to provide additional details to LKDFN regarding the PKMW. Please do not hesitate to contact the undersigned or Kofi Boa-Antwi (867 447 3001 or kofi.boa-antwi@riotinto.com) if you have any questions related to this submission.

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Sean Sinclair
Superintendent, Environment

cc: Catherine Fairbairn, MVEIRB
Kate Mansfield, MVEIRB
Ryan Fequet, WLWB
Anneli Jokela, WLWB

ATTACHMENT

Response to LKDFN'S Comments on Supplemental Information Requests – Environmental Review for the Processed Kimberlite to Mine Workings Project Proposal

1. LKDFN Comment #1 on DDMI's Response to MVEIRB's Supplemental IRs

In response to Review Board IR30, Diavik indicated that it is necessary to have a hydrological connection between the pit lake(s) and Lac de Gras (for example, by fracturing the water-retaining plastic concrete wall that forms the core of the dike).

- a) Please confirm Diavik's understanding and intent of pit "isolation". For example, does isolation mean preventing fish from swimming into the pit(s) or does it mean preventing water exchange between the pit(s) and Lac de Gras?
- b) Please provide support for Diavik's position that the pits need to be hydrologically connected to Lac de Gras in some way.
- c) Please describe the methods that Diavik would use to connect the pit(s) to Lac de Gras if the dikes were not breached.

1.1 Developer's Response to LKDFN Comment #1

- a) The intent of a no-reconnection or pit "isolation" scenario is to prevent fish from using the pit lake area. It has been described as a contingency if for some reason water quality conditions in the pit lakes were not suitable for fish and aquatic life. Isolation does not mean preventing water exchange between the pit lakes and Lac de Gras.
- b) A hydrologic connection is required to decommission the dikes. Preventing a hydrologic connection would mean operating and maintaining the dikes as water retaining engineered structures in perpetuity. Without a hydrologic connection, the pit lakes would accumulate water over time from both direct precipitation and runoff. Water would need to be regularly removed from the pit lake to prevent water levels from rising above engineered limits of the dike. This would require

DDMI to have a site presence in perpetuity. With a hydrologic connection the dikes would no longer be functioning as engineered water retaining structures and would not require long term operations or maintenance because pit lake water levels would passively equalize with Lac de Gras.

- c) Two concepts have been considered to create a hydrologic connection while not allowing fish passage into the pit lake area. One is to excavate breaches, as previously described, to remove the plastic concrete core and then immediately backfill the excavation with crushed rock. Water would be able to flow through the backfilled rock, but fish could not travel through. Another option would be to drill into the plastic concrete wall from the surface of the dike and hydraulically fracture the wall in numerous locations. Water would be able to flow through the fractured rock and concrete wall, but fish could not travel through.

2. LKDFN Comment #2 on DDMI's Response to MVEIRB's Supplemental IRs

Diavik indicated in its response to Review Board IR31 that if pit water quality is determined to pose a risk to water quality, fish and fish habitat, caribou, humans, or cultural land uses, it could 're-isolate' the pit lake from Lac de Gras. Please clarify if water connectivity would still be required and how the re-isolation would proceed.

2.1 Developer's Response to LKDFN Comment #2

Water connectivity (passage of water between the pit lake(s) and Lac de Gras) would still be required in the example described in response to MVEIRB IR#31. In this scenario, the "re-isolation" would be achieved by retroactively employing the same hydrologic connection methods described in Response to LKDFN Comment #1c. Once hydrologic connectivity was reestablished water would flow through the dike, but fish could not travel through.

3. LKDFN Comment #3 on DDMI's Response to MVEIRB's Supplemental IRs

Diavik has used the Aquatic Effects Monitoring Program benchmarks for determining the safety of the pit water. Please clarify and discuss how these relate to:

- a) chronic and toxic effects to aquatic life
- b) Canadian Council of Ministers of the Environment guidelines for the protection of aquatic life
- c) drinking water quality guidelines

3.1 Developer's Response to LKDFN Comment #3

In the Processed Kimberlite to Mine Workings Proposal the Aquatic Effects Monitoring Program (AEMP) Benchmarks are used to define:

- When water quality in the top 40m of the water column is acceptable to allow re-connection of the pit lakes with Lac de Gras; and
- Magnitude of water quality effects (see Table 4-2 of the Summary Impact Statement [SIS] for the Processed Kimberlite to Mine Workings Project).

AEMP Benchmarks are the lesser value of the Canadian Council of Ministers of the Environment guidelines for the protection of aquatic life (CWQG PAL) and the Canadian drinking water quality guidelines (GCDWQ). Where a current guideline does not exist, site specific values were developed and adopted through public review of the Diavik AEMP Design. These guidelines are also equivalent to the Ecological Thresholds for Water Quality used to define magnitude of effects in the original Diavik Environmental Impact Statement (See DDMI 1998 Fish and Water Table 6-2; a copy of the table from the original Diavik Environmental Impact Statement is included in Appendix A for reference). Some specific values have changed somewhat since 1998 through public review of the AEMP Design but the intent remains the same.

This is further described in the Summary Impact Statement at Page 43:

The magnitude of effects on water quality is defined using water quality benchmarks developed for the AEMP (Golder 2017a), which were established to maintain changes in water quality of Lac de Gras within acceptable ranges. The AEMP benchmarks are the lower of benchmarks developed for the protection of aquatic life (CWQG PAL) or the health of humans who may drink the water (GCDWQ). Where the CWQG PAL and GCDWQ are not available from the two primary sources,

equivalent benchmark values from other jurisdictions may be adopted. In some cases (e.g., where natural background concentrations in Lac de Gras exceed the guidelines), adjustments have been made to the benchmark values. The CWQG PAL and the GCDWQ are intentionally and conservatively set at levels that are protective of their intended receptors. Thus, at the AEMP benchmark levels, there are no expected adverse effects to aquatic life or to human health. However, even if the AEMP benchmark levels are occasionally exceeded by modest margins or for short periods of time, it does not follow that there would be adverse effects to aquatic life or to human health.

4. LKDFN Comment #4 on DDMI's Response to MVEIRB's Supplemental IRs

Please discuss the risk (in terms of likelihood and consequence) that water from the pits will mix with Lac de Gras if the dikes are not breached and the walls are not fractured. Please describe the possible pathways of water exchange between the pit lake and Lac de Gras (for example, from water level in pit rising so that it overtops the dike, or from weathering and eventual failure over the very long term).

4.1 Developer's Response to LKDFN Comment #4

There is a low likelihood that water from the pit lakes will passively mix with Lac de Gras through the dikes if they are not breached or the walls are not fractured. As described in the Response to LKDFN Comment #1b above, in this scenario DDMI would likely be required to operate and maintain the dikes as engineered water retaining structures in perpetuity. In this example, water from precipitation and runoff would cause water levels in the pit lakes to rise above those in Lac de Gras. These water levels would likely be managed by periodic pumping of excess water to Lac de Gras. If water was not periodically pumped out of the pit lakes it would eventually fill up the pit lakes and over-top the engineered dike plastic concrete wall and water would flow to Lac de Gras. DDMI does not consider active water management of pit lake water levels to be an acceptable objective post-closure given this would require DDMI to have a site presence in perpetuity.