Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

Reasons for Decision

Issued pursuant to paragraph 40(2)(c) of the Mackenzie Valley Land Use Regulations (MVLUR) and sections 72.25 and 121 of the *Mackenzie Valley Resource Management Act* (MVRMA) and section 54 of the *Waters Act*

Water Licence and Land Use Permit Amendment Applications	
Preliminary Screener	MVLWB
File Number	MV2005C0032 and MV2005L2-0015
Company	De Beers Canada Inc.
Project	Gahcho Kue Project – Kennady Lake, NT
Date of Decision	November 7, 2018

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These Reasons for Decision set out the Mackenzie Valley Land and Water Board's (the MVLWB/Board) regulatory process and decisions on the March 19, 2018 Amendment Applications submitted by De Beers Canada Inc. (De Beers) to the Board for Water Licence (Licence) MV2005L2-0015 and Land Use Permit (Permit) MV2005C0032 for the Gahcho Kue Project.

A list of abbreviations is provided in Section 1 below. A summary of the Applications is provided in Section 2 below, followed by the regulatory process in Section 3. Section 4 describes the legislative requirements applicable to this regulatory process, leading to the Board's decisions with supporting rationale in Sections 5 and 6.

1.0 List of Abbreviations

AEMP	Aquatic Effects Monitoring Plan
Applicant or De Beers	De Beers Canada Inc.
Applications	De Beers Canada Inc.'s submissions in support of Water Licence MV2005L2-0015 and Land Use Permit MV2005C0032
CCME	Canadian Council of Ministers of the Environment
DFO	Department of Fisheries and Oceans
Distribution List	Refer below to Section 4: Legislative Requirements
ECCC	Environment and Climate Change Canada
EQC	Effluent Quality Criteria
GNWT	Government of the Northwest Territories
GNWT-ENR	Government of the Northwest Territories – Environment and Natural Resources
GNWT-Lands	Government of the Northwest Territories – Department of Lands
Intervenor	A reviewing Party that submits an intervention
IR	Information Request
Licence	Water Licence MV2005L2-0015
LKDFN	Łutsel K'e Dene First Nation
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLUR	Mackenzie Valley Land Use Regulations
MVLWB or Board	Mackenzie Valley Land and Water Board
MVRMA	*Mackenzie Valley Resource Management Act*
Minister	Minister of Environment and Natural Resources for the Government of the Northwest Territories
NSMA	North Slave Metis Alliance
Party	As per the Board's *Rules of Procedures*
Permit	Land Use Permit MV2005C0032
POPC	Parameters of Potential Concern
Project	Gahcho Kue Project
Reviewer	As per the Board's *Rules of Procedures*
SCC	Supreme Court of Canada
SNP	Surveillance Network Program
SSWQO	Site Specific Water Quality Objective
Standard Template	Board's *Standard Land Use Permit Conditions Template*
WMP	Water Management Pond
WQO	Water Quality Objective

2.0 Summary of Applications

On March 19, 2018, De Beers submitted Applications to amend their Licence MV2005L2-0015 and Permit MV2005C0032.[1] These amendment Applications are to address a geotechnical issue identified in the open pits, namely, the presence and orientation of joint sets. This necessitates a proposed change to pit design, including the extraction of up to an additional 100 Million tonnes (Mt) of mine rock over the life of the mine. Several other changes to the Project are also proposed including:

- Increase footprint of 85.23 ha;
  Broken down as follows:
  - Dyke L haul road – 5ha
  - Road to temporary laydown – 1ha
  - Temporary laydowns – 19.25ha
  - Airstrip re-alignment and increased width – 17.5ha
  - Run of mine pad area – 12ha
  - East pad extension – 4.48ha
  - Expanded pits, West Mine Rock Pile, and road – 26ha
- Increase the depth of Tuzo Pit to a max of 373 m;
- Increase the height of the West Mine Rock Pile to a max of ~135 m (a 35 m increase);
- Expansion of the West Mine Rock Pile to store ~228 Mt of waste rock (increase in both footprint and height);
- Construction of the A2 North Perimeter Berm;
- Increase the annual quantity of fresh water withdrawn to not exceed 45,000 m^3/y;
- Increase in aviation fuel from 303,000 L to 500,000 L (an increase of 197,000 L); and
- Additional equipment (major pieces of additional equipment included in the Permit Application).

3.0 Regulatory Process

On March 19, 2018, De Beers submitted Applications to amend their Licence MV2005L2-0015 and Permit MV2005C0032. The Applications were deemed complete on March 29, 2018 under subsection 22(1) of the MVLUR.[2] The review of the Applications commenced following the distribution of the complete letter, on April 3, 2018.

A public notice of the Applications was published in *News North* during the week of April 9, 2018 to fulfill paragraph 43(1)(a) of the *Waters Act*.[3]

On April 12, 2018, the Board invoked paragraph 22(2)(b) of the MVLUR for the Application to Permit MV2005C0032.[4]

On April 13, 2018, Board staff distributed a draft work plan (version 1) in which Reviewers were requested to provide their comments and recommendations. Comments were received by April 20, 2018 from: Government of

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[1] See Water Licence MV2005L2-0015 and Land Use Permit MV2005C0032 Amendment Applications, submitted to the MVLWB on March 19, 2018. Supporting documentation included: Updated Project Description, Mine Rock Management Alternatives Analysis, Environmental Screening Assessment, Effluent Quality Criteria Report, Geochemical Characterization Plan V.4, Groundwater Monitoring Program V.4, Operational Water Management Plan V.5, Processed Kimberlite and Mine Rock Management Plan V.6, and Final Detailed Construction Plan West Mine Rock Pile V.2.

[2] See MVLWB Letter – Application Complete, dated March 29, 2018.

[3] See Notice of Application, dated April 9, 2018.

[4] See MVLWB Letter – Invoke paragraph 22(2)(b) of MVLUR, dated April 12, 2018.

the Northwest Territories – Environment and Natural Resources (GNWT-ENR), Department of Fisheries and Oceans Canada (DFO), Board staff and De Beers.[5] The Board subsequently released an updated work plan (version 2) on May 10, 2018.[6] This included the scheduling of a public hearing under paragraph 41(2)(b) of the *Waters Act*.

By May 7, 2018, comments and recommendations regarding the Applications were received by the Board from the following Reviewers: North Slave Metis Alliance (NSMA), Ni Hadi Xa, Environment and Climate Change Canada (ECCC), DFO, GNWT-ENR, Government of the Northwest Territories – Department of Lands (GNWT-Lands), and Board staff.[7] De Beers responded to Reviewers' on May 21, 2018.[8]

De Beers' technical session presentations were submitted on May 30, 2018.[9] Technical sessions were held on May 30-31, 2018, in Yellowknife, NT, to discuss and seek clarity on issues raised by Reviewers and Board staff, and to provide an opportunity to discuss the Applications in advance of Reviewers submitting comments and recommendations to the Board. The technical sessions were facilitated by Board staff and were transcribed.[10] Attendees included: De Beers, Tlicho Government, NSMA, Akaitcho IMA Implementation Office, Ni Hadi Xa, ECCC, DFO, GNWT-ENR, GNWT-Lands, and Board staff.[11] Information requests (IR) and Commitments resulting from the session were circulated to the Distribution List on June 1, 2018.[12] De Beers submitted responses on June 14, 2018.[13] On June 19, 2018, Board staff requested further clarification on the responses to the IRs.[14] De Beers responded on June 20, 2018, providing additional clarifying information.[15]

A public notice of the public hearing was published in *News North* during the week of June 4, 2018 to fulfill paragraphs 43(2)(a) of the *Waters Act*.[16]

On June 7, 2018, the Board approved an amended preliminary screening to account for the changes that were a result of the March 19, 2018 Amendment Applications.[17]

The pre-hearing conference was held on June 11, 2018 in Yellowknife, NT to discuss the potential content of the public hearing, written interventions and presentations, notices of intent to appear at the hearing, and to briefly outline the Board's (2004) *Rules of Procedure, Including Public Hearings*.[18,19] The pre-hearing conference was attended in-person by representatives from NSMA, GNWT-ENR, DFO, and Board staff; De Beers, ECCC and Board staff participated by teleconference. Summary notes were recorded and distributed on June 14, 2018.[20]

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[5] See Comments on Draft Work Plan, submitted to the MVLWB on April 20, 2018.
[6] The Work Plan (version 2), distributed May 10, 2018.
[7] See Review Comment Summary Table – Application, dated May 21, 2018.
[8] *Ibid.*
[9] See De Beers – Technical session presentations (parts 1, 2, 3, 4, 5, 6, 7, and Nitrate Management Slide), submitted to the MVLWB on May 30, 2018.
[10] See Technical session – Transcripts Day 1 and Day 2, dated May 30 and 31, 2018.
[11] See Technical session – Sign-in Sheet, dated May 31, 2018.
[12] See Technical session – Information Requests and Commitments, dated June 1, 2018.
[13] See De Beers – Response to Information Requests and Commitments, submitted to the MVLWB on June 14, 2018.
[14] See Board staff – Further Clarification on Responses to Information Request Requested, dated June 19, 2018.
[15] See De Beers – Additional Clarifying Information, submitted to the MVLWB on June 20, 2018.
[16] See Notice of Public Hearing, dated April 9, 2018.
[17] See MVLWB Letter – Preliminary Screening Determination, dated June 7, 2018.
[18] See Pre-hearing conference – Agenda, dated June 7, 2018.
[19] See MVLWB Rules of Procedure, Including Public Hearings (2004).
[20] See Pre-hearing conference – Summary Notes, dated June 14, 2018.

On June 27, 2018, written interventions were received from DFO, ECCC, and GNWT.[21] De Beers responded to written interventions on July 5, 2018.[22]

On June 29, 2018, De Beers submitted a revised financial security estimate using RECLAIM[23] and proposed an updated security payment schedule that would coincide with various phases of the project which was subsequently sent out for review by Board staff. Board staff noted in the review that, "any changes to the existing conditions related to security, based on comments received during this review, will be brought before the Board when a decision is made on the amendments. Based on the work plan associated with the amendment applications, the Draft Licence and Permit will be circulated on August 29, 2018 and will be updated to address any comments received through this review."

On July 6, 2018, public hearing presentations were received from DFO, ECCC, and GNWT.[24] De Beers submitted a public hearing presentation on July 13, 2018.[25]

On July 17, 2018, Board staff circulated the public hearing agenda.[26]

On July 20, 2018, comments and recommendations were received from the GNWT-ENR on the financial security estimate. Responses were received from De Beers on July 30, 2018.[27]

The public hearing was held on July 25, 2018 in Yellowknife, NT, at the Chateau Nova, Lynx Room. Translation services were provided, and the proceeding was recorded and transcribed.[28] Attendees included: DFO, ECCC, GNWT, Board staff, and De Beers. Undertakings resulting from the hearing were recorded and circulated to the Distribution List on July 26, 2018.[29] There were three undertakings directed at De Beers and one directed at GNWT-ENR. De Beers responded to the undertakings on August 3, 2018[30] and GNWT-ENR responded on August 15, 2018.[31]

On August 27, 2018, Board staff circulated draft Licence and Permit conditions to Reviewers for review and comment. The following Reviewers responded by September 12, 2018: GNWT-ENR and ECCC.[32] De Beers responded to comments and provided comments of their own on September 19, 2018.[33]
On September 26, 2018, ECCC and GNWT-ENR submitted written closing arguments to the Board.[34] Late closing arguments were received on October 1, 2018 from DFO.[35] De Beers submitted their closing arguments on October

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[21] See Written Interventions: DFO, ECCC, and GNWT, submitted to the MVLWB on June 27, 2018.
[22] See De Beers – Response to Interventions; DFO, ECCC, and GNWT, submitted to the MVLWB on July 5, 2018.
[23] See De Beers – Security Estimate RECLAIM Report v.5 and Security Estimate RECLAIM Excel Report v.5, submitted to the MVLWB on June 29, 2018.
[24] See Public Hearing Presentations: DFO, ECCC, and GNWT, submitted to the MVLWB on July 6, 2018.
[25] See De Beers – Public Hearing Presentation, submitted to the MVLWB on July 13, 2018.
[26] See MVLWB Public Hearing Agenda, dated July 17, 2018.
[27] See Comments on Financial Security Estimate, submitted to the MVLWB on June 29, 2018.
[28] See Public Hearing – Transcripts, dated August 8, 2018.
[29] See Public Hearing – Undertakings to De Beers and GNWT, dated July 26, 2018.
[30] See De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[31] See GNWT-ENR – Response to Undertaking 4, submitted to the MVLWB on August 15, 2018.
[32] See Review Comment Summary Table – Draft Licence and Permit, dated September 19, 2018.
[33] *Ibid.*
[34] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018.
[35] See Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

3, 2018.[36] The closing arguments allowed an opportunity for Intervenors and De Beers to update their position based on issues raised during the regulatory process, and to summarize their final recommendations to the Board.

On September 27, 2018, Board staff issued an information request to the GNWT-ENR requesting further rational/information in relation to the comments and recommendations received on the revised financial security estimate.[37] A response was received from the GNWT-ENR on October 5, 2018[38] with a final response received from De Beers on October 17, 2018.[39]

On November 7, 2018, the Board met to make decisions regarding the Applications and the revised financial security estimate.

4.0 Legislative Requirements

In conducting the review process for the Amendment Applications as described in Sections 2 and 3 above (respectively, Summary of Applications and Regulatory Process), the Board has ensured that all applicable legislative requirements have been satisfied as outlined below.

4.1 MVRMA: The Board's Duty to Consult

In exercising its authority under the MVRMA, generally, the Board must ensure that the concerns of Aboriginal people have been taken into account under paragraph 114(c) of the MVRMA. It must also consider the importance of conservation to the well-being and way of life of Aboriginal peoples of Canada, under paragraph 60.1(a) of the MVRMA, specifically those to whom section 35 of the *Constitution Act*, 1982 applies and who use an area of the Mackenzie Valley. Accordingly, the Board works with applicants, affected parties (including Aboriginal organizations/governments), and other parties (such as other boards and regulators) to ensure that potential impacts of proposed projects are understood and carefully considered before decisions are made with respect to the issuance of Permits and Licences.

In order to address the question of Aboriginal consultation it is first helpful to understand the general process through which the Board considers an application.[40,41] Following the initiation of engagement and the submission of an application, a proposed project goes through several stages in the Board's regulatory process. Each application is reviewed to ensure that all necessary information is included and to confirm that the right types of Permit and Licence have been applied for.[42]

4.1.1 Distribution List

Each application and supporting documents are uploaded to the Board's webpage and then an application package is distributed to parties, including: appropriate federal and territorial government departments and agencies; land owners; affected communities and Aboriginal organizations/governments; Renewable

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[36] See De Beers – Closing Arguments, submitted to the MVLWB on October 3, 2018.
[37] See Information Request to GNWT-ENR, dated September 27, 2018.
[38] See Response to Information Request from GNWT-ENR, dated October 5, 2018.
[39] See Final Response from De Beers on Information Request to GNWT-ENR, dated October 17, 2018.
[40] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Guide to the Land Use Permitting Process (2013).
[41] See www.mvlwb.com → Resources → Policies and Guidelines: Guide to Completing Water Licence Applications to the Mackenzie Valley Land and Water Board (2003).
[42] This check for completeness is completed within ten days of receipt for Permit applications.

Resource Boards; heritage regulators; and other interested parties. Table 1 below identifies the Distribution List that the Board used for this regulatory process.

Table 1: Organizations on the Distribution List for Applications for Licence MV2005L2-0015 and Permit MV2005C0032

Akaitcho IMA Implementation Office
CanNor NWT Region
Chamber of Mines NWT & Nunavut
Dene Nation
Deninu K'ue First Nation
Environment and Climate Change Canada
Fisheries and Oceans Canada
Fort Resolution Metis Council
Fort Smith Metis Council
Government of the Northwest Territories - Education, Culture and Employment
Government of the Northwest Territories - Environment and Natural Resources
Government of the Northwest Territories - Health and Social Services
Government of the Northwest Territories - Infrastructure
Government of the Northwest Territories - Industry, Tourism and Investment
Government of the Northwest Territories - Department of Lands
Government of the Northwest Territories - Municipal and Community Affairs
Government of the Northwest Territories - Office of the Regulator of Oil and Gas Operations
Government of Canada
Hamlet of Fort Resolution
Hay River Metis Council
Indigenous and Northern Affairs Canada - Contaminants and Remediation Directorate
Kátł'odeeche First Nation
Lutsel K'e Dene First Nation
Mackenzie Valley Environmental Impact Review Board
North Slave Metis Alliance
Northwest Territory Metis Nation
Salt River First Nations
Tłı̨chǫ Government
Tłı̨chǫ Lands Protection Department
Town of Fort Smith
West Point First Nation
Workers' Safety and Compensation Commission
Yellowknives Dene First Nation

The Board requests that Reviewers provide comments with respect to the Amendment Applications and associated management plans. For a Type A Permit, as was this case, within 42 days of receipt of a complete application, unless additional information is required, the Board will either: (a) issue the amended Permit with conditions; (b) conduct a hearing under section 24 of the MVRMA or require that further studies or investigations be made; (c) refer it to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) for environmental assessment; or (d) refuse to issue the amended Permit if a requirement set out in section 61 or 62 of the MVRMA has not been met or for any other reason as provided for in legislation. For a Type A Licence, as was this case, within nine months the Board will either: (a) issue the amended Licence with conditions; (b) conduct a hearing under section 24 of the MVRMA and/or section 41 of the *Waters Act*; (c) refer it to MVEIRB for environmental assessment; or (d) refuse to

issue the amended Licence if a requirement set out in section 61 or 62 of the MVRMA has not been met or for any other reason as provided for in legislation. When the review is completed, comments are forwarded to the applicant for a response.

The Amendment Applications are then assessed to determine if they are exempt from Part 5 of the MVRMA. Details relating to preliminary screening are outlined below in Section 4.3 (MVRMA Part 5).

4.1.2 The Board's Role in Consultation

The Board's requirements for engagement are set out in its *Engagement and Consultation Policy* (the Policy).[43] The Policy was developed to ensure that the Board's obligations for achieving meaningful consultation (as set out by the land claims and applicable legislation) with all affected parties, including Aboriginal groups in the Mackenzie Valley, are met and consultation results clearly articulated. The Policy has three broad objectives; to guide applicants in proactive engagement related to licence and permit applications; to assist the Board to meet its own statutory requirements by providing a forum for consultation on concerns and proposed mitigations; and to assist in ensuring the adequacy of Crown consultation.

The core of the Policy is:

1) To require proponents to initiate dialogue and engagement planning with affected parties, particularly affected Aboriginal organizations/governments, in advance of an application with the goals of:
   - explaining the project;
   - identifying concerns and potential environmental impacts (including any potential for impacts to Aboriginal and treaty rights);
   - addressing concerns raised; and
   - ensuring appropriate levels and types of engagement are carried out over the life of an authorization or project.
2) To apply consultative approaches throughout a proceeding, which assist affected parties to meaningfully contribute to the assessment of impacts on the environment and the establishment of appropriate mitigations in order for the Boards to meet statutory responsibilities pursuant to the MVRMA and the *Waters Act* and their regulations.
3) To assist in ensuring, and if necessary rule on, the adequacy of Crown consultation before making a final decision or recommendation, taking into account information gathered during proponent engagement and through its consultative processes.

4.1.3 Notifications and Initial Engagement

The following is a high-level summary of notifications and early engagement activity undertaken by De Beers on the Amendment Applications for the Gahcho Kue Project. For more detail on the timing of engagement activities, see Section 3 (Regulatory Process) of these Reasons for Decision, as well as material filed by De Beers in support of their Amendment Applications.

[43] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement and Consultation Policy (June 1, 2013).

In accordance with the *Engagement and Consultation Policy* and associated guidelines, the Board requires proponents to engage with potentially affected parties prior to and during the operation of a project.[44] Engagement ensures that affected parties are able to develop an understanding of a proposed project or component of a project; provide feedback during the engagement process on issues of concern with regards to a project; and work towards building relationships with proponents that are operating in an area.[45]

De Beers included a record of engagement as part of their Amendment Applications which highlighted the engagement activities that took place prior to submitting the applications and a summary of the discussion topics.[46] Where contact was made, the engagement record indicates that no concerns were raised.

4.1.4 The Boards Process and Participation of Aboriginal Groups

Aboriginal communities and organizations were engaged throughout the review phase of the Board's process. Review comments were received from NSMA and Ni Hadi Xa during the initial review of the Amendment Applications. Participation occurred during the Technical Session by Tlicho Government, NSMA, Ni Hadi Xa, and the Akaitcho IMA Implementation Office. For more detail on the comments received, see Section 3 (Regulatory Process) of these Reasons for Decision.

It should be noted that the Aboriginal parties, as with all reviewers, had the opportunity to participate in, and review, the hearing transcripts, as well as the various public products of the Board's process.

4.1.5 Views of the Board

As noted above in Section 4.1.2 (The Board's Role in Consultation), the Board's *Engagement and Consultation Policy* has three broad objectives.

Regarding the first objective, the Board has determined the level of engagement by DeBeers was adequate. In accordance with the Policy and the MVLWB Engagement Guidelines, De Beers initiated dialogue with Aboriginal organizations and governments starting in April 2017 through to December 2017, prior to filing their Amendment Applications with the MVLWB on March 19, 2018.[47]

Further, De Beers provided detailed explanation of the Project during the technical session that was held on May 30-31, 2018.

Regarding the second objective, namely facilitating the effective contribution of all reviewers in the process, the Board has determined its process was sufficiently robust. The process provided opportunities for the review of the Amendment Applications; participating in a technical session, an opportunity to file any written interventions, participating in a public hearing, commenting on the draft Permit and Licence conditions, and filing closing arguments.

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[44] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement and Consultation Policy (June 1, 2013).
[45] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB, Information for Proponents on the MVLWB's Engagement Requirements (2014).
[46] See Water Licence MV2005L2-0015 and Land Use Permit MV2005C0032 Environmental Screening Assessment, submitted to the MVLWB on March 19, 2018.
[47] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits (September 2014).

Regarding the final objective, namely the adequacy of Crown consultation, the Board has determined that the duty to consult in relation to matters within its jurisdiction has been satisfied. Administrative tribunals such as Land and Water Boards under the MVRMA can rule on questions of law. The Board therefore has the authority, if necessary, to assess the adequacy of Crown consultation before making a final decision or making a recommendation to the responsible Minister and may use remedies available to it in addressing Aboriginal consultation issues.

In summation, the Board finds that Aboriginal parties were engaged throughout the entirety of the Board process. This included project pre-engagement by the proponent, Application review, and the Technical Session. The Board's role in regard to the Crown's duty to consult was discharged appropriately, as directed by its own *Engagement and Consultation Policy*. The Board therefore finds that Crown consultation has been adequate on the Amendment Applications related to the Gahcho Kue Project.

4.2 MVRMA Part 3 and 4 and *Waters Act*: Land and Water Regulation

The use of land, water, and the deposit of waste proposed is of a nature contemplated by the MVRMA and the *Waters Act*.

The Board has jurisdiction to issue this amended Licence and Permit under subsection 60(1.1) and section 102 of the MVRMA.

4.2.1 General

The Board has considered the people and users of the Mackenzie Valley, and any traditional knowledge and scientific information that was made available to it during this regulatory proceeding, under section 60.1 of the MVRMA.

4.2.2 Public Notice

Notice and copies of the Amendment Applications were given to fulfill sections 63 and 64 of the MVRMA. The Board is satisfied that a reasonable amount of time was given to communities, First Nations, and the public to participate in this regulatory process by making submissions to the Board.

4.2.3 Water Use Fees

De Beers is required to pay water use fees under subsection 8(1) of the Waters Regulations. Water use fees for the additional water allotment shall be paid prior to use of these additional amounts, and for the duration of the Licence on or before its annual Anniversary date.

4.2.4 Existing Licences

With respect to paragraph 26(5)(a) of the *Waters Act*, the Board is satisfied that the granting of this Licence will not adversely affect, in a significant way, any existing Licensee or any other applicant if compliance with the Licence occurs.

4.2.5 Compensation to Existing Water Uses

Paragraph 26(5)(b) of the *Waters Act* prohibits the issuance of the Licence unless the Board is satisfied that appropriate compensation has been or will be paid by the applicant to persons who would be adversely affected by the use of waters, or deposit of waste proposed by the applicant, at the time when the applicant filed its Amendment Applications with the Board.

The Board received no claims for compensation either during the time-period stipulated in the Notice of Application or afterwards. Provided compliance with the Licence conditions takes place, the Board finds that there are no water users or persons listed in paragraph 26(5)(b) of the *Waters Act* who will be adversely affected by the use of waters or the deposit of waste proposed.

4.2.6 Water Quality Standards

With regards to subparagraph 26(5)(c)(i) of the *Waters Act*, the Board is satisfied that compliance with the Licence conditions will ensure that waste will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's *Water and Effluent Quality Management Policy*.[48] These are discussed further in Section 5.5 of these Reasons for Decision (Part G of the Licence: Conditions Applying to Water and Waste Management).

4.2.7 Effluent Quality Standards

There are no effluent quality standards prescribed in the Waters Regulations. The Board is nonetheless satisfied that the effluent quality standards set out in the Licence are consistent with the Board's *Water and Effluent Quality Management Policy* and will protect the receiving waters and environment. These are further discussed in Section 5.5 of these Reasons for Decision (Part G: Conditions Applying to Water and Waste Management and Schedule 5).

4.2.8 Financial Responsibility

The Board must satisfy itself of the financial responsibility of De Beers under paragraph 26(5)(d) of the *Waters Act* before it can issue the Licence.

During the public hearing of May 2014, when the Gahcho Kue Project's first Licence and Permit Applications entered the regulatory process after the completion of the environmental impact review, the Board sought clarification on this matter from De Beers. In response, De Beers confirmed that they would be financially liable for all of the funding related to the joint venture, including the responsibilities associated with posting any required security.[49] In the current Licence and Permit, the Board has imposed terms and conditions sufficient to protect the land, water resources, and the environment. In addition, the terms and conditions of the Licence and Permit, including financial security requirements, are in the Board's view sufficient to ensure satisfactory closure and reclamation of the Project.

As a result, and for the reasons set out above, the Board is satisfied that the financial capacity of De Beers, in this case, is adequate and meets the requirements of paragraph 26(5)(d) of the *Waters Act*.

4.2.9 Minimization of Adverse Effects

With regards to subsection 27(2) of the *Waters Act*, it is the opinion of the Board that compliance with the Licence will ensure that any potential adverse effects on other water users, which might arise because of the issuance of the Licence, will be minimized.

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[48] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).
[49] See Public Hearing – Day 1 Transcripts page 169-170, dated May 6, 2014.

4.2.10 Time Limit

The Board is satisfied it has adhered to subsection 47(1) of the *Waters Act*, which requires it to make a decision within a period of nine months after the day on which a licence application is made or a notice advertised as per subsections 43(1) and 43(2) of the *Waters Act*.

4.3 MVRMA Part 5

4.3.1 Preliminary Screening

On June 7, 2018, the Board met and conducted a preliminary screening of the activities associated with the Amendment Applications, to fulfill subsection 124(1) of the MVRMA. The Board determined that the activities associated with the Amendment Applications would not have a significant adverse impact on the environment and would not be a cause of public concern. The Board's Preliminary Screening Report includes its reasons for that decision and is available on the Board's public registry.[50] The Board is satisfied the proposed development has been screened pursuant to the MVRMA.

5.0 Decision – Water Licence MV2005L2-0015

In making its decision and preparing these Reasons for Decision, the Board has reviewed and considered:

1) The comments, recommendations, and concerns that arose during the regulatory processes;
2) The evidence and submissions from Reviewers and De Beers received by the Board;
3) The Staff Report prepared for the Board; and
4) The purpose, scope and intent of the Board's statutory responsibilities under the MVRMA and the *Waters Act*.

Having due regard to the facts, circumstances, and the merits of the submissions made to it, the Board has determined that Licence MV2005L2-0015 should be amended, subject to the scope, definitions, conditions, and term contained therein. The only changes made pertain to the Scope and Definitions, Part G, Schedules 1-3, Annex A, and Annex C of Licence MV2005L2-0015. The Board's reasons for this decision are set out below.

5.1 Part A: Scope and Definitions

Part A of the Licence contains the scope and definitions for terms used throughout.

Scope

The scope of the Licence ensures the Licensee is entitled to conduct activities which have been applied for and screened by the Board. In setting out the scope of the Licence, the Board endeavoured to provide enough detail to identify and describe the authorized activities, without being unduly restrictive or prescriptive, and to allow for project flexibility throughout the life of the Licence.

In their March 19, 2018 Amendment Application, De Beers proposed the following changes to the scope (changes are ***bolded***):

> This Licence entitles the Licensee to use Water and dispose of Waste for the purpose of constructing, operating, closing, and reclaiming the Gahcho Kue Project (the Project), a diamond mine located within the Kennady Lake watershed of the Kirk Lake basin, approximately 280 kilometers (km) northeast of Yellowknife, Northwest Territories (NWT). The scope of the Project is described ***in the***

[50] See MVLWB Preliminary Screening and Reasons for Decision, dated June 7, 2018.

> ***Updated Project Description 2018 and supporting materials submitted in March 2018***, and the additional information submitted during the regulatory process, and includes the following:

The rational provided by De Beers was that the scope must cover the adjustments made to the mine plan as applied for in their Amendment Applications.

During the Board's review process, one comment was received from ECCC requesting clarification on the rational for the change to the scope.[51] In response, De Beers stated that there was a typo in their request (reference should have been to the Licence and not the Permit).[52]

Board staff released the draft Licence conditions on August 27, 2018 for review.[53] Board staff proposed alternative wording for the scope, that was consistent with recent Licences issued by the Board, and was not too restrictive and would capture the applications submitted by De Beers to date, and not limiting to only the most recent submission (changes are ***bolded***):

> This Licence entitles the Licensee to use Water and dispose of Waste for the purpose of constructing, operating, closing, and reclaiming the Gahcho Kue Project (the Project), a diamond mine located within the Kennady Lake watershed of the Kirk Lake basin, approximately 280 kilometers (km) northeast of Yellowknife, Northwest Territories (NWT) ***including the following***:
>
> ***These activities are described in submissions to the Mackenzie Valley Land and Water Board, including, but not limited to:***
>
> ***xxii. The Water Licence Application received on November 28, 2013, and the additional information submitted during the regulatory process, and approved on September 23, 2014;***
>
> ***xxiii. The May 2, 2018 Amendment Application and related documents submitted during the regulatory process, approved on July 20, 2018; and***
>
> ***xxiv. The March 19, 2018 Amendment Application and related documents submitted during the regulatory process, approved on XXX, XX, XXXX.***
>
> ***If any discrepancy or conflict results from reference to the submissions in subparagraphs xxii to xxiv, the contents of the more recently approved document(s) shall prevail.***

During review of the Draft Licence conditions, no comments or recommendations were received on the scope.

The Board determined that the proposed wording put forth by Board staff adequately addresses De Beers' request to update the scope of the Licence to cover the adjustments made to the mine plan as applied for in their Amendment Applications, as well as cover the previously authorized activities that have not changed.

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[51] See Review Comment Summary Table – Application, dated May 21, 2018.
[52] *Ibid.*
[53] See Board staff Draft Licence Conditions, dated August 27, 2018.

Definitions

The Board defined items in the Licence to ensure a common understanding of conditions, to avoid future differences in interpretation, and to use wording similar to that found in previously issued Licences. Where appropriate, the Board created new definitions, changed standard wording, or used specific definitions to describe specific facilities related to the Gahcho Kue Project as described below:

- Area 7 - A new definition for Area 7 was added. This definition was included because it is a specific facility related to this Project. The definition was provided by De Beers as an Undertaking.[54] An update to the proposed wording was provided by De Beers during review of the Draft Licence conditions to have the term "run off" as "runoff". No other comments or recommendations were received on the proposed new wording.
- Project - New wording for the definition for Project was proposed by De Beers. Board staff provided alternative wording that was less prescriptive and would match the definition of Project in the associated Permit. During the review of the Draft Licence conditions, GNWT-ENR recommended that the definition for "Project" proposed by the Board be added to the Water Licence which was acceptable to De Beers.

In the approved Licence, a Modification is defined as, "a change, other than an expansion, that does not alter the purpose or function of a structure". De Beers requested in its March 19, 2018 Amendment Application to revise the definition for Modification to remove 'other than an expansion'.[55] During review of the Amendment Application, GNWT-ENR recommended that the definition not be changed as an expansion may include an alteration of the project footprint which could require an amendment.[56] No other party submitted evidence or recommendations to the Board regarding this proposed amendment.

The definition of Modification used in the approved Licence is consistent with recently issued water licences and is defined within the Exemption List Regulations. In its Intervention, GNWT-ENR stated that "Modifications are specific activities that don't require amendments to the scope of a water licence or to terms and conditions of a water licence. Changes to the scope or the footprint of the mine, including the expansion of a facility (areal expansion) require an amendment to the licence and cannot be processed via a modification".[57] As such, the Board did not amend the definition of modification as proposed.

5.2 Part B: General Conditions and Schedule 1

Part B and Schedule 1 of the Licence contain general administrative conditions regarding compliance and conformity with the MVRMA and *Waters Act* and is consistent with standard conditions found in previous Licences issued by the Board.

Part B, condition 10 and Schedule 1, condition 1: Annual Water Licence Report

The requirements for the Annual Water Licence Report are outlined in Part B, condition 10, and Schedule 1, condition 1. The purpose of the Annual Water Licence Report is to provide the Board and all stakeholders the opportunity to be annually updated on project components and activities, and to provide a platform for stakeholders to submit comments, observations, feedback, and questions as necessary. The requirements

[54] See De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[55] See Water Licence MV2005L2-0015 Amendment Application, submitted to the MVLWB on March 19, 2018.
[56] See Initial Comments on Amendment Application, submitted to the MVLWB on May 7, 2018.
[57] See Written Interventions from GNWT, submitted to the MVLWB on June 27, 2018.

are intended to provide clarity and summarize information already captured through existing submissions; they are not meant to be onerous.

During the regulatory process, a concern was raised regarding nitrate loading to the Water Management Pond and De Beers ability to meet the newly proposed EQC. De Beers will undertake appropriate monitoring and management actions to ensure that they can meet the EQC but there is currently no reporting mechanism for those efforts to the Board and other stakeholders. De Beers indicated that the Annual Water Licence Report would be an appropriate tool for reporting on the actions implemented at site to reduce nitrate loadings. No suggested wording was provided, and as such, Board staff provided wording in the Draft Licence conditions for review. In response, ECCC and De Beers concurred that the modified wording to Schedule 1, condition 1(i) was acceptable.[58]

The Board has amended Schedule 1 condition 1(i) so that De Beers provides annual updates on the success of management measures undertaken to reduce nitrate loading to the Water Management Pond.

5.3 Part C: Conditions Applying to Security Deposits and Schedule 2

Part C and Schedule 2 of the Licence contain conditions that set the level of security to be maintained by the Licensee and set out requirements related to posting and updating security. As in other licences, the Board may request a security update from the proponent at any time, and may adjust the security amount at any time, based on available information. Specifically, Part C items 3 and 4 stipulate that the Board can revise the security deposit and that the Licensee will post the new deposit within 90 days. This condition pertains to both increases and reductions in security.

The remainder of this section of the reasons addresses how the Board set the security deposit amounts stipulated in the Licence and the Permit. The security deposits required by these two instruments are discussed together since the estimates deal with the same project and are intimately linked.

Security Deposit Amounts

The Board has determined that the security deposit amount shall be $97,318,038. Consistent with the Board's normal practice, the Board adopted the split between land and water security estimates in RECLAIM and has placed the land liability amounts under the Permit, and the water liability under the Licence. $53,925,648 is required under the Licence and $43,392,390 is required under the Permit.

A detailed explanation of how the Board determined the total security deposit is provided in Appendix 2: Detailed Reasons for Decision for the Determination of the Gahcho Kue Project Reclamation Security.

Phased Security Payments

For a description of the rationale for the milestones currently set in the Licence, the reader is referred to section 4.3.4 and Appendix 2 of the Board's August 11, 2014 Reasons for Decision[59] document (the August 2014 Reasons for Decision).

[58] See Comments on Draft Conditions, submitted to the MVLWB on September 12, 2018.
[59] See MVLWB – Reasons for Decision for MV2005L2-0015, dated August 11, 2014.

On June 29, 2018 De Beers submitted a revised financial security estimate using RECLAIM[60] and proposed an updated security payment schedule that would coincide with various phases of the project, and not the currently approved phases.

The Board has selected the following milestones for the security payment schedule, as described in Schedule 2 of the Licence, condition 56 of the Permit, and in Appendix 2 of these reasons:

Table 2: Total Security Deposit Required for the Gahcho Kue Mine

Phased Payment Schedule			
	Total (cumulative total)	Land (cumulative total)	Water (cumulative total)
Prior to the commencement of Construction	$15,429,858	$11,816,392	$3,613,466
One year following the date the security was posted under Schedule 2, item 1(a) the Licensee	$19,043,323	$11,816,392	$7,226,931
Prior to Year 1 of Operations	$37,594,133	$13,817,863	$23,776,270
Prior to conducting activities identified in the January 19, 2017 Amendment Application	$37,620,366	$13,844,096	$23,776,270
Prior to Year 5 of Operations	$80,028,694	$38,519,939	$41,508,755
Prior to Year 7 of Operations	$89,091,861	$42,210,679	$46,881,182
Prior to Year 12 of Operations	$97,318,038	$43,392,390	$53,925,648

5.4 Part D: Conditions Applying to Water Use and Schedule 3

Part D and Schedule 3 of the Licence contains conditions related to water use for Gahcho Kue Project. These are consistent with standard conditions found in previous Licences issued by the Board.

De Beers has requested an increase to the annual allotment of fresh water, to 45,000 m^3 from 35,000 m^3. In addition, to allow for alignment with recent comments and advice from DFO, De Beers requested that the Licence allows for downstream flow mitigation every year, not only every 3 out of 4 years. As such, De Beers requested an update to the existing wording of Schedule 3, condition 1 c).

Schedule 3, Condition 1 b) and c)

Currently, Schedule 3, condition 1 a) allows for up to 60,000 m^3 to be annually withdrawn during the Construction phase. Construction took place over two years (2014/15 and 2015/16), and in each of those years De Beers used less than this annual allotment.

De Beers entered into the Operation phase in September 2016. In their Updated Project Description, dated November 28, 2013, De Beers requested that the annual water allotment be decreased (to 27,000 m^3/y) as it was anticipated that there would be a smaller workforce onsite.[61]

[60] See De Beers – Security Estimate RECLAIM Report v.5 and Security Estimate RECLAIM Excel Report v.5, submitted to the MVLWB on June 29, 2018.
[61] See Water Licence MV2005L2-0015 2013 Updated Project Description, submitted to the MVLWB, dated November 28, 2013.

No concerns were raised during the initial 2013/2014 regulatory process regarding the annual quantity of water of up to 60,000 m^3.

March 19, 2018 Amendment Applications

In the March 19, 2018 Amendment Applications, De Beers requested an increase to the fresh water usage to 45,000 m^3/y. De Beers indicated that additional camp capacity and other developments at site have created a previously unanticipated shortage of water for full camp. During the review of these applications, only the GNWT-ENR commented on the request to increase the water use volumes. GNWT-ENR noted that as per the Operational Water Management Plan V.5, the amount of water available under ice in Area 8 is 1,300,000 m^3. If 10% was withdrawn as per Fisheries and Oceans protocol, a total of 130,000 m^3 would be available for use. However, as Kennady Lake has since been dewatered, GNWT-ENR was unclear if the previously referenced available water volumes were current, because the water withdrawal could have impacted the aquatic environment through the reduction of dissolved oxygen under ice. As such, GNWT-ENR requested De Beers:

1) Outline the date when the initial assessment of available water within Area 8 was completed; and
2) Update the volume of available water for use within Area 8, taking into account any changes in water levels that may have occurred as a result of the dewatering of Kennady Lake.

In response, De Beers stated that:

1) The assessment for water use during construction (i.e., 60,000 m^3/yr) and operations (27,000 m^3/yr) considered the construction of Dyke A and dewatering of Kennady Lake, as well as the reduced drainage area reporting to Area 8. The initial assessment of available water within Area 8 was completed as part of the Gahcho Kue Mine Construction Water Management Plan v.2 (June 2014). Operational data was collected, including surface water elevations in Area 8, and were taken into consideration for the March 19, 2018 Amendment Applications; and
2) The potable water requirements are expected to be similar to the annual quantities withdrawn in 2015 and 2016 during construction and will continue to be monitored. The conservative assessment of Area 8 water supply presented considered an approximate lake water surface elevation of 420.7 m and assumed 2 m thick ice cover. Under normal conditions, Area 8 water surface elevations would be expected to be approximately equal to the Area 8 lake outlet zero-flow elevation (approximately 420.5 m) during the freeze-up period; the lake water surface elevation may increase over the winter period due to local runoff and precipitation while the lake outlet is frozen, which may partially offset water withdrawals. The potable water supply from Area 8 is a small annual supply volume compared to the volume of Area 8 and predicted outflows during construction and operations. Any effects to fish habitat from the increase in the annual water use during operations from 27,000 m^3/y to 45,000 m^3/y would be expected to be negligible (i.e., likely not measurable).

Technical Session

Board staff held a technical session on May 30-31, 2018.[62] Following a presentation by De Beers on the Camp Water Use, the floor was opened to allow any questions.[63] No direct questions were asked regarding the increase to camp water use; however, the GNWT-ENR provided a follow up response to their initial questions (noted above under the heading March 19, 2018 Amendment Applications) in that they had reviewed the information and had no further concerns regarding the requested water use.

[62] See Technical session – Transcripts for Day 1 and Day 2, dated May 30-31, 2018.
[63] See Technical session – De Beers' Presentation, dated May 30, 2018.

Interventions

In their intervention, DFO noted that it is important to understand potential additional negative impacts associated with increased water usage and ensure adequate mitigations are being applied or that additional losses to fish and fish habitat will be accounted for. As such, DFO recommended that De Beers conduct an assessment to determine the efficacy of the downstream flow mitigation plan and whether the current flow augmentation was adequate.

Public Hearing

A public hearing was held on July 17, 2018.[64] During their presentation, the GNWT-ENR stated that the information provided by De Beers alleviated any concerns they had regarding any potential impact to the aquatic environment, and as such, they had no concerns with the increase to the annual water use to 45,000 m^3.

In their presentation, DFO stated that the increased water usage could have negative impacts in the areas downstream of Area 8 due to compounded decreased flow. DFO recommended that De Beers continue to work with them to resolve any downstream flow issues and ensure appropriate mitigation is enacted. DFO confirmed that they were not recommending any changes to the Licence at this time based on the Amendment Application.

Draft Conditions

In their recommendations on the Draft Licence conditions, De Beers stated that to align with recent comments and advice from DFO regarding the downstream flow mitigation, they request the wording of Schedule 3, condition 1 c) be reworded from "…for every three out of four years…" to "…for ***at least every*** three out of four years…".[65]

Closing Arguments

In closing, DFO recommend that De Beers continue to work with DFO to resolve the downstream flow and ensure appropriate mitigations are enacted and effective.[66] De Beers committed to conducting an assessment as part of the 2018 Aquatic Effects Monitoring Plan (AEMP) downstream flow monitoring to determine whether the current flow augmentation as outlined in the Downstream Flow Mitigation Plan is adequate. The increase in potable water withdrawals (from 35,000 m^3 to 45,000 m^3) will also be considered as part of this evaluation. De Beers will continue to engage with DFO through the MVLWB-mandated AEMP and AEMP Response Plan, as well as directly with respect to any potential implications for the *Fisheries Act* Authorization.[67]

The Board approves De Beers' request to amend Schedule 3, condition 1 b), from 35,000 m^3 to 45,000 m^3 as there were no outstanding concerns based on the evidence submitted. The Board also approves De Beers' request to amend Schedule 3, condition 1 c), from "…for every three out of four years…" to "…for ***at least*** every three out of four years…" as the request was to allow for alignment with recent comments and advice from DFO as observed in the evidence submitted.

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[64] See Public Hearing – Transcripts, dated August 8, 2018.
[65] See Comments on Draft Conditions, submitted to the MVLWB on September 12, 2018.
[66] See Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.
[67] See De Beers – Closing Arguments, submitted to the MVLWB on October 3, 2018.

5.5 Part G: Conditions Applying to Water and Waste Management and Schedule 5

Part G and Schedule 5 of the Licence contains conditions applying to water and waste management activities for the Gahcho Kue Project.

Operation Water Management Plan

Part G, condition 4 of the Licence requires that an Operational Water Management Plan be submitted a minimum of 60 days prior to the commencement of milling, for Board approval and be annually reviewed and updated as per Part G, condition 18.

In the March 19, 2018 Amendment Applications, De Beers submitted an updated Operational Water Management Plan to align with the updated project description and to address any potential environmental impacts identified in the environmental screening report.

During the review of the updated Operational Water Management Plan, comments were received from Board staff indicating errors in a table,[68] which were acknowledged by De Beers.

In addition, during this proceeding, discussions took place regarding the management of water between the Water Management Pond, Area 7, Area 8, and Lake N11. Specifically, Board staff note that draft amended conditions have been developed under which the Water Management Pond water can be discharged to N11, Area 7, and Area 8 via Area 7.

The Board has determined that as the amended conditions affect the Operational Water Management Plan, specifically aligning with, but not limited to, Part G, conditions 29, 30, 31, 32, 33, and 35,[69] the Operational Water Management Plan shall be updated to address the changes of the Licence.

Groundwater Monitoring Program

Part G, condition 6 of the Licence requires that a Groundwater Monitoring Program be submitted within 6 months following issuance for Board approval.

In the March 19, 2018 Amendment Applications, De Beers submitted an updated Groundwater Monitoring Program to align with the updated project description and to address any potential environmental impacts identified in the environmental screening report.

During the review of the updated Groundwater Monitoring Program, comments were received from Ni Hadi Xa indicating font errors in figures 4 and 5,[70] which were acknowledge by De Beers by resubmitting updated figures.

The Board requires De Beers to update the Groundwater Monitoring Program to include the corrected figures as indicated by Ni Hadi Xa.

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[68] See Review Comment Summary Table – Application, dated May 21, 2018.
[69] Note that the condition that was originally 32 in Licence MV2005L2-0015 has been split into conditions 32 and 33 in the amended Licence; this means that Part G, condition 34 in the original Licence is now numbered 35 in the amended Licence.
[70] See Review Comment Summary Table – Application, dated May 21, 2018.

Geochemical Characterization and Management Plan

Part G, condition 14 of the Licence requires that a Geochemical Characterization and Management Plan be submitted within 60 days following Licence issuance, for Board approval and be annually reviewed and updated as per Part G, condition 18.

In the March 19, 2018 Amendment Applications, De Beers submitted an updated Geochemical Characterization and Management Plan to align with the updated project description and to address any potential environmental impacts identified in the environmental screening report.

During the review of the updated Geochemical Characterization and Management Plan, Ni Hadi Xa, ECCC, the GNWT-ENR, and Board staff provided comments.[71] Most comments sought clarification from De Beers, however, one comment from Board staff noted a discrepancy in the tabulated data and requested De Beers revise the table if necessary. In response, De Beers submitted an updated table.

The Board requires De Beers to update the Geochemical Characterization and Management Plan to include the corrected values as indicated by Board staff.

Processed Kimberlite and Waste Rock Management Plan

Part G, condition 17 of the Licence requires that a Processed Kimberlite and Waste Rock Management Plan be submitted to the Board for approval 90 days prior to the commencement of construction of the South Mine Rock Pile, West Mine Rock Pile, the fine kimberlite containment facility and the coarse kimberlite containment facility. The plan shall be annually reviewed and updated as per Part G, condition 18.

In the March 19, 2018 Amendment Applications, De Beers submitted an updated Processed Kimberlite and Waste Rock Management Plan to align with the updated project description and to address any potential environmental impacts identified in the environmental screening report.

During the review of the updated Processed Kimberlite and Waste Rock Management Plan, comments were received from Ni Hadi Xa[72] seeking clarification from De Beers. In response, De Beers provided additional details.

The Board approves the Processed Kimberlite and Waste Rock Management Plan as submitted.

Effluent Quality Criteria – Lake N11 and Area 8

The Board's approach to managing the deposit of waste to the receiving environment through water licence conditions is described in the Board's *Water and Effluent Quality Management Policy*.[73]

[71] *Ibid.*
[72] See Review Comment Summary Table – Application, dated May 21, 2018.
[73] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).

Part G, condition 29

In the March 19, 2018 Amendment Applications, De Beers proposed the following changes to the wording of Part G, condition 29 from:

> The Licensee shall provide Water sampling results from SNP station 02 and 04 to an Inspector no later than five (5) days prior to any planned Discharge of Wastewater from the Water Management Pond to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector.

To (changes are ***bolded***):

> The Licensee shall provide water sampling results from *SNP* ***stations currently active within the Water Management Pond*** **to determine** ***the ability for the water to meet Effluent Quality Criteria during discharge to N11*** no later than five (5) days prior to any planned Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector.

The rational provided by De Beers was that SNP 02 is fairly isolated due to its bathymetry within the pond and that an overview of all discharge locations within the Water Management Pond would be more appropriate.

During the review of these applications, the GNWT-ENR and Board staff commented on the requested change. GNWT-ENR noted that the intent of this SNP location was to ensure that the water from the discharge location meets the discharge limits prior to discharge into the environment. Further, the intent of the approved condition was to ensure sampling results were provided to the Inspector prior to discharge. As such, GNWT-ENR requested De Beers clarify:

1) How the proposed amendments would provide a more accurate assessment of discharge water quality than in-line monitoring at SNP-02 and SNP-04;
2) Why the proposed amendment references only Lake N11 and excludes Area 8; and
3) Why the proposed amendment excludes specific reference to provide results to the Inspector.

In response, De Beers stated that:

1) The intent of the change was not meant to take away the requirement to provide the results of any monitoring to the Inspector. The pre-discharge sampling of SNP 02 occurs at the intake location in Area 3 of the Water Management Pond which is a large body of water with multiple SNP stations currently sampled (SNP 02, SNP 05, and SNP 06). The request for additional data to be considered was meant to allow the Inspector to evaluate the water quality of a larger area and not only the semi-isolated area of SNP 02, which may not always be representative of the entire pond;
2) The same request is not required for discharge from Area 7 to Area 8 as the issue does not occur in Area 7 and therefore a change for SNP-04 is not being requested; and
3) This was a typo. The updated proposed wording is "The Licensee shall provide water sampling results from SNP stations currently active within the Water Management Pond **to an Inspector** to determine the ability for the water to meet Effluent Quality Criteria during discharge to N11 no later than five (5) days prior to any planned Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector." De Beers is also open to alternative wording.

Board staff noted that this condition is commonly used in water licences to ensure that the Inspector is aware of the water quality prior to discharge occurring. Further rationale was requested of De Beers.

In response, De Beers stated that:

The purpose of the request was related to the SNP 02 station, particularly during winter where bathymetry and ice growth consumes water availably creating a semi-isolated area, where water quality is not representative of the entire Water Management Pond. It is anticipated that this flexibility would be required during winter discharge, where in the summer, sufficient mixing with the Water Management Pond is expected to occur.

Technical Session

Board staff held a technical session on May 30-31, 2018.[74] Following a presentation by De Beers on the various Amendment changes, which included the requested update to the wording of Part G, condition 29, the floor was opened to allow any questions.[75]

The GNWT-ENR, ECCC, and Board staff all asked various clarifying questions. To finish, the GNWT-ENR stated that they might make a recommendation regarding the wording in their intervention.

Interventions

In their intervention, the GNWT-ENR noted that the intent of this SNP location was to ensure that the water from the intake location meets discharge limits prior to discharge into the environment. As such, the GNWT-ENR requested additional clarity to accurately indicate which sampling data is required prior to Inspector approval. To ensure non-compliant water is not discharged to Lake N11, a sampling location closest to the intake should be sampled, which is currently SNP 20. Should De Beers have evidence that water quality at the location of SNP 20 may not be reflective of overall conditions in the Water Management Pond, the intake location may require relocation. To ensure compliant water will be discharged to Lake N11, all approved EQCs for discharge to Lake N11 should be added to SNP 20, in addition to currently required toxicity testing. Finally, the intent of this clause is to ensure sampling results are provided to the Inspector prior to discharge. As such, GNWT-ENR providing the following re-wording (changes are ***bolded***):[76]

> The Licensee shall provide Water sampling results ***to an Inspector*** from ***the*** SNP stations ***closest to the intake location in the*** Water Management Pond ***or Area 7 to determine the ability for the Water to meet Effluent Quality Criteria during discharge to N11 or Area 8*** no later than five (5) days prior to any planned Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector.

In response to the GNWT-ENRs intervention, De Beers stated that the proposed wording is acceptable and appreciates the support for increased flexibility regarding the inclusion of additional pre-discharge samples from proximate SNP stations in the Water Management Pond or Area 7 for consideration by the Inspector prior to discharge, if required. De Beers also stated they agree with the recommendation from the GNWT-ENR to include all parameters for which applicable EQC exist as well as any required toxicity testing outlined in the Licence.[77]

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[74] See Technical session – Transcripts for Day 1 and Day 2, dated May 30-31, 2018.
[75] See Technical session – De Beers' Presentation, dated May 30-31, 2018.
[76] See Written Interventions from GNWT, submitted to the MVLWB on June 27, 2018.
[77] See De Beers – Response to Interventions from GNWT, submitted to the MVLWB on July 5, 2018.

Public Hearing

A public hearing was held on July 17, 2018.[78] Following De Beers' presentation, the floor was opened to allow any questions. The GNWT-ENR asked De Beers to confirm their interpretation of the GNWT-ENR's recommendation regarding specifically which SNP stations would be used to determine the applicability of discharge. In response, De Beers stated that water quality samples from other SNP stations could be used to inform the Inspector on their decision as whether or not to allow discharge to Lake N11. De Beers suggested using either SNP 05 or SNP 06, or to create a new location.

The GNWT-ENR stated that they may not have been clear in their recommendation, as they were thinking a single station was appropriate. As such, additional clarity would be provided in their closing arguments.

Draft Conditions

In their recommendations on the Draft Licence conditions, ECCC stated that they concur with the wording as proposed by the GNWT-ENR.[79] The GNWT-ENR also provided clarification on their original recommendation in that it was intended that a single station was to be used to determine the ability of water to meet EQCs and that the location used be the one closest to the intake. As such, the GNWT-ENR stated that they would provide a revised recommendation as part of their closing arguments.

In response, De Beers stated they continue to recommend the wording initially proposed in the March 19, 2018 Amendment Application. However, should the GNWT's revised suggestion be used, they recommend that the station for pre-discharge water quality sampling be stipulated as the same location as SNP 20, and that the definition of SNP 20 be revised as the centre of the Water Management Pond, or alternatively defined as the mid-point of SNP 05, SNP 06 and SNP 20.

Closing Arguments

In closing, GNWT-ENR updated their recommended wording to provide additional clarity as it was their intent to recommend that the single station nearest the water intake, in any water storage area, be sampled prior to discharge (changes are ***bolded***):[80]

> The Licensee shall provide water sampling results ***to the Inspector from the SNP Station closest to the intake location in the Water Management Pond to determine the ability of the water to meet Effluent Quality during discharge to Lake N11 and the SNP Station closest to the intake location in Area 7 to determine the ability for the water to meet Effluent Quality Criteria during discharge to Area 8***. These results shall be provided no later than five (5) days prior to any planned Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by the Inspector.

In closing, De Beers reiterated their request for additional flexibility for the location of the SNP station used for the pre-discharge monitoring in the Water Management Pond. The rational is that the current monitoring location is within a small, shallow bay within the Water Management Pond, which can become isolated due to restrictive bathymetry. When in-lake circulation conditions are reduced or limited, as a result of low water levels or under-ice conditions, the water quality within the small bay is not always representative of the

[78] See Public Hearing – Transcripts, dated August 8, 2018.
[79] See Review Comment Summary Table – Draft Licence and Permit, dated September 19, 2018.
[80] See Closing Arguments from GNWT-ENR, submitted to the MVLWB on September 26, 2018.

water that would be drawn from the Water Management Pond once pumping begins. During discharge, water from the Water Management Pond is drawn from a much larger area of the Water Management Pond.

De Beers notes that although the water quality between SNP 02 and the centre of the Water Management Pond would not be expected to be substantially different, the possibility exists that a difference may be seen at SNP 02 (exceedance of an EQC for one or more parameters) which would mean that discharge would be disallowed, even when water quality meets EQC in the rest of the Water Management Pond. This scenario highlights a potential risk for De Beers when managing water at site, which could result in major operational issues.

De Beers proposes to address this constraint by providing monitoring results from more than one SNP station in the Water Management Pond to the Inspector prior to discharge. However, if the Board is of the opinion that only one station should be used for confirming water quality prior to discharge, De Beers recommends that the station for pre-discharge water quality sampling be stipulated as the same location as SNP 20, and that the definition of SNP 20 should be revised as the centre of the Water Management Pond, or alternatively defined as the mid-point of SNP 05, SNP 06, and SNP 20. The relocation is required in order to sample the water representative of the discharge water quality and to ensure that sampling actually can conform to the Water Licence condition.

The Board has decided to reword the condition so as to define the monitoring station as SNP 20 as requested by De Beers but did not amend the location of SNP 20 as there was insufficient evidence to support the latter request.[81] In their decision, the Board notes that after issuance of the amended Licence, De Beers may apply to the Board to change the definition and location of SNP 20; such a submission should be accompanied by relevant evidence and reviewers will have the opportunity to comment on the proposed change as per the Board's review process.

Part G, condition 30 (discharges to Lake N11)

Part G, condition 30 sets out the EQC for discharges from the Water Management Pond to Lake N11. Detailed reasons for decision regarding the EQC are provided in Appendix 1.

Part G, condition 31 (discharges to Area 8)

The existing water licence for Gahcho Kue anticipated only one year of discharge from the Water Management Pond to Area 8 during operations although, to date, no such transfer has taken place.[82] In its March 19, 2018 Amendment Application, De Beers has proposed instead to discharge water from Area 7 to Area 8; the primary purpose of the proposed discharge is to supplement the downstream flow mitigation water that is needed to substitute for the water that used to flow naturally from Kennady Lake.

Area 7 is within the controlled water management area of the site and collects run-off water from the surroundings. In addition to the collection of run-off water, De Beers would like the flexibility to use Area 7 for contingency storage of wastewater from the Water Management Pond on an as-needed basis. Originally, De Beers stated[83] that if it does use Area 7 for contingency storage, the wastewater would be pumped back into the Water Management Pond or another pit, and not to Area 8. Based on this assumption, the EQC De

[81] See Section 4, De Beers – Closing Arguments, submitted to the MVLWB on October 3, 2018.
[82] See page 35 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[83] *Ibid*.

Beers' originally derived[84] for discharges from Area 7 to Area 8 were only for the scenario that water quality in Area 7 was influenced solely by the run-off water that was collected there. If Area 7 was ever needed for contingency storage of wastewater from the Water Management Pond, then De Beers proposed[85] to submit another EQC Evaluation Report in recognition of the fact that, in the latter scenario, the effluent quality would be quite different than if it were just composed of run-off water.

During the Technical Sessions,[86] ECCC and GNWT-ENR questioned the logic of this approach and asked whether it might make more sense to develop a more fulsome list of EQC for Area 7 discharges that would be achievable for the two scenarios: 1) when Area 7 only contains run-off water; and 2) when Area 7 contains a mixture of run-off water and wastewater from the Water Management Pond. In this way, another amendment to the Licence might be avoided in the case that De Beers finds it needs to use Area 7 for contingency storage of Water Management Pond effluent in future. De Beers concurred with this idea and provided a full EQC analysis[87] of scenario 2.

At the end of the Amendment proceeding, neither ECCC and GNWT-ENR had substantial concerns about the EQC values being proposed, but they continued to recommend that only one set of EQC be included in Part G, item 31. GNWT-ENR stated:[88]

> ENR believes that the application of one set of EQC to Area 7 which are protective and achievable will provide administrative efficiency; will provide additional clarity to the Inspector from an enforcement standpoint; and, will provide De Beers with additional operational flexibility and certainty regarding the different sources of water discharged to Area 8.

This GNWT-ENR recommendation remained unchanged in closing arguments.[89] In its closing arguments, ECCC also stated[90] that it "would like to reiterate that there should be a full suite of parameters for EQC for all discharges from Area 7", noting that De Beers should not have any issues meeting the criteria and not have to do additional monitoring.

In De Beers' closing argument,[91] it points out that both sets of EQC were derived using established procedures and are protective of the receiving environment. De Beers goes on to distinguish the EQC as being "primary EQC" that are based on "expected condition of Area 7 under normal operations of the Mine" (i.e., scenario 1 as described above) from the "contingency EQC" which would only be applicable in certain situations when the Water Management Pond water storage capacity temporarily reached for some reason (e.g., extended periods of wet conditions). De Beers states:[92]

> Further, De Beers' opposition to a single set of EQC for Area 7 discharge to Area 8 is because the Primary discharge condition (i.e., where the water in Area 7 is primarily sourced from natural sub-

[84] See Section 3.2.2 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[85] See page 35 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[86] See pages 144-152 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[87] See De Beers - Response to IR#1, Responses to Information Requests from the Technical Sessions, submitted to the MVLWB on June 14, 2018.
[88] See Section 2.2.1, Written Interventions: GNWT, submitted to the MVLWB on June 27, 2018.
[89] See Closing Arguments: GNWT-ENR, submitted to the MVLWB on September 26, 2018.
[90] See Closing Arguments: ECCC, submitted to the MVLWB on September 26, 2018.
[91] See De Beers – Closing Arguments, submitted to the MVLWB on October 3, 2018.
[92] *Ibid*, Section 3.2.

watershed runoff) is the expected operations scenario; the Contingency discharge condition is derived for a water management contingency conditions that is not anticipated during the Mine operations.

The Board notes that the EQC proposed by De Beers for the "Primary discharge condition" are a subset of the EQC proposed for the "Contingency discharge condition"; therefore, there is no indication that there is an issue with achievability in either scenario. As well, there is no evidence that the monitoring and management requirements will be different for De Beers in either case. Conversely, there may be some logistical issues (e.g., notification of the Board and Inspector, the potential need for approval, etc.) around the determination of which set of EQC apply at different points in the mine life. For these reasons, the Board has decided to include only one set of EQC for discharges from Area 7 to Area 8 in Part G, condition 31; these EQC will be applicable in all the potential water management scenarios that De Beers has stated may occur during the operation of the mine.

Appendix 1 provides detailed reasons for decision for the EQC listed in Part G, condition 31 for discharges from Area 7 to Area 8.

Part G, condition 32 – Effluent Quality Criteria Exceedances

Draft Conditions

Board staff released the draft Licence conditions on August 27, 2018 for review.[93] Board staff proposed additional wording for consideration, as it was identified during the regulatory process that once De Beers entered the operational phase of Operations, discharge from the Water Management Pond directly to Area 8 no longer takes place.[94] During Operations, if Water is discharged from the Water Management Pond, it will be directed through Area 7 prior to being released to Area 8 (changes to Part G, condition 32 are ***bolded***):

> If the EQCs as listed in Part G, items 30 and 31 are exceeded, the Licensee shall cease all Discharge from the Water Management Pond ***and/or Area 7*** to Lake N11 and/or Area 8, shall notify the Board and an Inspector, and shall take the necessary corrective action to mitigate the exceedance, as outlined in the Water Management Plan, to the satisfaction of an Inspector immediately.

In their recommendations on the Draft Licence conditions, De Beers stated that the updated clause was acceptable.[95]

During the Board meeting, there was further reconsideration of the proposed wording in the draft Licence. It was determined that there could still be some misinterpretations, and as such, the Board split condition 32 into two separate conditions, thereby creating a new condition. As such, the existing conditions 33 and 34, became conditions 34 and 35, respectively. The Board also updated the rationale of SNP 20 to align with the shifting of the conditions to allow for the new condition. The Board has determined that this new wording adequately addresses the amendments sought by De Beers regarding discharges to Area 8.

Part G, condition 35 (previously condition 34 as noted above)

In the March 19, 2018 Amendment Application, De Beers originally requested only an additional year of discharge from the Water Management Pond to Lake N11 such that discharges would not continue past Year

[93] See Board staff Draft Licence Conditions, dated August 27, 2018.
[94] See Technical session – Transcripts Day 1, dated May 30 and 31, 2018.
[95] See Review Comment Summary Table – Draft Licence and Permit, dated September 19, 2018.

4 of operations (i.e., past 2020). However, during the amendment process, De Beers altered its request, seeking amendments that would allow for discharges from the Water Management Pond to Lake N11 for the entire operational period of the mine as long as "EQC are met and site-specific water quality objectives (SSWQO) in Lake N11 continue to be met."[96]

In support of this request, De Beers provided modeling predictions[97] supporting the ability to meet SSWQOs in Lake N11 during operations (i.e., at least until 2028) if the proposed water quality-based EQC continued to be met. De Beers summarizes the modeling results as follows:

> Based on modeling simulations if EQC in the WMP are met in 2021 to 2028, annual discharges under Water Licence discharge conditions to Lake N11 will result in whole lake average chloride, fluoride, sulphate, nitrate, and total ammonia concentrations projected to remain below site specific water quality objectives (SSWQO). Whole lake average concentrations of total phosphorus, total aluminum, chromium, copper, and iron are predicted to "slightly exceed the SSWQO for short periods of time during ice covered conditions each year. The risk of adverse effects from these brief periods of SSWQO exceedances for the listed parameters is considered low, so De Beers proposed to maintain the proposed MAC [maximum average concentration] EQC and MGC [maximum grab concentration] EQC for the life of Mine.

In its intervention to the Board, GNWT-ENR stated[98] that "given that multiple parameters are predicted to be above EQC and SSWQO, GNWT recommends that approval of Year 5 discharge not be granted at this time. Similarly, ECCC was concerned about discharges past Year 4, recommending[99] a requirement to "validate predictions which have been used in developing the EQC once further operational data are available, prior to proceeding with a fifth year of discharge to Lake N11."

In response to the recommendations, Board staff proposed to include a condition under Part G of the amended Licence as follows:

> If the Licensee proposes to continue to Discharge to Lake N11 beyond January 1, 2021, the Licensee shall submit an EQC Evaluation Report to the Board for approval six (6) months prior to the proposed continuation of Discharge. The objective of the report is to evaluate whether the EQC in Part G, item 30 will continue to ensure that water quality objectives in the Receiving Environment are maintained if Discharge continues to Lake N11.

In its comments[100] on the draft amended Licence and in its closing arguments,[101] ECCC supported the inclusion of this condition using the proposed wording. In its closing arguments, GNWT-ENR continued to recommend that discharges not be approved beyond Year 4 at this time due to existing predictions of exceedances to several SSWQO in Lake N11. In response,[102] De Beers noted the level of conservatism in its modelled predictions and stressed that exceedances would only occur for brief periods of time and only in under-ice conditions.

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[96] See Section 3, De Beers – Closing Arguments, submitted to the MVLWB on October 3, 2018.
[97] See Response to IR#3, Responses to Information Requests from the Technical Sessions: De Beers, submitted to the MVLWB on June 14, 2018.
[98] See Section 2.1.14 - Written Interventions from GNWT, submitted to the MVLWB on June 27, 2018.
[99] See Section 4.3.Written Interventions from ECCC, submitted to the MVLWB on June 27, 2018.
[100] See ECCC 4 – Comments on Draft Conditions, submitted to the MVLWB on September 12, 2018.
[101] See Closing Arguments: ECCC, submitted to the MVLWB on October 1, 2018.
[102] See Section 3.1, Closing Arguments: De Beers, submitted to the MVLWB on October 3, 2018.

De Beers also indicated, in its closing arguments, that it would be "willing to provide an EQC confirmation report prior to discharge in September 2021 as an assurance that continued discharge will meet EQC and not result in harm to the aquatic environment within Lake N11." Furthermore, De Beers suggested that the EQC confirmation report will include:

- a record of operational water quality monitoring data in the WMP and Lake N11;
- a comparison to modelled projections; and
- if operational data differ appreciably from previous model predictions, an update to the model.

The Board notes that: 1) during the proceeding, De Beers did not provide conclusive evidence that it will need to discharge effluent to Lake N11 past Year 4; and 2) that the original EQC determinations for discharges to Lake N11 did not consider discharges past Year 4. Nonetheless, if SSWQO can continue to be met in Lake N11, then allowing additional discharge past Year 4 would still meet the primary objective of the Board's Water and Effluent Quality Management Policy. Based on all the evidence provided, the Board has decided to include a condition in the amended Licence that will require De Beers to submit an EQC Evaluation Report for approval if it decides effluent discharges to Lake N11 past January 2021 are required by the mine. Part G, condition 35 in the amended Licence has the same wording originally suggested by Board staff in the draft amended Licence that was distributed to reviewers on August 27, 2018.[103]

5.6 Annex A: Surveillance Network Program

Annex A of the Licence contains conditions applying to the Surveillance Network Program (SNP). The SNP details the sampling and monitoring requirements related for compliance with numerous conditions and plans required by the Licence. Requirements for measuring flows, volumes, and meteorological data are based on standard water licence conditions as are the reporting requirements.

Part B, condition 2 – Site Descriptions and Monitoring Requirements

Board staff released the draft Licence conditions on August 27, 2018 for review.[104] Board staff proposed additional wording for consideration in the SNP Station Quick Reference Table, specifically to SNP Station # 02 and 04, and to the Description of SNP 02 and Description and Status of SNP 04, as it was identified during the regulatory process that once De Beers entered the operational phase of Operations, that Kennady Lake would cease to be an operational entity and would be delineated differently (i.e., Area 7, Area 8, or the Water Management Pond).

During the review of the draft conditions, comments and recommendations were received from ECCC and De Beers. ECCC stated that they were in support of the changes to the SNP Station descriptions for clarity, while De Beers recommends that the wording be adjusted to remove "Kennady Lake", as there will be no discharge from Kennady Lake during operations, only from Area 7 or the Water Management Pond.

The Board has updated the SNP Station Quick Reference Table for SNP stations 02 and 04, as well as the Description of SNP 02 and Description and Status of SNP 04, to address comments received during the regulatory process associated with the amendment application submitted March 19, 2018.

[103] See Board staff Draft Licence Conditions, dated August 27, 2018.
[104] *Ibid.*

5.7 Annex C: Revisions to Water Licence MV2015L2-0015

Annex C of the Licence contains a table which identifies updates and tracks changes made to the Licence. This table has been updated to address this Amendment Application.

6.0 Decision – Land Use Permit MV2005C0032

In making its decision and preparing these Reasons for Decision, the Board has reviewed and considered:

1) The comments, recommendations, and concerns that arose during the regulatory processes;
2) The evidence and submissions from Reviewers and De Beers received by the Board; and
3) The Staff Report prepared for the Board.

Having due regard to the facts, circumstances, and the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA, the Board has determined that Permit MV2005C0032 should be amended, subject to the scope, definitions, conditions, and term contained therein. The only changes made pertain to the Definitions, 26(1)(*l*) Security Deposit, 26(1)(*m*) Fuel Storage, and Annex B. The Board's reasons for this decision are set out below.

6.1 Part B: Definitions

The Board defined items in the Permit to ensure a common understanding of conditions, to avoid future differences in interpretation, and to use wording similar to that found in previously issued Permits. For the most part, the definitions used wording from the Board's *Standard Land Use Permit Conditions Template* (Standard Template). Where appropriate, the Board created new definitions, changed standard wording, or used specific definitions to describe specific facilities related to the Gahcho Kue Project as described below:

- Project - New wording for the definition for Project was proposed by De Beers. Board staff provided alternative wording that was less prescriptive and would match the definition of Project in the Licence. During the review of the Draft Permit conditions De Beers recommended that the definition of Project for the Permit match those of the revised Licence.

6.2 Part C: Conditions Applying to All Activities

The subheadings below correspond to the headings in the conditions section of the Permit, as outlined in section 26(1) of the MVLUR. Most conditions in the Permit are from the Board's Standard Template and are not discussed in detail in these Reasons for Decision unless notable due to recommendations or concerns raised during the public review. Where applicable, the Board's reasons for including non-standard conditions are discussed.

26(1)(l) Security Deposit

The Board has included a requirement for a phased security consistent with the Licence as described in 5.3 above.

26(1)(m) Fuel Storage

March 19, 2018 Amendment Applications

In the March 19, 2018 Amendment Applications, De Beers requested that condition 58, the "Check of Leaks", be changed from "…a minimum once per day…" to "…a minimum ***of once per week***…" to align with the Federal Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations which require monitoring of tanks no more than every seven days.

Technical Session

Board staff held a technical session on May 30-31, 2018.[105] During Day 1 of the technical session, it was clarified by De Beers that to align with the federal storage tank system regulations, inspections would be once per month.

Public Hearing

A public hearing was held on July 17, 2018.[106] During the hearing, Board staff noted that the Standard Template for the frequency of checks would be designated by an inspector or Board staff on the basis of the quantity of fuel, type of container used and location, among other variables. As such, it was asked if it was the GNWT opinion that the proposed change by De Beers was an acceptable practice.[107] This request was taken as Undertaking #4.[108] In response, GNWT-ENR confirmed with GNWT-Lands that they supported the amended change to monthly fuel checks.[109]

The Board has updated condition 58 from "…a minimum once per day…" to "…a minimum of once per ***month***…" as requested and based on the evidence received.

6.3 Annex B: Table of Revision History

Annex B of the Permit contains a table which identifies updates and tracks changes made to the Permit. This table has been updated to address this Amendment Application.

7.0 Conclusion

Subject to the scopes, definitions, conditions, and terms set out in the Licence and Permit, and for the reasons expressed herein, the MVLWB is of the opinion that the land-use activities, water use, and waste disposal associated with the Gahcho Kue Project can be completed by De Beers Canada Inc. while providing for the conservation, development, and utilization of land and water resources in a manner that will provide the optimum benefit for all Canadians and in particular for residents of the Mackenzie Valley.

Water Licence MV2005L2-0015 and Land Use Permit MV2005C0032 contain provisions that the Board deems necessary to ensure and monitor compliance with the MVRMA, *Waters Act*, and the Regulations made thereunder, and to provide appropriate safeguards in respect of De Beers use of the land and water and deposit of waste affected by the Licence and Permit.

SIGNATURE

Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

November 7, 2018

Date

[105] See Technical session – Transcripts Day 1, dated May 30, 2018.
[106] See Public Hearing – Transcripts, dated August 8, 2018.
[107] *Ibid.*
[108] See Public Hearing – Undertakings to GNWT, dated July 26, 2018.
[109] See GNWT-ENR – Response to Undertaking 4, submitted to the MVLWB on August 15, 2018.

Appendix 1: Detailed Reasons for Decision for Effluent Quality Criteria for Gahcho Kue Project

1.0 Introduction

On August 11, 2014, the Board submitted its recommendation[110] for approval of Licence MV2005L2-0015 to the Minister of Environment and Natural Resources for the Gahcho Kue Diamond Project as operated by De Beers Canada Inc (De Beers); the Licence was subsequently approved by the Minister and the Board issued the Licence on September 24, 2014.

On March 19, 2018, De Beers submitted an amendment application[111] (the March 19, 2018 Amendment Application) to address a geotechnical issue identified in the open pits, namely, the presence and orientation of joint sets. The identified issue has necessitated a change to the pit design, including the extraction of up to an additional 100 Mt of mine rock over the life of mine. As described in the March 19, 2018 Amendment Application, there are a number of project changes required to accommodate the additional quantity of extracted mine rock, including changes that affect the effluent quality criteria (EQC) set out in Licence MV2005L2-0015. In this amendment process, De Beers has requested changes to the EQC for discharges from the water management pond to Lake N11 as well as EQC for discharges to Area 8. Specifically, amendments have been proposed for existing[112] Licence conditions 29, 30, 31, 32, and 34 in Part G of MV2005L2-0015.

This Appendix to the Board's Reasons for Decision provides a detailed analysis of the evidence related to the proposed amendments of Part G, conditions 30 and 31; decisions related to the other proposed amendments to Part G can be found in Section 5.5 in the main body of the Reasons for Decision. Note that this Appendix will focus only on the proposed amendments; for a description of the rationale for EQC determinations made on the original mine application, the reader is referred to Appendix 1 of the Board's August 11, 2014 Reasons for Decision[113] document (the August 2014 Reasons for Decision).

The EQC and related conditions for amended Licence MV2005L2-0015 have been determined based on the evidence before the Board at this time. The EQC or other conditions of MV2005L2-0015 may be amended in the future if other relevant evidence is presented to the Board.

2.0 General Principles for Setting EQC for Discharges to Lake N11 and Area 8

As discussed in the August 2014 Reasons for Decision, EQC determinations are guided by the Board's *Water and Effluent Quality Management Policy*[114] (the Policy). The step-wise process for deriving EQC can be summarized as:

1) Determine the Parameters for Review. In this step, the Board evaluates the evidence to determine which chemical parameters may be elevated in the effluent relative to background concentrations and that, therefore, may need to be regulated through EQC in the water licence.

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[110] See MVLWB – Board Recommendation for Approval of MV2005C0032 and MV2005L2-0015, August 11, 2014 and MVLWB - Reasons for Decision for MV2005L2-0015, dated August 11, 2014.
[111] See Water Licence MV2005L2-0015 Amendment Application, submitted to the MVLWB on March 19, 2018; see MVLWB registry for accompanying documents.
[112] Note that the condition that was originally 32 in Licence MV2005L2-0015 has been split into conditions 32 and 33 in the amended Licence; this means that Part G, conditions 33 and 34 in the original Licence are now numbered 34 and 35 in the amended Licence.
[113] See MVLWB – Reasons for Decision for MV2005L2-0015 – Appendix 1, dated August 11, 2014.
[114] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).

2) Derive Water Quality-Based EQC. As described more fully in the August 2014 Reasons for Decision, EQC are first derived with the goal of ensuring that the water quality objectives for the receiving environment will be met during all phases of the project.
3) Evaluate Technology-Based EQC. These EQC are not calculated per se but are based on what effluent quality the proponent can reasonably and consistently achieve at the end-of-pipe.
4) Determination of final EQC values for the water licence. Generally, the Board will choose those EQC that are the lower of the values derived as per step 3) or 4) above. However, and as per the Policy, the Board will ensure that EQC are set at levels that the proponent can reasonably and consistently achieve[115].

Included in De Beers' March 19, 2018 Amendment Application was an Effluent Quality Criteria Report[116] (the 2018 EQC Report), prepared by Golder Associates and dated March 2018. In this report, De Beers described its review and conclusions for EQC using the same step-wise process given above.

3.0 Consideration of Proposed Amendment to Part G, condition 30 (EQC for Discharges from the Water Management Pond to Lake N11)

The construction of dykes around Kennady Lake created a "controlled area" in which minewater, run-off, or other wastewater generated on site is collected without danger of accidental release to the receiving environment. Within the controlled area, a water management pond (WMP) has been established as the primary reservoir for the storage of site water. Beginning in 2017, De Beers has pumped wastewater from the WMP to Lake N11 during open water conditions from Surveillance Network Program (SNP) station 02. As set out in Table 1a, De Beers has proposed a number of changes to the EQC currently listed in Part G, conditions 30 of MV2005L2-0015.

While the original project description only anticipated three years of discharges from the WMP to Lake N11, the March 19, 2018 Amendment Application requested one additional year of discharge. During the amendment process, De Beers revised its proposal, finally requesting that discharges from the WMP to Lake N11 be allowed to continue until the end of mine life[117] as long as their proposed EQC continue to be met. Responses to Information Request #3 from the Technical Sessions (held May 30-31, 2018), included evidence[118] to support this request. As discussed in Section 5.5 of the main body of these Reasons for Decision, the Board has decided to allow discharges from the WMP to Lake N11 until 2020 as originally requested; prior to discharging beyond that year, De Beers must submit an EQC Evaluation Report (as per Part G, condition 35 of the amended Licence) for approval by the Board.

[115] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).
[116] See De Beers – Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[117] See slide 14 of De Beers – Public Hearing Presentation, submitted to the MVLWB on July 13, 2018.
[118] See De Beers – Response to IR#3, Responses to Information Requests from the Technical Sessions, submitted to the MVLWB on June 14, 2018.

Table 1a: Comparison of existing condition in Part G, item 30 to amendments proposed by De Beers

<table>
<tr><th>Part G, item 30 of MV2005L2-0015</th><th>Revisions to Part G, item 30 as proposed by De Beers (proposed amendments shown in bold italics)</th></tr>
<tr><td>Discharges from the Water Management Pond to Lake N11 shall meet the following EQC at SNP station 02:
<table>
<tr><th>Parameters</th><th>Maximum Average Concentration (in mg/L)</th><th>Maximum Grab Concentration (in mg/L)</th></tr>
<tr><td>Ammonia as N</td><td>10</td><td>20</td></tr>
<tr><td>Sulphate</td><td>150</td><td>300</td></tr>
<tr><td>Nitrate as N</td><td>10</td><td>20</td></tr>
<tr><td>Total Phosphorus</td><td>0.03</td><td>0.06</td></tr>
<tr><td>Chloride</td><td>160</td><td>320</td></tr>
<tr><td>Fluoride</td><td>0.15</td><td>0.3</td></tr>
<tr><td>Total Aluminum</td><td>0.1</td><td>0.2</td></tr>
<tr><td>Total Chromium</td><td>0.002</td><td>0.004</td></tr>
<tr><td>Total Copper</td><td>0.003</td><td>0.006</td></tr>
<tr><td>Total Iron</td><td>0.4</td><td>0.8</td></tr>
<tr><td>Total Molybdenum</td><td>0.3</td><td>0.6</td></tr>
<tr><td>Total Nickel</td><td>0.09</td><td>0.18</td></tr>
<tr><td>Total Uranium</td><td>0.06</td><td>0.12</td></tr>
<tr><td>Total Suspended Solids</td><td>15</td><td>25</td></tr>
<tr><td>Total Petroleum Hydrocarbons</td><td>-</td><td>5</td></tr>
</table>
mg/L = milligrams per litre

Any Water or Waste from the Project that enters the Receiving Environment at SNP 02 shall have a pH between 6.5 and 9.0.</td><td>Discharges from the Water Management Pond to Lake N11 shall meet the following EQC at SNP station 02:
<table>
<tr><th>Parameters</th><th>Maximum Average Concentration (in mg/L)</th><th>Maximum Grab Concentration (in mg/L)</th></tr>
<tr><td>Total Ammonia (mg N/L)</td><td>6</td><td>10</td></tr>
<tr><td>Sulphate</td><td>100</td><td>155</td></tr>
<tr><td>Nitrate (mg N/L)</td><td>20</td><td>30</td></tr>
<tr><td>Total Phosphorus (mg P/L)</td><td>0.022</td><td>0.03</td></tr>
<tr><td>Chloride</td><td>300</td><td>515</td></tr>
<tr><td>Fluoride</td><td>1.5</td><td>3.0</td></tr>
<tr><td>Aluminum</td><td>0.23</td><td>0.35</td></tr>
<tr><td>Chromium</td><td>0.002</td><td>0.004</td></tr>
<tr><td>Copper</td><td>0.004</td><td>0.007</td></tr>
<tr><td>Iron</td><td>0.6</td><td>1.0</td></tr>
<tr><td>Total Cadmium</td><td>0.00008</td><td>0.00016</td></tr>
<tr><td>Total Suspended Solids</td><td>15</td><td>25</td></tr>
<tr><td>Total Petroleum Hydrocarbons</td><td>-</td><td>5</td></tr>
</table>
mg/L = milligrams per litre

Any Water or Waste from the Project that enters the Receiving Environment at SNP 02 shall have a pH between 6.5 and 9.0.</td></tr>
</table>

3.1 Parameters for Review

In its 2018 EQC Report, De Beers adopted the same list of parameters for review[119] as used by the Board in its August 2014 Reasons for Decision with the exception of total suspended solids, pH, and total petroleum hydrocarbons. De Beers' choice of parameters for review is acceptable in this case since no changes to EQC for the latter three parameters has been requested for discharges to Lake N11 in the March 19, 2018 Amendment Application.

[119] See Section 2.1 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018. Note that in the De Beers 2018 EQC Report, "parameters for review" are called "parameters of interest" instead.

3.2 Determination of Water Quality-Based EQC

The derivation of Water Quality-Based EQC involves the following subtasks:

a) Derivation of numeric water quality objectives (WQOs) for the receiving environment.
b) Definition of a mixing zone or other location downstream of the mine where the WQOs must be met.
c) Definition of Parameters of Potential Concern (POPC). POPC are those chemical parameters that, in the Board's opinion, have "the potential to adversely affect water quality in the receiving environment".[120]
d) Calculation of numeric EQC to meet water quality objectives at the specified location for each POPC.

3.2.1 Derivation of Numeric Site-Specific WQOs for Lake N11

The level of water quality that must be maintained in order to protect a given water use is defined by WQOs which are established for each specific receiving environment. WQOs may be described either numerically (e.g., grams of a substance per litre) or as narrative statements. For example, the Canadian Council of Ministers of the Environment (CCME) has published the Canadian Water Quality Guidelines for the Protection of Aquatic Life[121] (CCME Guidelines), which define numeric objectives, for substances in water, which are meant to protect all forms of aquatic life and all aspects of aquatic life cycles from adverse toxic effects over the long term. There are also published guidelines which can be adopted as water quality objectives with the goal of protecting other water uses including drinking water and recreational uses.

During the original application for MV2005L2-0015, the Board considered the evidence available and decided to adopt site-specific water quality objectives (SSWQOs) with the goal of protecting traditional water uses in the Gahcho Kue receiving environment. The details of the Board's deliberations and conclusions on SSWQO for Lake N11 in 2014 can be found in Appendix 1 of the August 2014 Reasons for Decision.[122]

In Section 2.2 of its 2018 EQC Report, De Beers proposed changes to four of the SSWQOs that had been adopted in 2014: fluoride, nitrate, total silver, and total strontium. The Board's consideration of the proposed SSWQO for these four parameters can be found below in Sections 3.2.1.1 to 3.2.1.4, respectively. Changes to the SSWQO for total cadmium were proposed during the amendment process, as discussed in Section 3.2.1.5, below. Table 2a summarizes the Board's decisions on the SSWQO that will apply to Lake N11 based on the evidence provided in the March 19, 2018 Amendment Application.

Section 3.2.1.1 Proposed SSWQO for Fluoride

In 2014, the Board adopted the CCME Guideline for fluoride of 0.12 mg/L for Licence MV2005L2-0015. In Section 2.2.1 of its 2018 EQC Report, De Beers notes that primary source of fluoride at the mine was groundwater and that concentrations in the WMP have been increasing during operations; furthermore, De Beers does not believe that the current EQC for fluoride, which is based on an SSWQO of 0.12 mg/L for Lake N11, will be "consistently achievable for the duration of the proposed operational discharge from the WMP to Lake N11."[123]

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[120] See Section 7.2, www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).
[121] See page 1, CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, CCME, Winnipeg.
[122] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 3.2.1, dated August 11, 2014.
[123] See Section 2.2.1, De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.

De Beers cites a recent peer-reviewed publication[124] which had calculated a chronic effects benchmark for the protection of aquatic life of 1.94 mg/L for fluoride; in this study, acute toxicity occurred at concentrations ranging from 11.5 mg/L to greater than 800 mg/L. Since the Canadian maximum acceptable concentration[125] for drinking water is only 1.5 mg/L for fluoride, De Beers has proposed[126] to adopt this lower value as an SSWQO for Lake N11. In its intervention to the Public Hearing, the GNWT-ENR supported De Beers' proposed SSWQO for fluoride; no other party raised objections to the proposed SSWQO.

For these reasons, the Board has set the SSWQO for fluoride to 1.5 mg/L for Lake N11.

Section 3.2.1.2 Proposed SSWQOs for Nitrate

In Section 2.2.2 of its 2018 EQC Report, De Beers has indicated that the current EQC for nitrate, which is based on an SSWQO of 2.93 mg N/L for Lake N11, will be not be "consistently achievable for the duration of the proposed operational discharge from the WMP to Lake N11 in Years 3 and 4."[127] For this reason, De Beers has now proposed to adopt a hardness-dependent SSWQO[128] that was originally developed for the Ekati Diamond Mine Site in 2012. The latter SSWQO takes into account the evidence that increasing water hardness can decrease the toxicity of nitrate; in this case, the objective is expressed as an equation rather than a single numeric value. Since the hardness-dependent SSWQO for nitrate is less than 2.93 mg N/L when the ambient hardness is less than 27 mg/L (as $CaCO_3$), De Beers proposes to apply the CCME Guideline value of 2.93 mg N/L when the hardness in Lake N11 is below 27 mg/L (as $CaCO_3$) and the hardness-dependent SSWQO when the hardness in Lake N11 is greater than or equal to 27 mg/L (as $CaCO_3$).

Although De Beers similarly proposed the use of the hardness-dependent nitrate SSWQO in its original Gahcho Kue Licence application, the Board adopted[129] the lower CCME Guideline value of 2.93 mg N/L as an SSWQO for nitrate in Lake N11 based on the lack of evidence that a higher value was necessary. At this time, the Board accepts that even with De Beers' enhanced efforts at source control for nitrate, the current EQC for nitrate may not be reasonably and consistently achievable within 1 or 2 years. Since De Beers has proposed the use of the same hardness-dependent nitrate SSWQO that has been adopted at Ekati Diamond Mine and at Snap Lake Diamond Mine, the Board deems it reasonable to adopt it at this location as well.

Note that while no party opposed the change in the SSWQO for nitrate, the GNWT-ENR did request[130] that De Beers reconfirm its efforts to reduce nitrate levels in the WMP through active source control measures; De Beers has made this confirmation and the Board has added a condition to the amended Licence requiring the documentation of progress on nitrate source control in the Annual Water

[124] McPherson C, Lee DHY, Chapman PM. 2014: Development of a fluoride chronic effects benchmark for aquatic life in freshwater. Environ. Toxicol. Chem. 33(11), 2612-2627.
[125] Health Canada 2017. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, ON, Canada.
[126] See Section 2.2.1, De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[127] See Section 2.2.2, De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[128] BHP Billiton, "EKATI Diamond Mine Site-Specific Water Quality Objective for Nitrate, April 2012", submitted on April 26, 2012 to the Wek'eezhii Land and Water Part as part of the renewal of W2012L2-0001.
[129] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 3.2.1.2, dated August 11, 2014.
[130] See Section 2.1.4, Written Intervention from GNWT, submitted to the MVLWB on June 27, 2018.

Licence Report (i.e., as per Schedule 1, condition 1(i), as described in Section 5.2 of the main body of these Reasons for Decision).

For these reasons, the Board has adopted De Beers' proposed nitrate SSWQO for Lake N11 of 2.93 mg N/L when the hardness level is less than 27 mg/L (as $CaCO_3$) in Lake N11, and to a value equal to $e^{0.9518[\ln(\text{hardness in Lake N11})] - 2.032}$ mg N/L when the hardness level in Lake N11 is equal to or greater than 27 mg/L (as $CaCO_3$). Note that this latter SSWQO equation is only valid for hardness levels less than 160 mg/L; at or above a hardness of 160 mg/L, the nitrate SSWQO is equal to 16.42 mg N/L.

Section 3.2.1.3 Proposed SSWQO for Silver

In 2015, the CCME revised its water quality guideline value for total silver[131] from 0.0001 mg/L to 0.00025 mg/L; for this reason, De Beers has proposed adopting the new guideline value as the silver SSWQO for Lake N11. No party has raised any issues with this proposal and the Board deems it reasonable to accept the revised CCME Guideline value for total silver at this time.

Section 3.2.1.4 Proposed SSWQO for Strontium

For the reasons described in Appendix 1 (Section 3.2) of the August 2014 Reasons for Decision,[132] the Board originally adopted a strontium SSWQO of 14 mg/L for Lake N11 based on work done by De Beers in a proceeding for its Snap Lake Mine in 2013. As noted by De Beers in Section 2.2.4 of its 2018 EQC Report, during the peer-review process of the manuscript describing the derivation of the strontium SSWQO, the SSWQO was changed to 10.7 mg/L in the published paper.[133] De Beers has, therefore, proposed to lower the strontium SSWQO from 14 mg/L to 10.7 mg/L at this time; the Board accepts the lower strontium SSWQO value for Lake N11.

Section 3.2.1.5 Proposed SSWQO for Cadmium

During the Technical Sessions in May 2018, it was discovered[134] that there was an error in the August 2014 Reasons for Decision related to the SSWQO chosen for cadmium. Due to a mistake in concentration units in tables[135] in the August 2014 Reasons for Decision, the Board chose the drinking water standard for the cadmium SSWQO instead of the more stringent CCME Guideline for the protection of aquatic life. De Beers initially carried the erroneous cadmium SSWQO through in its 2018 EQC Report but agreed to adopt the more stringent CCME value after the error was explained.[136]

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[131] CCME. 2015. Canadian Water Quality Guidelines: Silver. Scientific Criteria Document. CCME, Winnipeg, MB, Canada.
[132] See MVLWB – Reasons for Decision for MV2005L2-0015, dated August 11, 2014.
[133] McPherson C, Lawrence G, Elphick J, Chapman PM. 2014: Development of a strontium chronic effects benchmark for aquatic life in freshwater. Environ. Toxico. Chem., 33(11): 2472-2478.
[134] See pages 133-135, See Technical session – Transcripts for Day 1, dated May 30, 2018.
[135] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Tables 1 and 7, dated August 11, 2014. Note that since the concentration of cadmium in the effluent was predicted to be lower than the CCME guideline value, the error made in the August 2014 Reasons for Decision had no material effect on EQC chosen for the original water licence.
[136] See Section 2.2, De Beers – Response to Interventions; ECCC, submitted to the MVLWB on July 5, 2018.

As described in De Beers' response[137] to Undertaking #1 from the July 2018 Public Hearing, the CCME Guideline for total cadmium[138] is 0.00004 mg/L when the ambient hardness is less than 17 mg/L (as $CaCO_3$). Since the hardness levels in Lake N11 and Area 8 are both below 17 mg/L, De Beers proposes to adopt 0.00004 mg/L for total cadmium at Gahcho Kue; the Board agrees that this is a reasonable SSWQO for total cadmium at this time.

[137] See De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[138] CCME 2014. Canadian water quality guidelines for the protection of aquatic life: Cadmium. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg, MB, Canada.

Table 2a: SSWQO for Lake N11 for the Amended Water Licence

Parameter	SSWQO (mg/L)	Notes
Major Ions		
Chloride	120	Unchanged from 2014.
Fluoride	1.5	The Canadian maximum acceptable concentration for drinking water has been adopted as the SSWQO; see section 3.2.1.1.
Potassium	41	Unchanged from 2014.
Sulphate	41	Unchanged from 2014.
Conventional Parameters		
Total Dissolved Solids	500	Unchanged from 2014.
Nutrients		
Ammonia as N	2.4	Unchanged from 2014.
Nitrate as N	Hardness dependent	- When the hardness in Lake N11 is < 27 mg/L (as CaCO3), the SSWQO = 2.93 mg N/L - When the hardness is Lake N11 is ≥27 mg/L (as CaCO3), the SSWQO = $e^{0.9518[\ln(\text{hardness in Lake N11})] - 2.032}$ mg N/L up to a maximum of 16.42 mg N/L See additional detail in section 3.2.1.2.
Total Phosphorus	0.0109	Unchanged from 2014.
Total Metals		
Aluminum	0.1	Unchanged from 2014.
Antimony	0.006	Unchanged from 2014.
Arsenic	0.005	Unchanged from 2014.
Barium	1	Unchanged from 2014.
Beryllium	0.004	Unchanged from 2014.
Boron	1.5	Unchanged from 2014.
Cadmium	0.00004	Changed to CCME guideline value for the protection of aquatic life; see section 3.2.1.5.
Chromium	0.001	Unchanged from 2014.
Cobalt	0.004	Unchanged from 2014.
Copper	0.002	Unchanged from 2014.
Iron	0.3	Unchanged from 2014.
Lead	0.0038	Unchanged from 2014.
Mercury	0.00004	Unchanged from 2014.
Molybdenum	0.073	Unchanged from 2014.
Nickel	0.025	Unchanged from 2014.
Selenium	0.001	Unchanged from 2014.
Silver	0.00025	Changed to the revised CCME guideline value; see section 3.2.1.3.
Strontium	10.7	Changed to the revised SSWQO as developed by DBCI; see section 3.2.1.4.
Thallium	0.0008	Unchanged from 2014.
Uranium	0.015	Unchanged from 2014.
Vanadium	0.006	Unchanged from 2014.
Zinc	0.03	Unchanged from 2014.

3.2.2 Mixing Zone Considerations

In its 2018 EQC Report,[139] De Beers confirmed that it was not proposing any changes to the mixing zone dimensions for Lake N11 or Area 8 as part of the March 19, 2018 Amendment Application. Therefore, the edge of the regulated mixing zone in Lake N11 remains[140] at 200 m from the diffuser.

Although the mixing zone dimensions are unchanged, De Beers updated[141] the near-field mixing model for Lake N11 to reflect: 1) the as-built drawings of the installed submerged diffuser; and 2) the most recent predictions of effluent quality[142] from the WMP. In 2014, De Beers predicted[143] the dilution ratio at the edge of the regulated mixing zone in Lake N11 would be between 40 and 89; in its 2018 EQC Report,[144] the dilution ratio was updated to 35. The updated dilution ratio was used to calculate the predicted maximum concentrations[145] of parameters of potential concern at the edge of the Lake N11 mixing zone in 2020, at the end of 4 years of discharge from the WMP.

As described in Section 3.1.1 of De Beers' 2018 EQC Report, the updated dilution ratio is used in the EQC calculations along with an estimation of the assimilative capacity of Lake N11. To determine the assimilative capacity of Lake N11, De Beers developed mass balance models that considered the relative natural inflows to the lake and how concentrations of POPC will accumulate over time. Using these models, De Beers has estimated[146] that after 4 years of seasonal discharges from the WMP, Lake N11 will be made up of approximately 34% of WMP effluent. This accumulation of contaminants from the WMP over time is accounted for in the calculations of EQC with the goal of ensuring that SSWQOs will continue to be met in Lake N11 during operations.

Section 3.2.2.1 Determination of Parameters of Potential Concern

Parameters of Potential Concern (POPC) are defined as those chemical parameters in the effluent that have, in the Board's opinion, the potential to adversely affect water quality in the receiving environment. In this step of the EQC setting process, the Board considers the evidence as to which chemical parameters qualify as POPC.

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[139] See Section 2.3 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[140] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 3.2.2, dated August 11, 2014.
[141] See Section 2.3 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[142] See De Beers – Environmental Screening Assessment March 2018 – Appendix C, Table 8, submitted to the MVLWB on March 19, 2018.
[143] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 3.2.2, dated August 11, 2014.
[144] See Section 2.3 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[145] *Ibid*, table 2-7.
[146] See Section 3.1.1, Figure 3-1 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.

In Section 2.4 of its 2018 EQC Report, De Beers proposed POPC based on a screening process[147] that progressively eliminated parameters if they met the following successive criteria:

1) If the maximum predicted discharge concentration of a parameter was lower than the baseline concentration minus 10%,
2) If the maximum predicted discharge concentration of a parameter was less than the WQO minus 10%, or
3) If the maximum predicted concentration at the mixing zone was less than the baseline concentrations minus 10%.

Based on the analysis presented in its 2018 EQC Report,[148] De Beers concluded that chloride, fluoride, sulphate, nitrate, total ammonia, total phosphorus, total aluminum, total chromium, total copper, and total iron qualified as POPC. In calculations[149] done as per Undertaking #1 to the July 2018 Public Hearing, De Beers added total cadmium as a POPC for discharges to Lake N11.

In 2014, the Board decided to add total molybdenum, total nickel, and total uranium to the list of POPC even though the three parameters did not initially screen-in using De Beers' criteria. The additional POPC were added by the Board to address the uncertainty in the geochemical source terms for De Beers' site water quality model. During this amendment process, however, De Beers noted[150] the following:

> Since the original Water Licence application was submitted, the Mine has started operations, monitoring data have been collected, and water quality model predictions have been updated. The monitoring data show that total molybdenum, nickel, and uranium concentrations in the WMP are orders of magnitude lower than the current EQC in the Water Licence and orders of magnitude lower than site-specific water quality objectives. Therefore, De Beers does not believe that total molybdenum, nickel, and uranium should be considered POPC and have requested that they be removed from the Water Licence.

No party has objected, in their interventions[151] or closing arguments[152] to the Public Hearing to the removal of the molybdenum, nickel, and uranium EQC. Based on the evidence, and the fact that these three parameters will continue to be monitored and reported on as part of the SNP and the AEMP, the Board has decided not to consider molybdenum, nickel, and uranium as POPC; consequently, the amended Licence will not include EQC for these three parameters.

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[147] Note that De Beers has applied the same screening criteria as they did in 2014, see Section 3.2.3 of MVLWB - Reasons for Decision for MV2005L2-0015, dated August 11, 2014.
[148] See Section 2.4.4 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[149] See De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[150] See De Beers' response to comment # ECCC 12 - initial comments and responses to the March 19, 2018 Amendment Application, with De Beers responses posted to the MVLWB on May 21, 2018.
[151] See Written Interventions: DFO, ECCC, and GNWT; submitted to the MVLWB on June 27, 2018.
[152] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018 and, Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

The Board accepts De Beers' proposed list of POPC for Lake N11 noting that pH, total suspended solids, and total petroleum hydrocarbons, although not explicitly re-analyzed in the 2018 EQC Report, will continue to have EQC that are unchanged from 2014.

Section 3.2.2.2 Calculation of Water Quality-Based EQC

In its 2018 EQC Report, De Beers proposed using a method for calculating water quality-based EQC for all POPC other than nitrate that followed guidance published by Alberta Environmental Protection[153] and the United States Environmental Protection Agency.[154] As described in the August 2014 Reasons for Decision, this methodology was also used for the calculation of EQC for the original Licence MV2005L2-0015, and has been used previously by the Boards for calculating EQC in other proceedings. Section 3.2.4 of the August 2014 Reasons for Decision gave a detailed explanation of the EQC calculation method and, since the method has not changed, that analysis is not repeated here.

In Section 3.1.4 of its 2018 EQC Report, De Beers explains that the use of the standard EQC calculation method assumes the "worst-case or most limiting conditions (i.e., minimum dilution factor and maximum proportion of effluent in the receiving environment) assuming that the most limiting conditions existed for the duration of the discharge period."[155] When applied to the calculation of an EQC for nitrate, De Beers found that the calculated EQC value was not achievable; for this reason, De Beers derived an EQC for nitrate that was based on a mass balance model of Lake N11. This model assumed that nitrate participated in nutrient cycling in a way that reduced nitrate concentrations over time; this assumption was supported by monitoring data from the Snap Lake Diamond Mine.[156] The model for Lake N11 was used to identify constant concentrations of nitrate that the mine could discharge from the WMP to Lake N11 while keeping Lake N11 nitrate concentrations below the SSWQO; these values were used by De Beers to support their proposed nitrate EQC.

Note that no party has objected, in their interventions[157] or closing arguments[158] to the Public Hearing, to the EQC derivation methods used by De Beers.

[153] Alberta Environmental Protection, 1995, Water Quality Based Effluent Limits Procedures Manual, Edmonton, AB.
[154] United States Environmental Protection Agency, 1991, Technical Support Document for Water Quality-Based Toxics Control. EPA 505-2-90-001. Washington, DC, USA.
[155] See Section 3.1.4 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[156] *Ibid.*
[157] See Written Interventions: DFO, ECCC, and GNWT; submitted to the MVLWB on June 27, 2018.
[158] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018 and, Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

For the reasons set out above, the Board has accepted De Beers' method of deriving EQC for the identified POPC, as described in the 2018 EQC Report. The water quality based EQC, as calculated[159] by De Beers, for POPC in discharges to Lake N11 are provided in Table 3a. Note that none of the calculated EQC exceed acute SSWQOs for each POPC[160] except for the Maximum Grab Concentration for total iron (see Section 3.4, below, for further discussion on this point).

Table 3a: Calculated Water Quality-Based EQC for POPC in Discharges to Lake N11

Parameter	Concentration Units	Maximum Average Concentration	Maximum Grab Concentration
Ammonia as N	mg/L	6	10
Sulphate	mg/L	100	155
Nitrate as N	mg/L	20	30
Total Phosphorus	mg/L	0.022	0.03
Chloride	mg/L	300	515
Fluoride	mg/L	3.5	6
Total Aluminum	mg/L	0.23	0.35
Total Cadmium	Mg/L	0.00008	0.00016
Total Chromium	mg/L	0.002	0.005
Total Copper	mg/L	0.004	0.007
Total Iron	mg/L	0.6	1.3

3.3 Technology-Based EQC

Since De Beers has not proposed to actively treat the effluent, technology-based EQC are, in this case, based on what the proponent has predicted to be achievable after all mitigation and waste management practices have been implemented on site. Therefore, consistent with the August 2014 Reasons for Decision,[161] the Board has determined that the technology-based EQC for this project are equal to the maximum predicted concentration of POPC in the WMP; De Beers has provided predictions[162] for these concentrations until late 2020. In Table 4a, below, the technology-based EQC are compared to the water quality-based EQC reported in Section 3.2.

[159] Calculation of water quality-based EQC for all parameters in Table 3 other than total cadmium are described in Section 3 of De Beers 2018 EQC Report; the calculation for the total cadmium EQC is described in De Beers' response to Undertaking #1 from De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[160] See Section 3.1.5 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[161] See MVLWB - Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 3.3, dated August 11, 2014.
[162] See Appendix C of De Beers – Operational Water Management Plan V5, submitted to the MVLWB on March 19, 2018.

Table 4a: Comparison of Water Quality-Based EQC to Technology-Based EQC for Discharges to Lake N11

Parameters of Potential Concern	Water quality-based EQC (in mg/L)	Technology-based EQC (in mg/L)
Ammonia as N	6	2.3
Sulphate	100	41
Nitrate as N	20	23
Total Phosphorus	0.022	0.022
Chloride	300	299
Fluoride	3.5	0.35
Total Aluminum	0.23	0.11
Total Cadmium	0.00008	0.000042
Total Chromium	0.002	0.002
Total Copper	0.004	0.0026
Total Iron	0.6	0.4

3.4 Final EQC for Discharges at SNP Station # 2 from the Water Management Pond to Lake N11

The comparisons in Table 4a above show that for all POPC except nitrate, De Beers' effluent quality predictions for the WMP show that the calculated water quality-based EQC are achievable as long as the assumptions with respect to the technology-based EQC remain valid.

With respect to nitrate, De Beers described,[163] during the Technical Sessions, how it has implemented management measures in an effort to reduce nitrate concentrations in the WMP and how early monitoring results indicate that these efforts may be successful. Therefore, since the technology-based EQC are based on nitrate predictions that do not account for De Beers' nitrate management efforts, it is reasonable to assume that the water quality-based EQC for nitrate will be reasonably and consistently achievable. De Beers itself has recommended the calculated water quality-based nitrate EQC be set for the amended Licence. Furthermore, no party to the proceeding has objected, in their interventions[164] or closing arguments[165] to the Public Hearing, to the nitrate EQC as proposed by De Beers. The Board has decided to set the nitrate EQC for the amended Licence equal to the calculated water quality-based EQC as proposed by De Beers.

With respect to the remaining POPC, the Board notes that De Beers has proposed Maximum Average Concentrations (MAC) and Maximum Grab Concentrations (MGC) that equal the calculated water quality-based EQC for all parameters except for fluoride and total iron:

- With respect to fluoride, De Beers has recommended reducing the MAC value so that it is equal to the Canadian drinking water standard; in De Beers' opinion, the proposed MAC/MGC for fluoride of 1.5/3 mg/L is achievable.
- With respect to total iron, De Beers has recommended lowering the MGC value to 1 mg/L from the calculated value of 1.3 mg/L because the latter value exceeds an acute benchmark for total iron.

[163] See pages 182-187 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[164] See Written Interventions: DFO, ECCC, and GNWT; submitted to the MVLWB on June 27, 2018.
[165] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018 and, Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

The Board notes that the proposed EQC for total ammonia, sulphate, and total phosphorus are lower than the current EQC in MV2005L2-0015.

GNWT-ENR has expressed some concern[166] that the EQC for phosphorus may, during under-ice conditions, allow the phosphorus SSWQO in Lake N11 to be exceeded for periods of time. Although phosphorus is not toxic to aquatic life, prolonged increases in phosphorus can cause increases in the nutrient or trophic status of the lake. GNWT-ENR notes,[167] however, that the predictions provided by De Beers were conservative and "that potential effects will continue to be monitored in the receiving environment through the Aquatic Effects Monitoring Program." With this caveat, GNWT-ENR states[168] that they have no concern about this or any of the other EQC proposed by De Beers for discharges from the WMP to Lake N11. ECCC did not indicate any concerns with the proposed EQC for Lake N11 in either its intervention[169] or closing arguments.[170]

As one of the objectives in the Board's Policy is to minimize the amount of waste deposited to the receiving environment, the Board set many of the EQC for the original MV2005L2-0015 at levels lower than what was deemed necessary to maintain SSWQOs in the receiving environment (i.e., some EQC were set equal to the lower of the technology-based and water quality-based EQC). In that case, De Beers had only requested to discharge from the WMP to Lake N11 for 3 years and, given the conservative nature of the effluent quality predictions at that time, the technology-based EQC were deemed to be achievable. While the original March 29, 2018 Amendment Application only proposed to discharge from the WMP to Lake N11 for one additional year (i.e., Year 4), during this proceeding De Beers altered its request. At the end of the amendment process, De Beers was seeking amendments that would allow discharges from the WMP to Lake N11 for the entire operational period of the mine as long as "EQC are met and site-specific water quality objectives (SSWQO) in Lake N11 continue to be met."[171]

As discussed in Section 5.5 of the main body of these Reasons for Decision, the Board has decided to allow discharges from the WMP to Lake N11 until 2020 as originally requested; prior to discharging beyond that year, De Beers must submit an EQC Evaluation Report (as per Part G, condition 35 of the amended Licence) for approval by the Board. Given the possibility that De Beers may be allowed to discharge beyond 2020, there is a chance that the technology-based EQC listed in column 3 of Table 4a (i.e., the maximum predicted concentrations[172] of POPC in the WMP for Year 4) will not be reasonably and consistently achievable after January 2021. For these reasons, the Board has decided to set the EQC for discharges from the WMP to Lake N11 equal to the water quality-based EQC calculated[173] by De Beers and as evaluated in previous sections of this Appendix.

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[166] See Section 2.1.6, Written Interventions: GNWT, submitted to the MVLWB on June 27, 2018.
[167] *Ibid*.
[168] *Ibid*.
[169] See Written Interventions: ECCC, submitted to the MVLWB on June 27, 2018.
[170] See Closing Arguments: ECCC, submitted to the MVLWB on September 26, 2018.
[171] See Section 3, Closing Arguments: De Beers, submitted to the MVLWB on October 3, 2018.
[172] See Appendix C of De Beers – Operational Water Management Plan V5, submitted to the MVLWB on March 19, 2018.
[173] Note that as per Table 3-6 of its 2018 EQC Report, De Beers originally calculated a maximum grab concentration (MGC) of 0.005 mg/L for total chromium even though the original MGC for this parameter was 0.004 mg/L in MV2005L2-0015. In the May 7, 2018 initial comments and responses, GNWT-ENR comment #22 requested that De

The final EQC for discharges from the Water Management Pond to Lake N11 at SNP Station 02 are listed in Table 5a below and in Part G, item 30 of amended Licence MV2005L2-0015. Note that as per the existing language in Part G, item 30, discharges from the WMP to Lake N11 will have to have a pH between 6.5 and 9.0. The Board considers these EQC to be set at levels that will protect downstream water uses as well as minimize the amount of waste discharged. Furthermore, the evidence is consistent with these EQC being reasonably and consistently achievable during operations at the Gahcho Kué Mine.

Table 5a: Final EQC for Discharges to Lake N11 at SNP Station 02

Parameters	Maximum Average Concentration (in mg/L unless otherwise indicated)	Maximum Grab Concentration (in mg/L unless otherwise indicated)
Ammonia as N	6	10
Sulphate	100	155
Nitrate as N	20	30
Total Phosphorus	0.022	0.03
Chloride	300	515
Fluoride	1.5	3.0
Total Aluminum	0.23	0.35
Total Cadmium	0.00008	0.00016
Total Chromium	0.002	0.004
Total Copper	0.004	0.007
Total Iron	0.6	1.0
Total Suspended Sediments	15	25
Total Petroleum Hydrocarbons	-	5

4.0 Proposed Amendment to Part G, condition 31 (EQC for Discharges from Area 7 to Area 8)

In this section of Appendix 1, the Board discusses the determination of EQC for discharges to Area 8.

The existing Licence for Gahcho Kue anticipated only one year of discharge from the WMP to Area 8 during operations although, to date, no such transfer has taken place.[174] In its March 19, 2018 Amendment Application, De Beers has proposed instead to discharge water from Area 7 to Area 8; the primary purpose of the proposed discharge is to supplement the downstream flow mitigation water that is needed to substitute for the water that used to flow naturally from Kennady Lake.

Area 7 is within the controlled water management area of the site and collects run-off water from the surroundings. In addition to the collection of run-off water, De Beers would like the flexibility to use Area 7 for contingency storage of wastewater from the WMP on an as-needed basis. Originally, De Beers stated[175] that if it does use Area 7 for contingency storage, the wastewater would be pumped back into the WMP or another pit, and not to Area 8. Based on this assumption, the EQC De Beers' originally derived[176] for discharges from Area 7 to Area 8 were only for the scenario that water quality in Area 7 was

Beers clarify the rationale for this increase to the MGC for total chromium; De Beers responded that it was not necessary and that a MGC of 0.004 mg/L for total chromium was achievable.

[174] See page 35 of Technical session – Transcripts for Day 1, dated May 30, 2018.

[175] *Ibid*.

[176] See Section 3.2.2 of De Beers - Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.

influenced solely by the run-off water that collected there. If Area 7 was ever needed for contingency storage of wastewater from the WMP, then De Beers proposed[177] to submit another EQC Evaluation Report in recognition of the fact that, in the latter scenario, the effluent quality would be quite different than if it were just composed of run-off water.

During the Technical Sessions,[178] ECCC and GNWT-ENR questioned the logic of this approach and asked whether it might make more sense to develop a more fulsome list of EQC for Area 7 discharges that would be achievable for the two scenarios: 1) when Area 7 only contains run-off water from the surrounding catchment; and 2) when Area 7 contains a mixture of run-off water and wastewater from the WMP. In this way, another amendment to the Licence might be avoided in the case that De Beers finds it needs to use Area 7 for contingency storage of WMP effluent in future. De Beers concurred with this idea and, in its response to Information Request #1 from the Technical Session, provided a full EQC analysis[179] of scenario 2. The EQC proposed by De Beers for scenario 1 and 2 can be found in column 2 of Table 6a, below.

Table 6a: Comparison of existing condition in Part G, condition 31 to amendments proposed by De Beers

<table>
<tr><th>Part G, condition 31 of MV2005L2-0015</th><th>Revisions to Part G, condition 31 as proposed by De Beers (proposed amendments shown in bold italics)</th></tr>
<tr><td>Discharges from the Water Management Pond to Area 8 shall meet the following EQC at SNP station 04:
<table>
<tr><th>Parameters</th><th>Maximum Average Concentration in mg/L</th><th>Maximum Grab Concentration in mg/L</th></tr>
<tr><td>Ammonia as N</td><td>7</td><td>14</td></tr>
<tr><td>Sulphate</td><td>70</td><td>140</td></tr>
<tr><td>Nitrate as N</td><td>3.5</td><td>7</td></tr>
<tr><td>Total Phosphorus</td><td>0.012</td><td>0.024</td></tr>
<tr><td>Total Chromium</td><td>0.001</td><td>0.002</td></tr>
<tr><td>Total Molybdenum</td><td>0.09</td><td>0.18</td></tr>
<tr><td>Total Nickel</td><td>0.02</td><td>0.04</td></tr>
<tr><td>Total Uranium</td><td>0.02</td><td>0.04</td></tr>
<tr><td>Total Dissolved Solids</td><td>110</td><td>220</td></tr>
<tr><td>Total Suspended Sediments</td><td>6</td><td>12</td></tr>
<tr><td>Total Petroleum Hydrocarbons</td><td>-</td><td>5</td></tr>
</table>
mg/L = milligrams per litre</td><td>1) Discharges from the Area 7 to Area 8 shall meet the following EQC at SNP station 04:
<table>
<tr><th>Parameters</th><th>Maximum Average Concentration</th><th>Maximum Grab Concentration</th></tr>
<tr><td>Total Copper</td><td>0.002</td><td>0.003</td></tr>
<tr><td>Total Cadmium</td><td>0.00004</td><td>0.00008</td></tr>
<tr><td>Total Suspended Sediments</td><td>15</td><td>25</td></tr>
<tr><td>Total Petroleum Hydrocarbons</td><td>-</td><td>5</td></tr>
</table>
mg/L = milligrams per litre

2) Discharges from the Area 7 to Area 8 (with Water from the Water Management Pond Stored in Area 7) shall meet the following EQC at SNP station 04:
<table>
<tr><th>Parameters</th><th>Maximum Average Concentration</th><th>Maximum Grab Concentration</th></tr>
<tr><td>Chloride</td><td>100</td><td>200</td></tr>
<tr><td>Fluoride</td><td>1.0</td><td>2.0</td></tr>
<tr><td>Nitrate (mg N/L)</td><td>4.0</td><td>8.0</td></tr>
</table></td></tr>
</table>

[177] See page 35 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[178] See pages 144-152 of Technical session – Transcripts for Day 1, dated May 30, 2018.
[179] See De Beers – Response to IR#1, Responses to Information Requests from the Technical Sessions, submitted to the MVLWB on June 14, 2018.

<table>
<tr><th>Part G, condition 31 of MV2005L2-0015</th><th>Revisions to Part G, condition 31 as proposed by De Beers (proposed amendments shown in bold italics)</th></tr>
<tr><td>Any Water or Waste from the Project that enters the Receiving Environment at SNP 04 shall have a pH between 6.5 and 9.0.</td><td>
<table>
<tr><td>Total Phosphorus (mg P/L)</td><td>0.009</td><td>0.018</td></tr>
<tr><td>Total Aluminum</td><td>0.083</td><td>0.17</td></tr>
<tr><td>Total cadmium</td><td>0.00004</td><td>0.00008</td></tr>
<tr><td>Total chromium</td><td>0.001</td><td>0.002</td></tr>
<tr><td>Total copper</td><td>0.002</td><td>0.003</td></tr>
<tr><td>Total Suspended Sediments</td><td>15</td><td>25</td></tr>
<tr><td>Total Petroleum Hydrocarbons</td><td>-</td><td>5</td></tr>
</table>
mg/L = milligrams per litre

Any Water or Waste from the Project that enters the Receiving Environment at SNP 04 shall have a pH between 6.5 and 9.0.
</td></tr>
</table>

Note that the Board's decisions on Area 8 are consistent with those described above for discharges to Lake N11. Therefore, this section will not substantively repeat those reasons unless the supporting evidence with respect to Area 8 is materially different than that for Lake N11.

4.1 Parameters for Review

The list of parameters for review for Area 8 is the same as the list for Lake N11 (see section 3.1 of this Appendix for more detail).

4.2 Determination of Water Quality-Based EQC

As already discussed in section 3.2, the derivation of Water Quality-Based EQC involves the following subtasks:

a) Derivation of numeric WQOs for the receiving environment.
b) Definition of a mixing zone or other location downstream of the mine where the WQOs must be met.
c) Definition of Parameters of Potential Concern (POPC). POPC are those chemical parameters that, in the Board's opinion, have "the potential to adversely affect water quality in the receiving environment".[180]
d) Calculation of numeric EQC to meet WQOs at the specified location for each POPC.

4.2.2 Derivation of Numeric Site-Specific WQOs for Area 8

The details of the Board's deliberations and conclusions on SSWQO for Area 8 in 2014 can be found in Appendix 1 of the August 2014 Reasons for Decision.[181]

[180] See Section 7.2, www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Water and Effluent Quality Management Policy (March 31, 2011).
[181] See MVLWB – Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 4.2.1, dated August 11, 2014.

In its 2018 EQC Report, De Beers proposed changes to four of the SSWQOs that had been adopted in 2014 for Area 8: fluoride, silver, strontium, and cadmium. The Board finds that the evidence related to these four SSWQO for Lake N11 applies as well to Area 8, therefore the Board's consideration of the proposed SSWQO for these four parameters can be found in subsections 3.2.1.1, 3.2.1.3, 3.2.1.4, and 3.2.1.5, respectively. Table 7a summarizes the Board's decisions on the SSWQO that will apply to Area 8 based on the evidence provided in the March 19, 2018 Amendment Application.

Table 7a: SSWQO for Area 8 for the Amended Water Licence

Parameter	SSWQO (mg/L)	Notes
Major Ions		
Chloride	120	Unchanged from 2014.
Fluoride	1.5	The Canadian maximum acceptable concentration for drinking water has been adopted as the SSWQO; see section 3.2.1.1.
Potassium	41	Unchanged from 2014.
Sulphate	62	Unchanged from 2014.
Conventional Parameters		
Total Dissolved Solids	500	Unchanged from 2014.
Nutrients		
Ammonia as N	2.4	Unchanged from 2014.
Nitrate as N	2.93	Unchanged from 2014.
Total Phosphorus	0.0109	Unchanged from 2014.
Total Metals		
Aluminum	0.1	Unchanged from 2014.
Antimony	0.006	Unchanged from 2014.
Arsenic	0.005	Unchanged from 2014.
Barium	1	Unchanged from 2014.
Beryllium	0.004	Unchanged from 2014.
Boron	1.5	Unchanged from 2014.
Cadmium	0.00004	Changed to CCME guideline value for the protection of aquatic life; see section 3.2.1.5.
Chromium	0.001	Unchanged from 2014.
Cobalt	0.004	Unchanged from 2014.
Copper	0.002	Unchanged from 2014.
Iron	0.57	Unchanged from 2014.
Lead	0.0014	Unchanged from 2014.
Mercury	0.00004	Unchanged from 2014.
Molybdenum	0.073	Unchanged from 2014.
Nickel	0.025	Unchanged from 2014.
Selenium	0.001	Unchanged from 2014.
Silver	0.00025	Changed to the revised CCME guideline value; see section 3.2.1.3.
Strontium	10.7	Changed to the revised SSWQO as developed by DBCI; see section 3.2.1.4.
Thallium	0.0008	Unchanged from 2014.
Uranium	0.015	Unchanged from 2014.
Vanadium	0.006	Unchanged from 2014.
Zinc	0.03	Unchanged from 2014.

4.2.3 Mixing Zone Considerations

In Section 2.3 of its 2018 EQC Report, De Beers confirmed that it was not proposing any changes to the mixing zone dimensions for Lake N11 or Area 8 as part of the March 19, 2018 Amendment Application. Therefore, the edge of the regulated mixing zone in Area 8 remains[182] at 100 m from the diffuser.

Although the mixing zone dimensions are unchanged, De Beers updated the near-field mixing model for Area 8 to reflect: 1) the detailed design report for the diffuser; and 2) the modeled predictions of effluent quality[183] from Area 7. In 2014, De Beers predicted[184] the dilution ratio at the edge of the regulated mixing zone in Area 8 would be between 37 and 63; in the 2018 EQC Report,[185] the dilution ratio has been updated to 90. The updated dilution ratio was used to calculate the predicted maximum concentrations[186] of POPC at the edge of the Area 8 mixing zone during operations.

As described in Section 3.1.1 of De Beers' 2018 EQC Report, the updated dilution ratio is used in the EQC calculations along with an estimation of the assimilative capacity of Area 8. To determine the assimilative capacity of Area 8, De Beers developed mass balance models that considered the relative natural inflows to the lake and how concentrations of POPC will accumulate over time. Using these models, De Beers has estimated[187] that, based on the predicted discharges from Area 7 to Area 8 between 2018 and 2028, there are points in time that Area 8 will made up of 100% of Area 7 effluent. This accumulation of contaminants from the Area 7 over time is accounted for in the calculations of EQC with the goal of ensuring that SSWQOs will continue to be met in Area 8 during operations.

4.2.4 Determination of Parameters of Potential Concern

Parameters of Potential Concern (POPC) are defined as those chemical parameters in the effluent that have, in the Board's opinion, the potential to adversely affect water quality in the receiving environment. In this step of the EQC setting process, the Board considers the evidence as to which chemical parameters qualify as POPC. As described in Section 3.1.1 of its 2018 EQC Report,[188] De Beers proposed a screening process for POPC for discharges to Area 8 that was the same as the process for Lake N11 (see Section 3.2.3 of this Appendix for more detail).

As discussed in the opening paragraphs of Section 4 of this Appendix, De Beers has proposed EQC for two different scenarios related to the expected water quality in Area 7:

- scenario 1: when Area 7 only contains run-off water; and,

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[182] See MVLWB – Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 4.2.2, dated August 11, 2014.
[183] See De Beers – Environmental Screening Assessment March 2018 – Appendix C, Table 10, submitted to the MVLWB on March 19, 2018.
[184] See MVLWB – Reasons for Decision for MV2005L2-0015 – Appendix 1, Section 4.2.2, dated August 11, 2014.
[185] See Section 2.3 of De Beers – Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[186] *Ibid*, table 2-8.
[187] See Section 3.1.1, Figure 3-1 of De Beers – Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.
[188] See Section 2.4 of De Beers – Effluent Quality Criteria Report, March 2018, submitted to the MVLWB on March 19, 2018.

- scenario 2: when Area 7 contains a mixture of run-off water and wastewater from the WMP.

De Beers proposed[189] total copper and total cadmium as POPC for scenario 1. For scenario 2, De Beers proposed[190] chloride, fluoride, nitrate, total phosphorus, total aluminum, total cadmium, total chromium, and total copper. No party has objected, in their interventions[191] or closing arguments[192] to the Public Hearing to the list of POPC for discharges from Area 7 to Area 8.

Based on the evidence at this time, the Board accepts De Beers' proposed list of POPC for Area 8 noting that pH, total suspended solids, and total petroleum hydrocarbons, although not explicitly re-analyzed in the 2018 EQC Report, will continue to have EQC in the amended Licence.

4.2.5 Calculation of Water Quality-Based EQC

Water quality-based EQC for Area 8 were calculated using the same methodology as described in Section 3.2.4 of this Appendix for Lake N11. Similar to the conclusions for discharges to Lake N11, the Board has accepted De Beers' method of deriving water quality-based EQC for the identified POPC for discharges from Area 7 to Area 8. The water quality based EQC, as calculated[193] by De Beers, for POPC in discharges to Area 8 are provided in Table 8a.

The Board notes that, other than for nitrate, the water quality-based EQC proposed for discharges to Area 8 (as listed in Table 8a) are all equal to or less than the SSWQO for each parameter.[194] For nitrate, the proposed EQC of 4 mg N/L is only slightly higher than the SSWQO of 2.93 mg N/L.

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[189] Note that only total copper was identified as a POPC in De Beers 2018 EQC Report; in its response to Undertaking #1 (De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018), De Beers subsequently identified total cadmium as a POPC for these discharges as well.

[190] See response to Undertaking #1 of De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.

[191] See Written Interventions: DFO, ECCC, and GNWT, submitted to the MVLWB on June 27, 2018.

[192] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018 and, Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

[193] The calculations of water quality-based EQC for total copper and total cadmium in scenario 1 are provided in Section 3.2 of De Beers 2018 EQC Evaluation Report or in De Beers' response to Undertaking #1 from the Public Hearing (De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018). Calculation of water quality-based EQC for all parameters in Scenario 2 are described in De Beers' response to Information Request #1 (De Beers - Responses to Information Requests from the Technical Sessions, submitted to the MVLWB on June 14, 2018).

[194] See item 2) under IR#1, De Beers – Additional Clarifying Information, submitted to the MVLWB on June 20, 2018.

Table 8a: Water Quality Based EQC for POPC in Discharges to Area 8

Parameter	Maximum Average Concentration in mg/L	Maximum Grab Concentration in mg/L
Scenario 1: conditions when Area 7 only contains run-off water		
Total Cadmium	0.00004	0.00008
Total Copper	0.002	0.003
Scenario 2: conditions when Area 7 contains a mixture of run-off water and wastewater from the WMP		
Chloride	100	200
Fluoride	1	2
Nitrate as N	4	8
Total Phosphorus	0.009	0.018
Total Aluminum	0.083	0.17
Total Cadmium	0.00004	0.00008
Total Chromium	0.001	0.002
Total Copper	0.002	0.003

4.3 Technology-Based EQC

Since De Beers has not proposed to actively treat the effluent, technology-based EQC are, in this case, based on what the proponent has predicted to be achievable after all mitigation and waste management practices have been implemented on site.

With respect to scenario 1, De Beers has provided analysis that shows that the water quality-based EQC are achievable, but that further decreases in EQC concentrations would not be feasible.

With respect to scenario 2, there is some uncertainty as to what the effluent quality will be in future since the exact quantity and quality of any wastewater transferred from the WMP to Area 7 on a contingency basis is unknown. Given that the proposed EQC for scenario 2 are close to or actually lower than the SSWQO for each parameter, the Board has determined that further reductions to the EQC based on technological considerations is unnecessary, in this case, for the parameters listed in Table 8a.

Note that De Beers has requested that the EQC for total suspended sediments (TSS) for the amended Licence for discharges to Area 8 be equal to the existing EQC for discharges to Lake N11 (i.e., MAC = 15 mg/L, MGC = 25 mg/L). De Beers rationale[195] for this request, which was provided in Undertaking #2 to the Public Hearing, is that the TSS EQC is based on best available technology, it is equivalent to requirements in other mines in the NWT, and that it is protective of the receiving environment.

4.4 Final EQC for Discharges at SNP Station 04 from Area 7 to Area 8

GNWT-ENR has expressed some concern[196] that the although the proposed EQC for total copper is equal to the copper SSWQO, De Beers' modeling indicates that the SSWQO could occasionally be exceeded in Area 8 in under-ice conditions; in this case, the exceedances are predicted to be small and for short durations. GNWT-ENR notes, however, that the modeling analysis was conservative and that these exceedances may never be realized during operations. GNWT-ENR recommended that the

[195] See De Beers – Response to Undertaking 1-3, submitted to the MVLWB on August 3, 2018.
[196] See Section 2.2.2, Written Interventions: GNWT, submitted to the MVLWB on June 27, 2018.

copper EQC as proposed by De Beers is acceptable as long as copper concentrations in Area 8 continue to be evaluated in the Aquatic Effects Monitoring Program (AEMP). GNWT-ENR also expressed concerns[197] about total phosphorus but, again, recommended that the EQC as proposed was acceptable and that any potential issues will be identified as part of the AEMP reporting. GNWT-ENR did not express concerns about the remaining Area 8 EQC as proposed by De Beers.

In its Intervention to the Public Hearing, ECCC expressed similar concerns[198] to the GNWT-ENR about the potential for some parameters to exceed SSWQOs in Area 8 in under-ice conditions and made some recommendations regarding additional reporting and management requirements related to Area 7 discharges. De Beers agreed[199] to evaluate available monitoring data prior to making decisions regarding the quantity of water transferred from the WMP to Area 7 and for any subsequent discharges to Area 8, with the goal of confirming that EQC could be met and the SSWQO in Area 8 would be maintained. De Beers did not agree[200] with ECCC's recommendation for reporting April AEMP sampling results for Area 8 in SNP reports, citing logistical challenges. The Board is satisfied with De Beers' response and notes that an early warning of any SSWQO exceedances or trends toward exceedances will be captured by the existing AEMP Response Framework.

Note that no party has objected in their interventions[201] or closing arguments[202] to the Public Hearing, to the EQC values proposed by De Beers for discharges from Area 7 to Area 8, although disagreement remained with respect to the need for two sets of EQC in Part G, condition 31. As discussed in Section 5.5 of the main body of these Reasons for Decision, the Board has decided to include only one EQC for discharges from Area 7 to Area 8 in Part G, condition 31; these EQC will be applicable in all the potential water management scenarios that De Beers has stated may occur during the operation of the mine.

The final EQC for discharges from Area 7 to Area 8 at SNP Station 04 are listed in Table 9a below and in Part G, condition 31 of the amended MV2005L2-0015. Note that as per the existing language in Part G, condition 31, discharges from Area 7 to Area 8 will have to have a pH between 6.5 and 9.0. The Board considers these EQC to be set at levels that will protect downstream water uses as well as minimize the amount of waste discharged. Furthermore, the evidence is consistent with these EQC being reasonably and consistently achievable during operations at the Gahcho Kue Mine.

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[197] *Ibid*, Section 2.2.3.
[198] See Section 4.1, of Written Interventions: ECCC, submitted to the MVLWB on June 27, 2018.
[199] See Section 2.1.2, De Beers – Response to ECCC Intervention, submitted to the MVLWB on July 5, 2018.
[200] *Ibid*, Section 2.1.4.
[201] See Written Interventions: DFO, ECCC, and GNWT, submitted to the MVLWB on June 27, 2018.
[202] See Closing Arguments: GNWT-ENR and ECCC, submitted to the MVLWB on September 26, 2018 and, Closing Arguments: DFO, submitted to the MVLWB on October 1, 2018.

Table 9a: Final EQC for Discharges from Area 7 to Area 8

Parameters	Maximum Average Concentration (in mg/L unless otherwise indicated)	Maximum Grab Concentration (in mg/L unless otherwise indicated)
Chloride	100	200
Fluoride	1.0	2.0
Nitrate as N	4.0	8.0
Total Phosphorus	0.009	0.018
Total Aluminum	0.083	0.17
Total Cadmium	0.00004	0.00008
Total Chromium	0.001	0.002
Total Copper	0.002	0.003
Total Suspended Sediments	15	25
Total Petroleum Hydrocarbons	-	5

Appendix 2: Detailed Reasons for Decision for the Determination of the Gahcho Kue Project Reclamation Security

1.0 Introduction

This appendix provides a detailed explanation of how the Mackenzie Valley Land and Water Board (MVLWB or the Board) arrived at the reclamation security as discussed in the main body of the Reasons for Decision (Part 5.3 and 6.2) and required by conditions in the Licence and Permit. The Board required the posting of reclamation security deposits for the Gahcho Kue Project as presented in Table 1b. The security amounts required at each phase depicted below represents the total amount of security that shall be posted for the project, not the incremental amount of security required at each phase.

Table 1b: Total Security Deposits Required for Gahcho Kue Project

	Total	Land	Water
Total	**$97,318,038**	**$43,392,390**	**$53,925,648**
Phased Payment Schedule			
Prior to the commencement of Construction	$15,429,858	$11,816,392	$3,613,466
One year following the date the security was posted under Schedule 2, item 1(a) the Licensee	$19,043,323	$11,816,392	$7,226,931
Prior to Year 1 of Operations	$37,594,133	$13,817,863	$23,776,270
Prior to conducting activities identified in the January 19, 2017 Amendment Application	$37,620,366	$13,844,096	$23,776,270
Prior to Year 5 of Operations	$80,028,694	$38,519,939	$41,508,755
Prior to Year 7 of Operations	$89,091,861	$42,210,679	$46,881,182
Prior to Year 12 of Operations	$97,318,038	$43,392,390	$53,925,648

2.0 Reclamation Security Estimates – Evidence Submitted to the Board

On August 11, 2014, the Board issued Reasons for Decision which provide a detailed explanation of the security amount required to be posted for the project.[203]

The GNWT currently holds a total of $23,776,270.00 in reclamation liability security for the Gahcho Kue Mine under Licence MV2005L2-0015, and an additional $13,844,096.00 in reclamation liability security under Permit MV2005C0032; totaling $37,620,366.00.

[203] See MVLWB – Reasons for Decision for MV2005L2-0015, dated August 11, 2014.

Part C, condition 2 of Licence MV2005L2-0015 states the following:

> *Upon request of the Board, the Licensee shall submit a revised Project Reclamation liability estimate utilizing the current version of RECLAIM or another method acceptable to the Board.*

On March 16, 2017, the Board requested that De Beers submit a revised reclamation cost estimate by June 30, 2018. On June 29, 2018, De Beers submitted a 2018 Security Estimate Report for Board consideration.[204]

By July 20, 2018, comments and recommendations on the 2018 Security Estimate Report were only received from the GNWT-ENR. De Beers responded on July 30, 2018. [205]

On September 27, 2018 Board staff sent an Information Request to GNWT-ENR requesting a recommended amount of security, to be considered by the Board, related to air and wildlife monitoring that would be in line with the other diamond mines operating in the NWT, as well as requesting they provide further rationale as to why the cost code, and associated unit costs, for the placement of cover on the Fine Processed Kimberlite Containment Facility should be changed and increased. The GNWT-ENR was also requested to provide further rationale as to why this recommendation was related to only the Fine Processed Kimberlite Containment Facility, and not to any of the other areas of the mine site that required mine rock for cover that used the same cost code and unit costs.[206]

The GNWT-ENR responded on October 5, 2018 stating that the costs for air and wildlife were not provided by De Beers, and those are needed to provide a site-specific estimate. In the absence of the site-specific information, GNWT-ENR provided a range of costs that are included at the other mines operating in the Northwest Territories and anticipated that the costs at the Gahcho Kue mine site would fall somewhere in between the ranges. The GNWT-ENR also stated that unit costs in RECLAIM are reviewed as part of regular updates to the model but can also be modified between updates when revised costs for such work undertaken by government becomes available, or, site-specific unit costs are derived by a licensee based on site specific activities and information. GNWT-ENR notes that there may be some differences between the Ekati, Diavik and Gahcho Kue sites, but recommends that the updated unit costs be used at Gahcho Kue site as the activities are substantially the same. However, if De Beers could provide site-specific information that differs from activities and conditions experienced at Ekati, GNWT-ENR may consider adjusting its position.[207]

In their final response, received October 17, 2018, De Beers provided an estimate of costs associated with air and wildlife monitoring for the interim care and maintenance, active reclamation, and the post-reclamation phases (from years 2028-2051). De Beers also stated that mine rock would be available in the active layer, and therefore it was anticipated that drilling and blasting would not be required. However, in an effort to align unit costs with the GNWT, De Beers submitted proposed adjustments to the unit costs on the Processed Kimberlite facilities: \$7.09 at 50% (ripping at \$1.05/m^3 + spread at \$6.04/m^3) and \$6.04

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[204] See De Beers – Security Estimate RECLAIM Report v.5 and Security Estimate RECLAIM Excel Report v.5, submitted to the MVLWB on June 29, 2018.
[205] See Comments on Financial Security Estimate, submitted to the MVLWB on June 29, 2018.
[206] See Board staff – IR to GNWT-ENR on 2018 RECLAIM Financial Security Estimate Report, dated September 27, 2018.
[207] See GNWT-ENR – Response to IR on 2018 RECLAIM Financial Security Estimate Report, dated October 5, 2018.

at 50% (spread only at $6.04/m^3). This would increase the security by $367,244 for the Fine Processed Kimberlite Containment Facility and $97,573 for the coarse processed kimberlite containment facility.[208]

3.0 Summary of Security Estimates by Mine Component

3.1 Tailing Facility

De Beers' estimate included costs to cover the Fine Processed Kimberlite and the Coarse Processed Kimberlite facilities using the cost codes and unit costs as provided in the RECLAIM Model. During the review period, the GNWT-ENR recommended that the unit costs for the closure activity of capping the Fine Processed Kimberlite Facility with material sourced from a waste rock pile be consistent with those approved by the Wek'eezhii Land and Water Board for the Ekati Security Estimate and Diavik Waste Rock Storage Area Closure Plan. This would increase the security by $2,840,947.

In response, De Beers stated that ripping and blasting to access mine rock for processed kimberlite cover will not be required, as sufficient non-frozen mine rock is available in the South and West Mine Rock piles. To demonstrate that sufficient non-frozen waste rock was available in the waste rock piles to cover the processed kimberlite facilities, De Beers completed a volume balance of the waste rock piles and the processed kimberlite piles. In various scenarios (looking at years 5, 7, and 12 of the mine life), De Beers demonstrates that the amount of rock removed from the active layer of the mine rock piles would be about 1.89 m, which would still be within the 3 m active layer.

Following the GNWT-ENR October 5, 2018 response to Information Request from Board staff, as described above in section 2.0 of Appendix 2, De Beers submitted a partial update to the unit costs in an effort to align with those recommended by the GNWT-ENR. A breakdown of the updated unit costs is provided in Table 2b below:

Table 2b: Updated Unit Costs for Cover Construction of Processed Kimberlite Facilities

Activity	Quantity	Initial Submission Unit Costs	Proposed Adjustments to Unit Costs
Fine Processed Kimberlite Facility	1,385,827.5 m^3	$6.30 * 1,385,827.5 = **$8,730,713**	Rip/Load/Haul/Spread - Specific Unit cost for GNWT Ekati experience - $7.09 / m3 Load/Haul/Spread – Specific Unit cost from GNWT Ekati experience - $6.04 / m3. Total Cost = $7.09 / m3 * 50% (Quantity of Rock) + $6.04 / m3 * 50% (Quantity of Rock) $7.09 * (1,385,827.5 * 50%) + $6.04 * (1,385,827.5 * 50%) = **$9,097,957** (an increase of $367,244)

[208] See De Beers – Final Response to IR to GNWT-ENR on 2018 RECLAIM Financial Security Estimate Report, dated October 17, 2018.

Coarse Processed Kimberlite Facility	368,209 m^3	$6.30 * 368,209 = **$2,319,719**	Rip/Load/Haul/Spread - Specific Unit cost for GNWT Ekati experience - $7.09 / m3 Load/Haul/Spread – Specific Unit cost from GNWT Ekati experience - $6.04 / m3. Total Cost = $7.09 / m3 * 50% (Quantity of Rock) + $6.04 / m3 * 50% (Quantity of Rock) $7.09 * (368,209 * 50%) + $6.04 * (368,209 * 50%) = **$2,417,292** (an increase of $97,573)

The Board has determined that the updated unit costs are applicable to the Gahcho Kue mine site. However, in their final response to the GNWT-ENR, De Beers has put forth an alternative calculation that has not been evaluated by the GNWT-ENR. As noted by the GNWT-ENR, they may consider adjusting their position based on evidence submitted by De Beers. As such, the Board has not required a change to the proposed security at this time, but requires De Beers to consider the new unit costs, for all areas requiring covers using mine rock, in their next submission of the RECLAIM Financial Security Estimate.

As the developer of the RECLAIM model and the party that is responsible for clean-up of the site in the case of abandonment, the GNWT's recommendations are well-informed. As such, prior to resubmission to ensure an efficient review, the Board requires De Beers to:

a) Engage with the GNWT with the goal of building consensus and enabling the proponent and the GNWT to provide a thorough rationale for any differences in opinion; and
b) Based on the engagement completed to satisfy direction (a) above, outline any differences between the GNWT and De Beers' estimates/positions, and provide a rationale for De Beers' position.

3.2 Monitoring and Maintenance

Monitoring and maintenance costs have been updated from De Beers' initial submission and all costs are included under the line item "ALL MONITORING". During the review period, the GNWT-ENR recommended that De Beers provide an estimate on the amount of security that should be held for air and wildlife monitoring for the Gahcho Kue mine, which would be consistent with other diamond mines operating in the Northwest Territories.

De Beers responded that the MVLWB 2014 Reasons for Decision stated that air quality effects monitoring, and wildlife effects monitoring was outside the Boards' jurisdiction and therefore the estimated costs associated with these programs were not included in determining the security amount.

Following the GNWT-ENR October 5, 2018 response to Information Request from Board staff, as described above in section 2.0 of Appendix 2, De Beers provided an estimate of costs associated with air and wildlife monitoring for the interim care and maintenance, active reclamation, and the post-reclamation phases (from years 2028-2051).

The Board has determined that air and wildlife monitoring costs are applicable to the Gahcho Kue mine site. However, in their final response to the GNWT-ENR, De Beers has provided an estimate of costs for years 2028-2051. As noted by the GNWT-ENR, it is their understanding that air and wildlife monitoring programs are currently being conducted onsite, therefore, costs to undertake these monitoring programs in the case of insolvency represents an existing liability and securities should be appropriately posted under each phase, including the current phase. As such, the Board has not required a change to the proposed security at this time, but requires De Beers to consider air and wildlife monitoring costs in their next submission of the RECLAIM Financial Security Estimate.

As the developer of the RECLAIM model and the party that is responsible for clean-up of the site in the case of abandonment, the GNWT's recommendations are well-informed. As such, prior to resubmission to ensure an efficient review, the Board requires De Beers to:

a) Engage with the GNWT with the goal of building consensus and enabling the proponent and the GNWT to provide a thorough rationale for any differences in opinion; and
b) Based on the engagement completed to satisfy direction (a) above, outline any differences between the GNWT and De Beers' estimates/positions, and provide a rationale for De Beers' position.

4.0 Security Phasing Schedule for Land Use Permit and Water Licence

Security phasing schedules for security amounts divided between land and water-related liabilities were submitted to the Board by De Beers as a part of their 2018 RECLAIM Financial Security Estimate Report. This schedule has been updated from those outlined in the Licence and Permit.

Tables 3b and 4b below break down the phases of De Beers' current Security and the Summary Table from the 2018 Security Estimate Report for Scenario 2.

Table 3b: Breakdown of De Beers' Current Phases of Security

Project Phase	Land	Water	Total
Prior to the commencement of Construction	$11,816,392	$3,613,466	$15,429,858
One year following the date the security was posted under Schedule 2, item 1(a) the Licensee	$0	$3,613,465	$3,613,465
Prior to Year 1 of Operations	$2,001,471	$16,549,339	$18,550,810
Prior to conducting activities identified in the January 19, 2017 Amendment Application	$26,233	$0	$26,233
Prior to Year 4 of Operations	$1,382,934	$40,713,234	$42,096,168
Prior to Year 7 of Operations	$831,146	$1,559,554	$2,390,700
Prior to Year 11 of Operations	$655,145	$1,099,554	$1,754,699
Total	**$16,713,321**	**$67,148,612**	**$83,861,933**

Table 4b: Breakdown of De Beers' Summary Table from the 2018 Security Estimate Report for Scenario 2

Project Phase	Land	Water	Total
Prior to Year 6 of Operations	$38,519,939	$41,508,755	$80,028,694
Prior to Year 7 of Operations	$3,690,740	$5,372,427	$9,063,167
Prior to Year 13 of Operations	$1,181,711	$7,044,466	$8,226,177
Total	**$43,392,390**	**$53,925,648**	**$97,318,038**
Total proposed change (+/-) from current security amount	**+ $26,679,069**	**- $13,222,964**	**+ $13,456,105**

Tables 5b and 6b below list out the milestones associated with the phases of De Beers' current Security and the Summary Table from the 2018 Security Estimate Report.

Table 5b: Milestones associated with De Beers' Current Phases of Security

Project Phase	Land	Water
Prior to the commencement of Construction	August 20, 2014	October 23, 2014
One year following the date the security was posted under Schedule 2, item 1(a) the Licensee	-	September 29, 2015
Prior to Year 1 of Operations	June 26, 2016	June 30, 2016
Prior to conducting activities identified in the January 19, 2017 Amendment Application	February 9, 2018	-
Prior to Year 4 of Operations	This amount coincides with the end of Mining of the Hearn Pit	
Prior to Year 7 of Operations	This amount coincides with the end of Mining of 5034 Pit	
Prior to Year 11 of Operations	This amount correlates to the projected end of production	

Table 6b: Milestones proposed by De Beers' from the 2018 Security Estimate Report for Scenario 2

Project Phase	Scenario 2
	Year
- End of Deposition: Fine Processed Kimberlite Containment Facility	Year 6 (2022)
- End of 5034 mining - End of Deposition – West Mine Rock Pile -Progressive Reclamation Complete: Fine Processed Kimberlite Containment Facility	Year 7 (2023)
*	Year 13 (2029)

* Unknown phase of the project (none provided for Year 13)

The initial milestones were set to coincide with specific activities to occur onsite (see section 4.3.4 and Appendix 2 of the Board's August 11, 2014 Reasons for Decision[209] for further details). In the project phases that are forthcoming, the Board has determined that the milestones are to stay the same (to coincide with the end of mining the various pits; namely, the Hearn Pit, the 5034 Pit, and the end of production), but to be updated to the year in which the milestone would now occur based on the information provided by De Beers in their 2018 Security Estimate Report.[210] Table 7b below lists out the milestones associated with the phases as set by the Board.

[209] See MVLWB – Reasons for Decision for MV2005L2-0015, dated August 11, 2014.
[210] See De Beers – Security Estimate RECLAIM Report v.5 and Security Estimate RECLAIM Excel Report v.5, submitted to the MVLWB on June 29, 2018.

Table 7b: Project Phases and Milestones as set by the Board

Project Phase	Milestone
Prior to Year 5 of Operations	This amount coincides with the end of Mining of the Hearn Pit
Prior to Year 7 of Operations	This amount coincides with the end of Mining of 5034 Pit
Prior to Year 12 of Operations	This amount correlates to the projected end of production