De Beers

Group of Companies

Gahcho Kué Mine

March 2018 Water Licence Amendment Applications (MV20015L2-0015 and MV2005C0032) Closing Arguments

October 2018

TABLE OF CONTENTS

1 INTRODUCTION

De Beers Canada Inc. (De Beers) submitted a Water Licence and Land Use Permit Amendment Application Package to the Mackenzie Valley Land and Water Board (MVLWB) for the Gahcho Kué Mine on March 15, 2018, to amend the existing Water Licence (MV2005L2-0015) and Land Use Permit (MV2005C0032) (De Beers 2018).

The Water Licence and Land Use Permit amendments are required to accommodate necessary changes to the mine plan resulting from a geotechnical issue within the pits (i.e., joint sets) that will result in additional mine rock being extracted from each of the three pits. It is not possible to mine the ore bodies safely without making these adjustments. The additional mine rock must be extracted in order to ensure the pits remain safe for workers and equipment throughout the life of mine. It is expected that approximately 100 Mt of additional mine rock will be removed. This mine rock will be stored on the West Mine Rock Pile resulting in a small increase in the footprint of the project. Most of the increase in the size of the West Mine Rock Pile will be within the water management pond (WMP), an area already designated for disturbance. Adjustments to the mine schedule and water management will also be required.

Review comments on the Amendment Application and the associated documents were received on May 8, 2018, and De Beers provided responses to these review comments on May 21, 2018. Following this, as part of the MVLWB permitting and licencing process, De Beers participated in a Technical Session held in Yellowknife on May 30 and 31, 2018. De Beers responded to Information Requests (IRs) on June 14, 2018 and June 20, 2018. Interventions were submitted by Parties on June 27, 2018 and De Beers responded to the Interventions on July 5, 2018. The Public Hearing was held July 25, 2018, with De Beers responding to Undertakings on August 3, 2018. The draft Water Licence was distributed for review on August 29, 2018 with review comments due September 12, 2018. De Beers provided its comments on the draft Water Licence and related reviewer comments on September 19, 2018. Interveners provided written Closing Arguments September 26, 2018 and this submission provides De Beers' written Closing Argument.

The following key issues are addressed directly in this submission:

- Definition of Modification
- Effluent quality criteria (EQC)
  - WMP discharge to Lake N11: Discharging beyond Year 4
  - Area 7 discharge to Area 8: primary and contingency EQC
- Surveillance Network Program Changes (SNP)
- *Fisheries Act* and offsetting requirements

De Beers would like to thank the MVLWB, its staff, and all of the Interveners on the Water Licence and Land Use Permit amendment process for their efforts to review and provide recommendations to improve the Gahcho Kué Mine. De Beers looks forward to continuing

engagement with communities, regulatory agencies, and MVLWB staff, as De Beers implements the amended Water Licence and Land Use Permit.

2 DEFINITION OF MODIFICATION

De Beers stands by its request for an amendment to the term ‘modification’ under Part A of the Water Licence, such that the definition of modification omits the exclusion of expansion. Therefore, De Beers recommends that the definition be altered to "Modification - a change that does not alter the purpose or function of a structure."

As per the submission to the MVLWB (De Beers 2018), the rationale for the request is based on recent Board decisions (i.e., Land Use Amendment #2; MVLWB June 7, 2017 – MV2005C0032 Reasons for Decision) where an increase in size (or expansion) of several internal dykes at the Mine (i.e., Dykes D, A1, and L) were considered modifications. De Beers is in agreement with this decision, which is consistent with De Beers’ opinion that in order to maintain consistency in the interpretation and understanding of modifications, expansion of approved site infrastructure, including dykes, where the change does not alter the intent, purpose, or function of the structure, should be classified as a modification.

Expansion to existing structures are often required to address site-specific requirements, which generally results in an increase in the size of a structure. Under the current definition, any plan to increase the size of a structure appears to be the trigger of a modification that would require advance approval from the Board to undertake the work. Under the current definition, therefore, it would appear that there would be very few, if any, adjustments to approved structures that could be addressed as modifications under the current licence without the amendment to the definition of the term, ‘modification’. Currently, conditions associated with Modifications (Part F, Item 1) provide the appropriate level of responsibility by De Beers and Board oversight for expansions to approved site infrastructure.

De Beers, therefore, recommends that the definition of modification under Part A of the Water Licence omits the exclusion of expansion.

3 EFFLUENT QUALITY CRITERIA

De Beers has recommended EQC for operational discharges from the Mine in the EQC Report, included as Attachment 3 of the 2018 Water Licence amendment application package (De Beers 2018) and as revised through the Water Licence process. The EQC were developed using a comprehensive screening process, similar to those EQC included in the existing Water Licence. EQC are proposed for the following:

- Continued discharge from the WMP to Lake N11 (Table 1)
- Discharge from Area 7 to Area 8 as an additional water source of water for downstream flow mitigation where the water in Area 7 is sourced solely from the Area 7 sub-watershed (Table 2)
- Discharge from Area 7 to Area 8 as an additional source of water for downstream flow mitigation where the water in Area 7 is sourced from the Area 7 sub-watershed as well as the WMP (Table 3).

Table 1: Proposed EQC for Discharge from the Water Management Pond to Lake N11

Parameter	Maximum Average Concentration	Maximum Grab Concentration
Chloride	300 mg/L	515 mg/L
Fluoride	1.5 mg/L	3 mg/L
Sulphate	100 mg/L	155 mg/L
Nitrate	20 mg N/L	30 mg N/L
Total Ammonia	6 mg N/L	10 mg N/L
Total Phosphorus	0.022 mg/L	0.03 mg/L
Aluminum	0.23 mg/L	0.35 mg/L
Cadmium	0.00008 mg/L	0.00016 mg/L
Chromium	0.002 mg/L	0.005 mg/L
Copper	0.004 mg/L	0.007 mg/L
Iron	0.6 mg/L	1 mg/L
Total Suspended Solids	15 mg/L	25 mg/L
Total Petroleum Hydrocarbons	-	5 mg/L

Table 2: Proposed Primary EQC for Discharge from Area 7 to Area 8, under General Operating Conditions (Area 7 Sub-Watershed Runoff)

Parameter	Maximum Average Concentration	Maximum Grab Concentration
Cadmium	0.00004 mg/L	0.00008 mg/L
Copper	0.002 mg/L	0.003 mg/L

Total Suspended Solids	15 mg/L	25 mg/L
Total Petroleum Hydrocarbons	-	5 mg/L

Table 3: Proposed Contingency EQC for Discharge from Area 7 to Area 8, under Contingency Conditions (Water Transferred from WMP to Area 7)

Parameter	Maximum Average Concentration	Maximum Grab Concentration
Chloride	100 mg/L	200 mg/L
Fluoride	1 mg/L	2 mg/L
Nitrate	4 mg N/L	8 mg N/L
Total Phosphorus	0.009 mg/L	0.018 mg/L
Aluminum	0.083 mg/L	0.17 mg/L
Cadmium	0.00004 mg/L	0.00008 mg/L
Chromium	0.001 mg/L	0.002 mg/L
Copper	0.002 mg/L	0.003 mg/L
Total Suspended Solids	15 mg/L	25 mg/L
Total Petroleum Hydrocarbons	-	5 mg/L

It is De Beers' understanding that there is alignment between De Beers and Interveners on the proposed EQC to be included in the Water Licence for discharge from the WMP to Lake N11. It is De Beer's understanding that there is also alignment with Environment and Climate Change Canada (ECCC) regarding the acceptability of applying these EQC in the Water Licence for the period of Mine operations (i.e., continued discharge to Lake N11), as long as: EQC are met, and Site Specific Water Quality Objectives (SSWQO) continue to be met in Lake N11. ECCC has indicated in their Closing Argument that they are satisfied that operational discharge from the WMP can continue to Lake N11 following submission of an EQC confirmation report to the MVLWB in January 2021, which confirms that SSWQO will continue to be met with the current EQC following completion of discharge in 2020. De Beers is in agreement with ECCC's recommendation; an EQC evaluation completed in advance of the operational discharge in 2021 that confirms that EQC and SSWQO will be met will provide the MVLWB with the necessary assurance that the aquatic environment will continue to be protected during operational discharge after 2020. The recommendation of the Government of the Northwest Territories, Environment and Natural Resources (GNWT-ENR) to limit the applicability of EQC in the Water Licence to 2020 limits operational flexibility; simply put, if EQC can be met in the WMP, and SSWQO can be met in Lake N11, which will be presented in an EQC confirmation report, De Beers should be permitted to discharge without having to apply for another Water Licence amendment for discharge to Lake N11 beyond Year 4. Further discussion on this topic is provided in Section 3.1.

There is also some divergence regarding EQC that would be applied to discharge from Area 7 to Area 8. It is the recommendation of ECCC and GNWT-ENR that the EQC

developed for the contingency scenario be applied for any discharge from Area 7 to Area 8. In contrast, De Beers' recommendation is that two sets of EQC apply to the Area 7 discharge: Primary EQC which apply when water in Area 7 is sourced solely from the Area 7 watershed (expected to be the standard operating condition), and Contingency EQC should Area 7 be required as a contingency to manage water from the WMP (a contingency condition in the water management plan). De Beers does not agree with the application of additional EQC for discharge from Area 7 to Area 8 unless water from the WMP actually is transferred to Area 7, and has provided EQC in the event a contingency condition is required. Further information and justification related to this topic is provided in Section 3.2.

3.1 WMP Discharge to Lake N11: Discharging Beyond Year 4

De Beers is requesting that the EQC proposed for the discharge from the WMP to Lake N11 remain applicable for the period of Mine operations and not be limited to specific years of discharge in the Water Licence. As described in De Beers' response to IR#3 from the Technical Sessions, the EQC were developed based on multiple years of discharge and the protection of the receiving environment. Therefore, De Beers does not agree to any hard limit on the number of years of discharge. Allowing the discharge to extend beyond Year 4 in the Water Licence reduces the likelihood that De Beers will have to apply for another Water Licence amendment within the next few years.

De Beers will not discharge if EQC are not met. However, should EQC be met in the WMP beyond Year 4 (2020 Calendar Year), De Beers should be permitted to discharge. De Beers requires more operational flexibility to discharge to Lake N11, with the security that in doing so the receiving environment will remain protected. Should there be constraints in water management at some point in the Mine life (e.g., water storage capacity is less than projected due to several years of well above average wet conditions, an extension of the life of Mine, or delays in mining or the schedule of mine development), De Beers may need to discharge water from the WMP. If the water quality meets EQC for discharge, discharge should be permissible.

As per De Beers' response to IR #3 from the Technical Sessions, the updated water quality modelling for the WMP indicates that EQC proposed for discharge to Lake N11 are projected to be achievable for all EQC parameters in Year 5 (which represents the timeframe between September 25, 2020 to September 24, 2021), with the exception of chloride, nitrate, total phosphorus, and total chromium. These predictions are based on several conservative assumptions, including continued discharge at the maximum average concentration (MAC) and 100% exclusion of salts due to ice formation. Furthermore, the exceptions are predicted for only a very short period of time under ice. The response also showed that if EQC are met in Year 6 (after September 24, 2021), and in each subsequent year of Mine operations, and discharges to Lake N11 continuously occur at the MAC EQC, SSWQO will be met in Lake N11 for all EQC parameters, with a few exceptions; these exceptions are total phosphorus, total aluminum, total chromium, total copper, and total iron, which as stated in the response to IR#3 and discussed at the technical sessions, are briefly predicted to occur at concentrations slightly higher than their respective SSWQO during under ice conditions. These short duration under-ice peak concentrations are attributed to the conservative assumption that ice formation results in complete (i.e., 100%)

salt rejection (including nutrients and metals) from the volume of water that freezes into the underlying volume of water below the ice. As under-ice peak concentrations are only slightly higher than their respective SSWQO for a short duration, De Beers considers the risk of any potential adverse effects to be low. Note that the use of the MAC EQC for the discharge quality for the duration of mine operations provides additional conservatism to the evaluation.

The GNWT indicated in their Closing Argument that their position is that discharge for Year 4 can be extended until the end of the open-water season (i.e., past the Water Licence renewal date of September 24, 2020), but that future years of discharge should not be permitted at this point in time. As indicated in the response to the Draft Water Licence comments, De Beers is 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. This 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. If water in the WMP meets EQC, discharge to Lake N11 should be permitted to continue. Provision of an EQC confirmation report prior to planned discharge will assure the MVLWB that water quality in the WMP will continue to meet discharge criteria and also limit the need for another Water Licence amendment process. In their Closing Argument, ECCC indicated that the EQC confirmation report would address the recommendations in their intervention.

As such, De Beers requests that the EQC for the discharge from the WMP to Lake N11 in the Water Licence not be tied to a specific date in the Mine operations, but be applicable for the life of the Mine. The provision of the EQC confirmation report will provide the MVLWB and other parties with additional assurance that the water quality in the WMP will meet discharge criteria and that the receiving environment will remain protected.

3.2 Area 7 Discharge to Area 8: Primary and Contingency EQC

De Beers has proposed the use of Area 7 as an alternate water source to Lake N11 for downstream flow mitigation. Area 7 is a segregated basin of the dewatered Kennady Lake within the controlled area; it is separated from Area 6 by the placement of Dyke K, and includes a large proportion of natural watershed, as well as the South Mine Rock Pile and an ore stockpile. The use of Area 7 as a supplemental source of water for downstream flow mitigation was always an original intention of the operational water management plan. As the refill period for Area 7 from its watershed runoff is relatively slow, discharge from Area 7 to Area 8 as an alternate to piped discharge from Lake N11 for downstream flow mitigation is limited to approximately once every three years.

De Beers has proposed two sets of EQC for the Area 7 discharge to Area 8:

- Primary EQC for Area 7 for water that collects in Area 7 from runoff
- Contingency EQC, which would be triggered in the event that any water from the WMP is transferred to Area 7.

The Primary EQC are based on the expected condition of Area 7 under normal operations of the Mine, where its recharge is sourced from its own sub-watershed (i.e., primarily natural catchment runoff, not water from the pits or the WMP). Primary EQC under this condition are limited to copper as presented in the EQC Report (De Beers 2018), cadmium as provided in supplemental IRs (i.e., Information Requests Responses – Outstanding Information, provided to MVLWB on June 20, 2018), TSS, and TPH. Under this standard refill condition, no additional water quality parameters would require EQC.

The contingency EQC would only be applicable to discharge from Area 7 to Area 8 if De Beers required Area 7 to accommodate a water transfer from the WMP to Area 7 as a water storage contingency (e.g., in a situation when the water storage capacity in the WMP was higher than projected due to extended periods of wet conditions, or the availability of pits for water transfer from the WMP was later than planned). These contingency EQC are listed in Table 3. As the contingency option is not proposed under normal operations of the Mine, these Contingency EQC would only be required in the event that Area 7 is used for any storage of WMP water and that discharge to Area 8 is required. Pre-discharge monitoring and confirmation by the Inspector will verify water quality meets the Contingency EQC.

De Beers stands by its position that two sets of EQC for Area 7 discharge to Area 8 should be written into the amended Water Licence. These EQC were developed using derivation methods that have been widely used and accepted in Water Licence applications and amendments in northern diamond mines over the past five years, which are focused on protection of the receiving environment. Under the Primary and Contingency conditions, the two sets of EQC under the discharge conditions make sure SSWQO would be maintained in Area 8 for the period of Mine operations. 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-watershed runoff) is the expected operations scenario; the Contingency discharge condition is derived for a water management contingency condition that is not anticipated during the Mine operations.

4 SURVEILLANCE NETWORK PROGRAM CHANGES

Part G, Item 29 currently reads:

> *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.*

De Beers recommends that the wording be adjusted. De Beers cannot sample from either SNP 02 or 04 prior to discharge because these stations are in-line stations; as there is no water in the pipes prior to discharge, samples are actually taken from a location close to the intake. The requirement in the Water Licence as it is currently written is therefore not possible to comply with.

As discussed at the Technical Sessions, De Beers' is also requesting additional flexibility for the SNP station used for pre-discharge monitoring in the WMP. As described above, the sample cannot be taken from SNP 02, but instead is taken from a location close to the intake. This monitoring location is within a small, shallow bay within the WMP, 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 water that would be drawn from the WMP once pumping begins. During discharge, once the pumps are operating, water from the WMP is drawn from a much larger area of the WMP; the proportion of water that enters the intake from this shallow embayment would therefore represent a very small proportion of the water that is ultimately discharged to Lake N11 (it would actually represent a small proportionate volume of water in the initial pumped discharge). It is noted that although the water quality between SNP 02 and the centre of the pond would not be expected to be substantially different, the possibility that a slight difference at SNP 02 (slight exceedances of an EQC for one or few parameters) could mean that discharge would be disallowed, even when water quality meets EQC in the rest of the WMP. This scenario highlights a potential risk to the water management at the site, which could result in major operational issues for De Beers; under this situation, the risk is that De Beers would not be permitted to discharge, resulting in the need to store up to 3.45 Mm^3 of water more than expected on a given year.

As discussed at the Technical Sessions, De Beers proposes to address this constraint by providing monitoring results from more than one SNP station in the WMP to the Inspector prior to discharge for determining the ability to meet EQC. However, if the MVLWB 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 WMP, 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.

5 FISHERIES ACT AUTHORIZATION AND OFFSETTING REQUIREMENTS

De Beers is continuing to work with Fisheries and Oceans Canada (DFO) related to the *Fisheries Act* Authorization and offsetting requirements related to the 2018 mine plan amendment. De Beers received a *Fisheries Act* Authorization 03-HCAA-CA6-00057.1 from DFO for the Gahcho Kué Mine in June 2014 for the serious harm to fish associated with the construction, operations, and closure of the Mine. De Beers provided an update to the Offsetting Plan based on the 2018 mine plan amendment to DFO in June 2018.

De Beers has committed to continue to consult with DFO on the quantification of habitat losses and gains from the proposed offsetting measures to demonstrate that the gains will counterbalance the losses predicted to occur as a result of the Mine's activities. The Final Offsetting Plan will include offsetting measures as required by DFO to achieve equivalency as per the Authorization. De Beers has also committed to providing additional information to DFO in a Request for Review related to the design of the proposed closure diversion channel, including information related to fish passage and use, once further design details are available.

The proposed 2018 Water Licence amendment does not affect the existing Downstream Flow Mitigation Plan (DFMP) or monitoring of the Arctic Grayling population and downstream spawning/rearing habitat conducted as part of the AEMP or AEMP Response Plan (De Beers 2018). As per the AEMP Response Plan, De Beers has committed to conducting an assessment as part of the 2018 AEMP downstream flow monitoring to determine whether the current flow augmentation as outlined in the DFMP is adequate. The small increase in potable water withdrawals from Area 8 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 for the Mine.

6 SUMMARY

De Beers would like to thank the MVLWB, its staff, and all of the Interveners on the Water Licence and Land Use Permit amendment process for their efforts to review and provide recommendations for the Mine.

De Beers requests that the MVLWB take into consideration the many operational safeguards that are already included in the Water Licence and Land Use Permit for environmental protection as they consider the minor amendments De Beers is requesting for the Gahcho Kué Mine through this process. De Beers respects these safeguards, including the establishment of EQC for discharge to the receiving environment, annual reporting, and Inspector authorizations. De Beers is committed to adhering to the conditions in the Water Licence and Land Use Permit, and to protecting the environment. Excessive limitations on mining activities when the risk to the environment is low, such as restricting the number of years of discharge, even when water quality meets EQC and SSWQO can be maintained, or lengthy approval processes for a minor expansion to the footprint of a dyke or engineered facility, have the potential to result in unnecessary burden on De Beers, the MVLWB, and reviewers to undergo subsequent regulatory processes.

Industry requires flexibility to operate, recognizing the limits established by the regulatory authorities to protect the environment in which it operates. It is critical for De Beers that conditions written into the Water Licence are those that can be met, and which are viable for the life of the Mine. Regulatory processes such as Water Licence amendments are extremely expensive and onerous processes for industry. It is the MVLWB's responsibility to ensure that the Water Licence and Land Use Permit resulting from this processes forward looking such that it can account for the mine plan as currently advanced for the Mine. If a hard limit on discharge were to be included in the Water Licence, it would not be a licence fit for the rest of the operational mine life. De Beers understands, and has explained to Interveners throughout this amendment process, that if operational discharge is not permitted beyond Year 4, another Water Licence amendment would be required within as little as 2 years. De Beers also understand that engineered structures may be adjusted from time to time, and as such, some may need to be slightly larger than originally designed (e.g., dykes). These sorts of changes generally do not change the overall effects of the Mine on the environment and should be permitted through simple regulatory review processes, not amendments.

As De Beers remarked in our opening comments at the Public Hearing (July 25, 2018), we are continuing to drill within the Mine leases in hope of finding additional ore. If additional commercially viable ore is found, or if the mine plan requires adjustment for other reasons, De Beers will continue to work through the existing processes managed by the MVLWB to ensure any future adjustments to the mine plan are reviewed, assessed, and permitted appropriately. Mines are always changing, and the Gahcho Kué Mine is no different. De Beers will continue to change and adjust the mine plan as needed to ensure it is an economically viable Project. It is incumbent on the agencies that regulate mines, including the MVLWB, to ensure that the permits and licences issued to mines, allow the operators the flexibility they need to remain economically viable, to improve, and to become more efficient, while ensuring the overall effects on the environment have been considered and

are found to be acceptable. De Beers looks forward to continuing engagement with communities, regulatory agencies, and MVLWB staff, as we implement the amended Water Licence and Land Use Permit, as well as existing programs at the Mine.

7 REFERENCES

De Beers (De Beers Canada Inc.) 2018. Water License (MV2005L2-0015) and Land Use Permit (MV2005C0032) Amendment Applications. Submitted to Mackenzie Valley Land and Water Board March 18, 2018