



## Staff Report

<b>Applicant:</b> De Beers Canada Inc.	
<b>Location:</b> Kennady Lake, NT	<b>Application:</b> MV2005L2-0015
<b>Date Prepared:</b> April 13, 2016	<b>Meeting Date:</b> April 18, 2016
<b>Subject:</b> Updated Construction 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) an update to the Construction Water Management Plan (Plan) (Version 6) as submitted by De Beers Canada Inc. (De Beers) under Water Licence (Licence) MV2005L2-0015 for decision.

### 2. Background

- December 16, 2014 – Version 3 of the Plan is conditionally approved by the Board;
- December 20, 2014 – De Beers submits the revised Plan (Version 4) to address the requested updates as outlined in the Board’s conditional approval letter;
- December 22, 2014 – Written confirmation of conformity is granted by Board staff;
- February 11, 2015 – De Beers submits a revised Plan (Version 5) with proposed changes to the discharge rate and the compliance date;
- February 12, 2015 – Revised Plan (Version 5) is approved by the Board;
- March 30, 2016 – De Beers submits a revised Plan (Version 6) to the Board;
- March 31, 2016 – Revised Plan (Version 6) distributed for review;
- April 8, 2016 – Reviewer comments and recommendations due;
- April 11, 2016 – Proponent responses due; and,
- **April 18, 2016 – Board package presented to the Board.**

### **3. Discussion**

#### Background

Following issuance of the Licence on September 24, 2014, this Plan was first considered approved by the Board on December 22, 2014. De Beers subsequently submitted a revised Plan on February 11, 2015 to increase the discharge rate to Lake N11. This Plan (Version 5) was approved February 12, 2015.

#### Requested Change

On March 30, 2016, De Beers submitted the revised Plan (Version 6) to the Board for decision. This revision includes specific details regarding proposed winter pumping of annual runoff water from Lake A1 to Lake J1. The intent of the proposed winter pumping is to prevent annual freshet water from flowing into the Water Management Pond prior to the completion of Dyke A1. An independent study regarding the outlet of Lake J1 is included in support of this proposal.

### **4. Comments**

Although pumping from Lake A1 to Area 8 via Lake J1 was included in previous versions of the Plan, the timing of this pumping was not specified, and details regarding the potential impacts and mitigations of winter pumping through Lake J1 were not provided. Information regarding the potential impacts and mitigations for winter pumping in other areas were provided in previous versions of the Plan, and this revised Plan applies this information to Lake J1.

### **5. Reviewer Comments**

By April 8, 2016, comments and recommendations on the updated Plan were received from 3 reviewers:

- Environment and Climate Change Canada (no comments);
- Fisheries and Oceans Canada (no comments); and
- Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR).

De Beers responded on April 11, 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.

## 7. Conclusion

Board staff concludes that the updates to the Plan will not adversely affect the receiving or downstream environment.

## 8. Recommendation

Board staff recommends that the Board approve the Construction Water Management Plan (Version 6) as submitted March 30, 2016.

## 9. Attachments

- [Construction Water Management Plan \(Version 6\)](#);
- Review Comment Summary Table; and
- Draft Decision Letter from the Board.

Respectfully Submitted,



Angela Love  
Regulatory Officer



Lindsey Cymbalisky  
Technical Advisor

Reviewed by,



Rebecca Chouinard  
Regulatory & Technical Director

## Review Comment Table

<b>Board:</b>	MVLWB
<b>Review Item:</b>	De Beers Gahcho Kue - Construction Water Management Plan - V.6 - 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="#">Construction Water Management Plan - V.6</a> (9 MB)
<b>Item For Review Distributed On:</b>	Mar 31 at 11:46 <a href="#">Distribution List</a> Mar 31 at 11:47 <a href="#">Distribution List</a>
<b>Reviewer Comments Due By:</b>	Apr 8, 2016
<b>Proponent Responses Due By:</b>	Apr 11, 2016
<b>Item Description:</b>	<p>In accordance with the requirements of Water Licence MV2005L2-0015, De Beers Canada Inc. has submitted their Construction Water Management Plan to the Mackenzie Valley Land and Water Board.</p> <p>The updated Construction Water Management Plan (Plan) (Version 6) contains specific details to describe the anticipated under-ice pumping of annual runoff water from Lake A1 to Lake J1. The annual runoff pumping at Lake A1 was included in the previous versions of the Plan, but specific details regarding the timing of the pumping were not. As such, Version 6 of the Plan includes specific details regarding initiation of pumping from Lake A1 to LAke J1 prior to freshet under-ice in Year -1.</p> <p>Please submit comments using the Online Review System by downloading the excel comment table or using the "add comment" button by 5:00 pm MST on April 8, 2016.</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>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>	Angela Love 867-766-7456 Jen Potten 867-766-7468

## 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 No Comments <b>Recommendation</b>	Acknowledged	
Fisheries and Oceans Canada: Mark D'Aguiar				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
1	No comments or concerns	<b>Comment</b> Fisheries and Oceans Canada- Fisheries Protection Program has reviewed the CWMP V.6 and has no comments or concerns. <b>Recommendation</b> n/a	Acknowledged	
GNWT - ENR: Central Email GNWT				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
17	General File	<b>Comment</b> ( <a href="#">doc</a> ) ENR Letter with Comments and Recommendations <b>Recommendation</b>	Acknowledged	
1	Topic 1: Scope of Review	<b>Comment</b> As per the description provided on the Online Review System: "The updated Construction Water Management Plan (Plan) (Version 6) contains specific details to describe the anticipated under-ice pumping of annual runoff water from Lake A1 to Lake J1. The annual runoff pumping at Lake A1 was included in the previous versions of the Plan, but specific details regarding the timing of the pumping were not. As such, Version 6 of the Plan includes specific details regarding initiation of pumping from Lake A1 to Lake J1 prior to freshet under-ice in Year -1." As such, ENR's review was specific to Section 2.2.3, as noted in De Beers' Revision History, and the Golder Memo in Appendix D as	Acknowledged	Acceptable response. The scope of the review was limited to the revisions noted by ENR. De Beers did not identify any additional revisions.

		<p>noted in the March 30th, 2016 letter.</p> <p><b>Recommendation</b> 1) ENR recommends that if there have been other revisions undertaken by De Beers within Version 6 of the Water Management Plan, they should be highlighted for appropriate review by the Board and stakeholders. The scope of ENR's review was limited to Section 2.2.3 and Appendix D.</p>		
2	Topic 2: Discharge Location	<p><b>Comment</b> Appendix D, Section 2.0 makes the assumption that the majority of Lake J1 will be frozen to the bed and that discharge will likely be distributed across the ice surface, unless they are discharged to a deeper location with free water below the ice. In Section 5 of Appendix D, it is recommended that the diffuser be placed at the location of maximum water-ice depth. Section 2.2.3 does not specify whether water will be discharged to the ice surface as assumed in Appendix D or to a deeper location within Lake J1 as recommended later in Appendix 2. This is of importance as there are different risks associated with both discharge locations. A short list of impacts from pumping under ice in Lake J1 include destratification of anoxic layers, introduction of low DO to overwintering fish, increased bed erosion and TSS to levels that effect fish, etc. A short list of impacts from pumping to ice surface include overflow or aufeis development, safety concerns for wildlife, and flooding and erosion of shoreline and stream channels connecting lakes in the area.</p> <p><b>Recommendation</b> 1) ENR</p>	<p>De Beers assumes the reviewer meant Lake J1 not D1.</p> <p>De Beers does not agree with the recommendation for additional review. The requested information is provided within the CWMP and directly addressed here. Although the memo from Golder, included as Appendix D, allows for the discharge of water over ice, De Beers will not discharge water over-ice. De Beers is proposing to conduct winter discharge with the same methods that have been previously used to dewater Kennady Lake (i.e., to Area 8 from Area 7, and to Lake N11 from Area 3).</p> <p>The discharge to Lake J1 will occur under ice to a deeper section of Lake J1 as is indicated in Figure E-13 of Appendix D. This under-ice discharge is only planned to occur in 2016, to support the construction of Dyke A1. Water will be discharged through a submerged diffuser upwards in the water column to mitigate any possibility of scouring or lake bed erosion. This discharge design was used successfully at both Lake</p>	<p>Acceptable response. This information should have been more clearly detailed in the revised Plan; however, De Beers has identified the potential impacts and plans to implement appropriate mitigations and adaptive management actions.</p>

		<p>recommends that De Beers clarify whether the location of discharge from Lake A1 to D1 is below the ice or directly to the ice surface. Once the clarification is provided, a review of the proposed method should occur.</p>	<p>N11 and Area 8 through 2014 and 2015. While the recommended maximum flow rate for A1 to J1 has been calculated to be 0.126m<sup>3</sup>/s, the current infrastructure on site has a restrictions that will see the maximum achievable flow rate of approximately 0.1m<sup>3</sup>/s which will add an exceptional level of protection against aufeis generation.</p> <p>Like other small lakes in the Kennady Lake watershed, Lake J1 will have anoxic layers due to its relatively shallow (~4m) depth, and in the late stage of winter during which the discharge is planned. This lake, and others similar to it in the watershed, are presumed to provide limited overwintering habitat to fish because of its relatively shallow depth; however, dewatering discharge from Lake A1 will provide supplemental dissolved oxygen to the lake, which is slightly earlier than typically occurs each year (saturated dissolved oxygen conditions tends to occur in early May once snow melt starts to enter the lake and lake margin ice melts away [Faithful 2016]).</p> <p>Additionally, TSS concentrations will be monitored daily in the discharge to Lake J1 throughout the pumping period. TSS concentrations will be monitored to make sure that they do not exceed EQC criteria for TSS (i.e., 12 mg/L maximum average concentration, or 20 mg/L Maximum Grab</p>	
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			<p>concentration); if TSS levels rise above the action levels set in the CWMP, pumping will cease until monitoring data show that TSS levels have recovered.</p> <p>Ref: Faithful, J.W. 2016. Physico-chemical changes in two northern headwater lakes in the Northwest Territories, Canada, during winter to spring transitions. Journal of Great Lakes Research. 42, 167-172. DOI 10.1016/j.jglr.2016.01.004.</p>	
3	Topic 3: Lake A1	<p><b>Comment</b> The requirement for under-ice pumping from Lake A1 to Lake D1 is related to the need to prevent water from entering the Water Management Pond (Kennady Lake). It is noted that currently there is only a cofferdam in place at the outlet of Lake A1.</p> <p><b>Recommendation 1)</b> ENR requests an update on the timeline related to the construction of the A1 dike.</p>	<p>The dyke A1 coffer dam is scheduled for initiation in April and completion in May. Dyke A1 is scheduled for completion in June.</p>	Acceptable response.
4	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR requests clarification on whether under-ice discharge from Lake A1 to Lake J1 will be required beyond the 2016 season.</p>	<p>Discharge from Lake A1 to lake J1 under ice is not anticipated to be required once Dyke A1 is complete. Details regarding the anticipated schedule for annual discharge during Operations will be provided in the Operational Water Management Plan to be submitted in Q2 2016.</p>	Acceptable response.
5	Topic 4: Lake A1 Water Levels	<p><b>Comment</b> De Beers notes that the proposal includes lowering the water level of Lake A1 from the natural elevation of 421.3m to 421.0m. It is not clear why a 30 cm reduction in water level will provide the necessary contingency to prevent water from entering the Water Management Pond area. The water level compared to the elevation of the cofferdam or</p>	<p>See Table in A1 Elevation Tab</p>	<p>It is unclear what De Beers is referring to in its response; however, it is likely that De Beers evaluated the operational risks associated with this proposed change, and the requested</p>



		<p>the elevation of the proposed A1 dike design is not provided. This information will provide a better understanding of available contingency storage and implications in the event that downstream monitoring in Lake J1 indicates that pumping to the Lake J1 area should be reduced or suspended.</p> <p><b>Recommendation 1)</b> ENR requests that De Beers provide a table which includes natural and altered elevations of Lake A1, the cofferdam and the A1 dike and provide an indication of the contingency volumes available with the proposed water level of 421.0m.</p>		<p>information does not seem to be necessary to evaluate the potential environmental impacts. Appropriate monitoring and action levels have been provided for the identified environmental risks.</p>
6	Topic 5: Monitoring	<p><b>Comment</b> As noted in the Water Management Plan, the discharge of water during the winter season to Lake J1 may have the potential to enhance aufeis production in the outlet. This had already been identified in other areas of the Gahcho Kue project and as such monitoring programs have been developed to ensure the detection of any aufeis development in areas downstream of winter discharge locations. Aufeis may result in ice blockages which may lead to unexpected flow diversions and erosion issues. Appendix D, Section 5 recommends that "the Lake J1 outlet be checked during WSE monitoring" and that if "ice blockages at the narrow sections between the basins or at the Lake J1 outlet are impeding the flow of water, mitigation may include careful trenching to allow for the movement of water or supplemental pumping." ENR notes that the timing and frequency of these inspections is not provided.</p>	<p>De Beers will monitor the narrow section between the two basins of Lake J1, and the outlet of Lake J1 weekly during winter dewatering. Additionally, pumped discharge would enter the upstream basin; water transfer from the pumping would be from the upstream basin to downstream basin, which would equalize the hydrostatic water levels in the two basins. Weekly inspections will be initiated concurrently with pumping and will continue throughout the winter pumping period. Weekly inspections will include measuring the lake elevation, ice thickness, and aufeis development.</p>	<p>Acceptable response.</p>

		<p>Further, supplemental pumping in the event of a blockage may make the problem worse.</p> <p><b>Recommendation 1)</b> ENR recommends that De Beers clarify the timing and frequency of inspections of the narrow sections between the basins and the Lake J1 outlet to ensure there are no ice blockages impeding the flow of water.</p>		
7	None	<p><b>Comment</b> None</p> <p><b>Recommendation 2)</b> ENR recommends that De Beers outline all methods available to them to avoid issues associated with ice blockages at narrow sections between basins. This should include a decision to reduce or stop winter discharges until spring freshet.</p>	<p>As stated in GNWT-ENR-6, De Beers will monitor the narrow section between the basins and Lake J1 outlet weekly during winter dewatering. Weekly inspections will include measuring the lake elevation, ice thickness, and aufeis development. De Beers will monitor TSS and flow on a daily basis. De Beers will also cease de-watering if aufeis reaches 0.6 m at J1A or at the outlet of J1B consistent with the Construction Water Management Plan. The pumping rate will be reduced if the J1 water level under ice-covered conditions is above its 10-year annual discharge elevation.</p>	Acceptable response
8	Topic 6: Appendix D	<p><b>Comment</b> Appendix D, Section 3.0 notes the surface area of Lake J1 however the value is listed in m3. It is unclear if this is actually a volume or should be a surface area.</p> <p><b>Recommendation 1)</b> ENR requests that De Beers clarify the surface area of Lake J1.</p>	<p>The surface area of Lake J1 is 504,713 m2 (EIS, Annex H, H.IV-3)</p>	Acceptable response



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

April 8, 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 – Construction Water Management Plan (Version 6)**

Attention: Angela Love

Environment and Climate Change Canada has reviewed the information submitted to the Mackenzie Valley Land and Water Board from De Beers Canada Inc. (the Proponent) regarding the above-mentioned water management plan and has no comments at this time.

The Proponent is still required to comply with its obligations under relevant legislation, including 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

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

April 8, 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  
Construction Water Management Plan Version 6.0  
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: Scope of Review**

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

As per the description provided on the Online Review System:

*“The updated Construction Water Management Plan (Plan) (Version 6) contains specific details to describe the anticipated under-ice pumping of annual runoff water from Lake A1 to Lake J1. The annual runoff pumping at Lake A1 was included in the previous versions of the Plan, but specific details regarding the timing of the pumping were not. As such, Version 6 of the Plan includes specific details regarding initiation of pumping from Lake A1 to Lake J1 prior to freshet under-ice in Year -1.”*

As such, ENR’s review was specific to Section 2.2.3, as noted in De Beers’ Revision History, and the Golder Memo in Appendix D as noted in the March 30<sup>th</sup>, 2016 letter.

**Recommendation(s):**

- 1) ENR recommends that if there have been other revisions undertaken by De Beers within Version 6 of the Water Management Plan, they should be highlighted for appropriate review by the Board and stakeholders. The scope of ENR's review was limited to Section 2.2.3 and Appendix D.

**Topic 2: Discharge Location****Comment(s):**

Appendix D, Section 2.0 makes the assumption that the majority of Lake J1 will be frozen to the bed and that discharge will likely be distributed across the ice surface, unless they are discharged to a deeper location with free water below the ice. In Section 5 of Appendix D, it is recommended that the diffuser be placed at the location of maximum water-ice depth.

Section 2.2.3 does not specify whether water will be discharged to the ice surface as assumed in Appendix D or to a deeper location within Lake J1 as recommended later in Appendix 2. This is of importance as there are different risks associated with both discharge locations.

A short list of impacts from pumping under ice in Lake J1 include destratification of anoxic layers, introduction of low DO to overwintering fish, increased bed erosion and TSS to levels that effect fish, etc.

A short list of impacts from pumping to ice surface include overflow or aufeis development, safety concerns for wildlife, and flooding and erosion of shoreline and stream channels connecting lakes in the area.

**Recommendation(s):**

- 1) ENR recommends that De Beers clarify whether the location of discharge from Lake A1 to D1 is below the ice or directly to the ice surface. Once the clarification is provided, a review of the proposed method should occur.

**Topic 3: Lake A1****Comment(s):**

The requirement for under-ice pumping from Lake A1 to Lake D1 is related to the need to prevent water from entering the Water Management Pond (Kennady Lake). It is noted that currently there is only a cofferdam in place at the outlet of Lake A1.

**Recommendation(s):**

- 1) ENR requests an update on the timeline related to the construction of the A1 dike.
- 2) ENR requests clarification on whether under-ice discharge from Lake A1 to Lake J1 will be required beyond the 2016 season.

**Topic 4: Lake A1 Water Levels****Comment(s):**

De Beers notes that the proposal includes lowering the water level of Lake A1 from the natural elevation of 421.3m to 421.0m. It is not clear why a 30 cm reduction in water level will provide the necessary contingency to prevent water from entering the Water Management Pond area. The water level compared to the elevation of the cofferdam or the elevation of the proposed A1 dike design is not provided.

This information will provide a better understanding of available contingency storage and implications in the event that downstream monitoring in Lake J1 indicates that pumping to the Lake J1 area should be reduced or suspended.

**Recommendation(s):**

- 1) ENR requests that De Beers provide a table which includes natural and altered elevations of Lake A1, the cofferdam and the A1 dike and provide an indication of the contingency volumes available with the proposed water level of 421.0m.

**Topic 5: Monitoring****Comment(s):**

As noted in the Water Management Plan, the discharge of water during the winter season to Lake J1 may have the potential to enhance aufeis production in the outlet. This had already been identified in other areas of the Gahcho Kue project and as such monitoring programs have been developed to ensure the detection of any aufeis development in areas downstream of winter discharge locations. Aufeis may result in ice blockages which may lead to unexpected flow diversions and erosion issues.

Appendix D, Section 5 recommends that “the Lake J1 outlet be checked during WSE monitoring” and that if “ice blockages at the narrow sections between the basins or at the Lake J1 outlet are impeding the flow of water, mitigation may include careful trenching to allow for the movement of water or supplemental pumping.”

ENR notes that the timing and frequency of these inspections is not provided. Further, supplemental pumping in the event of a blockage may make the problem worse.

**Recommendation(s):**

- 1) ENR recommends that De Beers clarify the timing and frequency of inspections of the narrow sections between the basins and the Lake J1 outlet to ensure there are no ice blockages impeding the flow of water.
- 2) ENR recommends that De Beers outline all methods available to them to avoid issues associated with ice blockages at narrow sections between basins. This should include a decision to reduce or stop winter discharges until spring freshet.

**Topic 6: Appendix D**

**Comment(s):**

Appendix D, Section 3.0 notes the surface area of Lake J1 however the value is listed in m<sup>3</sup>. It is unclear if this is actually a volume or should be a surface area.

**Recommendation(s):**

- 1) ENR requests that De Beers clarify the surface area of Lake J1.

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  
Conservation, Assessment and Monitoring Division  
Department of Environment and Natural Resources  
Government of the Northwest Territories