

29 June 2022

Mason Mantla, Chair
Wek'èezhii Land and Water Board
#1, 4905 – 48th Street
Yellowknife, NT, X1A 3S3

Re: Water Licence W2020L2-0004 Notification of 2022 Under-ice Action Level Exceedance

Dear Mr. Mantla:

Water Licence W2020L2-0004 Part J, Condition 9a requires Arctic Canadian Diamond Company Ltd. (Arctic Canadian) notify the Wek'èezhii Land and Water Board (the Board) regarding exceedances of any Action Level defined in the approved Aquatic Response Framework (ARF) within 60 days of detection. Arctic Canadian has received the analytical results from the 2022 under-ice Aquatic Effects Monitoring Program and is providing notification, herein, to the Board, of water quality variables at specific sampling locations that have exceeded an Action Level (Table 1).

Table 1. 2022 Under-ice Aquatic Response Framework Action Level Exceedance

Variable	Lake where Action Level was Exceeded		
	Low Action Level	Medium Action Level	High Action Level
Chloride	Leslie, Moose	-	-
Potassium	Moose	Leslie	-
Nitrate-N	Horseshoe	-	-
Nitrite-N	-	-	Horseshoe

In response to these Action Level exceedances, Arctic Canadian suggests the following:

Chloride

The low Action Level for chloride was exceeded during the under-ice season in 2022 at Leslie and Moose lakes. The average concentrations of chloride in April 2022 at Leslie Lake (i.e., 227.5 mg/L) and Moose Lake (i.e., 200 mg/L) were greater than 50% of the hardness-dependent water quality benchmarks of 388 mg/L.

The Chloride Response Plan version 2.1 was submitted to the Board in 2019 to address a low Action Level exceedance in Leslie Lake. The Response Plan was approved on 16 October 2019 with additional direction if a medium Action Level is exceeded in Leslie Lake. No change in Action Level exceedance has occurred since 2018, therefore no update to the Chloride Response Plan is required.



Potassium

The low Action Level for potassium was exceeded at Moose Lake and a medium Action Level was exceeded at Leslie Lake during the under-ice season in 2022. The average concentration of potassium in April 2022 at Moose Lake (i.e., 42.0 mg/L) was greater than 50% of the 64 mg/L water quality benchmark (i.e., 32 mg/L), and the average concentration of potassium at Leslie Lake (i.e., 49.8 mg/L) was greater than 70% of the 64 mg/L water quality benchmark (i.e., 44.8 mg/L).

During the under-ice season of 2018, a high Action Level exceedance for potassium was identified for Leslie Lake and a medium Action Level exceedance was identified for Moose Lake. Mitigation for the high Action Level exceedance observed in April 2018 was successful following cessation of Discharge from the Long Lake Containment Facility (LLCF) during the 2018 open-water season. Furthermore, potassium under-ice concentrations have decreased from 60.6 mg/L in April 2018 to 49.8 mg/L in April 2022.

Following this exceedance of a medium Action Level for potassium in 2022, additional under-ice water quality sampling will be implemented in 2023 to more regularly monitor the under-ice potassium concentrations in Leslie Lake. Overall, total potassium concentrations in the immediate Receiving Environment (i.e., Leslie Lake) have remained lower than concentrations observed during the initial exceedance in 2018 indicating that actions implemented as part of the Potassium Response Plan have been effective.

The Potassium Response Plan Version 3.0 was approved by the Board on 19 December 2019, and addressed the medium Action Level exceedance in Leslie Lake. No change in Action Level exceedance has occurred since, therefore no update to the Potassium Response Plan is required. The 2022 AEMP Report will include the results of the evaluation of effects and details about the Action Level exceedances.

Nitrate

The low Action Level for nitrate was exceeded during the under-ice season in 2022 at Horseshoe Lake. The average concentration of nitrate in April 2022 at Horseshoe Lake (i.e., 2.6 mg/L) was greater than 50% of the 3.8 mg/L hardness-dependent water quality benchmark (i.e., 1.9 mg/L). This was the first year an Action Level exceedance for nitrate was identified in Horseshoe Lake. Typically, an Action Level exceedance would not be identified with one year of an elevated concentration being detected and additional monitoring would be used to confirm the Action Level exceedance (i.e., determining the increasing trend as per #2 of the low Action Level criteria). However, due to the late season Discharge from the Two Rock Sedimentation Pond (TRSP) prior to ice formation and the most recent modelling results, Arctic Canadian has proactively determined an Action Level exceedance.

Nitrite

The high Action Level for nitrite was exceeded during the under-ice season in 2022 at Horseshoe Lake. The average concentration of nitrite in April 2022 at Horseshoe Lake (i.e., 0.08 mg/L) was greater than the respective water quality benchmark (0.06 mg/L). Like nitrate, Arctic Canadian has determined an Action Level exceedance as a proactive measure, although additional confirmatory monitoring will have to be completed in upcoming years to determine if an increasing trend is present or not.

Nitrogen Response Plan

Nitrate and nitrite concentrations in Horseshoe Lake have historically been less than 20% of the concentrations seen in the under-ice season for 2022, and well below the benchmarks set out in version 3.0



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of the ARF (2018)^{1,2}. These Action Level exceedances were unusual considering the historical concentrations of the variables and additional under-ice water quality sampling will be conducted in 2023 to confirm and monitor the nitrate and nitrite concentrations in Horseshoe Lake.

The Nitrogen Response Plan Version 2.2³ was approved by the Board on 29 June 2017⁴, and successfully addressed the low Action Level exceedance in Cujo Lake. In accordance with Part J, Item 9(b) of Water Licence W2020L2-0004, the Nitrogen Response Plan will be updated and submitted to the Board for approval within 90 days of detection in response to the low Action Level exceedance for nitrate and high Action Level exceedance for nitrite in Horseshoe Lake (i.e., submitted by 6 September 2022).

Arctic Canadian trusts that you will find the information to be clear and informative. Should you have any questions, please contact Derek Donald, Environment Advisor – Fisheries and Aquatics, at Derek.Donald@arcticcanadian.ca or 403-910-1933 ext. 2109 or the undersigned at Laura.Pacholski@arcticcanadian.ca or 403-589-0689.

Sincerely,

Original signed by Laura Pacholski

Laura Pacholski, P.Chem.

Team Lead – Environmental Management and Monitoring

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Document Owner: Environment Department

Date: 29-June-2022

¹ See WLWB Online Registry at www.wlwb.ca for [W2012L2-0001 - Ekati - AEMP - Response Framework - Version 3.0 - Jun 29 18.pdf](#)

² See WLWB Online Registry at www.wlwb.ca for [W2012L2-0001 - Ekati - AEMP - Response Framework - Version 3.0 - Directive and Reasons for Decision - Dec 3 18.pdf](#)

³ See WLWB Online Registry at www.wlwb.ca for [W2012L2-0001 - Ekati - AEMP - Nitrogen Response Plan - Version 2.2 - Jun 29 17.pdf](#)

⁴ See WLWB Online Registry at www.wlwb.ca for [W2012L2-0001 - Ekati - Nitrogen-Selenium-Potassium-Fish Response Plans - Directive and Reasons for Decision - Jan 25 18.pdf](#)