1. Purpose/Report Summary


2. Background

- April 4, 2012 – Issuance of Licence MV2011L2-0004; including approval of North Pile Management Plan;
- July 26, 2012 – Updated Plan submitted to Board;
- August 17, 2012 – Board acknowledged Updated Plan and requested resubmission following completion of forthcoming Risk Assessment in September 2012;
- February 27, 2014 – Board requested submission of 2014 Plan;
- June 8, 2014 – 2014 Plan received;
- October 9, 2014 – Board approved 2014 Plan;
- January 30, 2018 – 2018 Plan received;
- February 1, 2018 – Review commenced;
- February 27, 2018 – Reviewer comments and recommendations due and received;
- March 6, 2018 – Responses received;
- April 12, 2018 – 2018 Plan presented to the Board for decision.

3. Discussion

Submission History

A North Pile Management Plan was submitted with De Beers’ Application for Licence MV2011L2-0004, and was approved upon Licence issuance on April 4, 2012. Part E, condition 7 of Licence MV2011L2-0004 states the following:
<table>
<thead>
<tr>
<th><strong>Board:</strong></th>
<th>MVLWB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Review Item:</strong></td>
<td>De Beers Canada Inc. - Snap Lake - North Pile Management Plan (MV2011L2-0004 &amp; MV2017D0032)</td>
</tr>
</tbody>
</table>
| **File(s):** | MV2011L2-0004  
MV2017D0032 |
| **Proponent:** | De Beers Canada Inc. - Snap Lake |
| **Document(s):** | North Pile Management Plan (15MB) |
| **Item For Review Distributed On:** | Feb 1 at 15:51 Distribution List |
| **Reviewer Comments Due By:** | Feb 27, 2018 |
| **Proponent Responses Due By:** | Mar 6, 2018 |

**Item Description:**


Reviewers are invited to submit questions, comments, and recommendations on this submission by **Tuesday February 27, 2018 at 5pm MST.**

All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments regarding this submission or using the Online Review System, please contact Kierney Leach at 867-766-7470 or kleach@mvlwb.com.

**General Reviewer Information:**

In addition to the email distribution list, the following organizations received review materials by fax:

- Fort Resolution Métis Council - Trudy King (867) 394-3322
- Hay River Metis Council - Trevor Beck, President (867) 874-4472
- NWT Metis Nation - Tim Heron, NWTMN IMA Coordinator (867) 872-3586

**Contact Information:**

Jacqueline Ho 867-766-7465  
Jen Potten 867-766-7468  
Kierney Leach 867-766-7470
February 27, 2018

Jacqueline Ho  
Regulatory Officer  
Mackenzie Valley Land and Water Board  
7th Floor – 4910 50th Avenue  
P.O. Box 2130  
Yellowknife, NT  
X1A 2P6

Dear Ms. Ho,

Re:  DeBeers - Snap Lake  
Water Licence – MV2011L2-0004  
North Pile Management Plan  
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the manual at reference based on its mandated responsibilities under the Environmental Protection Act, the Forest Management Act, the Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act and the Wildlife Act and provides the following comments and recommendations for the consideration of the Board.

**Topic 1: Surveillance – Seepage Monitoring – Water Quality**

**Comment(s):**

Information on the water quality of lakes and rivers in the Northwest Territories (NWT) that is collected on a regular basis by industry, as part of their various monitoring programs, represents a large source of water quality knowledge. This knowledge could inform decision makers about trends and natural variation in water quality in the NWT, as well as the cumulative effects from multiple use activities within an area or region. However, in order to use this information to understand water quality conditions in the NWT, the information must first be available in an accessible format.

It is important to provide metadata that provides context for the water quality data. Metadata refers to a description of data that was collected as part of a water quality
sampling program, and includes field conditions and a description of laboratory analyses conducted. Metadata standards are required to ensure the proper use and interpretation of the data by the users.

**Recommendation(s):**

1) CIMP, ENR recommends that De Beers Canada should submit water quality data associated with their Annual Water Use Report to the public registry in an accessible format (e.g., csv or spreadsheet file).

2) CIMP, ENR recommends that DeBeers Canada complete the attached metadata template annually in the same spreadsheet as the associated water quality data and submit it to the public registry in an accessible format (e.g., csv or spreadsheet file).

**Topic 2: Metadata Template Attachment**

**Comment(s):**

CIMP ENR has attached the Metadata Template for use by the proponent.

**Recommendation(s):**

1) CIMP ENR recommends that the Board require the use of the attached Metadata Template to ensure consistency of reporting of data.

**Topic 3: Sump Water Levels**

**Comment(s):**

A statement in Section 1.1 identifies that action will be taken if sump levels are seen to be rising and reach a level beyond safe capacity, i.e. above freeboard levels. A further statement in this section indicates that:

“Should a sump level be identified as trending towards a risk of over-topping at the crest elevation, an excavator will be used to remove ice, thereby opening capacity in the sump,”

These statements do not appear to align with Section 2.5.2 which identify that the sumps are to be maintained at “lowest practical level”, i.e. 15 to 17% of capacity, or with similar statements in the Starter Cell and West Cell design documents, which also suggest that sump water levels will be maintained at the lowest possible level.
For example, Section 3.4 in the Snap Lake Mine West Cell Perimeter Water Control Structures Detailed Design document includes the following design consideration:

“The sump will provide short-term storage prior to the pumping of the water to the WMP. It is important to note that the sump is not designed to perform as a long-term water storage facility. Active pumping during freshets and periods of high precipitation should be expected. It is recommended that pumping infrastructure be provided to maintain the minimum practicable water level within the sump at all times.”

ENR notes that triggering a response action after allowing the water level to exceed the freeboard level, as is implied by the statement in Section 1.1, does not appear to align with the design intent of these structures.

**Recommendation(S):**

1) ENR recommends that De Beers review the response action triggers for water levels in the sumps and set more reasonable actions levels that will keep water levels in the sumps as low as possible.

**Topic 4: Reference to Applicable Legislation**

**Comment(s):**

Section 2.0 refers to the Northwest Territories Waters Act (1992). This applicable legislation for the site is now the Waters Act.

**Recommendation(s):**

1) ENR recommends that the legislative reference be updated.

2) ENR recommends that the definitions from the previous Northwest Territories Waters Act (1992) that are quoted in Section 2.0 be updated with wording from the current legislation.

**Topic 5: Embankment Seepage**

**Comment(s):**

Section 3.2, 3. states:

"The embankments are constructed to promote the drainage of water from the North Pile and through the embankments themselves. Therefore, the quantity and rate of seepage from the North Pile does not adversely impact the stability of the"
facility." This does not appear to be consistent with Table 1 in Appendix A that provides Response Framework Threshold Values for seepage through perimeter embankments. For example, a “Concern Situation” related to perimeter embankment seepage would be “Turbid seepage”, or “Visible seepage higher on downstream slope or higher rate than historically observed”. A “Buffer Situation” would be “Visible seepage higher on downstream slope or higher rate continuously increasing from historical observations.”

Recommendation(s):

1) ENR recommends that De Beers confirm the acceptable levels of treatment through the North Pile embankments.

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

Sincerely,

[Signature]

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

Att: Metadata Template
February 23, 2018

Via online submission

Jacqueline Ho
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th Street
P.O. Box 2130
Yellowknife, NT X1A 2P6

Dear Ms. Ho:


Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board (MVLWB) regarding the above-mentioned management plan and is submitting comments via the online review system. 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.

Sincerely,

[original signed by]

Melissa Pinto
Senior Environmental Assessment Coordinator

Attachment(s): ECCC Comments Excel Sheet

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU)
ECCC Review Team
February 27, 2018

Re: North Pile Management Plan

Dear Ms. Leach,

Snap Lake Environmental Monitoring Agency (SLEMA) has reviewed the North Pile Management Plan. Enclosed please find the Comment Table.

If you have any questions whatsoever please feel free to contact the undersigned at 867-765-0961 / exec@slema.ca.

Sincerely,

Original signed by

Philippe di Pizzo
Executive Director
## Comment Summary

<table>
<thead>
<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
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<tbody>
<tr>
<td>1</td>
<td>General File</td>
<td>Comment (doc) ECCC Cover Letter Recommendation</td>
<td>Noted.</td>
<td></td>
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<tr>
<td>2</td>
<td>Section 1.1 Background Page 2 (pdf page 9), 4th bullet point</td>
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</table>
**Comment** De Beers Canada Inc. (the Proponent) states that "The potential for release of fine PK dust from a drying surface within the inactive North Pile is not expected, but in the event that it occurs it will be managed appropriately". ECCC notes there is no detail how the Processed Kimberlite (PK) dust will be managed in the event that it is released from the drying surface of the North Pile.  
**Recommendation** ECCC recommends that the Proponent provide clarification on how PK dust will be managed in the event that it occurs on the North Pile. | Mar 6: De Beers notes that dust monitoring and management is current covered under the Air Quality and Emissions monitoring report and the Snap Lake Interim Closure and Reclamation Plan. Duplicating content between reports is redundant. | De Beers’ response addresses the comment. |
| 3  | Section 2.5.2 North Pile Facility Infrastructure and Performance (2a) vii b. and c.; Sump Sequencing Page 18 (pdf page 25) | 
**Comment** It appears that numbered bullets are missing.  
**Recommendation** ECCC recommends that the missing bullets be added/corrected. | Mar 6: This will be corrected in the final version of the report. |  |
| 4  | Section 2.5.2 North Pile Facility Infrastructure and Performance (2a) vii b. and c.; Microfiltr | 
**Comment** All brine from the new Reverse Osmosis treatment system will be pumped to the underground workings. Returning the brine underground will increase salinity of the flooded works; will the quantity to be disposed of affect the quality of minewater at closure?  
**Recommendation** ECCC recommends that the Proponent identify any changes to the quality of water in the | Mar 6: As per De Beers Resonse to Comments ECMP v2 :De Beers removed contaminated materials from the underground prior to commencing flooding, which ensured that the surface and groundwater are not contaminated - this was verified by the GNWT Inspector during bi-weekly inspections of the underground. The estimated volume of surface waters to manage each year is approximately 400,000 m3. This water is expected to have high TDS levels and to have | De Beers’ response addresses the comment. |
| ation & Reverse Osmosis Units Page 23 (pdf page 30) | flooded underground works which may result from disposal of the brine waste stream to the underground works. | a similar chemical signature as the underground mine water encountered during mining operations. The chemical composition and nature of connate water at Snap Lake was the subject of EA1314-02 requiring De Beers to treat the deep connate water and develop EQCs and SSWQOs that are protective of Snap Lake. De Beers notes that the surface water can be dealt with in one of three ways: 1. Discharged to Snap Lake if it meets the EQC's. 2. Discharged underground if it does not meet the EQC's. 3. Treated and discharged to Snap Lake and with process residuals being discharged underground. De Beers expects approximately 30-50% of the surface waters will be discharged underground. At the time of the May 2017 overtopping of the fresh-air raise De Beers had pumped a total of approximately 30,000 m³ of water underground to the 5180 level. Upon identification of the overtopping De Beers then ceased pumping underground and obtained emergency discharge authorization from the GNWT Inspector until the cessation of freshet (refer to spill follow up report and subsequent water management updates). De Beers' authorization did not allow for the recommencement of pumping surface water underground until after the site was stabilized and the emergency authorization discontinued. The overtopping was caused by the initially high pumping rates and faster than expected refilling rate. Upon recommencing with water pumping to the underground it was at a substantially reduced rate of approximately 2000 m³ per day or less. At this rate, the water level in the mine workings remained relatively constant. De Beers will continue to discharge TDS water underground to the 5180 level (consistent with the MVLWB approved water management plan) approximately 260 m below the mine entrance. This discharge is into the deeper connate (saline) waters already present at those depths in the mine workings. This deep saline water forms a chemocline within the underground mine. |
water column, which restricts this water from rising due to its density. Connate water in the underground workings and the De Beers Notes the following for the decision note from Board Staff: Board Staff note the water management practices are approved under the Water Management Plan, and that Snap Lake water quality is monitored and analyzed through the Surveillance Network Program (SNP) and Aquatic Effects Monitoring Program (AEMP). SNP monitoring would foreseeably detect a large input of TDS into Snap Lake. Board Staff note that the AEMP Design Plan notes TDS as one of the major mine-related stressors and notes various TDS pathways of aquatic effects; however, the concentration of TDS in Snap Lake has been decreasing since the mine has ceased operation. Board Staff recommend that De Beers ensure that AEMP annual reporting specifically and adequately accounts for this decreasing trend as they analyze for potential contaminants.

5
Section 3.1 Details and Rationale for Monitoring (2b) i. a.; Inspections Page 26 (pdf page 33) Comment This section references routine daily and weekly inspections at the North Pile Facility. Elsewhere in the document (e.g. page 3, 5th paragraph) there are references to monthly site visits. Frequency should be clarified. Recommendation ECC recommends that the Proponent clarify frequency of inspections of the North Pile facility.

Mar 6: The North Pile Facility is inspected bi-weekly between the months of October through to April (with an onsite presence). Weekly inspections occur between the months of May through to September. Daily inspections occur during any construction/maintenance works of the North Pile facilities. Should an unwanted anomaly (such as sloughing or cracking) be observed during inspection, inspection frequency is increased. Also, after a large rainfall event and during freshet frequency of investigations is increased. Reporting is monthly between the months of October through to April, and bi-weekly through the months of May to September.

Board staff recommend De Beers include this additional detail in the North Pile Management Plan and ensure all references to the frequency of inspections are consistent.

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<tr>
<td>8</td>
<td>General File</td>
<td>Comment (<a href="#">doc</a>) ENR Letter with Comments, Recommendations and Metadata Attachment Recommendation</td>
<td></td>
<td>Noted.</td>
</tr>
<tr>
<td>9</td>
<td>General File</td>
<td><strong>Comment</strong> (doc) Metadata Template Attachment <strong>Recommendation</strong></td>
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<td>Topic 1: Surveillance “Seepage Monitoring” Water Quality</td>
<td><strong>Comment</strong> Information on the water quality of lakes and rivers in the Northwest Territories (NWT) that is collected on a regular basis by industry, as part of their various monitoring programs, represents a large source of water quality knowledge. This knowledge could inform decision makers about trends and natural variation in water quality in the NWT, as well as the cumulative effects from multiple use activities within an area or region. However, in order to use this information to understand water quality conditions in the NWT, the information must first be available in an accessible format. It is important to provide metadata that provides context for the water quality data. Metadata refers to a description of data that was collected as part of a water quality sampling program, and includes field conditions and a description of laboratory analyses conducted. Metadata standards are required to ensure the proper use and interpretation of the data by the users. <strong>Recommendation</strong> 1) CIMP, ENR recommends that De Beers Canada should submit water quality data associated with their Annual Water Use Report to the public registry in an accessible format (e.g., csv or spreadsheet file).</td>
<td><strong>Mar 6:</strong> This data has been provided to the GNWT and is also available annually as a part of the AEMP annual report.</td>
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<td>2</td>
<td>None</td>
<td><strong>Comment</strong> None <strong>Recommendation</strong> 2) CIMP, ENR recommends that De Beers Canada complete the attached metadata template annually in the same spreadsheet as the associated water quality data and submit it to the public registry in an accessible format (e.g., csv or spreadsheet file).</td>
<td><strong>Mar 6:</strong> De Beers notes that this request is unrelated to the submission of the North Pile plan and is better suited for another mechanism. Additionally there is no legislative requirement to provide this data in this form. De Beers has met with CIMP to discuss the inclusion of this data and is still awaiting feedback on the process. <strong>De Beers and GNWT are encouraged to continue this discussion.</strong></td>
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<td>#</td>
<td>Topic 2: Metadata Template Attachme nt</td>
<td><strong>Comment</strong></td>
<td><strong>Mar 6:</strong></td>
<td>See ENR-2.</td>
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<td>CIMP ENR has attached the Metadata Template for use by the proponent. <strong>Recommendation</strong> 1) CIMP ENR recommends that the Board require the use of the attached Metadata Template to ensure consistency of reporting of data.</td>
<td><strong>Mar 6:</strong> Please see response to CIMP above.</td>
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<td>4</td>
<td>Topic 3: Sump Water Levels</td>
<td><strong>Comment</strong> A statement in Section 1.1 identifies that action will be taken if sump levels are seen to be rising and reach a level beyond safe capacity, i.e. above freeboard levels. A further statement in this section indicates that: &quot;Should a sump level be identified as trending towards a risk of over-topping at the crest elevation, an excavator will be used to remove ice, thereby opening capacity in the sump.&quot; These statements do not appear to align with Section 2.5.2 which identify that the sumps are to be maintained at &quot;lowest practical level&quot;, i.e. 15 to 17% of capacity, or with similar statements in the Starter Cell and West Cell design documents, which also suggest that sump water levels will be maintained at the lowest possible level. For example, Section 3.4 in the Snap Lake Mine West Cell Perimeter Water Control Structures Detailed Design document includes the following design consideration: &quot;The sump will provide short-term storage prior to the pumping of the water to the WMP. It is important to note that the sump is not designed to perform as a long -term water storage facility. Active pumping during freshets and periods of high precipitation should be expected. It is recommended that pumping infrastructure be provided to maintain the minimum practicable water level within the sump at all times.&quot; ENR notes that triggering a response action after allowing the water level to exceed the freeboard level, as is implied by the statement in</td>
<td><strong>Mar 6:</strong> Section 1.1 should be amended to note the following adjustment: In the emergency event that the water is approaching freeboard level in the winter, water is accumulated and freeze within the sumps. During the winter months (between October through to mid-to-end of March) sump pump houses are winterized. Should there ever be a risk to water approaching minimum freeboard levels within any of these sumps, an operating procedure with the use of an excavator has been developed to de-ice that particular sump to maintain sufficient storage capacity. Through analysis of historical trends regarding inflow rates into the sumps, the risk of overtopping during the winter months is understood and those sumps that are more likely a risk have been identified by management. It is the site intent to de-winterize the sump pump houses and begin removing water to the WMP (where possible) in mid-March to end of April to increase storage capacity in preparation for Freshet that normally commences at the start of May.</td>
<td>Board staff recommend De Beers include these additional details in Section 1.1 of a revised North Pile Management Plan.</td>
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<td>Section 1.1, does not appear to align with the design intent of these structures. <strong>Recommendation</strong> 1) ENR recommends that De Beers review the response action triggers for water levels in the sumps and set more reasonable actions levels that will keep water levels in the sumps as low as possible.</td>
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<td>Topic 4: Reference to Applicable Legislation</td>
<td><strong>Comment</strong> Section 2.0 refers to the Northwest Territories Waters Act (1992). This applicable legislation for the site is now the Waters Act. <strong>Recommendation</strong> 1) ENR recommends that the legislative reference be updated.</td>
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<td><strong>Mar 6:</strong> De Beers will update this in future iterations of this report.</td>
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<td>Board staff recommend De Beers update the Plan to include the proper legislative reference.</td>
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<td>6</td>
<td>None</td>
<td><strong>Comment</strong> None <strong>Recommendation</strong> 2) ENR recommends that the definitions from the previous Northwest Territories Waters Act (1992) that are quoted in Section 2.0 be updated with wording from the current legislation.</td>
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<td><strong>Mar 6:</strong> De Beers will update this in future iterations of this report.</td>
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<td>Board staff recommend De Beers update the Plan to include the proper definition as requested by ENR.</td>
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<td>7</td>
<td>Topic 5: Embankment Seepage</td>
<td><strong>Comment</strong> Section 3.2. 3. states: &quot;The embankments are constructed to promote the drainage of water from the North Pile and through the embankments themselves. Therefore, the quantity and rate of seepage from the North Pile does not adversely impact the stability of the facility.&quot; This does not appear to be consistent with Table 1 in Appendix A that provides Response Framework Threshold Values for seepage through perimeter embankments. For example, a &quot;Concern Situation&quot; related to perimeter embankment seepage would be &quot;Turbid seepage&quot;, or &quot;Visible seepage higher on downstream slope or higher rate than historically observed&quot;. A &quot;Buffer Situation&quot; would be &quot;Visible seepage higher on downstream slope or higher rate continuously increasing from historical observations.&quot; <strong>Recommendation</strong> 1) ENR recommends</td>
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<td><strong>Mar 6:</strong> The intent of the Golder Response Framework &amp; Action Plan is to be referenced when there is a change in conditions. For instance, if there was an increase in the rate or quality of seepage from existing trends, appropriate persons need to be notified and an action plan established as per the Golder Response Framework &amp; Action Plan. Increase in quantity or rate of seepage from the embankment can indicate any of the following: greater level of thaw/drainage from the slurry deposition or erosion of the siltation control between the rockfill and the slurry on the upstream embankment. If increase in quantity/rate/quality of seepage, then seepage would be turbid, which could indicate a change in condition and reference to the Golder Response Framework &amp; Action Plan.</td>
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<td><strong>Mar 6:</strong> As stated in the Plan, the North Pile is designed to promote drainage while maintaining its stability. Board staff note that ENR is unsure if there is in fact a linkage between the quality, quantity and rate of seepage, with the stability of the North Pile facility. This question stems from the Response Framework Threshold Values for seepage in Appendix A. As described in De Beers’ response,</td>
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that De Beers confirm the acceptable levels of treatment through the North Pile embankments.

there are many reasons why an engineer would investigate should a change occur in the quantity/rate/quality of seepage, aside from structural stability. Therefore, De Beers’ response adequately addresses the question.

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<tr>
<td>1</td>
<td>p 1, 3rd paragraph, &quot;as a proactive management initiative, sumps have been fitted with visual elevation poles (to) assist in standardizing daily monitoring&quot;.</td>
<td><strong>Comment</strong> I wish such visual elevation pole were in fact in place in all sumps (this has been a long-standing request of this inspector going back to at least 2011). To the best of his knowledge, no such markers are in place in sumps 1 and 5 (they were in place during the current winter at sumps 2, 3, and 4). <strong>Recommendation</strong> Add some form of permanent visual elevation pole to sumps 1 and 5. Also add a permanent visual elevation marker(s) of some sort identifying the critical level of Sump 4 (which identifies the elevation/level which the sump must remain below if flow direction from Snap Lake is to be assured).</td>
<td><strong>Mar 6:</strong> It will need to be confirmed with site which sumps currently have visual elevation poles within them. However, De Beers has when possible, maintained weekly surveying of perimeter sump levels to indicate sump volumes, which has further been used to identify where pumping is required.</td>
<td>De Beers’ response addresses the comment. Board staff recommend De Beers work with the Inspector to meet these requests.</td>
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</table>

| 2  | p 2, 2nd paragraph, "The North Pile will be kept in a stable state that will allow for the re-start of operations of the mine.‘ | **Comment** Given the stated intent to now permanently close the mine, this statement should be removed (for clarity). **Recommendation** Remove ‘The North Pile will be kept in a stable state that will allow for the re-start of operations of the mine.’ | **Mar 6:** De Beers will update this in future iterations of this report. | Board staff recommend De Beers remove the sentence as requested by the Inspector to ensure clarity and consistency, as the mine is heading into final closure. |
operation of the mine.

3  p 2, 2nd paragraph, second bullet "Regular facility surveillance and stability related engineering programs"

**Comment** ‘Regular’ is not definitively quantifiable. Thus, the inspector won’t be able to confirm compliance has been successfully demonstrated (or that non-compliance has occurred). In order to be enforceable, the Inspector needs clear descriptions of what form surveillance will take, the aspects of facility status and stability that will be inspected, the expectations which will demonstrate that facility operational and stability performance are being met, and action levels that clearly denote what action will be taken at different observed operational or stability-related outcomes are observed.

**Recommendation** Define what form surveillance will take, the aspects of facility status and stability which will be inspected, the expectations which will demonstrate that facility operational and stability performance are being met, and action levels which clearly define the action(s) which will be taken as different observed operational or stability-related outcomes are encountered. Provision of these definitions in a table for quick reference/clarity would be appreciated.

Mar 6: Refer to Technical Memorandum - Monitoring Response Frameworks developed and delivered by Golder Associates in January, 2018. Bi-weekly inspections (October through to April) & weekly inspections (May through to September) are completed, with visual identification and/or use of embankment slope survey prisms to identify any of the following: displacement, sloughing of perimeter embankment crests & downstream slopes, sinkholes, cracking, erosion of crest & downstream slopes & seepage through the embankment. Further, data is gathered regarding standpipes, vibrating wire piezometers & thermistors on the North Pile and recorded with historical results to identify any response triggers or if everything is as per the norm.

De Beers’ response addresses the comment.

4  p 2, 2nd paragraph, fourth bullet "The potential for release of fine PK dust from a drying surface within the inactive"

**Comment** Same comment as for the second bullet (define managed appropriately, unless De Beers is fine with the determination being made at the Inspectors discretion. In which case, leave this as is).

**Recommendation** Define ‘managed appropriately’, set measurable criteria which will define when this has been accomplished (so the Inspector can determine whether or not compliance has been attained based on pre-established criteria, and report on that).

Mar 6: Managed appropriately is: the use of an erosion protection layer on the slopes and crests of the Starter/East Cell, which protects the PK from wind and water erosion. Also, wetting of the PK material to saturate and reduce disturbance via surface vehicles is done as need be when there is activity on the North Pile in areas that are not covered by an erosion protection layer.

De Beers’ response addresses the comment.
| Page | Comment | Recommendation | Mar 6: | De Beers’ response addresses the comment.
De Beers should update the Spill Contingency Plan’s MSDS sheets prior to chemical use. |
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<td>5</td>
<td>p 2, 2nd paragraph, fourth bullet &quot;a consideration of chemical amendments is an approved alternative&quot;</td>
<td><strong>Comment</strong> If such adaptive management action does get triggered, the Inspector should be provided with an MSDS sheet for whatever chemical amendment(s) are going to be applied. <strong>Recommendation</strong> Provide MSDS sheets for any chemical amendments before they are to be used.</td>
<td><strong>Mar 6:</strong> MSDS sheets are currently available in the Spill Contingency Plan.</td>
<td>De Beers’ response addresses the comment. De Beers should update the Spill Contingency Plan’s MSDS sheets prior to chemical use.</td>
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<td>6</td>
<td>p 2, 3rd paragraph. &quot;De Beers will explore the installation of additional sensors and data uploads via a wireless network to augment regular visual inspections.&quot;</td>
<td><strong>Comment</strong> Will the Engineer in Charge provide input into how, where, and what sort of additional sensors may be deployed? <strong>Recommendation</strong> Provide the Inspector with a summary of additional sensor installation (if and when the decision to deploy comes to fruition). Include a map illustrating where these installations are as soon as they have been deployed (an as built drawing will be fine).</td>
<td><strong>Mar 6:</strong> De Beers is considering the installation of water level sensors for the perimeter sumps so that these can be monitored remotely. Instrumentation that was identified in the North Pile Response Framework document is being considered (thermistors and vibrating wire piezometers on the East Cell, Starter Cell &amp; Dam 1 of the WMP).</td>
<td>De Beers’ response addresses the comment. Board staff note that as per the February 22, 2018 letter to De Beers, the Board requires De Beers to submit details about new remote monitoring systems at least 60 days prior to their implementation to replace a physical presence at Snap Lake, for approval, including, at a minimum, information on the new technology proposed, data and results of field trials, relevant studies, and</td>
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Comment As stated previously, the Inspector has concerns about the potential inflow of large volumes of water which may be trapped inside the North Pile from previous input of water during mining operations. History at this facility shows that large volumes of processed water can and do get trapped in the embankments/tailings that such processed water can move without warning in very short periods of time (hours, not weeks). To be prudent/pro-actively managing the facility, the Inspector recommends a human presence to inspect the sumps in a manner which would detect such large additions of water in time to mount appropriate containment action (before freeboard is breached, not after...potentially weeks after). This would seem to require some sort of visual observation by a human on a time interval in the range of hours (not weeks or months). To do otherwise is an avoidable risk.

Recommendation Maintain a human presence to inspect the sumps in a manner which would detect such large additions of water in time to mount appropriate containment action (before freeboard is breached, not after...potentially weeks after). Supplemental monitoring with some sort of remote monitoring may assist with this action (IF it can achieve monitoring goals during blowing snow, poor visibility events, and arctic weather regimes and impacts).

Comment If volumes of seepage approach anywhere near levels encountered during active addition of slurry to the North pile (December-February, 2011-12), sumps could receive in the order of millions of liters of processed water in a matter of...
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<th>as trending towards a risk of overtopping, an excavator will be used to remove ice, thereby opening capacity in the sump.</th>
<th>hours. Large volumes of processed water could still remain in spite of the lack of addition of slurry to the North Pile. As I recall, over 5 million litres of water overtopped TS4 and indeed actually avoided containment sumps completely in less than 6 hours. The presence of such volumes of water in precarious containment was not known at that time either, and the checking of sumps every 6 hours was considered overkill before the event. In the inspectors opinion, the presence of large volumes of water from historical slurry deposition in the North Pile remains a reasonable possibility and a risk which would not be adequately accounted for by zero-occupancy remote monitoring. There is value in adhering with the chicken little principle in this scenario, as opposed to relying on technology subjected to brutal weather conditions where successful detection still leaves meaningful response times outside the expected range required to take meaningful &amp; effective response action. ie., successful deployment of ice berms or containment socks to contain spilling sumps and contain spills before they spread over the receiving environment needs to occur during the spill event...the opportunity to deploy any winter spill containment effort would be lost in the time it takes staff to access Snap Lake from GK. <strong>Recommendation</strong> Re-consider the environmental risks associated with proposed zero-occupancy remote monitoring.</th>
<th>Extended Care and Maintenance Plan Version 2 which requests monthly site visits between October – March. Prior to extending the monitoring program during October - March to monthly inspections of the North Pile, De Beers should submit to the Board from the Engineer of Record, for approval, confirmation that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.</th>
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<td>9</td>
<td>Continuity Error. p 14, &quot;Figure 6 provides a diagram...&quot;</td>
<td><strong>Comment</strong> I believe this should read Figure 1 And the figure on p. 15, which is unlabelled, should also have ‘figure 1’ added to it. <strong>Recommendation</strong> Change Figure 6 to Figure 1.</td>
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</table>
| 10 | Continuity Error. p 16, "Please refer to the map provided above (Figure 5),..." | **Comment** I believe this is another continuity error, and should read ‘Figure 1’.  
**Recommendation** Change figure 5 to Figure 1, and label the figure on p. 15 ‘figure 1’. | **Mar 6:** De Beers notes that this will be corrected in future iterations of this report. | Board staff recommend De Beers update the Figures as requested. |
| 11 | p 16. "Table 4 shows individual sump capacities and total water storage capacity. The sumps and WMP should be operated at levels of 15-17% of capacity in use". | **Comment** Using this 17% capacity as maximum sump volume available, this means that there is only about 33,711 m3 storage capacity at the mine (not including whatever capacity remains in the underground). Given the later comment (page 17) that during freshet...the objective at all times is to maintain the sump levels as low as possible, per their design intent, this seems to indicate that average freshet flows will exceed approved storage capacity many times over. To give this scope, De Beers freshet analysis suggests that freshet design criteria will encounter an estimated inflow during freshet of about 27,000 m3 per day for a 10 day period which would need to be accounted for, with a total expected ingress of about 420,000 m3 over 10 days. Intended storage capacity (as per design intent) thus seems precarious (but adequate?).  
**Recommendation** None, as long as proposed Reverse Osmosis Treatment is successful at achieving discharge criteria at a rate which allows sump/WMP levels to remain at or below 17% capacity. If the Engineer in Charge is comfortable with exceeding 17% capacity the use of 100% capacity during freshet this should be clarified, in writing. Failing that, this discussion seems to indicate that there may well be concerns during the forthcoming freshet or any other event which would cause sump/WMP levels to exceed the | **Mar 6:** The Design intent is to keep the water levels within the sumps as low as possible. During Freshet season, the remaining storage capacity that is below the freeboard level is expected to be utilised to contain the freshet volumes over a two week period. | De Beers’ response addresses the comment. |
17% capacity best practice objective. The development of a contingency in case RO treatment can’t maintain sumps at less than 17% of capacity seems to be needed, and should be developed/reviewed/approved through the MVLWB review process before the 2018 freshet.

Comment It’s the inspectors understanding that the brine waste by-product which results from the RO treatment process poses potential environmental and/or operational challenges with regards to disposal. Has De Beers resolved how to resolve this brine waste product (and any other waste product which might result from RO treatment)? Is this method approved through the MVLWB review process (if so, please identify where). Recommendation Describe what approved methods of disposal of waste by-products from the RO process De Beers proposes to utilize, plus detail how/when this will be accomplished. See recommendations for response #16.

Mar 6: See ECCC Comment 4: As per De Beers Response to Comments ECMP v2: De Beers removed contaminated materials from the underground prior to commencing flooding, which ensured that the surface and groundwater are not contaminated - this was verified by the GNWT Inspector during bi-weekly inspections of the underground. The estimated volume of surface waters to manage each year is approximately 400,000 m3. This water is expected to have high TDS levels and to have a similar chemical signature as the underground mine water encountered during mining operations. The chemical composition and nature of connate water at Snap Lake was the subject of EA1314-02 requiring De Beers to treat the deep connate water and develop EQCs and SSWQOs that are protective of Snap Lake. De Beers notes that the surface water can be dealt with in one of three ways: 1. Discharged to Snap Lake if it meets the EQC’s 2. Discharged underground if it does not meet the EQC’s 3. Treated and discharged to Snap Lake and with process residuals being discharged underground. De Beers expects approximately 30-50% of the surface waters will be discharged underground. At the time of the May 2017 overtopping of the fresh-air raise De Beers had pumped a total of approximately 30,000 m3 of water underground to the 5180 level. Upon identification of the overtopping De Beers then ceased pumping underground and obtained emergency discharge authorization from the GNWT Inspector until the cessation of freshet (refer to spill follow up report and subsequent water management updates). De Beers’ authorization did not allow for the recommencement of pumping surface water.
underground until after the site was stabilized and the emergency authorization discontinued. The overtopping was caused by the initially high pumping rates and faster than expected refilling rate. Upon recommencing with water pumping to the underground it was at a substantially reduced rate of approximately 2000 m³ per day or less. At this rate, the water level in the mine workings remained relatively constant. De Beers will continue to discharge TDS water underground to the 5180 level (consistent with the MVLWB approve water management plan) approximately 260m below the mine entrance. This discharge is into the deeper connate (saline) waters already present at those depths in the mine workings. This deep saline water forms a chemocline within the underground mine water column, which restricts this water from rising due to its density. Connate water in the underground workings and the De Beers Notes the following for the decision note from Board Staff: Board Staff note the water management practices are approved under the Water Management Plan, and that Snap Lake water quality is monitored and analyzed through the Surveillance Network Program (SNP) and Aquatic Effects Monitoring Program (AEMP). SNP monitoring would foreseeably detect a large input of TDS into Snap Lake. Board Staff note that the AEMP Design Plan notes TDS as one of the major mine-related stressors and notes various TDS pathways of aquatic effects; however, the concentration of TDS in Snap Lake has been decreasing since the mine has ceased operation. Board Staff recommend that De Beers ensure that AEMP annual reporting specifically and adequately accounts for this decreasing trend as they analyze for potential contaminants.

<p>| 13 | p. 20. continuity errors | <strong>Comment</strong> I believe figure 7 should actually say ‘figure 2’ And the discussion on turbidity refers to Figure 7 which I believe should be Figure 2 as well. | <strong>Recommendation</strong> Change the title of | <strong>Mar 6:</strong> De Beers notes that this will be corrected in future iterations of this report. | Board staff recommend De Beers update the North Pile Management Plan accordingly. |</p>
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<tr>
<th>Page</th>
<th>Comment</th>
<th>Recommendation</th>
<th>Mar 6</th>
<th>De Beers’ response addresses the comment.</th>
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<td>14</td>
<td>p. 22. More continuity errors.</td>
<td><strong>Comment</strong> Continuity error. Figure 8 should say &amp; figure 3. <strong>Recommendation</strong> Change title of figure to figure 3.</td>
<td>De Beers notes that this will be corrected in future iterations of this report.</td>
<td>Board staff recommend De Beers update the North Pile Management Plan accordingly.</td>
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<td>15</td>
<td>p. 22.</td>
<td><strong>Comment</strong> 1.   Can one thus say that the capacity of the MWTP is 11,000 m³/day, which in tandem with the AWTP (28,560 m³/day) gives a maximum potential treatment capacity of 39,560 m³/day on site? <strong>Recommendation</strong> Answer question 1.</td>
<td>To treat TSS the inspector would be correct. De Beers will manage its water to ensure that EQCs are met through all the treatment and storage options available. This will included discharge of Brine Underground.</td>
<td>De Beers’ response addresses the comment.</td>
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<td>16</td>
<td>p. 23. &quot;all brine that is collected as a by product of the water treatment process will be collected and pumped through to the underground workings&quot;</td>
<td><strong>Comment</strong> 1. Did De Beers consider other disposal options for the brine and, if so, 2. What were the other disposal options looked at why were they discounted? 3. Are there any environmental concerns associated with storage of Brine into the underground, and if so, how will they be mitigated? 4. Is the disposal of RO brine an approved method of disposal (approved through the MVLWB review process)? If so, please describe when that approval was granted. <strong>Recommendation</strong> Answer questions 1-4.</td>
<td>1. De Beers refers the inspector to GNWT 12, the approved method of discharge underground is consistent with the MVLWB approved Water Management Plan. Alternatives could include storage on the North Pile, reverting to the 2014 EQCs for Nitrates or overland discharge. 2. The other options were not ideal because returning water to the North Pile will continue to maintain the total mass balance on the Pile increasing the length of time until water meets EQCs in Closure. It is important to note that only a few times during the 2017 freshet De Beers exceeded EQCs during the emergency discharge period. Overland discharge is not ideal as it will impact a larger area until a final closure water design is complete and changing EQCs results in the need of a Water Licence Amendment which takes ~ 1 year to complete which would not have been concluded until after the 2018 Freshet. 3. See Board response provided in GNWT 12. 4. See GNWT 12 Board Response contained within the decision note for ECMP v.2 Decision Letter</td>
<td>Noted. De Beers’ response addresses the comment.</td>
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<td>17</td>
<td>p. 26. &quot;Routine visual inspections seem to conflict with De Beers desire (stated elsewhere) to go to zero occupancy for 30 day periods. <strong>Recommendation</strong> Describe in detail</td>
<td><strong>Comment</strong> These daily and weekly inspections seem to conflict with De Beers desire (stated elsewhere) to go to zero occupancy for 30 day periods. <strong>Recommendation</strong> Describe in detail</td>
<td>During the winter period of camp vacancy at Snap Lake (between October through to March) a supplemental monitoring program will occur whereby there will be persons onsite to complete fortnightly</td>
<td>Board staff recommend De Beers include this additional detail in the North Pile</td>
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<td>Be carried out daily and weekly at the North Pile.....Weekly inspection of the North Pile embankments and water control structures are to be conducted and documented</td>
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<td>how De Beers proposes to conduct these daily and weekly inspections throughout the calendar year. If De Beers wishes to change this, then a letter from the Engineer in Charge indicating that they approve any proposed reduction in inspections * specifying what sampling regime would suffice should accompany any De Beers response.</td>
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<td>inspections. Further to this point, consideration is being made to extend the monitoring program during this time period to monthly inspections dependent on the review of seepage rates into the perimeter sumps and in consultation with the Engineer of Record. In addition, remote monitoring of key instrumentation within the North Pile facilities will supplement the fortnightly visual inspections. During the period of camp occupancy (which is during the summer &amp; Freshet periods between April and September) daily &amp; weekly inspections of the North Pile facilities will apply.</td>
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<td>Management Plan and ensure all references to the frequency of inspections are consistent. Prior to extending the monitoring program during Oct - March to monthly inspections, De Beers should submit to the Board from the Engineer of Record, for approval, confirmation that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.</td>
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| 18 | p. 28. "Survey monuments have been installed on the North Pile embankments...the survey monuments are read monthly during snow-free condition s" |
| --- |
| Comment 1. Has De Beers considered surveying these monuments during the snow season as well? Such data might well prove invaluable in detecting bulging of embankments due to build up of ice lenses from within the embankment walls during the winter season. Recommendation Answer question 1. |
| Mar 6: Survey monuments are surveyed when possible. That is to say, during winter months the survey monuments prism lenses cannot be effectively read with survey instrumentation due to snow cover and condensation within the lenses themselves. Typically, this data can only be gathered during the warmer months of the year. |
| De Beers’ response addresses the comment. |

<p>| 19 | p. 30. &quot;Seepage monitoring&quot; |
| --- |
| Comment Include the frequency/rate of sampling of these monitoring events. Recommendation Include the |
| Mar 6: De Beers notes that this will be corrected in future iterations of this report. Board staff recommend De Beers update the |</p>
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| **Comment** | I believe this figure should say figure 4.  
**Recommendation** | Change Figure 11 to Figure 4. |
| Mar 6: | De Beers notes that this will be corrected in future iterations of this report. |
| Board staff recommend De Beers update the North Pile Management Plan accordingly. |

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| **Comment** | Numberous continuity errors demonstrate that more effort and care needs to be made in the editing process.  
**Recommendation** | Ensure in this and future submissions that figures and tables described in the text match those in the figures. And replace dated information (i.e., references to re-establishing operations, etc.) with updated, relevant content. |
| Mar 6: | De Beers notes that this will be corrected in future iterations of this report. |
| Board staff recommend De Beers update the North Pile Management Plan accordingly. |

**MVLBW: Kierney Leach**
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<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Staff Analysis</th>
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<tbody>
<tr>
<td>1</td>
<td>General</td>
<td><strong>Comment</strong> It is not clear whether the Revision History Table content is indicative of the 2018 Plan updates, or if it includes updates from previous versions/iterations of the Plan, as there is no reference to submission dates or versions numbers in the Table. In addition, there are some inconsistencies throughout the Plan. For example, page 2 of the Plan states, &quot;The North Pile will be kept in a stable state that will allow for the re-start of operations of the mine.&quot; It is Board staff's understanding that the Snap Lake Mine is heading into final closure and is not considering options for the re-start of mining operations. <strong>Recommendation</strong> Please update the Plan to provide clarity.</td>
<td>Mar 6: De Beers notes that this will be corrected in future iterations of this report.</td>
<td>Board staff recommend De Beers update the North Pile Management Plan accordingly.</td>
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<td>2</td>
<td>In General</td>
<td><strong>Comment</strong> The Plan appears not to be proofread. There are lots of typo errors and editing issues, for example, tables and figures are poorly organized in Revision History, Table of Contents, and in various sections. <strong>Recommendation</strong> Resubmission is requested.</td>
<td>Mar 6: De Beers notes that this will be corrected in future iterations of this report.</td>
<td>Board staff recommend De Beers update the North Pile Management Plan accordingly.</td>
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<td>3</td>
<td>Section 1</td>
<td><strong>Comment</strong> It is stated in page 1 that the information outlined in this Plan is based on Snap Lake's Extended Care and Maintenance phase and future plans for reclamation and closure of the North Pile. However, the Plan does not provide specific description for &quot;zero occupancy&quot; remote monitoring. During the site visit on February 6, 2018, site security surveillance system was demonstrated. However, it might not help the environmental monitoring, especially water monitoring.</td>
<td>Mar 6: During the winter period of camp vacancy at Snap Lake (between October through to March) a supplemental monitoring program will occur whereby there will be persons onsite to complete fortnightly inspections. Further to this point, consideration is being made to extend the monitoring program during this time period to monthly inspections dependent on the review of seepage rates into the perimeter sumps and in consultation with the Engineer of Record. In addition, remote monitoring of key instrumentation within the North Pile facilities</td>
<td>Board staff recommend De Beers include this additional detail in the North Pile Management Plan. Prior to extending the monitoring program during October - March to monthly inspections of the North Pile, De</td>
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<td><strong>Recommendation</strong></td>
<td>More and consistent information about zero occupancy remote monitoring is requested.</td>
<td>will supplement the fortnightly visual inspections. During the period of camp occupancy (which is during the summer &amp; Freshet periods between April and September) daily &amp; weekly inspections of the North Pile facilities will apply.</td>
<td>Beers should submit to the Board from the Engineer of Record, for approval, confirmation that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.</td>
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<td><strong>4 Section 2.5.2 Comment</strong></td>
<td>In page 23, it is stated that all brine that is collected as a byproduct of the water treatment process will be collected and pumped through to the underground workings. <strong>Recommendation</strong> Justification of doing so is requested.</td>
<td>Mar 6: See DBCI response to ECCC Comment 4: As per De Beers Resonse to Comments ECMP v2: De Beers removed contaminated materials from the underground prior to commencing flooding, which ensured that the surface and groundwater are not contaminated - this was verified by the GNWT Inspector during bi-weekly inspections of the underground. The estimated volume of surface waters to manage each year is approximately 400,000 m³. This water is expected to have high TDS levels and to have a similar chemical signature as the underground mine water encountered during mining operations. The chemical composition and nature of connate water at Snap Lake was the subject of EA1314-02 requiring De Beers to treat the deep connate water and develop EQCs and SSWQOs that are protective of Snap Lake. De Beers notes that the surface water can be dealt with in one of three ways: 1. Discharged to Snap Lake if it meets the EQC's 2. Discharged underground if it does not meet the EQC's 3. Treated and discharged to Snap Lake and with process residuals being discharged underground. De Beers expects approximately 30-50% of the surface waters will be discharged underground. At the time of the May 2017 overtopping of the fresh-air raise De Beers had pumped a total of approximately 30,000 m³ of water underground to the 5180 level. Upon identification of the overtopping De Beers then ceased pumping underground and obtained emergency discharge authorization</td>
<td>De Beers’ response addresses the comment.</td>
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from the GNWT Inspector until the cessation of freshet (refer to spill follow up report and subsequent water management updates). De Beers' authorization did not allow for the recommencement of pumping surface water underground until after the site was stabilized and the emergency authorization discontinued. The overtopping was caused by the initially high pumping rates and faster than expected refilling rate. Upon recommencing with water pumping to the underground it was at a substantially reduced rate of approximately 2000 m3 per day or less. At this rate, the water level in the mine workings remained relatively constant. De Beers will continue to discharge TDS water underground to the 5180 level (consistent with the MVLWB approve water management plan) approximately 260m below the mine entrance. This discharge is into the deeper connate (saline) waters already present at those depths in the mine workings. This deep saline water forms a chemocline within the underground mine water column, which restricts this water from rising due to its density. Connate water in the underground workings and the De Beers Notes the following for the decision note from Board Staff: Board Staff note the water management practices are approved under the Water Management Plan, and that Snap Lake water quality is monitored and analyzed through the Surveillance Network Program (SNP) and Aquatic Effects Monitoring Program (AEMP). SNP monitoring would foreseeably detect a large input of TDS into Snap Lake. Board Staff note that the AEMP Design Plan notes TDS as one of the major mine-related stressors and notes various TDS pathways of aquatic effects; however, the concentration of TDS in Snap Lake has been decreasing since the mine has ceased operation. Board Staff recommend that De Beers ensure that AEMP annual reporting specifically and adequately accounts for this decreasing trend as they analyze for potential.
Section 3.1

**Comment** Routine daily and weekly inspections are mentioned in page 26 the North Pile monitoring. This should be conducted when staff are on site. How will the inspections be conducted under the scenario of "zero occupancy" remote monitoring?

**Recommendation** More information is requested.

**Mar 6:** During the winter period of camp vacancy at Snap Lake (between October through to March) a supplemental monitoring program will occur whereby there will be persons onsite to complete fortnightly inspections. Further to this point, consideration is being made to extend the monitoring program during this time period to monthly inspections dependent on the review of seepage rates into the perimeter sumps and in consultation with the Engineer of Record. In addition, remote monitoring of key instrumentation within the North Pile facilities will supplement the fortnightly visual inspections. During the period of camp occupancy (which is during the summer & Freshet periods between April and September) daily & weekly inspections of the North Pile facilities will apply.

Board staff recommend De Beers include this additional detail in the North Pile Management Plan and ensure all references to the frequency of inspections are consistent.

Prior to extending the monitoring program during October - March to monthly inspections of the North Pile, De Beers should submit to the Board from the Engineer of Record, for approval, confirmation that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.

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**Comment** It is stated in page 27 that the objective of the third party inspections is to carry out a detailed review of the conditions of the facilities and facility operation during the spring freshet and prior to freeze up. There appears to be two third party inspections, i.e. one during the spring freshet and another one prior to freeze-up. However, only one geotechnical inspection was reviewed last year.

**Recommendation** Clarification is requested.

**Mar 6:** An annual inspection is completed by the EOR each year as per the agreement in place with the MVLWB. The EOR (Golder) comes to site to inspect the facility. This generally occurs sometime in the summer period, when the North Pile is absent of snow cover and can be observed more efficiently. Further to this, an additional Anglo internal inspection and risk-based review is conducted to maintain conformance with the Anglo standards.

Appropriate response.
The Licensee shall act in accordance with the approved North Pile Management Plan and shall review the Plan annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations or monitoring a minimum of ninety (90) days prior to the commencement of the construction of each phase of the North Pile Facility. Revised Plans shall:

a) Describe how the Licensee is meeting the objectives listed in Part E, item 6;

b) Satisfy the requirements of Schedule 4, item 2 of this Licence; and

c) Be in accordance with Part B, item 6 of this Licence.

On July 26, 2012, the Plan was updated and submitted to the Board to reflect operational changes at the Snap Lake Mine. The Board responded to the submission with a letter to De Beers on August 17, 2012 stating:

The Board appreciates De Beers’ initiative in submitting the NPMP. In light of the upcoming Risk Assessment (September 15, 2012) and any resulting changes to the management of the North Pile, the Board requests that De Beers resubmit the NPMP following submission of the Risk Assessment.

On February 27, 2014, the Board requested that De Beers submit an updated 2014 North Pile Management Plan (2014 Plan) by June 6, 2014 to include the action items from the October 30, 2013 Snap Lake Working Group meeting (attached). The 2014 Plan was submitted by De Beers on June 8, 2014, went through a series of updates, and was approved by the Board with the West Cell Final Design Report on October 9, 2014.

2018 Plan

On October 12, 2017 the Board issued Permit MV2017D0032 for Snap Lake Mine to replace Permits MV2010D0053 and MV2014D0010. Condition 79 of Permit MV2017D0032 states:

The Permittee shall submit to the Board for approval, by January 30, 2018, a North Pile Management Plan, and shall annually review the plan and make any necessary revisions to reflect changes in operations or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.

As such, De Beers submitted the 2018 Plan on January 30, 2018 (attached). As Snap Lake Mine is now in Extended Care and Maintenance, and the Mine is heading into final closure, the 2018 update is intended to incorporate all management changes to reflect the ceasing of operations, and eventual closure.

4. Comments

Not applicable.

5. Reviewer Comments

By February 27, 2018, comments and recommendations on the 2018 Plan were received from 5 reviewers:

- Environment and Climate Change Canada (ECCC);
- Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR);
- Government of the Northwest Territories – Lands Inspector (Inspector);
• Board staff; and
• Snap Lake Environmental Monitoring Agency (SLEMA).

De Beers responded on March 6, 2018. The Review Summary and Attachments (attached) present the concerns identified through the review of the North Pile Management Plan.

The majority of review comments identified missing or incorrectly referenced information throughout the 2018 Plan. Reviewers requested that these errors and inconsistencies be corrected.

In addition, many review comments requested that De Beers clarify the frequency of inspections of the North Pile, and how this would change if the Board approves the Extended Care and Maintenance Plan, Version 2, which describes monthly site visits from October – March. De Beers responded the following:

“Consideration is being made to extend the monitoring program [from October – March] to monthly inspections dependent on the review of seepage rates into the perimeter sumps and in consultation with the Engineer of Record. In addition, remote monitoring of key instrumentation within the North Pile facilities will supplement the fortnightly visual inspections. During the period of camp occupancy (which is during the summer & Freshet periods between April and September) daily & weekly inspections of the North Pile facilities will apply.”

As stated above, De Beers is currently in consultation with the Engineer of Record on whether the frequency of in-person inspections of the North Pile can be changed to monthly inspections. The Board could require De Beers to submit a report from the Engineer of Record, for approval, confirming that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.

6. Security

The GNWT currently holds $39,066,247.00 in reclamation security for the Snap Lake Mine under Licence MV2011L2-0004, and $21,335,671.00 under Permits MV2010D0053 and MV2014D0010 (which is to be transferred under new Permit MV2017D0032 imminently).

7. Conclusion

Board staff conclude that further information was provided by De Beers in their responses to reviewer comments. Some of this additional detail and corrections to identified references could be included in a revised 2018 Plan for increased consistency and clarity.

Board staff suggest the 2018 Plan conforms with the requirements of Licence MV2011L2-0004.

8. Recommendation

Board staff recommend the Board make a motion to approve, as an interim submission, the 2018 North Pile Management Plan as required by Part E, condition 7 of Water Licence MV2011L2-0004 and Condition 79 of Land Use Permit MV2017D0032, and that De Beers be required to submit a revised 2018 Plan – Version 2 by June 11, 2018 in accordance with the comments and commitments made during this review. The revised Plan will be considered approved upon written confirmation of conformity from Board staff.
A draft decision letter is attached for the Board’s consideration, and includes the following recommended text:

• The Board requires that De Beers submit a report from the Engineer of Record, for approval, confirming that a reduction in inspection frequency to monthly is suitable and includes appropriate rationale prior to implementation.

9. Attachments

• Board requested submission of 2014 Plan – February 27, 2014
  o 2014 North Pile Management Plan – June 8, 2014
  o Board approved 2014 Plan – October 9, 2014
• 2018 North Pile Management Plan – January 30, 2018
• Review Summary and Attachments
• Draft Decision Letter from the Board

Respectfully submitted,

Kierney Leach
Technical Regulatory Specialist