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March 24, 2020

W2015L2-0001

Sean Sinclair
Diavik Diamond Mines (2012) Inc.
P.O Box 2498
Suite 300, 5201-50th Avenue
Yellowknife, NT X1A 2P8

Dear Sean Sinclair,

Re: Management Plan Revisions to Support Removal of Sulphuric Acid Tank System (W2015L2-0001)

The Wek'èezhìi Land and Water Board (WLWB) met on March 24, 2020 to consider Diavik Diamond Mines (2012) Inc.'s (DDMI's) request to revise several management plans in support of decommissioning and removing the acid dosing system (sulphuric acid tank system) from the North Inlet Water Treatment Plant (NIWTP). This submission included proposed updates to the Water Management Plan,¹ the Ammonia Management Plan,² and the NIWTP Operations Plan,³ to remove reference to the acid dosing system, in conformance with Part H, Conditions 12, 13, and 14 of its Water Licence WL2015L2-0001 (the Licence).⁴

As detailed in the attached Reasons for Decision, the Board has decided to approve the requested changes to the associated plans and requires an updated Version 2.1 of the NIWTP Operations Plan. DDMI is to work with Board staff on a submission date of Version 2.1 of the NIWTP Operations Plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "J Mackenzie".

Joseph Mackenzie
Chair, Wek'èezhìi Land and Water Board

Copied: DDMI Distribution List

¹ See WLWB Online Registry (www.wlwb.ca) for [Diavik - Water Management Plan - Version 15 - Jan 15 20.pdf](#)

² See WLWB Online Registry for [Diavik - Ammonia Management Plan - Version 7 - Jan 15 20.pdf](#)

³ See WLWB Online Registry for [Diavik - North Inlet Water Treatment Plant Operations Plan - Version 2 - Jan 15 20.pdf](#)

⁴ See WLWB Online Registry for [Diavik - Water Licence - Schedule 1, Schedule 6 and SNP Updates - Jun 13 18.pdf](#)



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Reasons for Decision

Reference/File Number:	W2015L2-0001 (Type "A" Water Licence)
Licensee:	Diavik Diamond Mines (2012) Inc. (DDMI)
Subject:	Management Plan Revisions to Support Removal of Sulphuric Acid Tank System

Decision from the Wek'èezhìi Land and Water Board Meeting of March 24, 2020

1.0 Decision

On March 24, 2020, the Wek'èezhìi Land and Water Board (WLWB or the Board) considered Diavik Diamond Mines (2012) Inc.'s (DDMI's) request to update a number of management plans in support of decommissioning and removing the acid dosing system (sulphuric acid tank system) from the North Inlet Water Treatment Plant (NIWTP). This request by DDMI included proposed updates to the Water Management Plan,⁵ the Ammonia Management Plan,⁶ and the NIWTP Operations Plan,⁷ to remove reference to the acid dosing system, in conformance with Part H, Conditions 12, 13, and 14 of its Water Licence WL2015L2-0001 (the Licence).⁸ In consideration of the submission, reviewer comments, and proponent responses, the Board has decided the following:

1. Approve Version 15 of the Water Management Plan;
2. Approve Version 7 of the Ammonia Management Plan;
3. Approve Version 2 of the North Inlet Water Treatment Plant Operations Plan;

⁵ See WLWB Online Registry (www.wlwb.ca) for [Diavik - Water Management Plan - Version 15 - Jan 15 20.pdf](#)

⁶ See WLWB Online Registry for [Diavik - Ammonia Management Plan - Version 7 - Jan 15 20.pdf](#)

⁷ See WLWB Online Registry for [Diavik - North Inlet Water Treatment Plant Operations Plan - Version 2 - Jan 15 20.pdf](#)

⁸ See WLWB Online Registry for [Diavik - Water Licence - Schedule 1, Schedule 6 and SNP Updates - Jun 13 18.pdf](#)

4. DDMI is to submit Version 2.1 of the NIWTP Operations Plan with the operational steps provided in response to WLWB staff comment 1. DDMI is to work with Board staff to determine a submission date for Version 2.1 of the NIWTP Operations Plan.

2.0 Background

On January 15, 2020, DDMI submitted a request to the Board to revise three of its management plans to support the decommissioning and removal of the acid dosing system (sulphuric acid tank system) from the North Inlet Water Treatment Plant (NIWTP). Specifically, DDMI proposed updates to the Water Management Plan, the Ammonia Management Plan, and the NIWTP Operations Manual, to remove reference to the acid dosing system, in conformance with Part H, Conditions 12, 13, and 14 of its Water Licence WL2015L2-0001. The NIWTP Operations Plan submitted by DDMI represents a substantially updated version when compared to the previously approved Version 1 of the Plan and contains “a description of the Standard Operating Procedure for pH adjustments in the NIWTP” as per Part H, Conditions 13 and 14 of the Licence.

In its submission, DDMI explains that the original intent of the sulphuric acid tank system:

...was to control the pH of water in the NIWTP to reduce the concentration of the unionized ammonia (NH₃) component of Total ammonia in the NIWTP-treated effluent prior to discharge to the external receiving environment (Lac de Gras). Unionized ammonia is more toxic to aquatic life than ionized ammonia (NH₄⁺), the other component of total ammonia.

DDMI stated that sulphuric acid has never been used as part of the water treatment process at Diavik Mine because it uses aluminum sulphate as a coagulant instead. DDMI explains that the use of this coagulant has been able to sufficiently control the pH of water prior to effluent discharge. DDMI also explains that ammonia concentrations are unlikely to increase as the mine approaches closure.

The revised management plans were distributed for public review on February 13, 2020. Reviewers were asked to provide comments by March 5, 2020. Fisheries and Oceans Canada (DFO), the Government of the Northwest Territories - Department of Environment and Natural Resources - Environmental Assessment and Monitoring Section (GNWT-ENR-EAM), and the Wek'èezhii Renewable Resources Board (WRRB) indicated they had no recommendations at this time. Board staff submitted a question. Proponent responses were submitted by the deadline of March 10, 2020. Reviewer comments and recommendations, as well as proponent responses, are available on the WLWB online registry.^{9,10,11}

⁹ See WLWB Online Registry for [Diavik - Ammonia Management Plan - Version 7 - Review Summary and Attachments - Mar 10 20](#)

¹⁰ See WLWB Online Registry for [Diavik - North Inlet Water Treatment Plant Operations Plan - Version 2 - Review Summary and Attachments - Mar 10 20](#)

¹¹ See WLWB Online Registry for [Diavik - Water Management Plan - Version 15 - Review Summary and Attachments - Mar 10 20](#)

3.0 Reasons for Decision

3.1 Water Management Plan

DDMI's currently approved Water Management Plan is Version 14.2.¹² The purpose of the Water Management Plan is to describe the site water management and the water balance simulation results for the life of the mine. DDMI's proposed revisions to the Water Management Plan (i.e., Version 15) included:

- Updates to the description of the pH control system in the NIWTP in Section 3 of the Plan (Surface Water Systems) to highlight the use of an in-line acid pH control system and a lime slaking and dosing system as optional contingency measures for supplemental alkalinity and pH control; and
- Minor updates to the status of the A21 open pit and to supporting information throughout the Water Management Plan to align with other approved management plans or designs.

No concerns from Parties were received during the public review with respect to the decommissioning and removal of the acid dosing system (sulphuric acid tank system) from the North Inlet Water Treatment Plant (NIWTP) and the associated changes to the Water Management Plan, including the administrative updates. Based on these considerations, the Board approves Version 15 of the Water Management Plan.

➤ ***Decision #1: The Board approves Version 15 of the Water Management Plan.***

The Board notes that the Water Balance for the Site included in Version 15 has not been updated since Version 14.2. As per the June 13, 2018 Board decision on Version 14.1 of the Water Management Plan, the Board stated that the water balance "can be updated in the [Water Management] Plan when the Plan is updated or if changes to the water balance impact the Water Management Plan" (Decision 2b).¹³ The Board reminds DDMI that going forward, it would expect DDMI to provide an updated water balance with the Water Management Plan if the Plan is being updated.

3.2 Ammonia Management Plan

DDMI's currently approved Ammonia Management Plan is Version 6.1.¹⁴ The purpose of the Ammonia Management Plan is to describe existing ammonia management requirements, procedures and investigations at the Diavik Diamond Mine to ensure effluent discharges remain below effluent quality criteria (EQC). DDMI's proposed revisions to the Ammonia Management Plan (i.e., Version 7) included:

- Removing references to the concentrated sulphuric acid dosing system;
- Replacing Diavik's site map with an updated version in Appendix A; and
- Minor updates to the status of the A21 open pit and supporting information throughout the Ammonia Management Plan to align with other approved management plans or designs.

¹² See WLWB Online Registry for [Diavik - Water Management Plan - Version 14.2 - Jul 5 18.pdf](#)

¹³ See WLWB Online Registry for [Diavik - Water Management Plan V 14.1 Updates to Schedule 1, 6, and SNP - Directive and Reasons for Decision - Jun 13 18.pdf](#)

¹⁴ See WLWB Online Registry for [Diavik - Ammonia Management Plan - Version 6.1 - Aug 18 17.pdf](#)

No concerns from Parties were received during the public review with respect to the decommissioning and removal of the acid dosing system (sulphuric acid tank system) from the North Inlet Water Treatment Plant (NIWTP) and the associated changes to the Ammonia Management Plan. No concerns were received with respect to proposed map update. Based on these considerations, the Board has decided to approve Version 7 of the Ammonia Management Plan.

➤ **Decision #2: The Board approves Version 7 of the Ammonia Management Plan.**

3.3 North Inlet Water Treatment Plant Operations Manual

DDMI's currently approved North Inlet Water Treatment Plant (NIWTP) Operations Manual is Version 1.¹⁵ The purpose of the NIWTP Operations Manual is to provide information and guidelines for the day-to-day operation and maintenance of the NIWTP.

DDMI's proposed revisions to the NIWTP Operations Plan (i.e., Version 2)¹⁶ included:

- Describing the Standard Operating Procedure (SOP) for pH adjustments in the NIWTP through the addition of a coagulant (aluminum sulphate) prior to discharges to Lac de Gras;
- Removing significant SOP level details describing how to operate the treatment plant; and
- Removing the requirement for the sulphuric acid dosing system.

During the public review, DDMI was asked about the description provided for the SOP for pH adjustments through the addition of a coagulant (WLWB staff comment 1). Version 1 of the NIWTP Operations Plan included a detailed description of the acid dosing system, including operational steps; Version 2 did not contain the same level of detail for the addition of a coagulant. DDMI was asked if specific operational steps need to be taken when using the coagulant and if so, to outline these steps and comment on how they align with general best practices for this type of pH control method (WLWB staff comment 1).

In response, DDMI described the operational steps related to pH control in the NIWTP:

1. Aluminum sulphate is added as a coagulant (at dosages between 20 to 40 mg/L) in the water treatment process in the NIWTP to remove the total suspended solids (TSS) from the water and control effluent pH to within a range of 6.0 to 8.4, as per the Diavik Water Licence (W2015L2-0001).
2. If pH does not fall within the acceptable range, additional aluminum sulphate can be added to reduce pH by 0.05 - 0.065 pH units per mg/L. The impact of aluminum sulphate dosage changes is very quick with a response time of 5 - 10 minutes.
3. The NIWTP has an automated in-line pH alarm system that will automatically shut down the NIWTP, if DDMI's internal lower and upper limits for effluent pH (currently set at 6.7 and 7.9) are reached, to prevent the discharge of effluent outside the acceptable pH range in the Water Diavik Licence to Lac de Gras. Recirculation during a shut down allows continued plant operation while pH performance is stabilized without discharging to Lac de Gras.

¹⁵ See WLWB Online Registry for [Diavik - NIWTP Operations Manual - Version 1 - Oct 1 10.pdf](#)

¹⁶ See WLWB Online Registry for [Diavik - North Inlet Water Treatment Plant Operations Plan - Version 2 - Jan 15 20.pdf](#)

DDMI's response provides a detailed explanation of the operational steps that are required when using aluminum sulphate for pH control of the effluent in the NIWTP. DDMI did not address the second part of the question on how the steps align with general best practices for this type of pH control method; however, the Board is satisfied that there are operational procedures in place that demonstrate how pH levels can be adjusted. The Board approves Version 2 of the NITWP Operations Plan but requires DDMI to submit Version 2.1 to incorporate the information provided by DDMI in its response. DDMI is to work with Board staff to determine a submission date for Version 2.1

- ***Decision #3: The Board approves Version 2 of the North Inlet Water Treatment Plant Operations Plan.***
- ***Decision #4: The Board requires DDMI to submit Version 2.1 of the NIWTP Operations Plan with the operational steps provided in response to WLWB staff comment 1. The Board directs DDMI to work with Board staff to determine a submission date for Version 2.1 of the NIWTP Operations Plan.***

3.4 Use of the term "Amended"

In the cover letter with the management plans, DDMI also stated that there were "minor administrative changes" made to the associated management plans, including "Minor updates to the status of the A21 open pit and to supporting information (such as updating references to the current Amended Water Licence)". It was unclear what DDMI meant by "current Amended Water Licence" and DDMI confirmed after the public review that it was referencing the current Water Licence (i.e., W2015L2-0001). In future submissions to the Board, DDMI committed to not using the word "amended" when referring to the current Water Licence to avoid confusion. No updates to the associated management plans related to this are required.

Signed the 24th day of March 2020, on behalf of the Wek'èezhii Land and Water Board



Witness



Joe Mackenzie
Chair, Wek'èezhii Land and Water Board