



## Staff Report

<b>Applicant:</b> De Beers Canada Inc.	
<b>Location:</b> Kennady Lake, NT	<b>Application:</b> MV2005L2-0015
<b>Date Prepared:</b> June 1, 2016	<b>Meeting Date:</b> June 9, 2016
<b>Subject:</b> Operational Water Management Plan	

### 1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the Operational Water Management Plan (Version 1) (Plan) as submitted by De Beers Canada Inc. (De Beers) under Water Licence (Licence) MV2005L2-0015 for decision.

### 2. Background

- April 18, 2016 – Version 6 of the Construction Water Management Plan is approved by the Board;
- April 22, 2016 – De Beers submits the Operational Water Management Plan (Version 1) (Plan) including a request to modify the compliance date;
- May 12, 2016 – The Board approves the request to modify the compliance date;
- May 19, 2016 – Reviewer comments and recommendations due for the Plan;
- May 26, 2016 – Proponent responses due; and
- **June 9, 2016 – Board package presented to the Board.**

### 3. Discussion

An Operational Water Management Plan is required under Part G, item 4 of the Licence as follows:

A minimum of sixty (60) days prior to the commencement of milling, the Licensee shall submit an Operational Water Management Plan to the Board for approval. The Plan shall meet the objectives listed in Part G, item 1, and satisfy the requirements of Schedule 5, item 2. The Licensee shall not

commence Discharge from the Water Management Pond until the Board has approved the Plan.

On April 22, 2016, De Beers submitted the Operational Water Management Plan including a request to modify the compliance date associated with the commencement of milling (from 60 days referenced above in the condition to 45 days). On May 12, 2016 the Board approved the request to modify the compliance date.

#### **4. Comments**

N/A

#### **5. Reviewer Comments**

By May 19, 2016, comments and recommendations on the Plan were received from 5 reviewers:

- Environment and Climate Change Canada;
- Fisheries and Oceans Canada;
- Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR);
- GNWT-Lands; and
- Board Staff.

De Beers responded on May 26, 2016. The reviewer comment summary table (attached) presents the concerns identified through the review of the updated Plan.

#### **6. Security**

The GNWT currently holds \$7,226,931.00 in reclamation security for the Gahcho Kué mine for this Licence. De Beers' next deposit of security (in the amount of \$16,549,339) is due prior to year 1 of Operations (prior to mining and milling).

#### **7. Conclusion**

Board staff concludes that further information was provided by De Beers in their responses to reviewer comments, however some reviewers requested additional information before the Plan is approved. This Plan should be re-submitted to reflect updates as agreed to during the review. The Board will need to determine whether some of the information requested shall be submitted and reviewed prior to approval, or whether the Licence currently provides enough flexibility to evaluate incoming data, and request an updated plan at a later date if required.

The mechanisms currently in place for the Board to request updates include Part G, item 18 of the Licence which states (emphasis added):

The Licensee shall adhere to the approved Plans referred to in Part G, item 2 (Waste Management Plan); Part G, items 3, 4, and 5 (Water Management Plans); Part G, item 11 (Erosion and Sediment Management Plan); Part G, item 12 (Explosives Management Plan); Part G, item 14 (Geochemical Characterization and Management Plan); Part G, item 15 (Dyke A Construction and Management Plan); Part G, item 16 (Dyke Construction and Management Plan) and Part G, item 17 (Processed Kimberlite and Waste Rock Management Plan), *and shall annually review the Plans and make any necessary revisions to reflect changes in operations, or as directed by the Board.* Revised plans shall include a brief summary of the changes made, and shall be presented in a format consistent with the Mackenzie Valley Land and Water Board's Standard Outline for Management Plans. Revised Plans shall be submitted to the Board for approval at least sixty (60) days prior to any proposed changes to the requirements in the approved Plan.

An Annual Water Licence Report (Annual Report) is required to be submitted to the Board no later than March 31 of every year in accordance with Schedule 1, item 1.

Under the Annual Report, Part 1, item f) requires:

A summary of activities conducted in accordance with the approved **Water Management Plan**, relevant to the appropriate phase of the Project and as required in Part G, items 3, 4, and 5 of this Licence, undertaken during the previous calendar year, including:

- vi. A comparison of Water and Wastewater quantities measured in the year to the Water balances predicted for that year in the approved Water Management Plan, and an explanation of any significant differences between predictions and actual measurements;
- xv. An updated Water balance if required as per the approved Water Management Plan.

And item g) requires:

A summary of activities conducted in accordance with the approved **Groundwater Monitoring Program**, required in Part G, item 6 of this Licence, undertaken during the previous calendar year, including:

- i. A summary and interpretation of monitoring results, including an evaluation of trends in Open Pit inflow quantity and quality;

- ii. A comparison of monitoring results to predictions of Open Pit inflow quantity and quality, with an explanation for any significant differences;
- iv. An assessment of the effects of Open Pit development on Groundwater movement and quality.

Note that the GNWT made several recommendations for De Beers to perform additional modelling of the water quality within the controlled area based on different potential scenarios of groundwater inflow into the pits. De Beers disagreed with these recommendations. Board staff note that the Licence requires De Beers to monitor groundwater quality and quantity in the pits and to compare the results to action levels described in the Groundwater Monitoring Plan. If groundwater quality or quantity deviates from current predictions, De Beers will report on this in the Annual Report and the Board and reviewers will have the opportunity to require De Beers to revise their water quality models at that time, to revise their plans (as per the mechanisms stated above), and/or to implement additional mitigations as necessary. In the absence of additional monitoring data or measured deviations from current water quality predictions, it is unclear how additional modelling would be beneficial. Finally, Board staff note that if deviations in groundwater quality and quantity predictions are measured, this will not have an immediate impact on the receiving environment since De Beers will still have to comply with the EQC in the Licence; as well, Part G, item 34 limits De Beers to only three years of discharge without additional analysis and approval by the Board.

## **8. Recommendation**

Board staff recommends that the Board:

- 1) Approve the Operational Water Management Plan (Version 1), upon receipt of an updated Plan (Version 2) in accordance with comments made during this review and written confirmation of conformity from Board staff; or
- 2) Deny the Operational Water Management Plan (Version 1) as submitted on April 22, 2016 and require De Beers to resubmit the Plan, allowing reviewers the opportunity to review the new information.

## 9. Attachments

- [Operational Water Management Plan \(Version 1\)](#);
- Review Comment Summary Table; and
- Draft Decision Letter from the Board.

Respectfully Submitted,



Angela Love  
Regulatory Officer



Kierney Leach  
Regulatory Officer

Reviewed by,



Rebecca Chouinard  
Regulatory & Technical Director

## Review Comment Table

<b>Board:</b>	MVLWB
<b>Review Item:</b>	De Beers Gahcho Kue - Operational Water Management Plan (Version 1) - MV2005L2-0015
<b>File(s):</b>	<a href="#">MV2005L2-0015</a>
<b>Proponent:</b>	De Beers Canada Inc - Gahcho Kue
<b>Document(s):</b>	<a href="#">Operational Water Management Plan</a> (35 MB)
<b>Item For Review Distributed On:</b>	Apr 26 at 16:02 <a href="#">Distribution List</a>
<b>Reviewer Comments Due By:</b>	May 19, 2016
<b>Proponent Responses Due By:</b>	May 26, 2016
<b>Item Description:</b>	<p><b>Update - May 12, 2016: Please note that the Board has approved the request to modify the compliance date (from 60 days to 45 days) as requested by De Beers in the Cover Letter to this Plan.</b></p> <p>De Beers Gahcho Kue has submitted an Operational Water Management Plan (Version 1) to satisfy the requirements of Part G, item 4 of their Water Licence MV2005L2-0015.</p> <p>Please submit comments using the Online Review System by downloading the excel comment table or using the "add comment" button.</p> <p>If you have any questions or comments regarding this Plan or using the Online Review System, please contact Angela Love at 867-766-7456 or <a href="mailto:angela.love@mvlwb.com">angela.love@mvlwb.com</a>.</p>
<b>General Reviewer Information:</b>	<p>This information has also been distributed by fax to:</p> <p>Fort Resolution Métis Council Trudy King fax: (867)394-3322; <a href="mailto:Fieldworker.frmc53@northwestel.net">Fieldworker.frmc53@northwestel.net</a></p> <p>Hay River Metis Council Karen Lafferty President fax: (867)874-4472; <a href="mailto:hrcm@northwestel.net">hrcm@northwestel.net</a></p> <p>NWT Metis Nation Tim Heron NWTMN IMA Coordinator fax: (867)872-3586; <a href="mailto:rcc.nwtmn@northwestel.net">rcc.nwtmn@northwestel.net</a></p>
<b>Contact Information:</b>	<p>Angela Love 867-766-7456 Jen Potten 867-766-7468 Kierney Leach 867-766-7470</p>

## Comment Summary

### Environment and Climate Change Canada: Melissa Pinto

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
1	General File	<b>Comment</b> <a href="#">(doc)</a> ECCC Cover Letter <b>Recommendation</b>		
2	Contact Water; Table 2.9 Timeline for Water Management during Mine Operations under Current Management Plan	<b>Comment</b> Discharge from the Water Management Pond (WMP) to Lake N11 or Area 8 or Area 7 is coded as fresh water for Years 1-3. During this time the WMP will be actively receiving contact water from the pits, effluent from the Sewage Treatment Plant (STP), and surface water from Areas 4-7. The contents of the WMP represent mine effluent, and should be colour-coded as contact water not fresh water. <b>Recommendation</b> Revise Table 2.9 WMP (Area 3/5) colour coding for Years 1-3 to reflect contact water rather than fresh water.	<b>May 27:</b> Corrected.	Acceptable response.  The table shall be updated with this information.
3	Figures 2 to 9 Water Management Plan During Mine Operations (Year -1 to Years 9 to 11)	<b>Comment</b> Font issues on the figures have made the map labels difficult to read; numbers and letters are missing. <b>Recommendation</b> Correct labels on figures.	<b>May 27:</b> This appears to be an issue with the version of Adobe Reader that is being used to read the file. The file displays correctly in Adobe Reader Version 11.	Acceptable response. No concerns were noted by Board.
4	Flow to/from Fine PKC Facility; Figures 10 to 14 Water Management Flow Diagrams (Year -1 to Years 8-11)	<b>Comment</b> On the flow diagrams, the arrow between Filter Dyke L and the Fine Processed Kimberlite Containment (PKC) Facility shows flow going into the PKC Facility. This does not reflect what is noted in Section 2.3.3 (Water Management Pond), that Fine PKC Facility drainage is through Filter Dyke L to the WMP. <b>Recommendation</b> Clarify flow direction through Filter Dyke L from the Fine PKC Facility.	<b>May 27:</b> The direction of flow is from the Fine PK Facility through the filter dyke L and into the water management pond Area 3. The direction of the arrows on Figures 10-14 between the Filter Dyke L and the Fine PK facility will be corrected to reflect that.	Acceptable response.  The flow diagrams shall be updated with this information.

5	De-icing Fluids Management; Section 2.3.14.4 Runoff from Airstrip Area	<p><b>Comment</b> It is indicated that runoff from 50% of the airstrip surface will flow towards Area 8, and sediment management measures will be used to control sediment transport. It is not clear if aircraft de-icing fluids will be used in the area that drains towards Area 8.</p> <p><b>Recommendation</b> Clarify if aircraft de-icing fluids will be used in the area that drains towards Area 8 and identify how aircraft de-icing fluids will be managed in respect of runoff towards Area 8.</p>	<p><b>May 27:</b> The airstrip apron where de-icing is performed is within the Controlled Area Boundary with the slope leading toward Area 7. The portion of the airstrip apron where de-icing is performed is lined with HDPE liner and drains towards a fully lined glycol retention facility. Water within this facility is sampled each spring, treated if required and discharged towards Area 7. If treatment is not required, the water from within the facility will be discharged directly over the tundra towards Area 7.</p>	Acceptable response.
6	Overland Discharges; Section 2.4.3 Sewage Water Management and Section 2.4.4 Contaminated Snow/Ice and Water	<p><b>Comment</b> Section 2.4.3 (Sewage Water Management) indicates that treated sewage effluent will be discharged overland during the early operation period, in the Area 7 watershed. Similarly, Section 2.4.4 (Contaminated Snow/Ice and Water) states that the separated water from the landfarm will be tested before being transferred to the STP or disposed of overland within the controlled area. Part G: Conditions Applying to Water and Waste Management, Effluent Quality Criteria - Lake N11 and Area 8, condition 28 of the Water Licence states that: "All Wastewater to be Discharged to the Receiving Environment shall be directed to the Water Management Pond, or any other location as otherwise approved by the Board".</p> <p><b>Recommendation</b> Clarify discharge locations approved for terrestrial discharges.</p>	<p><b>May 27:</b> The treated effluent discharge location for the Sewage Treatment Plant has been in effect since its establishment under the previously governing water license MV2003L2-0003. The location was approved by both the Board and Inspector to serve the current accommodation facilities as SNP 1725-13 and was changed to SNP-07 once MV2005L2-0015 came into force. The specific location of the discharge, within the Area 7 catchment boundary, is 12V 590918mE 7035895mN. The discharge pathway is in excess of 300m from Area 7 and comprised of rolling tundra sufficient for the absorption/filtration of the effluent.</p>	Acceptable response.
7	Typographical Error; Section 2.4.4 Contaminated	<p><b>Comment</b> The last sentence on page 61 says "...details on containment snow and water management...". It would be more appropriate to use "contaminated</p>	<p><b>May 27:</b> The use of the term 'containment snow' was a typographical error. This will be corrected to 'contaminated snow'.</p>	Acceptable response.  The sentence shall be updated



	Snow/Ice and Water	snow". <b>Recommendation</b> Clarify whether the sentence contains a typographical error and correct if necessary.		with this information.
8	Discharge Criteria; Section 2.4.4 Contaminated Snow/Ice and Water	<b>Comment</b> The first sentence on page 62 indicates that "Water which has accumulated within the bulk fuel storage facilities will be tested and discharged overland within the controlled area provided it meets the discharge criteria as specified within the Water License". <b>Recommendation</b> Clarify which discharge criteria are being applied to overland discharges, as the criteria set in the water licence specifically apply to discharges to Lake N11 and Area 8.	<b>May 27:</b> Water from the fuel containment berms will be tested to determine the water quality in relation to Total Petroleum Hydrocarbons limit as stated within the Effluent Quality Criteria located in Part G, Item 30 of the Licence.	Acceptable response.  The section shall be updated with this information.
9	Runoff Losses to Freezing; Section 2.5.3 Water Balance and Predictive Modeling	<b>Comment</b> Section 2.5.3 (Water Balance and Predictive Modeling) on page 72 states that: "Drainage from the mine rock piles, coarse PK Facility, and the Fine PKC Facility will include runoff from direct precipitation. As new material is continuously deposited on these Project facilities between Years 1 and 11, the net annual runoff yield is estimated to increase as their surface area and water saturation increase with time. This will result in drainage increasing from approximately 240,000 m <sup>3</sup> /y early in the Project life to approximately 700,000 m <sup>3</sup> /y in Year 7...". It is not clear whether the model accounts for losses to permanently frozen ice within the rock materials. <b>Recommendation</b> Clarify if the model has evaluated the effects of losses to freezing for precipitation that infiltrates rock piles which may be frozen year-round at the base.	<b>May 27:</b> The water balance model did not assume any freezing of the mine facilities, such as the mine rock piles, the Fine PKC Facility, and the Coarse PK Pile, during operations and closure. The development of permafrost conditions in the mine rock and PK storage facilities were not considered in the water quality modelling assessment scenario (Section 8.II-5, Appendix 8.II Water Quality Model Report, 2012 EIS Supplement [De Beers 2012], which relied on the site water balance information as a source term in the modelling. If permafrost was to develop within these structures, it is anticipated that seepage inputs to the water balance would be reduced, but runoff inputs would be increased.	Acceptable response.  This section shall be updated with this information to provide clarity.

10	Action Levels for Raised Lakes; Table 3.2 Summary of Estimated Water Elevation Raise and Action Levels	<p><b>Comment</b> Lakes E1 and D2 are among the lakes which will be raised due to the diversion of surface runoff from the controlled area. Table 3.2 shows action levels for Lakes E1 and D2 but does not indicate how increases to raised Lakes D3 and A1 would be actioned. Monitoring of shoreline stability will need to be done for lakes which have raised water levels; this should be noted within the Water Management Plan, as it directly impacts water quality.</p> <p><b>Recommendation</b> Identify whether action levels would apply to Lakes D3 and A1 which will also be raised in water elevation. Provide details of monitoring for effects associated specifically with lake level increases.</p>	<p><b>May 27:</b> There are action levels associated with Lakes E1 and D2 because those lakes are adjacent to dykes G and F respectively. The action levels are related to the need to maintain a minimum of 1m freeboard at the dykes and to ensure the water management pond has sufficient capacity. Lake D3 will join with Lake D2 and therefore the action level provided Lake D2 is also applicable to D3. The action level for Dyke A1, and Area 1 (i.e. Lake A1) is listed in Table 3.2. The monitoring program for the raised lakes is described in detail in the Aquatic Effects Monitoring Program (see Table 7.3-1, AEMP Design Plan V.5). Monitoring will occur at Lake D2/D3 and will include hydrology, water quality, plankton, sediment quality, benthic invertebrates, and fish tissue chemistry. Lake D2/D3 was selected as the sampling location for Aquatic Effects Monitoring as it is considered representative of the raised lakes. Water level monitoring will occur throughout the year.</p>	Acceptable response.
11	Toxicity Tests and Action Levels; Section 3.2.4 Water Quality Action Levels	<p><b>Comment</b> Section 3.2.4 (Water Quality Action Levels) does not include discussion of toxicity testing results, and any actions that would be triggered by test results that showed chronic or acute toxicity. The full suite of toxicity tests will be done at the start and end of discharge from the WMP, and it is noted that the acute tests are a licence compliance point (discharges are to be not acutely toxic). The chronic tests provide a measure of potential effects in the receiving environment, and should be used as an indicator of effluent quality</p>	<p><b>May 27:</b> Schedule 5, Part G) 2. specifies the requirements of the Operational Water Management Plan. These requirements do not require a response framework associated with toxicity. Rather, toxicity is discussed in Annex A, Part B of the Water License MV2005L2-0015 which stipulates SNP requirements, including the requirement to complete toxicity test results. Toxicity testing is completing as a component of the SNP and the AEMP and is reported on within those documents. Any response framework activities that are</p>	Acceptable response.

		<p>for management response.</p> <p><b>Recommendation</b> Discuss how bioassay test results will be evaluated and identify relevant action levels for tests.</p>	<p>triggered would be completed under those two mechanisms. Table 11.4-1 of the Approved AEMP design plan details the weight of evidence components and evaluation criteria for water quality. Section 12.5 also of the approved AEMP design plan details the approaches that may be utilized should a response framework action be triggered for toxicity.</p>	
12	<p>Action Level Water Treatment Options Section 3.2.4.1 Action Level for Water Quality in Water Management Pond and Discharge Locations</p>	<p><b>Comment</b> Section 3.2.4.1 (Action Level for Water Quality in Water Management Pond and Discharge Locations) outlines some of the responses that could be taken if the measured data exceeds the action level. In previous sections of the Operational Water Management Plan (e.g. Section 1.3; 2.5.5.2), water treatment was listed as a contingency, and should be given consideration in this Section.</p> <p><b>Recommendation</b> Discuss water treatment options which could be used as a contingency.</p>	<p><b>May 27:</b> The installation of a water treatment facility is not a potential response to any of the individual action levels identified in Section 3.2.4.1. The installation of a water treatment facility is a potential contingency option that De Beers would consider in the unlikely scenario of not being able to discharge water for two full consecutive years or more in the early life of the project (years 1-4). Installation of a water treatment facility would only be considered if none of the management responses to the defined action levels were sufficient at addressing the issue for at least two full years.</p>	<p>Acceptable response.</p>
13	<p>Definition of Effluent; 6.3 Glossary</p>	<p><b>Comment</b> Effluent is defined in the Operational Water Management Plan as "Water flows that must be treated before discharge to the receiving environment". This definition should be broadened to include any contact water. The definition found in the Metal Mining Effluent Regulations may provide guidance: "<b>effluent</b> means an effluent — hydrometallurgical facility effluent, milling facility effluent, mine water effluent, tailings impoundment area effluent, treatment pond effluent, seepage and surface drainage, treatment</p>	<p><b>May 27:</b> The definition of the term 'effluent' in the OWMP is consistent with the definition approved within the Construction Water Management Plant (Section 5.3) and the use of the term throughout the Water License. De Beers suggests that the changing of a definition already acceptable by the Board review process is not warranted in this case.</p>	<p>This response addresses the comment.</p>

		<p>facility effluent other than effluent from a sewage treatment facility — that contains a deleterious substance."</p> <p><b>Recommendation</b> At a minimum, redefine "effluent" to include contact water.</p>		
14	Appendices A, B and C	<p><b>Comment</b> These appendices were not reviewed.</p> <p><b>Recommendation</b> None</p>	<b>May 27:</b> Acknowledged	N/A
15	Monthly Operational Discharges and Loads; Appendix D Predicted Water Quality Within Water Management Pond	<p><b>Comment</b> It is noted that Table D1 is not included. Table D2 presents the parameter concentrations (mg/L) in the operational discharge from the WMP (Years 1-3) and gives monthly concentrations for each year. Table D3 presents the monthly operational load (kg/month) from the WMP to Lake N11 or Area 8 for the June, July and August discharges in each of Years 1-3. These numbers are taken forward to annual operational loads for Lake N11 (Years 1-3) and Area 8 (Year 1). It is not clear how the monthly load values were derived from the concentrations in Table D2. Were the three discharge months taken from Table D2 to calculate loadings and if so, are the rest of the monthly concentrations representing potential quality of effluent if the discharge period is extended?</p> <p><b>Recommendation</b> Clarify the purpose of the monthly operational discharge concentrations in Table D2, and how the loadings were derived in the tables following Table D2.</p>	<p><b>May 27:</b> These tables were sourced from Appendix D of the EQC Report (De Beers 2014) that was generated as part of the Type A Water Licence application process, and which was revised and resubmitted to the Board in April 2014. The purpose of this appendix was to provide information on the predicted concentrations and loads of parameters of interest (POI) in the operational discharges from the water management pond (WMP) for the Mine to Lake N11 or Area 8, which are the water bodies directly receiving the WMP discharges during the operations phase. The predicted water quality parameter concentrations in the operational discharge from the WMP are provided in Table D2. The list of parameters in Table D2 matches the POI identified in Section 2.1 of the EQC Report. The monthly loads of POI in the WMP discharge to Lake N11 for the first three years of operations are presented in Table D3, while Table D4 provides the annual loads for each of the three years of operational discharge. The loads are calculated from the concentration of the POI in the WMP during discharge and the associated discharge rate. In general, monthly loads of POI to</p>	This response addresses the comment.

			Lake N11 increase from month to month during periods of discharge. As well, annual loads are anticipated to increase from Year 1 to 3, with peak loads occurring in Year 3. Monthly loads for the Year 1 operational discharge to Area 8 are presented in Table D5, with Table D6 providing the annual load for that one year.	
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**Fisheries and Oceans Canada: Mark D'Aguiar**

<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Response</b>
1	General File	<b>Comment</b> <a href="#">(doc)</a> Fisheries and Oceans comments cover letter <b>Recommendation</b>		
3	Section 2.4.5 - Area 8 Downstream Supplemental Flow	<b>Comment</b> De Beers has presented a flow mitigation plan that has been developed to augment flows downstream of Area 8 to avoid potential harmful population level effects on the fish community between Area 8 and Lake 410. As part of the Downstream Flow Mitigation Plan, the proponent has proposed flow mitigation to be conducted 3 out of 4 years in order to provide conditions suitable for successful Arctic Grayling spawning. It is understood that "Downstream flow mitigation will be initiated when persistent flow is measured at the outlet of stream K5 (as per continuous water level and flow data from SNP 19) and consistent with the flow rates stipulated in the Fisheries Act authorization". However in the event that multiple sequential dry years occur, it is unclear how De Beers will respond, and the process for selecting the year to not augment. <b>Recommendation</b> Fisheries and Oceans Canada recommends that De Beers clarify the process /plan	<b>May 27:</b> De Beers will augment the downstream flow 3 out of 4 years. A non-augmented year can occur no more frequently than once during any sample of 4 consecutive years during Operations beginning in 2017. If there are a series of 'dry' years within a 4 year period, De Beers will follow the same rule of thumb, such that only 1 out of any selection of 4 consecutive years can be mitigated at the 'dry' level of 0.1m <sup>3</sup> /s. If pumping at the dry level of 0.1m <sup>3</sup> /s has already occurred during 1 of the prior 3 consecutive years, and conditions are assessed as 'dry', De Beers will pump at the 'average' level.	This response addresses the comment.

		for flow mitigation if several sequential 'dry years' occur.		
<b>GNWT - ENR: Central Email GNWT</b>				
<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Response</b>
17	General File	<b>Comment</b> <a href="#">(doc)</a> ENR Letter with Comments and Recommendations <b>Recommendation</b>		
1	Topic 1: Timelines	<b>Comment</b> DeBeers has requested a reduction in the designated period of time for submission prior to the initiation of operations of 15 days (45 days rather than 60 days). Currently, Part G, Item 4 of the Water Licence reads as follows: "A minimum of sixty (60) days prior to the commencement of milling, the Licensee shall submit an Operational Water Management Plan to the Board for approval. The Plan shall meet the objectives listed in Part G, item 1, and satisfy the requirements of Schedule 5, item 2. The Licensee shall not commence Discharge from the Water Management Pond until the Board has approved the Plan." DeBeers has also stated that: "A reduction in the number of days between submission of this plan and start of operations is not expected to have any effect or consequence on the environment. There will be no discharge from the water management pond between the date of initiation of operations and the date the Plan is approved (as per the license condition Part G, item 4). DeBeers will continue to manage water as per the approved Construction Water Management Plan V.6 until such time as the Operational Water Management Plan is approved." Further, DeBeers notes that this reduced lead time will ensure that they are able to move	<b>May 27:</b> Acknowledged	The Board approved the request to modify the compliance date on May 12, 2016 as per Part B, item 7 of the Licence.

		<p>into operations in the early summer of 2016 if construction progresses as currently forecast. It is not clear to ENR why 15 days would make any difference from an operational perspective given the potential start date is already anticipated (summer 2016). ENR notes that the time period established in the Water Licence is for review and approval processes. However, ENR acknowledges that the Board may amend compliance dates within the Water Licence at its discretion.</p> <p><b>Recommendation</b> 1) ENR does not object to this change should the Board wish to proceed, but cautions that water management activities associated with operations should not occur until an Operational Water Management Plan is approved.</p>		
2	Topic 2: Groundwater Projections	<p><b>Comment</b> Section 2.2.4 outlines water quality projections for the shallow and deep groundwater regimes associated with the open pits. Table 2.5 outlines the anticipated TDS concentrations in the passive pit inflows, but the anticipated proportions of shallow to deep groundwater used to calculate these projections is unclear. This proportion is important as the amount of water to be managed and its quality will dictate the water quality in the Water Management Pond and ultimately impact water quality discharged to Lake N11. The timing of this discharge could also be affected (e.g. potentially making it less than 3 years).</p> <p><b>Recommendation</b> 1) ENR recommends that DeBeers provide additional information and research results on the relative proportions of shallow to deep</p>	<p><b>May 27:</b> In Commitment 3, provided to the MVLWB following the Gahcho KuÃ© Project LUP and WL Technical Sessions (dated March 6, 2014 [De Beers 2014]), De Beers presented updated water quality model predictions for the water management pond (WMP) based on the revised mine plan. The model update was developed from an updated hydrogeological assessment (Appendix A in this commitment) and the March 2014 version of the water balance (EBA 2013). The updated hydrogeological assessment describes the proportion of surface water (lake water) in pit inflows, and the relative contribution of the surface flows from the basins (areas) within the controlled area of Kennady Lake (refer to Tables 2 and 3 within the Appendix). Simply stated, as each mine pit</p>	This response addresses the comment.

		groundwater projected for each pit.	develops (i.e., 5034, Hearne, and Tuzo), higher groundwater inflows with increasing TDS concentrations are encountered as the mined pits get deeper. Once the pits have been mined out, and backflooding commences, the proportion of groundwater inflows reduces compared to the surface water inflows. The filling pit reduces the passage of groundwater into the backflooded pit. TDS concentrations reduce as the pit refills as a consequence of a higher contribution of surface water inflows.	
3	None	<b>Comment</b> None <b>Recommendation 2)</b> ENR recommends that DeBeers model pit water inflows and water quality if more deep groundwater and less shallow groundwater enter the pits increase in deep water by 25 or 50%.	<b>May 27:</b> The hydrogeological model will be updated if needed to incorporate the results of the monitoring data that indicate an increase in groundwater inflows or groundwater chemistry compared to current modelling projections over an extended monitoring period. Additional updates to the groundwater model may be required based on operational changes as the Mine advances. Trends in groundwater quantity and quality collected from monitoring data will be evaluated to determine whether there is an increasing trend that requires examination and a potential mitigative response. Actual trends (i.e., trends based on measured data) will be compared to trends predicted in the current version of the hydrogeological assessment (refer to Appendix A in Golder [2014]). If the measured groundwater quantity or quality represents a significant difference from the current model projections, a re-calibration of the model would be	This response addresses the comment.  If an update is required, all necessary plans shall be updated accordingly and submitted to the Board for approval.



			<p>considered. Low action levels associated with the Groundwater Monitoring Program (De Beers 2015) include consideration of a response to update the hydrogeological model if: . Inflow quantity (measured as daily pumping rate volumes averaged over a one-month period) from any one pit be greater than 20% higher than predicted daily rates from consecutive one month average measurements over a six-month interval (amounting to six average measurements). If the higher than predicted flows are correlated to a short-term effect such as freshet, transient drainage of a high storage feature, or dewatering of lakebed sediments, then no further action would be needed; OR . Monthly average concentrations of parameters of concern in sump discharge be greater than 10% of the projected concentrations for defined depths (as appropriate) as projected in the current hydrogeological assessment, and supported by a temporal trend (i.e., greater than a six month period). The results of groundwater monitoring and any updates to the groundwater model will be used to update the water quality model as necessary.</p>	
4	<p>Topic 3: Water Management Pond/Areas 3 &amp; 4</p>	<p><b>Comment</b> Table 2.6 outlines the predicted maximum concentrations in the Water Management Pond for a variety of parameters. While ENR appreciates that DeBeers has only provided information during the anticipated discharge period (3 years), information related to the projected water quality of the Water Management Pond through operations should be included.</p>	<p><b>May 27:</b> During operations, groundwater inflows to the open pits contribute the majority of water that requires management, and storage in the WMP. The modelled projections of groundwater inflow to the pits has been developed with added conservatism associated with groundwater quantity and quality, including higher hydraulic conductivity than measured</p>	<p>This response addresses the comment.</p>

		<p>Further as noted above, ENR requests that DeBeers describe how water quality within the Water Management Pond would change over the initial 3 years if more deep groundwater reports to the pits than anticipated.</p> <p><b>Recommendation</b> 1) ENR recommends that DeBeers describe how water quality within the Water Management Pond would change over time if more deep groundwater reports to the pits.</p>	<p>during hydrogeological testing at the site and the presence of hypothetical EPZs (see response to GNWT - 7). Therefore, De Beers is of the opinion that a higher proportion of deeper groundwater inflows to the pits, and it's resulting higher TDS, is unlikely. However, in the event that a higher proportion of deeper groundwater inflows to the pits occurred, it would potentially result in having to manage a higher volume TDS water source within the controlled area. It may also result in the WMP becoming more elevated in TDS concentrations. While it is important to note that not all the groundwater inflowing to the pits is transferred to the WMP (most is, but there are other water management areas within the controlled area that will be used over the operational phase (e.g., Area 6 and Hearne pit following its mining), the OWMP presents a series of contingencies to manage higher than anticipated water volumes and a nil discharge case; some of these contingencies may be applicable under a condition of having to manage higher than projected volumes within the controlled area. In the event that the WMP has a higher TDS concentration than modelled, this circumstance can be managed at closure under the existing water management plan. The majority of the WMP, and any other area within the controlled area that possesses elevated TDS water, will still be directed to the bottom of Tuzo pit at closure; the increased TDS concentrations in this water</p>	
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			would further increase the stability of the meromictic conditions established by overlying this water with fresh surface water when Kennady Lake is refilled.	
5	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends that projected water quality in the Water Management Pond be included for the duration of operations - past the initial 3 years.</p>	<p><b>May 27:</b> De Beers does not agree with this recommendation. There is no requirement in the W.L. Schedule 5, item 2, to repeat EIS water quality projections past the first three years within the Operational Water Management Plan. De Beers provided to the MVLWB, following the Gahcho KuÃ© Project LUP and WL Technical Sessions (dated March 6. 2014) within Commitment 3, the updated water quality model predictions for the water management pond based on the revised mine plan, but capped the maximum water quality constituent concentrations at Year 3. This was because the mine plan assumed a three-year operational discharge period. The 2012 EIS Supplement (De Beers 2012) presented time series plots for each of the modelled water quality constituents (e.g., TDS, nutrients, metals) for Kennady Lake and Area 8 (Appendix 8.IV) over each of the mine phases. For each plot, the time series data under the 'operations' phase presented water quality constituent concentration projections, and therefore the temporal changes in concentration over operations, specifically for the water management pond (WMP). These can be viewed as providing an overview of each of the water quality constituent concentrations in the WMP over operations; however, these</p>	<p>Revisions to the Plan can be requested by the Board as per Part G, item 18 of the Licence.</p> <p>An Annual Water Licence Report is also required to be submitted and includes a summary of activities conducted under the water management plan. This report is sent for review and reviewers have an opportunity to submit comments to the Board which may inform a future requirement to re-submit the Plan including additional information or predictions.</p> <p>Lastly, Part G, item 34 of the water licence prohibits more than three years of discharge from the WMP</p>

			<p>temporal trends are considered overestimates. Commitment 3 showed that as a result in the modification in the mine sequencing in the current mine plan, projected TDS concentrations in the WMP decrease compared to that presented in the 2012 EIS. The difference for TDS concentrations between the 2012 EIS Supplement and the updated modelling presented in Commitment 3 is presented in Figure 1 of Commitment 3.</p>	<p>to Lake N11 or Area 8 unless the proponent submits an EQC Evaluation Report and the Board approves additional discharges. In the meantime, the quality of groundwater flowing into the pits will be monitored and exceedances of action levels will trigger a re-evaluation of predictions for the WMP.</p>
6	None	<p><b>Comment</b> None  <b>Recommendation 3)</b> ENR recommends that the Water Management Plan be revised to include this information prior to approval.</p>	<p><b>May 27:</b> De Beers does not agree with this recommendation. The Operational Water Management Plan has been prepared in accordance with the terms and conditions of the Water License. There is no requirement in the W.L. Schedule 5, item 2, for this type of information to be included within the Operational Water Management Plan.</p>	<p>See above.</p>
7	Topic 4: Groundwater Projections	<p><b>Comment</b> Section 2.2.4 states that deep groundwater is anticipated at 300m, based on Fritz and Frappe (1987) and the site drilling is "generally consistent" with this understanding. It is not clear the extent to which "generally consistent" refers. A review of groundwater quality at depth in the North was provided during the Jay Project Review process. At a 300 meter depth water quality at Diavik was in the order of 400 mg/L range, at Ekati was estimated to be 1,050 mg/L and Frappe &amp; Fritz is estimated to be</p>	<p><b>May 27:</b> Site-specific groundwater quality data for the Gahcho Kuã mine site were represented to a maximum of 450 m. The Gahcho Kuã TDS profile (Figure 8.3-11 in the EIS [De Beers 2011]) is "generally consistent" with the Fritz and Frappe (1987) profile in that it increases with depth, with the profile generally clustered around other profiles in the North. Below 450 m, the Fritz and Frappe profile was used to estimate TDS concentrations. In the numerical hydrogeological model,</p>	<p>This response addresses the comment.</p>

		<p>1,200 mg/L TDS. Note all of these have assumed depth profiles that are considered "generally consistent". That figure includes groundwater data collected at Gahcho Kue. Many of the points lie higher than the Frappe &amp; Fritz profile. Some are much lower and align with Diavik or Ekati data. ENR seeks clarity on if this has somehow effected the projected concentration by pit proposed in Table 2.5.</p> <p><b>Recommendation</b> 1) ENR recommends that DeBeers provide additional information on the extent to which site drilling results at the Gahcho Kue site is similar to groundwater characteristics noted in Fritz and Frappe (1987) and which they are not.</p>	<p>conservative assumptions were made so that potential groundwater inflow quantity and quality would not be underestimated. For example, the hydraulic conductivity of the rock was modelled as being three times greater than measured and assumed to not decrease below 500 m depth, with the presence of hypothetical enhanced permeability zones (EPZs) intersecting each pit, when none have been identified within the pit region from drilling surveys. These assumptions have resulted in conservatively high estimates of groundwater inflow quantity and quality in the modeling; higher hydraulic conductivity and the presence of EPZs result in higher inflows to the pits during operations and will induce deeper high TDS groundwater to flow up into the pits.</p>	
8	<p>Topic 5: Groundwater Projections</p>	<p><b>Comment</b> Table 2.5 outlines a projected reduction in TDS concentrations over time in each open pit as the mine plan progresses. ENR notes that experience at other mine sites has shown that concentrations of TDS increases as the depth of the pit increases, and that concentrations should remain constant at maximum depth. Further, rationale for such large TDS decreases in Hearne Pit should be fully described.</p> <p><b>Recommendation</b> 1) ENR requests that DeBeers provide further rationale for specific TDS decreases for each open pit especially the large scale decrease in Hearne Pit.</p>	<p><b>May 27:</b> Table 2.5 summarizes the projected TDS concentration with time for passive groundwater inflow to the mined pits. The TDS concentrations, averaged on an annual basis, represent the mixed TDS concentration for groundwater reporting to each open pits with surface water inflows representing lake water contributions from the surface water located in the various basins (areas) within the controlled area of Kennady Lake (e.g., Area 7, Area 4, WMP). This is detailed in Table 2.4. The large reduction of TDS concentrations in the Hearne pit column of Table 2.5 from Year 8 on represents the change in TDS concentration of the passive inflows to Hearne pit following pit backflooding. After</p>	<p>This response addresses the comment.</p>

			Year 7, the pit is backflooded, so the primarily inflows to Hearne pit are surface waters (representing 90% of the inflows), which possess a considerable lower TDS concentration compared to groundwater inflows, which are reduced substantially due to the backflooded pit.	
9	Topic 6: Open Pits	<p><b>Comment</b> Upon review of the Plan, it is unclear if at any point, mined out pits will be used to receive water from the Water Management Pond and/or other active pit(s). For example, as per Table 2.9, if Hearne is completed while other pits are active, could any high TDS mine water be placed into Hearne to reduce mine water going into the Water Management Pond to aid in closure (i.e. assist in Kennady Lake reaching closure water quality objectives)? Table 2.9 does not denote any water going into the pits; however, later in the Plan Section 2.3.3 states the Water Management Pond will be the primary reservoir for storage of mine water before the open pits (i.e. 5034 and Hearne Pits) are mined-out. Additionally, 2.3.7 states that: "After mining 5034 Pit is completed in Year 7, Tuzo Pit will be the only active pit, and water captured in the Tuzo Pit will be directed to the process plant to supplement process water requirements, to the mined-out open pits, or to the WMP." Emphasis added.</p> <p><b>Recommendation</b> 1) ENR requests that DeBeers clarify if any of the mined out pits will be used for mine water storage from active pits. If not, GNWT requests that</p>	<p><b>May 27:</b> The mined-out open pits will be used as mine water storage from active pits. There is flexibility in the plan to deal with the pit water. As the plan states the Tuzo water can be directed to the process plant, mined out pits, or the water management plan. The current water balance assumes the Tuzo water is directed to the process plant. The water balance will be updated throughout the project life to incorporate project changes and revised assumptions as necessary.</p>	<p>This response addresses the comment.</p> <p>Section 2.9 shall be updated with this information.</p>

		DeBeers outline rationale why this process cannot occur.		
10	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends that the Water Management Plan be revised to clarify this prior to approval and include if and how decisions would be made to transfer pit water from Tuzo Pit.</p>	<p><b>May 27:</b> De Beers does not agree with this recommendation. De Beers must maintain some operational flexibility to move water within the Controlled area, as has already been described within the Operational Water Management Plan. See response to item 9 above.</p>	<p>Revisions to the Plan can be requested by the Board as per Part G, item 18 of the Licence.</p> <p>An Annual Water Licence Report is also required to be submitted and includes a summary of activities conducted under the water management plan. This report is sent for review and reviewers have an opportunity to submit comments to the Board which may inform a future requirement to re-submit the Plan including additional information or predictions.</p>
11	Topic 7: Hearne Pit	<p><b>Comment</b> Figure 14 illustrates that during years 8-11, excess water is being dewatered from the mined out Hearne Pit and transferred to the Water Management Pond. It is unclear why water is still being moved out of Hearne Pit near the end of operations if the closure option for Hearne Pit is to be filled. DeBeers should outline if there operational requirements (e.g. fine PK deposition) that</p>	<p><b>May 27:</b> As stated in Page 34 of Operational Water Management Plan Version 1, the rational for moving excess water from Hearne Pit to the Water Management Pond is to maintain the water in West Area 6 (including the mined out Hearne Pit) below the maximum storage capacity. The maximum operationing water level in West</p>	<p>This response addresses the comment.</p>

		<p>require Hearne Pit to be dewatered during this period.</p> <p><b>Recommendation</b> 1) ENR recommends that DeBeers clarify the rationale for moving excess water from Hearne Pit to the Water Management Pond during the final years of operations.</p>	<p>Area 6 is assumed to be 421.3 m for the future Dyke N design.</p>	
12	Topic 8: Reclaim Water	<p><b>Comment</b> Figures 13/14 and Section 2.3.8 outline that mine water from Hearne and 5034 are being pumped to the Water Management Pond prior to being used for reclaim water in the process plant while mine water from Tuzo is being pumped directly to the process plant. It is unclear why the different mine water is being handled differently.</p> <p><b>Recommendation</b> 1) ENR requests that DeBeers clarify why water from different pits is to be treated differently prior to use as process water.</p>	<p><b>May 27:</b> Pit water from the 5034 and Hearne will be pumped to the water management pond, rather than directly to the process plant because the piping infrastructure into the process plant will be drawing from the water management pond. Additionally, it is anticipated that there will be insufficient water available in 5034 or Hearne pits to supply the process plant with sufficient volume of reclaim water. The rationale for pumping pit water directly from Tuzo to process plant is to lock any high TDS pit water with fine PK into the mined-out Hearne Pit. This strategy will help obtaining better water quality in the Water Management Pond during operating and closure.</p>	<p>This response addresses the comment.</p>
13	Topic 9: Area 8 Downstream Supplement Flow	<p><b>Comment</b> Section 2.4.5 provides a description of activities related to the augmenting of downstream flow in Area 8. ENR understands that these activities are outlined in the Fisheries Act authorization and the Downstream Flow Mitigation Plan and as such have no comments at this time. If deviations from the aforementioned documents exist, they should be highlighted by DeBeers.</p> <p><b>Recommendation</b> 1) If deviations from the Fisheries Act authorization or the Downstream Flow Mitigation Plan related to downstream flow supplement in</p>	<p><b>May 27:</b> As was highlighted in Section 2.4.5 of the OWMP, "the downstream flow mitigation has been simplified from four categories originally presented in the downstream flow mitigation plan to three categories - wet, average, and dry. This change was made in order to better align with the expected sampling precision of annual snow-pack surveys which are used to predict the downstream flow regime for the subsequent season. "</p>	<p>This response addresses the comment.</p>



		Area 8 exist, ENR requests that specifics be highlighted by DeBeers.		
14	Topic 10: Monitoring	<p><b>Comment</b> Section 3 provides a description of activities related to monitoring. ENR understands that these activities are covered under the SNP, AEMP and Dyke Management Plans as referenced, and as such have no comments at this time. If deviations from the aforementioned documents exist, they should be highlighted by DeBeers.</p> <p><b>Recommendation</b> 1) If deviations from the SNP, AEMP or Dyke Construction Plans related to monitoring exist, ENR requests that specifics be highlighted by DeBeers.</p>	<b>May 27:</b> There are no deviations from the SNP, AEMP, or Dyke Management Plans.	Noted.
15	Topic 11: Action Levels - Groundwater	<p><b>Comment</b> Section 3.2.1 outlines the groundwater action levels. ENR understands these action levels were previously approved under the Groundwater Management Plan and as such ENR has no additional comments at this time. If deviations from this document exist, they should be highlighted by DeBeers.</p> <p><b>Recommendation</b> 1) If deviations from the Groundwater Management Plan related to groundwater action levels exist, ENR requests that they be highlighted by DeBeers.</p>	<b>May 27:</b> There are no deviations proposed from the approved Groundwater Management Plan.	Noted.
16	Topic 12: Action Levels “ Water Level and Discharge	<p><b>Comment</b> Section 3.2.2 outlines water level and discharge action levels related to Lake N11 and Area 8. ENR understands these action levels were previously approved under the AEMP Design Plan and as such ENR has no additional comments at this time. If deviations from this document exist, they should be highlighted by DeBeers.</p>	<b>May 27:</b> There are no deviations proposed from the action levels related to water level and discharge as defined in the AEMP Design Plan.	Noted.

		<b>Recommendation</b> 1) If deviations from action levels related to water level and discharge in the AEMP Design Plan exist, ENR requests that they be highlighted by De Beers.		
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**GNWT - Lands: Andrew Howton**

<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Response</b>
1	Section 2.4.4 Contaminated Snow/Ice and Water	<b>Comment</b> This section does not clearly specify the discharge criteria for water from bulk fuel storage facilities. It states "criteria as specified within the water license" but does not say which criteria within the water license or where in the license. <b>Recommendation</b> The discharge criteria should be listed within the Operational Water Management Plan document.	<b>May 27:</b> The discharge criteria (TPH = 5 mg/L) will be included within the text of the document as requested.	Acceptable response.  The section shall be updated with this information.

**MVLWB: Lindsey Cymbalisky**

<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Response</b>
1	Section 1.1 Project Overview (and everywhere else which mentions using the WMP and Area 7 as a source for downstream flow mitigation)	<b>Comment</b> It states that 'Water for Area 8 downstream flow mitigation will be sourced from Lake N11 and Lake A1 or from the WMP and Area 7 if the water quality in the WMP and Area 7 meets the discharge criteria.' <b>Recommendation</b> The Water Licence does not specify criteria for discharging water from Area 7 to Area 8, or from the WMP to Area 8 beyond one year. The EQC in the Water Licence for Area 8 were never intended to account for ongoing flow mitigation and were not designed with Area 7 discharge in mind. If De Beers plans to use water from Area 7 for flow mitigation in Area 8, they should propose, at a minimum, TSS criteria for this discharge (as well as criteria for any other	<b>May 27:</b> De Beers understands that an EQC Evaluation Report is required if discharge from the water management pond to Area 8 is anticipated for more than one year of operations.	Noted.

		potential parameters of concern that might be in the Area 7 water). Rationale for these criteria should be provided. Further, Board staff reminds De Beers that discharge from the WMP to Area 8 beyond one year of operations requires the submission of and EQC Evaluation Report as per Part G, item 34.		
2	Section 2.4.3 Sewage Water Management	<b>Comment</b> It states that 'Effluent from the STP will be tested regularly to ensure it meets the criteria as per the Water Licence prior to mixing with other waters or fine tailings and will be reported in the Annual Waste Management Plan Report.' <b>Recommendation</b> Please clarify what the 'Annual Waste Management Plan Report' is (maybe it should be the Annual Water Licence Report)?	<b>May 27:</b> The reviewer is correct. The sentence should have read "Annual Water License Report".	Acceptable response.  The sentence shall be updated with this information.
3	Section 2.4.4 Contaminated Snow/Ice and Water	<b>Comment</b> It states that 'Water which has accumulated within the bulk fuel storage facilities will be tested and discharged overland within the controlled area provided it meets the discharge criteria as specified within the Water Licence.' <b>Recommendation</b> The Water Licence does not specify criteria for this proposed discharge point. Please clarify what criteria De Beers is referring to.	<b>May 27:</b> Water from the fuel containment berms will be tested to determine the water quality in relation to Total Petroleum Hydrocarbons limit as stated within the Effluent Quality Criteria located in Part G, Item 30 of the Licence. If water quality meets this criteria, it will be discharged directly to the tundra within the controlled area boundary. If the tested water does not meet criteria, the water will be treated using an oil/water separator and discharged to the tundra within the controlled area boundary upon verification that the hydrocarbon levels are within the EQC.	Acceptable response.  The section shall be updated with this information.
4	Section 3.2.4.1 Action Level for Water Quality in Water Management	<b>Comment</b> It mentions that monitoring will be undertaken in the edge of the mixing zones (SNP 01 in Lake N11 and SNP 03) where action levels have been	<b>May 27:</b> Action levels as presented in Tables 8.4-1 and 8.4-2 of the AEMP Design Plan v5 (De Beers 2016) for water quality (including drinking water quality)	Acceptable response.  The plan shall be updated with

	Pond and Discharge Locations	developed. No action levels for the mixing zones are provided. <b>Recommendation</b> Further detail on the action levels for mixing zones is required.	will apply to the water quality data collected from the SNP edge of the mixing zone in Lake N11 and Area 8 during operational discharge to those receiving water bodies. These low action levels will be used to identify environmental change and avoid the occurrence of significant adverse mine-related changes to the aquatic ecosystem due to toxicological impairment and nutrient enrichment.	this information.
5	Section 3.3.9 Aufeis Monitoring	<b>Comment</b> This section discusses aufeis monitoring, but it is not tied to any action levels (for water discharge, for example). How is this monitoring used in the water management plan to support decision making? <b>Recommendation</b> Please describe how aufeis monitoring is linked to the action levels in this Plan.	<b>May 27:</b> In V6 of the Construction Water Management Plan which precedes the Operational Water Management Plan as the governing document of water management, aufeis development action levels were identical to water level action levels in that if the water/ice level elevation at the outlet of the receiving water body exceeded 0.6m above the zero discharge elevation, pumping will be ceased and monitoring will be implemented during freshet to document or mitigate any bank erosion that may occur (CWMP, V6, Section 2.2.1.8). DeBeers will add this specific information to the Operational Water Management Plan.	Acceptable response.  The plan shall be updated with this information.



Fisheries and Oceans Canada  
5204 – 50<sup>th</sup> Avenue  
Yellowknife, NT  
X1A 1E2

May 19, 2015

*Your file*      *Votre référence*  
MV2005L2-0015

*Our file*      *Notre référence*  
03-HCAA-CA6-00057

Mackenzie Valley Land and Water Board  
**Attention: Angela Love**  
Box 2130, 7<sup>th</sup> Floor, 4922- 48<sup>th</sup> St  
Yellowknife, NT X1A 2P6

Dear Ms. Love:

**Subject: De Beers Canada Inc. Gahcho Kué Project – Operational Water Management Plan Version 1- Request for Comments.**

The Fisheries Protection Program of Fisheries and Oceans Canada (DFO-FPP) would like to thank the Mackenzie Valley Land and Water Board (MVLWB) for the opportunity to provide comments on DeBeers Canada Inc.'s *Operational Water Management Plan* (Version 1) for the Gacho Kué project as required by Part G, item 4 of their Water Licence MV2005L2-0015.

As outlined in your request dated April 26, 2016, reviewers are invited to submit comments and recommendations to the MVLWB by May 19, 2016.

DFO-FPP has reviewed DeBeers *Operational Water Management Plan, Version 1* to provide comments related to the Program's mandate to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. DFO-FPP's Canada's comments are provided in the attached table.

If you have any questions, please contact Mark D'Aguiar at our Yellowknife office at 867-669-4911, or by email at [Mark.D'Aguiar@dfo-mpo.gc.ca](mailto:Mark.D'Aguiar@dfo-mpo.gc.ca). Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Jennifer Thomas  
A/Regional Manager, Regulatory Reviews  
Fisheries Protection Program

Copy: Mark D'Aguiar, DFO



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

Environmental Protection Operations Directorate  
Prairie & Northern Region  
5019 52<sup>nd</sup> Street, 4<sup>th</sup> Floor  
P.O. Box 2310  
Yellowknife, NT X1A 2P7

May 19, 2016

ECCC File: 5100 000 013/007  
MVLWB File: MV2005L2-0015

Angela Love  
Regulatory Officer  
Mackenzie Valley Land and Water Board  
7<sup>th</sup> Floor, 4922 48<sup>th</sup> Street  
P.O. Box 2130  
Yellowknife, NT X1A 2P6

Via online submission

**RE: MV2005L2-0015 – De Beers Canada Inc. – Gahcho Kue Mine – Operational Water Management Plan (Version 1)**

Attention: Angela Love

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board regarding the above-mentioned management plan. ECCC's specialist advice is provided based on our mandate, in the context of the *Canadian Environmental Protection Act*, the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

Should you require further information, please do not hesitate to contact me at (867) 669-4733 or [Melissa.Pinto@canada.ca](mailto:Melissa.Pinto@canada.ca).

Sincerely,

Melissa Pinto  
Environmental Assessment Coordinator

Attachment(s): ECCC Comments Excel Sheet

cc: Wade Romanko, Head, Environmental Assessment North (NT and NU)  
ECCC Review Team

May 19, 2016

Angela Love  
Regulatory Officer  
Mackenzie Valley Land and Water Board  
7<sup>th</sup> Floor – 4910 50<sup>th</sup> Avenue  
P.O. Box 2130  
Yellowknife, NT  
X1A 2P6

Dear Ms. Love,

**Re: DeBeers Canada Inc. – Gahcho Kue Mine  
Water Licence – MV2005L2-0015  
Operational Water Management Plan - Version 1  
Request for Comments**

The Department of Environment and Natural Resources has reviewed the plan at reference based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Forest Protection Act*, *Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

### **Topic 1: Timelines**

#### **Comment(s):**

DeBeers has requested a reduction in the designated period of time for submission prior to the initiation of operations of 15 days (45 days rather than 60 days).

Currently, Part G, Item 4 of the Water Licence reads as follows:

*“A minimum of sixty (60) days prior to the commencement of milling, the Licensee shall submit an Operational Water Management Plan to the Board for approval. The Plan shall meet the objectives listed in Part G, item 1, and satisfy the requirements of Schedule 5, item 2. The Licensee shall not commence Discharge from the Water Management Pond until the Board has approved the Plan.”*

DeBeers has also stated that:

*“A reduction in the number of days between submission of this plan and start of operations is not expected to have any effect or consequence on the environment. There will be no discharge from the water management pond between the date of initiation of operations and the date the Plan is approved (as per the license condition Part G, item 4). DeBeers will continue to manage water as per the approved Construction Water Management Plan V.6 until such time as the Operational Water Management Plan is approved.”*

Further, DeBeers notes that this reduced lead time will ensure that they are able to move into operations in the early summer of 2016 if construction progresses as currently forecast. It is not clear to ENR why 15 days would make any difference from an operational perspective given the potential start date is already anticipated (summer 2016). ENR notes that the time period established in the Water Licence is for review and approval processes.

However, ENR acknowledges that the Board may amend compliance dates within the Water Licence at its discretion.

**Recommendation(s):**

- 1) ENR does not object to this change should the Board wish to proceed, but cautions that water management activities associated with operations should not occur until an Operational Water Management Plan is approved.

**Topic 2: Groundwater Projections**

**Comment(s):**

Section 2.2.4 outlines water quality projections for the shallow and deep groundwater regimes associated with the open pits. Table 2.5 outlines the anticipated TDS concentrations in the passive pit inflows, but the anticipated proportions of shallow to deep groundwater used to calculate these projections is unclear.

This proportion is important as the amount of water to be managed and its quality will dictate the water quality in the Water Management Pond and ultimately impact water quality discharged to Lake N11. The timing of this discharge could also be affected (e.g. potentially making it less than 3 years).

**Recommendation(s):**

- 1) ENR recommends that DeBeers provide additional information and research results on the relative proportions of shallow to deep groundwater projected for each pit.



- 2) ENR recommends that DeBeers model pit water inflows and water quality if more deep groundwater and less shallow groundwater enter the pits – increase in deep water by 25 or 50%.

### **Topic 3: Water Management Pond/Areas 3 & 4**

#### **Comment(s):**

Table 2.6 outlines the predicted maximum concentrations in the Water Management Pond for a variety of parameters. While ENR appreciates that DeBeers has only provided information during the anticipated discharge period (3 years), information related to the projected water quality of the Water Management Pond through operations should be included.

Further as noted above, ENR requests that DeBeers describe how water quality within the Water Management Pond would change over the initial 3 years if more deep groundwater reports to the pits than anticipated.

#### **Recommendation(s):**

- 1) ENR recommends that DeBeers describe how water quality within the Water Management Pond would change over time if more deep groundwater reports to the pits.
- 2) ENR recommends that projected water quality in the Water Management Pond be included for the duration of operations - past the initial 3 years.
- 3) ENR recommends that the Water Management Plan be revised to include this information prior to approval.

### **Topic 4: Groundwater Projections**

#### **Comment(s):**

Section 2.2.4 states that deep groundwater is anticipated at 300m, based on Fritz and Frappe (1987) and the site drilling is “generally consistent” with this understanding. It is not clear the extent to which “generally consistent” refers.

A review of groundwater quality at depth in the North was provided during the Jay Project Review process. At a 300 meter depth water quality at Diavik was in the order of 400 mg/L range, at Ekati was estimated to be 1,050 mg/L and Frappe & Fritz is estimated to be 1,200 mg/L TDS. Note all of these have assumed depth profiles that are considered “generally consistent”. That figure includes groundwater data collected at Gahcho Kue. Many of the points lie higher than the Frappe & Fritz profile. Some are much lower and align with Diavik or Ekati data. ENR seeks clarity on if this has somehow effected the projected concentration by pit proposed in Table 2.5.

### Recommendation(s):

- 1) ENR recommends that DeBeers provide additional information on the extent to which site drilling results at the Gahcho Kue site is similar to groundwater characteristics noted in Fritz and Frape (1987) and which they are not.

### Topic 5: Groundwater Projections

#### Comment(s):

Table 2.5 outlines a projected reduction in TDS concentrations over time in each open pit as the mine plan progresses. ENR notes that experience at other mine sites has shown that concentrations of TDS increases as the depth of the pit increases, and that concentrations should remain constant at maximum depth. Further, rationale for such large TDS decreases in Hearne Pit should be fully described.

#### Recommendation(s):

- 1) ENR requests that DeBeers provide further rationale for specific TDS decreases for each open pit especially the large scale decrease in Hearne Pit.

### Topic 6: Open Pits

#### Comment(s):

Upon review of the Plan, it is unclear if at any point, mined out pits will be used to receive water from the Water Management Pond and/or other active pit(s).

For example, as per Table 2.9, if Hearne is completed while other pits are active, could any high TDS mine water be placed into Hearne to reduce mine water going into the Water Management Pond to aid in closure (i.e. assist in Kennady Lake reaching closure water quality objectives)?

Table 2.9 does not denote any water going into the pits; however, later in the Plan Section 2.3.3 states the Water Management Pond will be the primary reservoir for storage of mine water before the open pits (i.e. 5034 and Hearne Pits) are mined-out. Additionally, 2.3.7 states that:

*“After mining 5034 Pit is completed in Year 7, Tuzo Pit will be the only active pit, and water captured in the Tuzo Pit will be directed to the process plant to supplement process water requirements, **to the mined-out open pits**, or to the WMP.”* Emphasis added.

**Recommendation(s):**

- 1) ENR requests that DeBeers clarify if any of the mined out pits will be used for mine water storage from active pits. If not, GNWT requests that DeBeers outline rationale why this process cannot occur.
- 2) ENR recommends that the Water Management Plan be revised to clarify this prior to approval and include if and how decisions would be made to transfer pit water from Tuzo Pit.

**Topic 7: Hearne Pit****Comment(s):**

Figure 14 illustrates that during years 8-11, excess water is being dewatered from the mined out Hearne Pit and transferred to the Water Management Pond. It is unclear why water is still being moved out of Hearne Pit near the end of operations if the closure option for Hearne Pit is to be filled. DeBeers should outline if there are operational requirements (e.g. fine PK deposition) that require Hearne Pit to be dewatered during this period.

**Recommendation(s):**

- 1) ENR recommends that DeBeers clarify the rationale for moving excess water from Hearne Pit to the Water Management Pond during the final years of operations.

**Topic 8: Reclaim Water****Comment(s):**

Figures 13/14 and Section 2.3.8 outline that mine water from Hearne and 5034 are being pumped to the Water Management Pond prior to being used for reclaim water in the process plant while mine water from Tuzo is being pumped directly to the process plant. It is unclear why the different mine water is being handled differently.

**Recommendation(s):**

- 1) ENR requests that DeBeers clarify why water from different pits is to be treated differently prior to use as process water.

**Topic 9: Area 8 Downstream Supplement Flow****Comment(s):**

Section 2.4.5 provides a description of activities related to the augmenting of downstream flow in Area 8. ENR understands that these activities are outlined in the

*Fisheries Act* authorization and the Downstream Flow Mitigation Plan and as such have no comments at this time. If deviations from the aforementioned documents exist, they should be highlighted by DeBeers.

**Recommendation(s):**

- 1) If deviations from the *Fisheries Act* authorization or the Downstream Flow Mitigation Plan related to downstream flow supplement in Area 8 exist, ENR requests that specifics be highlighted by DeBeers.

**Topic 10: Monitoring**

**Comment(s):**

Section 3 provides a description of activities related to monitoring. ENR understands that these activities are covered under the SNP, AEMP and Dyke Management Plans as referenced, and as such have no comments at this time. If deviations from the aforementioned documents exist, they should be highlighted by DeBeers.

**Recommendation(s):**

- 1) If deviations from the SNP, AEMP or Dyke Construction Plans related to monitoring exist, ENR requests that specifics be highlighted by DeBeers.

**Topic 11: Action Levels - Groundwater**

**Comment(s):**

Section 3.2.1 outlines the groundwater action levels. ENR understands these action levels were previously approved under the Groundwater Management Plan and as such ENR has no additional comments at this time. If deviations from this document exist, they should be highlighted by DeBeers.

**Recommendation(s):**

- 1) If deviations from the Groundwater Management Plan related to groundwater action levels exist, ENR requests that they be highlighted by DeBeers.

**Topic 12: Action Levels – Water Level and Discharge**

**Comment(s):**

Section 3.2.2 outlines water level and discharge action levels related to Lake N11 and Area 8. ENR understands these action levels were previously approved under the AEMP Design Plan and as such ENR has no additional comments at this time. If deviations from this document exist, they should be highlighted by DeBeers.

**Recommendation(s):**

- 1) If deviations from action levels related to water level and discharge in the AEMP Design Plan exist, ENR requests that they be highlighted by De Beers.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the North Slave Region and were coordinated and collated by the Environmental Impact Assessment Section, Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email [patrick\\_clancy@gov.nt.ca](mailto:patrick_clancy@gov.nt.ca).

Sincerely,



Patrick Clancy  
Environmental Regulatory Analyst  
Environmental Impact Assessment Section  
Conservation, Assessment and Monitoring Division  
Department of Environment and Natural Resources  
Government of the Northwest Territories