

**GOVERNMENT OF THE NORTHWEST TERRITORIES**  
**TECHNICAL INTERVENTION**

FOR

**DE BEERS CANADA MINING INC.**  
**GAHCHO KUE DIAMOND MINE**  
**WATER LICENCE AMENDMENT**  
**MV2005L2-0015**

Submitted to:

Mackenzie Valley Land and Water Board  
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## LIST OF ACRONYMS

Aboriginal Affairs and Northern Development (now known as Crown-Indigenous Relations and Northern Affairs Canada)	AANDC
Aquatic Effects Monitoring Program	AEMP
Canadian Council of Ministers of the Environment	CCME
De Beers Canada Incorporated	De Beers
Effluent Quality Criteria	EQC
Environmental Impact Review	EIR
Environment and Natural Resources	ENR
Government of the Northwest Territories	GNWT
Mackenzie Valley Land and Water Board	Board
Million Tonnes	MT
Potentially Acid Generating	PAG
Processed kimberlite	PK
Site Specific Water Quality Objectives	SSWQO
Surveillance Network Program	SNP
Water Management Pond	WMP
West Mine Rock Pile	WMRP

## **1.0 INTRODUCTION**

The following concerns and issues have resulted from the Government of the Northwest Territories (GNWT) and their retained expert's review of plans and submissions as part of the De Beers Canada Incorporated's (De Beers) Gahcho Kue Diamond Mine water licence amendment application MV2005L2-0015. This technical intervention explains GNWT's concerns and provides recommendations for the Mackenzie Valley Land and Water Board's (the Board) consideration. This submission takes into consideration all of the documents provided with the amendment application, as well as relevant submissions provided under the existing water licence.

GNWT appreciates the opportunity to express its concerns and provide recommendations and suggestions to the Board. GNWT and its retained experts intend to provide technical input at the public hearing on July 25-26, 2018, to assist the Board in making a decision related to proposed water licence amendments.

### **1.1 Report Outline**

This technical intervention is structured to discuss amendments to the water licence requested by De Beers. This includes amendments to effluent quality criteria (EQC) for effluent discharge into Lake N11 and Area 8 and changes to the Surveillance Network Program (SNP), the expansion of the West Mine Rock Pile (WMRP) by approximately 100 MT, water usage, and other various amendments. The document is divided into the following sections:

Section 1 – Introduction to the technical intervention and GNWT's involvement in the regulatory review for the proposed amendment application for Water Licence MV2005L2-0015.

Section 2 – Includes a review of proposed changes to EQC, an assessment of potential impacts or uncertainties, and recommendations to the Board including those related to the SNP.

Section 3 – Includes a review of the proposed expansion of the WMRP and an assessment of potential impacts or uncertainties.

Section 4 – Includes a review of the environmental liability existing on site, specifically changes associated with the proposed water licence amendments. Due to these changes, De Beers will need to submit an updated RECLAIM estimate, which is outside the scope of this document.

Section 5 – Includes a review of the requested increase to camp water usage (to 45,000 m<sup>3</sup>) as well as the proposed amendment related to annual discharge limits from the Water Management Pond (WMP) into Lake N11; and

Section 6 – Provides recommendations on the "other amendments" within the water licence amendment application not related to previous topics.

## **2.0 PROPOSED CHANGED TO EFFLUENT QUALITY CRITERIA (EQC) AND SNP**

Currently, Water Licence MV2005L2-0015 includes allowances to discharge various waste streams and flow augmentation water to Lake N11 and Area 8. As such, the Water Licence includes EQC for discharge from both areas to ensure that previously established site specific water quality objectives (SSWQO) are maintained in the environment. The following section will outline GNWT's position on De Beers' proposed changes to these EQC as well as proposed amendments to SNP sampling.

### **2.1 Lake N11**

#### **2.1.1 Chloride**

De Beers has requested that the EQC for chloride be increased from 160 mg/L maximum average and 320 mg/L maximum grab to 300 mg/L maximum average and 515 mg/L maximum grab.

The SSWQO for chloride in Lake N11 is currently 120 mg/L which is the Canadian Council of Ministers of the Environment (CCME) guideline for the protection of aquatic life. De Beers predicts that the maximum chloride at the edge of the mixing zone in Lake N11 would be 104 mg/L.

GNWT was unclear as to the necessity for an increase and requested clarification in this regard as part of the May 7th Information Requests.

In their response, De Beers provide additional information outlining a predicted exceedance of current maximum average concentrations in September/October 2019 and September/October 2020. As such, given that SSWQOs will be maintained in the receiving environment and De Beers has provided rationale on the necessity for the chloride increase, GNWT has no further concerns with the proposal.

As noted above, De Beers predicts the chloride concentrations at the edge of the mixing zone will be 104 mg/L. It is unclear if this prediction is a result solely of the CORMIX model or if this also accounts for chloride loadings into Lake N11 given that chloride is persistent in the receiving body which will result in less dilution over time.

#### ***Recommendation:***

***GNWT has no concern with the proposed increase for chloride EQCs to 300 mg/L maximum average and 515 mg/L maximum grab. However, if monitoring results indicate that the chloride concentration exceed 120 mg/L at the edge of the mixing zone, the EQCs will need to be reduced accordingly.***

### **2.1.2 Fluoride**

De Beers has requested that the EQC for fluoride be amended from 0.15 mg/L maximum average and 0.3 mg/L maximum grab to 1.5 mg/L maximum average and 3.0 mg/L maximum grab.

During the original licensing of Gahcho Kue, De Beers proposed a site specific water quality objective based on their own research; however at that time it appeared that a lower value (i.e. CCME of 0.12 mg/L) was achievable and the Board determined that value to be an appropriate SSWQO. Given the predicted increases in fluoride, De Beers now proposes that a SSWQO for fluoride based on recent literature would be more appropriate. While a SSWQO for fluoride of 1.94 mg/L was developed and approved for Snap Lake, De Beers has proposed that the drinking water guideline of 1.5 mg/L would be a more appropriate guideline for Gahcho Kue. GNWT notes this is also a more conservative and protective value than was approved for Snap Lake.

In the May 7<sup>th</sup> Information Requests, GNWT requested that De Beers clarify their findings on the necessity of an EQC for fluoride, specifically as it related to: Table 2-11 in the EQC report; the proposed amended SSWQO; and, the proposed amended EQC. In their response, De Beers provided additional information related to fluoride indicating the necessity for an EQC.

Given that SSWQOs will be maintained in the receiving environment and De Beers has provided rationale on the necessity for the fluoride increase, GNWT has no further concerns with the proposal.

#### ***Recommendation:***

***GNWT has no concern with the proposed increase in EQC for fluoride to 1.5 mg/L maximum average and 3.0 mg/L maximum grab.***

***ENR supports De Beers' proposed fluoride SSWQO of 1.5 mg/L.***

### **2.1.3 Sulphate**

De Beers has requested that the EQC for sulphate be decreased from 150 mg/L maximum average and 300 mg/L maximum grab to 100 mg/L maximum average and 155 mg/L maximum grab.

Table 2-9 of the EQC Report notes that the maximum Water Management Pond (WMP) discharge will be 42 mg/L.

#### ***Recommendation:***

***GNWT has no concern with the proposed reduction of the EQC for sulphate to 100 mg/L maximum average and 155 mg/L maximum grab.***

#### 2.1.4 Nitrate

De Beers has noted that nitrate has been increasing since the start of operations, and the current EQC are no longer achievable. Therefore, De Beers has requested that the EQC for nitrate be increased from 10 mg N/L maximum average and 20 mg N/L maximum grab to 20 mg N/L maximum average and 30 mg N/L maximum grab.

The previously approved SSWQO for nitrate in Lake N11 was the CCME guideline of 2.93 mg N/L. In Section 2.2.2 of the EQC Report, De Beers has proposed using the hardness adjusted SSWQO for nitrate which has been approved for Ekati of  $e^{0.9518 [\ln(\text{hardness})] - 2.032}$  mg N/L for the hardness range 27-160 mg/L. De Beers believes this hardness adjusted value is suitable as the SSWQO for Lake N11 as the Ekati value was derived for use at a hardness range up to 160 mg/L which is similar to Lake N11. Above a hardness concentration of 160 mg/L, De Beers has proposed an SSWQO of 16.62 mg N/L.

ENR notes that the mean + 2SD baseline hardness in Lake N11 and Area 8 was 9 mg/L and 14 mg/L respectively. As a result of discharge from the Gahcho Kue operation, the hardness in Lake N11 and Area 8 will increase over time. De Beers proposes using this anthropogenically increasing hardness to increase their discharge limits, by adjusting their SSWQO and EQC to reflect the hardness attenuating effect of higher hardness waters.

ENR has previously expressed opposition to using anthropogenically influenced hardness as natural hardness. The issue of concern is that proponents can use the ameliorative properties of their effluent (if such properties exist) to deposit contaminants at increasing concentrations and of which are knowingly greater than the pre-development conditions. From a strictly toxicological perspective, toxicity may not occur if all the molecules in question (contaminant and ameliorative chemical) are subject to the same environmental fate and transport processes because the ratio between contaminant and “ameliorative” molecules may remain constant. However, for nitrate, there are also implications regarding nutrient enrichment. GNWT has previously provided comments to the WLWB (e.g. ENR’s review of the Diavik Diamond Mines (2012) Inc. 2014 AEMP Review) that nitrogen can be a limiter, or co-limiter with phosphorous, of nitrification in receiving waters. This potential effect would not be attenuated by hardness.

From a water and environmental policy perspective, the discharge of waste should be limited to the extent reasonably possible and the use of known toxicity modifying factor relationships should not be used to increase contaminant loads by taking advantage of “ameliorative” molecules coincidentally found in an effluent stream. The logical extension of allowing molecules in an effluent stream to be considered in modifying toxicity may allow a proponent to simply modify the effluent composition (i.e. hardness) to increase loads to the environment. This is clearly not the intent of the site-specific water quality derivation process or the “Guiding Principles” of the Water and Effluent Quality Management Policy released by the MVLWB in 2011. CCME (1999) is emphatic on this point stating: “... modifications of guidelines to site-specific objectives should not be made on the basis of aquatic ecosystem characteristics that have arisen as a direct result of previous human activities.” Further, CCME (2007) reiterates this point stating: “Similarly, modifications of guidelines to site-specific objectives should not be made on the basis of degraded aquatic ecosystem characteristics that have arisen as a direct negative result of previous human activities”.

GNWT notes that the source of nitrate in mine effluent is typically blasting residue, and management options to control nitrate inputs at the source can be effective. In the May 7th Information Requests, GNWT requested additional information on nitrate reduction measures implemented at the site. In their response, De Beers noted that a nitrate steering committee has been launched which is responsible for developing and implementing a nitrate reduction strategy. De Beers went on to outline a variety of response actions that have been implemented to date and reiterated their commitment to reducing nitrate loadings to the WMP through “aggressive source control measures” in order to meet proposed EQC values in 2019 and 2020.

In regards to the development of an EQC for nitrate, a mass balance model of Lake N11 was developed. This included an assumption that nitrate participates in nutrient cycling. It was also noted that this approach also assumed that nitrate concentrations in N11 behaved the same as nitrate concentrations in Snap Lake as “(t)he first-order decay rate and temperature coefficient were obtained from the fully-mixed calibration of nitrate concentrations in Snap Lake between 2004 and 2016.” De Beers believed this to be a reasonable assumption given that the source of nitrate in both lakes is the same and climatic conditions are similar in both locations.

In response to the May 7th Information Requests, De Beers stated that they had re-modelled nitrate concentrations in Lake N11 conservatively; removing the assumptions that nitrate concentrations in Lake N11 would behave the same as Snap Lake. Based on these results, De Beers determined that the proposed EQCs would maintain the proposed hardness adjusted SSWQO for nitrate in Lake N11.

***Recommendation:***

***GNWT is concerned that the nitrate increase relies upon anthropogenically induced hardness. However, the GNWT could support the requested increase provided De Beers reconfirmed its efforts to reduce nitrate in the WMP and continued progress on addressing blast residue as part of the nitrate response plan.***

### **2.1.5 Ammonia**

De Beers has requested that the EQC for ammonia be decreased from 10 mg N/L maximum average and 20 mg/L maximum grab to 6 mg N/L maximum average and 10 mg N/L maximum grab.

The maximum anticipated concentration for total ammonia outlined in the EQC Report from the WMP into N11 is 2.3 mg N/L.

***Recommendation:***

***GNWT has no concerns with the reduction in EQC for ammonia.***

### 2.1.6 Phosphorus

De Beers has requested that the EQC for phosphorus be decreased from 0.03 mg P/L maximum average and 0.06 maximum grab to 0.022 mg P/L maximum average and 0.03 mg P/L maximum grab.

The maximum anticipated total phosphorus outlined in the EQC Report from the WMP into N11 is 0.022 mg P/L. Table 2-2 of the EQC Report notes that the SSWQO for Lake N11 is 0.0109 mg P/L which is to maintain oligotrophic status in the receiving environment. Given the projected maximum noted, De Beers is predicting a maximum concentration in Lake N11 (at the edge of the mixing zone and within the fully mixed lake) of 0.013 mg P/L which will temporarily move the lake from oligotrophic to mesotrophic status during under-ice conditions.

On Page 109 of the Environmental Screening Assessment, De Beers notes that:

*Concentrations of phosphorus are projected to increase in Lake N11 during the operational discharge period, primarily from loading sources from the WMP due to loading from groundwater inflow, mine rock, and PK sources. Based on the maximum total phosphorus concentration projected for operations (0.013 mg/L), an increase in productivity at all trophic levels would be expected in Lake N11 during operations. The increase in total phosphorus in Lake N11 will be short-lived and will return to pre-development conditions after Year 4. As noted in the 2011 and 2012 EIS, the total phosphorus projection is bound by some conservatism.*

During Day 1 of the technical sessions, there was a discussion about phosphorus loadings into Lake N11. GNWT requested that De Beers provide an EQC for phosphorus for discharge from the WMP into Lake N11 that would ensure that the SSWQO for phosphorus would not be exceeded and that the trophic status of the receiving environment would be maintained.

In response, De Beers' consultants noted that phosphorus increases would only occur during the under-ice period as a result of salt exclusion and that open water phosphorus concentrations would decline back to levels in the area of 0.006 mg/L. As such, given that increases will only occur for a relatively short time during winter, their position was that the risk for increased productivity was relatively low and it was concluded that "the commitment to try and maintain oligotrophic conditions...is still met..." ([Technical Sessions, Day 1, p. 172](#)).

One of the objectives outlined in Section 6.0 of the Board's Water and Effluent Quality Management Policy (2011) is the maintenance of water quality in the receiving environment that allows for current and future water uses. This is further described in that section which notes that the level of protection is defined by the "water quality standards" or "water quality objectives". The application of this policy in the water licensing process can be observed in the Reasons for Decision dated August 11, 2014 from the Board for the Gahcho Kue Water Licence (MV2005L2-0015) which contained the following references to the Policy and the relationship between EQCs and the maintenance of concentrations below SSWQO:

- As per the Water and Effluent Quality Management Policy (the Policy), the Board sets water licence conditions, including EQC, with the goal of ensuring that current and future water uses in the receiving environment will be protected. As stated in the Policy:

- “Protection of water quality in the receiving environment is the primary objective. The level of protection will be defined by the water quality standards that have been set site-specifically for the receiving environment in question. Effluent Quality Criteria (EQC) will be set for a project to ensure that water quality standards will be met.” (p. 48).
- As per the Board’s Policy, the Board has the same goal of minimizing the amount of waste to be discharged; however, the Board prefers to consider the principle of waste minimization when deciding on a final EQC instead of altering SSWQO directly. For example, EQC are first calculated based on maintaining the concentration of a parameter of potential concern below the SSWQO in the receiving environment.(p. 53)
- According to the Water and Effluent Quality Management Policy, EQC are set to ensure that water quality objectives are not exceeded at the edge of a defined mixing zone.(p. 56).

As noted above, the Policy uses terminology for water quality standards and water quality objectives interchangeably. As such, it is the GNWT’s opinion that the SSWQOs approved by the Board are meant to be maintained in the environment and that EQCs must be calculated to ensure this. GNWT has considered the information provided by De Beers that phosphorus exceedances will occur for a relatively short period during winter when biological productivity is extremely low. However, GNWT notes that this phosphorus may also be available in early spring. Along with the increase in nitrates (as noted in Section 2.1.4) this phosphorous will potentially be available and contribute to increased biological at this time.

SSWQOs are intended to be met at the edge of a mixing zone. Further, De Beers is requesting an increase to nitrate EQCs and SSWQO. Given the linkage between phosphorus and nitrate, there is a concern about maintaining trophic status in Lake N11. Note, De Beers is also requesting that discharge be prolonged longer than Year 4 as long as EQCs are being achieved. Thus, Lake N11 could experience these conditions under a more prolonged period than originally assessed.

GNWT understands that this prediction is believed to be conservative and that potential effects will continue to be monitored in the receiving environment through the Aquatic Effects Monitoring Program (AEMP). Therefore, AEMP action levels should be assessed and annual AEMP results should be reviewed to assess indications of nutrient enrichment. Appropriate management response mechanisms should also be developed given the potential nutrient enrichment, even though the phosphorus EQC is to be reduced.

***Recommendation:***

***GNWT has no concerns with the reduction in EQC for phosphorus. GNWT will continue to provide feedback through the AEMP to ensure phosphorus and nitrate concentrations and nutrient enrichment action levels and responses are appropriate.***

### **2.1.7 Aluminum**

De Beers has requested that the EQC for aluminum be increased from 0.1 mg/L maximum average and 0.2 mg/L maximum grab to 0.23 mg/L maximum average and 0.35 mg/L maximum grab.

Table 2-2 notes that the current SSWQO for aluminum is 0.1 mg/L which is the CCME guideline for the protection of aquatic life.

The maximum anticipated aluminum concentration in Table 2-7 of the EQC Report would result in a project maximum aluminum concentration in Lake N11 of 0.06 mg/L at the edge of the mixing zone.

GNWT was unclear as to the necessity for an increase in aluminum and requested clarification in this regard as part of the May 7th Information Requests. In their response, De Beers provided additional information outlining a prediction of approaching or exceeding current maximum average concentrations in September/October 2019 and September/October 2020. As such, given that SSWQOs will still be maintained in the receiving environment and De Beers has provided rationale on the necessity for the aluminum increase.

#### ***Recommendation:***

***GNWT has no concern with the proposed increase of the EQC for aluminum to 0.23 mg/L maximum average and 0.35 mg/L maximum grab***

### **2.1.8 Chromium**

De Beers had originally requested that the EQC for chromium be increased from 0.004 mg/L maximum grab to 0.005 mg/L maximum grab.

The maximum anticipated chromium concentration in Table 2-7 of the EQC Report from the WMP into Lake N11 is 0.002 mg/L. Given that the predicted maximum concentration is less than the current maximum grab, it is unclear what necessitates the EQC increase.

In the May 7th Information Requests, GNWT requested that De Beers clarify the rationale between the requested increase to the chromium maximum grab from 0.004 mg/L to 0.005 mg/L.

In their response, De Beers concurred that the requested increase in the total chromium maximum grab is no longer necessary.

### **2.1.9 Copper**

De Beers has requested that the EQC for copper be increased from 0.003 mg/L maximum average and 0.006 mg/L maximum grab to 0.004 mg/L maximum average and 0.007 maximum grab.

In the May 7th Information Requests, GNWT requested that De Beers clarify the rationale behind the request to increase the EQC for copper. In their response, De Beers provided additional clarification on the methods used to establish EQCs and noted that there is some uncertainty.

De Beers also noted that predictions for maximum average copper concentrations in the WMP are 0.00262 mg/L and 0.00265 mg/L in September and October 2020, respectively. While not exceeding the current EQC, GNWT appreciates that these values are very close to the EQC value given the uncertainties in the water quality modelling, and that increasing the EQC would provide some operational flexibility to De Beers.

Additionally, GNWT notes that predicted maximum concentrations at the edge of the mixing zone will not exceed the SSWQO for copper (0.002 mg/L).

As such, given that SSWQO will be maintained in the receiving environment and De Beers has provided rationale on the necessity for the copper increase, GNWT has no further concerns with the proposal.

#### ***Recommendation:***

***GNWT has no concern with the proposed increase to the EQC for copper of 0.004 mg/L maximum average and 0.007 mg/L maximum grab.***

### **2.1.10 Iron**

De Beers has requested that the EQC for iron be increased from 0.4 mg/L maximum average and 0.8 mg/L maximum grab to 0.6 mg/L maximum average and 1.0 mg/L maximum grab.

In the May 7th Information Requests, GNWT requested that De Beers clarify the rationale behind the request to increase the EQC for iron. In their response, De Beers provide additional information regarding an exceedance of current maximum average concentrations in September/October 2020.

GNWT notes that with the proposed increase in the iron EQC, the predicted concentration of iron at the edge of the mixing zone is 0.2 mg/L will remain below the SSWQO for iron (0.3 mg/L).

#### ***Recommendation:***

***GNWT has no concern with the proposed increase to the EQC for iron to 0.6 mg/L maximum average and 1.0 mg/L maximum grab***

### **2.1.11 Molybdenum**

De Beers has requested to remove molybdenum as an EQC for discharges to Lake N11. Table 2-9 of the EQC Report notes that the projected maximum WMP discharge concentration is 0.0067 mg/L. As this is greater than baseline, molybdenum was carried through in the screening process in Section 2.4.2 of the EQC Report. The final screening process for retention of a parameter as an EQC was outlined in Table 2-11 of the EQC Report and is based on whether predicted concentrations were above site-specific water quality objectives minus 10%. In this case, the projected discharge concentration for molybdenum of 0.0067 mg/L was below the SSWQO (0.073 mg/L) - 10% = 0.066 mg/L and as such it was not retained as an EQC.

In the May 7th Information Requests, GNWT requested that De Beers provide a summary of changes to molybdenum at site (predictions, observations, etc.) and/or screening protocol that resulted in molybdenum being screened out when it was previously identified as a parameter of potential concern requiring an EQC.

In their response, De Beers clarified that molybdenum was not retained in previous versions of the EQC report but was added by the Board because of uncertainties in the water quality model predictions. Current monitoring data indicate that molybdenum concentrations are orders of magnitude lower than current EQC or SSWQO.

#### ***Recommendation:***

***GNWT has no concern with De Beers' request to remove molybdenum from the EQC list at this time. Concentrations should still be collected as part of the SNP.***

### **2.1.12 Nickel**

De Beers has requested to remove nickel as an EQC for discharges to Lake N11. Table 2-9 of the EQC Report notes that the projected maximum WMP discharge concentration for nickel is 0.0063 mg/L. As this is greater than baseline, nickel was carried through in the screening process in Section 2.4.2. The final screening process for retention of a parameter as an EQC was outlined in Table 2-11 of the EQC Report and is based on whether predicted concentrations were above site-specific water quality objectives minus 10%. In this case, the projected discharge concentration for nickel of 0.0063 mg/L was below the SSWQO (0.025 mg/L) - 10% = 0.023 mg/L and as such it was not retained as an EQC.

In May 7th Information Requests, GNWT requested that De Beers provide a summary of changes to nickel at site (predictions, observations, etc.) and/or screening protocol that resulted in nickel being screened out when it was previously identified as a parameter of potential concern requiring an EQC.

In their response, De Beers clarified that nickel was not retained in previous versions of the EQC report but was added by the Board because of uncertainties in the water quality model predictions. Current monitoring data indicate that nickel concentrations are at least an order of magnitude lower than current EQC or SSWQO.

***Recommendation:***

***GNWT has no concern with De Beers' request to remove nickel from the EQC list at this time. Concentrations should still be collected as part of the SNP.***

***2.1.13 Uranium***

De Beers has requested to remove uranium as an EQC for discharges to Lake N11. Table 2-9 of the EQC Report notes that the projected maximum WMP discharge concentration for uranium is 0.0032 mg/L. As this is greater than baseline, uranium was carried through in the screening process in Section 2.4.2. The final screening process for retention of a parameter as an EQC was outlined in Table 2-11 of the EQC Report and is based on whether predicted concentrations were above site-specific water quality objectives minus 10%. In this case, the projected discharge concentration for uranium of 0.0032 mg/L was below the SSWQO (0.015 mg/L) - 10% = 0.014 mg/L and as such it was not retained as an EQC.

In the May 7th Information Requests, GNWT requested that De Beers provide a summary of changes to uranium at site (predictions, observations, etc) and/or screening protocol that resulted in uranium being screened out when it was previously identified as a parameter of potential concern requiring an EQC.

In their response, De Beers clarified that uranium was not retained in previous versions of the EQC report but was added by the Board because of uncertainties in the water quality model predictions. Current monitoring data indicate that uranium concentrations are at least an order of magnitude lower than current EQC or SSWQO.

***Recommendation:***

***GNWT has no concern with De Beers' request to remove uranium from the EQC list at this time. Concentrations should still be collected as part of the SNP.***

***2.1.14 Discharging beyond Year 4***

There was discussion during the technical sessions on whether De Beers would be discharging beyond Year 4 of operations. De Beers confirmed that they were requesting to discharge beyond Year 4 provided that EQCs would still be met. The Board initiated a line of questioning in this regard that lead to the following Information Request (#3):

*De Beers will endeavor to confirm that:*

- 1. the Effluent Quality Criteria proposed for discharge to Lake N11 will be achievable in Year 5, and*
- 2. that under the Year 5 discharge conditions, the modeled predictions in Lake N11 will be within the Site-Specific Water Quality Objectives.*

In their response, De Beers noted that water management pond concentrations are projected to exceed the maximum average concentration for chloride, nitrate, total phosphorus and total chromium. In addition, whole-lake average total phosphorus, aluminum, chromium, copper, and iron concentrations are projected to slightly exceed SSWQO for short periods during under-ice conditions.

Given the abundance of parameters that will be exceeded, albeit marginally and temporarily, GNWT is concerned given the uncertainty in long-term predictions that there may be additional exceedances in future.

**Recommendation:**

***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.***

## **2.2 Area 8**

### **2.2.1 Water Management Discharge into Area 8**

Currently, the Water Licence outlines various EQC for discharge from the WMP into Area 8. In the application letter, it is indicated that De Beers no longer proposes to discharge from the WMP into Area 8 but instead proposes to use site run-off from Area 7 for flow augmentation into Area 8. As such, De Beers has proposed that current EQCs from the WMP into Area 8 be removed from the licence. However, GNWT notes the following references in the application package to water from the WMP being discharged directly to Area 8 or indirectly via Area 7:

- March 2018 Project Description: Table 1-1
  - *Diversion of clean water from Lake N11 or other sources (e.g., WMP or Area 7 if quality is adequate) to manage inflow volumes and **augment Area 8 flow** (i.e., downstream flow mitigation [De Beers 2012]).(emphasis added)*
- Environmental Screening Assessment
  - ***In addition** to water from Lake N11 and the **WMP being used for Area 8 downstream flow mitigation**, De Beers proposes that the runoff water collected in Area 7 also be used as a supplemental water source for Area 8 downstream flow mitigation (if water quality meets discharge criteria)(emphasis added)*
  - *Page 110 - De Beers also proposes in this 2018 mine plan amendment that the runoff water collected in Area 7 be pumped to Area 8 for downstream flow mitigation **in addition to** the previously identified sources of Lake N11 and the **WMP**.(emphasis added)*
- Operational Water Management Plan, v.5
  - *2.3.2 - **Pumping water from the WMP** to mined out pits (5034 or Hearne) or **other designated area (i.e. Area 7)**, if required to facilitate the water management, perform maintenance on infrastructure, and facilitate mining;(emphasis added)*

- Table 2.9 – notes that water from the WMP may be discharged into Area 7.

In the May 7<sup>th</sup> Information Requests, GNWT requested that De Beers clarify whether water from the WMP will continue to be discharged into Area 8 either directly or indirectly via Area 7.

In responses to May 7<sup>th</sup> Information Requests, De Beers noted that Area 7 may be used to create additional contingency storage for the WMP. If there is a need to discharge this water into Area 8, De Beers would apply to amend the approved EQC for the Area 7 discharge.

During the technical sessions, GNWT and ECCC questioned De Beers on the removal of EQCs from Area 8 related to WMP discharge, specifically, if they can continue to be met, keeping them in place would provide operational flexibility.

As a result of this discussion, De Beers noted that there may be some value in maintaining this flexibility and avoid the potential for another Water Licence amendment process in the future. Information Request #1 developed through this discussion was stated as follows:

*De Beers will endeavor to evaluate and propose Effluent Quality Criteria for the water licence amendment, for the discharge of Area 7 to Area 8 when a certain percentage (to be described in the evaluation) of Water Management Pond water is stored in Area 7 as a water storage contingency.*

De Beers' response to Technical Session Information Requests on June 14<sup>th</sup>, 2018 included an analysis of EQC that would be required for discharge from Area 7 into Area 8. Some additional clarification was required related to the responses and the Board submitted a supplemental Information Request to De Beers on [June 19<sup>th</sup>, 2018](#) regarding which EQC De Beers were proposing and under which circumstances they would apply.

De Beers responded on [June 20, 2018](#) providing additional clarification to reviewers.

Regarding the specific EQC to be applied at Area 7, De Beers clarified that they are proposing the same EQC that were presented in the March 2018 Water Licence amendment application in that the only parameter requiring an EQC would be copper with a maximum average concentration of 0.002 mg/L and a maximum grab concentration of 0.003 mg/L. They are also proposing that should De Beers wish to transfer water from the WMP into Area 7 and then discharge that water into Area 8 for flow mitigation, this would only be a contingency option. De Beers noted that these EQC were outlined in Table 1-9 from the June 14<sup>th</sup> response and again included as Table 2 in the June 20<sup>th</sup> response.

While ENR understands the alternate water management options being proposed by De Beers, it would be prudent to apply one set of EQC to Area 7 that would encompass run-off water but also water from the WMP. ENR notes that water would already be sampled prior to discharge so this should not place any additional financial or monitoring burden on the proponent. Additionally, as noted by De Beers in their response, water quality in Area 7 will meet these EQC throughout the life of mine.

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.

Note, dilution factors may vary in Area 8 depending on the composition (e.g. salinity/density) of the water discharge (runoff vs WMP water). While it isn't clear that this has been accounted for in the updated EQCs, ENR notes that proposed EQC are at, or below, SSWQOs, and as such this should be not be a factor in achieving SSWQOs in Area 8.

**Recommendation:**

**ENR recommends that a single set of EQC be included in the Water Licence that is applicable to all discharges from Area 7 into Area 8. These are noted in Table 2 of De Beers June 20<sup>th</sup> response, as follows:**

Parameters of Potential Concern	Effluent Quality Criteria	
	Maximum Average Concentration	Maximum Grab Concentration
Chloride, mg/L	100	200
Fluoride, mg/L	1	2
Nitrate, mg N/L	4	8
Total phosphorus, mg P/L	0.009	0.018
Total aluminum, mg/L	0.083	0.17
Total cadmium, mg/L	0.00004	0.00008
Total chromium, mg/L	0.001	0.002
Total copper, mg/L	0.002	0.003

mg/L = milligrams per litre; N = nitrogen; P = phosphorus.

**2.2.2 Copper**

As noted in the Effluent Quality Criteria Report, De Beers is anticipating that the SSWQO for copper in Area 8 (0.002 mg/L) will be slightly exceeded at the edge of the mixing zone (0.0021 mg/L).

Page 114 of the Environmental Screening Assessment notes:

*“Despite the projected exceedance of the site-specific water quality objective, the potential for copper to cause adverse effects to aquatic life in Area 8 is considered low. The site-specific water quality objective for copper is based on the CCME guideline, which is intended to be conservative and protective of the most sensitive species. The CCME guideline is based on toxicity tests with naive organisms, whereas organisms inhabiting Area 8 are expected to potentially have some degree of acclimation or adaptation to copper, given that baseline sediment copper concentrations in Kennady Lake exceed the CCME ISQG (Section 2.4.3.1). Given the small magnitude by which*

*projected maximum concentrations exceed the site-specific water quality objectives, and the potential for ameliorating factors, such as other water quality characteristics (e.g., dissolved organic carbon) to reduce bioavailability and ameliorate copper toxicity, the potential for adverse effects from copper is considered to be low.”*

In the Information Requests, GNWT requested that De Beers clarify if they have undertaken any studies to confirm that copper levels in water may not adversely affect organisms inhabiting Area 8 as they are “expected to potentially have some degree of acclimation or adaptation to copper, given that baseline sediment concentrations in Kennady Lake” as noted by De Beers in their application.

In their response, De Beers noted that copper toxicity was assessed during the Environmental Impact Review (EIR) process at the request of Aboriginal Affairs and Northern Development Canada (AANDC) using the biological ligand model. As well, De Beers noted aquatic species will be monitored as part of the AEMP and adaptive management will be implemented if necessary.

During the technical session, there was additional discussion on potential effects to the organisms in Area 8 should the SSWQO for copper be exceeded. In response to concerns raised from GNWT, De Beers’ consultants referenced discussions during the EIR rationalizing the low risk to the receiving environment on the basis of exceeding copper. Specifically, the references noted were related to De Beers’ response to Aboriginal Affairs and Northern Development’s (AANDC) Information Request #9 dated April 2012 and Section 8.9 of the Conformity Response dated July 2011 during the EIR.

GNWT is not certain that these references provide additional confidence that a higher level of copper can be tolerated by the receiving environment in Area 8. The conclusions within the response to AANDC IR #9 noted that “the dissolved and total copper BLM-derived CEBs ranged from 1.63 to 2.30 µg/L. These BLM-derived CEBs are similar to the CCME water quality guideline for copper (2 µg/L).” In addition, [Section 8.9 of the 2011 Conformity 11 Response Environmental Impact Statement](#) referenced by De Beers makes the conclusion that:

*Predicted copper concentrations in Kennady Lake and Area 8 marginally exceed the CEB (Table 8.9-9). Despite the predicted exceedances of the CEB, the potential for copper to cause adverse effects to aquatic life in Kennady Lake and Area 8 is considered to be low. The CEB for copper is based on the CCME guideline, which is intended to be conservative and protective of the most sensitive species. The predicted concentrations summarized in Table 8.9-9 are only slightly greater than the CEB, indicating the possibility (but not necessarily the likelihood) of effects to the most sensitive species. However, the CCME guideline does not consider the potential for other water quality characteristics (e.g., dissolved organic carbon) to reduce bioavailability and ameliorate copper toxicity. Furthermore, the CCME guideline is based on toxicity tests with naive organisms, whereas organisms inhabiting Kennady Lake potentially have some degree of acclimation or adaptation to copper, given that baseline sediment copper concentrations exceed the CCME interim sediment quality guideline (Section 8.3.6.2.1). Given the small magnitude by which predicted maximum concentrations exceed the CEB, and given the potential for ameliorating factors*

*discussed above, the potential for adverse effects from copper is considered to be low. Follow-up monitoring will be undertaken to confirm this evaluation. (p.8-364-365).*

GNWT notes that references provided by De Beers have not provided any additional rationale; however, GNWT notes that the EIR accounted for slight exceedances of the copper benchmark and did not identify significance associated with in.

GNWT has considered the information provided by De Beers that copper exceedances will be small and occur for a relatively short period during winter. GNWT also highlights that this prediction is believed to be conservative and may not be realized during operations. Ultimately, conditions will be monitored in the receiving environment through the AEMP. Should AEMP results or monitoring data indicate higher concentrations and/or a longer period of exceedance, this will require additional consideration and response through the management response framework.

***Recommendation:***

***GNWT is concerned that copper may exceed the SSWQO in Area 8. The GNWT could support the EQC for copper provided De Beers continue to review copper concentrations and evaluate effects via the AEMP.***

***GNWT will continue to provide review feedback through the AEMP regarding copper and appropriate action levels and management response actions.***

### **2.2.3 Phosphorus**

Table 2-8 of the EQC Report notes that although projected maximum concentrations from Area 7 are 0.0075 mg P/L, predicted phosphorus concentrations in Area 8 are 0.012 mg P/L. Table 2-12 notes that the SSWQO for phosphorus in Area 8 is 0.011 mg P/L. Phosphorus was screened out as a parameter of interest as the discharge concentrations were lower than baseline, however concentrations are predicted to exceed the SSWQO in Area 8. GNWT notes in Table A1 of the EQC Report that the mean phosphorus concentration in Area 8 during baseline was 0.004 mg/L and the maximum phosphorus concentration was 0.009 mg/L.

In the Information Requests, GNWT requested that De Beers discuss phosphorus behavior in Area 8 that may be resulting in the increase. As well, GNWT requested that De Beers discuss the potential for phosphorus loading to Area 8 and whether the screening for phosphorus (i.e. discharge limit lower than SSWQO) is appropriate given phosphorous behaviour (i.e. concentrations could cycle and accumulate in the receiving environment beyond discharge limits and potentially create SSWQO exceedances).

As noted in Section 2.1.6 (Phosphorus in Lake N11), there was a discussion during Day 1 of the technical session regarding phosphorus concentrations in Lake N11 and Area 8 which included references to the seasonal timing of increased phosphorus as it relates to biological activity in the aquatic environment. GNWT refers to concerns and conclusions in Section 2.1.6 regarding phosphorus exceedances during the under-ice period.

**Recommendation:**

***GNWT will continue to provide feedback through the AEMP to ensure phosphorus and nutrient enrichment action levels and responses are appropriate for Area 8.***

## **2.3 Surveillance Network Program**

### ***2.3.1 Amendments to SNP-02 and SNP-04***

De Beers has requested that Part G, Item 29 of the current Water Licence be changed 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:

*“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.”*

De Beers notes that the referenced SNP Stations (SNP-02 and SNP-04) are related to in-line monitoring of active discharge and it is not possible to obtain samples from these locations to support pre-discharge confirmation sampling. As such, sample location must be located within the WMP or Area 7 prior to discharge. Within the WMP, De Beers currently samples SNP-20 to provide this information, however it has been communicated that this area may not be reflective of conditions within the entire WMP as it is fairly isolated in a shallow area.

GNWT notes that the intent of this SNP location is to ensure that the water from the intake location meets discharge limits prior to discharge into the environment. As such, GNWT concurs that additional clarity is required within Part G, Item 29 of the Water Licence to correctly outline which sampling data is required prior to Inspector approval that discharge should occur into Lake N11. GNWT notes that to ensure non-compliant water is not discharged into 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 WMP, the intake location may require relocation. In addition, GNWT notes that the SNP requirements at SNP-20 are limited to toxicity testing. To ensure compliant water will be discharged into Lake N11, all approved EQCs for discharge into Lake N11 should be added to SNP-20, in addition to currently required toxicity testing. This would also apply to pre-discharge sampling for Area 7.

Finally, the intent of this clause is to ensure sampling results are provided to the Inspector prior to discharge. On that note, the existing clause specifies that the results are provided to

the Inspector, while the proposed condition does not specify the Inspector. In their responses dated May 21, De Beers did note at the technical session that there was no intent to remove the Inspector from the clause and that that was merely a typo.

#### **Recommendation:**

***GNWT recommends the following re-wording of condition Part G, Item 29 of the Water Licence proposed by De Beers:***

***“The Licensee shall provide water sampling results **to an Inspector** from the SNP stations ~~currently active within the~~ **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.”***

***GNWT recommends that the monitoring results provided to the Inspector prior to discharge should include all parameters for which applicable EQC exist, as well as any required toxicity testing outlined in the Water Licence.***

#### **2.3.2 Amendments to SNP-04**

Section 4.5.7 of the Environmental Screening Assessment provided with the Water Licence amendment application notes that “SNP-04 will need to be relocated from its current location to the area where the flow mitigation diffuser will be located, or a new SNP station for this diffuser established.” The description for SNP-04 notes that it is used for in-line monitoring for end-of-pipe Discharge from Kennady Lake to Area 8.

GNWT notes that the WMP and Area 7 are both parts of “Kennady Lake” so the SNP-04 description is still valid however it is unclear whether it requires relocation within Area 8.

During the May 7, 2018 Information Request, GNWT requested clarification on whether the discharge location into Area 8 will remain the same if the water source changes from the Water Management Pond to Area 7. In their response, De Beers noted that the discharge location is anticipated to remain the same.

Therefore, it is GNWT’s understanding that relocation of SNP-04 is no longer required.

#### **2.3.3 Amendments to SNP-07**

Currently, Condition G, Item 27 of the Water Licence has an EQC for faecal coliforms of 20 CFU/100mL for the Sewage Treatment Plant at SNP-07. In the amendment application, De Beers has proposed that an EQC for faecal coliforms be added to EQCs for N11 and Area 7, however the rationale is unclear.

In the May 7th Information Requests, GNWT recommended that De Beers outline the rationale behind the inclusion of an EQC for faecal coliforms for discharges from the WMP and Area 7.

De Beers responded to reviewers noting that this was a typographical error and that they do not want to propose EQC for fecal coliforms in the discharge from the WMP to Lake N11 or the discharge from Area 7 to Area 8 but maintain the current EQC for faecal coliforms from the sewage treatment plant.

### **3.0 EXPANSION OF THE WEST MINE ROCK PILE (WMRP)**

#### **3.1 Storage of Potentially Acid Generating (PAG) material**

Table 7 of the Environmental Screening Assessment provided with the Water Licence amendment application refers to “in-lake storage” for a portion of the potentially acid generating (PAG) material in the WMRP. Section 3.2 and 5.3.2 of the West Mine Rock Pile Final Detailed Construction Plan specifies that approximately 4.0 MT of PAG material will be in a “long-term submerged zone” which will include PAG from 5034 during Years 4&5 (2.0 MT), Hearne Pit Year 5 (0.5 MT) and Tuzo Year 4 (1.5 MT) while the remaining PAG material will be placed within the centre of the pile. Additionally, Page 21 of the Geochemical Plan, v.4 notes that “In the first two years of operation, PAG rock will be placed within the mine rock piles; the basal layer of the mine rock piles is below the final closure water level of Kennady Lake. Between Year 2 and Year 8, PAG rock will be segregated within the core of the mine rock piles. After Year 8, the PAG rock will be placed in the mined-out 5034 Pit, which will ultimately be below the final closure water level of Kennady Lake. Submersion of rock below the final water level of Kennady Lake will mitigate the acid generation potential of PAG rock.”

GNWT requested that De Beers clarify if PAG material below the high water mark will be submerged during operations or only during closure. If the latter, GNWT requested clarification on how long PAG material will be exposed prior to being submerged and whether the amount of time the PAG material is exposed to air is increased as result of the WMRP expansion. If PAG material was exposed for a longer time period, GNWT recommended that De Beers comment on whether this will affect the quality of seepage from the Rock Pile, both in the near term and during closure.

In their response, De Beers noted that:

*“The PAG rock below the West Mine Rock Pile will be partially submerged for a few years during operation until the water level rises to about elevation 420 masl in 2021, and be then be submerged to until 2026. The water level will drop to about 417.0 masl while the pits are being filled. It will be partially submerged during the refilling phase. During the operations and closure period, site monitoring (e.g., SNP, geochemical characterization plan) will be undertaken, which will identify any seepage/water quality concerns around the rock piles during periods when the PAG rock is partially submerged.”*

GNWT notes that management of PAG material will continue in a manner similar to that

previously approved through the Water Licence. De Beers will continue to monitor waste rock produced and manage it in accordance with Board approved management plans. The GNWT has no further concerns on the waste rock expansion or PAG material. The GNWT will continue to review waste rock and geochemical characterization plans as part of licence review processes with a goal of ensuring that the environment is protected and closure is successful for the mine.

### 3.2 Water Management

Section 4 of the West Mine Rock Final Detailed Construction Plan, Version 2 references that runoff from the pile will flow directly into Area 5 and that diversion ditches might be required along the western perimeter. The need for the diversion ditches is to be further evaluated during construction. GNWT understands that Area 5 is a component of the WMP during operations; however, uncontrolled runoff and seepage water from the pile will report directly to Kennady Lake during closure.

Table 1 of the Geochemical Characterization Plan V.4 provided with the Water Licence amendment application references a “Summary of Commitments of Geochemical Characterization Plan” which includes a condition from the Water Licence, Part G, Item 19:

*The Licensee shall construct, operate, and maintain the South Mine Rock Pile, West Mine Rock Pile, the Fine Kimberlite Containment Facility, and the Coarse Kimberlite Containment Facility, and all other Waste storage facilities, to design specifications/engineering standards such that:*

*b) Any Seepage from the Waste storage facilities that occurs and does not meet effluent quality requirements, as specified in Part G, shall be prevented from entering the Receiving Environment;*

GNWT requested clarification from De Beers regarding how it will determine that seepage from Waste storage facilities is suitable for entry into the environment as well as clarification from De Beers regarding proposed water management for seepage and runoff water from the rock piles, during closure.

In their response, De Beers outlined several options that would be available at closure to temporarily manage water quality issues that may be associated with waste rock piles such as:

- Delayed breaching of dykes;
- Refilling of Kennady Lake can be ceased or reduced;
- Basins of Kennady Lake could be segregated to keep poor quality isolated from the other areas of the lake;
- Containment dykes could be raised to store poor quality water;
- Poor quality water could be treated; and/or
- Additional options may be developed and evaluated once the sources of poor water have been identified.

Given the size of the water management pond will be reduced as the size of the waste rock piles and the processed kimberlite facilities expand, the potential for poorer water quality

during operations and increased contaminants in lake sediments is increased. Therefore, adding poorer quality seepage from the waste rock piles could have implications for closure and ultimately reopening of Kennady Lake.

GNWT appreciates the information provided by De Beers as well as information provided during the technical sessions on waste rock seepage. The GNWT will continue to participate through closure planning process and provide recommendations and mechanisms to ensure successful closure of the mine.

## **4.0 CLOSURE AND SECURITIES**

### **4.1 Security**

If approved, the expansion to the waste rock pile will have implications on the amount of reclamation security that will be required for the site. The Board has required De Beers to submit an updated security estimate on June 30, 2018. This estimate is to undergo a separate review and approval process. GNWT will participate in this security review process, and will work with the Board and De Beers to establish a revised security amount that reflects the liabilities at the site.

### **4.2 Closure Implications**

#### **4.2.1 Area 7**

The Project Description notes that progressive closure options exist regarding restoring Area 7 earlier in the mine life.

During the Information Requests, GNWT requested clarification if the use of Area 7 for flow augmentation to Area 8 inhibits the potential to restore Area 7 earlier in the mine life. In their response, De Beers noted that it is not anticipated that the use of Area 7 for flow augmentation will inhibit the potential to restore Area 7 earlier in mine life as Lake N11 remain the primary source for flow augmentation to Area 8.

GNWT has no further comment regarding progressive reclamation of Area 7.

#### **4.2.2 Kennady Lake**

The expansion of the WMRP results in an additional permanent footprint within Kennady Lake. Specifically, as noted on p.93 of the Environmental Screening Assessment, provided with the Water Licence amendment application, the loss of surface area of Kennady Lake will increase from 12.4% to 20.1%. The original anticipated loss was 11.8%. While the covering letter from De Beers does note that this area was already designated for disturbance, the expansion of the WMRP will now be a permanent disturbance.

While De Beers references offsetting through DFO mechanisms as a tool to mitigate loss of aquatic habitat at Kennady Lake, GNWT notes that the re-establishment of aquatic species *within* Kennady Lake post-closure was an important component of project approval (see the Environmental Impact Statement). As part of the amendment application, De Beers provided a Mine Rock Management Alternatives Analysis. Table 4 states that the selected option meets closure objectives, which include returning Kennady Lake to a state that will support a functioning aquatic ecosystem and traditional uses. As the available surface area of Kennady Lake has now been reduced, GNWT submitted an information request to De Beers.

De Beers responded that approximately 649.7 ha of Kennady Lake will remain post-closure, thus it will continue to be a medium-sized lake that can support a fish assemblage. Also, De Beers notes in Table 7 of the Environmental Screening Assessment, provided with the Water Licence amendment application, that the extension of mine life will have no linkage to water and sediment quality or fish. De Beers does not expect that this delay will alter the overall ability of the lake to be recolonized. De Beers also assessed impacts to N11 from additional pumping during operations (Environmental Screening Assessment, Page 90) but it is not clear if impacts to Lake N11 were also assessed during the refilling of Kennady Lake.

GNWT would like to note that it is still a requirement for De Beers to meet closure objectives and commitments related to the re-establishment of Kennady Lake.

## **5.0 WATER USE**

De Beers has proposed two amendments related to water use; the first related to an increase in camp water use of 45,000 m<sup>3</sup> and the second related to a change in reporting of discharge water from the WMP from the anniversary year of the water licence to a calendar year.

### **5.1 Water Use – 45,000 m<sup>3</sup>**

De Beers has requested that annual water use from Area 8 be increased from 27,000 m<sup>3</sup> to 45,000 m<sup>3</sup>, an annual increase of 18,000 m<sup>3</sup>. Based on discussions with De Beers, GNWT understands that additional camp capacity and other developments at site have created a previously unanticipated shortage of water for full camp operations.

As noted in Section 2.4.1 of the Operational Water Management Plan v.5, the amount of water available under ice in Area 8 is 1,300,000 m<sup>3</sup>. De Beers notes that if 10% were withdrawn as per Fisheries and Oceans Canada protocol, a total of 130,000 m<sup>3</sup> would be available for use.

GNWT noted that since the initial assessment of available water within Area 8 was completed Kennady Lake was dewatered. As a result, it was unclear if the previously referenced available water volumes are current. GNWT notes that water withdrawal has the potential to impact water quality and the aquatic environment through the reduction of dissolved oxygen under ice.

In an Information Request, GNWT requested that De Beers outline the date when the initial assessment of available water within Area 8 was completed. As well, GNWT requested that De Beers provide an update on the volume of water available 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.

On May 21, 2018, De Beers provided a response noting that the initial assessment of available water within Area 8 considered the construction of Dyke A and dewatering of Kennady Lake, as well as the reduced drainage area reporting to Area 8. De Beers also noted that operational data collected and reported annually, including surface elevations in Area 8, were also taken into consideration during the environmental screening assessment provided with the current amendment.

***Recommendation:***

***GNWT has no concern with De Beers request to increase annual water use to 45,000 m<sup>3</sup>/year from Area 8.***

## **5.2 Discharge Limits into N11**

Schedule 3, Part D, Item 2(b) of the Water Licence contains an annual discharge limit from the WMP into N11 of 3,450,000 m<sup>3</sup>/year. De Beers has requested an addition to this condition whereby if the discharge is not completed within the anniversary year of the licence, it may be completed within the subsequent anniversary year. De Beers' rationale outlines that the discharge pipe is only available outside of the downstream flow mitigation period. Additionally, De Beers has noted that as a result of the Water Licence anniversary date occurring on September 24<sup>th</sup>, discharge may be limited to the period between September 1<sup>st</sup> and September 24<sup>th</sup>.

There was a great deal of discussion during the technical sessions related to operational constraints that exist by using the anniversary date of the Water Licence as opposed to the calendar year. As a result, an Information Request was formulated at the technical session through which De Beers would provide analysis over a multi-year scenario to compare operational discharge of the WMP to Lake N11 under a calendar year vs an anniversary year.

Upon completion of the evaluation, De Beers has indicated that they no longer wish to pursue this change however it was indicated that they would like to retain more operational flexibility by discharging between September 2020 and September 2021 (Year 5 scenario) and proposing that discharge over the anniversary date not require additional sampling on the anniversary date.

Regarding the sampling requirements, GNWT does not see any additional benefit of conducting sampling on the anniversary date. Discharge water should be sampled prior to initiating discharge to ensure the water meets EQC and toxicity testing requirements and again on the final day of the Discharge period (i.e. at the current sampling frequency). Additionally, ENR notes that the SNP also includes a requirement for weekly sampling during discharge at SNP-02 and SNP-04 which should continue. ENR considers that a discharge period would begin when DeBeers initiated pumping from the WMP (i.e. late summer), and would end when pumping finished for the season (i.e. late fall).

Regarding discharge into Year 5, GNWT references recommendations made previously in Section 2.14.

**Recommendation:**

**GNWT supports De Beers request that additional sampling not be required on the anniversary date of the Water Licence. Regular monitoring should occur during discharge periods.**

## 6.0 OTHER AMENDMENTS

### 6.1 Definition of Modification

De Beers has request an amendment to the definition “*modification*” under Part A of the Water Licence so that it includes expansion. De Beers notes specifically:

*“The recent Board decision on Land Use Amendment #2 (MVLWB June 7, 2017 – MV2005C0032 Reasons for Decision) confirmed that an increase in the size of several dykes (D, A1, and L) can be considered a Modification under the licence). To ensure consistency in interpretation and understanding of modifications, De Beers requests that the definition of modification omit the exclusion of expansions.”*

In those Reasons for Decision, the MVWLB did note that “*the increase in size of dykes D, A1 and L, can be considered a Modification under Licence MV2005L2-0015*” for the following reason:

*“As the sequencing adjustments described in the Permit Amendment Application were part of the 2013 Updated Project Description outlined in the scope of the Licence, the Board has decided that changing the size of engineered Dykes D, L and A1 is not considered an expansion. Additionally, these dykes do not alter the purpose or function of the structure; therefore, these activities are a modification under Licence MV2005L2-0015.”*

As such, the Board did not determine that expansions should be included as a modification, but rather that the changing of the sizes of Dykes D, L and A1 were not considered an expansion.

GNWT also notes that De Beers made a similar request regarding an amendment to the definition of “*modification*” in a December 2013 amendment application for the Snap Lake Mine. In the Board’s Reasons for Decision dated June 8, 2015, the Board decided the following:

*“The definition of Modification used in the approved Licence is consistent with recently issued licences. In its Intervention, GNWT-ENR identified that including “expansion” could lead to future confusion regarding the scope of activities licence. The Board*

*agreed with the GNWT-ENR and did not amend the definition of modification as proposed.”*

Expansions were specifically excluded from the definition of a modification for regulatory clarity purposes. 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.

***Recommendation:***

***GNWT recommends that the definition not be changed.***

## **7.0 REFERENCES**

CCME (Canadian Council of Ministers of the Environment). 1999. A Protocol for the Derivation of Water Quality Guidelines for the Protection of Aquatic Life. Canadian Council of Ministers of the Environment. Winnipeg, MB, Canada.

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In: Canadian environmental quality guidelines, 1999. CCME, Winnipeg.