<table>
<thead>
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<th>APPENDIX C</th>
<th>ENGAGEMENT</th>
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<td>Appendix C.1</td>
<td>Snap Lake Record of Engagement related to Closure and Reclamation</td>
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<td>Appendix C.3</td>
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<td>Appendix C.4</td>
<td>Summary of Closure Commitments</td>
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</table>
# Appendix C.1. Snap Lake Record of Engagement Related to Closure and Reclamation

<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting Type</th>
<th>Participants</th>
<th>Summary</th>
<th>Discussion related to Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 4, 2011</td>
<td>Technical workshop</td>
<td>YKDFN, LKDFN, DKNF, Tlicho Government, NSMA, NWTMN</td>
<td>Discussed ICRP revisions, suggestions to strengthen goals and objectives, and suggestions supporting increased involvement of community representatives in closure planning.</td>
<td>Discussed present and future closure and reclamation. Received ICRP feedback.</td>
</tr>
<tr>
<td>Dec 20, 2012</td>
<td>Email</td>
<td>Tlicho Kwe Beh Working Group</td>
<td>Invitation sent to schedule a closure and reclamation information session.</td>
<td>Current Snap Lake closure plan process.</td>
</tr>
<tr>
<td>Jan 22, 2013</td>
<td>Meeting</td>
<td>Tlicho Kwe Beh Working Group</td>
<td>Mine Closure and Reclamation Meeting: Presentation on the ICRP and discussed reclamation and the regulatory process.</td>
<td>Discussed closure planning process, objectives, and closure criteria.</td>
</tr>
<tr>
<td>February 2013</td>
<td>Newsletter</td>
<td>All</td>
<td>Let's Talk newsletter entitled &quot;An opportunity to update plans for closure and reclamation of the Snap Lake Mine&quot;. Newsletter was distributed by email and provided in meetings.</td>
<td>Provided summary of De Beers' activities to be undertaken to update the ICRP, including ongoing process, opportunities for community involvement, and description of specific closure plans for the North Pile, underground mine, and infrastructure.</td>
</tr>
<tr>
<td>Early February, 2013</td>
<td>N/A</td>
<td>DKFN, LKDFN, NSMA, Tlicho Government, YKDFN</td>
<td>Invitation for De Beers to host half-day meetings, in communities, to brief staff on the ICRP in advance of the Closure Options and Research Workshop.</td>
<td>N/A</td>
</tr>
<tr>
<td>Feb 25, 2013</td>
<td>Meeting</td>
<td>DKFN Lands and Environment staff and youth representatives</td>
<td>Meeting to discuss closure objectives and reclamation plans.</td>
<td>Closure objectives and reclamation plans.</td>
</tr>
<tr>
<td>Feb 26, 2013</td>
<td>Meeting</td>
<td>LKDFN</td>
<td>Meeting to discuss closure objectives and reclamation plans.</td>
<td>Closure objectives and reclamation plans. Questions about reclamation of the North pile; De Beers' response noted that community input and TK would inform closure. LKDFN asked about the process for returning the reclamation security, and participants agreed that an annual update on closure progress would be beneficial. De Beers answered all questions and no further concerns or comments were expressed.</td>
</tr>
<tr>
<td>Feb 28, 2013</td>
<td>Meeting</td>
<td>NSMA Lands and Environment staff</td>
<td>Meeting to discuss closure objectives and reclamation plans.</td>
<td>De Beers expressed interest in hosting a community meeting to discuss closure and reclamation planning for the Snap Lake Mine. NSMA asked about closure of the underground including the removal of the equipment and infrastructure and the extent of backfilling. De Beers responded with a description of how waste materials would be managed and how the construction of the underground mine does not depend on backfilling for long-term stability. Questions related to the process for updating and approving the ICRP. De Beers referred to the MVLWB process and water licence conditions, and noted that community input to the ICRP is important.</td>
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### Appendix C.1. Snap Lake Record of Engagement Related to Closure and Reclamation

<table>
<thead>
<tr>
<th>Date</th>
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<th>Participants</th>
<th>Summary</th>
<th>Discussion related to Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 13, 2013</td>
<td>Meeting</td>
<td>DKFN, LKDFN, YKDFN, NSMA</td>
<td>Closure Options and Research Options Workshop held in Yellowknife to discuss closure objectives and reclamation plans.</td>
<td>• LKDFN asked about the results of reclamation research projects. De Beers responded that ongoing research program updates and findings from completed research would be referenced in the Interim Closure and Reclamation Plan and summarized in the Annual Mine Reclamation Status report submitted to the MVLWB. • NSMA asked if the closure objectives were considered final. De Beers and MVLWB responded that although not set in stone, the current objectives were approved by MVLWB and would not be re-evaluated until the next ICRP revision. • YKDFN requested clarification regarding the closure goals and principles to which De Beers would adopt the MVLWB guidelines, and asked how priority areas would be determined. De Beers responded that priorities would be determined based on research, community input, traditional knowledge, and expert review. • YKDFN asked if the ICRP includes a list of commitments. De Beers confirmed it did not, but that they would consider the recommendation. • YKDFN commented on the importance that should be given to the requests of landowners (re: closure) rather western-science based prediction of impacts. De Beers explained that the environmental assessment predictions will be refined to reduce uncertainty at closure, and that closure criteria (for water) may be different than the criteria during mine operations. • YKDFN inquired about the trigger to select the desired aesthetics at closure, and De Beers responded that this would be determined through engagement with communities, TK, and expert review. • YKDFN expressed concern about the terminology used for revegetation options, and De Beers agreed to update the plan to provide more clarity. • De Beers clarified that the recently developed closure objectives were not based on research, but that future research would inform and improve upon them; and confirmed that the company will need to demonstrate that the site has achieved these closure objectives before the financial security deposit is returned.</td>
</tr>
<tr>
<td>April 15, 2013</td>
<td>Letter</td>
<td>DKFN, LKDFN, YKDFN, NSMA, Tlicho</td>
<td>Request to hold public workshops in communities, including discussion of the Interim Closure and Reclamation Plan.</td>
<td>N/A</td>
</tr>
<tr>
<td>May 24, 2013</td>
<td>Workshop</td>
<td>DKFN – Fort Resolution</td>
<td>Public workshop providing information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Demonstration of closure and reclamation including presentation illustrating the sequence of infrastructure removal.</td>
</tr>
<tr>
<td>May 25, 2013</td>
<td>Workshop</td>
<td>NSMA – Yellowknife</td>
<td>Community workshop providing information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Presentation included closure objectives, closure planning in the NWT, timeline for closure, community engagement, contents of the closure and reclamation plan, progression of activities, research options, and reclamation plans. • Also provided a demonstration of closure and reclamation including presentation illustrating the sequence of infrastructure removal. De Beers noted that NSMA staff had met with De Beers in regard to the closure plan, and that there would be additional opportunities to engage including during the updates to the ICRP every three years.</td>
</tr>
<tr>
<td>May 27 and 30, 2013</td>
<td>Workshop</td>
<td>LKDFN – Lutsel K’e</td>
<td>Two-day public workshop providing information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Included discussion of closure and reclamation plans; De Beers noted that input from the community from these meetings would be considered as De Beers refines these plans. • Concern expressed about dust from the North Pile after closure. De Beers responded that a site visit would provide LKDFN members to see some of the capping trials currently underway at the North Pile. • Request for a subsequent workshop to include discussion of closure and reclamation.</td>
</tr>
<tr>
<td>May 29, 2013</td>
<td>Workshop</td>
<td>YKDFN – N’dilo</td>
<td>Information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Included discussion of closure and reclamation plans.</td>
</tr>
<tr>
<td>June 3, 2013</td>
<td>Workshop</td>
<td>Tlicho – Wekweeti</td>
<td>Information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Participants asked about planned cover for the rock piles; De Beers noted that rock piles would be covered and possibly re-vegetated, but taking into consideration that vegetation may attract wildlife.</td>
</tr>
<tr>
<td>June 4, 2013</td>
<td>Workshop</td>
<td>Tlicho – Gameti</td>
<td>Information about human resource initiatives, business opportunities, environment and permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>• Presentation included closure objectives, closure planning in the NWT, timeline for closure, community engagement, contents of the closure and reclamation plan, progression of activities, research options, and reclamation plans. No questions, comments, or concerns were raised.</td>
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De Beers Canada Inc.
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<thead>
<tr>
<th>Date</th>
<th>Meeting Type</th>
<th>Participants</th>
<th>Summary</th>
<th>Discussion related to Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 5, 2013</td>
<td>Workshop</td>
<td>Tlicho - Whati</td>
<td>Information about human resource initiatives, business opportunities, environment, permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>Presentation included closure objectives, closure planning in the NWT, timeline for closure, community engagement, contents of the closure and reclamation plan, progression of activities, research options, and reclamation plans. No questions, comments, or concerns were raised.</td>
</tr>
<tr>
<td>June 6, 2013</td>
<td>Workshop</td>
<td>Tlicho - Behchoko</td>
<td>Information about human resource initiatives, business opportunities, environment, permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>Presentation included closure objectives, closure planning in the NWT, timeline for closure, community engagement, contents of the closure and reclamation plan, progression of activities, research options, and reclamation plans. No questions, comments, or concerns were raised.</td>
</tr>
<tr>
<td>June 12, 2013</td>
<td>Workshop</td>
<td>NWTMN - Hay River</td>
<td>Information about human resource initiatives, business opportunities, environment, permitting, closure and reclamation planning, and aquatic effects monitoring program.</td>
<td>Presentation included closure objectives, closure planning in the NWT, timeline for closure, community engagement, contents of the closure and reclamation plan, progression of activities, research options, and reclamation plans. NWTMN asked questions about the effects of devolution and inflation on closure securities; De Beers responded that the frequency of renegotiation accounts for inflation, and advised that any changes to the securities would be a government decision.</td>
</tr>
<tr>
<td>January 14-15, 2015</td>
<td>Meeting</td>
<td></td>
<td>Presentation and overview of mining methods, water, and proposed amendments to the Snap Lake Type A Water License, and update on the Gahcho Kué project.</td>
<td>Asked if De Beers would shut down the mine if they cannot meet the limits set, De Beers responded that they would need to look at all of the options that may have previously been discounted, such as discharging water to another watershed, or disposal underground before making a decision on how to manage this. But, some of these solutions take very long to approve and implement, and therefore closure would be an option.</td>
</tr>
<tr>
<td>February 3, 2015</td>
<td>Community meeting and workshop</td>
<td>LKDFN - Lutsel K’ee Ni Hadi Xa</td>
<td>Conducted open house and interactive workshop. Presentations from Snap Lake, Gahcho Lake, and Ni Hadi Xa, and Chief and council meeting.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>May 21, 2015</td>
<td>Site Visit</td>
<td>LKDFN</td>
<td>Tour of Snap Lake Mine site.</td>
<td>Presentation included closure objectives, closure planning as part of site tour.</td>
</tr>
<tr>
<td>June 13, 2015</td>
<td>Community Meeting</td>
<td>NSMA Ni Hadi Xa</td>
<td>Presentations included updates by Gahcho Kue, Ni Hadi Xa, Snap Lake Environment, and new initiatives. Discussed caribou, water, and employment.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>June 15, 2015</td>
<td>Community Meeting</td>
<td>Narngel</td>
<td>Presentations included updates by Gahcho Kue, Ni Hadi Xa, Snap Lake Environment, and new initiatives.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>June 16, 2015</td>
<td>Community Meeting</td>
<td>Whati</td>
<td>Presentations included updates by Gahcho Kue, Ni Hadi Xa, Snap Lake Environment, and new initiatives.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>June 18, 2015</td>
<td>Community Meeting</td>
<td>Fort Resolution</td>
<td>Presentations included updates by Gahcho Kue, Ni Hadi Xa, Snap Lake Environment, and new initiatives.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>June 19, 2015</td>
<td>Community Meeting</td>
<td>Behchoko</td>
<td>Presentations included updates by Gahcho Kue, Ni Hadi Xa, Snap Lake Environment, and new initiatives.</td>
<td>Presentation included closure objectives, closure planning as part of overall update.</td>
</tr>
<tr>
<td>June 24-25, 2015</td>
<td>TK Workshop</td>
<td>SLEMA</td>
<td>Discussion of current and planned activities at Snap Lake</td>
<td>Included discussion of closure and reclamation including revegetation. The TK Panel and SLEMA Board Members visited the Mine site, followed by a workshop to discuss TK observations, comments, and questions.</td>
</tr>
<tr>
<td>July 25, 2015</td>
<td>Site Visit</td>
<td>NSMA</td>
<td>Introduction with mine overview and purpose of visit. Tour of the mine included surface site, Discussion held regarding water treatment and North Pile height.</td>
<td>Discussion of closure and reclamation as part of site tour.</td>
</tr>
<tr>
<td>September 1, 2015</td>
<td>Site Visit</td>
<td>Tlicho</td>
<td>Introduction with overview and purpose of visit presentation. Tour of the mine included surface tour.</td>
<td>Discussion of closure and reclamation as part of site tour.</td>
</tr>
<tr>
<td>September 3, 2015</td>
<td>Site Visit</td>
<td>DFN</td>
<td>Introduction with overview and purpose of visit presentation. Tour of the mine included surface tour.</td>
<td>Discussion of closure and reclamation as part of site tour.</td>
</tr>
<tr>
<td>September 8, 2015</td>
<td>Site Visit</td>
<td>YKDFN</td>
<td>Introduction with overview and purpose of visit presentation. Tour of the mine included surface site tour and water treatment plant.</td>
<td>Discussion of closure and reclamation as part of site tour.</td>
</tr>
<tr>
<td>Date</td>
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<td>Summary</td>
<td>Discussion related to Closure</td>
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</tr>
<tr>
<td>December 4, 2015</td>
<td>Letter</td>
<td>LKDFN, MVLWB, NSMA, Tlicho Government, YKDFN, GNWT</td>
<td>Notification of suspension of operations at Snap Lake Mine, employment updates, and intention of maintaining a workforce on site.</td>
<td>• Official notification that Snap Lake Mine is being placed under care and maintenance effective Friday, December 4, 2015. The decision to suspend operations also triggers the Suspension of Operations measures as agreed to in the Impact Benefit Agreement (IBA) between De Beers Canada Inc. and the Lutsel K’e and Kache Dene First Nation.</td>
</tr>
<tr>
<td>December 16, 2015</td>
<td>Meeting</td>
<td>YKDFN, Tlicho</td>
<td>Update regarding mine care and maintenance.</td>
<td>• Listed in 2015 record of engagement but cannot find original record.</td>
</tr>
</tbody>
</table>
| January 20, 2016 | Community Meeting | LKDFN – Lutsel K’e, Ni Hadi Xa | Presentation updates from Snap Lake Mine, Gahcho Kue, and Ni Hadi Xa. Discussion included environment updates, AEMP, regulatory submissions, and ICPR.                                                                 | • Inquires raised about the closure and reclamation timeline.  
• Inquiry about whether jobs and contracts were available for the care and maintenance period, whether current employees will have re-training opportunities or whether current employees with simply be let go.  
• Concern raised regarding contractors lack of knowledge of IBA commitments for employment and training.  
• Comments by De Beers: explanation of timeline and purpose for care and maintenance, about putting as much as efforts as possible in to restore the closure landscape as much as possible and to work together to meet those objectives. |
| January 21, 2016 | Meeting | LKDFN – Wildlife, Lands and Environment Committee | Discussed topics raised at the January 20, 2016 meeting, care and maintenance, and closure planning.                                                                                                                      | • Discussed closure and rock storage as options.  
• Description of closure in De Beers presentation.  
• Community workshop proposed on AEMP and closure.  
• Discussed care and maintenance program options, 1 is to flood the mine.                                                                                           |
| January 21, 2016 | Meeting | GNWT | Care and maintenance update.                                              | • Discussion of current and planned activities at Snap Lake.                                                                                                 |
| February 4, 2016 | Meeting | Tlicho Kwe Beh Working Group | Care and maintenance update.                                              | • Update on care and maintenance, long term planning, water treatment, and remote monitoring.  
• Closure plan criteria, water license, and land use permit applications.                                                                                         |
| February 10, 2016| Update | Tlicho Kwe Beh Working Group | Update to Chiefs on Snap Lake Mine status. Discussed employment and IBA. | • Impact of Care & Maintenance at SLM on Tlicho staff.  
• Closure is a last option as there are still at least 30M carats in the ground.  
• Whether or not Tlicho will receive a pro-rated payment of the IBA annual payment, given the decision to place the mine in care and maintenance occurred about three-quarters of the way through the year. |
| February 10, 2016| Teleconference | Tlicho Government | Provided update on care and maintenance, IBA's, employment opportunities, and site access. Follow up email summarizing teleconference also sent February 10, 2016. | • De Beers provided updates on:  
  - Impact of care and maintenance at SLM on Tlicho staff;  
  - Whether or not the IBA between DBCI and Tlicho for SLM remains in effect;  
  - Whether or not Tlicho will receive a pro-rated payment for the IBA annual payment (since the decision to place the mine in care and maintenance occurred 3 quarters through the year);  
  - Opportunity for Tlicho employees to transfer to Gahcho Kue project; and  
  - Question about site access.  
• De Beers provided an overview of the decision to place SLM into care and maintenance and the work underway at the mine to prepare for steady-state care and maintenance.  
• De Beers said care and maintenance budget would be about $61M annually, with cost to pump water out of the mine averaging $2M/ month.  
• Closure is a last option for De Beers as there are still at least 30M carats in the ground, with potential for a further 10M-15M carats as the dyke continues to dip down. |
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</table>
| February 15, 2016 | Snap Lake Working Group Meeting | MVLWB GNWT Federal Government (ECC, DFO, NPMO) SLEMA MVERIB NSMA Tlicho Government | Snap Lake Mine update on Care and Maintenance, water license, and land use applications. | - De Beers presentation included a summary of the transition to care and maintenance and current status, summary of updated plans and submissions that will be submitted for extended care and maintenance (expected by April 19, 2016).  
- Discussed topics for the next May 12, 2016 working group meeting.  
- Discussion on extended care and maintenance and closure criteria. |
| February 22, 2016 | Meeting               | LKDFN                                             | Update on care and maintenance.                                         | - Discussion of current and planned activities at Snap Lake.                                      |
| February 24, 2016 | Meeting               | YKDFN                                             | Update on care and maintenance.                                         | - Discussion of current and planned activities at Snap Lake.                                      |
| Feb 25, 2016     | Site Visit            | YKDFN GNWT                                        | Tour of the Snap Lake Mine.                                             | - Care and Maintenance.  
- Discussion of current and planned activities at Snap Lake.                                      |
| March 1, 2016    | Report                | MVLWB                                             | Distributed to MVLWB:  
1. MVLWB Letter to De Bees Canada Inc., January 7, 2016: Board Decision on Approval of Request to Extend Submission Date of the Engagement Plan-Water License MVLW2011L2-0004  
2. Appendix A: De Beers Group of Companies working with Aboriginal Communities Policy  
3. Appendix B: Template Engagement Record of Meeting | - Submission overview highlighted De Beers’ announcement to suspend operations at Snap Lake Mine, and the mine would be placed under temporary care and maintenance. Length of temporary closure may be up to 3 years or more, depending on market conditions. |
| March 31, 2016   | Community Meeting     | YKDFN                                             | Meeting included update from De Beers, election policy, IBA programs.   | - Discussion of current and planned activities at Snap Lake.                                      |
| April 5, 2016    | Meeting               | GNWT (Lands, ENR, ITI)                            | Update on care and maintenance.                                         | - Discussion of current and planned activities at Snap Lake.                                      |
| April 15, 2016   | Letter                | GNWT                                              | Follow up to April 5, 2016 Snap Lake Mine Care and Maintenance meeting, | - Discussed possible Extended Care and Maintenance filing in 2016 and potential that care and maintenance would trigger an environmental assessment. |
| April 20, 2016   | Meeting               | YKDFN - Dettah                                    | Snap Lake Mine update for chief and council, including care and maintenance, water license and land use permit applications. | - Long term planning and closure plan criteria.                                                                                                           |
| May 2016         | SLEMA Meeting         | SLEMA Core Group                                  | Snap Lake Mine update on care and maintenance, water license and land use permit applications. | - Long term planning and closure plan criteria.                                                                                                           |
| May 5, 2016      | Meeting               | YKDFN-N’Dilo                                      | Snap Lake Mine update on care and maintenance, water license and land use permit applications, and long term planning. | - Closure plan criteria.                                                                                                                                   |
| May 5, 2016      | Snap Lake Working Group Meeting | GNWT LKDFN MVLWB NSMA SLEMA Tlicho YKDFN         | Snap Lake Mine update on care and maintenance, water license and land use permit applications, and long term planning. | - Closure plan criteria.                                                                                                                                   |
| May 9, 2016      | Letter                | Letter received from LKDFN                        | Received feedback regarding request to alter and suspend reporting requirements under the EA. | - Concern about the terms “temporary closure” and “care and maintenance” being used interchangeably.  
- Concern that temporary closure may be up to 3 years or more.  
- Requested a time limited be placed on the length of time the mine can be “temporarily closed.”                                                                 |
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<tbody>
<tr>
<td>*Date Unknown</td>
<td>Letter</td>
<td>Letter received from YKDFN</td>
<td>Response to a previous De Beers letter regarding modifications to reporting requirements under the EA.</td>
<td>Acknowledged the transition into care and maintenance to reduce economic burdens means a reduction in the negative environmental impacts, but concerned about the amalgamation of reporting documents such as the Vegetation Annual Report and the Closure and Reclamation Status update.</td>
</tr>
<tr>
<td>May 16, 2016</td>
<td>Letter</td>
<td>YKDFN</td>
<td>Provided update on the Snap Lake Mine application for Extended Care and Maintenance discussed at the May 5, 2016 MVLWB Snap Lake Working Group.</td>
<td>Notification of the care and maintenance application and evaluating options for:</td>
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<tr>
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<td>- Optimizing care and maintenance.</td>
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<td>- Re-opening the mine by De Beers or by a qualified 3rd party buyer.</td>
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<td>- Sale of a Qualified 3rd party.</td>
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<tr>
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<td>- Final closure of the Snap Lake Mine.</td>
</tr>
<tr>
<td>May 16, 2016</td>
<td>Letter</td>
<td>NSMA</td>
<td>NSMA’s response to De Beers request to alter and suspend reporting requirements under the EA.</td>
<td>De Beers requested that the Vegetation Annual Report be incorporated into the Annual Closure and Reclamation Status Update.</td>
</tr>
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<td></td>
<td>NSMA’s opinion that the needs for the Snap Lake Environmental Agreement Annual Report will remain until the termination of the Agreement (i.e., full and final implementation of the Closure and Reclamation Plan), although it may diminish somewhat during the extended care and maintenance period.</td>
</tr>
<tr>
<td></td>
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<td>NSMA recommended that requirements for a condensed version of the Environmental Agreement Annual Report be continued during the Extended C&amp;M period.</td>
</tr>
<tr>
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<td></td>
<td>Inquiry about using native plants for revegetation (confirmed).</td>
</tr>
<tr>
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<td></td>
<td>Comment made regarding the airstrip as a resource/ opportunity for a potential outfitter in the future, and also good for emergencies.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Inquiry regarding why mine rocks were not going to be revegetated.</td>
</tr>
<tr>
<td>May 25, 2016</td>
<td>Community Meeting</td>
<td>DKFN – Fort Resolution Ni Hadi Xa</td>
<td>Introduction with opening prayer. Updates from Snap Lake, Gahcho Kue, and Ni Hadi Xa. Topics included IBAs and environment.</td>
<td>De Beers informed attendees of the EIA conducted to look at the baseline for closure.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Inquiry from participant about how community members will know what the land looked like before and how they can visualize what it will look like after.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Inquiry from participant about whether the community will be eligible for contracts with Snap Lake at closure.</td>
</tr>
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<td>Inquiry from participant regarding whether fish will be put back in the lake.</td>
</tr>
<tr>
<td>May 26, 2016</td>
<td>Community Meeting</td>
<td>YKDFN – N’Dilo</td>
<td>Presentations included Snap Lake, Gahcho Kue, environment, employment, IBA updates.</td>
<td>Inquiry regarding why mine was closing.</td>
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<td>Inquiry about whether care and maintenance would be contracted out or handled by De Beers.</td>
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<td>Concern raised about whether putting Snap Lake on care and maintenance will not benefit local community members.</td>
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<td></td>
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<td>Condition of the land after mine closure.</td>
</tr>
<tr>
<td>May 27, 2016</td>
<td>Letter</td>
<td>GNWT</td>
<td>Thank you letter regarding the Snap Lake Mine site visit to discuss the future Extended Care and Maintenance.</td>
<td>Evaluating options for:</td>
</tr>
<tr>
<td></td>
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<td>- Optimizing care and maintenance.</td>
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<td>- Re-opening the mine by De Beers or by a qualified 3rd party buyer.</td>
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<td>- Sale of a Qualified 3rd party.</td>
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<td>- Final closure of the SLM.</td>
</tr>
<tr>
<td>May 27, 2016</td>
<td>Letter</td>
<td>YKDFN</td>
<td>Thank you letter regarding the Snap Lake Mine site visit to discuss the future Extended Care and Maintenance.</td>
<td>Reviewed previous discussion on application for Extended Care and Maintenance expected to be at least 3 years or more until economic and/or operational/technical improvements can be achieved to resume operations.</td>
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<td>Evaluating options for:</td>
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<td>- Optimizing care and maintenance.</td>
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<td>- Sale of a Qualified 3rd party.</td>
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<td>- Final closure of the SLM.</td>
</tr>
<tr>
<td>June 13-14, 2016</td>
<td>Community Meeting</td>
<td>NSMA – Old Fort Rae</td>
<td>On-the-land community visit and group discussion about Snap Lake Mine activities and history of site.</td>
<td>Discussion of current and planned activities at Snap Lake.</td>
</tr>
<tr>
<td>Date</td>
<td>Meeting Type</td>
<td>Participants</td>
<td>Summary</td>
<td>Discussion related to Closure</td>
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</tbody>
</table>
| August 29, 2016    | SLEMA Meeting| LKDFN - Lutsel K'e SLEMA GWNT (ENR)             | Presentation included SLEMA and De Beers updates, financial statement, caribou, community involvement, and employment.                                                                               | • Discussed cost, timeline, and maintenance of closure.  
• Questions raised about closure plans and objectives in general.  
• Inquiry about making the area acceptable for traditional use in closure plans.  
• Inquiry for when closure plans will be submitted.  
• Inquiry about why De Beers requested an extension to their closure plans.  
• Concern raised about De Beers lack of experience with closure.  
• De Beers asked attendees questions related to closure criteria. |
| August 30, 2016    | Community Meeting | Tlicho - Behchoko | Presentations included Snap Lake, Gahcho Kue, IBA updates, wildlife, and employment.                                                                                                                      | • Concern raised regarding closure costs and general closure commitments made by companies.  
• Inquiries regarding hiring local for care and maintenance activities and care and maintenance time length.  
• Inquiry about the accurate cost of reclamation. |
| September 4-5, 2016 | Fish Tasting Event | NSMA NWTMN TG LKDFN DKFN YKDFN | Fish tasting event.                                                                                                                                                                                      | • Annual fish tasting event including discussion of care and maintenance plans for closure.                                                                                                                                                               |
| October 18-19, 2016 | Unknown.     | YKDFN Tlicho Government NSMA LKDFN DKFN NWTMN GNWT MLWLB Government of Canada | Discussed delaying the flooding and continuing to explore other options for the mine.                                                                                                                | • Discussion of current and planned activities at Snap Lake.  
• Discussion of current and planned activities at Snap Lake.  
• Discussion of current and planned activities at Snap Lake.  
• Discussion of current and planned activities at Snap Lake. |
<p>| December 5, 2016   | Meeting | LKDFN | Update on Snap Lake status.                                                                                                                        | • Discussion of current and planned activities at Snap Lake.                                                                                                                                  |
| December 7, 2016   | Meeting | NSMA | Update on Snap Lake status.                                                                                                                        | • Discussion of current and planned activities at Snap Lake.                                                                                                                                  |
| December 7, 2016   | Letter | NSMA | Letter informing of Snap Lake asset purchase and IBAs.                                                                                           | • Discussion of current and planned activities at Snap Lake.                                                                                                                                  |
| December 13, 2016  | Meeting | YKDFN | Update on Snap Lake status.                                                                                                                        | • Discussion of current and planned activities at Snap Lake.                                                                                                                                  |
| December 14, 2016  | Annual General Meeting | SLEMA | Update on Snap Lake Mine.                                                                                                                          | • Provided an update on the status of care and maintenance, and the closure and reclamation plan.                                                                                               |
| December 14, 2016  | Meeting | Tlicho Government | Update on Snap Lake mine.                                                                                                                            | • Provided an update on the status of care and maintenance, and the closure and reclamation plan.                                                                                                 |
| December 15, 2016  | Annual General Meeting | SLEMA | Update on Snap Lake Mine.                                                                                                                            | • Long-term regulatory process of the mine.                                                                                                                                                    |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting Type</th>
<th>Participants</th>
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<th>Discussion related to Closure</th>
</tr>
</thead>
</table>
| May 30, 2017 | Closure Workshop | NSMA, YKDFN, Ni Hadi Xa, Federal Government, GNWT, MVLWB | Snap Lake Working Group Closure Workshop. Included update on Snap Lake Mine activities, financial costs, flooding of the underground, and environment. | • De Beers description on differences between Snap Lake mine today (care and maintenance) and Snap Lake mine at final closure.  
• De Beers update on the multiple accounts analysis to support final design of a cover over the North Pile during care and maintenance, acknowledged the MMER amendments, and indicated that these regulations have been taken into consideration when developing the Extended care and maintenance plan.  
• Questions raised regarding how Site Wide objective 4 would eventually be checked off post-closure (Mine areas are physically stable and safe for use by people and wildlife).  
• Discussion regarding how difficult it would be to verify criteria has been met for Site Wide objective 5 (Landscape features (shape and vegetation) to match aesthetics of the surrounding natural area).  
• Questions and discussion on risk assessment regarding Infrastructure Objective 2 (on-site disposal areas are safe for people, wildlife, and vegetation).  
• Questions on how long Site Assessment takes and the remediation of crossing and spur roads for Snap Lake regarding Infrastructure Objective 3 (Contaminated soils and waste disposal areas that cannot contaminate land and water).  
• Discussion on the financial security estimate, how the estimate considers the costs for reclamation research, the annual Extended Care and Maintenance cost, and the timing to complete research relative to the final closure and reclamation plan. |
| June 13, 2017 | Email          | 21 Recipients          | Distributed the draft meeting notes from the May 30, 2017 Snap Lake Closure Workshop. | N/A |
| August 16, 2017 | Letter         | Tische Government, NSMA, YKDFN, LKDFN, SLEMA | Invitation to review the updated Interim Closure and Reclamation Plan and provide input by November 15, 2017. Informed participants of interest in small group meetings with community members to present closure and reclamation objectives. | • Provided notification that as a condition of the Type A water license, De Beers is required to submit to the MVLWB an updated Interim Closure and Reclamation Plan (ICRP).  
• De Beers hopes the ICRP will incorporate closure objectives that also incorporate TK from users in the general area.  
• Offered for De Beers and SLEMA to attend meetings to present closure and reclamation objectives. |
| November 24, 2017 | TK Workshop     | NSMA, SLEMA            | Discussion held regarding the future of Snap Lake Mine, revegetation, the North Pile, and water quality. | • Discussion on how to incorporate TK into Snap Lake closure criteria prior to regulatory submission of an updated closure plan in January 2018.  
• Question raised as to who De Beers’ “qualified person” would be with regards to post-closure wildlife risk assessment – De Beers’ response was that this would most likely be a consultant.  
• NSMA members expressed the need to recognize TK on the same level as science, and want to have parallel inspection/approval by TK holders wherever closure criteria call for inspections/approval by a professional engineer.  
• Explained that effluent water quality criteria for closure may increase from current criteria due to smaller effluent volumes.  
• Attendees decided that a half-day follow-up meeting was required to discuss specific TK requirements for closure criteria. |
<table>
<thead>
<tr>
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<th>Participants</th>
<th>Summary</th>
<th>Discussion related to Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 3, 2017</td>
<td>TK Workshop</td>
<td>NSMA, SLEMA</td>
<td>Follow-up to the Nov 24, 2017 workshop.</td>
<td>De Beers asked TK questions regarding:</td>
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<td>• What is the desired future use (types and activities at site in the future)? What amount of time will land users stay at site post-closure? What time of year will land users visit site post-closure (e.g., overwinter travel, caribou migration)? What plant types and areas are important to be safe for wildlife? What is the priority areas for vegetation? How can De Beers ensure long term physical stability of mine areas and drainage pathways? What possible post-closure landscape features would increase the threat of predation or harm to wildlife? What are the recommended methods to achieve long term stability in the North Pile? Will physical and chemical criteria support the desired future use and aesthetics condition post-closure? • Incorporation of traditional knowledge into Snap Lake closure criteria prior to regulatory submission of an updated closure plan in January 2018. • Confirmation on the acceptability of De Beers’ definition of the word “safe”. • Concern raised regarding any kind of rock dumps or areas with rock cover, particularly the potential for gaps between chunks of rock that could cause animals to break their legs. • Inquiry for engineered covers to be amenable to revegetation (i.e., the processed kimberlite containment area, and the sediments from the water treatment pond). • General consensus for all areas of the mine should be treated to encourage natural vegetation, but direct seeding was not necessary. • Concern raised that the group did not have enough information on current and future site erosion to know how De Beers can ensure long term physical stability of mine areas and drainage pathways. • Inquiry about having the approval of TK holders incorporated into the closure criteria.</td>
</tr>
<tr>
<td>December 14, 2017</td>
<td>SLEMA Traditional Knowledge Panel Meeting</td>
<td>NSMA, LKOFN, Tlicho Government, YKDFN, SLEMA</td>
<td>Presentation on the status of the Snap Lake Mine, and outline of the Snap Lake Mine’s closure and reclamation plan.</td>
<td>• De Beers presentation on the status of the Snap Lake mine and outline of the mine’s closure and reclamation plan. • Concerns raised regarding any machinery and heavy equipment left behind, rock piles, waste rock, and whether they are too high for animals to climb over. • Questions raised regarding mine closure monitoring, whether Snap Lake mine will reopen. • Requested a report of all materials and what is going to be left behind.</td>
</tr>
<tr>
<td>April 11, 2018</td>
<td>Community Meeting</td>
<td>Tlicho – Whati, including teachers, students, and community members</td>
<td>Snap Lake update and student questions on mining and the environment.</td>
<td>• Discussion of current and planned activities at Snap Lake.</td>
</tr>
<tr>
<td>May 11, 2018</td>
<td>Community Workshop</td>
<td>DKNF – Fort Resolution</td>
<td>Environmental update on Snap Lake and Gahcho Kue mines. Site overview to Grade 9 - 12 classes.</td>
<td>• Discussion of current and planned activities at Snap Lake.</td>
</tr>
<tr>
<td>July 13, 2018</td>
<td>Site Visit</td>
<td>SLEMA</td>
<td>Site visit to Snap Lake</td>
<td>• Site-based update including site tour and discussion about closure and transition to zero-occupancy.</td>
</tr>
<tr>
<td>July 31, 2018</td>
<td>Community Meeting</td>
<td>YKDFN – N’Dilo</td>
<td>Snap Lake update</td>
<td>• Discussion about remote monitoring at the mine and transition to zero occupancy at the mine site.</td>
</tr>
<tr>
<td></td>
<td>Meeting</td>
<td>YKDFN – N’Dilo</td>
<td>Snap Lake discussion held regarding monitoring and transition to zero occupancy.</td>
<td>• Discussion of current and planned activities at Snap Lake.</td>
</tr>
<tr>
<td>August 5 – 6, 2018</td>
<td>Fish Tasting Event</td>
<td>Not available</td>
<td>Not available</td>
<td>• Discussion of current and planned activities at Snap Lake.</td>
</tr>
<tr>
<td>November 6, 2018</td>
<td>Closure Workshop</td>
<td>Snap Lake Working Group</td>
<td>Presentation of proposed closure criteria and upcoming final closure plan for Snap Lake.</td>
<td>• Discussed site wide objectives, infrastructure objectives, North Pile objectives, and underground objectives. Addressed each objective by focusing on proposed closure criteria for physical stability, chemical stability, future use and aesthetics.</td>
</tr>
<tr>
<td>Date</td>
<td>Meeting Type</td>
<td>Participants</td>
<td>Summary</td>
<td>Discussion related to Closure</td>
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</table>
| November 7, 2018 and December 17, 18, 2018 | Workshop     | Tlicho Government including Elders and staff SLEMA | Snap Lake presentation provided followed by questions and discussion about the final closure plan and TK input. | - Concerns raised related to a general increase of abandoned mines, contamination, possible increase in dust levels after mine closure, fuel spills and how it can impact wildlife.  
- Questions raised about post closure plans and monitoring, how long the airstrip will be there, financial costs and how long term monitoring will be paid, how long reclamation takes, how the facility will be covered, how to get equipment off the site, underground and slope post closure plans.  
- Request for a written response regarding the tailings facility, whether the facility should be monitored and if it will be around forever.  
- Request for having stockpile material left behind so communities can process it and keep the profits.  
- Request for having a video made explaining site aspects, life cycle of the mine, and closure process – also suggested book format.  
- Request for a visual timeline illustrating how long the monitoring will go on for, what infrastructure will be removed, and what year the land is anticipated to look more like the natural environment.  
- Request to have a comparison of height between the tailings facility and other known areas such as Crystal Mountain. |
| March 7, 2019               | Closure Workshop | Snap Lake Working Group          | Presentation of forthcoming final closure and reclamation plan for Snap Lake. | Discussed overall closure plan, with focus on proposed North Pile closure cover, water management systems and monitoring. |

C.2.1 2013 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval.

ICRP v3.2 was approved by the MVLWB January 30, 2014. Between the submission of the ICRP v3.2 to the MVLWB (July, 2013) and its approval, the ICRP was subject to a review process by stakeholders. De Beers provided responses to the review comments; however, ICRP v3.2 was not revised to incorporate applicable comments. ICRP v4 (this report) was updated to consider the review comments on ICRP v3.2. Stakeholder review comments and De Beers’ responses are provided in the MVLWB Staff Report.

The following documentation is included herein as a record of the 2013 activities:

- MVLWB January 20, 2014 Staff Report titled “De Beer Interim Closure and Reclamation Plan (ICRP) Version 3.2”.

Staff Report

Applicant:
De Beers Canada Inc. (De Beers)

Location:
Snap Lake

Application:
MV2011L2-0004

Date Prepared:
January 20, 2014

Meeting Date:
January 30, 2014

Subject:
De Beer Interim Closure and Reclamation Plan (ICRP) Version 3.2

1. Purpose/Report Summary

The purpose of this report is to present to the Mackenzie Valley Land and Water Board (MVLB or The Board) De Beers’ submission of their updated Interim Closure and Reclamation Plan (ICRP) version 3.2 for Board decision.

2. Background

- June 8, 2011 – Version 3.1 of the ICRP was submitted as part of De Beers’ WL renewal application, however the review was postponed until after the WL renewal process was complete;
- June 7, 2012 – Board staff sent a letter to De Beers and reviewers explaining that Version 3.1 of the ICRP would be reviewed internally for conformity with the AANDC guidelines and current best practices within the NWT;
- July 5, 2012 – Version 3.1 of the ICRP was rejected by the Board. A work plan was approved which outlined a process for the finalization of the closure objectives and ultimately the submission of an updated version of the ICRP (Version 3.2);
- August 6, 2012 – De Beers submitted their proposed Closure Objectives;
- August 16, 2012 – Based on requests from reviewers, the Land and Water Board extended the dates for the submission of reviewer’s comments to ensure parties had sufficient time to consider the closure objectives proposed by De Beers;
- September 20, 2012 – Reviewer comments received;
October 9, 2012 – De Beers submitted their response to reviewer comments;
October 11, 2012 – Letter from De Beers indicating a plan to hold community meetings early in the new year (January/February) and proposing to postpone the Options Workshop until after the community meetings;
November 5, 2012 – Letter from De Beers clarifying their request to postpone the Workshop in order to continue to engage with communities; and,
November 22, 2012 – Board Meeting approval of the closure objectives;
March 13, 2013 – Closure Options Workshop;
July 29, 2013 – Updated ICRP Version 3.2 submitted;
September 3, 2013 – Reviewer comments due;
September 20, 2013 – De Beers responses due; and
January 30, 2014 – Board decision on the ICRP version 3.2.

3. Discussion

The Board approved the Closure Objectives on November 22, 2012. However due to the November 5, 2012 letter from De Beers, final approval of the ICRP was postponed pending engagement with the communities and the closure options workshop. According to the December 20, 2013 Amendment Application’s Engagement Log, closure meetings were held through February 2013 with Deninu K’ee First Nation (DKFN), Lutsel K’ee Dene First Nation (LKDFN), North Slave Metis Alliance (NSMA) and the Tlcho. The Engagement log also stated that the ‘YKDFN invitation was accepted but consisted of a general discussion on site activities in lieu of a formal closure discussion’ (2013 Amendment application Engagement Log Section 2.2). The Closure Options workshop was held on March 13, 2013.

On July 29, 2013, De Beers submitted an updated ICRP, version 3.2. This version included ‘updated site closure objectives, options, and a Reclamation Research Plan based on information gathered from reviewer’s comments, community meetings and a technical workshop. Preliminary closure criteria were also included for future review and refinement, incorporating input from the meetings described above.’ (ICRP 3.2 p-10).

4. Review Comments

Comments were received from Aboriginal Affairs and Northern Development Canada (AANDC), Environment Canada (EC), Government of the Northwest Territories – Environment and Conservation (GNWT - ENR), NSMA, and YKDFN. Please refer to the Online Review Comment Summary Table for all the comments and responses.
A large number of comments were received during the review process. Many of the comments did not focus on the closure objectives or the updates made as a result of the options workshop. Most comments focused on topics that will be addressed in future versions of the ICRP. Version 4.0 will be submitted 3 years after approval of the current version 3.2. The intent being that each version will provide more detail as the mine proceeds and the reclamation research allows for more details to be incorporated into the plan. The main focus of the next version of the ICRP will be to discuss the closure criteria.

YKDFN questioned the vision closure goal for the Project. They state that ‘the Project does not provide the context on what practicalities would cause us to accept a closure that did not feature a self sustaining ecosystem.’ The broad project closure vision was taken from the Board approved Closure Guidelines for use by Mines in the Mackenzie Valley and is based on the definition provided in AANDC’s 2002 Closure and Reclamation Policy.

5. Conclusion
De Beers has followed the Board closure process which was to complete the Closure Objectives and conduct a Closure Options Workshop. This has been completed. Version 3.2 incorporates the approved objectives, input gathered from community meetings and the Closure Options Workshop. Closure criteria and Research Plans have been submitted but will continue to be reviewed in upcoming versions of the ICRP. Version 4.0 of the ICRP will address the closure criteria and related items.

6. Recommendations
Board staff recommends that the ICRP version 3.2 be approved as the goals of completing the Closure Objectives and conducting a Closure Options Workshop have been completed.

Pursuant to Part I Item 2 the ICRP version 4.0 will be submitted 3 years from the approval of version 3.2 and will focus primarily on addressing closure criteria and related items.

7. Attachments
- ICRP Version 3.2;
- Comment Summary Table; and,
- Draft approval letter.

Respectfully submitted,

Marc Casas,
Regulatory Officer
# Review Comment Table

<table>
<thead>
<tr>
<th>Board:</th>
<th>MVLWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Item:</td>
<td>MV2011L2-0004 - De Beers - Snap Lake - ICRP</td>
</tr>
<tr>
<td>File(s):</td>
<td>MV2011L2-0004</td>
</tr>
<tr>
<td>Proponent:</td>
<td>De Beers Canada Inc. - Snap Lake</td>
</tr>
<tr>
<td>Document(s):</td>
<td>ICRP - Version 3.2 (12MB)</td>
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<td>Item For Review Distributed On:</td>
<td>July 31 at 15:34 Distribution List</td>
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<tr>
<td>Reviewer Comments Due By:</td>
<td>Sep 3, 2013</td>
</tr>
<tr>
<td>Proponent Responses Due By:</td>
<td>Sep 20, 2013</td>
</tr>
</tbody>
</table>

Please submit comments using the Online Review System by downloading the excel comment table or using the "add comment" button by 5pm August 30, 2013.

To reduce the file download time, right-click on the file link above and choose "Save link/target as..." to save the file directly to your computer.

If you have any questions or comments regarding the ICRP or using the Online Review System, please contact Lindsey Cymbalisty at 867-766-7471 or lindsey@mvlwb.com, or Jen Potten at 867-766-7468 or jpotten@mvlwb.com.

This request was also distributed by fax to the following organizations:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Contact Name</th>
<th>Contact Position/Title</th>
<th>Email/Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Resolution Metis Council</td>
<td>Trudy King</td>
<td></td>
<td>(867)394-3322; <a href="mailto:Fieldworker.fmnc53@northwestel.net">Fieldworker.fmnc53@northwestel.net</a>;</td>
</tr>
<tr>
<td>Hay River Metis Council</td>
<td>Wally Shuman</td>
<td>President</td>
<td>(867)874-4472; <a href="mailto:hrnc@northwestel.net">hrnc@northwestel.net</a>;</td>
</tr>
<tr>
<td>NWT Metis Nation</td>
<td>Tim Heron</td>
<td>NWTMN IMA Coordinator</td>
<td>(867)872-2772; <a href="mailto:rcm.nwtm@northwestel.net">rcm.nwtm@northwestel.net</a>;</td>
</tr>
<tr>
<td>Smith Landing First Nation</td>
<td>Andrew Wanderingspirit</td>
<td>Chief</td>
<td>(867)872-5154; <a href="mailto:chief@slfn196.com">chief@slfn196.com</a>;</td>
</tr>
</tbody>
</table>

| Contact Information: | Jen Potten 867-766-7468 | Lindsey Cymbalisty 867-766-7471 | Rebecca Chouinard 867-766-7459 |

## Comment Summary
## SNAP LAKE MINE
Final Closure and Reclamation Plan


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### AANDC: Nathen Richa

<table>
<thead>
<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Staff Response</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>General File</td>
<td>Comment (doc) AANDC Cover Letter Recommendation</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td>General Comment - Reclamation Research</td>
<td>Comment</td>
<td>The plan includes several areas of specific research, the results of which will form the basis for developing more advanced closure activities and objectives. As such, only generalized closure details are provided in the Interim Closure and Reclamation Plan for the three mine components. Given that much information and detail remains to be provided, AANDC has provided fairly high level comments on the contents of the plan. <strong>Recommendation</strong> AANDC recommends DeBeers continue to gather, report and update closure information to address areas of uncertainty. The research results are required to prepare a detailed closure plan for each component. AANDC recommends that annual progress reports provide the results of all information gathering initiatives and reclamation research for each component.</td>
<td>Sep 19: De Beers is committed to completing reclamation research to inform areas of uncertainty and aid in final closure planning. The reclamation research plan as presented in the ICRP is reflective of this fact. De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation research and relevant closure information. In addition to, providing specific reclamation reports as an Appendix.</td>
</tr>
<tr>
<td>3</td>
<td>General Comment - Post-Closure Monitoring</td>
<td>Comment</td>
<td>The plan includes very little information about post-closure monitoring. In all, less than a page is devoted to the subject. This is a concern for the Department as post-closure monitoring is required after reclamation is complete in order to assess performance and ensure that closure objectives and criteria are being achieved. <strong>Recommendation</strong> AANDC recommends the Board require DeBeers to provide additional detail regarding the timeframe for post-closure monitoring and the</td>
<td>Sep 19: A more detailed post-closure monitoring discussion that includes a timeframe for monitoring will be provided in the revised ICRP.</td>
</tr>
<tr>
<td>Time</td>
<td>General Comment - Closure Criteria</td>
<td>Comment</td>
<td>Provisional closure criteria are provided for some closure objectives. AANDC notes the importance of closure criteria as they will be used to confirm that a closure objective has been met in the post-closure period. Ultimately, the following is required to assess performance of closure activities and determine if the company can relinquish the site: derivation of final closure objectives, activities and criteria; post-closure monitoring; and post-closure performance assessments. It is the relinquishment aspect that makes derivation of closure criteria critically important to the closure and reclamation planning process. As such, research and refinement of closure criteria should be the focus for DeBeers in the next few years. AANDC notes that separate reclamation objectives and activities may be required for different parts of the North Pile and specific closure objectives and criteria may ultimately be required for each sub-component (such as: PAG rock, landfill area, landfill area, Starter Cell, East/West Cell, etc). <strong>Recommendation</strong> AANDC recommends that specific closure criteria be added to the plan as part of revisions to the ICRP. Criteria should be developed specific to mine components. Note, in some instances, specific objectives, activities and criteria may be required for different areas within the same component. AANDC recommends reclamation research be initiated for the North Pile as soon as possible. Results should be made available to the Board and reviewers as soon as possible.</td>
<td><strong>Sep 19:</strong> De Beers will review language in the draft ICRP and where possible, strengthen the language in the revised ICRP to note that closure criteria is a key component to develop before the next version of the ICRP is completed (i.e., 3 years from date of approval of the current ICRP). The development of closure criteria in the next ICRP was a planned activity as directed by the MVLWB. Further development of closure criteria is a reclamation research activity summarized in Appendix E, Section 2.3 of the ICRP. De Beers’ current reclamation objectives have been approved by the MVLWB and were derived with input from the MVLWB, reviewers and De Beers. The categorization of the objectives into the main mine site areas was an outcome of the MVLWB review process and ruling. As a result, De Beers followed the MVLWB ruling on reclamation objectives in the development of the ICRP. AANDC’s comment that “separate reclamation objectives and activities may be required” suggests that the current MVLWB approved objectives may not be considerate of specific mine components. De Beers is interested in advancing the ICRP towards a final plan and will consider in the development of closure criteria the specific mine components; however, De Beers will work within the MVLWB approved reclamation objectives in completing this work. Reclamation research for the North Pile has been initiated and reported annually with the Annual Report.</td>
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<td>Time</td>
<td>they are available.</td>
<td>De Beers’ opinion that annual submission of reclamation research is a suitable timeframe to submit findings to the MVLWB and reviewers.</td>
<td>During the October 30, 2013 WG meeting on the NP, De Beers made reference to Paste Feasibility studies to be completed in February 2014. It is anticipated that these studies would provide De Beers with increased clarity regarding the operation of the NP. As part of their NP Management Plan, which remains outstanding, De Beers will have to highlight any additional plans (including the ICRP) that are impacted by any proposed changes to the NP Management Plan.</td>
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<td>5</td>
<td>General Comment - Slurry vs. Paste &amp; Progressive Reclamation</td>
<td><strong>Comment</strong> AANDC notes that the ICRP rarely discusses the mechanism for PK deposition into the North Pile. In the later sections of the ICRP (i.e. Progressive Reclamation p. 109 of 143) the fact that PK is deposited as slurry is revealed. There is little discussion about the implications of PK deposition into the East Cell as slurry rather than paste (deposition began in 2012). AANDC notes that the Progressive Reclamation section correctly references uncertainty in the closure of the Starter Cell due to its higher water content. The greater the amount of water in the cell the longer it will take for permafrost to aggrade. However, the section goes on to discuss that the East and West cell will receive waste materials with lower water content. AANDC notes that this has not been the case for the East Cell to date. <strong>Recommendation</strong> AANDC recommends that the Board require DeBeers to further discuss the deposition of PK in the plan and that the Project Description section be updated to include this detail (e.g. Section 4.4.2.1). AANDC recommends that a schedule be included in the plan that includes the date when paste will be deposited into the North Pile. Note, the company has indicated on the public record over several years now that paste would be used to deposit PK in the North Pile (i.e. during water licence renewal in 2011, during the summer of 2012, etc.).</td>
<td><strong>Sep 19:</strong> Within the Reclamation Research Plan (Appendix E, Section 3.1) De Beers identifies and discusses the reclamation uncertainties with regards to slurry deposition versus paste deposition within the North Pile. Thus, research is planned to address this topic. De Beers will provide further discussion on PK type deposited into the Starter and East Cells to date within Section 4.4.2.1. The West Cell of the North Pile is not operational. The time of deposition of PK, and type of PK deposited within the North Pile is influenced by a variety of factors, including the paste trials being completed at Snap Lake. An update on paste activities and deposition was provided within De Beers’ Aug 30, 2013 submission to the MVLWB titled &quot;Snap Lake Mine De Beers Canada Inc. Follow Up to Starter Cell Raise Request Water Licence #MV2011L2-0004&quot;. As a result of current paste research and the variability inherent in optimizing mine operations, De Beers cannot provide long-term predictions, with certainty, of PK quantities and type to be reported to the North Pile. Rather, a summary of materials deposited to the North Pile is reported in the Annual Report as per Schedule 1 Part B, Item 1(r). Paste has been successfully deposited within the North Pile and in the Starter Cell Phase IV lift package it is noted that a summary of research will be submitted in the 2013 WLAR.</td>
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<td>6</td>
<td>Section 4 Project</td>
<td><strong>Comment</strong> The section notes that</td>
<td><strong>Appropriate response.</strong></td>
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<td>Time</td>
<td>Description - 4.4.2.1 North Pile</td>
<td>DeBeers has committed to progressively reclaiming the North Pile. Once a cell has reached its capacity it would be reclaimed. Note that the timeline for reclamation of the Starter Cell would be altered because of the proposed raise to the structure which is currently under review by the MVLWB. Further, as noted above, the deposit of PK as slurry has also occurred in the East Cell. <strong>Recommendation</strong> AANDC recommends that the ICRP account for all potential PK deposition methods (i.e., slurry, paste, combination) as the different methods will have a direct bearing on the closure option, activity, criteria and performance monitoring for any cell that does not receive PK as a paste only. planned to further understand the uncertainties regarding the North Pile closure performance. Specific questions have been identified to assess the impact of slimes versus paste deposition, permafrost aggradation into the waste materials, etc. Without the analysis being completed, it is De Beers opinion that it is premature to conclude that PK deposition method will have a &quot;direct bearing on the closure option, activity, criteria and performance monitoring&quot;. De Beers accepts AANDC perspective and will integrate this recommendation into the proposed research plan. Post deposition piezometers/ thermistors will be install on the cells. Without the completed research to clarify uncertainties of the various types of paste and associated closure methods, it is difficult for De Beers to respond until these have been clarified. However as research results are gathered, the different closure methods will have to be identified and discussed.</td>
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<td>Section 4 Project Description - 4.4.2.1 North Pile and 4.4.2.2 Underground Mine</td>
<td><strong>Comment</strong> The section describes that over the mine life it is estimated that 1.8 Mt of waste rock and 23 Mt of PK will be produced. As per the mine plan, DeBeers is to deposit nearly half of the PK produced by the mine into the underground as backfill. In 2012, 1.29 Mt of PK was deposited into the North Pile as the deposit of PK as backfill had yet to begin. <strong>Recommendation</strong> AANDC recommends that DeBeers include the anticipated date for the deposit of PK as underground backfill in this section of the ICRP. Also, DeBeers should describe if there are any consequences from an operational standpoint if PK is not deposited underground as backfill for the remainder of the mine life. AANDC recommends that DeBeers prepare a schedule, similar to Figure 4.4 that outlines the schedule and total anticipated volume of PK deposited underground for the remainder of the mine life. This schedule should be included in the ICRP. <strong>Sep 19:</strong> A new update regarding on paste activities and deposition was provided within De Beers Aug 30, 2013 submission to the MVLWB titled &quot;Snap Lake Mine De Beers Canada Inc. Follow Up to Starter Cell Raise Request Water Licence #MV2011L2-0004&quot;. Research in regards to underground paste deposition is currently being completed and an anticipated date for deposit cannot be provided at this time. Information on paste research has been proposed to be discussed Quarterly at the Snap Lake update meeting. The quantity of paste deposited is incorporated into the Water License Annual report and duplicating the information in this report is unnecessary.</td>
<td>The February 2014 Feasibility Study should provide some insight into these concerns.</td>
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</table>
8 Section 4 Project Description - 4.4.2.3 Infrastructure - Water Management System

**Comment** This section does not include any description of the water management issues and water storage issues encountered at the mine site over the past few years. The section states, "Effective water management strategies at the Snap Lake Mine have been developed to minimize impacts to the aquatic environment from the Project." There is no reference to the recent modeling that suggests that inflows into the underground are expected to reach 56,000 m³/day by the end of operations which is a drastic increase (nearly double) from previous inflow rate estimates.

**Recommendation** AANDC recommends that this section include aspects of the water management system that DeBeers is contemplating to improve such as expansion to the Water Management Pond, Raise to the Starter Cell, addition of external ponds, trenches and sumps to collect water that escapes the North Pile, the additional outfall line, etc.

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9 Section 4 Project Description - 4.4.2.3 Infrastructure - Quarries

**Comment** AANDC is concerned with the sequencing of PK deposition which is expected to cover all quarries including the quarry in the West Cell; however, that quarry is also intended to provide the source material for the closure cover for any PK deposited in the West Cell. AANDC assumes that cover material will be extracted from the quarry and then stockpiled until it is required for construction of the cover. This should be clearly explained in the plan. However, if an alternate approach is contemplated it should be explained in the ICRP.

**Recommendation** AANDC recommends that a further description of the quarry and quarry sequencing be included in

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**Sep 19:** The closure and reclamation plan should address only infrastructure that is complete. If changes to infrastructure are proposed they will be included in future iterations of the plan. Contemplating potential changes that might not occur adds little value to the plan.

**Appropriate response**
Time | Section 4 Project Description - 4.4.2.3 Infrastructure - Landfarm
--- | ---
**Comment** The section states that a lined landfarm currently exists at the mine and is located within the North Pile area. The cell is designed to bioremediate any hydrocarbon impacted materials and soil. Operation of the landfarm has not occurred to date. **Recommendation** AANDC recommends that the ICRP include a schedule and anticipated volumes of hydrocarbon impacted soil expected during the remaining operation of the mine. This data should be based on information from previous years. This data would be used to determine the amount of available construction material and or cover material that may be available at the end of operations after successful bioremediation.

**Sep 19:** De Beers currently ships hydrocarbon contaminated soil off-site instead of treatment within the on-site landfarm. De Beers can provide in the revised ICRP a summary of quantity of contaminated soil shipped off-site, which may provide a rough basis for the yearly quantity generated during operations. It is unknown if the operations quantity would be similar to closure quantity, but nonetheless will provide a reasonable yearly approximation.

**Appropriate response. The waste management plan should explain or reference how the hydrocarbons are dealt with on site.**

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**Table 5.4 Closure Objectives, Criteria, Measurements, Research**

**Comment** All objectives and criteria presented here require follow-up monitoring. See comment above about post-closure monitoring. **Recommendation** AANDC recommends that this table include a column for monitoring which could include type, frequency and length.

**Sep 19:** See response to AANDC review comment #3. **This should be included in the next version of the ICRP, which will deal with criteria.**

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**Table 5.4 Closure Objectives, Criteria, Measurements, Research**

**Comment** Table headings are incorrect on subsequent pages. **Recommendation** AANDC recommends the table be updated.

**Sep 19:** Tables will be updated in the revised ICRP. **Appropriate response**

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**Table 5.4 Closure Objectives, Criteria, Measurements, Research**

**Comment** AANDC is aware that the objectives included in the Table were approved by the MVLWB and recommended for inclusion in v. 3.2 of the ICRP. However, the closure objectives

**Sep 19:** It is De Beers' interpretation of the Objectives is correct.
for the North Pile do not include impacts to water such as seepage, leachate and or runoff. This renders the objectives for the North Pile incomplete (only requires a cover and physical stability). DeBeers has correctly mentioned the uncertainty regarding the reclamation of the North Pile, in particular the starter Cell because of the high water content. This will undoubtedly lead to seepage issues and delay permafrost aggradation in the pile.

Recommendaion AANDC recommends that beyond the PK cover and physical stability requirement for the North Pile, an additional objective be required related to chemical stability. This objective could include criteria such as thermal, geochemical, water content/.saturation, runoff quality, seepage quality, geochemical, etc.

Comment Table 5.7 - Closure Objectives, Closure Activity, Options Considered, Research

In some instances only a few words are provided regarding alternative closure activities and options for each closure objective.

Recommendaion AANDC recommends that the ICRP clearly describe the alternative Closure Activities and Options for all the mine components in the event that testing or analyses indicate that the preferred option can not be implemented.

Sep 19: A description of closure options and activities for specific mine components is provided in Section 5.2.4 of the ICRP.

Noted.

Comment Section 5.2.4.1 North Pile

The section describes the anticipated rock cover thickness proposed for the North Pile which may include PAG and PK material. The proposed cover thickness for PAG material is at least 4 m and the cover thickness proposed for PK material is 0.5 m of 250 mm minus material. There is no mention of proposed cover type and thickness over the landfill and landfarm areas. AANDC assumes that the cover for the PK material would need to be crushed in order to meet the that is safe for people, vegetation, aquatic life, and wildlife. An additional objective, as recommended by AANDC, is therefore not necessary.

Sep 19: Reclamation research on cover material thickness and gradation commenced in 2010 and has been reported in annual reports to the MVLWB. Research continues on the topic of cover material specifications and performance as outlined in Appendix E, Section 3.2 of the ICRP.

Appropriate response
specification. However, a thicker cover could be placed that would reduce this handling/crushing requirement. AANDC notes that the section states that rock cover thickness and material gradation were not evaluated at this time. AANDC also notes that reclamation research is proposed to help address specifics regarding cover material and thickness. AANDC expects that settlement may occur for PK depositions areas, particularly those with high water content.

**Recommendation** AANDC recommends that reclamation research occur immediately to determine the type and source of cover material and cover thickness. This would ensure that proper specifications are in place for progressive reclamation proposed for each cell of the North Pile.

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### 16 Appendix E - Reclamation Research Plans

**Comment** Throughout the reclamation research plan overview sections, descriptions and results of research conducted since 2010 have been included and referenced (specifically revegetation, north pile and underground research). Some of these reports have not been referenced at the end of the research plan section. Many of these reports are not available to reviewers.

**Recommendation** AANDC recommends that research pertaining to reclamation be made available to reviewers. Any future reclamation research results should be provided to reviewers as part of Annual Reclamation Status Reports.

**Sep 19:** De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation research and relevant closure information, in addition to, providing specific reclamation reports as an Appendix. Note, that not all research has a report associated with its completion; for example, on site experiences and observations help fill research gaps, but may not have a formal report that can be provided as an Appendix.

**De Beers response is sufficient provided they provide all referenced material in the Appendices. In the past not all references were made available.**

### 17 Appendix E - Reclamation Research Plan - 2.2 Revegetation

**Comment** A potential research topic could include vegetation of fine PK areas particularly as an alternative to a rock cover in zones prone to ponding or instability (sinking rock cover due to water content).

**Sep 19:** De Beers in partnership with various consultants does and will research various alternatives for closure.

**Appropriate Response.**
| Time | Appendix E - Reclamation Research Plan - 2.3 Development of Closure Criteria | **Recommendation** AANDC recommends that this be included in the Reclamation Research Plan. | **Comment** Research for the development of closure criteria is welcomed. The type and results of the research must be included as part of the Annual Reclamation Status Reports. **Recommendation** AANDC recommends that closure criteria be developed for all mine components and that the criteria are measurable. | **Sep 19:** De Beers will complete closure criteria to satisfy each closure objective. Development of closure criteria is a planned research activity (Appendix E, Section 2.3). Criteria will be developed, where possible, to be measurable. De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation research and relevant closure information, in addition to, providing specific reclamation reports as an Appendix. | This is certainly the intent of the criteria. This will be covered in depth during the next version of the ICRP (Version 4.0). |
| 18 | Appendix E - Reclamation Research Plan - 3 North Pile | **Comment** There are many topics outlined in the North Pile research plan concerning areas of uncertainty. However the objectives presented only cover closure covers and physical stability. Chemical stability objectives for the North Pile have not been included in the ICRP. The research pertaining to the Starter Cell is critically important and understanding the geotechnical and geochemical conditions is extremely important to AANDC as well since, depending upon when paste is produced, conditions in the starter cell may represent conditions in the North Pile as a whole. Further, AANDC views thermal monitoring within the Starter Cell and the East Cell as being of equal value. **Recommendation** AANDC recommends that the Starter Cell research be initiated immediately and that results be provided to the Board and reviewers annually. | **Sep 19:** Reclamation research into the North Pile closure performance has commenced and findings will be reported in the annual report to the MV/LWB. The structure of Appendix E is arranged to have primary headings correspond to the reclamation objectives. North Pile research includes aspects of uncertainty beyond closure cover and physical stability, and does include thermal and water quality aspects. | Appropriate response |
| 19 | Appendix E - Reclamation Research Plan - 4 Underground Mine | **Comment** AANDC has concerns with potential leaching of contaminants from the backfilled PK which is to be placed underground. There is little | **Sep 19:** De Beers will review language in the draft ICRP and where possible, strengthen the language in the revised ICRP regarding potential leaching of Annual closure Progress Report will be submitted by April 30, 2014. Pursuant to Part I Item 3 |
### Time

| Appendix E - Reclamation Research Plan - 5.2 Disposal of Contaminated Soils and Sediment | **Comment** There is an entire reclamation research task associated with handling and disposing of hydrocarbon contaminated soil. AANDC is unclear why this poses such an area of concern for DeBeers as they currently have a lined contaminated soil remediation area at the site. The facility should be used to clean any contaminated soils that occur during the reminder of operations. These materials could be stockpiled for use as construction or cover material after they have been successfully remediated (appropriate criteria are achieved). **Recommendation** AANDC recommends that DeBeers initiate the operation of the lined contaminated material remediation facility and stockpile remediated material for future construction and remediation. | **Sep 19:** De Beers acknowledges AANDC’s review comment and will consider when the landfarm becomes operational. It is also important to understand that the landfarm will need to move when the West Cell construction commences. This response does not really fit with comment 10, which states that hydrocarbon is shipped off-site. It is my understanding that De Beers does not intend to commission the landfarm. It is not directly related to the material being presented to the Board. Nonetheless it does warrant clarification. Can De Beers clarify what their current and future plans are for the Landfarm? This can be done by revising upcoming reports such as Waste Man Plan. |
### De Beers Canada Inc.

#### Environment Canada: Jane Fitzgerald

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<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Staff Response</th>
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#### GNWT - Environment and Natural Resources: Patrick Clancy

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<td>1</td>
<td>Topic 1: Mine Water Management - General Comment</td>
<td>Comment (doc) cover letter Recommendation</td>
<td>Sep 19: As the mining activities progress water quality and quantity modelling and sampling will continue and be adjusted in line with actual results. A site wide water quality model was completed as part of the De Beers' environmental assessment. At that time, site-wide water quality predictions at closure were provided that accounted for the various individual mine components. An updated site wide water quality model was completed in 2011 titled &quot;Snap Lake Mine Site Water Quality&quot; (Golder, 2011) which focuses on the operation phase of the mine. This type of site-wide model will require updating for closure conditions at a future date, either when required to facilitate closure planning, or prior to final closure. In the revised ICRP, De Beers will reinforce the language in the appropriate section to note the</td>
<td>In the recent Amendment Application (December 20, 2013) a site wide water balance model was submitted. De Beers will have to incorporate any changes into future versions of the ICRP.</td>
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De Beers Canada Inc.
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<td>Sep 19</td>
<td>Reclamation research is proposed to update the longer term thermal regime within the North Pile and to assess the water quality at closure that comes from the North Pile (Appendix E, Section 3.1 of the ICRP). At the current time, De Beers considers the proposed remedial option to be suitable for the Snap Lake Mine. In the event that the research suggests that the current plan for managing seepage waters is not adequate, then alternative remedial options will be considered. 2) De Beers will include further details regarding the geochemistry of the PK within the revised ICRP. Further, additional details regarding freezing point depression will also be provided in the revised ICRP. 3) Closure criteria for the North Pile are to be developed prior to the next update to the ICRP (i.e., in about 3 years time). Criteria for the North Pile cover, such as those proposed in the MEND document will be considered further during the development of the closure criteria. De Beers agrees that the MEND document provides valuable technical information to</td>
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being deposited within the North Pile; 1) The MEND Cold Regions Cover System Design Technical Guidance Document (AANDC 2012) should be consulted as the final rock cover design is established to provide guidance for development of the cells; 2) Incinerator Waste/Sewage Waste is deposited into the North Pile however it will only be contained by aggraded permafrost and may be free flowing until encapsulation; and 3) The proponent indicates that the North Pile is anticipated to meet water quality targets two years after closure, however the study for permafrost aggradation has not progressed as anticipated and a slurry has been used instead of the proposed paste.

**Recommendation**

Recommendation(s): 1) In the event that permafrost does not aggrade as anticipated for the North Pile or is shown to be warming during post-closure monitoring, please provide further rationale that the only remedial option is to treat seepage/accumulated pore water until it meets discharge targets or alternatively provide secondary remedial options to amend the North Pile design; 2) The proponent should define the geochemical makeup of the PK slurry and include a description of the PK within the document. It should also be noted in the PK discussion whether the PK is causing freezing point depression and whether it will affect the aggradation of permafrost (i.e. Chlorides, major ions, etc.); 3) In the North Pile design, please reference the MEND Cold Regions Cover System Design Technical Guidance Document (AANDC 2012) as it provides technical guidance for closure and design in northern climates. The proponent should highlight how guide cover closure planning and will add this reference to the revised ICRP. 4) The implications of the waste material type deposited within the North Pile on the thermal regime within the North Pile will be added as a specific question to answer as part of the North Pile Closure Performance (Water Quality) Reclamation Research Plan (Appendix E, Section 3.1). 5) The two year timeframe for water quality was based on predictive modeling of water quality from the North Pile as presented during De Beers' Environmental Assessment. Specific reference to this study will be added to the revised ICRP.
its design will meet the limitations identified in the guidance document and ensure that the design will meet the 100 year estimate for closure; 4) As there will be a landfill within the North Pile trench the proponent must provide evidence that the deposited material will not become a source of contamination in the future. Please provide evidence that the contaminants (including degradation of machinery, tires, sewage etc) will be encapsulated by the North Pile design, and that if aggradation does not proceed as anticipated that the PK slurry lifts and rock cover will ensure encapsulation; and 5) As there are on-going studies to ensure aggradation of permafrost in the North Pile, please provide clarity on the basis for the two year time frame for water quality. A two year time frame for permafrost aggradation is consistent with DEW Line landfills however they are in an area of continuous permafrost, Snap Lake is just above the discontinuous zone and has been affected by mine development and PK slurry deposition. Please consider extending this timeframe or providing clarification on how the two year timeframe was established.

### Topic 3: Permafrost Conditions- Groundwater and Talik Under Snap Lake

**Comment:** The underground surface features are said to be in a talik, however loading onto the groundwater regime is mentioned only briefly as DeBeers does not anticipate geochemical loading although potential ARD has been identified. It has been noted that groundwater conditions have been greater than anticipated with the current second diffuser being required due to a greater than 36,000 m$^3$/day influx with a maximum estimate of 56,000 m$^3$/day influx.

**Recommendation:**

**Sep 19:** 1) understanding the complex groundwater flow systems is difficult. Research is ongoing to understand inflows throughout mine life and as this research area is refined, research will progress on post closure groundwater quality/quantity and to research how to limit contaminants entering groundwater. 2) De Beers is currently revising the underground, site and lake models in preparation for the Water License amendment application to be submitted in December 2013. As noted above this updated modeling was provided as part of their Dec 20, 2013 Amendment Application which is available on the registry.
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<td>4</td>
<td><strong>Comment</strong> Comment(s): When a reclamation research option(s) are not presented, it is difficult to navigate the text as there are no references to sections of the ICRP or Appendix E; Site Wide Objective (SW2) - There is no mention of having civil works developed to re-establish pre-mining drainage. <strong>Recommendation</strong> Recommendation(s): 1) Consider revising the table to include references to the background information for ease of use; 2) Please refer to Mine Water Management general comments.</td>
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| Sep 19 | 1) Not all closure objectives have an associated reclamation research plan, as such a cross-reference cannot be provided. 2) Please see response to GNWT-ENR review comment #1. |

| Noted |

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<td>5</td>
<td><strong>Comment</strong> Comment(s): The proponent does not indicate how its backfilling concept design will mitigate water management, as a result of the talik the groundwater has the capacity to freely flow into the surrounding drainage basin; The proponent does not indicate how it will ensure final stability of bulkheads, drifts and adits. Surface water infiltration has not been addressed in the closure option and not addressed as an overall model for the site. <strong>Recommendation</strong> Recommendation(s): 1) Please clarify or highlight under Appendix E how the underground</td>
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| Sep 19 | 1) De Beers suggests that this item be discussed in future iterations of the closure plan and be included as a research item. 2) Due to the room and pillar mining method, paste does not need to be structural to ensure long term stability. 3) The closure plan has not been developed to a stage where these specific details can be provided. Closure condition water routing will be further considered prior to end of operations. In general, water could be directed away from audits/portals through appropriate ditching or through the use of swales to promote drainage way from the |

| Appropriate response. These topics can be discussed during future iterations of the ICRP. |

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<td>6 Topic 6: Infrastructure 5.2.4.3</td>
<td>Roadways and the airstrip will be removed as per the ICRP however there is no mention of a design for water management that will return the mine to a pre-development state. <strong>Recommendation</strong> Recommendation(s): 1) Please provide anticipated remedial techniques to ensure that roadways and airstrip are remediated to minimize erosion and ensure water management. In addition, as stated in the Draft Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (AANDC 2011) the draft guidelines are to</td>
<td>Sep 19: The closure plan has not been developed to a stage where these specific details can be provided. Closure condition water routing will be further considered prior to end of operations. In general, water could be directed through appropriate ditching or through the use of swales. De Beers is committed to satisfying the MVLWB approved closure objectives as specified in the ICRP. The specific objectives referenced by the reviewer are encompassed by within the MVLWB approved closure objectives.</td>
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De Beers Canada Inc.

SNAP LAKE MINE
Final Closure and Reclamation Plan


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<tr>
<th>Time</th>
<th>Topic 7: Water Management</th>
<th>Comment</th>
<th>Sep 19:</th>
<th>This will be addressed and discussed as the level of detail increases in future versions of the ICRP.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>build upon the Mine Reclamation Guidelines for the Northwest Territories (INAC 2007). From the 2007 document the following objectives must be achieved: a) Ensure infrastructure does not become a source of contamination; b) Return area to its original state or to a state compatible with the desired end use; c) Restore natural drainage patterns where surface infrastructure has been removed; and d) Restore the natural use by wildlife. These objectives should be achieved from reclamation activities, please clarify and provide rationale on how the remedial techniques proposed for roadways and the airstrip meet the above objectives for closure.</td>
<td>The Water Management Plan (WMP) will be layered with non-potentially acid generating (PAG) rock to prevent erosion of sediment, however there is no mention if the sediment will be a potential contaminant into the future; and . The sediment has been indicated to be a potential source of contamination (pore water and therefore sediment Section 8.3.4.3)</td>
<td>1) The closure plan has not been developed to a stage where these specific final design aspects can be provided. This information will be developed during the final engineering design and addressed in a final ICRP. 2) If during further engineering it is realized that a rock cover is not a viable technique to limit mobility of sediment, an alternative will be sought. It is De Beers' opinion that a rock cover is a viable option and further contingency/alternative planning is not warranted at this time.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Topic 7: Water Management</td>
<td>Comment(s): .</td>
<td>Sep 19:</td>
<td>This will be addressed and discussed as the level of detail increases in future versions of the ICRP.</td>
</tr>
<tr>
<td></td>
<td>Recommend</td>
<td>Recommendation(s): 1) Please clarify and provide comment on how the rock cover will provide a stable condition limiting the movement of sediment contaminants; and 2) If the proposed cover cannot meet the objectives stated in the Mine Reclamation Guidelines of the Northwest Territories (INAC 2007) for contaminated soils (which include sediments) then the proponents should provide alternate remedial options to address the mobility of sediment contaminants</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Topic 8: Surface Facilities</td>
<td>Comment Comment(s): . Hazardous materials are identified</td>
<td>Sep 19:</td>
<td>This will be addressed and discussed as the level of detail increases in future versions of the ICRP.</td>
</tr>
<tr>
<td>Time</td>
<td>Recommendation</td>
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<td>9</td>
<td><strong>Comment</strong> Comment(s): It is stated that all facilities will be washed out with high pressure hoses removing all hazardous materials, however there is no mention of a water capture system; <strong>Recommendation</strong> Recommendation(s): 1) Please describe and clarify how DeBeers intends to capture all water used for decommissioning process where the location of the lined hazardous waste storage area is known. This information will be developed as part of the final ICRP. De Beers agrees that upon decommissioning, an assessment of the decommissioned area is needed to ensure that reclamation criteria are achieved. 2) The closure plan has not been developed to a stage where the execution of this reclamation task is known. De Beers can commit that flushing will occur within zones where there is containment of the water and therefore not uncontrolled release to the environment. 3) Any modifications, or development of new, environmental management plans will be completed prior to commencement of reclamation and will be tailored to satisfy applicable regulations, permits, and approved plans.</td>
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</table>

This will be addressed and discussed as the level of detail increases in future versions of the ICRP.

file:///Y|...1L2-0004%20-%20Snap%20-%20ICRP%20version%201_2%20-Reviewer%20comment%20and%20response%20%20Table.htm[17/01/2014 4:39:27 PM]
| Time | Topic 10: Solid Waste Facilities | Comment | It is indicated that solid waste will be disposed of in the North Pile and that lifts of PK will be utilized however the containment properties of the PK slurry are not defined or if the entrapment of solid waste will be entirely by permafrost; and. The landfarm liner is proposed to be removed and cut-up and the area will be re-graded, however no mention of delineation of the area under the liner for PHC contamination is mentioned. Recommendation | Recommendation(s): 1) Please define how all solid waste will be encapsulated (mechanically and chemically) within the PK lifts; and 2) Delineation of soil under the liner is required as the containment system may have had failures. The proponent should include a commitment of delineation under the landfarm to ensure that no contaminated soils remain post-closure. | SEP 19: 1) The solid waste will be capped with cover material to separate the waste from the environment. The cap over the solid waste will need to address similar design aspect as the cap used over the PK. The thermal regime and water quality from the North Pile is a focus of the Reclamation Research Plan - see response to GNWT-ENR review comment #2 for additional details. 2) De Beers' agrees that upon decommissioning that an assessment of the decommissioned area is needed to ensure that reclamation criteria are achieved. Criteria will be developed prior to issuance of the next version of the ICRP (i.e., 3 years time). Criteria specific to this topic will aim to address closure objective 11 - Preventing remaining infrastructure from contaminating land or water. | Appropriate response. |
| Time | Topic 11: Section 6.3 Completed Progressive Reclamation | Comment | For the emulsion plant area, it is stated that no further remedial activities are planned, however only assessments were conducted at the site. Recommendation | Recommendation(s): 1) Please clarify and demonstrate how the area is no longer an area of environmental concern as no remedial activities were conducted only studies; 2) In the table please provide the major conclusions of each study and identify if this is an area of environmental concern | SEP 19: 1) Remedial action about the emulsion plant was completed in 2012 and reported to the MVLWB as part of the 2012 Annual Closure and Reclamation Plan Progress Report (see Appendix A for specific reports). Based on the work completed, it is concluded that no further remedial action is necessary. 2) A summary of the progressive reclamation is provided in Section 3.0 of the 2012 Annual Closure and Reclamation Plan Progress Report. The reports that document the Environmental Assessment | Appropriate response. |
Time

(for ease of reference); and 3) The fate of the water must also be determined; dilution with active melt is not an appropriate remedial technique if water has been shown to be impacted.

and sampling activities undertaken are provided in Appendix A of the annual report. 3) The reports provided in Appendix A of the 2012 Annual Closure and Reclamation Plan Progress report provide perspective on water quality post reclamation. Further, De Beers maintains the SNP stations, as defined in the water licence, that monitors water quality from the emulsion plant area.

12 Topic 12: Section 7.2.9 Waste Management

Comment Comment(s): The proponent indicates that all non-hazardous waste and incineration ash will be deposited within the North Pile. DeBeers has stated in its Domestic and Sewage Waste Plan that the following materials will be deposited within the landfill: a) non-recyclable plastics; b) conveyor belts; c) tires; d) motors, v-belts; e) piping and fittings; f) rebar; g) building and bulk debris (furniture, cabling, carpeting, drywall, insulation); h) incinerator ash; i) scrap metals; j) dewatered sewage sludge; and, k) empty cement and lime bags.

Recommendation

Recommendation(s): 1) The proponent must show through analytical testing, that all material deposited in the North Pile trench are chemically inert and approved by a regulatory authority prior to deposition within the landfill. In addition the ash from incinerator waste must be shown to meet Environment Canada's Technical document for batch waste incineration and be analytically tested by an accredited laboratory to ensure that the waste meets the NWT Environmental Guideline for Industrial Waste Discharges. Incineration ash can be contaminated with toxic compounds and by-products such as dioxins and furans and should therefore be tested to ensure that it

Sep 19: The Incinerator ash (composite samples) is tested on a quarterly basis as per Environment Canada's specifications. The samples have consistently met the standards for disposal as set. Since the installation of the new incinerators, there has not been enough ash generated to send away for a sample but it is expected to be the same or better quality as a result of the fact that 1) the new incinerators are new and better technology than the older ones, and 2) the waste streams for incineration did not change or increase at all.

Appropriate response.
<table>
<thead>
<tr>
<th>13</th>
<th>Topic 13: Hydrology</th>
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<tbody>
<tr>
<td><strong>Comment</strong></td>
<td>Comment(s): In Section 8.3.4.1 the proponent indicates that the duration of effects would be limited to the operations phase and would be reversible within a 3 year timeline, however an overall mine water management plan has not been developed (or provided in the ICRP) to direct flow around and away from the underground; and In Section 8.3.4.2 there is no mention of contaminant deposition (NO₂, Al, Cu, Cr, TDS etc.) into Snap Lake, this is only mentioned under the aquatic systems habitat.</td>
</tr>
<tr>
<td><strong>Recommendation</strong></td>
<td>Recommendation(s): 1) Because of the talik indicated to be under Saap Lake, there is a potential route for water movement as the mine floods (through ARD and PK backfill). Further study on how this will affect Snap Lakes watershed is required. In addition as the mine floods the underground workings are within a continuous permafrost area (active layer at the mining opening) extending into the talik under Saap Lake. How will mine flooding affect the surrounding permafrost conditions through energy transfers (warm water from the underground interacting with the permafrost)? Please clarify and provide information (or provide a reference to ongoing studies) on how the ICRP will address these potential issues; and 2) The proponent has indicated that there is a potential release of contaminants (TDS, Cr,</td>
</tr>
<tr>
<td><strong>Sep 19:</strong></td>
<td>Please refer to De Beers’ response to GNWT-ENR review comments #1 and #5. 2) Predicted residual impacts and full discussion on the analysis completed is provided in the Project Environmental Assessment Report (De Beers, 2002).</td>
</tr>
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Appropriate response, GNWT-ENR comments 1 and 5 provide additional information.
<table>
<thead>
<tr>
<th>Time</th>
<th>Topic 14: Fish Health</th>
<th>Comment</th>
<th>Sep 19: 1) The 30 year timeframe was based on a site-wide water quality model that accounts for the loadings from the North Pile. The site-wide water quality model and the associated impact assessment were presented in the Project Environmental Assessment Report (De Beers, 2002). 2) The impact assessment findings for NL5 and NL6 were presented in the Project Environmental Assessment Report (De Beers, 2002).</th>
<th>Appropriate response, additional modeling has been conducted as part of the Dec 20 2013 amendment application.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Comment(s): The proponent indicates that discharges of treated effluent to Snap Lake will cease and are expected to be reversible within 30 years, however it is unknown if the North Pile will meet discharge criteria and/or if the permafrost will aggrade as designed. <strong>Recommendation</strong> Recommendation(s): 1) This is premature to state that it will be reversible until the North Pile design is finalized and a loading model is completed as the mine continues to expand. Please provide further rationale and clarify how DeBeers determined that impacts would be negligible. 2) Please provide further rationale and clarify how DeBeers determined that impacts to NL5 and NL6 Lakes from elevated sediment (pH, nitrate, aluminum and hexavalent chromium) and fish food (chromium, copper and aluminum) were rated as low.</td>
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**North Slave Metis Alliance: Eric Binion**

<table>
<thead>
<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer</th>
<th>Proponent Response</th>
<th>Board Staff Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>General File</td>
<td>Comment (doc) NSMA Cover Letter for De Beers ICRP Recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Section 1, Plain Language Summary, Pg 8.</td>
<td>Comment The category &quot;Site Wide&quot;, first used here but occurring repeatedly throughout the report, does not include a clear definition. Does &quot;Site Wide&quot; refer to the 550ha total land lease area of Snap Lake? <strong>Recommendation</strong> The NSMA recommends refining the definitions of the site categories to</td>
<td>Sep 19: Impacts to the land leased area from the mine are addressed and mitigated as appropriate.</td>
<td>Noted</td>
</tr>
<tr>
<td>Time</td>
<td>Section 5.1.4.1 North Pile, Pg 85.</td>
<td><strong>Comment</strong> The NSMA believes that it is impossible for De Beers to &quot;leave a positive legacy behind&quot; when, as stated, &quot;revegetation of the North Pile surface materials is not proposed, primarily due to an expected lack of available surface materials to support active revegetation efforts, promoting natural revegetation remains a potential option to aid in erosion control of surface materials.&quot; <strong>Recommendation</strong> The NSMA believes that finding a suitable way to encourage revegetation of the North Pile should be viewed as critically important to meeting the goal of &quot;positive legacy&quot; and that this requires further integration into the ICRP.</td>
<td><strong>Sep 19:</strong> Revegetation research is a planned activity (see Appendix E, Section 2.2) and acknowledge NSMA’s view that the North Pile should be considered a priority area to further assess as part of the planned research.</td>
<td><strong>Appropriate Response</strong></td>
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<td>2</td>
<td>Section 5.2.4 Table 5.7, Pg 80. SW4-6.</td>
<td><strong>Comment</strong> Regarding closure objectives SW4, SW5, and SW6, there are no details provided on appropriate slope grades to encourage the safe passage for Caribou and other wildlife. <strong>Recommendation</strong> The NSMA recommends an explicit statement that the North Pile slopes will not be sloped at a grade obstructive to the passage of migrating Caribou herds and other wildlife. Research should be conducted in this area if it has not been already.</td>
<td><strong>Sep 19:</strong> Research regarding wildlife use of the site and safe passage is an identified uncertainty that reclamation research aims to fill through further community engagement and Traditional Knowledge (Appendix E, Section 2.1).</td>
<td>These will be set out as criteria in future versions of the ICRP with input from reviewers and research.</td>
</tr>
<tr>
<td>3</td>
<td>Section 5.2.4 Table 5.7, Pg 80. SW7.</td>
<td><strong>Comment</strong> Regarding the statement that &quot;[a] combination of two revegetation approaches may be employed&quot;, it is unclear if this means that a combination of these will be employed, or if it is possible only surface preparation will be used. <strong>Recommendation</strong> The NSMA</td>
<td><strong>Sep 19:</strong> Without further reclamation research De Beers cannot conclude that both reclamation approaches will be applied; however, it is likely that both natural recovery and active revegetation will both be employed.</td>
<td><strong>Appropriate response</strong></td>
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<tr>
<td>Time</td>
<td>Section</td>
<td></td>
<td>Comment</td>
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<tr>
<td>5</td>
<td>3.2.1</td>
<td></td>
<td>Topography and Surface Hydrology, Pg 27.</td>
<td>A description of the physical environment of the northwest peninsula of Snap Lake is given, however no description/quantification is provided of the number of streams re-routed or affected due to the mine itself.</td>
</tr>
<tr>
<td>6</td>
<td>5.2.5</td>
<td></td>
<td>Table 5.7, Pg 82. I1 ; Surface Facilities, Pg 98.</td>
<td>Regarding the selected closure activity statement that &quot;[a]ll potentially hazardous material and/or contaminant sources will be removed from remaining infrastructure. All non-hazardous debris will be disposed of within the North Pile.&quot;</td>
</tr>
</tbody>
</table>

Sep 19: Inland lakes and streams affected by the project were discussed in the project EA. No fish bearing lakes were impacted and only one stream (stream 27) was affected by the project. This stream was compensated as per DFO specifications and is now closed. Connectivity will not be reestablished post closure.

Sep 19: At closure, non-hazardous and inert items will be consistent with the types outlined in De Beers approved Waste Management Plan for operations. Monitoring the performance of the cover system and seepage water quality from the North Pile (including landfill trench area) will be completed post-closure. The materials deposited in the trench will be covered with non-PAG rock (not PAG rock). The main purpose of the cover aims to separate the environment from the waste and control water infiltration.

Yellowknife Dene First Nation: Environment Office YKDFN
<table>
<thead>
<tr>
<th>ID</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>General File</td>
<td>Comment <em>(doc)</em> (Submitted after Due Date) YKDFN comments Recommendation</td>
<td></td>
<td>See reviewer comments section of the Staff Report.</td>
</tr>
</tbody>
</table>
C.2.2 2014 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval.

C.2.3 2015 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval.

In December, 2015 the Mine was entered into C&M.

C.2.4 2016 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval.

The January, 2016 Care and Maintenance Plan and April, 2016 Extended Care and Maintenance Plan were submitted to the MVLWB for review and approval. Stakeholder review comments were incorporated into the MVLWB approved (June 30, 2016) Extended Care and Maintenance Plan. Stakeholder review comments and De Beers’ responses are provided in the MVLWB Staff Report.

De Beers’ request to defer submission of the ICRP from January, 2017 to January 2018 was approved by the MVLWB.

The following documentation is included herein as a record of the 2016 activities:

- MVLWB March 21, 2016 Staff Report titled “Care and Maintenance”.
- Snap Lake Working Group February 2016 presentation titled “De Beers Snap Lake Mine 2016 Environmental Update”.
- MVLWB June 14, 2016 Staff Report titled “Extended Care and Maintenance Plan and SNP Update Request”.
- Snap Lake Working Group May 2016 presentation titled “De Beers Canada Inc., Snap Lake Mine Extended Care and Maintenance Plan”.
- MVLWB September 9, 2016 Staff Report titled “Request to defer an updated Interim Closure and Reclamation Plan”.

De Beers Canada Inc.
Staff Report

Applicant:
De Beers Canada Inc.

Location: Snap Lake, NT
Application: MV2011L2-0004

Date Prepared: March 21, 2016
Meeting Date: March 31, 2016

Subject: Care and Maintenance Plan

1. Purpose/Report Summary
The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the Care and Maintenance Plan for the Snap Lake Mine as submitted by De Beers Canada Inc. (De Beers) under Water Licence (Licence) MV2011L2-0004.

2. Background
- December 4, 2015 – De Beers submits notification of suspension of operations;
- December 7, 2015 – Care and maintenance meeting with Government of the Northwest Territories (GNWT) - Inspectors and Board staff;
- December 8, 2015 – Care and maintenance meeting with De Beers, GNWT - Inspectors and Board staff;
- December 22, 2015 – Care and maintenance follow-up meeting with De Beers;
- January 6, 2016 – Care and Maintenance Plan submitted;
- January 14, 2016 – Care and Maintenance Plan sent out for review;
- February 15, 2016 – Working group meeting with Board staff, reviewers and De Beers;
- February 24, 2016 – Review comments due;
- March 9, 2016 – Responses due; and
- March 31, 2016 – Care and Maintenance Plan presented to the Board.

3. Discussion
On December 4, 2015, De Beers provided notification of the suspension of operations at the Snap Lake Mine. De Beers continues to evaluate its options, which include: 1) re-opening the mine; 2) selling the mine; and 3) optimizing care and maintenance activities to maintain all viable options for an extended care and maintenance period (3 years or more). Since receiving the notice,
Board staff have been in discussions with De Beers regarding the care and maintenance phase of the mine, and the impact that it may have on regulatory requirements.

Meeting
February 15, 2016 – Board staff hosted a working group meeting with reviewers and De Beers to foster an open discussion on the current care and maintenance phase and the upcoming submission of the Extended Care and Maintenance Plan. De Beers’ presentation and meeting summary notes are attached.

Care and Maintenance Plan
Section 7 of the currently approved Interim Closure and Reclamation Plan (ICRP) addresses temporary closure. According to the ICRP, a ‘specific temporary closure schedule’ needs to be developed upon entering temporary closure or a care and maintenance phase.

De Beers submitted the Care and Maintenance Plan, including a temporary closure schedule, on January 8, 2016 in support of Section 7 of the ICRP. De Beers stated that the scope of activities to be undertaken during the care and maintenance phase will be in compliance with the existing authorizations that they currently hold.

As part of the optimization of the on-going care and maintenance activities, De Beers will actively seek to reduce Snap Lake’s impacts to the environment. De Beers plans to submit an Extended Care and Maintenance Plan in April 2016, for Board approval, which will likely include flooding of the mine workings and suspension of associated dewatering operations in order to minimize environmental impacts and reduce costs.

4. Comments
Not applicable.

5. Reviewer Comments
By February 24, 2016, comments and recommendations on the Care and Maintenance Plan were received from the following reviewers:
- GNWT – Environment and Natural Resources;
- Fisheries and Oceans Canada; and
- Environment and Climate Change Canada.

De Beers responded on February 26, 2016. The reviewer comment summary table (attached) presents the concerns identified through the review of the Care and Maintenance Plan.
6. Security
The GNWT currently holds $39,066,247.00 in reclamation security for the Snap Lake Mine for this Licence.

7. Conclusion
The Care and Maintenance Plan addresses the temporary closure information requirements set out in NMLWB/AANDC’s Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. Board staff concludes that the submitted Care and Maintenance Plan can be approved at this time.

8. Recommendation
Board staff recommends the Board approve the De Beers Care and Maintenance Plan for the Snap Lake Mine, as submitted on January 8, 2016.

9. Attachments
- De Beers Notification of Suspension of Operations;
- Care and Maintenance Plan;
- De Beers’ February 15, 2016 Presentation;
- Summary notes from February 15, 2016 working group meeting;
- Comment summary table; and
- Draft decision letter.

Respectfully submitted,

Angela Love
Regulatory Officer

Reviewed by,

Jen Potten
Regulatory and Office Manager
### Review Comment Table

<table>
<thead>
<tr>
<th>Board:</th>
<th>MVLWB</th>
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<tr>
<td>Review Item:</td>
<td>MV2011L2-0004 - De Beers Snap Lake - Care and Maintenance Plan</td>
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<tr>
<td>File(s):</td>
<td>MV2011L2-0004</td>
</tr>
<tr>
<td>Proponent:</td>
<td>De Beers Canada Inc. - Snap Lake</td>
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<tr>
<td>Document(s):</td>
<td>Snap Lake Care and Maintenance Plan (2 mb)</td>
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<td>Item For Review Distributed On:</td>
<td>Jan 14 at 10:46 Distribution List</td>
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<tr>
<td>Reviewer Comments Due By:</td>
<td>Feb 24, 2016</td>
</tr>
<tr>
<td>Proponent Responses Due By:</td>
<td>Mar 9, 2016</td>
</tr>
<tr>
<td>Item Description:</td>
<td>On December 4, 2015 De Beers submitted a notification letter indicating that the Snap Lake Mine has entered into Care and Maintenance phase. Section 7 of the current Interim Care and Maintenance Plan (ICRP) deals with Temporary Closure. On January 8, 2016 De Beers submitted the Snap Lake Mine Care and Maintenance Plan in accordance with Section 7 of the ICRP. Please submit comments by February 24, 2016. Proponent responses are due March 9, 2016. Thanks and have a nice day!</td>
</tr>
<tr>
<td>Contact Information:</td>
<td>Angela Love 867-766-7456 Jen Potten 867-766-7468</td>
</tr>
</tbody>
</table>

### Comment Summary

**Environment and Climate Change Canada: Loretta Ransom**

<table>
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<tr>
<th>ID</th>
<th>Topic</th>
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<td><a href="doc">Comment</a> ECC No Comments Recommendation</td>
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**Fisheries and Oceans Canada: Mark D’Aguilar**

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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General</td>
<td>Comment No comments Recommendation No Comments</td>
<td>Feb 26: Acknowledged.</td>
<td>Noted.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Reviewer/Comment/Recommendation</td>
<td>Proponent Response</td>
<td>Board Response</td>
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<td>11</td>
<td>General File</td>
<td>Comment (doc) Att: Jan 26, 2016 Memo, Brodie Consulting to Water Resources Division, Snap Lake Care and Maintenance Plan Comments Recommendation</td>
<td>Noted.</td>
<td></td>
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<tr>
<td>12</td>
<td>General File</td>
<td>Comment (doc) ENR Letter with Attachment - Comments and Recommendations Recommendation</td>
<td>Noted.</td>
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</table>

1. **Topic 1: Section 2.4.2 - Waste Management**
   - **Comment**: Section 2.4.2 identifies that Hazardous and Non-Hazardous Waste will be managed consistent with the approved Waste Management Plan. Table I in the Waste Management Plan identifies that hazardous wastes are collected and stored for backhaul on the winter road to an off-site facility. **Recommendation 1)** ENR recommends DeBeers confirm that hazardous wastes will be shipped off-site this winter per the Waste Management Plan.
   - **Proponent Response**: Feb 26: De Beers will continue to manage hazardous waste on the mine site as per the MVIWB approved Waste Management plan. As facilities are put into care and maintenance De Beers will transport hazardous waste to an approved off-site disposal facility as necessary. De Beers will ship material off-site as generated either by air or if applicable via winter road in 2016 and subsequent winter roads. De Beers anticipates the construction of the 2017 Snap Lake Spur Road for the additional transport of waste.
   - **Board Response**: Acceptable response.

2. **Topic 2: Section 2.5 - Explosives Plant**
   - **Comment**: Section 2.5 identifies that the manufacture of explosives in the surface plant will cease, but does not identify how the explosive reagents will be handled - i.e. will they remain on-site or be shipped off-site? **Recommendation 1)** ENR recommends DeBeers confirm how the explosives reagents will be managed during the ICM period.
   - **Proponent Response**: Feb 26: De Beers notes that explosives previously mixed as emulsion or not suitable for off-site disposal will be destroyed consistent with the Explosives Act. Any product that can be removed from Site will be shipped off-site on the 2016 and 2017 Winter Roads, inclusive of bulk products. De Beers will continue to manage any bulk products until their shipment from Site in the approved containment facilities.
   - **Board Response**: Acceptable response.
<table>
<thead>
<tr>
<th>Topic 3: Section 2.5 - North Pile Dusting</th>
<th><strong>Comment</strong> The plan identifies that dust generation from a drying surface within the inactive North Pile is not expected. ENR notes that experience with other northern sites suggest that dusting will become an issue. Experience at other sites has also shown that control by irrigation (i.e. water sprays) can be labor intensive. Other methods, such as soil adhesives, may provide longer term control (i.e. application every second season), but may not be applicable at all location due to requirements for trafficable talings and low pressure equipment. <strong>Recommendation</strong> 1) ENR recommends that the Board require DeBeers to develop a Wind Erosion Plan that includes a more developed assessment of the different options, as well as a preferred option, that could be implemented if dusting becomes an issue during the summer.</th>
<th><strong>Feb 26:</strong> De Beers reminds the GNWT ENR that there is already a Air Quality Emissions Monitoring and Management Plan for the Snap Lake Mine developed as a component of the Environmental Agreement. Under this plan, there are specific action triggers that would result in the management of fugitive dust generated anywhere on the mine site, inclusive of the North Pile. De Beers will manage the dust as per the approved methods at the Snap Lake Mine, and notes that there is a provision in this plan for the use of chemical amendments if it is deemed necessary and if above response level triggers. De Beers notes that the development of another management plan is not appropriate at this time.</th>
<th>Acceptable response.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 4: Section 6.2 - North Pile Freeboard and Spillway</td>
<td><strong>Comment</strong> Section 6.2 of the ICM does not discuss freeboard requirements or spillway function for the North Pile. The capacity of the structure and various cells should be assessed to ensure it is adequate for the longer term care and maintenance period. The assessment should also include an update of the North Pile water balance as the operations water balance is likely not representative of care and maintenance. <strong>Recommendation</strong> 1) ENR recommends that the freeboard requirements and spillway function be assessed for adequacy. Modification may be required during the care and maintenance period. The assessment should include an</td>
<td><strong>Feb 26:</strong> De Beers is committed in maintaining design freeboard requirements in all of its embankment dams and sumps, following the current water management practices at Snap Lake Mine (active pumping). De Beers notes the mine is required to keep a 1 m freeboard as a licence condition in MV2011L2-0004. As part of the Care and Maintenance considerations for the North Pile, De Beers will evaluate the need for the design and construction of spillovers in critical areas to potentially reduce long term reliance on pumping during extreme precipitation events. Timely notification will be provided to the MVLWB and GNWT Inspector on any modification to the North Pile. De Beers notes to GNWT ENR that a water balance for the entire site will be provided under the Extended Care and Maintenance Plan, as discussed on February 15 2016 during the Snap Lake Working Group.</td>
<td>Acceptable response.</td>
</tr>
<tr>
<td>S</td>
<td>Topic 5: Reclamation Research and Progressive Reclamation</td>
<td><strong>Comment</strong> ENR understands that there will be no deposition of PKC into the North Pile while Snap Lake is under care and maintenance. This provides an opportunity to collect information about the behaviour of the North Pile that will be useful during final closure. The planned monitoring programs could include additional visual monitoring (survey) and water quality sampling of the surface of the North Pile to assess the effects of freezing and pore water expulsion. Thermistor strings could be installed or replaced during this period. Additionally, progressive reclamation could be initiated on the starter cell by beginning cover construction. This would provide information on the constructability and performance of the proposed covers. <strong>Recommendation 1</strong> ENR recommends that DeBeers include visual monitoring and sampling of water on the surface and within the pore water of the North Pile. This information will be used to assess the effects of freezing and pore water expulsion during closure.</td>
<td><strong>Feb 26</strong> De Beers will continue to monitor the North Pile for its thermo-stability regime and seepage through Care and Maintenance. This monitoring includes collection and review of thermistors and piezometer data, and SNP water quality and quantity monitoring at an appropriate frequency. De Beers notes that several new thermistors and piezometers were installed in the North Pile, specifically the East Cell embankment dams as a component for improvements on the currently existing monitoring program. This work is ongoing and will be reported in future annual reports. De Beers will also provide the corresponding reports as a component of the ICRP update in 2017.</td>
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</table>
| 6 | None | **Comment** None. **Recommendation** None.

ENR recommends that De Beers initiate progressive reclamation and begin cover construction on the Starter Cell to provide information on constructability and performance of the planned cover systems. | **Feb 26:** De Beers does not concur with ENR’s assessment. The purpose of Care and Maintenance is to be able to resume operations at the Snap Lake Mine. By initiating the progressive reclamation of the Starter Cell this would preclude the future commencement of operations as a North Pile requires an expansion (vertical or horizontal) to account for the full production of the mine. De Beers in the future may consider the trial cover on the Starter Cell as a component of Closure Research. De Beers also notes to the GNWT ENR that a test cover was previously constructed and monitored on the Starter Cell with reports provide as a component of closure research in annual reports. De Beers also notes that it is completing the work for a closure cover design that will be submitted to the MVLWB. | Acceptable response. |

| 7 | Attachment: **Comment** Att: Jan 26, 2016 Memo, Brodie Consulting to Water Resources Division, Snap Lake Care and Maintenance Plan Comments **Recommendation** None. | **Feb 26:** De Beers notes the Brodie Consulting memorandum and again emphasizes that this information will be considered in the development of the next ICRP update to be submitted in 2017. | Acceptable response. |
Environment and Climate Change Canada

Environmental Protection Operations Directorate (EPOD)
Prairie & Northern Region (PNR)
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

February 24, 2016

ECCC File: 5100 000 034/004
MVWLB File: MV2011L2-0004

Via online submission

RE: MV2011L2-0004 – De Beers Snap Lake – Care and Maintenance Plan

Attention: Jen Potten

Environment and Climate Change Canada has reviewed the information submitted to the Mackenzie Valley Land and Water Board regarding the above-mentioned plan and has no comments at this time.

De Beers 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 (667) 869-4744 or loretta.ransom@ec.gc.ca.

Sincerely,

Loretta Ransom
Senior Environmental Assessment Coordinator

cc: Wade Romanko, Head, Environmental Assessment North (NT and NU), PNR-EPOD
MEMORANDUM

DATE: January 22, 2016
TO: Paul Green, GNWT - ENR
CC: John Brodie, P. Eng.
SUBJECT: Snap Lake C&M Plan

De Beers has submitted a care and maintenance (C&M) plan for the Snap Lake mine, which ceased operations on Dec. 4, 2015. Comments on that plan are as follows.

Section 2.4.2 Waste Management
Will existing hazardous wastes be shipped off-site?

Section 2.5 – Explosives Plant
Will explosive reagents remain on site or be removed?

Partial and Full mine flooding
Mine flooding will reduce the “upwelling” of connate groundwater. This would have a positive impact on water quality in Snap Lake. The company should be encouraged to assess this as soon as possible.

Section 2.6 North Pile
The company believes that wind erosion of PK material will not be a problem. This seems optimistic as dusting has been an issue at other closed northern tailings areas including Giant, Colomac, Ptnnigan, and possibly Nanisivik before the cover was installed. It is recommended that a wind erosion plan be developed now and submitted for review prior to the summer of 2016. Where dusting has been an issue, control by irrigation has generally not been found to be practical.
or effective. Considering the very low strength of the tailings surface, access for irrigation (or any other method) could be quite problematic; which again suggests the need to develop a plan now.

There is no mention of freeboard requirements or spillway function in the C&M manual. These should be assessed and demonstration of adequate capacity for C&M period provided to the Board. A C&M water balance for the North Pile, considering possible extreme events, should be included in that assessment. Operations water balance is not necessarily representative of C&M because there is no addition of process water, but also not “pore space” to contain excess water.

**Monitoring**

In addition to maintaining the monitoring as per the Water Licence, it may be useful to conduct additional visual and other monitoring (survey, water quality sampling) of the surface of the inactive North Pile to assess the effects of freezing and pore water expulsion.

**Mine Closure (not addressed in C&M Plan)**

It is curious that there is no mention of starting closure work on the North Pile, specifically cover construction on the Starter Cell. This work is outstanding, and conducting this during C&M would provide (additional) purpose to the C&M staff as well as earlier opportunity to assess the constructability and performance of the proposed covers.
February 24, 2016

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

Dear Ms. Potten,

Re: DeBeers Canada Inc.
Water Licence – MV2011L2-0004
De Beers Snap Lake - Care and Maintenance Plan
Request for Comments

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories 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: Section 2.4.2 - Waste Management**

**Comment(s):**

Section 2.4.2 identifies that Hazardous and Non-Hazardous Waste will be managed consistent with the approved Waste Management Plan. Table I in the Waste Management Plan identifies that hazardous wastes are collected and stored for backhaul on the winter road to an off-site facility.

**Recommendation(s):**

1) ENR recommends DeBeers confirm that hazardous wastes will be shipped off-site this winter per the Waste Management Plan.
Topic 2: Section 2.5 - Explosives Plant

Comment(s):

Section 2.5 identifies that the manufacture of explosives in the surface plant will cease, but does not identify how the explosive reagents will be handled – i.e. will they remain on-site or be shipped off-site?

Recommendation(s):

1) ENR recommends DeBeers confirm how the explosives reagents will be managed during the ICM period.

Topic 3: Section 2.6 - North Pile – Dusting

Comment(s):

The plan identifies that dust generation from a drying surface within the inactive North Pile is not expected. ENR notes that experience with other northern sites suggest that dusting will become an issue. Experience at other sites has also shown that control by irrigation (i.e. water sprays) can be labor intensive. Other methods, such as soil adhesives, may provide longer term control (i.e. application every second season), but may not be applicable at all location due to requirements for trafficable tailings and low pressure equipment.

Recommendation(s):

1) ENR recommends that the Board require DeBeers to develop a Wind Erosion Plan that includes a more developed assessment of the different options, as well as a preferred option, that could be implemented if dusting becomes an issue during the summer.

Topic 4: Section 6.2 – North Pile – Freeboard and Spillway

Comment(s):

Section 6.2 of the ICM does not discuss freeboard requirements or spillway function for the North Pile. The capacity of the structure and various cells should be assessed to ensure it is adequate for the longer term care and maintenance period. The assessment should also include an update of the North Pile water balance as the operations water balance is likely not representative of care and maintenance.

Recommendation(s):

1) ENR recommends that the freeboard requirements and spillway function be assessed for adequacy. Modification may be required during the care and
maintenance period. The assessment should include an update of the North Pile water balance considering extreme climatic events/seasons.

**Topic 5: Reclamation Research and Progressive Reclamation**

**Comment(s):**

ENR understands that there will be no deposition of PKC into the North Pile while Snap Lake is under care and maintenance. This provides an opportunity to collect information about the behaviour of the North Pile that will be useful during final closure.

The planned monitoring programs could include additional visual monitoring (survey) and water quality sampling of the surface of the North Pile to assess the effects of freezing and pore water expulsion. Thermistor strings could be installed or replaced during this period. Additionally, progressive reclamation could be initiated on the starter cell by beginning cover construction. This would provide information on the constructability and performance of the proposed covers.

**Recommendation(s):**

1) ENR recommends that DeBeers include visual monitoring and sampling of water on the surface and within the pore water of the North Pile. This information will be used to assess the effects of freezing and pore water expulsion during closure.

2) ENR recommends that De Beers initiate progressive reclamation and begin cover construction on the Starter Cell to provide information on constructability and performance of the planned cover systems.

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.

Sincerely,

[Signature]

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

Att: Jan 26, 2016 Memo, Brodie Consulting to Water Resources Division, Snap Lake Care and Maintenance Plan Comments
DE BEERS SNAP LAKE MINE
2016 ENVIRONMENTAL UPDATE
Snap Lake Working Group
February 2016

PRESENTATION OVERVIEW

Part 1: Care and Maintenance
Part 2: 2016 Regulatory Submissions – Extended Care and Maintenance
PART 1: CARE AND MAINTENANCE

CURRENT STATUS OF SNAP LAKE MINE

• De Beers has invested considerable effort to make Snap Lake Mine sustainable:
  • Cost reductions
  • Operational improvements
  • New mining method
  • Restructuring DBCI
• Unfortunately, global markets have continued to deteriorate with falling demand and reduced prices
• On December 4, De Beers Canada suspended mining operations at Snap Lake Mine
CARE AND MAINTENANCE PLAN

- Mining operations have ceased, while maintaining the ability to resume in the future
- The mine is being placed in a “care and maintenance” (C&M) state
- The activities to continue during care and maintenance are as described in the Care and Maintenance Plan provided to the MVLWB
- The length of the care and maintenance may be 3 years or more, dependent on market conditions, but will be reviewed in late 2016
CARE AND MAINTENANCE PLAN

- Mining has ceased, but mine dewatering will continue in the near term
- Equipment and personnel necessary for spill response, emergency response and maintenance of required facilities are available
- Mine infrastructure and the environment will be monitored in accordance with approved schedules
- Non-essential infrastructure and services will be secured and moth-balled or modified to conserve energy and maintenance requirements

CARE AND MAINTENANCE PLAN

- The 2016 winter road has been constructed and is being used for fuel and inventory delivery and removal of non-essential equipment and inventory
- The airstrip remains in operation although the number of flights has been reduced
- Water management and treatment capacity will be appropriate to maintain compliance with all requirements and seasonal flows
- West Cell construction will be paused and stabilized. Water management facilities will manage reduced scope
PART 2: 2016 REGULATORY ACTIVITIES
Extended Care and Maintenance

2016 REGULATORY ACTIVITIES

• De Beers will continue to evaluate options for:
  • Re-opening the mine
  • Optimize the care and maintenance activity to extend the period to ensure viable options remain open
  • Sale to a Qualified Operator
  • Closing the mine

• Under an extended C&M scenario, activities would be optimized in order to allow for a longer time as may be necessary to evaluate economic options and conditions

• With approval of respective regulators, environmental activities would be scaled accordingly
2016 REGULATORY ACTIVITIES - WHY FLOOD SNAP LAKE MINE UNDERGROUND?

De Beers will be applying for an extended care and maintenance plan to the MVLWB to flood the underground workings to improve the sustainability of the operation once technical and economic evaluations are completed.

What are the benefits of flooding the underground workings of Snap Lake Mine?

- Environmental impacts are reduced; limited discharge of water to the receiving environment; reduced footprint and loading of mine effluent on the downstream water bodies; lower emissions as the mine would burn less diesel and reduced monitoring and supervision requirements.
- Flooding will allow for the care and maintenance period to be prolonged until the global markets improve and it can be re-opened by De Beers or another Qualified Operator.

2016 REGULATORY ACTIVITIES – WHERE DOES THE WATER COME FROM?

- 95% of water in mine comes from Snap Lake.
- Snap Lake Mine currently discharges approximately 50,000 m³/day back into the environment.
- Optimization of underground water management is being conducted during care and maintenance.
Updates within the Extended Care and Maintenance Plan

- Updates to Section 2.5 of the EC&M that will include:
  - Flooding Scenario of Snap Lake Underground
  - How De Beers will reopen the Snap Lake underground
  - How De Beers will meet the requirements identified in Section 5.0 Permanent Closure

Updates within the Extended Care and Maintenance Plan

- Section 3.0
  - An updated ITASCA report for a flooded Snap Lake underground
  - New Water Balance for Snap Lake Mine- This will dictate the estimated discharge from the water treatment plan.
  - New Snap Lake Water Model update
  - Downstream Lakes Water Model Update based on new level of discharge up to and including Node 22 in MacKay Lake

De Beers is committed to maintaining compliance with the Water Licence
Updates within the Extended Care and Maintenance Plan

- A C&M Aquatic Effects Monitoring Program
- A C&M Water Management Plan
- An updated C&M SNP that is reflective of requested condition (i.e. frequency of testing at SNP 02-17b if not discharging)
- Other applicable Management and Monitoring Programs.

2016 REGULATORY ACTIVITIES

- De Beers will continue with regulatory processes as may be required to allow for the re-opening of the mine in the future if markets improve
- SLEMA annual activities have been reviewed and discussed with the SLEMA Executive Director
- De Beers will continue to engage with SLEMA and communities
- De Beers will develop an Extended Care and Maintenance Plan for MVLWB approval, in accordance with licence requirements and applicable guidance considering a flooded underground
- De Beers will continue its work toward developing the next Interim Closure and Reclamation Plan Research and Criteria Development to meet the 2017 MVLWB submission date
Next Snap Lake Working Group Topics

1. Closure Criteria
2. Discussion on Extended Care and Maintenance
3. Other topics of interest

THANK YOU
Staff Report

Applicant:
De Beers Canada Inc.

Location: Snap Lake, NT
Application: MV2011L2-0004

Date Prepared: June 14, 2016
Meeting Date: June 22, 2016

Subject: Extended Care and Maintenance Plan and SNP Update Request

1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the De Beers Canada Inc. (De Beers) Extended Care and Maintenance Plan for the Snap Lake Mine, in accordance with Section 7 of the Interim Closure and Reclamation Plan (Version 3.2) which is required as part of Part I, item 1 of Water Licence (Licence) MV2011L2-0004. A request to update the Surveillance Network Program (SNP) relating to the Extended Care and Maintenance Plan is also presented.

2. Background

- January 30, 2015 – Board approves the Interim Closure and Reclamation Plan (version 3.2);
- December 4, 2015 – De Beers submits notification of suspension of operations;
- December 7, 2015 – Care and maintenance meeting with Government of the Northwest Territories (GNWT) - Inspectors and Board staff;
- December 8, 2015 – Care and maintenance meeting with De Beers, GNWT - Inspectors and Board staff;
- December 22, 2015 – Care and maintenance follow-up meeting with De Beers;
- January 8, 2016 – Care and Maintenance Plan submitted;
- January 14, 2016 – Care and Maintenance Plan sent out for review;
- February 15, 2016 – Working group meeting with Board staff, reviewers and De Beers;
- February 24, 2016 – Review comments due;
- March 9, 2016 – Responses due;
- March 31, 2016 – Care and Maintenance Plan approved by the Board;
• April 20, 2016 – Extended Care and Maintenance Plan (including SNP update request) submitted;
• April 20, 2016 – Extended Care and Maintenance Plan sent out for review;
• May 5, 2016 – Working group meeting with Board staff, reviewers and De Beers;
• May 26, 2016 – Review comments due for Extended Care and Maintenance Plan;
• May 31, 2016 – Review comments due for SNP request;
• June 2, 2016 – Responses on Extended Care and Maintenance Plan due;
• June 7, 2016 – Responses on SNP request due; and
• June 22, 2016 – Extended Care and Maintenance Plan, including updates to the SNP, presented to the Board.

3. Discussion

Interim Closure and Reclamation Plan (version 3.2)
On January 30, 2015, the Board approved the Interim Closure and Reclamation Plan (version 3.2) (ICRP) submitted to fulfill Part I, item 1 of Licence MV2014L2-0004. Section 7 of the ICRP addressed temporary closure whereby a ‘specific temporary closure schedule’ needs to be developed upon entering temporary closure or a care and maintenance phase.

Suspension of Operations and Care and Maintenance Plan
On December 4, 2015, De Beers provided notification of the suspension of operations at the Snap Lake Mine (attached).

On January 8, 2016, De Beers submitted a Care and Maintenance Plan to the Board, which included a temporary closure schedule. De Beers explained that the scope of activities to be undertaken during the care and maintenance phase will be in compliance with their existing authorizations.

Extended Care and Maintenance Plan
On April 20, 2016, De Beers submitted an Extended Care and Maintenance Plan, for Board approval (attached). This plan proposes the flooding of the mine workings and suspension of associated dewatering operations in order to minimize environmental impacts and reduce costs, with the goal of future re-opening. This also included updates to the SNP.

During the extended care and maintenance period De Beers will continue to assess the Snap Lake Mine for: 1) Reopening; 2) Further optimization of extended care and maintenance activities (i.e. Passive Water Treatment); 3) Sale to a qualified operator; or 4) Final closure.
Meetings

Since receiving the notice of suspension of operations, Board staff have been in discussions with De Beers regarding the care and maintenance phase of the mine, and the impact that it may have on regulatory requirements.

On May 5, 2016, Board staff hosted a working group meeting with reviewers and De Beers to foster an open discussion on the Extended Care and Maintenance Plan, prior to the review comment deadline. De Beers’ presentation and Board staff’s meeting summary notes are attached. Snap Lake Environmental Monitoring Agency (SLEMA) recommended that the SNP portion of the Extended Care and Maintenance Plan be reviewed separately in order for reviewers to have a specific review in which to focus their comments and recommendations.

4. Comments

Not applicable.

5. Reviewer Comments

As requested by reviewers at the May 5, 2016 working group meeting, the Extended Care and Maintenance Plan and the associated update to the SNP were split into two separate reviews.

By May 26, 2016, comments and recommendations on the Extended Care and Maintenance Plan were received from the following reviewers:

- GNWT – Environment and Natural Resources;
- Snap Lake Environmental Monitoring Agency;
- Environment and Climate Change Canada; and
- Tlicho Lands Protection Department.

De Beers responded on June 2, 2016.

By May 31, 2016, comments and recommendations on the associated SNP portion of the Extended Care and Maintenance Plan were received from the following reviewers:

- GNWT – Environment and Natural Resources;
- Snap Lake Environmental Monitoring Agency; and
- GNWT Inspector.

De Beers responded on June 7, 2016.

The reviewer comment summary tables (attached) presents the concerns identified through both reviews.
6. Security
The GNWT currently holds $39,066,247.00 in reclamation security for the Snap Lake Mine for this Licence.

7. Conclusion
The Extended Care and Maintenance Plan addresses the temporary closure information requirements set out in MVLWB/AANDC’s Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. However, the Plan – as submitted, does not address all of the concerns that were raised during the review.

The SNP request, including suggestions made during the review, supports the Extended Care and Maintenance Plan activities.

8. Recommendation
Extended Care and Maintenance Plan
Board staff recommends the Board approve the Extended Care and Maintenance Plan as an interim plan, and require the submission of a revised version. This revised Plan shall include the updates identified by reviewers and identified in the attached draft decision letter. The revised Plan would be reviewed by Board staff to ensure conformance with the decision letter.

SNP update
Board staff recommends the Board approve the attached draft SNP update that reflects the request and comments submitted during the review period.

9. Attachments
- Current Water Licence, February 18, 2016
- De Beers’ Notification of Suspension of Operations, December 4, 2015
- Extended Care and Maintenance Plan, April 20, 2016
- De Beers’ May 5, 2016 Working Group Presentation
- Summary notes from May 5, 2016 working group meeting
- Reviewer Comment Summary Tables:
  - Extended Care and Maintenance Plan
  - SNP update request
- Draft updated Water Licence
- Draft Decision letters:
  - Extended Care and Maintenance Plan
  - SNP update request
- Draft Reasons for Decision:
  - Extended Care and Maintenance Plan
  - SNP Update

MV2011L2-0004 – De Beers Snap Lake – Extended Care and Maintenance Plan and SNP Page 4 of 5
Respectfully submitted,

Kierney Leach
Regulatory Officer

Reviewed by,

Jen Polten
Regulatory and Office Manager

Reviewed by,

Rebecca Chouinard
Regulatory & Technical Director
## Review Comment Table

<table>
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<tr>
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<th>MVLWB</th>
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<td>Review Item:</td>
<td>De Beers Snap Lake - Extended Care and Maintenance Plan (MV2011L2-0004)</td>
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<td>MV2011L2-0004</td>
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<td>Proponent:</td>
<td>De Beers Canada Inc. - Snap Lake</td>
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<td>Document(s):</td>
<td>Extended Care and Maintenance Plan (16 MB)</td>
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<td>Item For Review Distributed On:</td>
<td>Apr 20 at 16:35 Distribution List</td>
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<tr>
<td>Reviewer Comments Due By:</td>
<td>May 26, 2016</td>
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<tr>
<td>Proponent Responses Due By:</td>
<td>June 2, 2016</td>
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### Item Description:

De Beers Snap Lake has submitted their Extended Care and Maintenance Plan for Water Licence MV2011L2-0004. Section 7 of the current Interim Care and Maintenance Plan (ICRP) deals with Temporary Closure. On April 20, 2016 De Beers submitted the Snap Lake Mine Extended Care and Maintenance Plan in accordance with Section 7 of the ICRP.

The length of the temporary closure was expected to be 3 years or more, dependent on market conditions. As part of the on-going evaluation, De Beers has optimized the plan for the “extended care and maintenance” of the mine which will include flooding of the underground workings to reduce the risk to the environment and improve the annual operating costs preserving the asset for the future.

The Extended Care and Maintenance Plan contains references to 5 additional plans; separate reviews for these plans have been organized. Please direct your comments for each specific plan accordingly. These plans include:

- Spill Contingency Plan;
- Emergency Response Plan;
- Waste Management Plan;
- Water Management Plan; and
- Aquatic Effects Monitoring Program (AEMP) Design Plan.

Additionally, it was requested during the May 5, 2016 Snap Lake Working Group Meeting, that a separate ORS item be created in order for reviewers to direct their comments on the Surveillance Network Program changes in a separate location. Thus, Table 4: De Beers Snap Lake Mine SNP- Requested
Comment Summary

<table>
<thead>
<tr>
<th>Environment and Climate Change Canada: Loretta Ransom</th>
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<tr>
<td><strong>ID</strong></td>
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<td>Section 2.5.2 - Re-Opening of the Underground Restart Sequence</td>
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<tr>
<td><strong>Comment</strong> The intent during the extended care and maintenance is to have the ability to reopen the Snap Lake Mine. The sequence of events is provided that would need to occur in order to reopen the mine, however, there is no mention of how the low quality water that is being stored in the underground will be managed. No details are provided on the expected quality of this water and what would be needed for treatment to ensure discharge is compliant with the water licence should the mine reopen. Given the inputs of groundwater and surface environment. This will be accomplished by using a pumping station established in the collar of the mine and monitored as SNP 02-01. This will allow De Beers to manage water into the water management pond and treatment plant during periods of discharge. Additionally, engineered controls such as weirs or ditches contoured to the water management infrastructure would also be considered if required, however the mine openings were designed for this purpose while utilizing the natural elevations and locations of the three access points to the underground workings for worker safety.</td>
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<td><strong>June 2:</strong> De Beers shall operate the mine in accordance with the Water Licence while adhering to the EQCs. An extensive BATEA study was conducted as a component of the Water Licence Amendment process discussed throughout 2014 and 2015 and is available on the public registry for MV201IL2-0004 regarding handling of poor water quality. Depending on the length of Extended Care and Maintenance, consideration of new technologies or operational improvements would be considered to improve the Acceptable response.</td>
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<tr>
<td>Topic 2: Roads and Culverts</td>
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3 | Topic 3: Erosion Control | **Comment** Section 2.4.3 notes that erosion will be controlled by passive methods, though the specifics are unclear. **Recommendation** 1) ENR requests that DeBeers elaborate on the passive methods proposed for erosion control on site, and why active methods will not be required. | **June 2:** Passive erosion control would consist of spillways, rip rap of embankments and weirs to limit the turbulent flow of water which is a primary driver of erosion. Active erosion management would still be required in the event of deficiencies. Other passive systems such as the creation of a wetland will also be implemented both for current needs and future long term closure implementation. De Beers is currently installing erosion protection (rip rap) of targeted areas of the Process Kimberlite Facility as part of scheduled maintenance and will investigate implementation of passive wet-land management controls. | This additional information shall be added to the Extended Care and Maintenance Plan. |

4 | None | **Comment** None | **June 2:** De Beers notes a method of passive erosion control would be spillways and is discussed in GNWT Topic 5 below. | Noted. |

5 | Topic 4: Water Management | **Comment** Regarding water management, it is stated in Section 2.4.4 that monitoring and inspections will be completed on a regular basis. The anticipated frequency of monitoring and inspections is unclear. | **June 2:** Water Management inspections are stipulated in the SNP, AEMP and Water Management Plan as well as Part E Conditions Applying to Waste Management - Inspections of Structures (Clauses 3-5), The North Pile (Clauses 6-8) and Acid Rock Drainage (Clauses 9- | Acceptable response; This additional information shall be added to the Extended Care and Maintenance Plan. |
<table>
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<tr>
<th>Recommendation</th>
<th>June 2: De Beers notes that it will remain compliant with the water licence. All items are confirmed for completion except for the spillway which will be evaluated during ECM.</th>
<th>This additional information shall be added to the Extended Care and Maintenance Plan.</th>
</tr>
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</table>
| 6 Topic 5: North Pile | **Comment** Section 2.6 includes a list of activities related to the North Pile that “may” occur during care and maintenance. These include:  
- Surveillance of the North Pile Facility will continue during Extended Care and Maintenance consistent with the Snap Lake North Pile Management Plan;  
- Monitoring of ground thermistors and piezometers, manually or remotely, will continue to support analysis of potential ground movement and stability analysis;  
- Regular facility surveillance and stability related engineering programs will be performed;  
- Annual geotechnical/geochemical inspection will continue;  
- Towards Sustainable Mining (TSM) requirements for proper tailings management services will continue to be monitored and met, including update of Operation Maintenance and Surveillance (OMS) manual and Emergency Response Plan for the area;  
- In addition, the water collection system (sumps and ditches) and dust control capability will be maintained | Summarize this below:  
1). De Beers will remain compliant with the conditions of the licence and permits.
throughout the care and maintenance period. 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. PK deposition piping was purged, flushed and drained wherever possible. As noted in the initial review of the January 8, 2016 Suspension Care and Maintenance Plan, DeBeers has an Air Quality Program in place at Snap Lake Mine as a component of the Snap Lake Mine - 15 - April 2016 Extended Care and Maintenance Plan Version 1 Environmental Agreement. If dust were to trigger adaptive management a consideration of chemical amendments is an approved alternative in this program; and . Required heavy equipment and operator(s) or contractors will be retained as necessary to manage the North Pile as necessary on a fly-in and fly-out basis. While the list of activities is qualified by "may" in the preamble statement, specific activities within the list appear to be confirmed. It is therefore unclear which activities are already confirmed, and which activities may occur. If they "may" occur, the triggers for implementing the activities is not clear. ENR notes that based on this list of activities, on-site personnel will be
<table>
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<th>Necessary during the Extended Care and Maintenance period. <strong>Recommendation</strong> 1) ENR recommends that DeBeers clarify which activities related to the North Pile are slated for completion, and which activities have yet to be determined.</th>
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<tr>
<td>7</td>
<td>None</td>
<td><strong>Comment</strong> None</td>
<td><strong>June 2:</strong> De Beers would consider the construction of a spillway on the North Pile, consistent with the original design, to reduce the requirement of active water management using pumps and pipes on the surface of the North Pile.</td>
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<td>8</td>
<td>Topic 6: Maintenance Schedule</td>
<td><strong>Comment</strong> Section 2.9 outlines additional remote monitoring which will be investigated &quot;where possible&quot; and specific activities are qualified by terms such as &quot;routinely&quot;, &quot;as required&quot;, &quot;on a regular basis&quot; and &quot;wherever possible&quot;. This uncertainty makes it difficult to determine the frequency and scope of inspections and maintenance work. Further, this section brings into question whether there are plans to have site personnel present for the entire Extended Care and Maintenance period. <strong>Recommendation</strong> 1) ENR recommends that frequencies related to maintenance and inspections throughout the Care and Maintenance Plan be quantified, in order to provide additional certainty</td>
<td><strong>June 2:</strong> De Beers notes that in the initial years of ECM the maintenance frequencies will be consistent with that of the current care and maintenance program. The use of remote telemetry will be in supplement to on-site maintenance that will achieve the response frameworks identified in our management plans. As conditions stabilize and remote monitoring is established, off-site monitoring will be conducted, with a minimum of monthly visits.</td>
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<td><strong>This response addresses the comment.</strong></td>
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<td><strong>This response addresses the comment.</strong></td>
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<td>and a better understanding of the precise work being proposed by DeBeers.</td>
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<td>9</td>
<td><strong>None</strong></td>
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<td><strong>Comment</strong> None</td>
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<td><strong>Recommendation</strong> 2) ENR recommends that DeBeers provide clarity regarding the number of onsite personnel during the Extended Care and Maintenance Period. The number of personnel and their responsibilities should be described. If DeBeers is proposing that there will be specific periods of time where no onsite presence will be maintained, it should be clearly stated. Should this be the case, additional rationale should be provided by DeBeers to support this request, including how risks to the environment will be monitored, identified, and responded to during these periods. This updated information should be provided to the Board and circulated for comment prior to approval.</td>
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<td><strong>June 2:</strong> Snap Lake Mine will maintain the appropriate number of employees on site to achieve the conditions of the licence permits and authorizations. In the initial Extended Care and Maintenance period the camp will be staffed with the potential for the winter periods to have low to no staffing. Site visits and remote monitoring will be carried out to achieve the licence requirements. Once remote monitoring is in place, water quality from surface can achieve direct discharge into the environment, or passive water treatment systems are completed, staffing would be appropriate to meet the licence conditions and reduced to having no one on site continuously.</td>
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<td><strong>Acceptable response.</strong></td>
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<td>10</td>
<td><strong>Topic 7: Total Dissolved Solids</strong></td>
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<td><strong>Comment</strong> Section 3.1.3.1 states that TDS in water discharged to Snap Lake will decrease after 2016; however, Table 2 indicates an increase in TDS concentrations in discharge to Snap Lake after 2016. In addition, Section 3.1 states that within approximately one year of flooding, the underground mine (2017 to 2018) water quality returns to below the Health Canada Aesthetic</td>
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<td><strong>June 2:</strong> To clarify, the underground water quality prediction in the upper workings of the mine will be of similar quality to that within Snap Lake reducing over time (Section 3.1.1). The water discharge during care and maintenance will be primarily influenced by surface water quality (approximately 235,000 m3/year) that is</td>
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<td><strong>This additional information shall be added to the Extended Care and Maintenance Plan.</strong></td>
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</table>
Objective of 500 mg/L for total dissolved solids as discussed in the 2014 Water Licence Amendment. Table 2 notes that the underground water would still contain TDS concentrations in excess of 700 mg/L, however it is possible that the reference in Section 3.1 may have meant to be in reference to Snap Lake water (not underground water). ENR appreciates that this topic was discussed at the May 5, 2016, meeting but requires further clarification on the record.

**Recommendation 1** ENR requests that DeBeers clarify the predictions for TDS concentrations being discharged into Snap Lake after 2016.

Supplemented by underground mine water (Section 3.1.3 Golder Figure 3.2 Appendix IIIC). Section 3.1.4 discusses Snap Lake (in-lake) water quality. Based on mass loading and the total volume of discharge (which equals approximately 10 days of the current discharge volume) the TDS within Snap Lake reduces overtime as the assimilative capacity returns to baseline conditions. At no time will De Beers be at risk of exceeding the TDS EQC during Extended Care and Maintenance. The concentration increases in 2017-2020 in mine effluent represents predicted maximum concentrations based upon 2015 sampling. This is expected to decrease as noted in 3.1.3.3 as the North Pit, which is the main contributor of mass loading on surface water, will decrease over time. De Beers will also discharge water into the underground as noted in GNWT Topic 8.

**Comment None**

**Recommendation 2** ENR requests that DeBeers describe how long it will take for groundwater in the mine to stratify and if pumping water from the underground to mix with surface runoff.

**June 2:** The stratification is limited to the lowest workings of the mine and represents a minor component of the total void space of the mine. By returning water underground to the lowest This response addresses the comment.
| Topic 8: North Pile | **Comment** Section 3.1.3 outlines options to improve discharge water quality that might be considered in the future including returning high concentration surface water to the underground, freezing/capping the north pile, etc. It is not clear how these options will be discussed moving forward or the criteria that will be used to make final decisions. **Recommendation** 1) ENR requests that DeBeers outline how options related to the improvement of discharge water quality will be discussed in the future and outline the criteria that will be used when making final decisions in this regard. Options to discharge highly contaminated surface waters to the underground prior to practical workings (5180 level or lower if possible) there is little risk of stratification as any turbulent flow would be buffered due to the complex nature of the tunnel structures underground. This complex tunnel network further stabilizes the water quality in the mine workings. The volume of freshet discharge is minor (~235,000 m³/year) and will be of limited duration until water from surface can be directly discharged into the environment once it achieves the effluent quality criteria. | **June 2:** In the ECM plan De Beers has presented a maximum discharge scenario to indicate the highest concentrations and volumes of water that would go into the receiving environment. De Beers concurs with ENR and its primary method of water discharge, until passive treatment or water quality achieves discharge EQCs will be into the underground workings in combination with the treatment and discharge of upper working mine water. In the event that head pressures cannot be overcome, or issues with the underground return system, the presented discharge scenario would occur. For alternate |
| Topic 9: Water Quality Modeling | **Comment** Section 3.1.5 provides an update on the downstream lakes water course model. It is stated that “to employ a conservative monitoring approach and to match monitored constituent concentrations at the Lac Capot Blanc outlet, the volume of Lac Capot Blanc was increased to a volume greater than that calculated from the bathymetry data.” There was a discussion at the May 5th meeting related to why the volumes of Lac Capot Blanc needs to be increased in the model in order to match the observed constituent concentrations at the outlet. ENR was concerned that if the model is unable to accommodate the actual volume of Lac Capot Blanc and observed monitoring results, there may be an issue with the model itself. DeBeers and its consultants noted that further investigations will be conducted in the future to determine additional variables that may account for modeling discrepancies. **Recommendation** 1) ENR recommends that DeBeers provide the next steps. |
| --- |
| treatment methods (passive treatment etc.) notification of construction would be provided to the MVLWB with the updated management plans that corresponds to the request (i.e. Water Management Plan) | **June 2**: De Beers, under a separate cover, have an MVLWB approved Downstream Watercourses Special Study and AEMP Design Plan, and will continue to monitor the environment in Lac Capot Blanc. It is through monitoring and action levels not modelling that will assess conformity with Measure 1 D of EA 1314-02. A summary report of the Downstream Watercourses special study will be completed and submitted to the MVLWB in 2017. |
| 14 | Topic 10: Aquatic Effects Monitoring Program | **Comment** Section 3.2.1 outlines proposed amendments to the AEMP Design related to the Extended Care and Maintenance Plan and Appendix IV contains the Aquatic Effects Monitoring Program 2013 Addendum. ENR notes that this document has been distributed by the Board for review under separate cover. **Recommendation** 1) ENR’s comments specific to the AEMP Design will be submitted to the Board through that separate review. | **June 2:** Noted | Acknowledged. |

| 15 | Topic 11: Water Management Plan | **Comment** Section 3.2.3 references that with any upgrades and changes to the water management system at Snap Lake Mine, an updated Water Management Plan will be provided for review and MVLWB approval. ENR notes that a revised Water Management Plan has been included as Appendix 1C but has also been distributed by the Board for review under separate cover. As such, comments specific to the Water Management Plan will be submitted under that review. **Recommendation** 1) ENR’s comments specific to the AEMP Design will be submitted to the Board under that separate review. | **June 2:** Noted | Acknowledged. |
### Snap Lake Environmental Monitoring Agency - SLEMA: Zhong Liu

<table>
<thead>
<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>comments from SLEMA staff</td>
<td><strong>Comment</strong> No concerns are raised for this document itself.</td>
<td><strong>June 2</strong>: De Beers thanks SLEMA for the review and notes the cautionary note, De Beers is committed to disposing of waste consistent with the Waste Management Plan and in the case of explosives in consultation with the Chief Inspector of Mines consistent with the Explosives Act.</td>
<td>Noted.</td>
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### Tlicho Lands Protection Department: Sjoerd van der Wielen

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<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
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<tbody>
<tr>
<td>1</td>
<td>Remote Site Monitoring</td>
<td><strong>Comment</strong> Throughout the document, and during the recent De Beers' presentation on the Extended Care and Maintenance Plan, there are numerous references to the remote monitoring of the Snap Lake site. While over the longer term this objective may be possible, there are currently too many uncertainties, as the company works to stabilize and manage the site in the near term, to consider a zero employee site. <strong>Recommendation</strong> Tli?cho? Government does not support a zero employee/remote monitoring of the site until it is proven by De Beers that the site is stable and contingencies are in place to react to any issue that arise on site. The Tli?cho? Government recommends</td>
<td><strong>June 2</strong>: De Beers agrees with the Tlicho Government. De Beers will conduct trials during the initial years of Extended Care and Maintenance prior to the full implementation of a remote monitoring network. De Beers would propose, other then updating the ECM Plan, which forms chapter 7 the Interim Closure and Reclamation Plan, that the respective management plans that house the Action Level Responses Frameworks be updated to incorporate remote monitoring as it is established. De Beers emphasizes that it currently utilizes remote monitoring at Snap Lake for water management,</td>
<td>Acceptable response. An updated Extended Care and Maintenance Plan shall be submitted to the Board for approval prior to moving to a zero-employee site with remote monitoring systems.</td>
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<td>2.4.4 Water Management</td>
<td><strong>Comment</strong> Monitoring and inspection is intended to be done on a regular basis. <strong>Recommendation</strong> Tli’cho? Government would like to see more precision, as well as conditions in which water management changes or extreme scenarios would cause De Beers to have more frequent monitoring. In particular, how will freshet period be monitored under scenarios where there are fewer staff at site.</td>
<td><strong>June 2:</strong> De Beers has well established response frameworks associated with Water Management at the Snap Lake Mine (See Appendix IV of the Water Management Plan). De Beers conducts snow pack surveys and has on-site weather stations to monitor extreme events. Prior to freshet, De Beers will manage our water management structures to handle freshet. De Beers has successfully managed the 2016 freshet discharging the highest volumes of water to date at the mine. <strong>Acceptable response.</strong></td>
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<td>2.6 North Pile Operation</td>
<td><strong>Comment</strong> Planning for extreme climactic events or snow accumulation. <strong>Recommendation</strong> Recommend there be identification of potential snow accumulation and how</td>
<td><strong>June 2:</strong> De Beers currently manages the North Pile with operators brought in as required. See response to Tlicho Comment 5 on the stability of the North Pile. De Beers <strong>Acceptable response.</strong></td>
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<td>4</td>
<td>2.6 North Pile Operations</td>
<td><strong>Comment</strong> Need to refine design and construction of spillways, and the potential to reduce pumping, as well as the reference to passive water management systems. ** Recommendation** These are areas where there is very little detail provided, but latitude for change by the operator mentioned. The Tlicho Government is not in favour of any option that reduces oversight of the North Pile.</td>
<td><strong>June 2:</strong> De Beers notes that the design and construction or modification of the facility and water control structures requires MVLWB notification and stakeholder approval as per MV2011L2.0004 Part D Conditions Applying to Construction and Part J Conditions Applying to Modifications.</td>
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<td>5</td>
<td>3.1.2 Snap Lake Water Balance</td>
<td><strong>Comment</strong> The potential freezing scenarios are quite diverse, and there is very little detail on how freezing will be monitoring or studied over time. Further there is no detail on how freezing will be managed in a return to operational reality - how could full or even more than partial freeze pose long term stability risks? ** Recommendation** The proponent should identify how freezing will be managed and monitored.</td>
<td><strong>June 2:</strong> There is a common misconception that dykes and dams require the aggradation of permafrost to maintain their function and structure. While other mines in the NWT have incorporated permafrost as an integral component of their design criteria, De Beers water retention facilities and the process kimberlite facility are designed to not rely on permafrost. The presence of permafrost will allow</td>
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|   | 3.2.2 Surveillance Network Program | **Comment** North Pile drainage ditch and water management  
**Recommendation** The TIE?cho? Government suggests that the monitoring of all areas near the North Pile may need to be more frequent particularly during the freshet, to consider the reality of increased risk due to lower and less frequent review of the North Pile. | **June 2:** The drainage ditches and sumps will be managed prior to freshet as conducted during 2016. Once water is of the quality for direct discharge into the environment or a passive treatment system is in place notification would be provided as dictated by the Water License for board and stakeholder approval. | Acceptable response. |
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<td>6</td>
<td>3.2.5 Environmental and</td>
<td><strong>Comment</strong> Monitoring does not include characterization of freezing, or plans for</td>
<td><strong>June 2:</strong> Please see De Beers response to Tlicho Topic 5 North Pile</td>
</tr>
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</table>
| Geotechnical Monitoring | management of a variety of scenarios. Also, the review suggests there will be regular monitoring.  
**Recommendation** There should be studies or a plan identified for the characterization of freezing, as well as definition of the regular basis for monitoring. There is risk associated with remote monitoring, and these risks are not played out, and should be characterized, and then on the ground monitoring adjusted to reflect these risks. | Operations. Any remote monitoring would need to meet the current action levels identified in the North Pike Management Plan. De Beers is required to continue to monitor the thermistor network as required for the Water Licence Annual Report. De Beers will begin installing additional instrumentation in 2016 to support the monitoring of the action levels. |
|---|---|---|
| 8 | 3.2.1 AEMP | **Comment** Tlicho? Government has not carried out a detailed review of the proposed AEMP Design as part of this review, as our understanding is the AEMP is being reviewed under a separate review item.  
**Recommendation** Recommend MVLWB clarify that any approval of the ECMP does NOT constitute approval to change any aspect of the AEMP, until such time that the AEMP Design review is complete. | **June 2:** Noted, De Beers looks forward to the Tlicho's comments. |
| | | **May 27:** Yes, Tlicho Government’s understanding is correct. The approval of the Extended Care and Maintenance Plan does not constitute approval to change any aspect of the AEMP. Each Plan that has been submitted is being reviewed separately.
Environment and Climate Change Canada
Environnement et Changement climatique Canada

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

May 26, 2016

ECCC File: 5100 000 034/004
MVLWB File: MV2011L2-0004

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

Via online submission

RE: MV2011L2-0004 – De Beers Canada Inc. – Snap Lake Mine – Extended Care and Maintenance Plan

Attention: Angela Love

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board regarding the above-mentioned plan and is providing comments via online submission as requested. 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) 669-4744 or loretta.ransom@canada.ca.

Sincerely,

Loretta Ransom
Senior Environmental Assessment Coordinator

Attachment(s): ECCC Comments Excel Sheet

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

www.ec.gc.ca
DE BEERS CANADA INC.,
SNAP LAKE MINE
EXTENDED CARE AND MAINTENANCE PLAN

Glen Koropchuk, Sean Whitaker, Alexandra Hood and Marc Lincoln
May 5, 2016

INTRODUCTION
CURRENT STATUS OF SNAP LAKE MINE

- De Beers has invested considerable effort to make Snap Lake Mine sustainable:
  - Cost reductions
  - Operational improvements
  - New mining method
  - Restructuring DBCI

- Unfortunately, in 2015 the global markets continued to deteriorate leading to falling demand and reduced prices for all commodities and diamonds

- On December 4, De Beers Canada suspended mining operations at Snap Lake Mine. This original suspension is termed Care and Maintenance

CARE AND MAINTENANCE

- The original suspension of operations meant that mining operations ceased.
- We expected the duration of this suspension to be at least 3 years or more, dependent on economic conditions and technological/operational improvements, and will be reviewed in late 2016.
- De Beers has made the mine area safe for humans, wildlife and the environment, while maintaining mine infrastructure.
- Snap Lake will always have the ability to resume operations in the future when the economy and technological/operational conditions improve.
EXTENDED CARE AND MAINTENANCE

- De Beers is requesting to flood the underground workings to improve environmental sustainability and extend the suspension allowing the company to preserve the asset for the future.
- As discussed with the Government, Communities and Regulatory Officials, De Beers continues to evaluate options for:
  - Suspension Optimization (Extended Care and Maintenance)
  - Re-opening the mine;
  - Sale to a Qualified Operator; and,
  - Closing the mine.
- With approval of respective regulators, environmental activities would be scaled accordingly.
- Wherever possible, De Beers will explore the use of remote monitoring and technology to supplement on-site inspections.
- We are seeking approval for Extended Care and Maintenance.

EXTENDED CARE AND MAINTENANCE

- As always the priority is centered on protection and health and safety of people, wildlife and the environment
- All environmental monitoring commitments required by our licences, permits, leases, authorizations and environmental agreement will continue.
- Non-essential infrastructure and services will be secured and “put to sleep” or modified to conserve energy and reduce environmental impact/maintenance requirements
- Water management and treatment capacity will be appropriate to maintain compliance with all requirements and seasonal flows.
- The significant asset in the ground of 20-30 M carats will be preserved for the future.
EXTENDED CARE AND MAINTENANCE PLAN

WHY FLOOD SNAP LAKE MINE UNDERGROUND?

What are the benefits of flooding the underground workings of Snap Lake Mine?

- Environmental impacts are reduced:
  - Limiting discharge of water to the receiving environment;
  - Reducing the footprint and loading of mine effluent on the downstream water bodies; and,
  - Lowering air emissions as the mine would burn less diesel.

Flooding will allow for the Care and Maintenance period to be prolonged until the global markets improve and operational/technical advancements implemented so the mine can be re-opened by De Beers or another Qualified Operator.

De Beers remains committed to maintaining compliance with Water Licence MV2011L2-0004.
SITE FACILITIES

During Extended Care and Maintenance, site infrastructure will be managed to improve environmental sustainability and minimize costs whilst permitting the safe resumption of operations in the future:

- All necessary support facilities and services for Extended Care and Maintenance personnel will remain in operation during periods of occupancy;
- The dormitory sections, common areas and offices in the accommodations and service complexes, except for those required by Care and Maintenance personnel, will be closed off so that heating and ventilation can be reduced to minimum levels.
- Most surface mobile equipment will be relocated to parking areas and inspected on a regular basis.
- The power plant will be configured to operate under the reduced loading requirements, including remote operating where technology allows.

WASTE MANAGEMENT

De Beers have provided an updated Waste Management Plan with the application which states that throughout Extended Care and Maintenance:

- Hazardous and Non-Hazardous Waste will be managed consistent with the MVWLB approved Waste Management Plan.
- De Beers will continue to manage, maintain and monitor the Landfill within the North Pile consistent with the principles identified in the MVWLB approved Waste Management Plan.
AIR STRIP AND ROADWAY OPERATION

- Site roads and airstrip will be functional, if required, during periods of occupancy and erosion will be controlled as required.
- Inspection of the performance of side road ditches and culverts will be completed on a regular basis.
- Ice will be removed from culverts prior to freshet to facilitate surface water flow.
- Snow will be removed to maintain accessibility to all active areas, if any, of the mine site.
- Erosion will be controlled by sustainable passive methods to limit development of erosion gullies, seepage through the roads, excessive settlement and failures that may compromise future use of site roads and airstrip.

WATER MANAGEMENT

De Beers has updated the Water Management Plan to account for the proposed practices during Extended Care and Maintenance.

- Collection sumps and ditches will be maintained to manage runoff from the North Pile and general site prior to freshet.
- The Water Management Pond (WMP) will be maintained to provide surge capacity in the event of heavy precipitation or failure of the Water Treatment Plant (WTP).
- The WTP may be operated seasonally or water pumped underground to the lower workings to maintain water licence compliance.
- Monitoring and inspection of ditches, culverts, pipelines, WTP, containment dykes and other structural elements of the water management facilities will be completed on a regular basis by an Extended Care and Maintenance team.
UNDERGROUND ACTIVITIES

During Extended Care and Maintenance the underground workings of Snap Lake Mine will be flooded to reduce the risk to the environment.

During the flooding of the underground workings, first and foremost, De Beers will ensure the safety and health of workers.

Once flooded people will not have to go underground.

The pumps will be decommissioned in sequence accounting for:

- The inflows into each level;
- The storage capacity;
- The dewatering capacity;
- Ventilation requirements; and,
- The complexity of the electrical reticulation.

UNDERGROUND ACTIVITIES CONT'D

Ultimately the water level within the mine will reach homeostasis (~16-18 m from surface) with the local groundwater conditions as defined in the ITASCA technical memorandum (Appendix III and Section 3.1.1). Certain infrastructure and fixed and mobile equipment will be removed from underground and stored on surface or disposed of appropriately;

Any equipment or materials potentially contaminated with hydrocarbons or other hazardous materials will be removed from underground and prepared for storage or disposal as per the ECM Waste Management Plan;

All fuel, lubricants, hydraulic fluids, hazardous materials and degradable material will be removed from the underground workings to surface for storage or off-site shipment;

Any remaining explosives will be removed from underground and re-purposed or destroyed in consultation with the Chief Inspector of Mines;

The only items that will be left underground will be non-deleterious, constructed of steel, aluminum, vulcanized rubber or concrete, or associated with utility lines.
UNDERGROUND RETREAT

- Comprehensive project approach with dedicated project manager.
- All equipment to be removed has been identified and scheduled.
- Sequence identified and overlaid against the Itasca flooding program.
- ~60 days of activity.
- Risk management approach to ensure that the environment is protected, and the project team is safe.

UNDERGROUND ACTIVITIES – RE OPENING

The recommencement of operations at Snap Lake Mine requires winter road access to the site. De Beers may require:

- Initial use of skid planes followed by snow clearing and grading to reopen the runway to service the mine through the site restart execution process;
- Maintenance on the lighting systems and communication systems;
- Snow clearing and upgrading of the site roads including maintaining ditches, culverts to accommodate full production water management systems; and

Re-commissioning of the main power station, process plant, dormitories, out-buildings, waste handling facilities, boilers, surface lighting, electrical substations, electrical distribution, compressed air system and fire detection and protection system.
UNDERGROUND ACTIVITIES: REOPENING

De Beers has outlined several programs that are required prior to recommencing operations as follows:

- Emergency Response Team (ERT).
- Continuous Underground Geotechnical Inspection.
- Re-training/Employment of an Underground Team.
- Purchase and/or maintenance of the mobile fleet to prepare for re-entry.
- Re-establishment of water management infrastructure (Underground and Surface Management).
- Development of a re-entry ventilation program.
- Re-commission the Underground Service Systems.

UNDERGROUND WORKINGS – PERMANENT CLOSURE

In the event that De Beers, or another qualified operator, does not restart the operation, permanent closure requirements will be met for the underground mine as identified in Section 5.0 of the Interim Closure and Reclamation Plan (ICRP).

During extended care and maintenance after the flooding of the mine. We will continue to monitor and manage ICRP Site Wide Objectives through the Surveillance Network Program (SNP) and AEMP monitoring.
PROCESSED KIMBERLITE FACILITY

Processed Kimberlite (PK) deposition has stopped. We will monitor and maintain the PK Facility consistent with the Operation Maintenance and Surveillance (OMS) Manual.

The PK Facility will be kept in a stable state that will allow for the re-start of operations of the mine.

As part of Extended Care and Maintenance considerations for the PK Facility, we will review the design and construction of spillways in some areas to potentially reduce long term reliance on pumping during extreme precipitation events. Upon achieving water quality objectives, we will implement more sustainable passive water management systems.

MAINTENANCE ACTIVITIES

Remote monitoring will be investigated and implemented to improve reaction time and maintenance activities.

- Visual/remote inspections will be completed routinely to check for non-conformities. In situations where issues require further attention, maintenance will be completed.
- Staff and equipment operators will be contracted as required.
- Inspections will be completed by operator staff, contractors and/or geotechnical consultants.
- Equipment required for maintenance will be kept in operational condition in order to ensure that site infrastructure can be safely maintained.
- Equipment will be available for incident response and regular maintenance activities.
- Remote telemetry and monitoring devices will be established wherever possible while maintaining compliance with the mines’ licences, permits, leases, authorizations and environmental agreement.
ENVIRONMENTAL MANAGEMENT

EXTENDED CARE AND MAINTENANCE

ENVIRONMENTAL MANAGEMENT

Monitoring programs will be consistent with the level of discharge. We have updated several models for Snap Lake that are related to mine effluent. These updates were conducted to determine the approximate water quantity and quality that would require management.

The following models have been updated for extended care and maintenance:

- Underground Water Predictions for retreat planning and achieving homeostasis and predicted concentrations of TDS (ITASCA);
- Snap Lake Mine Water Balance (quantity of water generated on surface) (Golder);
- Snap Lake Site Water Quality Model (surface discharge quality) (Golder);
- Snap Lake Water Model (in-lake concentrations) (Golder); and,
- Downstream lake water model (up to and including Node 22 in MacKay Lake) (Golder).
UNDERGROUND WATER (UG) PREDICTIONS

De Beers contracted Itasca Denver, Inc. (Itasca) to conduct groundwater flow simulations and calculate the total dissolved solids (TDS) in the mine discharge for Snap Lake mine. ITASCA ran several scenarios to understand how the mine will flood to allow De Beers to conceptually plan a retreat sequence.

<table>
<thead>
<tr>
<th>Sill Elevation (Mine Flood Elevation)</th>
<th>Void Volume (m³)</th>
<th>Average Steady-State Inflow Rate (m³/day)</th>
<th>Average Steady-State Inflow Rate with 30 Percent Uncertainties (m³/day)</th>
<th>Time for Filling Void Volume Based on Simulated Rate (day)</th>
<th>Possible Range of Time Assuming 30 Percent Uncertainties of Simulated Rate (day)</th>
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<tbody>
<tr>
<td>4,970 and below</td>
<td>222,168</td>
<td>46,742</td>
<td>32,720 - 60,760</td>
<td>5</td>
<td>4 - 7</td>
</tr>
<tr>
<td>5,015-4,971</td>
<td>93,935</td>
<td>41,040</td>
<td>28,730 - 53,350</td>
<td>2</td>
<td>2 - 3</td>
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<tr>
<td>5,090-5,016</td>
<td>123,898</td>
<td>36,813</td>
<td>25,070 - 46,860</td>
<td>3</td>
<td>3 - 6</td>
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<tr>
<td>5,140-5,091</td>
<td>223,405</td>
<td>31,908</td>
<td>22,380 - 41,500</td>
<td>7</td>
<td>5 - 10</td>
</tr>
<tr>
<td>5,150-5,141</td>
<td>134,588</td>
<td>29,074</td>
<td>20,350 - 37,800</td>
<td>5</td>
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<tr>
<td>5,290-5,151</td>
<td>848,886</td>
<td>26,352</td>
<td>18,450 - 34,200</td>
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<td>5,450-5,291</td>
<td>1,292,020</td>
<td>5,818</td>
<td>4,070 - 7,860</td>
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<td>Total</td>
<td>2,939,597</td>
<td>277</td>
<td>213 - 399</td>
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UNDERGROUND WATER PREDICTIONS

The Total Dissolved Solids (TDS) concentrations in the mine seepage water were estimated through the volumetric mixing of seepage to the hanging wall (HW) and the footwall (FW).

The predicted steady-state TDS concentrations will improve in the underground workings.

Currently the TDS concentrations from UG are well below the regulatory discharge criteria.
SNAP LAKE MINE WATER BALANCE

Golder modeled two scenarios for surface water management; frozen and unfrozen conditions of the PK Facility. There has been freezing noted throughout the PK Facility, but the aggradation of permafrost is expected to be gradual and dependent on a number of processes. This freezing process will be studied as future component in the ICRP research plan.

The freezing process impacts the overall loading of constituents that are released into the perimeter water control structures. Although the timing of freezing for the PK Facility is not modelled, the model simplifies these processes by investigating the bounding scenarios (frozen and unfrozen), and conservatively allows for drain-down of the existing pile pore-water based on unfrozen conditions.

The bounded scenario maximum predicted volume of water generated annually on surface (on average) is approximately 235,000m³/year.

Ingress of water and disturbance will be minimized, therefore reducing the mobilization of constituents from the PK Facility.

WATER QUANTITY DISCHARGED

Monitoring data from 2004-2015 to develop model inputs to estimate discharge and relative concentration. Using these input values, water quality was projected from 2016-2020.

Key model properties include cessation of processing, therefore no process water or PK is placed in the facility. From 2016 - 2020, the upper surface of the facility was assumed to be frozen and that drainage of water from the pore space of the pile would occur over this period.

We will establish a surface water return to the underground workings to further lower discharge into the environment, if required. To be conservative, De Beers requested that Golder model and present the maximum predicted discharges into the environment from surface augmenting flow from underground.
WATER QUALITY

Under maximum predicted discharge, the constituent concentrations to Snap Lake are predicted to remain below EQC's as per Part F of Water License MV2011L2-0004.

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<tr>
<th>Group</th>
<th>Constituent</th>
<th>Major Ions</th>
<th>Nutrients</th>
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<tr>
<td>Conventional</td>
<td>Total dissolved</td>
<td>Calcium</td>
<td>Nitrate</td>
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<td>solids, calculated</td>
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<td>Chloride</td>
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<td>Total ammonia</td>
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<td>Reactive silica</td>
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<td>solids, calculated</td>
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Table 2 (Golder Table 4-2): Predicted Maximum Constituent Concentrations in Discharge to Snap Lake, 2016 to 2020

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Units</th>
<th>Predicted Maximum Concentrations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
<td>2016</td>
</tr>
<tr>
<td>Total dissolved solids, calculated</td>
<td>mg/L</td>
<td>762</td>
</tr>
<tr>
<td>Calcium</td>
<td>mg/L</td>
<td>150</td>
</tr>
<tr>
<td>Chloride</td>
<td>mg/L</td>
<td>339</td>
</tr>
<tr>
<td>Fluoride</td>
<td>mg/L</td>
<td>0.41</td>
</tr>
<tr>
<td>Magnesium</td>
<td>mg/L</td>
<td>22</td>
</tr>
<tr>
<td>Potassium</td>
<td>mg/L</td>
<td>7.2</td>
</tr>
<tr>
<td>Reactive silica, as SiO₂</td>
<td>mg/L</td>
<td>8.4</td>
</tr>
<tr>
<td>Sodium</td>
<td>mg/L</td>
<td>75</td>
</tr>
<tr>
<td>Sulphate</td>
<td>mg/L</td>
<td>75</td>
</tr>
<tr>
<td>Nitrate</td>
<td>mg/L</td>
<td>9.4</td>
</tr>
<tr>
<td>Nitrite</td>
<td>mg/L</td>
<td>0.13</td>
</tr>
<tr>
<td>Total ammonia</td>
<td>mg/L</td>
<td>1.2</td>
</tr>
<tr>
<td>Total phosphorus</td>
<td>mg/L</td>
<td>0.002</td>
</tr>
</tbody>
</table>

OPTIONS TO FURTHER IMPROVE WATER QUALITY DISCHARGE

There are several options which might be considered to further mitigate concentrations and/or loading

- Evaluation and optimization of how much mine-water continues to be pumped over time, and the periodicity of discharge from site (considering site capacity and mine-water).
- Evaluation and optimization of returning high-concentration surface water to the underground workings via existing water management infrastructure to mitigate discharge loadings and to meet EQCs.
- For parameters associated with PK Facility discharge (e.g. nitrate, ammonia, etc.) additional mitigation and reduction in concentration and loading may occur naturally over time (no blasting or explosives residue) that has not been accounted for in the model.
- Evaluation of freezing or capping of the PK Facility may provide additional reduction in concentrations and loadings both in the short and long term.
- Alternate treatment and management methods such as passive interventions, bioreactors, or smaller package plants may be more sustainable or result in cost savings and will be investigated in the future.
WATER QUALITY IN SNAP LAKE

The water quality in Snap Lake is predicted to remain below the site specific water quality objectives of the AEMP with water quality improving over time.

DOWN STREAM LAKES WATER MODEL

Predicted constituent concentrations in the downstream lakes from 2016 to 2020 showed the following:

- Constituent concentrations in Snap Lake are predicted to reduce over time. In the downstream lakes concentrations were predicted to increase from 2016 to 2020 as water flows out of Snap Lake (Section 3.1.4) but will improve overtime.

- In Scenarios 1 and 2 (Goldie Model Run ID’s), TDS concentrations were predicted to range from 47 mg/L to 63 mg/L at the Lac Capot Blanc outlet in 2020 (Appendix IIIIE). As water travelled from the outlet of Lac Capot Blanc through the Lockhart River system, constituent concentrations were predicted to decrease, as was the difference between concentrations predicted under scenario 1 vs. scenario 2. At Node 22 in MacKay Lake, calculated TDS concentrations were predicted to range from 16 mg/L to 17 mg/L in 2020 (i.e., a reduction in concentrations of TDS of 66% and 73% from the Lac Capot Blanc outlet, respectively).

- The work to determine the range of natural variability and background concentrations is still ongoing as a component of the Downstream Lake Special Study, but De Beers does not anticipate exceeding the range of natural variability during extended care and maintenance.
ENVIRONMENTAL MANAGEMENT
MONITORING PLAN UPDATES
(AEMP AND SNP)

AEMP DESIGN PLAN UPDATE - REVISIONS OVERVIEW

De Beers is committed to maintaining compliance during the Extended Care and Maintenance period

• Update is based on the 2013 Approved AEMP Design Plan
  - Intended to be effective 2017-2020
  - Includes 2015 Water Licence Requirements
  - Incorporates new SSWQOs and ECM Water Quality predictions and EA Measures
  - Assumes water quality improves over Extended Care and Maintenance versus Operations
  - The monitoring program and response framework are updated, field methods and reporting kept same

• Monitoring components remain essentially the same
  - Water, toxicity, sediment, plankton, benthos, fish health, fish tasting will continue
  - Fish community monitoring deferred

• Special Studies
  - All special studies deferred with the exception of Downstream Watercourses Special Study
WATER QUALITY

The water will remain safe to drink.

Objective: The document changes in water quality in Snap Lake for the purpose of identifying any mine-related effects.

ECM Changes:
- Water quality monitoring will continue in Snap Lake at reduced set of stations and frequency given the reduced discharge to the lake.
- Depending on location, samples will be collected three times/year, monthly or annually:
  - Diffuser stations monitored monthly during discharge (3 stations).
  - Other stations in SL (7 stations) and NEL (3-5 stations) will be sampled 3 x year (April/May, July and August/September).
  - Lake 13 monitored every 3 years to align with biological monitoring (5 stations).
  - Stream 1 sampled during freshet.
  - KING01 (upstream of King Lake) will continue to be monitored as per the DSW SS.

TOXICITY

- Toxicity program will continue through ECM with the same program except for the reduction of one station.

ECM Changes:
- Report toxicity data in its own chapter of AEMP annual report for clarity.
- Sample twice/year at three stations SNP 02-20 d,e,f (ice on: April/May; open water: August/September) for Daphnid and algae chronic toxicity tests, at the same time as the effluent toxicity samples.
- Composite diffuser sample once per year for Fish Early Life Stage toxicity test Fish Early Life Stage survival and growth once/year, anticipating this to be Fathead Minnow.
SEDIMENT AND BENTHIC INVERTEBRATES

Sediment Objective: determine if sediment quality in Snap Lake remains acceptable to support a healthy benthic invertebrate community
  - Sediment program with only one change: focus on main basin
    - Includes Annual monitoring of sediment at the diffuser, other stations every 3 years
    - Compares sediment to AEMP benchmarks (main basin to reference lakes)

ECM Changes:
  - Reduction in monitoring in NW arm to focus on main basin

Benthic Invertebrates Objective: whether benthic communities have been impacted by water and sediment changes in Snap Lake.

ECM Changes
  - Program the same as approved: three lakes sampled once every three years
  - Focused on stations in Snap Lake Main basin

PLANKTON

Plankton Objective: determine if plankton have been affected by Water Quality changes in Snap Lake

  - Program largely unchanged from the approved design
  - Continue to use the sampling locations same as Water Quality

ECM changes
  - Sampling completed annually in Snap Lake, Northeast Lake in two months of open water season instead of three (e.g. July/August)
  - NEL lake sampled annually; Lake 13 sampled once every three years in line with other biological components
  - Light meter sampling will recommence when operations resume
FISH

Fish Health Objective: determine if treated effluent is having a significant effect on growth, reproduction, survival and condition of fish in Snap Lake
• No Changes to the fish health program for ECM

Fish Tissue Objective: determine whether treated effluent has increased tissue metals that would limit consumption by humans and wildlife

ECM changes:
• Small-bodied fish tissue program (Lake Chub) program will not change
• Large-bodied fish tissue program (Lake Trout and Round Whitefish) occurs in 2016 and will occur again when operations resume unless triggered by the small-bodied fish tissue program.

Fish Tasting objective: to assess fish palatability
• Any changes to the program will be conducted in consultation with communities

AEMP RESPONSE FRAMEWORK

Response Framework Objective: systematic approach to respond to findings of the AEMP related to whether water is safe to drink, fish are safe to eat.

• AEMP Response Framework and Low Action levels will remain as approved in the 2013 AEMP Design Plan with some minor additions related to the amended SSWQOs and the EA Measures

ECM changes:
• Toxicity: updated the sub-lethal toxicity Low Action Level for test species to accommodate the MVLBW request to prevent repeat exceedance of outdated Action Levels unrelated to adverse effects
• Water Quality:
  - updated to include the new SSWQOs and remove aesthetics
  - added a new Significance Threshold for protection of traditional use based on Measure 1d
  - added an interim Low Action Level for Lac Capot Blanc (outlets)
SNP REQUESTED CHANGES

As a component of ECM, De Beers requested several SNP Amendments to align with the seasonal discharge and management of water at Snap Lake Mine (Section 3.2.2 of the ECM Plan)

Throughout ECM, De Beers will continue to monitor and evaluate the concentrations in the SNP. Once monitored conditions demonstrate compliance with the Water Licence, De Beers will notify the MVLWB and provide plans to allow for the direct discharge from surface facilities into the environment

WATER MANAGEMENT PLAN

The Plan describes how we will manage water throughout the initial period of ECM. With any significant upgrades and changes to the water management system at Snap Lake Mine, an updated water management plan will be provided for review and MVLWB approval. De Beers will review passive water treatment options to ensure the water quality objectives are achieved sustainably and efficiently throughout ECM.

De Beers is planning for the possibility that untreated seepage from the PK Facility during ECM may meet or be better than the water quality objectives and Water Licence effluent quality criteria over time. Once monitored conditions demonstrate compliance with the Water Licence, De Beers will notify the MVLWB and provide plans to allow for the direct discharge from surface facilities into the environment.
PHYSICAL SURFACE STRUCTURE MONITORING

The Site will be monitored and inspected regularly. We will explore and implement remote monitoring to further enhance inspections.

Environmental and physical stability monitoring will be completed by operator staff, contractors, communities or remote monitoring and will concentrate on the following items:

- Overall stability and integrity of buildings and facilities;
- Inspection on potential fuel spills from power generators, machinery parked at laydown areas, crusher and other equipment;
- Proper disposal of waste materials in the active disposal facility within the PK Facility.
- Food wastes are to be incinerated prior to disposal to limit wildlife on-site.
- Explosives (if any) and other hazardous materials stored in magazines or in the hazardous waste facility will be monitored for spills, excessive humidity, stability of storage facilities and access of humans or wildlife roads and the airstrip.

In the scenario where monitoring detects non-conformities, adequate maintenance will be completed.

ENVIRONMENTAL AND GEOTECHNICAL MONITORING

De Beers will explore and implement remote monitoring equipment to supplement regular site inspections.

A competent professional will monitor the stability of soil/rock structures including the PK Facility, WMP dams, and sumps on a regular basis.

The PK Facility monitoring will include settlement and seepage, signs of instability in slopes (e.g., cracking), development of erosion gullies and exposure of buried wastes (PK, solid waste materials), dust and excessive water ponding.

Monitoring of ground temperatures (thermistors) and standpipe piezometers will be maintained during ECM.

Signs of instability or degradation of the soil/rock structures will trigger maintenance activities.

Signs of seepage, and ponded water in or around site water retaining infrastructure will result in investigation, sampling and maintenance activities if warranted.

Waste management: environmental and stability monitoring will include inspection of waste materials, collection of potential contaminated seepage from lined areas for storage or on-site management.
FUTURE MVLWB SUBMISSIONS

De Beers will continue with regulatory processes as may be required to allow for the re-opening of the mine in the future if markets and operational/technological improvements allow that will include:

- A Land Use Permit Application in 2017
- A Water License Renewal before 2020

CLOSING

De Beers’ priority for ECM is to ensure the health and safety of people, wildlife and the environment. We expect the length of ECM to be at least 3 years or more, dependent on economic conditions and technological/operational improvements, but will be reviewed in late 2016.

De Beers continues to review the options for:

- Further optimization of ECM (Passive Water Treatment);
- Reopening the mine;
- Sale to a Qualified Third Party Buyer; or
- Final Closure of Snap Lake Mine.

De Beers will continue to work closely with our stakeholders.
ANY QUESTIONS
These meeting notes attempt to provide a general summary of the meeting. Ideas expressed by participants are paraphrased and summarized; they are not reproduced here verbatim.

**Date and Location:**
May 5, 2016 – 8:30 a.m. to 12:00 p.m.
Mackenzie Valley Environmental Impact Review Board Room
(2nd Floor, Scotia Centre)
5102 50th Ave Suite 200

**Attendees:**
- Lauren King (LKDFN) – phoned in
- Andy Young (GNWT) – phoned in
- Alex Power (YKDFN)
- Rick Walbourne (GNWT-ENR)
- Sarah Robertsen (NPMO)
- Melissa Pinto (ECCC)
- Zabyev Nevitt (Tlicho Gov’t)
- Jamie Steel (GNWT-Lands)
- Shin Shiga (NSMA)
- Monica Wendt (GNWT-ENR)
- Sjoerd van der Wiel (Tlicho Gov’t)
- Zhong Liu (SLEMA)
- Angela Love (MVLWB)
- Kerney Leach (MVLWB)
- Rebecca Chouinard (MVLWB)

**De Beers Presentation and Discussion:**

**Introduction:**
- Long Term Care and Maintenance option is being explored (seeking approval for the Extended Care and Maintenance Plan (ECM)).
- Explanation of difficulties of Snap Lake mine that were not originally predicted or modelled.
- This, along with current market conditions, led to the December 4th 2015 decision.
- De Beers is working very hard to ensure the safety of staff and the environment, adhering to all regulatory standards, as they move to ECM.

**Where is Snap Lake mine headed:**
- Four options:
- De Beers’ ultimate goal is to keep the mine on ECM until the market recovers and technology has improved, so the mine can re-open when more capital is available. De Beers believes closing the mine would be an asset loss for Canada and the Government of the Northwest Territories (GNWT).

Extended Care and Maintenance:
- This plan decreases the quantity of water discharge to the environment.
- Flooding the underground greatly reduces impact of water flowing downstream.
- Thus, the flooding of the mine is a positive plan for Extended Care and Maintenance both economically and environmentally.

Site Facilities:
- Most important factor is ensuring continual safety of people and wildlife.

Questions/Discussion:
- Questions regarding Remote Monitoring during freshet and heavy rainfall events, and if a team will be mobilized for this time period/these events. The response was that this situation is variable – this could change depending on the water quality at the time and/or how long the mine has been in ECM.
- Question regarding the response time of remote monitoring options, as well as emergency sensor equipment responding under extreme temperature conditions. De Beers’ response discusses response times, and how all emergency sensor equipment will not be affected by changing temperatures.

Waste Management:
- Description of Waste Management Plan

Water Management:
- Description of current Water Management Plan focusing on the management of the first two freshets
- Depending on the amount of time the mine remains in ECM, different options for water management may be introduced as the water quality changes. Discussion on passive systems.

Questions/Discussion:
Questions regarding the pumping of surface water to the underground, and how this would affect water quality of the void water. It was stated that due to the halting of operation and thus blasting, nitrates, for example, will reduce over time. Further, water containing higher Total Dissolved Solids (TDS) will settle to the bottom.

Underground Activities:
- Primary driver – health and safety of workers.
- Decisions made through risk management approach.
- Explanation of equipment removal - De Beers has a full inventory of surface and underground materials and is working closely with the inspector on safe removal and storage activities.
- Explanation of flooding process with temporary pumping stations for equipment/material removal in lower levels.
- Option available for mine re-opening.
Environmental Management:
- Underground water predictions and overall site water balance.
- Maximum predictions of discharge – based on worst case scenario (most conservative option).
- Knowledge gap in understanding the hydrology of Lac Capot Blanc that De Beers is still researching/investigating.

Questions/Discussion:
Alison Snow (consultant from Golder) on Phone:
Q: Concern regarding changing inputs of model/adjustments (increasing volumes of Lac Capot Blanc) to achieve specific outcomes to match monitoring sample results.
A: The volume of Lac Capot Blanc was increased in the model in order to match TDS lab results, however a scenario without this alteration was also presented. Something is missing in the model to account for this issue and more information is required. Perhaps the inflow calculations are off, or an incorrect volume of Lac Capot Blanc is being used. Golder is trying to collect new flow data each year (so far 2013 and 2016) to update the model flow rates.

Question presented asking if the TDS concentration values from Lac Capot Blanc could be incorrect, however Golder consultant states that based on samples and trends of results that have appeared over the years, they believe these results are correct.

Spill Contingency Plan
- Plans themselves have not changed substantially – it is the people that have changed ie. Numbers and titles of positions etc.

Aquatic Effects Monitoring Program (AEMP):
- Discussion of AEMP design plan and all changes that have been made as well as items that will remain the same.

Surveillance Network Program (SNP):
- Most stations will remain during ECM.
- Description of some stations that will be monitored only during periods of flow due to the fact that dewatering has been stopped.

*Request for the SNP section to be made into a separate Online Review System (ORS) item for separate comments. The MVLWB staff stated that this would be carried out.

Future Submissions:
- A Land Use Permit Application in 2017
- A Water License Renewal before 2020
Staff Report

Applicant:
De Beers Canada Inc.

Location: Snap Lake Mine

Application: MV2011L2-0004

Date Prepared: September 9, 2016

Meeting Date: September 23, 2016

Subject:
Request to defer an updated Interim Closure and Reclamation Plan

1. Purpose/Report Summary

   The purpose of this report is to present to the Mackenzie Valley Land and Water Board (MV/LWB or the Board) De Beers Canada Inc.’s (De Beers) request to defer the updated Interim Closure and Reclamation Plan (ICRP), currently due January 30, 2017, as required under Part I, Item 1 of Water Licence MV2011L2-0004 (Licence) for the Snap Lake Mine.

2. Background

   • January 30, 2014 – ICRP (Version 3.2) last approved by the Board;
   • February 18, 2016 – Board directed De Beers to resubmit;
   • June 27, 2016 – Board approved the Extended Care and Maintenance Plan;
   • August 17, 2016 – De Beers submits a request to extend the submission deadline for the updated ICRP from January 30, 2017 to June 2020;
   • August 19, 2016 – Request distributed for review;
   • September 2, 2016 – Reviewer comments due;
   • September 8, 2016 – De Beers’ responses due; and
   • September 23, 2016 – Request to defer the ICRP presented to the Board for decision;
   • January 30, 2017 – Current deadline for submission of an updated ICRP and revised reclamation security estimate; and
   • June 13, 2020 – Water Licence expires.

3. Discussion

   On August 17, 2016, De Beers Canada Inc. (De Beers) submitted a request to extend the submission deadline to update Snap Lake’s ICRP (attached). This ICRP was last approved on January 30, 2014, and as per Part I, Item 1 of Licence MV2011L2-0004, “The Licensee shall act in accordance with the approved Interim Closure and Reclamation Plan. Revisions to the Plan shall be submitted to the Board, for approval, every three (3) years after the date of approval, or as directed by the Board.” As such, the next submission is due January 30, 2017. Instead, De Beers has requested to submit the next ICRP, “prior to June 2020” (around the renewal of the licence).
De Beers is also required to submit a revised reclamation security estimate on January 30, 2017, based on the Board’s February 18, 2016 decision (attached) regarding deferral of submissions due to suspension of mining operations and Part C, item 3 of Licence MV2011L2-0004. The Board’s February 18, 2016 decision letter also directed De Beers to provide a progress report every three (3) months, starting June 30, 2016. This June 30, 2016 progress report is attached below.

In its ICRP deferral request, De Beers emphasizes that it will provide an updated RECLAIM estimate for stakeholder review and Board approval by January 30, 2017. With this, De Beers will also submit a Research Plan, which is usually submitted as Appendix E of the ICRP. This Research Plan will contain closure research and objectives.

4. Comments
Not applicable.

5. Reviewer Comments
By September 2, 2016, comments and recommendations on the request to defer the ICRP submission were received from the following reviewers:
- Snap Lake Environmental Monitoring Agency (SLEMA);
- Yellowknife Dene First Nation (YKDFN); and
- Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR).

De Beers responded on September 6, 2016, prior to the September 8, 2016 deadline. The reviewer comment summary table (attached) presents the concerns identified through the review of the request.

All reviewers agreed that De Beers should be granted an extension for the ICRP submission, however they suggested a 1-year extension rather than the requested “prior to June 2020” when the current Licence expires. Reviewer rationale is that, since it is possible De Beers may decide to permanently close the mine during Extended Care and Maintenance (ECM) there would not be a Final Closure and Reclamation Plan in place. While reviewers support an extension for the development of a well-informed ICRP, a three-year deferral is not supported as this would leave stakeholders without any detailed Closure and Reclamation Plan should the company decide to close the mine before an updated ICRP is submitted. GNWT-ENR also suggested a working group be developed to include discussions regarding ICRP and closure criteria development. Board staff note that the most recent the Snap Lake Working Group meeting (#6) was held by Board staff on May 5, 2016 (meeting notes attached).

De Beers responded that the ECM Plan has detailed how all mine areas will be maintained during the period of temporary closure, and that they have requested a three-year extension, because it will closely resemble a post-closure condition as the underground mine will be flooded. Furthermore, a three-year deferral will provide sufficient data to determine trends in the environment and also allow De Beers the time to progress the closure research necessary to develop closure criteria.
De Beers has committed to submit a revised reclamation security estimate by January 30, 2017, however, GNWT-ENR has recommended the submission of an additional updated RECLAIM security estimate to coincide with the next submission of the ICRP Update. Board staff note that De Beers will likely submit an updated RECLAIM security estimate for the water license renewal (approximately early 2019) (GNWT-ENR ID-3).

6. Security
The GNWT currently holds $39,066,247.00 in reclamation security for the Snap Lake Mine for Licence MV2011L2-0004.

7. Conclusion
De Beers has responded to the comments received and there are no outstanding issues regarding this request.

8. Recommendation
Board staff present the following options for the Board’s consideration:
   OR
2. Approve a one-year extension to the original submission deadline, changing the submission due date for the updated ICRP to January 30, 2018.
   OR
3. Any other option.

Board staff note that no changes to the Licence are required because the relevant conditions do not contain specific dates. Thus, a draft Licence was not provided as an attachment.

9. Attachments
   - Request to defer ICRP Update;
   - Board’s February 18, 2016 decision – updated reclamation security estimate;
   - Reviewer Comment Summary Table;
   - June 30, 2016 Progress Report;
   - Working Group 6 – May 5, 2016 – meeting summary notes;
   - Draft Decision Letter from the Board; and
   - Draft Reasons for Decision.

Respectfully submitted,

Kierney Leach
Regulatory Officer
## Review Comment Table

<table>
<thead>
<tr>
<th>Board:</th>
<th>MVLWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Item:</td>
<td>De Beers Snap Lake - Request to Defer the Full Interim Closure and Reclamation Plan Update</td>
</tr>
<tr>
<td>File(s):</td>
<td>MV2011L2-0004</td>
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<tr>
<td>Proponent:</td>
<td>De Beers Canada Inc. - Snap Lake</td>
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<tr>
<td>Document(s):</td>
<td>Request to Defer ICRP Update - Letter (108)</td>
</tr>
<tr>
<td>Item For Review Distributed On:</td>
<td>Aug 19 at 12:31 Distribution List</td>
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<tr>
<td>Reviewer Comments Due By:</td>
<td>Sep 2, 2016</td>
</tr>
<tr>
<td>Proponent Responses Due By:</td>
<td>Sep 8, 2016</td>
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### Item Description:

On August 17, 2016, De Beers Canada Inc. (De Beers) submitted a request to extend the submission deadline (of January 30, 2017) for an updated Interim Closure and Reclamation Plan (ICRP). This ICRP was last approved on January 30, 2014, and as per Part I, item 1 in Licence MV2011L2-0004, "The Licensee shall act in accordance with the approved Interim Closure and Reclamation Plan. Revisions to the Plan shall be submitted to the Board, for approval, every three (3) years after the date of approval, or as directed by the Board."

Additionally, a reclamation security estimate is required under Part C, item 3 of Water Licence MV2011L2-0004; this update was requested by the Board on February 18, 2016 at the request of GNWT-ENR, and is also due January 30, 2017. De Beers emphasizes that it will provide an updated RECLAIM estimate for stakeholder review and MVLWB approval by January 30, 2017. With this, De Beers will also submit a Research Plan, which is usually submitted as Appendix E of the ICRP. This Research Plan will contain closure research and objectives.

The document attached below provides further detail and rationale. Reviewers are invited to submit questions, comments and recommendations using the Online Review System (ORS) by **Friday September 2, 2016 at 1700h (5pm MST)** on De Beers' request to defer the ICRP update.

If you have any questions or comments regarding this deferral request 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 Métis Council - Trevor Beck, President (867)874-4472
- NWT Métis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586

### Contact Information:

- Angela Love 867-766-7456
- Jen Potten 867-766-7468
- Kierney Leach 867-766-7470

De Beers Canada Inc.
## Comment Summary

<table>
<thead>
<tr>
<th>ID</th>
<th>Topic</th>
<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Response</th>
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<tbody>
<tr>
<td>4</td>
<td>General File</td>
<td>Comment (doc) ENR Letter with Comments and Recommendations</td>
<td></td>
<td>Noted.</td>
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<tr>
<td>1</td>
<td>Topic 1: ICRP Deferral</td>
<td>Comment As per the letter to the Board dated August 17th, 2016, DeBeers is requesting to postpone the full Interim Closure and Maintenance Plan update until the Water Licence renewal (the existing Water Licence expires in June 2020). DeBeers notes that as a result of the current care and maintenance phase of the mine, the Interim Closure and Reclamation Plan (ICRP) was updated and approved by the Board twice in 2016 and an update should not be required as currently set out in the Water Licence for January 30, 2017. DeBeers has indicated that the other submissions that were required for January 2017 date, notably an updated RECLAIM Security estimate and a research plan, will be submitted as required. DeBeers states that they will continue to follow the Extended Care and Maintenance Plan that was approved by the Board in June 2016. ENR concurs that an updated RECLAIM security estimate is required at this time due to the length of time since security has been reviewed for the Snap Lake Mine. ENR also concurs that the submission of a reclamation Research Plan should occur at this time as this research will be important in guiding the preparation of revised or final Closure and Reclamation Plan for the</td>
<td>Sep 6: De Beers Canada concurs with this and will reach out to the GNWT for discussions on the RECLAIM estimate prior to submission in January 2017.</td>
<td>Acceptable response.</td>
</tr>
</tbody>
</table>
Snap Lake Mine. However, ENR does not see the need to delay the submission of an ICRP for 3 years. ENR notes that the last version of the ICRP that was approved was Version 3.2 in January 2014. ENR would suggest that additional time could be granted DeBeers to prepare and submit an updated ICRP for Board approval but suggests that one year would be more appropriate. In recent regulatory processes related to closure and reclamation planning, workplans and a working group have been established to discuss and guide the development of the plan. ENR suggests the process also apply to the Snap Lake Mine. In addition, ENR notes that under Part I, Condition 2 of Water Licence MV2011L2-0004, DeBeers is required to submit an Annual Closure and Reclamation Plan Progress Report on April 30 following the year reported. As these reports were not mentioned in the deferral request, ENR assumes that these reports will continue to be submitted annually.

**Recommendation 1)** It is recommended that DeBeers submit a revised RECLAIM Security Estimate and Reclamation Research Plan in January 2017 for regulatory review and Board approval.

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<tr>
<th><strong>2</strong></th>
<th><strong>None</strong></th>
<th><strong>Comment None</strong></th>
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<tbody>
<tr>
<td></td>
<td><strong>Recommendation 2)</strong></td>
<td>DeBeers should be granted an extra year (January 30th, 2018) to prepare an ICRP, and that a working group be established to assist in the development of the goals, objectives and criteria for the ICRP as per similar processes for other mines.</td>
</tr>
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</table>

**Sep 6:** De Beers Canada reminds the GNWT ENR and the MVLWB that the goals and objectives for Snap Lake Mine were approved by the board in 2014 (ICRP V3.2) and that it is only closure criteria that will be provided to the MVLWB and would require additional consultation. De Beers also reminds the
| (e.g. Diavik, Ekati) over the upcoming year. | GNWT ENR that the Snap Lake Working Group is the appropriate forum to discuss closure criteria, in addition to any supplemental discussions between interested parties and stakeholders. The establishment of another working group is unnecessary. As De Beers will get approval for a new research plan in 2017, this will not provide De Beers sufficient time to physically complete the monitoring/activities to aid in the development of closure criteria. While De Beers acknowledges the parties’ concern regarding the timing of a submission, De Beers also reminds all parties that the mine is no longer a producing diamond mine and is in Extended Care and Maintenance. With this Extended Care and Maintenance Plan, De Beers has detailed how all mine areas will be maintained during the period of temporary closure. No future damages are anticipated unless related to progressive reclamation (quarry development etc.). De Beers has requested a three year extension, which will closely resemble a post-closure condition as the underground mine will be flooded. Three years will provide sufficient data to determine trends in the environment and also allow De Beers the time to progress closure research. The Snap Lake Mine had the first ICRP with approved goals and objectives being well }
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<td><strong>Comment (doc)</strong> Comments from SLEMA Recommendation</td>
<td><strong>Sep 6</strong>: De Beers will get approval for a new research plan in 2017, this will not provide De Beers sufficient time to physically complete the monitoring/activities to aid in the development of</td>
<td>Acceptable response.</td>
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Snap Lake Environmental Monitoring Agency - SLEMA: Zhong Liu

- **Sep 6**: De Beers reminds all parties that the mine is no longer a producing diamond mine and is in Extended Care and Maintenance. With this Extended Care and Maintenance Plan, De Beers has detailed how all mine areas will be maintained during the period of temporary closure. No future damages are anticipated unless related to progressive reclamation (quarry development etc.).

- Noted. The Board has decided to extend the submission deadline of the RECLAIM security estimate to January 30, 2018, to coincide with the ICRP submission.
De Beers acknowledges the parties’ concerns regarding the timing of a submission. De Beers also reminds all parties that the mine is no longer a producing diamond mine and is in Extended Care and Maintenance. With the Extended Care and Maintenance Plan, De Beers has detailed how all mine areas will be maintained during the period of temporary closure. No future damages are anticipated unless related to progressive reclamation (quarry development, etc.). De Beers has requested a three-year extension, which will closely resemble a post-closure condition as the underground mine will be flooded. Three years will provide sufficient data to determine trends in the environment and also allow De Beers the time to progress closure research.

The Snap Lake Mine was the first diamond mine with approved closure goals and objectives being well advanced beyond the other projects in the NWT.

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<tr>
<td>1</td>
<td>ICRP Deadline Extension Request</td>
<td>Comment: The YKDFN understands De Beers’ concern over having sufficient time to prepare the ICRP for submission to the Board. De Beers’ staff have communicated the desire to engage community member from the YKDFN (and other parties) so as to ensure that their concerns are properly incorporated into the ICRP. For this reason, the YKDFN is</td>
<td>Sep 6: De Beers will get approval for a new research plan in 2017, this will not provide De Beers sufficient time to physically complete the monitoring/activities to aid in the development of closure criteria. While De Beers acknowledges the parties concern regarding the timing of a submission, De Beers also reminds all</td>
<td>Acceptable response.</td>
</tr>
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willing to support a deadline extension. However, a three year extension is not acceptable to the YKDFN. Three years does not so much reflect an extension as skipping the current ICRP submission entirely. The Nation would like to point out that the current deadline is not a surprise, and De Beers has had ample opportunity to engage with communities regarding how closure and reclamation should proceed. As De Beers has communicated that their primary motivation for seeking an extension is to ensure community input, the Nation would like to reassure De Beers that we support this engagement and that we will endeavour to facilitate the expedient completion of the process.

**Recommendation** The Yellowknives recommend that the Board grant a one extension to De Beers to develop and submit the next draft ICRP.

| | parties that the mine is no longer a producing diamond mine and is in Extended Care and Maintenance. With the Extended Care and Maintenance Plan, De Beers has detailed how all mine areas will be maintained during the period of temporary closure. No future damages are anticipated unless related to progressive reclamation (quarry development etc.). De Beers has requested a three year extension, which will closely resemble a post-closure condition as the underground mine will be flooded. Three years will provide sufficient data to determine trends in the environment and also allow De Beers the time to progress closure research. The Snap Lake Mine was the first diamond mine with approved closure goals and objectives being well advanced beyond the other projects in the NWT. |
Snap Lake Environmental Monitoring Agency  
P.O. Box 95, Yellowknife, NT X1A 2N1  
Phone: 867-765-0961  
Website: www.slema.ca

September 2, 2016

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

Re: De Beers’ Request to Defer the Full ICRP Update  
Water Licence MV2011L2-0004

Dear Ms. Leach,

The Snap Lake Environmental Monitoring Agency (SLEMA) would like to thank the Mackenzie Valley Land and Water Board (MVLWB) for the opportunity to provide comments on De Beers’ Request to Defer the Full Interim Closure and Reclamation Plan (ICRP) Update.

SLEMA understands that De Beers would like to delay the January 2017 submission of the ICRP update to a date prior to the expiry of its water licence on June 13, 2020. In this event, De Beers would have to submit its application for renewal, including the ICRP update, at least a year before the licence expiry. This scenario would mean the planned January 2017 ICRP update would be deferred for two and a half years.

As De Beers stated, permanently closing the Snap Lake Mine is one of the options being considered; by their own admission, the future of the mine is uncertain.

SLEMA also notes that Part I, Item 3 of Water Licence MV2011L2-0004 states

- The Licensee shall, submit to the Board, a minimum of twenty-four (24) months prior to the end of operations, for approval, a Final Closure and Reclamation Plan

Because of the uncertain future of the mine, it is possible that there would not be a Final Closure and Reclamation Plan in place if De Beers decided to close the mine permanently during the Extended Care and Maintenance period. The review of the ICRP is an ongoing process, which allows De Beers to continuously collect input from the impacted communities and other interested parties to refine
its closure objectives, research plan, progressive closure and post-closure monitoring for the final closure and reclamation activities.

While SLEMA understands the preparation of a detailed and well informed ICRP requires time, we do not support a three-year deferral as requested by De Beers as this would leave stakeholders without any detailed closure and reclamation plan should the company decide to close the mine before any updated ICRP is submitted.

However, recognizing the need for more time, SLEMA recommends the MVLWB grant a maximum of one year extension to the original submission date.

If you have any questions or concerns, please feel free to contact the undersigned or Philippe di Pizzo at 867-765-0961 / exec@slema.ca.

Sincerely,

**Original signed by**

Arnold Enge
Chairperson
August 30, 2016

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

Dear Ms. Leach,

Re: DeBeers Canada Inc. – Snap Lake Mine
Water Licence – MV2011L2-0004
Request to Defer the Full Interim Closure and Reclamation Plan
Request for Comments

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the report 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: ICRP Deferral**

**Comment(s):**

As per the letter to the Board dated August 17th, 2016, DeBeers is requesting to postpone the full Interim Closure and Maintenance Plan update until the Water Licence renewal (the existing Water Licence expires in June 2020). DeBeers notes that as a result of the current care and maintenance phase of the mine, the Interim Closure and Reclamation Plan (ICRP) was updated and approved by the Board twice in 2016 and an update should not be required as currently set out in the Water Licence for January 30, 2017. DeBeers has indicated that the other submissions that were required for January 2017 date, notably an updated RECLAIM Security estimate and a research plan, will be submitted as required. DeBeers states that they will continue to follow the Extended Care and Maintenance Plan that was approved by the Board in June 2016.
ENR concurs that an updated RECLAIM security estimate is required at this time due to the length of time since security has been reviewed for the Snap Lake Mine. ENR also concurs that the submission of a reclamation Research Plan should occur at this time as this research will be important in guiding the preparation of revised or final Closure and Reclamation Plan for the Snap Lake Mine.

However, ENR does not see the need to delay the submission of an ICRP for 3 years. ENR notes that the last version of the ICRP that was approved was Version 3.2 in January 2014. ENR would suggest that additional time could be granted DeBeers to prepare and submit an updated ICRP for Board approval but suggests that one year would be more appropriate. In recent regulatory processes related to closure and reclamation planning, workplans and a working group have been established to discuss and guide the development of the plan. ENR suggests the process also apply to the Snap Lake Mine.

In addition, ENR notes that under Part I, Condition 2 of Water Licence MV2011L2-0004, DeBeers is required to submit an Annual Closure and Reclamation Plan Progress Report on April 30 following the year reported. As these reports were not mentioned in the deferral request, ENR assumes that these reports will continue to be submitted annually.

**Recommendation(s):**

1) It is recommended that DeBeers submit a revised RECLAIM Security Estimate and Reclamation Research Plan in January 2017 for regulatory review and Board approval.

2) DeBeers should be granted an extra year (January 30th, 2018) to prepare an ICRP, and that a working group be established to assist in the development of the goals, objectives and criteria for the ICRP as per similar processes for other mines (e.g. Diavik, Ekati) over the upcoming year.

3) It is recommended an updated security estimate should be provided with the next version of the ICRP for Board consideration and approval.

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.

Sincerely,

[Signature]

Patrick Clancy
Environmental Regulatory Analyst
Environmental Impact Assessment Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories
C.2.5 2017 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval. At the request of the MVLWB, updated closure criteria were included in the annual report for stakeholder review and comments. Stakeholder review comments and De Beers’ responses are provided in the MVLWB Staff Report. Additional closure workshops, with focus on current mine status and closure criteria was completed.

The following documentation is included herein as a record of the 2017 activities:

- MVLWB June 22, 2017 Staff Report titled “2016 Annual Closure and Reclamation Plan Progress Report”.
1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) De Beers Canada Inc.’s (De Beers) 2016 Annual Closure and Reclamation Plan Progress Report (Progress Report) required by Part I, item 2 of Water Licence (Licence) MV2011L2-0004.

2. Background

- May 1, 2017 – Progress Report submitted to the Board (attached);
- May 12, 2017 – Progress Report review commenced;
- May 30, 2017 – Closure Workshop;
- June 7, 2017 – Reviewer comments and recommendations due;
- June 15, 2017 – Responses received;
- July 6, 2017 – Progress Report presented to the Board for decision.

3. Discussion

Part I, item 2 of Licence MV2011L2-0004 requires that:

_The Licensee shall submit to the Board, by April 30 of the year following the calendar year reported, an Annual Closure and Reclamation Plan Progress Report. The Report shall be submitted for approval if changes are proposed to the Interim Closure and Reclamation Plan._

De Beers submitted an updated table of proposed closure criteria on page 22 of the 2016 Progress Report. On May 30, 2017, Board staff held a Closure Workshop to facilitate an open discussion between De Beers and reviewers on the proposed closure criteria. The workshop also gave reviewers the opportunity to ask questions and seek clarity before posting comments on the submission to the Online Review System (ORS). Meeting notes from the workshop are attached below.

As directed in the Board’s September 23, 2016 decision letter (attached), De Beers is to submit an updated Interim Closure and Reclamation Plan (ICRP Version 4.0), as well as an updated RECLAIM security estimate by January 30, 2018.
4. Comments
   Not applicable.

5. Reviewer Comments
   By June 7, 2017, comments and recommendations on the Progress Report were received from the following reviewers:
   - Environment and Climate Change Canada (ECCC);
   - Department of Fisheries and Oceans Canada (DFO);
   - Government of the Northwest Territories – Environment and Natural Resources (GNWT-CNR);
   - Snap Lake Environmental Monitoring Agency (SLEMA); and
   - Board staff.

   De Beers responded on June 14, 2017. The Review Summary and Attachments (attached) present the concerns identified through the review of the Progress Report.

   The review comments contain input and recommendations from reviewers on how De Beers can improve their closure criteria in the January 30, 2018 ICRP Version 4.0 submission.

6. Security
   The GNWT currently holds $39,066,247.00 in reclamation security for the Snap Lake Mine for Licence MV2011L2-0004. De Beers is to submit an updated RECLAIM security estimate by January 30, 2018.

7. Conclusion
   Board staff suggest this submission is in conformity with the requirements of Licence MV2011L2-0004 and conclude there are no outstanding issues or concerns with this submission.

8. Recommendation
   Board staff recommend the Board approve the 2016 Annual Closure and Reclamation Plan Progress Report. Board staff recommend the Board remind De Beers that the approval of the Progress Report does not mean that the proposed closure criteria are approved.

9. Attachments
   - 2016 Annual Closure and Reclamation Plan Progress Report
   - September 23, 2016 decision letter
   - May 30, 2017 – Meeting notes
   - Review Summary and Attachments
   - Draft Decision Letter from the Board

   Respectfully submitted,

   Kierney Leach
   Technical Regulatory Specialist
## Review Comment Table

| Item Description: | De Beers Canada Inc. (De Beers) submitted its 2016 Annual Closure and Reclamation Plan Progress Report on May 1, 2017. This report is required by Part I, item 2 of Licence MV201112-0004. Reviewers are invited to submit questions, comments, and recommendations on this submission by **Wednesday June 7, 2017 at 5pm MST**. Please take special note to Appendix 1, which outlines proposed closure criteria to be discussed at the May 30, 2017 Closure Workshop. 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 Application or using the Online Review System, please contact Kierney Bosch at 607-766-7470 or kbosch@mrndo.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) 994-3522 Hay River Métis Council - Trevor Beck, President (867) 834-4472 NWT Métis Nation - Tim Heron, NWTMN IMA Coordinator (867) 872-3586 |
### Comment Summary

<table>
<thead>
<tr>
<th>Environment and Climate Change Canada: Loretta Ransom</th>
<th>Reviewer Comment/Recommendation</th>
<th>Proponent Response</th>
<th>Board Staff Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Comment</td>
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<tr>
<td>1</td>
<td>General File</td>
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<tr>
<td>2</td>
<td>Appendix I - Closure Criteria Closure Objective SW3</td>
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</table>

**Comment:** The approved SW3 closure objective states "surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife." However, the proposed closure criteria only states that "in-lake specific water quality objectives to be proposed at a future date prior to the Final Closure Plan and will meet the requirements of MAVLB and MBWLB." This closure criteria does not include the two main contaminant sources in the closure objective, surface runoff and seepage water quality.

**Recommendation:** Environment and Climate Change Canada recommends the proposed closure criteria be amended to include surface runoff and seepage quality, as well as acknowledging overall surface water quality.

**June 14:** The reviewer's comment is reasonable and De Beers will consider it further within the next version of the ICWP v4.
|   | Appendix I - Closure Criteria Closure Objective UG1/UG2 | Comment The proposed closure criteria for closure objective UG1 and UG2 only acknowledge the process of flooding the mine and does not acknowledge the chemical and physical stability associated with the flooded underground prior to any form of capping. Without a capped underground water from the underground may overtop and enter nearby water bodies. Closure objectives relating to the underground have potential physical stability objectives (ensuring the water from the underground does not spill over) and chemical stability (ensuring that the quality of the water in the underground will not cause environmental impacts), which are not included in the proposed closure criteria. Recommendation Environment and Climate Change Canada recommends the Proponent provide additional details on closure criteria relating to the underground to account for physical and chemical stability issues associated with water in the underground overflowing. | June 14: De Beers does not agree with the reviewers comment that "water from the underground does not spill over" is a physical stability component for the underground. The mine will remain physically stable. For final closure of the underground will be capped as dictated by the Mine Health and Safety Act/Regulations. Should water spill onto surface in the interim, De Beers does agree that management of the underground water must be properly managed. De Beers is of the opinion that if underground water contacts the surface, it would be considered surface water and/or run-off and captured within SW3 objective. | Acceptable response |

|   | Fisheries and Oceans Canada: SALLY WONG |   |   |

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<tr>
<th>ID</th>
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<th>Board Staff Analysis</th>
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<tbody>
<tr>
<td>1</td>
<td>General</td>
<td>Comment DFO has reviewed the Snap Lake 2016 Annual Closure and Reclamation Plan Progress Report in accordance with its mandate and has no comments at this time. Recommendation Not applicable.</td>
<td>June 14: Acknowledged</td>
<td>Noted.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Reviewer Comment/Recommendation</td>
<td>Proponent Response</td>
<td>Board Staff Analysis</td>
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<tr>
<td>10</td>
<td>General File</td>
<td>Comment jdoc: ENR Letter with Comments and Recommendations</td>
<td></td>
<td>Noted.</td>
</tr>
<tr>
<td>1</td>
<td>Topic 1: Buildings</td>
<td>Comment Section 2.1 contains a list of buildings that may be decommissioned in 2017 which notably includes the environment shop and fish cleaning station. It isn’t clear if these buildings will still be required for monitoring requirements included in the Water Licence and Aquatic Effects Monitoring Program or if these buildings will be required during active closure, and in the case of fish cleaning station, for monitoring following initial closure. Recommendation 1] ENR requests that De Beers provide an outline of what the role of these areas was previously and confirm that the environment shop and fish cleaning station are no longer required for monitoring efforts (currently and at closure).</td>
<td>June 14: De Beers will manage its infrastructure to minimize its footprint during Care and Maintenance while still being able to perform all required monitoring. Only obsolete or buildings not required for re-starting the operation will be considered for removal from the mine as a component of progressive reclamation (laydowns, O&amp;M C dorm as examples). Decommissioning for the purpose of the ACRP/R building list, De Beers will be removing all hazardous materials from identified buildings, and securing them for long-term care and maintenance which includes turning off associated power.</td>
<td>Acceptable response.</td>
</tr>
<tr>
<td>2</td>
<td>Topic 2: Sediment Assessment</td>
<td>Comment Section 5.4.2 notes that the sediment assessment for the Water Management Pond and North Pile sumps and ditches (included in the appendices) will be used to support the selection of an appropriate closure method and criteria for these areas. Timelines associated with these steps are not clear. As well, the section is titled “Disposal of Contaminated Soils and Sediments”. As the final closure method of</td>
<td>June 14: The timing for development of the closure methods will be included in the next version of the ICRP v4. The water management structures (umps, ditches, and water management pond), and any sediments within, are considered within the infrastructure objectives category, specifically 13. Proposed criteria for 13 were included in the 2018 ACRP/R, and based on reviewer feedback, revised.</td>
<td>Acceptable response.</td>
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<td></td>
<td></td>
<td>These areas is unknown, a more appropriate title may be “Management and Final Closure of Contaminated Soils and Sediments”. <strong>Recommendation 1</strong> ENR requests additional information from De Beers on timelines associated with the development of appropriate closure methods and criteria for the Water Management Pond and North Pile sumps and ditches.</td>
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<tr>
<td>3</td>
<td>None</td>
<td>Criteria will be considered in the next version of the ICRP v4.</td>
<td></td>
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<tr>
<td>4</td>
<td>Topic 3: Securities</td>
<td><strong>Comment</strong> The report notes that no change in security is being sought by De Beers at this time. An updated security estimate will be provided in conjunction with the finalization of the ICRP v.4 in January 2018. <strong>Recommendation 1</strong> ENR is very interested in updating the financial security for the mine site and has requested a review of it. ENR looks forward to reviewing security and understands, as per the Board’s decision, this will occur with the proposed update to the Interim Closure and Reclamation Plan (ICRP) expected in early 2018.</td>
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</table>

June 14: De Beers notes ENR's recommendation and in the future will include a section titled "Management of Contaminated Soils and Sediments". Acceptable response.

June 14: As required, De Beers will submit an updated financial security estimate to the Board by January 30, 2018. Acceptable response.
| 5 | Topic 4: Interim Closure and Reclamation Plan | Comment | Section 9 outlines revisions that will be made to the ICRP in January 2018. ENR will provide detailed comments on any ICRP revisions during that time. Recommendation | None |
| 6 | Topic 5: Closure Criteria SW3 | Comment | Approved closure objective SW3 is stated as follows: “Surface runoff and seepage quality that is safe for people, vegetation, aquatic life and wildlife.” However, the proposed closure criteria related to SW3 for chemical stability is limited solely to water quality objectives in Snap Lake. While protection of the aquatic habitat in Snap Lake is important, ENR notes that the closure objective is related specifically to “surface runoff and seepage quality” and as such criteria should be established for those immediate areas of the site and not the receiving body. ENR has previously, and once again, raised concern over the reliance on the term “safe” in closure objectives and criteria as the term is too vague to describe the degree of remediation (i.e., human health risk assessments vs. protection of aquatic life or aquatic ecosystem protection - which will factor in a degree of chronic toxicity). Recommendation | ENR recommends that the closure criteria for SW3 under ‘chemical stability’ be included to include water quality for surface runoff and seepage water quality at the site. | June 14: The reviewer’s comment is reasonable and De Beers will consider it further within the next version of the ICRP. | Acceptable response. |

June 14: Acknowledged

Noted.
<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Comment None</th>
<th>Recommendation 2</th>
<th>ENR recommends that the closure objectives related to “safe” be changed to dictate what the level of safety is the objective (prevent chronic toxicity to aquatic biota, align with aesthetic environmental guidelines, align with human health guidelines, etc.).</th>
<th>June 14: The closure objectives have been approved by the MVLWB and a change to the wording is not considered necessary. The level of safety is addressed in the selection of the closure criteria.</th>
<th>Acceptable response.</th>
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<tr>
<td>8</td>
<td>Topic 6: Closure Criteria I3</td>
<td>Comment based on discussion at the technical workshop on May 30th, it is ENR’s understanding that the sediments currently being assessed in the Water Management Pond, as well as ditches and sumps on site, will be included in under this category (I3) as well. It isn’t clear as to the criteria that will be applied to these areas and whether these areas will remain submerged.</td>
<td>Recommendation 1</td>
<td>ENR requests that De Beers confirm that sediments on-site will be included under closure objective I3 related to contaminated soils and waste disposals.</td>
<td>June 14: The water management structures (sumps, ditches, and water management pond), and any sediments within, are considered within the infrastructure objectives category, specifically I3. Proposed criteria for I3 were included in the 2016 ACRRPR, and based on reviewer feedback, revised criteria will be considered in the next version of the ICIP_v4.</td>
<td>Acceptable response.</td>
</tr>
<tr>
<td>9</td>
<td>None</td>
<td>Comment None</td>
<td>Recommendation 2</td>
<td>ENR requests that De Beers clarify the criteria that will be applied to these areas and whether they will be submerged in water, exposed and/or covered.</td>
<td>June 14: Section 5.2.5.3 of the ICIP_v3 contains a description of the closure activities associated with the sumps and water management pond. ICIP_v3 states these areas will be covered with non-PAS rock. No controls are in place to allow or prevent water to/from the sump; thus, these structures may have ponding water depending on climate conditions. The closure activities will be updated in the next version of the ICIP_v4 to account for the research completed on the sediments.</td>
<td>Acceptable response.</td>
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<td>ID</td>
<td>Topic</td>
<td>Reviewer Comment/Recommendation</td>
<td>Proponent Response</td>
<td>Board Staff Analysis</td>
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<tr>
<td>1</td>
<td>Section 2.1 - Closure time variances</td>
<td><strong>Comment</strong> In this section, it states that the length of temporary closure “may be up to 3 years or more dependent on market conditions” at which time one of the options for De Beers in final closure of the Snap Lake Mine.</td>
<td><strong>Proponent Response</strong> June 14: De Beers as it evaluates the asset will ensure that all research is complete prior to mine closure. Should final closure be considered, a complete final reclamation plan will be provided to the Board as dictated by the licence.</td>
<td><strong>Board Staff Analysis</strong> Noted.</td>
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<td>2</td>
<td>Section 4, Table 5: Summary of progressive reclamation activities</td>
<td><strong>Comment</strong> This section states that the design of a rock cover for the Starter Cell of the North Pile commenced in 2013 and was advanced to the 50% design stage in 2014.</td>
<td><strong>Proponent Response</strong> June 14: In 2014, De Beers sought approval to complete a raise of the Starter Cell and therefore a final cover design was deferred to a later date to accommodate the longer operation of the Starter Cell. To date, the Starter Cell has not reached its PK disposal capacity. De Beers requires flexibility in their operation of the mine and timing for completion of research. In this case there was a contemplated change in design and operation of the North Pile that resulted in a deferral of a planned research activity. An updated RRP will be presented in the next version of the ICRP. However it is up to De Beers on what research to carry out. As the licensee De</td>
<td><strong>Board Staff Analysis</strong> Noted.</td>
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</table>
|   | Section 8. Closure planning timelines | **Comment** In this section, it states that “engagement with stakeholders as well as technical and economic evaluations in 2017 will continue to optimize extended care and maintenance activities.”
**Recommendation** Please describe or give examples of how De Beers will “optimize extended care and maintenance activities” and why these activities should take precedence over reclamation research including engagement. This is especially important to understand given the number of proposed closure criteria that rely on additional engagement and acquiring TK (e.g., SW1, SW4, SW5, 13).
   | Beers will ensure that prior to final closure all designs are finalized. |
|---|---|---|
| 3 | | June 14: As described in the approved Snap Lake Mine Care and Maintenance Plan, De Beers will complete technical and economic evaluations of the care and maintenance activities for an extended period to ensure viable options remain for the mine. This included an assessment of partially and fully flooding the underground mine. De Beers does not agree with the reviewer’s comments that care and maintenance activities take precedence over reclamation research or engagement. De Beers will ensure that the mine is managed consistent with the licence, and optimization of care and maintenance will be conducted in conjunction with reclamation research. Appendix 1 of the ACMP2R includes a description of the future research and engagement that is needed to support the selection of closure criteria. An updated RMP will be presented in the next version of the ICIP. |
|   | | Noted. |
| 4 | Closure Criteria - SW3 | **Comment** The criteria for chemical stability states that “in-lake specific water quality objectives to be proposed at a future date prior to Final Closure Plan”.
**Recommendation** As discussed at the workshop, there is no reason to wait prior to developing in-lake SSWQOs for Snap Lake. In most cases, the Board has already assigned |
|   |   | June 14: Acknowledged. De Beers will consider this further in the next version of the ICIP v4. |
|   |   | Acceptable response. |
SSWOO for Snap Lake In the Reasons for Decision for the last several water licence proceedings. Again as discussed at the workshop, De Beers should be working on performing the modelling necessary to calculate what seepage quality will be necessary to meet SSWOOs for Snap Lake at closure.

5 Closure Criteria - SWS

**Comment**: The criteria for future use and Aesthetics states that revegetation targets will be defined through research.

**Recommendation**: When will De Beers finalize the revegetation targets?

**June 14**: Appendix 1 of the ACRPRP states that "Targets will be defined through research and proposed prior to final closure plan as a component of the revegetation closure criteria document."

### Snap Lake Environmental Monitoring Agency - SLEMA, Zhong Liu

<table>
<thead>
<tr>
<th>ID</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>Section 2.1, pages 4 to 5, non-essential buildings</td>
<td>Comment: A list of select non-essential buildings to be decommissioned is provided, but no figures showing the buildings' location are presented. <strong>Recommendation</strong>: It will be helpful to provide figures of buildings' location for reviewers to understand the decommissioning schedule.</td>
<td></td>
<td>Acceptable response.</td>
</tr>
<tr>
<td>3</td>
<td>Section 2.1, page 5, decommissioning vs. removal</td>
<td>Comment: It is noticed that process complex is listed as non-essential building. It is also stated that &quot;removal of non-essential buildings is a typical progressive reclamation activity&quot;. Will the process complex be put to sleep or removed from the Mine? &quot;Removal&quot;</td>
<td></td>
<td>Acceptable response.</td>
</tr>
</tbody>
</table>
Is used interchangeably as "Decommissioning" in the report. However, there appear to be different ways of disposing of buildings for decommissioning, as described in the Snap Lake Mine 2017 Community Update (page 4), "(Non-)essential infrastructure and services will be secured and "put to sleep" or modified to conserve energy and maintenance requirements. Any infrastructure that will deteriorate over time will be removed from the Mine."

Recommendation For the list of non-essential buildings, it will be helpful to clarify what will be secured and put to sleep, what will be modified to conserve energy and maintenance requirements, and what else will be removed from the Mine. It will be even better to visualize them as De Beers did for the Snap Lake Mine Closure Sequence in the Snap Lake Mine 2017 Community Update (pages 35 to 50).

4 Appendix I, Closure Criteria, page 21, in general


June 14: Acknowledged. De Beers thanks SLEMA for this recommendation.

Acceptable response.
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>The review approach SEC adopted and some specific comments SEC made, in SLMA's opinion, may also apply to the review of the Snap Lake Mine's closure criteria. It is recommended that De Beers take efforts to answer the following review questions while refining the closure criteria for the coming ICIP Update due in January 2018: 1. Effective indicators: For each objective, do the criteria rely on indicators that are relevant for evaluating the desired outcome, and are these indicators to address all important facets of the desired outcome? 2. Measurable: Is the performance of indicators measurable, and can results be verified independently? 3. Thresholds: Do the criteria for each objective establish thresholds that define acceptable performance conditions for the closure objective and its associated valued components? 4. Timely Response: Will monitoring of performance with respect to closure criteria allow for timely response to any failure to achieve closure objectives?</th>
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<tbody>
<tr>
<td>5</td>
<td>Appendix 1, Closure Criteria</td>
<td>Comment Physical Stability Criteria for Site Wide (SW) Objectives 2 and 4, North Pile (NP) Objectives 1 and 2, Underground (UG) Objectives, and Infrastructure (I) Objectives 2 and 3 are related to design, construction or inspection by a professional engineer. Chemical Stability Criterion for SW1 and Physical Stability Criterion 12 refer to the post-closure wildlife risk assessment by a qualified person. These proposed criteria are June 14: Acknowledged. De Beers will consider this further in the next version of the ICIP v4. Acceptable response.</td>
</tr>
<tr>
<td>Comment</td>
<td>June 14: Acknowledged. De Beers will consider this further in the next version of the ICIP v4.</td>
<td>Acceptable response.</td>
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<td>Chemical stability criterion for SW3 is said to be proposed at a future date. However, the site-specific objectives for intake water quality were well discussed during the Water License Amendment Application Process (Dec 2013 and Nov 2014).</td>
<td>Acceptable response.</td>
<td></td>
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<tr>
<td>Environmental site assessment is referred to for 11, but no specific criteria are proposed.</td>
<td>Acceptable response.</td>
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</table>

**Appendix I, Closure Criteria, page 23**
June 7, 2017

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

Dear Ms. Potten,

Re: DeBeers – Snap Lake
Water Licence – MV2011L2-0004
2016 Annual Closure & Reclamation Plan Progress Report
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the report 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: Buildings**

**Comment(s):**

Section 2.1 contains a list of buildings that may be decommissioned in 2017 which notably includes the environment shop and fish cleaning station. It isn’t clear if these buildings will still be required for monitoring requirements included in the Water Licence and Aquatic Effects Monitoring Program or if these buildings will be required during active closure, and in the case of fish cleaning station, for monitoring following initial closure.

**Recommendation(s):**

1) ENR requests that De Beers provide an outline of what the role of these areas was previously and confirm that the environment shop and fish cleaning station are no longer required for monitoring efforts (currently and at closure).
Topic 2: Sediment Assessment

Comment(s):

Section 5.4.2 notes that the sediment assessment for the Water Management Pond and North File sumps and ditches (included in the appendices) will be used to support the selection of an appropriate closure method and criteria for these areas. Timelines associated with these next steps are not clear.

As well, the section is titled “Disposal of Contaminated Soils and Sediments”. As the final closure method of these areas is unknown, a more appropriate title may be “Management and Final Closure of Contaminated Soils and Sediments”.

Recommendation(s):

1) ENR requests additional information from De Beers on timelines associated with the development of appropriate closure methods and criteria for the Water Management Pond and North File sumps and ditches.

2) ENR recommends that De Beers consider alternate naming for sections related to the management of contaminated soils and sediments in the Progress Report.

Topic 3: Securities

Comment(s):

The report notes that no change in security is being sought by De Beers at this time. An updated security estimate will be provided in conjunction with the finalization of the ICRP v.4 in January 2018.

Recommendation(s):

1) ENR is very interested in updating the financial security for the mine site and has requested reviews previously. ENR looks forward to reviewing security and understands, as per the Board’s decision, this will occur with the proposed update to the Interim Closure and Reclamation Plan (ICRP) expected in early 2018.
Topic 4: Interim Closure and Reclamation Plan

Comment(s):

Section 9 outlines revisions that will be made to the ICRP in January 2018. ENR will provide detailed comments on any ICRP revisions during that time.

Recommendation(s):

None

Topic 5: Closure Criteria – SW3

Comment(s):

Approved closure objective SW3 is stated as follows:

"Surface runoff and seepage quality that is safe for people, vegetation, aquatic life and wildlife"

However, the proposed closure criteria related to SW3 for chemical stability is limited solely to water quality objectives in Snap Lake. While protection of the aquatic habitat in Snap Lake is important, ENR notes that the closure objective is related specifically to "surface runoff and seepage quality" and as such criteria should be established for those immediate areas of the site and not the receiving body.

ENR has previously, and once again, raises concern over the reliance on the term "safe" in closure objectives and criteria as the term is too vague to describe the degree of remediation (i.e. human health risk assessments vs. protection of aquatic life or aquatic ecosystem protection – which will factor in a degree of chronic toxicity).

Recommendation(s):

1) ENR recommends that the closure criteria for SW3 under “chemical stability” be included to include water quality for surface runoff and seepage water quality at the site.

2) ENR recommends that Closure Objectives related to “safe” be changed to dictate what the level of safety is the objective (prevent chronic toxicity to aquatic biota, align with aesthetic environmental guidelines, align with human health guidelines, etc.).
Topic 6: Closure Criteria – I3

Comment(s):

Based on discussion at the technical workshop on May 30th, it is ENR’s understanding that the sediments currently being assessed in the Water Management Pond, as well as ditches and sumps on site, will be included in under this category (I3) as well. It isn’t clear as to the criteria that will be applied to these areas and whether these areas will remain submerged.

Recommendation(s):

1) ENR requests that De Beers confirm that sediments on-site will be included under closure objective I3 related to contaminated soils and waste disposals.

2) ENR requests that De Beers clarify the criteria that will be applied to these areas and whether they will be submerged in water, exposed and/or covered.

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 Assessment and Monitoring 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.

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
Environment and Climate Change Canada
Environnement et Changement climatique Canada

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

June 7, 2017

ECCC File: 5100 000 034/004
MVLWB File: MV2011L2-0004

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

Via online review system

RE: MV2011L2-0004 – De Beers Canada Inc. – Snap Lake Mine – Annual Closure and Reclamation Plan Progress Report

Attention: Angela Love

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board regarding the above-mentioned report and is providing comments via the online review system as requested. 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) 668-4744 or loreta.ransom@canada.ca.

Sincerely,

Loretta Ransom
Senior Environmental Assessment Coordinator

Attachment(s): ECCC Comments Excel Sheet

CC: Georgina Williston, Head, Environmental Assessment North (NT and NU)
ECCC Review Team

www.ec.gc.ca
Snap Lake Environmental Monitoring Agency
Main Floor, Lahm Ridge Tower
4501 Franklin Avenue
P.O. Box 95, Yellowknife, NT X1A 2N1
Phone: 867-765-0961 FAX: 867-765-0963
Website: www.slema.ca

Kierney Leach
Technical Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O.Box 2130
Yellowknife, NT X1A 2P6

File: Water Licence MV2011L2-0004

Jun 7, 2017

RE: 2016 Annual Closure and Reclamation Plan Progress Report

Dear Ms. Leach,

Snap Lake Environmental Monitoring Agency (SLEMA) has reviewed the 2016 Annual Closure and Reclamation Plan Progress Report. 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
INTRODUCTION
SNAP LAKE MINE

- De Beers Canada Snap Lake Mine remains in suspended operations. During this period we will continue to evaluate options for:
  - Optimization of Extended Care and Maintenance;
  - Sale to a Qualified Operator; and,
  - Closing the mine.

- In 2016 De Beers went through a Sales Process, upon conclusion the decision was made to close the underground workings allowing them to flood. This limits our mine water discharge to freshet volumes reducing impacts on the environment.

- All mine infrastructure that could have contaminated the environment (mobile equipment and hydrocarbons as examples) was then removed from the underground and the workings were allowed to flood (February 2017). De Beers worked closely with the GNWT inspectors to ensure that closure commitments were achieved.

- As of May 2018 the mine water levels reached equilibrium with Snap Lake.

CARE AND MAINTENANCE

- Care and Maintenance (suspension of operations) means that mining operations have ceased.

- The length of Care and Maintenance may be 3 years or more, dependent on economic conditions and technological improvements.

- In this period De Beers will make the mine safe for humans, wildlife and the environment, while maintaining mine infrastructure.

- Wherever possible, De Beers will explore the use of remote monitoring and technology to supplement on-site activities.

- Snap Lake will always have the ability to resume operations in the future when economic conditions improve.
EXTENDED CARE AND MAINTENANCE

- Priority is centered on protection and health and safety of human occupants, wildlife and the environment
- All environmental monitoring required by licence, permit or environmental agreement will continue until otherwise approved
- Non-essential infrastructure and services will be secured and “put to sleep” or modified to conserve energy and maintenance requirements. Any infrastructure that will deteriorate over time will be removed from the Mine.
- Water management and treatment capacity are being evaluated to mitigate seasonal flows with options on cover and sump management.

Future MVLWB Submissions

De Beers will continue with regulatory processes that accommodate the status of the project and the potential re-evaluations of mine operations. These main processes include:
- A Land Use Permit Application in 2017 (~September 2016)
- A Water License Renewal for 2020
INTERIM CLOSURE AND RECLAMATION PLAN

- In 2018 De Beers Snap Lake Mine is required to provide the MVLWB an updated Interim Closure and Reclamation Plan and Security Estimate.

- With this update De Beers is required to develop reclamation criteria that will satisfy the objectives approved in 2013 for the Snap Lake Mine by the MVLWB.
OBJECTIVE CATEGORIES AND THEIR MAJOR MINE COMPONENTS

Site Wide (SW):

- Includes everything on site

North Pile (NP):

- Entire structure of the North Pile
  - Water management structures are an infrastructure component

Underground Mine (UG):

- All aspects of the underground mine that are below ground.
  - Vent and portal openings are an infrastructure component

Infrastructure (I):

- Airstrip
- Roads
- Water management structures (sumps, ditches, and water management pond)
- Water treatment plant
- Buildings
- Sewage treatment plant
- Processing facilities
- Rock pads
- Laydown areas
- Exploration pits
- Vent and portal structures at surface
- Quarry
- Diffuser and related piping
CLOSURE OBJECTIVE AND CRITERIA
SITE WIDE (SW)

Objective

- **SW1** - Dust levels safe for people, vegetation, aquatic life and wildlife.
- **SW2** - Drainage pathways for surface runoff are physically stable.
- **SW3** - Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife.
- **SW4** - Mine areas are physically stable and safe for use by people and wildlife.
- **SW5** - Landscape features (shape and vegetation) match aesthetics of the surrounding natural area.
- **SW6** - Safe passage and use for Caribou and other wildlife.
- **SW7** - Re-vegetation targeted to priority areas.

Criteria

1. **Physical Stability**
   
   Not applicable this is a chemical objective.

2. **Chemical Stability**
   
   - Ambient air quality shall not exceed the NWTAQGs.
   - Dustfall shall not exceed the AAAQG.
   - Satisfactory results of post-closure wildlife risk assessment completed by a qualified person.
   
   Aquatic life addressed within SW3.

3. **Future Use and Aesthetics**

   De Beers seeks Traditional Knowledge to understand whether the chemical objective will achieve the desired future use and aesthetics post closure.
CLOSURE OBJECTIVES AND CRITERIA

SITE WIDE (SW)

Objective

SW1 - Dust levels safe for people, vegetation, aquatic life and wildlife.

Criteria

1. Physical Stability
   Acceptable results of visual monitoring for deformation and degradation completed as part of site geotechnical inspections completed by a professional engineer.

2. Chemical Stability
   Not applicable as this is a physical objective.

3. Future Use and Aesthetics
   This is a physical objective that will be dictated by best engineering practices/design, input is required on any Traditional Knowledge that would be applicable in the final design.

SW2 - Drainage pathways for surface runoff are physically stable.

SW3 - Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife.

SW4 - Mine areas are physically stable and safe for use by people and wildlife.

SW5 - Landscape features (shape and vegetation) match aesthetics of the surrounding natural area.

SW6 - Safe passage and use for Caribou and other wildlife.

SW7 - Re-vegetation targeted to priority areas.

Objective

SW1 - Dust levels safe for people, vegetation, aquatic life and wildlife.

Criteria

1. Physical Stability
   Not applicable – This is a chemical objective. Physical stability criteria is provided in NP1.

2. Chemical Stability
   In-lake site specific water quality objectives to be proposed at a future date prior to Final Closure Plan and will meet requirements of MVEIRB and the MLWMB.

3. Future Use and Aesthetics
   As per EA 1.314.02 Measure 1 parts a through c. De Beers will satisfy water quality objectives so that:
   a) The aquatic ecosystem is protected so that fish populations and fish species composition are not adversely affected compared to pre-mining conditions.
   b) Water in Snap Lake is safe to drink according to the health-based standards of Health Canada’s Guidelines for Canadian Drinking Water Quality (August 2012 edition).
   c) Fish are safe to eat in Snap Lake.
CLOSURE OBJECTIVES AND CRITERIA
SITE WIDE (SW)

Objective
SW1 - Dust levels safe for people, vegetation, aquatic life and wildlife.
SW2 - Drainage pathways for surface runoff are physically stable.
SW3 - Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife.
SW4 - Mine areas are physically stable and safe for use by people and wildlife.
SW5 - Landscape features (shape and vegetation) match aesthetics of the surrounding natural area.
SW6 - Safe passage and use for Caribou and other wildlife.
SW7 - Re-vegetation targeted to priority areas.

Criteria

1. Physical Stability
Acceptable results of visual monitoring for deformation and degradation completed as part of site geotechnical inspections completed by a professional engineer. Satisfactory results of post-closure wildlife risk assessment completed by a qualified person.

2. Chemical Stability
Not applicable this is a physical objective.

3. Future Use and Aesthetics
This is a physical objective that will be dictated by best engineering design. Input is required on any Traditional Knowledge that would be applicable in the final design. However De Beers notes that it has received community and Traditional Knowledge on this topic since the earliest days of the Snap Lake Project (2002, EA, Water Licence process, community engagements as examples) but will be re-confirmed in 2017.

SW5 - Landscape features (shape and vegetation) match aesthetics of the surrounding natural area.
CLOSURE OBJECTIVES AND CRITERIA
SITE WIDE (SW)

Objective

SW1 - Dust levels safe for people, vegetation, aquatic life and wildlife.
SW2 - Drainage pathways for surface runoff are physically stable.
SW3 - Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife.
SW4 - Mine areas are physically stable and safe for use by people and wildlife.
SW5 - Landscape features (shape and vegetation) match aesthetics of the surrounding natural area.
SW6 - Safe passage and use for Caribou and other wildlife.
SW7 - Re-vegetation targeted to priority areas.

Criteria

1. Physical Stability
Satisfactory results of post-closure wildlife risk assessment completed by a qualified person.

2. Chemical Stability
Not applicable as objective is related to passage; however chemical stability will be assessed by comparison of site conditions to closure criteria for environmental media (soil, water, etc.) that are covered under separate objectives.

3. Future Use and Aesthetics
Traditional Knowledge required. Need to avoid landscape features that likely increase the threat of predation or harm for caribou.
NEXT STEPS
SITE WIDE (SW)

FUTURE RESEARCH
- Engineering analysis to inform surface water management and North Pile cover design
- Care and Maintenance monitoring to inform minimum effluent quality criteria to ensure runoff and seepage is safe
- Revegetation research to define priority areas and post-closure plant types and coverage

TRADITIONAL KNOWLEDGE QUESTIONS
- Will physical and chemical criteria support the desired future use and aesthetics conditions post-closure?
- What is the desired future use (types of activities at site in the future)?
- What amount of time land users would stay at site post-closure?
- What time of year land users would visit site post-closure (overwinter travel, caribou migration as examples)?
- What plant types and areas are important to be safe for wildlife?
- How to ensure long term physical stability of mine areas and drainage pathways?
- What landscape features to avoid that increase threat of predation or harm to wildlife?
- What are the priority areas for revegetation?
- Confirmation on the definition of safe:
  Not Likely to cause harm or injury.
  Example: Air quality that is not likely to cause harm or injury to people, vegetation, aquatic life or wildlife.

CLOSURE OBJECTIVE AND CRITERIA
NORTH PILE (NP)
### CLOSURE OBJECTIVES AND CRITERIA

#### NORTH PILE (NP)

**Objective**

NP1 – Prevent PK from entering the surrounding terrestrial and aquatic environment.

NP2 – Physically stable PK containment area to limit risk of failure that would affect safety of people or wildlife.

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Physical Stability</strong></td>
</tr>
<tr>
<td>a) Satisfactory performance monitoring of North Pile embankments throughout the facility's operation and, as determined by a professional engineer.</td>
</tr>
<tr>
<td>b) Completed North Pile rock cover design by a professional engineer.</td>
</tr>
<tr>
<td>c) Construction of the North Pile rock cover in accordance with the designs and QAQC procedures. Construction is documented in a summary as built report completed by a professional engineer.</td>
</tr>
<tr>
<td>d) Post closure geotechnical monitoring results and inspections by a professional engineer indicate the North Pile embankments and cover are performing as per design.</td>
</tr>
</tbody>
</table>

**2. Chemical Stability**

This is a physical objective to prevent the release of PK into the environment. The cover design will be linked to SW3.

**3. Future Use and Aesthetic**

De Beers requires input on the future use of the North Pile. This Processed Kimberlite facility must remain physically stable over time. Traditional Knowledge on how to ensure long term stability is appreciated and will be incorporated into the pre-feasibility and feasibility designs where appropriate in the future.
NEXT STEPS
NORTH PILE (NP)

FUTURE RESEARCH
• Engineering and alternatives analysis to inform North Pile cover design and post-closure runoff and seepage water management.

TRADITIONAL KNOWLEDGE QUESTIONS
• What is the desired future use (types of activities at site in the future)?
• What amount of time land users would stay at site post-closure?
• What time of year land users would visit site post-closure (overwinter travel, caribou migration as examples)?
• What are the recommended methods to achieve long-term stability of the North Pile?

CLOSURE OBJECTIVE AND CRITERIA
UNDERGROUND (UG)

Approximate extent of underground Mine
Incline Conveyor
Ramp Access
## CLOSURE OBJECTIVES AND CRITERIA

### UNDERGROUND (UG)

**Objective**

- **UG1** – Flooding of the underground mine will have no impacts to aquatic habitat and community in source lakes.
- **UG2** – Underground mine should not contribute to the contamination of ground or surface water.
- **UG3** – Underground mine workings are physically stable.

**Criteria**

1. **Physical Stability**
   
   This is not a physical stability objective.

2. **Chemical Stability**

   This is not a chemical stability objective – refer to UG2.

3. **Future Use and Aesthetics**

   This objective will be achieved through successful implementation of SW3.
CLOSURE OBJECTIVES AND CRITERIA  
UNDERGROUND (UG)

Objective
UG1 – Flooding of the underground mine will have no impacts to aquatic habitat and community in source lakes.
UG2 – Underground mine should not contribute to the contamination of ground or surface water.
UG3 – Underground mine workings are physically stable.

Criteria
1. Physical Stability
The Mine, prior to flooding, will be physically stable in accordance with the WSCC NWT’s Mines Act requirements. All Mine openings to surface will be designed and inspected in accordance with NWT Mines Act and associated regulations and will be constructed and inspected by a professional engineer.

2. Chemical Stability
Refer to UG2, this is a physical stability closure objective.

3. Future Use and Aesthetics
This is a physical stability objective that must meet specific requirements outlined in the Mines Act and associated regulations.

NEXT STEPS  
UNDERGROUND (UG)

FUTURE RESEARCH
- Care and Maintenance monitoring of flooded conditions to inform post closure surface water quality
- Ongoing monitoring of water levels, aquatic habitat and community in Snap Lake (and reference lakes)

TRADITIONAL KNOWLEDGE QUESTIONS
- Questions are addressed within the Site Wide category
CLOSURE OBJECTIVE AND CRITERIA
INFRASTRUCTURE (I)

Objective

1. Prevent remaining infrastructure from contaminating land or water.
2. On-site disposal areas are safe for people, wildlife, and vegetation.
3. Contaminated soils and waste disposal areas that cannot contaminate land and water.

Criteria

1. Physical Stability
   See 2 for on-site disposal areas.

2. Chemical Stability
   Following the completion of an Environmental Site Assessment all potentially hazardous materials will be removed off-site to an approved disposal facility.

3. Future Use and Aesthetics
   All hazardous materials will be removed from the Mine satisfying the requirements as defined by stakeholders.
CLOSURE OBJECTIVES AND CRITERIA

INFRASTRUCTURE (I)

Objective

I1 - Prevent remaining infrastructure from contaminating land or water.

I2 - On-site disposal areas are safe for people, wildlife, and vegetation.

I3 - Contaminated soils and waste disposal areas that cannot contaminate land and water.

Criteria

1. Physical Stability
   Any on-site disposal area (i.e. North Pile Landfills) will be designed, constructed by a professional engineer. Acceptable results of visual monitoring for deformation and degradation completed as part of site geotechnical inspections completed by a professional engineer. Satisfactory results of post-closure wildlife risk assessment completed by a qualified person.

2. Chemical Stability
   This is a physical stability objective. All hazardous waste will have been removed from the mine as identified in objectives I1 and I3.

3. Future Use and Aesthetics
   De Beers proposes the definition of safe: Safe is generally defined as "not likely to cause harm or injury".

CLOSURE OBJECTIVES AND CRITERIA

INFRASTRUCTURE (I)

Objective

I1 - Prevent remaining infrastructure from contaminating land or water.

I2 - On-site disposal areas are safe for people, wildlife, and vegetation.

I3 - Contaminated soils and waste disposal areas that cannot contaminate land and water.

Criteria

1. Physical Stability
   This is not a physical stability objective.

2. Chemical Stability
   Contaminated soil areas at the Mine are remediated in accordance with the GNWT Environmental Guideline for Contaminated Site Remediation and to the satisfaction of a professional engineer or geoscientist. Specific remedial criteria will be proposed following the completion of an Environmental Site Assessment and provided as a component of a Final Closure Reclamation Plan. If contaminants are identified remedial criteria will be proposed in the Final Closure Reclamation Plan.

3. Future Use and Aesthetics
   A site-wide Environmental Site Assessment will be completed, followed by execution of a Remedial Action Plan in accordance with GNWT guidelines.
NEXT STEPS

INFRASTRUCTURE (I)

FUTURE RESEARCH

- Environmental Site Assessment to inform areas for remedial action

TRADITIONAL KNOWLEDGE QUESTIONS

- What is the desired future use (types of activities at site in the future)?
- What amount of time land users would stay at site post-closure?
- What time of year land users would visit site post-closure (e.g., winter travel, caribou migration as examples)?

CLOSING

De Beers’ priority for Extended Care and Maintenance is to ensure the health and safety of humans, wildlife and the environment. The length of suspension of Snap Lake Mine may be 3 years or more, dependent on market conditions. As part of the on-going evaluation De Beers will continue to explore the options for:

- Further optimization of extended care and maintenance activities (i.e. Passive Water Treatment);
- Sale to a Qualified Third Party Buyer; or
- Final Closure of the Snap Lake Mine.

De Beers will continue to work closely with our stakeholders during this period to allow sufficient time to evaluate economic options and conditions for Snap Lake Mine.
ANY QUESTIONS

Appendix – Snap Lake Mine Closure Sequence
These meeting notes attempt to provide a general summary of the meeting. Ideas expressed by participants are paraphrased and summarized; they are not reproduced verbatim.

**Date and Location:**
May 30, 2017 – 8:30 a.m. to 12:15 p.m.
Mackenzie Valley Environmental Impact Review Board Room
(2nd Floor, Scotia Centre)
5102 50th Ave Suite 200

**Attendees:**

<table>
<thead>
<tr>
<th>Alex Power</th>
<th>YKDFN</th>
<th>Kierney Leach</th>
<th>MVLWB</th>
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<tbody>
<tr>
<td>Randy Freeman</td>
<td>YKDFN (teleconference)</td>
<td>Angela Love</td>
<td>MVLWB</td>
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<td>Rick Walbourne</td>
<td>GNWT-ENR</td>
<td>Shelagh Montgomery</td>
<td>MVLWB</td>
</tr>
<tr>
<td>Monica Wendt</td>
<td>GNWT-ENR</td>
<td>Kathy Racher</td>
<td>MVLWB</td>
</tr>
<tr>
<td>Zhong Liu</td>
<td>SMEA</td>
<td>Lorne Napier</td>
<td>MVLWB</td>
</tr>
<tr>
<td>Philippe di Pizzo</td>
<td>SMEA</td>
<td>Sean Whitaker</td>
<td>De Beers</td>
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<tr>
<td>Melissa Pinto</td>
<td>ECCC</td>
<td>Sarah McLean</td>
<td>De Beers</td>
</tr>
<tr>
<td>Meagan Tobin</td>
<td>ECCC (teleconference)</td>
<td>Alexandra Hood</td>
<td>De Beers</td>
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<tr>
<td>Reg Ejekam</td>
<td>ECCC (teleconference)</td>
<td>Andrew Williams</td>
<td>De Beers</td>
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<tr>
<td>Shawn MacKay</td>
<td>FRMC</td>
<td>Shawn Taylor</td>
<td>De Beers</td>
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<tr>
<td>Arthur Beck</td>
<td>FRMC</td>
<td>Jamie Van Gulck</td>
<td>ARKTIS</td>
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<td>Sally Wong</td>
<td>DFO</td>
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<tr>
<td>Shin Shiga</td>
<td>NSMA (teleconference)</td>
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<tr>
<td>Sarah Robertson</td>
<td>CanNor</td>
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<tr>
<td>Todd Stack</td>
<td>Ni Hadi Xa</td>
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<tr>
<td>Andrew Howton</td>
<td>GNWT-Lands</td>
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**De Beers Presentation and Discussion:**

**Introduction**

- Update on recent activity at Snap Lake Mine;
- Remote technologies are being researched and considered;
- Explanation on the Economic Viability of the Mine;
- Questions and discussions on the flooding of the underground and the elevated Zinc results;
• Description by De Beers on the differences between Snap Lake Mine today (Extended Care and Maintenance) and Snap Lake mine at final closure. The main difference is the North Pile;
• Description of how the North Pile would be closed;
• De Beers is currently going through a multiple accounts analysis to support final design of a cover over the North Pile during care and maintenance;
• A spillway may be built off the starter cell into the water management pond. Sump passive management is being developed;
• De Beers acknowledged the MMER amendments and indicated that these regulations have been taken into consideration when developing the Extended Care and Maintenance Plan. The AEMP has been aligned with the EEM program;
• Kimberlite traps carbon/carbon sink.

Site Wide -

Site Wide 1: Dust levels safe for people, vegetation, aquatic life and wildlife
• Discussion on how ‘satisfactory’ as described in the criteria could or would be defined.

Site Wide 2: Drainage Pathways for surface runoff are physically stable

Site Wide 3: Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife
• Work is currently being carried out to develop these criteria; they may not be finalized by the 2018 submission;
• De Beers is currently focussing attention and resources on items of high consequence;
• A discussion took place on how it is important to look at an ecosystem holistically, and not solely at water quality results. It was noted that key ecosystem components could be evaluated that represent ecosystem;
• GNWT noted that while the objective relates to runoff and seepage water quality, the criteria mentions only in-lake water quality. The criteria should be revised to reflect the intent of the objective.

Site Wide 4: Mine areas are physically stable and safe for use by people and wildlife
• A discussion on the importance of minimizing sedimentation and erosion, and how frost heaving can impact stability took place;
• Questions were asked on how this objective would eventually be checked off post-closure.

Site Wide 5: Landscape features (shape and vegetation) match aesthetics of the surrounding natural area
• The criteria for this objective will be informed by Traditional Knowledge, as well as research that will include engagement on landscape features and revegetation;
• Discussion on how it will be difficult to verify that criteria has been met for this objective.
Site Wide 6: Safe passage and use for Caribou and other wildlife

- Information and input provided by Fort Resolution Metis Council (FRMC) on Caribou and Vegetation. It was recommended to limit caribou access on the North Pile and slopes to be like surrounding esker.

Site Wide 7: Re-vegetation targeted to priority areas

- Information and input provided by Fort Resolution Metis Council (FRMC) on Vegetation and drainage. It was recommended that active re-vegetation of the North Pile should not occur, that any re-vegetation should be natural and like the surrounding eskers. Further it was recommended that wet/run-off areas should be targeted for re-vegetation to "treat" the water that passes over it.

Next Steps were discussed, including how the spillway will be modified to follow a more stable route with lower risks of erosion. Additionally, V-notching will be done on all the berms and possibly building swales. De Beers stated that re-vegetation remains a priority. De Beers also stated that they are looking for information from Aboriginal groups on how they envision the future use of this area; De Beers hopes to gather this information from a wide variety of groups and ages.

North Pile -

North Pile 1: Prevent PK from entering the surrounding terrestrial and aquatic environment

- De Beers stated that they are looking for suggestions from reviewers, specifically Aboriginal groups, on how to best merge Traditional Knowledge and Western Science or best engineering practise;
- De Beers explained that the North Pile cover is to be designed in conjunction with determining seepage and water quality, after which criteria will be set;
- De Beers explained that they have consultants working to advance the final cover design of the North Pile and ensure long-term stability.

North Pile 2: Physically stable PK containment area to limit risk of failure that would affect safety of people or wildlife

- Must meet design requirements and be physically stable.

Next Steps: Overall life of mine closure designs, as well as designs for closing the mine from its current state are being developed.

Underground -

Underground 1: Flooding of the underground mine will have no impacts to aquatic habitat and community in source lakes

Underground 2: Underground mine should not contribute to the contamination of ground or surface water

- Questions from reviewers on water quality sampling;
- Discussions on water management from the underground;
• Discussions on sampling underground surface water before use;
• Discussion on the speed at which the underground flooded and reached equilibrium, ahead of predictions.

Underground 3: Underground mine workings are physically stable
• No questions or comments.

Infrastructure -
Infrastructure 1: Prevent remaining infrastructure from contaminating land or water
• Discussion on how the Technical Memorandum completed by ARKTIS Solutions Inc. within the Annual Closure and Reclamation Plan Progress Report outlined elevated metals and hydrocarbon fractions in select sediment samples collected from the North Pile sumps;
• De Beers stated that site assessments will be carried out in phases, and will determine, for example, whether a Landfarm should be built on site, or if soil should be sent off site to a facility such as KBL Environmental Ltd. for treatment.

Infrastructure 2: On-site disposal areas are safe for people, wildlife, and vegetation
• Questions and discussions on risk assessments. How does one define what is satisfactory or “socially acceptable”? What is the threshold for risk and who makes that decision, the P. Eng?
• Discussion on how it is difficult for some people to put risk into a numerical concept.

Infrastructure 3: Contaminated soils and waste disposal areas that cannot contaminate land and water
• The GNWT is currently updating their 2003 Remedial Action Plan Guidelines/Standard which will influence criteria;
• De Beers stated that they will do a site assessment prior to closure, and based on the information gathered, criteria will be developed and put into the final closure plan. The final closure plan must be submitted to the NVLWB for approval 24 months prior to the end of operations;
• Question asked on how long Site Assessments take;
• Question asked on the remediation of crossings and spur roads for Snap Lake Mine;
• De Beers confirmed that sediment located in areas such as the Water Management Pond, ditches and sumps would be included in the broader definition of “contaminated soils” and be included within this category.

FINAL QUESTIONS
A discussion took place on the financial security estimate, including how the estimate considers the costs for reclamation research, the annual Extended Care and Maintenance cost, and the timing to complete research relative to the final closure and reclamation plan.
Snap Lake Closure Criteria – NSMA TK Workshop

December 3, 2017, 10:00-12:00
De Beers boardroom, 300-5120 49th St, Yellowknife

Attendees

- Adrian D’Hont (NSMA)
- Kathy Arden (NSMA)
- Lawrence Mercredi (NSMA) (phone)
- Wayne Langenhan (NSMA)
- Philippe di Pizzo (SLEMA)
- Nicole Goodman (NSMA staff)

This workshop was organized by NSMA as a follow-up to the November 24, 2017 workshop to discuss incorporation of Traditional Knowledge (TK) into Snap Lake closure criteria prior to regulatory submission of an updated closure plan in January 2018. The workshop group members worked through the list of TK questions (below, with discussion summarized) posed by De Beers in their proposed closure criteria.

What is the desired future use (types and activities at site in the future)?

The group consensus was that future land use strongly depends on two factors: access, and the potential future return of caribou. If the caribou return the area will definitely be used for hunting trips, especially if an all-season road to the Lockhart Lake camp is ever built. However, in the absence of caribou, the group expected that most of the people visiting the area would be those who are curious to see how the site has been cleaned up. It was noted that Snap Lake itself does not have good fishing, and so without caribou there is little reason to use the area.

What amount of time will land users stay at site post-closure? What time of year will land users visit site post-closure (for example overwinter travel, caribou migration)?

The group agreed that the site would be used mostly in winter, unless road access becomes possible. The group agreed that duration of time land users would stay on site will vary with conditions. Groups will stay “until they get a caribou.” However, it was noted that trips would likely be relatively short as there is not much firewood in the area.

What plant types and areas are important to be safe for wildlife?

The group was most concerned about any kind of rock dumps or areas with rock cover, with the concern being the potential for gaps between chunks of rock that could cause animals to break their legs.

What are the priority areas for revegetation?

The group believed that the entirety of the site footprint should be considered a “priority area,” and was concerned that setting priority areas would mean that non-priority areas might be left untreated. There was
also a strong desire for engineered covers (for example, of the processed kimberlite containment area, and the sediments from the water treatment pond) to be designed to be amenable to revegetation.

The group also had strong opinions on revegetation methods. The consensus was that all areas of the mine should be treated to encourage natural revegetation (methods such as scarifying, topdressing with soil, using fine-grained cover, etc.) but that direct seeding was not necessary. On the topic of direct seeding, the group expressed concerns with the site seed collection program, which involves collecting seeds from the local environment and sending them to southern nurseries to be propagated. The group expressed the sentiment that this would result in plants that were not properly adapted to the environment. Even if nurseries were northern nurseries, this would still be a concern as conditions in any nursery would be different than conditions at Snap Lake. The group was strongly against spending time and money on this effort, preferring that De Beers focus their resources on supporting natural revegetation.

**How can De Beers ensure long term physical stability of mine areas and drainage pathways?**

The group collectively felt that they did not have enough information on current and future site erosion risks to address this question, and would like some data on this topic (such as a site-wide erosion risk study, if such a document exists). It was noted that at Diavik, some erosion-prone areas have been stabilized by planting cuttings of local diamond willow; an idea approved of by the group.

**What possible post-closure landscape features would increase the threat of predation or harm to wildlife?**

The group did not want to see structures that would allow wildlife to be cornered by predators – all structures must be passable to wildlife. The group also reiterated their desire for fine cover material over all rock structures.

**What are the recommended methods to achieve long term stability of the North Pile?**

The group collectively expressed a desire for a full explanation of how the North Pile cover will work and what its engineering design objectives will be. It was noted that geotechnical/geochimical/hydrogeology information is often not very accessible and group members would like some plain language explanation.

A discussion arose around this question on the issue of the length of the monitoring process. It was stated in NSMA’s previous meeting that the expected duration of De Beers’ post-closure monitoring will be 10-20 years, before the site is handed back over to the GNWT. Group members would like to see De Beers leave some of their security money in trust with the GNWT in perpetuity to cover emergencies and long-term monitoring. It is understood that this is an ongoing conversation that parties to other large mines are having right now; however it is noted that Diavik’s TK Panel has asked for a similar contingency fund and that Diavik has responded positively.

**Confirmation on the acceptability of De Beers’ definition of the word “safe”:**

*Not likely to cause harm or injury (example: air quality that is not likely to cause harm or injury to people, vegetation, aquatic life or wildlife.”*

The group had some concerns with the definition of the word “safe.” NSMA members disagree with the practice of leaving waste on site (in landfill and underground), as even waste that is considered unlikely to leach or degrade by De Beers staff or GNWT inspectors could potentially be an environmental issue hundreds of years (or further) into the future. There was some concern that “safe” was being interpreted in too short of a time scale. Members suggested that a temporal aspect be added to the definition of safe –
an explicit consideration of very long timeframes instead of the current definition which offers no temporal guidance.

**Will physical and chemical criteria support the desired future use and aesthetics conditions post-closure?**

The group noted that a number of criteria call for inspection and approval by a professional engineer. There was a strong consensus that the approval of TK holders should be incorporated into the closure criteria on the same level. Further engagement with De Beers and SLEMA will be required to determine what this will look like, but at a minimum TK holders should be regularly brought to the mine site to inspect closure criteria progress as a necessary component of monitoring.
C.2.6  2018 ACTIVITIES

The Annual Closure and Reclamation Plan Progress report was submitted to the MVLWB for review and approval. Additional closure workshops, with focus on current mine status and closure criteria were completed.

The following documentation is included herein as a record of the 2018 activities:

- MVLWB July 19, 2018 Staff Letter titled “2017 Annual Closure and Reclamation Plan Progress Report - Acknowledge”.
- Community Presentation to YKDFN and invitation poster.
- MVLWB Working Group meeting notes titled “De Beers Canada Inc. – Snap Lake Mine Final Closure and Reclamation Plan Workshop Working Group Meeting 8 – November 6, 2018 MV2011L2-0004 & MV2017D0032”.
July 19, 2018

Sarah McLean
Environment & Permitting Manager
De Beers Canada Inc.
300-5120 49th Street
Yellowknife, NT X1A 1P8

Dear Ms. McLean:

Re: 2017 Annual Closure and Reclamation Plan Progress Report – Acknowledge
De Beers Canada Inc. – Mining, Snap Lake, NT

The Mackenzie Valley Land and Water Board (MVLWB or the Board) met on July 19, 2018 and reviewed your 2017 Annual Closure and Reclamation Plan Progress Report, which was submitted under Part I, condition 2 of Licence MV2011.2-0004 on April 20, 2018.

The Board hereby acknowledges the 2017 Annual Closure and Reclamation Plan Progress Report as submitted.

The Board encourages De Beers to continue to engage with all stakeholders on components of the Final Closure and Reclamation Plan, specifically on closure criteria, prior to its submission to the Board on January 30, 2019.

If you have any questions or concerns, please contact Kierney Leach at (867) 766-7470 or email kleach@mvlwb.com.

Yours sincerely,

Mavis Cl-Michaud
MVLWB, Chair

Copied to: Distribution List
From: Tyree Mullaney
Sent: July 15, 2018 4:20 PM
To: 'Sarah.McLean@debeersgroup.com', 'adamc.n同年card.aandc@canada.ca', 'admin@ckfn.ca', 'adrian.paradis@canada.ca', 'Alexandra.Hood@debeersgroup.com', 'Andrew.Williams@debeersgroup.com', 'Angela.Love@debeersgroup.com', 'apower@ykdene.ca', 'Carol.Lands@gmail.com', 'Charlene_Coe@gov.nt.ca', 'cheryl.laroque@gov.nt.ca', 'Chief.LKDFN@gmail.com', 'Chief.SRFN@northwestel.net', 'debbie.mills@gov.nt.ca', 'ecnwt.ec@canada.ca', 'Environmental_Health@gov.nt.ca', 'Erik.Madsen@debeersgroup.com', 'esangnis@ykdene.ca', 'Exec@SIEMA.ca', 'executive.director@miningnorth.com', 'Fieldworker.frmc35@northwestel.net', 'fisheries.protection@dfo-mpo.gc.ca', 'gary@truenorthsafaris.com', 'ginger.gibson@thefreightgroup.com', 'Glen_Mackay@gov.nt.ca', 'gnwt.ea@gov.nt.ca', 'gracencallenitez@tlicho.ca', 'Guyaine.Ross@debeersgroup.com', 'ima@dkfn.ca', 'lalel_arshad@gov.nt.ca', 'Jarmie.Steele@gov.nt.ca', 'jbleck@ykdene.ca', 'jessica.taylor@dfo-mpo.gc.ca', 'jhodd@fortsmith.ca', 'joe.heron@gov.nt.ca', 'johnny_lennie@gov.nt.ca', 'Jon.Posynick@gov.nt.ca', 'Jen_Potten@tlicho.ca', 'kfnchief@katlederieche.ca', 'Kierney.Leach', 'land@wpfn.ca', 'lands@denenation.ca', 'laurie.mcgregor@gov.nt.ca', 'LeeAnn_Malley@gov.nt.ca', 'Lindsey.Cymbalisty@dkfn.ca', 'lkofnl Sands@gmail.com', 'Lorraine.Seale@gov.nt.ca', 'Marty_Sanderson@gov.nt.ca', 'mellisa.pinto@canada.ca', 'Michelle.Peters@debeersgroup.com', 'Nathan Ritchie@gov.nt.ca', 'Patrick_Clancy@gov.nt.ca', 'Paul_Bedell@goilier.com', 'Paul_Green@gov.nt.ca', 'Pauline.DeLong@gov.nt.ca', 'Permits', 'Peter.Fast@gov.nt.ca', 'PreliminaryScreening@ReviewBoard.ca', 'rcc.nwtmnr@northwestel.net', 'Rick_Wallbourne@gov.nt.ca', 'Robert_Jenkins@gov.nt.ca', 'Sally.Wong@dfo-mpo.gc.ca', 'Sarah.McLean@debeersgroup.com', 'Scott.Stewart@gov.nt.ca', 'ScreeningOfficer@eastarm.ca', 'Sean.Whitaker@debeersgroup.com', 'Sarah.Elsasser', 'shin.shiga@msna.net', 'Shirley_Standafer-Pfister@gov.nt.ca', 'Tasha.Hall@golden.com', 'Tracy_Covey@gov.nt.ca', 'TyannaSteinwand@tlicho.ca', 'vanguard@arkissolutions.com', 'ziuo@siema.ca


Good afternoon,

Please see the attached document, if you have any questions please contact Kierney Leach at 867-766-7470 or at kleach@mvlwb.com

Regards,

Tyree Mullaney, EP
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P6
ph 867.766.7464 | fax 867.873.6610
tyree@mvlwb.com | www.mvlwb.com

De Beers Canada Inc.
Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.
July 19, 2018

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<td>NWTLelis Nation</td>
<td>Tim Heron</td>
<td>NWTMN IMA Coordinator</td>
<td>(867)872-3586; <a href="mailto:roc.nwtn@northwestel.net">roc.nwtn@northwestel.net</a></td>
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Please contact our office to report any errors in this list.
Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
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YELLOWKNIFE NT X1A 2P6
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FAX (867) 873-6610

FILE NUMBER

MV2011L2-0004

Date: July 19, 2018
To: various
Organization: various
Fax: various
Copied to: various
From: Tyree Mullaney

Number of pages including cover 5

Remarks:

Please see the attached documents, if you have any questions or concerns please call Tyree Mullaney at 867-669-0506 Ext. 464.

Thank you.

Delivered by Date
☐ Mail
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LET’S TALK...

GAHCHO KUÉ & SNAP LAKE

De Beers will be in your community to provide an environmental update on our operations in the NWT, Gahcho Kué Mine and Snap Lake Mine. We are committed to sharing information about our operations and we welcome your comments. All Yellowknives Dene First Nation community members are invited to participate.

PLEASE JOIN US

WHEN
Tuesday, July 31, 2018
6:00 p.m. to 9:00 p.m.
Dinner will be served (6:00 p.m.)

WHERE
N’Dilo Gym

If you would like to know more about this meeting, please contact Shirley Tsetta at De Beers:
Tel. (867) 766-7830
Email: shirley.tsetta@debeersgroup.com

De Beers Canada Inc.
OUTLINE

1. Status of Snap Lake Mine
   - Extended Care and Maintenance
2. Regulatory Matters
   - Land Use Permit Amendment
   - Final Closure and Reclamation Plan
3. Site Activities
   - Water Management
   - Wildlife, Dust, Noise
   - Vegetation, Air Quality
   - Aquatic Environment
4. Closure Progression Sequence
5. Questions

STATUS OF SNAP LAKE MINE

- In 2016 De Beers decided to close the underground mine allowing it to flood. This limits our mine water discharge to freshwater volumes, reducing impacts on the environment.
- All mine infrastructure that could have contaminated the environment (mobile equipment and hydrocarbons as examples) was removed.
- The underground was allowed to flood. De Beers worked closely with the GNWT inspectors to ensure that closure commitments were achieved.
- As of May 2018 the mine water levels reached equilibrium with Snap Lake.
- On December 14, 2017 De Beers notified the Board of the intent to close the Mine and submit a final closure plan in 2019.
- De Beers Canada Snap Lake Mine will remain in extended care and maintenance until demolition and closure activities are initiated.
EXTENDED CARE AND MAINTENANCE

- Priority is centered on protection and health and safety of human occupants, wildlife and the environment.
- All environmental monitoring required by licence, permit or environmental agreement will continue until otherwise approved.
- Non-essential infrastructure and services will be secured and “put to sleep” or modified to conserve energy and maintenance requirements.
- Water management and treatment will continue as required to address seasonal freshet flows.
- Extended Care Maintenance V3 was approved in June 2018. It allows for remote monitoring via satellite (cameras, piezometers, thermistors, weather, air quality) and seasonal occupation of site.

LAND USE PERMIT AMENDMENT

- A Land Use Permit Amendment was approved by the M/LWB in June of 2018.
- This land use permit allows for ongoing remote monitoring, regular inspections, and monthly site visits.
- Enables De Beers to move to zero occupancy in September of 2018.
- De Beers will continue to maintain Snap Lake Mine, and will occupy site as needed on a seasonal basis for additional monitoring and maintenance activities.
- Progressive reclamation of the north pile and mine site will continue throughout extended care and maintenance.
FINAL CLOSURE AND RECLAMATION PLAN

- De Beers will submit a final closure plan with the Water License renewal request in 2019.
- With this update De Beers is required to develop reclamation criteria that will satisfy the objectives approved in 2013 for the Snap Lake Mine by the MVLWB.
- De Beers has requested a Reclamation Working Group Session for October of 2018 to present updated criteria and seek input from interested parties.
- Closure activities such as demolition are anticipated to proceed after approval of the Final Closure Plan.

SITE ACTIVITIES
WATER MANAGEMENT and MONITORING

- To ensure that freshet flows collected at the mine site meet discharge criteria, De Beers installed a Reverse Osmosis (RO) Treatment Module at the Water Treatment Plant.
- The RO will be utilized primarily during freshet on an annual basis as needed. Treated water is discharged to Snap Lake or directed to the underground.
- Regular sampling includes water quality, elevations of sumps, samples from the surrounding bogs and samples from Snap Lake.
- The GNWT lands inspector visits Snap Lake regularly to check compliance against the land use permit and water licence.
SITE ACTIVITIES

WILDLIFE, NOISE, AND DUST MONITORING

- Continued wildlife monitoring through Care & Maintenance
- 55 species observed to date
- Noise monitoring program completed in June 2017 (every 5 years)
- Noise has decreased through care and maintenance and is negligible 1.5 km away
- Dust fallout monitoring program was completed in 2017 (annually)
- Dustfall is lower during Care and Maintenance than during Operations

SITE ACTIVITIES

ENVIRONMENTAL MONITORING
SITE ACTIVITIES

AIR QUALITY AND VEGETATION MONITORING

- Emission rates continue to be lower than predicted environmental assessment.
- We continue to monitor air quality (NO2/SO2 and suspended particulates) during extended care and maintenance.
- Vegetation programs are ongoing. Long-term vegetation plots are monitored and reported annually.
- De Beers continues to operate a weather station at Snap Lake. Data are uploaded via satellite for remote monitoring.

SITE ACTIVITIES

AQUATIC EFFECTS MONITORING PROGRAM

- The Aquatic Effects Monitoring Program (AEMP) is a requirement of the Water Licence.
- The goal of the AEMP is to assess potential Mine-related effects to the aquatic ecosystem of Snap Lake in a scientifically defensible manner.
- Key objectives of the program is to confirm that:
  - The water is safe to drink;
  - The fish is safe to eat.
- The answer is Yes!
2017 AEMP RESULTS
AEMP - WATER QUALITY

- Water quality at Snap Lake continues to track below AEMP bench marks and less than whole lake average model predictions.

- The changes to water quality in Snap Lake and downstream are not expected to cause adverse effects to resident aquatic life, do not pose a human health risk, and have not adversely affected the drinkability of the water.

- A low action level for nutrient enrichment was triggered for phytoplankton biomass, however not for zooplankton biomass. A response plan was submitted and posted for public review.

2017 AEMP RESULTS
AEMP - SEDIMENT QUALITY, BENTHIC INVERTEBRATES, FISH

- Sediment quality varies with natural variation. No mine related effect on sediment quality detected.

- Benthic invertebrates, fish health, fish chemistry, and fish communities remain within the normal range and no low action levels were triggered.

- Fish Tasting has occurred on a semi-annual basis as a component of the AEMP.

- Fish tasting will occur on September 5/6 of 2018. This will be the last fish tasting event for Snap Lake.
ANY QUESTIONS?
These meeting notes attempt to provide a general summary of the meeting. Ideas expressed by participants are paraphrased and summarized; they are not reproduced verbatim.

Date and Location:  
November 6, 2018 – 8:30 a.m. to 4 p.m.  
Nunasi Building (Genesis Room)  
5109 48th Street, Yellowknife, NT

Attendees:  
Angela Love                          Shirly Standafer-Pfister                          Via Teleconference:  
Kiefer Leach                          Charlie Nitsiza                                  Sarah McLean  
Shannon Allerton                      Violet Camassel-Blondin                          Meagan Tobin  
Chris Hotson                          Johnny Weyallon                                 Lara Fletcher  
Jaqueline Ho                          Joseph Judas                                    Paul Green  
Heather Scott                         Sonia Areoes                                    Eric Denholm  
Meghan Schnurr                        Philippe DiPizzo                                Sarah Elsasser  
Russell Wyker                         Derek Chubb  
Sally Wong                            Roberta Pedlar-Hobbs  
LeeAnn Malley Aileen                  Sean Whitaker  
Stevens                               Alex Hood  
Krista Chin                           Michelle Peters  
Tracy Covey                           Jamie VanGulik

Introduction

Round table introductions.

De Beers provided a summary of major events at the Snap Lake Mine from December 2015 (the announcement of Care and Maintenance) to present.

- The option to sell was not viable;
- 50,000 m³/day pumping out of the underground was not feasible.
De Beers indicated that zero-occupancy at Snap Lake commenced as of September 2018. Ongoing activities include:

- Treating site water/seasonal discharge;
- Continued maintenance and monitoring of the North Pile and its associated infrastructure;
- The implementation, use and maintenance of remote monitoring technology;
- An allowance of 4-day trips for monthly site visits is planned for. The required work can be carried out in one 8-hour work day, but extra time allotted is for contingency;
- Description of piezometer and thermistor network; satellite upload capabilities; which is central to the remote monitoring program;
- The main ramp has been physically closed off. Temporary ‘plugs’ have been implemented to prevent humans and animals from entering. A final design (2 horizontal plugs) will be presented in the Final Closure and Reclamation Plan (FCRP).

**Presentation and Discussion:**

Overall description of site.

De Beers asked the participants to ensure that they provide all information they would like to share with De Beers by the end of the workshop.

**Site Wide 1**

- Discussion took place on the timing or staging of ‘Active Closure’ and reclamation activities. In some cases, infrastructure will need to be built before the removal of other infrastructure;
- The GINWT asked De Beers if the long-term objectives for air quality aim for background levels. De Beers stated that impact was agreed to in the zone of influence, however, once sources are eliminated background levels could be re-established. De Beers has chosen a measurable standard and quantifiable value for their criteria. It was indicated that baseline data should be available from the Environmental Assessment;
- Discussion occurred on how the North Pile will be covered, its design, and rock cover source. Discussion took place on how revegetation will be carried out on site, and length of time for revegetation;
- De Beers noted that air quality was in a safe range for human health and wildlife even during peak operations;
- De Beers stated that they are currently recalculating site-specific water quality objectives (SSWQOs) for objective SW3. Current site water discharge is approximately 200,000 m³/year;
- Discussion that the Canadian Ambient Air Quality Guidelines (Canadian Council of Ministers of the Environment (CCME)) are more stringent than the proposed criteria (NWT air quality guidelines) and may be more relevant.
Site Wide 2

- Discussion on the monitoring duration of ‘3 years post-closure’
  - De Beers indicated that criteria will be met at year 3 post-closure and will request a security refund;
  - De Beers indicated that monitoring will be conducted after year 3 as well. Wording change suggestion to “at least 3 years” to indicate this monitoring duration commitment;
  - 3 years of data required before the Engineer of Record inspects and approves (i.e. Criteria met);
  - Wording change suggestion: 3 years following ‘decommissioning’ rather than 3 years following ‘post-closure’;
  - Wording change suggestion: “...for recommendation of the Engineer of Record”;  
  - De Beers noted that the site has LiDAR; 1m accuracy and can zoom into small infrastructure;
  - Discussion on contingency component in the RECLAIM model, and uncertainty in long-term relinquishment.

Site Wide 3

- Nitrate and TSS parameters require Effluent Quality Criteria (EQC);
- De Beers explained that the Water Quality Objectives (WQO) are being updated (lowering) consistent with Board guidance and some discussion took place on these updates;
- De Beers was questioned on which parameters of the criteria will be site-specific or follow CCME guidelines. Suggestion for De Beers to include a table with parameters, its value, and indicate if it is site specific or CCME in the FCRP;
- De Beers was questioned if it anticipates water quality to change in Snap Lake, and associated timelines for changes. What will Snap Lake look like in the future?
- Comments on criteria that is for “in-lake”, but not specific to runoff and seepage as indicated in the objective. De Beers outlined that all run off and seepage from the North Pile will report to the passive wetland treatment system. All other site run off is not of concern and therefore does not have associated criteria. (No PAG rock or ARD concerns at site);
- De Beers indicated that an EQC report is forthcoming with the FCRP in January or February of 2019;
  - De Beers is designing to a 200m mixing zone for passive treatment and discharge (main basin and northwest arm of Snap Lake); both “passive mixing zones” have been modelled. Discussion on including mixing zone in criteria for clarification;
  - Existing SNP network description/summary provided by De Beers;
  - Discussion that criteria is focused on safe for “aquatic life”, question on safety for other receptors e.g. human, wildlife. De Beers indicated that Human health and environmental risk assessment to come with FCRP, North Pile is frozen – heat is not being added. Modelling has taken into account frozen and unfrozen scenarios to be conservative.
Site Wide 4

- Similar discussion to Site Wide 2.

Site Wide 5

- De Beers indicated that the plan for the final topography at Inland Lake 6 (IL6) / sump 5 area, which has a 30-40 ft height and 1:1 grade slope, is to remain as is; De Beers shared the opinion that blasting to create a more gradual slope would be a greater environmental impact than leaving the steeper slope;
- Concerns were raised on whether this 1:1 grade slope would be a hazard for wildlife – specifically caribou;
- Comment that terms like ‘where possible’ should have additional information and rationale written into the criteria otherwise it is difficult to ensure the criteria has been adequately met.

Site Wide 6

- De Beers will create a 3:1 slope wherever possible and grade to historical natural topography where possible;
- Discussion on the Caribou range plan, the zone of influence, and De Beers’ view on the range plan;
- De Beers was questioned on how it will monitor caribou and other wildlife for safe passage and use (to meet objective SW6). De Beers indicated that there will be no monitoring of wildlife and that monitoring information will be located in the as-built documentation;
- Discussion on caribou disturbance features and management considerations;
- Similar discussions as in Site Wide 5.

Site Wide 7

- Comments on criteria reading like an activity, and ‘successful’ in the criteria could be clarified with % of cover, species composition, and time frame (or measurable components associated with the criteria);
- Defined “priority areas” as: the mine building and main laydown area;
- Main area: all infrastructure locations;
- De Beers is not planning to revegetate the rock pile (North Pile);
- De Beers is not planning to revegetate the haul roads;
- More defined criteria will be presented in the FCRP (Species composition etc. a defined end point).

Infrastructure 1

- Discussion on managing hydrocarbon contamination on site. Waste Management Plan will be updated to include how soils will be remediated;
- Discussion on Canada-wide standard for Petroleum Hydrocarbons in Soil.
North Pile 1

- Discussion on Geotechnical stability vs. Geochemical stability. De Beers views this objective as a Geotechnical/physical stability objective only. Reviewers commented that this Objective should also have chemical stability criteria;
- Detailed design, feasibility, and performance design will be submitted with the FCRP;
- The GNWT commented that there could be a reporting component added to the criteria to increase transparency for reviewers to check in and ensure the Engineer of Record’s criteria are met and everything is functioning as designed. Even a reference to technical memos or documents containing these Engineering Criteria would be useful;
- Other reviewer comments requesting that the criteria to be used by the Engineer of Record to assess physical stability should be outlined in the FCRP.

North Pile 2

- Similar to North Pile 1 (NP), GNWT suggests that criteria should be the same as for NP 1;
- De Beers outlined and described how they are designing water management for site in closure: site water (seepage and runoff) is to passively flow via spillways from the North Pile to wetlands for passive treatment. The wetlands will be a permanent feature (i.e. no plans to decommission) and could be needed to function for decades. They are currently at the feasibility phase of design;
- De Beers noted that timing for the inspection period will be included in the FCRP and therefore the criteria for this objective has not yet been finalized.

Infrastructure 2

- Reviewers have similar concerns with these criteria as for the North Pile 1 criteria. Criteria being used by the Engineer of Record to assess physical stability should be outlined in the FCRP for transparency purposes;
- De Beers noted that timing for the criteria will be presented in the FCRP.

Infrastructure 3

- De Beers clarified that the year published of the guideline was not included in case the guideline is updated in the future.

Underground 1

- Brine injection to the underground is to continue until use of the Reverse Osmosis (RO) treatment plant concludes;
- De Beers indicated that although they do not plan to continue the disposal of brine underground once passive treatment is commissioned, there is not expected to be limits on the number of years brine could be pumped underground.
- Reviewers commented that there should still be criteria proposed, even though flooding of the underground has already occurred, to prove that no impacts to aquatic habitat and community in source lakes has or will occur.
Underground 2

- De Beers was questioned on its plans and timeline to inject brine to the underground;
- Criteria for this objective have not yet been finalized and will be submitted in the FCRP;
- Discussion that criteria should be a measurable water quality standard. Comments from reviewers that even though the underground mine has been flooded and potential contaminant sources were removed, water quality should be monitored and compared with water quality standards in order to meet closure objective.

Underground 3

- Further discussion on using actual water quality data/values as criteria.
DEFINITIONS
### FOR DISCUSSION - CLOSURE CRITERIA

#### CLOSURE OBJECTIVE

**SEVEN SITE WIDE (SW) OBJECTIVES - SURFACE INFRASTRUCTURE**

1. **Minimize hazards to the public, recreation, aquatic life and wildlife.**
2. **Minimize impacts to surface water, wetlands and riparian areas.**
3. **Minimize impacts to existing and future groundwater and surface water.**
4. **Ensure that the mine site is left in a state that is safe to return and viable for future development.**
5. **Minimize maintenance, operating and regulatory risk.**
6. **Improve the environment on the surrounding coarses.**
7. **Reduce, develop and manage by rehabilitation other areas.**

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#### SUMMARY OF HEB ITENS

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<th>SURFACE INFRASTRUCTURE</th>
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<tr>
<td><strong>Building &amp; Equipment</strong></td>
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<tr>
<td>- Tailings Disposal Facility</td>
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<tr>
<td>- Heap Leach Facility</td>
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<tr>
<td>- Spillway</td>
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<td>- Water Treatment Facility</td>
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<td>- Storm Detention Pond</td>
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<tr>
<td>- Klondike Mine Site</td>
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<tr>
<td>- Eastern Water Treatment Facility</td>
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<tr>
<td>- Site Development</td>
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<td>- Site Infrastructure</td>
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<td>- Site Environment</td>
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</tbody>
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#### SITe WIDE (SW) - SURFACE INFRASTRUCTURE

**De Beers Canada Inc.**

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De Beers Canada Inc.
PASSIVE WATER MANAGEMENT

- To achieve water quality objectives, De Beers will develop a passive water management system that will meet SQWQOs in Snap Lake.
Tłı̨chǫ Knowledge
for the
CLOSURE AND RECLAMATION OF THE SNAP LAKE MINE
De Beers Canada Inc.

Tłı̨chǫ Government
Department of Culture and Lands Protection Land
Regulations Division
Introduction

Tłı̨chǫ Government (TG), Lands Regulation Division, Department of Culture and Lands Protection, were invited by De Beers Canada Inc (De Beers) to listen to their Closure and Reclamation Plan. De Beers provided sufficient funding for one gathering of staff from the Lands Regulation Division and two male elders from each of the four communities of the Tłı̨chǫ Region: Behchokǫ, Whati, Gamètì and Wekweètì. TG assisted with funding a second meeting.

The first meeting was held on November 7th, 2018 when De Beers representatives gave a brief presentation on their Closure and Reclamation Plan. De Beers staff prepared the following “traditional knowledge questions” for discussion by the elders.

1. Will physical and chemical criteria support the necessary future use and aesthetics conditions post-closure?
2. What is the necessary future use (types of activities at site in the future)?
3. What amount of time land users would stay at site post-closure?
4. What time of year land users would visit site post-closure (overwinter travel, caribou migration as examples)?
5. What plant types and areas are important to be safe for wildlife?
6. How to ensure long term physical stability of mine areas and drainage pathways?
7. What landscape features to avoid that increase threat of predation or harm to wildlife?
8. What are the priority areas for revegetation?

De Beers’ November 7th, 2018 agenda included a discussion to document answers to their traditional knowledge questions. However, the Tłı̨chǫ elders insisted they were not prepared to share Tłı̨chǫ knowledge before discussing the questions with their leadership and other members of their community.

The second meeting was held on December 17th and 18th, 2018 where the questions were discussed based on the Tłı̨chǫ knowledge discussed in their communities. During this meeting the staff of TG’s Lands Regulation Division and the Tłı̨chǫ elders discussed De Beers’ Closure and Reclamation Plan as well as the comments made by the North Slave Metis Alliances (NSMA) and the Łutsel K’e Dene First Nation on TK questions.

As is the epistemological process by the Tłı̨chǫ people, they discussed the incorporation of Tłı̨chǫ knowledge into De Beers’ plan based on their own experience. The oral narratives shared by the elders described the ecosystem and seasonal/annual “way of life” surrounding and adjacent to the mine site. As is the custom when sharing their knowledge, the elders shared information on both the Dene’s past and present use of the area. Harvesting activities such as hunting (caribou and water fowl migration), fishing, and trapping. It was noted that Dene continue to thrive by harvesting wildlife, medicinal plants, berries and fish.

When focussing on the questions, the Tłı̨chǫ elders were thinking of the cultural significances of the mine site and areas surrounding Snap Lake. The elders’ knowledge is presented in this document as necessary outcomes and recommendations for the proposed closure of and reclamation criteria.

Meetings were attended by:

Tłı̨chǫ Government Staff
- Violet Camsell-Blondin, Manager, Land Regulations Division
- Joline Huskey, Lands Administrative Officer, Land Regulations Division
- Rita Wetrade, Researcher, Research and Monitoring Division (November meeting only)
Tłı̨chǫ Translators

- Jonas Lafferty (November meeting only)
- James Rabesca
- Peter Huskey (December meeting only)

Tłı̨chǫ Elders

Elders selected to attend these meetings are respected for their knowledge and experience on the land, and their knowledge of the relationship between animals, wildlife movements and the habitat on which they thrive. These elders are:

- Elders Joe Rabesca and Charlie Apples, Behchokǫ Community
- Elders Charlie Jim Nıtsıza and Jimmy B Rabesca, Whatì Community
- Elders Louis Zoe and Fred Mantla, Gamètì Community
- Elders Joseph Judas and Jimmy Kodzän, Wekweǫtì Community

SLEMA

- Tłı̨chǫ Elders Johnny Weyallon and Noel Drybones, SLEMA Members
- Philippe di Pizzo, Executive Director (November meeting only)
- Sonia Aredes, Environmental Analyst (November meeting only)

De Beers Staff

- Alex Hood, Environmental Superintendent of Victor Mine (November meeting only)
- Michelle Peters, Snap Lake Superintendent (November meeting only)
- Sean Whitaker, Project Manager (November meeting only)

Results

The following comments, recommendation and questions were agreed to by all Tłı̨chǫ elders and discussed prior to presenting here with their leadership and other members of their community.

1. Will physical and chemical criteria support the Necessary future use and aesthetics conditions post-closure?

Necessary Outcome

- To have stock piles smooth and shaped like eskers.
- To have the entire area (mine site and adjacent area) back to its original, natural state – as it was pre-mine site.
- To have all roads, on both sides, smooth as possible to ensure natural re-vegetation.
- To have all infrastructure removed so that it will be safe for wildlife and humans.
- To have all caps to underground mined noted for safety purposes and should be monitored.
- Reclaim the site so that there are NO negative impacts on the ecosystem/environment. This includes everything, such as water, air, landscape, wildlife, aquatic life, vegetation and humans.

Questions

- What amount of security is there for the completion of closure and reclamation – how sure can we be this will be completed?
- Is there funding available for First Nations continual participation? (ex. Tłı̨chǫ Regions four communities: Behchokǫ, Whatì, Gamètì and Wekweǫtì)
Recommendations

- Provide funding to First Nations to participate as an elders’ committee, and on an ongoing basis as Diavik provides First Nations.
  - Tłı̨chǫ knowledge should be part of the closure and reclamations process at each stage.
  - For further and proper decision making on post-closure elders need to see the site before closure and reclamation begins process.
  - Elders and youth visit the site at each stage in the process of the closure and reclamation process. Experts should explain what is happening at mine site and surrounding area in plain language.
- Public engagement and communication expectations and considerations should be summarized in plain speak/language so that there is an understanding.

2. What is the desired future use (types of activities at site in the future)?

Necessary Outcome

- Continue to practice Tłı̨chǫ/Dene our way of life and harvesting such as medicine, hunting, trapping, and berry picking and fishing, and to be able to drink water from near by lakes and surrounding area. This shall also include the migratory species.
- Tłı̨chǫ participation in scientific environmental monitoring and by using Tłı̨chǫ knowledge monitoring processes.
- Continue fish tasting camp to be continued for at least 50 years and for safety shelter in any case of emergencies.
- ALL infrastructure removed from site.

Recommendations

- To participate in monitoring of site and adjacent area.
- Tłı̨chǫ monitors to be trained and participate in safety measures (i.e. Bear monitors)
- To have all caps to underground mine noted for safety purposes and monitored.
- To have the airstrip kept in place until the completion of the closure and reclamation and for emergencies purposes.
- To have items or equipment from the mine site donated to First Nation communities who will benefit from these items (i.e, exercising equipment, trailers, all equipment such communication equipment).

3. What amount of time land users would stay at site post-closure?

Necessary Outcome

- Time spent in this area depends on the migration of the caribou herds and water fowl, and the state of the ecosystem/environment. Tłı̨chǫ harvesters and elders hope to spend all seasons in area.
- Elders would like to participate in site visits, during the caribou migration (June and September). This will also indicate occurrences of other wildlife including musk ox’s, wolf, grizzly, fox, wolverine, ground hog, all fur barren ground wildlife, if they are returning back to site and using natural migration routes/trails. Harvesting activities will occur more often if site and surrounding area is healthy.
- No disruptions to the migration of wildlife.
4. **Recommendations**

- Participation of elders and youth in environmental monitoring, i.e. re-vegetate, water management, air quality, etc.
- Training program such as environmental management and practicing stewardship of the land.

**What time of year land users would visit site post-closure**

(overwinter travel, caribou migration as examples)?

**Necessary Outcome**

- Tłı̨chǫ will go out on the land (post-closure of site) throughout the year, depending on health of land—includes water.

**Recommendation**

- Tłı̨chǫ people participant in Opening and Closing ceremonies of the reclamation process.

5. **Recommendations**

- What plant types and areas are important to be safe for wildlife?

**Necessary Outcome**

- All fauna and flora indigenous to the area are important to wildlife. According to elders it depends on the animal, fish, or bird, therefore all plant types are important.
- All areas have pristine habitat allowing specific wildlife, fish or birds to thrive. For example:
  - Aquatic life includes fish and their fish habitat.
  - Willows are important to arctic hare, ptarmigan.
  - Berries: black berries, blue berries, cloud berries, cranberries are important to all bears, birds, rodents (barren land siksi̱k dedi), eagles, raptors, etc.

**Recommendations**

- Collect and test native plants that are not close to the site and that can be impacted from contaminates/dust/air emissions form the mine.
  - Important seeds to collect are shrubs (wildlife food) black/white lichen, native mushrooms of the area, grass and leaves from shrubs around the area.
  - Test the area and review the air control reports of the surrounding area.
  - Important plant type: labor tea, (note: look into what plant types there are in the area).
- Smooth slopes should be used for re-vegetation.

6. **How to ensure long term physical stability of mine areas and drainage pathways?**

**Necessary Outcome**

- To remove all contaminates from the mine site, including from underground mining; must be safe for the aquatic life, wildlife and for all humans.
- Continual monitoring of ecosystems for at least 50 years:
  - Water for the safety of aquatic life, wildlife, human and vegetation's, and
  - Underground water seepages should be tested for contaminates, i.e. oils, antifreeze, and other chemicals that are harmful.
- Continual monitoring the North Pile disposal and the water waste management facility to ensure that processed kimberlite cannot enter the surrounding area nor the water system such as Snap Lake.
  - Only by monitoring can the terrestrial and aquatic life be protected over the long term. Same for the safety of wildlife and human.
  - To have the North Pile facility physically stable to ensure risk of failure that could affect the safety of wildlife, human, vegetation and aquatic life.
- Continual monitoring of the Processed Kimberlite facility area on a regular basis (over 50 years):
  - High Priority in the Environmental monitoring programs (i.e. SNP station)
- Continual monitoring of stream, rivers and lakes (and other water pathways) in the areas surrounding mine site.

7. What landscape features to avoid that increase threat of predation or harm to wildlife?

Necessary Outcome
- To have all stock piles, in a smooth slope, safe for all wildlife so that they are not cornered from predators.
- To give stock piles a slope of 3:1.
- To form the stock piles in the shape of eskers and not have boulders protruding out; keep as smooth as possible and to its natural formation of eskers and the natural look of the tundra.

8. What are the priority areas for revegetation?

Necessary Outcome
- First priority is to revegetate the North pile disposal facility, water waste management pond, fuel storage facilities, processing facility, and the main camp area. If an order is necessary, do revegetate as above.
- In addition, smooth out all existing roads creating a situation where natural revegetation will occur.
- Use only native seeds of the area for natural growth.

Recommendation
- Do test samples on re-vegetation on stock piles, so Tłı̨chǫ community members can see for themselves the re-vegetation process.

Summary
There are a number of necessary outcomes to ensure the mine site and adjacent areas are in a similar natural state prior to developing and operating the Snap Lake Mine. Given the Tłı̨chǫ elders’ comments on the necessity of being part of the closure and reclamation process, it is recommended De Beers and SLEMA consider the Elders’ Committee model used by Diavik Diamond Mine. This Elders’ Committee visits the mine site on a regular basis, discusses ongoing activities including closure and reclamation plans. This type of committee allows appropriate exchange of information and in-depth discussion of reclamation plans—such as several days on how to ensure long-term stability for drainage pathways whereas during the De Beers meetings the Tłı̨chǫ elders had approximately an hour to discuss the same topic.
C.2.7 2019 ACTIVITIES

The 2018 Annual Closure and Reclamation Plan Progress report will be submitted to the MVLWB for review and approval prior to April 30, 2019. An additional Water Licence Renewal Workshop, with focus on closure criteria and water management strategies was completed prior to submission of the Water Licence application package. Further 2019 engagement activities will be conducted through the application review process and as described in the Engagement Plan.

The following documentation is included herein as a record of the 2019 activities to date (note that minutes of the workshop are not finalized as of submission date):

REGULATORY UPDATE

- Underground mine 2005-2011
- Expansion on and around mine site 2010
- Propylene to large closure activities in 2020

Major closure:
- Livestock diversions to reverse flow 2010
- A mineral mining licence is required
- A fresh water licence is required
- A wetland licence required for fish habitat
- Fresh water licence for 10 years (2012-2022)

Final Closure and Reclamation Plan (FCRP)

- Regulated by the provincial government

- FCP includes the proponent's broad vision for the site

- Water Licence and FCP are to be submitted together

- Closure is a plan in the Off-site Lake Plan

- Closure will be followed by the approval of the FCP and the terms of this new water licence, anticipated on Q1 2020

WORKSHOP AGENDA

1.00 Coffee and Networking
1.15 Welcoming Introduction
1.30 Final Closure Plan
1.45 The North Tail Water Control System
2.00 Lunch (sandwiches and drinks provided)
2.45 Effective Quality Criteria Water Quality
2.55 WTP & LLP
3.00 Survey and Closing Comments
3.15 Adjourn

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WATER LICENCE APPLICATION TABLE OF CONTENTS

- WaterLicence Application for:
- Mine Plan
- Ore
- Engagement Level
- Tailings Water Treatment and Disposal (TWTD) Program
- Environmental Criteria and Impacts on Resource and Habitat
- Aquatic Health Evaluation Report
- Engagement Plan
- BIA and Environmental Plan
- Water Management Plan
- mine Plan Management Plan

Complete
Comprehensive
Closure & Post-Closure

De Beers Canada Inc.
Closure Planning Process for Snap Lake Mine

- 2004: Environmental Assessment
- 2006: Closure Planning
- 2008: Closure Plan Approved by Water License Committee
- 2011: Filtration Plant Construction
- 2012: Construction of Filtration Plant
- 2013: Construction of Filtration Plant
- 2014: Water Level Monitoring
- 2015: Water Level Monitoring
- 2016: Water Level Monitoring
- 2017: Water Level Monitoring
- 2018: Water Level Monitoring
- 2019: Water Level Monitoring

Closure Planning Timeline

- 2004: Environmental Assessment
- 2006: Closure Planning
- 2008: Closure Plan Approved by Water License Committee
- 2011: Filtration Plant Construction
- 2012: Construction of Filtration Plant
- 2013: Construction of Filtration Plant
- 2014: Water Level Monitoring
- 2015: Water Level Monitoring
- 2016: Water Level Monitoring
- 2017: Water Level Monitoring
- 2018: Water Level Monitoring
- 2019: Water Level Monitoring
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SNAP LAKE MINE
Final Closure and Reclamation Plan


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**NORTH PILE (NP) OBJECTIVES**

1. Prevent NP from entering the surrounding terrestrial and aquatic ecosystems.
2. Prevent the release of NP siltation into the aquatic environment, which would affect the safety of people and wildlife.

**SUCCESS INDICATORS TO SUPPORT MONITORING**

Success indicators are the agreed-upon standards that demonstrate whether actual closure performance is progressing over time (as expected at the design phase), in order to meet closure objectives.

**UNDERGROUND (UG) OBJECTIVES**

1. Reduce the risk of underground mine failures to ensure the safety of people in nearby communities.
2. Reduce the risk of underground mine failures to the overall community.
3. Underground mine working is under study.

**EXAMPLE: NORTH PILE**

Objective (NP8): Prevent NP8 underground mine failure and consequent siltation into the aquatic environment, which would affect the safety of people in nearby communities. Successful underground mine failure prevention includes monitoring and mitigating measures as part of the overall mine operation's regulatory and safety program.
De Beers Group

NORTH PILE ENGINEERED COVER

__Design Objectives__
- Isolate waste material
- Reduce wind and water erosion
- Prevent surface and sub-surface contamination
- Safe access and usage for wildlife
- Demolition (benefit) avoids change in visual/number of pits

__Design Criteria__
- SHEX wind penetration control
- Nominal 2% slope gradient
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SNAP LAKE MINE
Final Closure and Reclamation Plan


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**NORTH PILE WATER MANAGEMENT**

**DESIGN OBJECTIVES AND CRITERIA**

- **Design Objectives**
  - Drain surface and subsurface drainage (surface run-off and seepage) and convey it to the on-site treatment systems
  - Provide stable embankments
  - To be physically stable over the long-term
  - To reduce risks to wildlife and use and meet closure and reclamation objectives proposed for the closure of the mine
  - To preserve access to various locations at the site
  - To use existing water management infrastructure to the extent practical

- **Design Criteria**
  - SLEV / SLEB to be used where practicable with engineering
  - Convey the peak flow from the 200-year, 24-hour meteorologic event (Environmental Design Flood event) to the post-closure treatment facilities, while providing 0.3 m of freeboard
  - Design to be protected against maximum precipitation (24-hour event plus 3-hour event + liner design flood event) without compromising the water management structures

**OUTLINE**

- Design Objectives and Criteria
- General Layout
- Detailed Design

**GENERAL LAYOUT**

**NORTH PILE WATER MANAGEMENT**

The following Perimeter Water Control Structures are considered for the closure of the NorthPile:

- Det. C Treated Channel
- North Perimeter Delta (including Sump A area)
- South Perimeter Delta (including Sump A and B areas)
- West Detention Delta (South)
OUTLINE

- Modelling Output
- Design Options
- Constructed Wetland for Mine Runoff
- Full Site Layout
- Wastewater Treatment System
- End-Pond Treatment System
- Summary

MODELLING OUTPUT

PASSIVE TREATMENT SYSTEM

- Site Model
- North File Hydrology (Flow Quantity) Model Outputs
- North File Water Quality Model Outputs
- Snap Lake Water Quality Model Outputs
- Environnement-Lake Water Quality Model Outputs
- Used to Schedule Design Water Quantity, Influent Water Quality, and Effluent Water Quality
### DESIGN CRITERIA – WATER QUALITY

#### PASSIVE TREATMENT SYSTEM

<table>
<thead>
<tr>
<th>Parameter of Potential Concern</th>
<th>Maximum Average Concentration</th>
<th>Maximum Daily Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate, as N (mg/L)</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>TDS (mg/L)</td>
<td>80</td>
<td>90</td>
</tr>
</tbody>
</table>

#### CONSTRUCTED WETLAND FOR NITRATE REMOVAL

- Principal components of the nitrogen cycle in wetlands:
  - Pool plant to remain active and operational until wetlands achieve the design EQC (runoff monitoring will be required).
  - Principal components of the nitrogen cycle in wetlands:
    - Nitrification
    - Denitrification
    - Phosphorus uptake
  - Wetland detention pond will require aeration to maintain aerobic conditions.
  - Wetland will require periodic flushing to maintain optimal water quality.
SNAP LAKE MINE
Final Closure and Reclamation Plan

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**Outline**

- AEMP Overview
- Summary of AEMP Design Plan
- Sampling Locations
- Sampling Schedule

- The goal of the AEMP is to assess potential Mine-related effects to the aquatic ecosystem of Snap Lake in a scientifically defensible manner.
- As streams from the Mine to the aquatic environment decrease, and water quality and bio-habitat positive responses, the extent and complexity of the AEMP can decrease.
AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

SUMMARY OF SNAP LAKE CLOSURE

- Snap Lake Mine is moving into the closure phase, beginning with the approval of the Water Licence and PEMP.
- Waters no longer pumped from the underground to the surface.
- Any impacts of the mine will include...
  - Siltation, vegetation of priority areas
  - Siltation, vegetation of priority areas
  - Sr. Risk Assessment
  - Mitigation of risks

- In Reclamation:
  - Wetlands
  - Reclamation: Water Control Structures
  - Passive Wetland Treatment System

- Monitoring will continue throughout Closure and Post-Closure.
- AEMP is adjusted to align with closure and post-closure.
- FCE re-evaluation was completed.
- All Environmental Management Plans updated for closure and post-closure.

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## Appendix C.3. Traditional Knowledge Summary Table

<table>
<thead>
<tr>
<th>#</th>
<th>Group</th>
<th>Document Title</th>
<th>Category</th>
<th>TK Input</th>
<th>De Beers FCRP Content</th>
<th>Cross-Reference – Section</th>
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<tbody>
<tr>
<td>1</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Desired future use - types and activities at site in the future</td>
<td>Future land-use depends on 2 factors, access and return of caribou. If the caribou return the area will definitely be used for hunting trips, especially if an all-season road to the Lockhart Lake camp is ever built. However, in the absence of caribou, the group expected that most of the people visiting the area would be those who are curious to see how the site has been cleaned up. It was noted that Snap Lake itself does not have good fishing, and so without caribou, there is little reason to use the area.</td>
<td>Closure objectives were developed to ensure that the Mine site supports safe future use by humans and wildlife. The future use and aesthetics of the site is considered for all specific closure objectives (Table 5.2).</td>
<td>2.2.4 5.3.1</td>
</tr>
<tr>
<td>2</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Amount of time land users stay at site post-closure</td>
<td>The site would be used mostly in winter, unless road access becomes possible. The duration of time land users would stay on site will vary with conditions. Groups will stay “until they get a caribou.” However, it was noted that trips would likely be relatively short as there is not much firewood in the area.</td>
<td>The closure objectives intend that the Mine site supports the safe future use of the site by humans and wildlife, with no restrictions on the time of year. Closure objectives that support future resource use at the site consider landscape features (shape and vegetation to match the aesthetics of the surrounding natural area (SW5) and safe passage and use for Caribou and other wildlife (SW6).</td>
<td>2.2.4 5.3.1 5.4.5 5.5.5</td>
</tr>
</tbody>
</table>
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<tr>
<td>3</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Plant types and areas safe for wildlife</td>
<td>It is important to wildlife safety that any kind of rock dumps or areas with rock cover not have large gaps between chunks of rock that could cause animals to break their legs.</td>
<td>A design objective for the safe passage and use for Caribou and other wildlife has been considered for the site (Table 5.2; SW6). Slopes will be graded to facilitate Caribou passage, including on the North Pile. Fill specifications and revegetation plans are designed to create a relatively smooth surface. The final landscape will be inspected by qualified professionals and representatives of SLEMA.</td>
<td>5.3.1, 5.3.2, 5.4.4</td>
</tr>
<tr>
<td>4</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Priority areas for revegetation</td>
<td>The entirety of the site footprint should be considered a “priority area”. Setting priority areas would mean that non-priority areas might be left untreated. There is also a strong desire for engineered covers. All areas of the mine should be treated to encourage natural revegetation (methods such as scarifying, topdressing with soil, using fine-grained cover, etc.) but direct seeding is not necessary. The group expressed concerns with the site seed collection program, which involves collecting seeds from the local environment and sending them to southern nurseries to be propagated. The group expressed the sentiment that this would result in plants that were not properly adapted to the environment. Even if nurseries were northern nurseries, the concern about ‘priority area’ is noted; however, some prioritization is necessary, because there is a limited amount of soil available to support reclamation efforts. It is not possible to apply the same revegetation approach to the entire footprint. The revegetation program that is proposed will allow for a natural progression of native vegetation species to develop on the reclaimed landscape over time. Passive, natural revegetation is planned for the North Pile and slopes along the edges of roads, pads and laydowns where equipment access is not safe or is difficult. This will be supplemented</td>
<td></td>
<td>5.3.1 Appendix I.1</td>
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<tr>
<td>5</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Long-term physical stability of mine areas and drainage pathways</td>
<td>The group felt they did not have enough information on current and future site erosion risks to address this question, and would like some data on this topic (such as a site-wide erosion risk study, if such a document exists). At Diavik, some erosion-prone areas have been stabilized by planting cuttings of local diamond willow; an idea approved of by the group.</td>
<td>North Pile cover design considered resistance of the cover to wind and water erosion, and also to promote surface runoff. Site-wide, mitigation measures to address erosion risks will include contouring surfaces to encourage water drainage, direct drainage to existing drainage paths, and active seeding at selected sites to stabilize surfaces. Cuttings of local species may be used as a contingency measure if seeding is not successful.</td>
<td>5.3.1 5.3.2</td>
</tr>
<tr>
<td>6</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Possible post-closure landscape features that would increase the threat of predation or harm to wildlife</td>
<td>All structures must be passable to wildlife, no structures should remain that allow wildlife to be cornered by predators. There is also a desire for fine cover material over all rock structures.</td>
<td>Please refer to response#3. The safe passage and use for Caribou and other wildlife is addressed as a closure objective (SW4; Table 5.2) grading slopes and finer fill will be applied to the North Pile to create relatively smooth, accessible surfaces.</td>
<td>5.3.1 5.4.2 5.4.4 5.5.2</td>
</tr>
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</table>

This would still be a concern as conditions in any nursery would be different than conditions at Snap Lake. The group was strongly against spending time and money on this effort, preferring that De Beers focus their resources on supporting natural revegetation.
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<td>7</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Recommended methods to achieve long-term stability of the North Pile</td>
<td>There is a desire for a full explanation of how the North Pile cover will work and what its engineering design objectives will be. It was noted that geotechnical/geochemical/hydrogeology information is often not very accessible and group members would like some plain language explanation.</td>
<td>The FCRP includes a Plain Language Summary that works to address this concern; in addition, Section 5.4.2 Physical Environment summarizes the approach used to design the North Pile for closure.</td>
<td>1.3.1 5.4.2</td>
</tr>
<tr>
<td>8</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Confirmation on the acceptability of De Beers' definition of the word “safe”</td>
<td>NSMA members disagree with the practice of leaving waste on site (in landfill and underground), as even waste that is considered unlikely to leach or degrade by De Beers staff or GNWT inspectors could potentially be an environmental issue hundreds of years (or further) into the future. There was some concern that “safe” was being interpreted in too short of a time scale. Members suggested that a temporal aspect be added to the definition of safe – an explicit consideration of very long timeframes instead of the current definition which offers no temporal guidance.</td>
<td>All hazardous materials will be removed from site for disposal. Alternatives were considered for the disposal of non-hazardous waste. Non-hazardous materials (e.g., salvageable equipment) will be removed from site as the preferred closure option where this makes economic sense at the time of closure. Remaining non-hazardous waste will be deposited in the North Pile landfill. Table 5.2 provides closure objectives and criteria, which are intended to define ‘safe’. This includes post-closure inspection and monitoring, and for relevant criteria includes inspection by SLEMA.</td>
<td>5.3.1 5.3.4</td>
</tr>
<tr>
<td>9</td>
<td>NSMA</td>
<td>Dec_03_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Physical and chemical criteria that support the desired future use and</td>
<td>A number of criteria call for inspection and approval by a professional engineer. There was a strong consensus that the approval of TK holders should be incorporated into the closure criteria on the same level. Further engagement with De Beers and</td>
<td>Table 5.2 provides closure objectives and criteria. This includes post-closure inspection and monitoring, and for relevant criteria includes inspection by representatives of affected</td>
<td>5.3.1 5.5.5</td>
</tr>
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<td>aesthetics conditions post-closure</td>
<td>SLEMA will be required to determine what this will look like, but at a minimum TK holders should be regularly brought to the mine site to inspect closure criteria progress as a necessary component of monitoring.</td>
<td>Indigenous Parties. Section 5.5.5 describes a site visit program for SLEMA.</td>
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<td>10</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Waste left on site (in underground and in landfill)</td>
<td>Expressed strong concern about waste being left underground and in landfill, and some stated the sentiment that De Beers should bring out everything they brought in, rather than leaving the land as a “garbage dump” that may cause issues for future generations. Waste items are/include/could be contaminated with petroleum-based products, and that they could leach and degrade over time. There was also a question on the possibility of leachate from underground equipment getting into Snap Lake through the same water pathways that led to the mine’s original underground water management issues.</td>
<td>Table 5.1 summarizes waste management activities for the underground mine. All hazardous materials, major structures and fixed and mobile equipment were removed from the underground prior to flooding. The only items that were left underground are non-hazardous, non-degradable, constructed of steel, aluminum, vulcanized rubber concrete, or associated with utility lines including the conveyance system (Section 5.3.3). Please refer to Section 5.3.4 of the FCRP in relation to waste handling for materials on surface. Key points to note include: • All hazardous materials will be removed from site. • Non-hazardous materials will be re-purposed where possible, and otherwise will be landfilled and then covered with a minimum 2 m thick rock cover.</td>
<td>5.2.2 5.3.3</td>
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<tr>
<td>11</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Future of Snap Lake Mine</td>
<td>General enquiry on the timeline for ongoing care and maintenance, and potential closure timelines.</td>
<td>The Mine is currently in a state of Extended Care and Maintenance, which will continue until closure activities commence. Section 8.1 provides a timeline for closure activities and Section 8.2 outlines the post-closure timeline. Figure 8.1 presents a schedule of all activities at Snap Lake Mine.</td>
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<td>12</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Monitoring (planned duration of monitoring of seepage from the North Pile)</td>
<td>NSMA members expressed some concern about long-term monitoring of seepage as water can take a long time (decades) to work its way through waste rock piles before seeping into the surrounding environment. NSMA members suggested that thermosiphons be considered to keep the exterior of the pile frozen to deal with seepage issue. Where does the legal responsibility for long-term monitoring lie, as De Beers intends to keep the mineral leases indefinitely.</td>
<td>Closure objectives (Table 5.2) include ensuring surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife (SW3). Natural permafrost development in the North Pile will reduce seepage, and the Pile cover will be constructed to encourage runoff and reduce infiltration. Thermosiphons were considered by De Beers’ engineering team; however they were considered not necessary, because data and modelling completed show that physical and chemical stability of</td>
<td>5.3.1 5.3.2 5.4.2 5.5</td>
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<td>13</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Legal</td>
<td>NSMA members mentioned that the Diavik elders group is in discussions with Diavik to leave some money to the government to support long-term monitoring after the Water Licence is closed and the site is turned over to the government.</td>
<td>Table 5.6 lists the monitoring program for Snap Lake along with the closure and post-closure reporting required (Water licence, NPRI, etc.). Financial security has been provided by De Beers under the Water Licence that includes post-closure monitoring. The North Pile will represent a permanent embankment on the landscape. The Canadian Dam Association (CDA) is currently reviewing requirements for monitoring such structures in a post-closure condition. De Beers will continue to track any changes in CDA requirements, and will work with government and Indigenous organizations to ensure that any obligations for monitoring are adequately funded.</td>
<td>5.5 10.1</td>
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<td>14</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>“qualified person” with regards to post-closure wildlife risk assessment</td>
<td>NSMA members asserted the need to recognize TK on the same level as science, and want to have parallel inspection/approval by TK holders wherever closure criteria call for inspections/approval by a professional engineer. NSMA members re-expressed the desire to send TK holders to work alongside professional engineers and consultants. SLEMA requested guidance on what form this might take. NSMA members suggested an analog to the Diavik TK panel, which consists of elders and youth from each community who regularly meet to discuss all aspects of the mine. Diavik has found this panel to be very helpful to them in solving problems by looking at issues in a different light. NSMA members noted that the Diavik TK panel runs parallel to and does not replace individual community consultation, although this cause other challenges re: sharing of information between TK panel members and community.</td>
<td>Table 5.2 outlines the closure objectives and criteria, and for relevant criteria, this includes post-closure inspection and monitoring, by a combination of professional engineers and representatives of SLEMA, which may include the TK panel. De Beers looks forward to continued dialogue to further define how this will be implemented.</td>
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<td>15</td>
<td>NSMA</td>
<td>Nov_24_Snap Lake Closure_NSMA TK Workshop_summary</td>
<td>Revegetation</td>
<td>NSMA members expressed concern on the practicality/effectiveness of propagating seeds for revegetation test plots in off-site nurseries.</td>
<td>Please refer to Section 5.3.1 in the FCRP. The revegetation program that is proposed will allow for a natural progression of native vegetation species to develop on the reclaimed landscape over time. Passive, natural revegetation is planned for the North Pile and slopes.</td>
<td>5.3.1</td>
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<td>16</td>
<td>Tlicho Government</td>
<td>TG SLEMA Closure &amp; Reclamation Comments for Snap Lake</td>
<td>Will physical and chemical criteria support the necessary future use and aesthetics conditions post-closure?</td>
<td>Outcome</td>
<td>The closure objectives and criteria, as summarized in Table 5.2 of the FCRP have incorporated many of the outcomes described by the Tlicho Government. For example, slopes of disturbed areas, including the North Pile, will be graded and the material size used for rock covers will facilitate safe human and Caribou passage. There will be no visible buildings, equipment or non-local materials remaining on site, and underground portals will be secured. Post-closure inspection and monitoring will be a combination of professional engineer and representatives of SLEMA. De Beers looks forward to continued</td>
<td>1 5.3.1</td>
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- Along the edges of roads, pads and laydowns where equipment access is not safe or is difficult. This will be supplemented by active seeding or planting of native vegetation at selected sites in order to prevent erosion or dust generation and to help speed the process of natural succession. Seeds from southern nurseries are currently the only source that has sufficient volume to meet the needs of the program.
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| 17 | Tlicho      | TG SLEMA Closure & Reclamation Comments for Snap Lake                           | What is the desired future use (types of activities at site in the future)? | landscape, wildlife, aquatic life, vegetation and humans. Recommendations  | • Provide funding to First Nations to participate as an elders’ committee, and on an ongoing basis as Diavik provides First Nations.  
• Tlicho knowledge should be part of the closure and reclamation process at each stage.  
• For further and proper decision making on post-closure elders need to see the site before closure and reclamation begins process.  
• Elders and youth visit the site at each stage in the process of the closure and reclamation process. Experts should explain what is happening at mine site and surrounding area in plain language.  
• Public engagement and communication expectations and considerations should be summarized in plain speak/language so that there is an understanding.  
• Dialogue to further define how this will be implemented.  
• The FCRP includes a Plain Language Summary at the beginning, and on-going engagement is planned to help ensure that interested parties are be fully informed. | 5.3.1  
5.3.4  
5.5.5 |
# Group | Document Title | Category | TK Input | De Beers FCRP Content | Cross-Reference – Section
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- Tłı̨chǫ participation in scientific environmental monitoring and by using Tłı̨chǫ knowledge monitoring processes.
- Continue fish tasting camp to be continued for at least 50 years and for safety shelter in any case of emergencies.
- ALL infrastructure removed from site.

**Recommendations**

- To participate in monitoring of site and adjacent area.
- Tłı̨chǫ monitors to be trained and participate in safety measures (i.e., Bear monitors).
- To have all caps to underground mine noted for safety purposes and monitored.
- To have the airstrip kept in place until the completion of the closure and reclamation and for emergencies purposes.
- To have items or equipment from the mine site donated to First Nation communities who will benefit from these items. (i.e., exercising equipment, trailers, all equipment such communication equipment).

remaining on site. A safety shelter is not currently planned, but De Beers is open to discussions if other Parties wish to take responsibility for maintenance of a shelter. De Beers has planned for the full decommissioning of the airstrip in the FCRP; however, if there is a desire for the airstrip to remain post-closure, the company is open to discussing opportunities to transfer responsibility to other Parties. Post-closure inspection and monitoring will be conducted by a combination of professional engineers and representatives of SLEMA, which may include the TK panel. Fish tasting, if requested by the community, may be a component of the site visit. De Beers looks forward to continued dialogue to further define how this will be implemented.
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| 18 | Tlicho Government      | TG SLEMA Closure & Reclamation Comments for Snap Lake                         | What amount of time land users would stay at site post-closure?           | **Outcome**  
> - Time spent in this area depends on the migration of the caribou herds and water fowl, and the state of the ecosystem/environment. Tlicho harvesters and elders hope to spend all seasons in area.  
> - Elders would like to participate in site visits, during the caribou migration (June and September). This will also indicate occurrences of other wildlife including musk ox's, wolf, grizzly, fox, wolverine, ground hog, all fur barren ground wildlife, if they are returning back to site and using natural migration routes/trails. Harvesting activities will occur more often if site and surrounding area is healthy  
> - No disruptions to the migration of wildlife.  
**Recommendations**  
> - Participation of elders and youth in environmental monitoring, i.e., Revegetate, water management, air quality, etc.  
> - Training program such as environmental management and practicing stewardship of the land.  
<p>|                                                                 | The closure objectives intend that the Mine site supports the safe future use of the site by humans and wildlife, with no restrictions on the time of year. Closure objectives that support future resource use at the site consider landscape features (shape and vegetation to match the aesthetics of the surrounding natural area (SW5) and safe passage and use for Caribou and other wildlife (SW6). Post-closure inspection and monitoring will be conducted by a combination of professional engineers and representatives of SLEMA, which may include the TK panel. De Beers looks forward to continued dialogue to further define how this will be implemented. | 2.2.4, 5.3.1, 5.4.5, 5.5.5 |
| #  | Group                        | Document Title                                                                 | Category                                                                 | TK Input                                                                 | De Beers FCRP Content                                                                                                                                                     | Cross-Reference – Section |
|----|------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|                                                                                                                                                                           |                           |
| 19 | Tlicho Government            | TG SLEMA Closure &amp; Reclamation Comments for Snap Lake                          | What time of year land users would visit site post-closure (overwinter travel, caribou migration as examples)? | Outcome                                                                  | • Tlicho will go out on the land (post-closure of site) throughout the year, depending on of health of land—includes water.                                               | 2.2.4 5.3.1 5.4.5 5.5.5   |
|    |                              |                                                                                |                                                                          | Recommendation                                                           | • Tlicho people participant in Opening and Closing ceremonies of the reclamation process.                                                                               |                           |
|    |                              |                                                                                |                                                                          |                                                                          | Please refer to response #18.                                                                                                                                           |                           |
|    |                              |                                                                                |                                                                          |                                                                          | De Beers looks forward to dialogue to address Opening and Closing ceremonies of the reclamation process.                                                              |                           |
| 20 | Tlicho Government            | TG SLEMA Closure &amp; Reclamation Comments for Snap Lake                          | What plant types and areas are important to be safe for wildlife?       | Outcome                                                                  | • All fauna and flora indigenous to the area are important to wildlife. According to elders it depends on the animal, fish, or bird, therefore all plant types are important.  | 5.3.1 5.5                   |
|    |                              |                                                                                |                                                                          |                                                                          | • All areas have pristine habitat allowing specific wildlife, fish or birds to thrive.                                                                                 |                           |
|    |                              |                                                                                |                                                                          |                                                                          | For example:                                                                                                                                                            |                           |
|    |                              |                                                                                |                                                                          |                                                                          | • Aquatic life includes fish and their fish habitat.                                                                                                                   |                           |
|    |                              |                                                                                |                                                                          |                                                                          | • Willows are important to arctic hare, ptarmigan.                                                                                                                     |                           |
|    |                              |                                                                                |                                                                          |                                                                          | • Berries: black berries, blue berries, cloud berries, cranberries are important to all bears, birds, rodents (barren land siksik dedi), eagles, raptors etc.                   |                           |
|    |                              |                                                                                |                                                                          |                                                                          | Recommendation                                                                                                                                                    |                           |
|    |                              |                                                                                |                                                                          |                                                                          | • Collect and test native plants that are not close to the site and that can be impacted from contaminates/dust/air emissions form the mine.                          |                           |
|    |                              |                                                                                |                                                                          |                                                                          | Vegetation and air quality monitoring have been conducted during operation of the mine. In addition, specific reclamation research studies were conducted to identify which vegetation species are best suited to be used during reclamation. The results from these programs have been directly incorporated into the FCRP, including the landform design and revegetation programs (see Section 5.3.1) and the vegetation monitoring programs (see Section 5.5). |                           |</p>
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|    | Tlicho         | TG SLEMA Closure & Reclamation Comments for Snap Lake | How to ensure long term physical stability of mine areas and drainage pathways? | • Important seeds to collect are shrubs (wildlife food) black/white lichen, native mushrooms of the area, grass and leaves from shrubs around the area.  
• Test the area and review the air control reports of the surrounding area.  
• Important plant type: labor tea (note: look into what plant types there are in the area).  
• Smooth slopes should be used for re-vegetation.  
Outcome  
• To remove all contaminants from the mine site, including from underground mining; must be safe for the aquatic life, wildlife and for all humans  
• Continual monitoring of ecosystems for at least 50 years: water for the safety of aquatic life, wildlife, human and vegetation’s, and  
• Underground water seepages should be tested for contaminates, i.e. oils, antifreeze, and other chemicals that are harmful.  
• Continual monitoring the North Pile disposal and the water waste management facility to ensure that processed kimberlite cannot enter the surrounding area nor the water system such as Snap Lake.  
• Only by monitoring can the terrestrial and aquatic life be protected over the De Beers appreciates the concern expressed. Post-closure monitoring, maintenance and reporting is outlined in Section 5.5 of the FCRP. As outlined in Section 5.5 of the FCRP, Post-closure monitoring is anticipated to continue for a minimum of 10 years, but ultimately it will continue until it is agreed that closure objectives and criteria have been achieved.  
Site stability inspections will be continued until closure criteria are achieved, to ensure that the site is physically and chemically stable and safe for use by people and wildlife; these are specified in Section 5.3 of the FCRP.  
The North Pile will represent a permanent embankment on the landscape. The Canadian Dam |
<p>| 21 | Tlicho         | TG SLEMA Closure &amp; Reclamation Comments for Snap Lake | How to ensure long term physical stability of mine areas and drainage pathways? |                                                                                                                                                                                                           |                                                                                                                                                                                                                                        |                          |</p>
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<td>long term. Same for the safety of wildlife and human.&lt;br&gt;• To have the North Pile facility physically stable to ensure risk of failure that could affect the safety of wildlife, human, vegetation and aquatic life.&lt;br&gt;• Continual monitoring of the Processed Kimberlite facility area on a regular basis (over 50 years): High Priority in the Environmental monitoring programs (i.e. SNP station).&lt;br&gt;• Continual monitoring of stream, rivers and lakes (and other water pathways) in the areas surrounding mine site.</td>
<td>Association (CDA) is currently reviewing requirements for monitoring such structures in a post-closure condition. De Beers will continue to track any changes in CDA requirements, and will work with government and Indigenous organizations to ensure that any obligations for monitoring are adequately funded.</td>
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<td>22</td>
<td>Tlicho Government</td>
<td>TG SLEMA Closure &amp; Reclamation Comments for Snap Lake</td>
<td>What landscape features to avoid that increase threat of predation or harm to wildlife?</td>
<td>Outcome&lt;br&gt;• To have all stock piles, in a smooth slope, safe for all wildlife so that they are not cornered from predators.&lt;br&gt;• To give stock piles a slope of 3:1.&lt;br&gt;• To form the stock piles in the shape of eskers and not have boulders protruding out; keep as smooth as possible and to its natural formation of eskers and the natural look of the tundra.</td>
<td>A design objective for the safe passage and use for Caribou and other wildlife has been considered for the site (Table 5.2; SW6). Slopes will be graded to facilitate Caribou passage, including on the North Pile. Fill specifications and revegetation plans are designed to create a relatively smooth surface. The final landscape will be inspected by a combination of professional engineers and representatives of SLEMA, which may include the TK panel.</td>
<td>5.3.1 5.3.2 5.4.4</td>
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| 23 | Tlicho, Government | TG SLEMA Closure & Reclamation Comments for Snap Lake                        | What are the priority areas for revegetation?                            | Outcome                                                                                       | Please see Section 5.3.1 in the FCRP for details. Prioritization of areas for revegetation is necessary, because there is a finite amount of soil available to support reclamation efforts. It is not possible to apply the same revegetation approach to the entire footprint. The revegetation program that is proposed will allow for a natural progression of native vegetation species to develop on the reclaimed landscape over time. Passive, natural revegetation is planned for the North Pile and slopes along the edges of roads, pads and laydowns where equipment access is not safe or is difficult. This will be supplemented by active seeding or planting of native vegetation at selected sites in order to prevent erosion or dust generation and to help speed the process of natural succession. Final grading of surfaces will be to reflect surrounding topography and re-establish natural drainage pathways where possible. Specific reclamation research studies were conducted to identify which vegetation species are best suited to be used during reclamation. The results from | 5.3.1  
5.5  
Appendix I.1 |
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<td>24</td>
<td>Tlicho Government</td>
<td>TG SLEMA Closure &amp; Reclamation Comments for Snap Lake</td>
<td>General/Overarching</td>
<td>Given the Tlicho elders’ comments on the necessity of being part of the closure and reclamation process, it is recommended De Beers and SLEMA consider the Elders’ Committee model used by Diavik Diamond Mine. This Elders’ Committee visits the mine site on a regular basis, discusses ongoing activities including closure and reclamation plans. This type of committee allows appropriate exchange of information and in-depth discussion of reclamation plans—such as several days on how to ensure long-term stability for drainage pathways whereas during the De Beers meetings the Tlicho elders had approximately an hour to discuss the same topic.</td>
<td>De Beers is committed to supporting the maintenance of traditional knowledge through the engagement of the communities, SLEMA and the TK Panel.</td>
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<td>Lutsel K’ee Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Trust</td>
<td>Suggest that additional information dissemination is necessary to restore social license to and ensure safety for the community. Moreover, inferences from these statements suggest that LKDFN requires stronger levels of engagement, manifested through a greater degree of knowledge-sharing practices during this time of industrial decoupling.</td>
<td>The comment is appreciated and acknowledged. De Beers has endeavoured to include strong engagement in the updated Community Engagement Plan, which includes knowledge-sharing practices. Additional means of engagement will be considered when requested by the communities.</td>
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<td>26</td>
<td>Lutsel K’ee Dene First Nation Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0 Transparency and Accountability Although industry may be held to the current highest standards in terms of care, maintenance and reclamation, knowledge and technology are ever-changing and reclamation must reflect this until a site is returned to an equal or similar land use. This requires monetary securities, transparency and accountability on behalf of industry to maintain the highest reclamation standards over the course of land rehabilitation, regardless of the decades and funding required to do so. Fulfilling these obligations will additionally require the open and honest discussions between industry and community members throughout the closure of Snap Lake Mine. Extending beyond the present legal requirements, reclamation, care and maintenance must be situated on a sliding time scale to guarantee the continual application of best management practices. Ensuring that the liability of a corporation is legally bound in the decades to come provides security and peace of mind for communities. De Beers is committed to transparency and accountability through the closure process. Examples of this in the FCRP, include: submitting an updated RECLAIM estimate; and commitment to incorporate a combination of professional engineers and representatives of SLEMA, which may include the TK panel, as part of post-closure monitoring</td>
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<td>27</td>
<td>Lutsel K’ee Dene First Nation Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0 Infrastructure Removal Concerns The removal of infrastructure is a source of concern for community members due to the lingering uncertainties and ecological threats these structures pose. Although this is already in progress, it is important to continue with the entire removal of infrastructure for several reasons. First, to prevent the residual historical scar on the land base will provide future</td>
<td>Please refer to Section 5.3.4 of the FCRP. Key points to note include: • All hazardous materials will be removed from site. • Non-hazardous materials will be re-purposed offsite where possible, and otherwise will be landfilled and then covered</td>
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<td>28</td>
<td>Lutsel K’ee Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Concerns Regarding the Reclamation of Dust</td>
<td>This is a growing source of concern as the extent of dust settling and means to remediate dust are largely unknown. As many participants have spent substantial time at the mine and in the Barren Lands, the uncertainty surrounding the chemical composition, geographical extent and potential impacts of the dust are of immediate concern. Individuals expressed the lack of understanding as to what the dust is composed of and identified it as a source of contamination.</td>
<td>Vegetation and air quality monitoring have been conducted during operation of the mine, are continuing during Extended Care and Maintenance, and will continue during closure. In particular, the Vegetation Monitoring Program (see Section 5.5) evaluates the potential linkage between dust deposition, and vegetation and soil quality. As part of revegetation activities, active seeding or planting of native vegetation at selected sites will be undertaken in order to prevent erosion or dust generation and to help speed the process of natural succession.</td>
<td>5.3.1, 5.5, Appendix I.1</td>
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| 29 | Lutsel K’e Dene First Nation  
Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0  
Development and Decommissioning of Roads | Development and Decommissioning of Roads | The development of roads in a previously untouched region is one of the most impactful and long lasting impacts derived from the development of mining operations. Through knowledge dissemination, the decommissioning of the access road to Snap Lake Mine has become a central element in the discourse surrounding reclamation. These roads significantly impact the traditional Dene Way of Life by perpetuating the decline in caribou by increasing accessibility to the region. Furthermore, roads present unnatural barriers to animals and create obstacles in the natural flow of ecosystems.  
Please refer to Section 5.3.4.2 in the FCRP. It is anticipated that during Closure, at least two years of winter roads (construction and maintenance) will be required to mobilize/demobilize equipment and supplies, including the removal of hazardous materials on the backhaul.  
Reclamation of the winter spur road following the final season of use will involve scarifying and loosening the top surface to facilitate natural revegetation. | De Beers FCRP Content  
Cross-Reference – Section |
| 30 | Lutsel K’e Dene First Nation  
Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0  
General concern about caribou health in the north | General concern about caribou health in the north | The increasing pressures on caribou are manifestations of the mounting cumulative effects; implying that caribou are declining in both population and health. Additional signs of change in the health and well-being of caribou across the north are exhibited through a lack of cultural presence, declining health and changing landscapes. | De Beers FCRP Content  
Cross-Reference – Section |

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<tr>
<td>31</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Contaminants</td>
<td>In terms of food safety, it is challenging for outsiders to conceptualize accessibility to food as the relationship to the land and sustenance base is unique and distinct for the Dene. Due to the combination of geographical isolation and sheer expense, the Dene Way of Life is intrinsically tied to the land and can be best abstracted as a human—nature continuum. Not only is the safety of food a growing area of concern, but also the decline in accessibility, quantity and quality of food has emerged as a regional issue. Although it is probable that this area of concern can be in part attributable to other landscape-level changes, mounting community observations highlight the direct impacts from the mines altering food security through contamination.</td>
<td>Closure objectives were developed to ensure that the Mine site supports safe future use by humans and wildlife. Potential effects of mine closure on wildlife and human health is described in Section 5.6 of the FCRP. Programs to monitor progress towards environmental objectives that support resource use, such as SW5 (landscape features (shape and vegetation) match aesthetics of the surrounding natural area) and SW6 (safe passage and use for Caribou and other wildlife), include a site visit by the SLEMA and fish tasting, if requested by the community, as a component of the AEMP.</td>
<td>5.3.1 5.5.5 5.6</td>
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<tr>
<td>32</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Loss of TK</td>
<td>With the encroachment of natural resource developments on the traditional Akaitcho Territory, the land base is becoming increasingly less accessible, resulting in a loss of traditional knowledge. This is a source of concern for many community members, youth and elders alike.</td>
<td>One of four closure principles for the site is to ensure compatibility with land use in surrounding areas. To address this, all closure criteria have been developed with consideration for land use and aesthetics objectives. De Beers is committed to supporting the maintenance of traditional knowledge through the engagement of the communities, SLEMA and the Tk Panel.</td>
<td>2.4 5.1</td>
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<tr>
<td>33</td>
<td>Lutsel K’ee Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Reconstructing Vegetative Health</td>
<td>Concerns and ideas regarding the necessity to revegetate the landscape to an equal or similar pre-mine state were raised. These concerns are centralized around the length of time required to return the land to its original or similar state and the desire to fast track the process through assisted vegetative processes such as tree planting, improving soil health and removing contaminants. In addition to revegetation practices, continual testing and monitoring need to occur to maintain a level of safety and ecological stability in the region.</td>
<td>Please refer to response #28. Revegetation of the site is described in Section 5.3.1 of the FCRP and the Revegetation Plan. The Plan includes active revegetation, passive revegetation, and soil preparation. A monitoring program will be implemented to ensure that revegetation occurs in accordance with closure criteria. Contaminated areas will be remediated through an Environmental Site Assessment, as described in Section 5.3.1 of the FCRP.</td>
<td>5.3.1 Appendix I.1</td>
</tr>
<tr>
<td>34</td>
<td>Lutsel K’ee Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Continual Community-Based Monitoring</td>
<td>Community-based monitoring is a methodology that members of ŁKDFN view as necessary and pertinent to ensure the continual safety and security of the land base. Rooted in the balance between job creation and land destruction, community-based monitoring offers a means to engage community members while enhancing ecological sustainability. Concerns stem from the gap between jobs offered to the community and attainable jobs for community members throughout the mining process. This gap could be offset through the implementation of a community-based monitoring program in which community members could be</td>
<td>Post-closure inspection will be completed by a combination of professional engineers and representatives of SLEMA, which may include the TK panel. De Beers looks forward to continued dialogue to further define how this will be implemented.</td>
<td>5.1</td>
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<td>35</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Culturally Appropriate Approaches to Reclamation</td>
<td>A key component for knowledge dissemination was to identify means for culturally appropriate approaches to reclamation. As suggested by participants this would require the connectivity to the land base to be re-established through further consultation and knowledge sharing practices.</td>
<td>Community engagement practices during closure are described in the Engagement Plan. Opportunities for site visits and knowledge sharing have been included in Section 5 of the FCRP to ensure that closure activities incorporate culturally appropriate approaches. De Beers looks forward to continued dialogue to further define how this will be implemented.</td>
<td>2.4 5 5.5.5</td>
</tr>
<tr>
<td>36</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Waste management statements of concern</td>
<td>Strategy</td>
<td>Waste materials on site will be managed in accordance with an approved Waste Management Plan. The proposed Waste Management Plan for closure has been submitted with the Water Licence application. All hazardous waste will be removed from site, and any contaminated areas will be identified and remediated to meet closure criteria through an Environmental Site Assessment. Potential effects, including to human health, are described in Section 5.6 of the FCRP.</td>
<td>5.3.1.2 5.3.4 5.6</td>
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<td>Hazardous Wastes</td>
<td>Are these potential impacts expected to be mitigated to the highest standards? Are the communities aware of the extensive risks? What mitigation strategies are in place to manage these risks? What is the expected geographic extent of these impacts? What is the expected timeframe of these impacts? What are the expected impacts to regional water quality? Was the toxicity of such products divulged to community members? Is there a plan in place to mitigate impacts in a community member comes across these materials while on the land? What is this plan? Will the contact with hazardous materials be reported to communities or stored in a database accessible to communities? Will communities be notified of such incidents?</td>
<td>Monitoring (geotech, geochem, etc.) and reporting requirements have been proposed in the FCRP (Table 5.6) and proposed Water Licence; reports will be available to the community, including any abnormal results. Contingency plans (Section 5.6) are provided</td>
<td>5.3 5.5 5.6 8 9</td>
</tr>
<tr>
<td>37</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Monitoring statements of concern</td>
<td>Compliance with WL</td>
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<td>5.3 5.5 5.6 8 9</td>
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<td>Surveillance</td>
<td>• Who will have access to this surveillance?</td>
<td>to address cases where results are not meeting closure criteria. Remote surveillance will be conducted during periods of non-occupancy on the site. Surveillance, which monitors water control structures and human or wildlife activity, will be monitored from Gahcho Kue mine. The MVLWB is notified during periods of vacancy. Site stability inspections will be continued until closure criteria are achieved; these are specified in Section 5.3 of the FCRP. Post-closure monitoring, maintenance and reporting is outlined in Section 5.5 of the FCRP; these reports will be available to the communities. Progressive reclamation activities completed to date are summarized in Section 6.3. The Mine is currently in a state of Extended Care and Maintenance (ECM), which will continue until closure activities commence. Section 8.1 provides a timeline for closure activities and Section 8.2 outlines the post-closure timeline. Figure 8.1 presents a schedule of all activities at Snap Lake Mine.</td>
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<td>• Will someone be continually monitoring this surveillance?</td>
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<td></td>
<td>• Will communities be notified of periods of vacancy?</td>
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<td>• What does the surveillance footage provide us with? Is it of the entire mine?</td>
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<td>• Can the surveillance footage determine subsurface problems?</td>
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<td>• Can the surveillance footage be used to determine animal abundance and distribution around the site?</td>
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<td>Optimization</td>
<td>• What additional optimization activities will take place?</td>
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<td>• What will the wireless sensor tell us?</td>
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<td>• Will communities have access knowing if the sensor detects something unusual?</td>
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<td>• What efforts will explicitly be made to ensure reduced environmental impacts?</td>
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<td>• What are the key parameters to be used?</td>
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<td>• Will communities be alerted of periods of zero occupancy?</td>
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<td>• What does progressive reclamation entail? Is there a detailed timeline for the anticipated final closure?</td>
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<td>• Will all non-essential infrastructure be removed?</td>
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|   |       |                                                     |                           | Emergency Response                                                       | - Is there an emergency plan in place for mitigating potential situations?  
- What could go wrong that would require emergency dispatch?  
- Regulatory accountability and responsibility  
- Remain accountable in what way?  
- Is accountability in perpetuity?  
- Financial security has been provided by De Beers under the Water Licence that includes post-closure monitoring.                                                                                                                                                                                                                      |
|   |       |                                                     |                           | Geotech/Geochem                                                          | - Will these inspections occur in perpetuity?  
- Will the reports from these inspections be available to communities?                                                                                                                                                                                                                       |
|   |       |                                                     |                           | Water Quality                                                            | - When will these levels return to normalized values?  
- Have the cumulative effects of these metalloids, heavy metals, ions and other materials been investigated?  
- Do these any of materials pose a risk of a significant adverse interaction with each other?  
- Water management during closure and post-closure is described in detail in Section 5.3.2 of the FCRP. The underground mine has been flooded and has reached a stable level. Water on surface will be managed in lined ponds, to ensure that drainage remains within the  
- Financial security has been provided by De Beers under the Water Licence that includes post-closure monitoring.                                                                                                                                                                                                                     |
| 38| Lutsel K’e Dene First Nation                     | Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0 | Environmental Sustainability | UG flooding                                                              | - How does this address sustainability and enhance levels of environmental protection?  
- Is it possible for the water to permeate the soil and contaminate a larger geographic scale?  
- Water management during closure and post-closure is described in detail in Section 5.3.2 of the FCRP. The underground mine has been flooded and has reached a stable level. Water on surface will be managed in lined ponds, to ensure that drainage remains within the  
- Financial security has been provided by De Beers under the Water Licence that includes post-closure monitoring.                                                                                                                                                                                                                     |
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<td>Long term Reclamation</td>
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<td>• What indicators define successful reclamation?</td>
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<td>• What levels of risk will remain post-reclamation?</td>
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<td>• Is there a timeframe outlining the projected reclamation completion?</td>
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<td>Chemicals</td>
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<td>• How can we be certain that there will no longer be a danger following the closure of the mine?</td>
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<td>Remedial action plan</td>
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<td>• Will culturally appropriate methodologies be followed to ensure cultural continuity?</td>
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<td>• What defines a level of ecological productivity and diversity? Will there be implications if these levels are not met?</td>
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<td>• What defines the expected end land use activity? Is this definition consistent for humans and wildlife alike?</td>
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<td>Land Farm</td>
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<td>• Look into the inoculation of fungi to mitigate contamination of hydrocarbons.</td>
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<td>39</td>
<td>Lutsel K’e Dene First Nation</td>
<td>Review of Snap Lake Mine Extended Care and Maintenance Plan V2.0</td>
<td>Water Quality</td>
<td>Passive systems</td>
<td>Water management, including wetland design and operation is described in Section 5.3.2 of the FCRP. The wetland is intended to treat for nutrients only and will be monitored for a minimum of 10 years following construction.</td>
<td>5.3.2 5.5 5.6</td>
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<td></td>
<td>• Numerous concerns surround the creation of a wetland, due to the permeability and transfer of minerals and nutrients within a wetland.</td>
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How can we ensure that the wetland will not be contaminated, or worse, if contaminated leach into the surrounding environment?

**Discharge**
- What are the consequences if these levels rise above the Site Specific Water Quality Objectives?
- How long would discharge occur for?

**UG Water**
- How long will these water pumps remain operational?
- Is there a way to ensure that these pumps remain function in times of dormancy?

**Water Discharge during C&M**
- When is it projected that TDS will return to baseline levels? Are there measures in place to ensure these levels do not increase?

**Discharge criteria**
- When are these levels predicted to return to stable and pre-mine state?

A liner system will be in place to ensure that drainage remains within the system.

Post-Closure monitoring programs outlined in Section 5.5 include mechanisms for contingency response and corrective action, in the form of Trigger-Action-Response Plans (TARPs).

Underground water is no longer being pumped, as the mine is fully flooded and water levels remain stable.

Water quality criteria are based on site specific water quality objectives, rather than baseline targets. These criteria are intended to be met throughout post-closure.

Concentrations of most water quality parameters that had increased during Operations are decreasing in the main basin of Snap Lake during Extended Care and Maintenance (ECM), and are expected to continue to decrease during Closure and into Post-Closure. Water quality modeling by Golder indicates changes to water quality in Snap Lake and downstream are not expected to cause adverse effects to resident
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<td>aquatic life, do not pose a human health risk, and have not adversely affected the drinkability of the water.</td>
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Appendix C.4. Summary of Closure Commitments

The list below is a compilation of closure commitments from the various engagement and permitting/licensing activities.

Table C.4-1 2002 to 2004 Environmental Assessment and Environmental Agreement Closure Commitments

<table>
<thead>
<tr>
<th>No.</th>
<th>Commitment Description</th>
<th>Commitment Type</th>
<th>Documents/ Public Hearings</th>
<th>Commitment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>De Beers committed to ensuring our project achieves sustainability in all circles: environmental, social and economic.</td>
<td>Management</td>
<td>MVLWB Hearing Transcript, Day 1, January 27/04, p. 10</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>2</td>
<td>De Beers committed to the North Pile shell construction method represented by Sections A and C of both Figures 7.11 and 7.12 taken from the report entitled, “Snap Lake Diamond Project Surface Engineering Optimization Study North Pile Management”. Other shell configurations will be tested, however, they will not be used until proven capable of providing equal or better long term pile stability and appropriate protection to the environment.</td>
<td>Management</td>
<td>Technical Sessions, Day 7, 3 December 2003, PowerPoint presentation</td>
<td>Completed.</td>
</tr>
<tr>
<td>4</td>
<td>De Beers will have intensive monitoring around the development of the north pile to be sure that the conditions and development are appropriate</td>
<td>Monitoring</td>
<td>Information Technical Session Transcript, Day 2, December 18/03, p. 100</td>
<td>On-going. De Beers maintains this commitment. Report on monitoring completed annually as per the Water Licence.</td>
</tr>
<tr>
<td>5</td>
<td>De Beers to provide a visual representation (3-D) of how the Snap Lake site will look after operations.</td>
<td>Management</td>
<td>Information Technical Session Transcript, Day 2, December 18/03, p. 125</td>
<td>Completed. 3-D model developed and utilized as needed for engagement.</td>
</tr>
<tr>
<td>No.</td>
<td>Commitment Description</td>
<td>Commitment Type</td>
<td>Documents/Public Hearings</td>
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<tr>
<td>6</td>
<td>De Beers to consider the possibility of a wildlife habitat compensation program.</td>
<td>Management</td>
<td>Information Technical Session Transcript, Day 2, December 18/03, p. 136</td>
<td>De Beers maintains this commitment.</td>
</tr>
<tr>
<td>7</td>
<td>De Beers will continue to facilitate the collection of Traditional Knowledge and will develop environmental monitoring programs that incorporate both Traditional Knowledge and science for the Snap Lake Diamond Project.</td>
<td>Management and Engagement</td>
<td>IR 1.42b, 2.2.13b; EAR Table 14.2-1</td>
<td>On-going. De Beers maintains this commitment. See Section 2.4 of this FCRP for additional discussion regarding engagement. Traditional Knowledge collection a component of several research programs. De Beers will facilitate engagement as per Engagement Plan (Version 1) approved by the Board on April 18, 2016. De Beers hosts site visits to Snap Lake and visits Aboriginal Communities each summer.</td>
</tr>
<tr>
<td>8</td>
<td>De Beers will avoid locations identified as having archaeological potential. Site personnel will be trained on what to do when a historical artifact is discovered.</td>
<td>Management</td>
<td>EAR p. IV.1-12</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>9</td>
<td>De Beers intends to refine information on the water quality of paste backfill porewater and to investigate potential amendments to the paste backfill</td>
<td>Management</td>
<td>North Lakes Report, April 2002, p. 65-66</td>
<td>Change in operation and commitment. Due to technical difficulties in development and deposition of PK paste, De Beers will place 100% of the PK produced over the life of the mine in the North Pile.</td>
</tr>
</tbody>
</table>

De Beers Canada Inc.
<table>
<thead>
<tr>
<th>No.</th>
<th>Commitment Description</th>
<th>Commitment Type</th>
<th>Documents/Public Hearings</th>
<th>Commitment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>As part of operational monitoring, De Beers will assess North Pile seepage quality and quantity and update or adjust water quality predictions, treatment, and mitigation strategies on an on-going basis as required</td>
<td>Management and Monitoring</td>
<td>IR 3.8.12, 3.10.18a</td>
<td>On-going. De Beers maintains this commitment. Report on monitoring completed annually as per the Water Licence. Acid/Alkaline Rock Drainage and Geochemical Characterization Plan approved by the Board on October 15, 2014. Surveillance Network Program completed as required by the project Water Licence.</td>
</tr>
<tr>
<td>12</td>
<td>Work is currently underway to collect baseline data from the north lakes area to refine the impact predictions of the EA. Once data collection and analysis is complete, information will be made available and monitoring plans based on the revised predictions will be finalized.</td>
<td>Management and Monitoring</td>
<td>IR 3.10.18a</td>
<td>Completed. Additional baseline studies completed to include a second reference lake.</td>
</tr>
<tr>
<td>13</td>
<td>Achieve appropriate consultation, in concert with DFO, to ensure the losses and gains of fish habitat, as well as the objectives of “No Net Loss” in relation to this project are communicated.</td>
<td>Engagement</td>
<td>Fish Habitat Information and Loss Accounting for Waterbodies Situated on the Northwest Peninsula of Snap Lake, 10 February 2003.</td>
<td>Completed. See Section 2.5.2 of this FCRP for summary of DFO authorizations.</td>
</tr>
<tr>
<td>14</td>
<td>Complete any regulatory requirements associated with the Snap Lake Diamond Project relating to “No Net Loss” and DFO’s Policy for the Management of Fish Habitat (1986).</td>
<td>Regulatory</td>
<td>Fish Habitat Information and Loss Accounting for Waterbodies Situated on the Northwest Peninsula of Snap Lake, 10 February 2003.</td>
<td>Completed. See Section 2.5.2 of this FCRP for summary of DFO authorizations.</td>
</tr>
<tr>
<td>15</td>
<td>The Snap Lake Diamond Project will implement a decommissioning and reclamation monitoring program that will extend and evolve throughout the construction, operation, and decommissioning phases of the project.</td>
<td>Management and Monitoring</td>
<td>EAR, Section 10.3.2.2.5</td>
<td>On-going. See Section 5.5 of this FCRP for post-closure monitoring.</td>
</tr>
<tr>
<td>16</td>
<td>Emerging technology and techniques will be implemented as they become available and the program will continue to evolve in consultation with government organizations and communities.</td>
<td>Management</td>
<td>EAR, Section 10.3.2.2.5</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>No.</td>
<td>Commitment Description</td>
<td>Commitment Type</td>
<td>Documents/Public Hearings</td>
<td>Commitment Status</td>
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<tr>
<td>17</td>
<td>De Beers will develop an adaptive management approach to reclamation that will incorporate the results of the re-vegetation and experimental test plot program. Research and reclamation approaches that have been developed as part of other mine operations in the region (e.g., BHP Billiton's EKATI Diamond Mine™) will also be employed as appropriate.</td>
<td>Management</td>
<td>IR 1.6, 1.8</td>
<td>On-going. De Beers maintains this commitment. See Appendix J of this FCRP for description of the revegetation research program.</td>
</tr>
</tbody>
</table>
### Table C.4-2 2003 Preliminary Closure and Reclamation Plan Closure Commitments

<table>
<thead>
<tr>
<th>No.</th>
<th>Commitment Description</th>
<th>Commitment Type</th>
<th>Documents/Public Hearings</th>
<th>Commitment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>De Beers is committed to a program of progressive reclamation at Snap Lake. Progressive reclamation has been built in as an integral part of the mine plan.</td>
<td>Management</td>
<td>IR1.8; Preliminary Mine Closure &amp; Reclamation Plan, 28 February 2003.</td>
<td>Complete. See Section 6 of this FCRP for updated information.</td>
</tr>
<tr>
<td>2</td>
<td>De Beers is committed to reducing residual environmental effects at the site upon closure.</td>
<td>Management</td>
<td>Preliminary Mine Closure &amp; Reclamation Plan, 28 February 2003.</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>3</td>
<td>De Beers is committed to providing suitable financial security and assurance to cover the cost of full reclamation of the Snap Lake Diamond Project.</td>
<td>Management</td>
<td>Preliminary Mine Closure &amp; Reclamation Plan, 28 February 2003.</td>
<td>On-going. See Section 10 of this FCRP for updated information.</td>
</tr>
<tr>
<td>4</td>
<td>With respect to contaminant uptake by roots of plants that grow on the North Pile, De Beers committed to monitor to see if there is root penetration to the processed kimberlite [North Pile]. If so, and if the lead shape is showing to be acidic, then De Beers indicated it will monitor plant tissue for any kind of metal uptake.</td>
<td>Management and Monitoring</td>
<td>Public Hearing Transcripts, Day 4, 1 May 2003, p. 103.</td>
<td>North Pile is not to be revegetated. Revegetation priority areas are identified in Section 5.3.1 and Appendix J of this FCRP.</td>
</tr>
<tr>
<td>5</td>
<td>De Beers is committed to maximizing recycling opportunities where suitable facilities exist within reasonable proximity (e.g. Alberta) at the time of closure, and where materials can be recycled at a reasonable cost. This includes some materials such as scrap metal, tires, conveyor belting, glass, etc. and may also include hazardous materials such as glycol, batteries and waste oil.</td>
<td>Management</td>
<td>Buried Materials Technical Memo, 28 February 2003.</td>
<td>On-going. De Beers maintains this commitment. See Section 5.3.4 of this FCRP.</td>
</tr>
<tr>
<td>6</td>
<td>De Beers is committed to continuing these efforts throughout the life of the project as they represent sound business and environmental management practices.</td>
<td>Management</td>
<td>IR 3.5.2d</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>7</td>
<td>De Beers is committed to the use of adaptive management in all aspects of operations. ISO 14001 Environmental Management Systems are based on the use of adaptive management and it is through this that De Beers’ commitment to “continual improvement” in environmental performance will be achieved. Adaptive management will be used to refine mitigation measures, including those that relate to wildlife</td>
<td>Management</td>
<td>IR 4.11.18a, 4.9.2</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>No.</td>
<td>Commitment Description</td>
<td>Commitment Type</td>
<td>Documents/Public Hearings</td>
<td>Commitment Status                                                                anoi</td>
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<tr>
<td>8</td>
<td>De Beers commits to changing its mitigative measures when the effects are different than those predicted (i.e., beyond the range of results normally expected). This process would be captured by the environmental management system during annual management reviews, regular internal auditing or documented internal communication between environmental staff and management.</td>
<td>Management</td>
<td>IR 3.5.15c</td>
<td>On-going. De Beers maintains this commitment and has been integrated into it the Mine’s management and monitoring plans.</td>
</tr>
</tbody>
</table>
### Table C.4-3  Water Licence 2011 Renewal Closure Commitments

<table>
<thead>
<tr>
<th>No.</th>
<th>Commitment Description</th>
<th>Commitment Type</th>
<th>Documents/Public Hearings</th>
<th>Commitment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>De Beers has undertaken to refine the predictive models with additional data and investigate possible management actions, as well as monitor TDS concentrations and report the same. When this has been completed, De Beers will have a technically defensible, environmentally protective path forward to put to the Board no later than 2013.</td>
<td>Management and Monitoring</td>
<td>Letter to Mackenzie Valley Land and Water Board (“MVLWB”) Re: Information Request #1, dated 29 June, 2011</td>
<td>Completed. Updated models were provided in June 2011 as part of the 2011 Water Licence Renewal Application, and again with the 2013 Water Licence Amendment Application. Models were further refined and provided within the Snap Lake Mine, Extended Care and Maintenance Plan V1.1 approved by the Board June 22, 2017 with conformance confirmed June 30, 2017.</td>
</tr>
<tr>
<td>2</td>
<td>De Beers will provide a summary of the site model, the lake model and the hydrogeology model in Snap Lake over time by September 27.</td>
<td>Management</td>
<td>Technical Sessions Day 1, 14 September, 2011, p. 240</td>
<td>Completed. Updated models were provided in June 2011 as part of the 2011 Water Licence Renewal Application, and again with the 2013 Water Licence Amendment Application.</td>
</tr>
<tr>
<td>3</td>
<td>De Beers has committed to limiting the amount of processed kimberlite placed in the North Pile to approximately 50% of the amount produced over the life of the mine.</td>
<td>Management</td>
<td>Letter to Board re: Response to AANDC Inspector Report, dated September 29, 2011.</td>
<td>Change in operation and commitment. Due to technical difficulties in development and deposition of PK paste, De Beers will place 100% of the PK produced over the life of the mine in the North Pile.</td>
</tr>
<tr>
<td>4</td>
<td>De Beers has committed to progressive reclamation and to full reclamation after the mine closes.</td>
<td>Management</td>
<td>Letter to Board re: Response to AANDC Inspector Report, dated September 29, 2011.</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>5</td>
<td>De Beers has committed to evaluating the footprint of the entire North Pile as part of the detailed design of the West Cell.</td>
<td>Management</td>
<td>Letter to Board re: Information Requests (#37) Responses to EC, DFO &amp; AANDC, dated 11 October, 2011</td>
<td>Complete. North Pile West Cell Design Information Package submitted in August 2014. With final closure of the mine, the footprint will remain static.</td>
</tr>
<tr>
<td>No.</td>
<td>Commitment Description</td>
<td>Commitment Type</td>
<td>Documents/Public Hearings</td>
<td>Commitment Status</td>
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<tr>
<td>6</td>
<td>De Beers has committed to fully defining the closure surface of the North Pile as part of the detailed design of the West Cell.</td>
<td>Management</td>
<td>Letter to Board re: Information Requests (#38) Responses to EC, DFO &amp; AANDC, dated 11 October, 2011</td>
<td>On-going. Sequencing to provide West Cell design and closure surface of entire North Pile did not permit these activities to occur together. This was a result of the option to raise the Starter Cell. North Pile closure surface is defined in Section 5.3.2 and Appendix H of this FCRP.</td>
</tr>
<tr>
<td>7</td>
<td>De Beers has committed to evaluating the use of geosynthetics based on the research findings on the bearing capacity of geosynthetics for the Starter Cell.</td>
<td>Management</td>
<td>Letter to Board re: Information Requests (#47) Responses to EC, DFO &amp; AANDC, dated October 11, 2011</td>
<td>On-going. Aspect has been evaluated in the design of the North Pile cover, see Appendix H.3 of the FCRP.</td>
</tr>
<tr>
<td>8</td>
<td>De Beers committed to continuing to operate the Snap Lake Mine in a sustainably, environmentally and socially responsible manner.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 1, December 13, 2011, p. 23</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
<tr>
<td>9</td>
<td>De Beers has committed to rerun the models which forecast what will happen in the future to water quality at Snap Lake on a regular basis using observed data.</td>
<td>Management and Monitoring</td>
<td>Public Hearing Transcripts, Day 1, December 13, 2011, p. 30</td>
<td>On-going. Most recent updates provided in Section 5.3.2 of this FCRP.</td>
</tr>
<tr>
<td>10</td>
<td>De Beers stated that they are currently evaluating ways in which water quality modeling can be improved to reduce uncertainties.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 31</td>
<td>See status of Commitment 9.</td>
</tr>
<tr>
<td>11</td>
<td>De Beers will update and refine their water quality model as they learn more about the mine.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 33</td>
<td>See status of Commitment 9.</td>
</tr>
<tr>
<td>No.</td>
<td>Commitment Description</td>
<td>Commitment Type</td>
<td>Documents/Public Hearings</td>
<td>Commitment Status</td>
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</tr>
<tr>
<td>13</td>
<td>De Beers committed to backfilling 50 percent of the total amount of the processed kimberlite into the mined-out areas underground over the life of the mine.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 39</td>
<td>Change in operation and commitment. Due to technical difficulties in development and deposition of PK paste, De Beers will place 100% of the PK produced over the life of the mine in the North Pile.</td>
</tr>
<tr>
<td>14</td>
<td>De Beers conducts regular geotechnical surveys concerning the stability of the North Pile.</td>
<td>Monitoring</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 40</td>
<td>Geotechnical site inspections continue to be completed on an annual basis as required by the project Water Licence.</td>
</tr>
<tr>
<td>15</td>
<td>An annual inspection of the North Pile is completed by a professional engineer registered in the Northwest Territories in accordance with the water license requirements, and daily inspections of the North Pile are part of normal operating procedures.</td>
<td>Regulatory and Monitoring</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 41</td>
<td>On-going. Requirement of the Water Licence (Part E, Item 3) and reported annually within the Annual Report.</td>
</tr>
<tr>
<td>16</td>
<td>De Beers will conduct the monitoring necessary to address thermal condition stability and closure conditions of the North Pile.</td>
<td>Monitoring and Management</td>
<td>Public Hearing Transcripts, Day 1, 13 December, 2011, p. 81</td>
<td>On-going. De Beers maintains this commitment. Annual summary presented within the Water Licence Report.</td>
</tr>
<tr>
<td>17</td>
<td>De Beers has committed to reviewing the 2011 Interim Closure and Reclamation Plan at a later date.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 3, 15 December, 2011, p. 186</td>
<td>Completed. As per MVLWB direction, 2011 ICRP (v3.1) was revised and 2013 ICRP (v3.2) approved by MVLWB in 2014.</td>
</tr>
<tr>
<td>18</td>
<td>De Beers has committed to being proactive in identifying and resolving any operational or environmental management issues as they may arise in the future.</td>
<td>Management</td>
<td>Public Hearing Transcripts, Day 3, 15 December, 2011, p. 187</td>
<td>On-going. De Beers maintains this commitment.</td>
</tr>
</tbody>
</table>
Table C.4-4  March 13, 2013 Closure Workshop Closure Commitments

<table>
<thead>
<tr>
<th>No.</th>
<th>Commitment Description</th>
<th>Commitment Type</th>
<th>Documents/Public Hearings</th>
<th>Commitment Status</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>De Beers will clearly demonstrate (using flow charts or tables) the relationship between closure objectives, options and the proposed reclamation research topics within the updated ICRP.</td>
<td>Linkages from closure objective/criteria to research</td>
<td>Closure Options and Research Technical Workshop, March 13, 2013.</td>
<td>Completed. See Section 5.3.1 of this FCRP.</td>
</tr>
<tr>
<td>2</td>
<td>De Beers will provide a summary table of commitments regarding closure in the updated ICRP.</td>
<td>Commitments</td>
<td>Closure Options and Research Technical Workshop, March 13, 2013.</td>
<td>Completed. See Appendix C of this FCRP.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Comment (doc) AANDC Cover Letter</td>
<td>De Beers’ Response</td>
<td>MVLWB Staff Response</td>
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<tr>
<td>1</td>
<td>General File</td>
<td>Comment(s): AANDC Review</td>
<td>AANDC Cover Letter</td>
<td>Recommendation</td>
</tr>
<tr>
<td>2</td>
<td>General Comment - Reclamation Research</td>
<td>Comment(s): The plan includes several areas of specific research, the results of which will form the basis for developing more advanced closure activities and objectives. As such, only generalized closure details are provided in the Interim Closure and Reclamation Plan for the three mine components. Given that much information and detail remains to be provided, AANDC has provided fairly high level comments on the contents of the plan.</td>
<td>Sep 19: De Beers is committed to completing reclamation research to inform areas of uncertainty and aid in final closure planning. The reclamation research plan as presented in the ICRP is reflective of this fact. De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation research and relevant closure information, in addition to, providing specific reclamation reports as an Appendix.</td>
<td>Appropriate response</td>
</tr>
<tr>
<td>3</td>
<td>General Comment - Post-Closure Monitoring</td>
<td>Comment(s): The plan includes very little information about post-closure monitoring. In all, less than a page is devoted to the subject. This is a concern for the Department as post-closure monitoring is required after reclamation is complete in order to assess performance and ensure that closure objectives and criteria are being achieved.</td>
<td>Sep 19: A more detailed post-closure monitoring discussion that includes a timeframe for monitoring will be provided in the revised ICRP.</td>
<td>Given the early stage of Life of Mine, more detailed Post Closure monitoring plans can be addressed in following versions of the ICRP. During the Criteria stage it will be easier to discuss post closure monitoring details.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Reviewer Comment(s): / Recommendation</td>
<td>De Beers' Response</td>
<td>MVLWB Staff Response</td>
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<td>would occur (e.g. thermal monitoring in North Pile, seepage quality and quantity monitoring, stability monitoring, dust/air monitoring, AEMP monitoring, etc.).</td>
<td>Provisional closure criteria are provided for some closure objectives. AANDC notes the importance of closure criteria as they will be used to confirm that a closure objective has been met in the post-closure period. Ultimately, the following is required to assess performance of closure activities and determine if the company can relinquish the site: derivation of final closure objectives, activities and criteria; post-closure monitoring; and post-closure performance assessments. It is the relinquishment aspect that makes derivation of closure criteria critically important to the closure and reclamation planning process. As such, research and refinement of closure criteria should be the focus for DeBeers in the next few years. AANDC notes that separate reclamation objectives and activities may be required for different parts of the North Pile and specific closure objectives and criteria may ultimately be required for each sub-component (such as: PAG rock, landfill area, landfarm area, Starter Cell, East/West Cell, etc.).</td>
<td>Sep 19: De Beers will review language in the draft ICRP and where possible, strengthen the language in the revised ICRP to note that closure criteria is a key component to develop before the next version of the ICRP is completed (i.e., 3 years from date of approval of the current ICRP). The development of closure criteria in the next ICRP was a planned activity as directed by the MVLWB. Further development of closure criteria is a reclamation research activity summarized in Appendix E, Section 2.3 of the ICRP. De Beers' current reclamation objectives have been approved by the MVLWB and were derived with input from the MVLWB, reviewers and De Beers. The categorization of the objectives into the main mine site areas was an outcome of the MVLWB review process and ruling. As a result, De Beers followed the MVLWB ruling on reclamation objectives in the development of the ICRP. AANDC's comment that &quot;separate reclamation objectives and activities may be required&quot; suggests that the current MVLWB approved objectives may not be considerate of specific mine components. De Beers is interested in advancing the ICRP towards a final plan and will consider in the development of closure criteria the specific mine components; however, De Beers will work within the MVLWB approved reclamation objectives in completing this work. Reclamation research for the North Pile has been initiated and reported annually with the Annual Closure and Reclamation Plan.</td>
<td>Appropriate response.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Reviewer Comment(s) / Recommendation</td>
<td>De Beers' Response</td>
<td>MVLWB Staff Response</td>
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<tr>
<td>5</td>
<td>General Comment - Slurry vs. Paste &amp; Progressive Reclamation</td>
<td>should be made available to the Board and reviewers as soon as they are available.</td>
<td>Progress Report since 2011 (research initiated in 2010). It is De Beers' opinion that annual submission of reclamation research is a suitable timeframe to submit findings to the MVLWB and reviewers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comment(s): AANDC notes that the ICRP rarely discusses the mechanism for PK deposition into the North Pile. In the later sections of the ICRP (i.e. Progressive Reclamation p. 109 of 143) the fact that PK is deposited as slurry is revealed. There is little discussion about the implications of PK deposition into the East Cell as slurry rather than paste (deposition began in 2012). AANDC notes that the Progressive Reclamation section correctly references uncertainty in the closure of the Starter Cell due to its higher water content. The greater the amount of water in the cell the longer it will take for permafrost to aggrade. However, the section goes on to discuss that the East and West cell will receive waste materials with lower water content. AANDC notes that this has not been the case for the East Cell to date.</td>
<td>Sep 19: Within the ICRP v3.2 Reclamation Research Plan (Appendix E, Section 3.1) De Beers identifies and discusses the reclamation uncertainties with regards to slurry deposition versus paste deposition within the North Pile. Thus, research is planned to address this topic. De Beers will provide further discussion on PK type deposited into the Starter and East Cells to date within Section 4.4.2.1. The West Cell of the North Pile is not operational. The time of deposition of PK, and type of PK deposited within the North Pile is influenced by a variety of factors, including the paste trials being completed at Snap Lake. An update on paste activities and deposition was provided within De Beers' Aug 30, 2013 submission to the MVLWB titled &quot;Snap Lake Mine De Beers Canada Inc. Follow Up to Starter Cell Raise Request Water Licence #MV2011L2-0004&quot;. As a result of current paste research and the variability inherent in optimizing mine operations, De Beers cannot provide long-term predictions, with certainty, of PK quantities and type to be reported to the North Pile. Rather, a summary of materials deposited to the North Pile is reported in the Annual Report as per Schedule 1 Part B, Item 1(r). Paste has been successfully deposited within the North Pile and in the Starter Cell Phase IV lift package it is noted that a summary of research will be submitted in the 2013 WLAR.</td>
<td>During the October 30, 2013 WG meeting on the NP, De Beers made reference to Paste Feasibility studies to be completed in February 2014. It is anticipated that these studies would provide De Beers with increased clarity regarding the operation of the NP. As part of their NP Management Plan, which remains outstanding, De Beers will have to highlight any additional plans (including the ICRP) that are impacted by any proposed changes to the NP Management Plan.</td>
<td>Updated. PK paste deposition in the North Pile is no longer a planned operation. See Section 4.6.1 and 5.3.2 of this FCRP for updated North Pile description and alternative analysis.</td>
</tr>
<tr>
<td>ID</td>
<td>Topic</td>
<td>Reviewer Comment(s): / Recommendation</td>
<td>De Beers' Response</td>
<td>MVLWB Staff Response</td>
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</tr>
<tr>
<td>6</td>
<td>Section 4 Project Description - 4.4.2.1 North Pile</td>
<td><strong>Comment(s):</strong> The section notes that DeBeers has committed to progressively reclaiming the North Pile. Once a cell has reached its capacity it would be reclaimed. Note that the timeline for reclamation of the Starter Cell would be altered because of the proposed raise to the structure which is currently under review by the MVLWB. Further, as noted above, the deposit of PK as slurry has also occurred in the East Cell. <strong>Recommendation(s):</strong> AANDC recommends that the ICRP account for all potential PK deposition methods (i.e., slurry, paste, combination) as the different methods will have a direct bearing on the closure option, activity, criteria and performance monitoring for any cell that does not receive PK as a paste only.</td>
<td>Sep 19: Reclamation research is planned to further understand the uncertainties regarding the North Pile closure performance. Specific questions have been identified to assess the impact of slurries versus paste deposition, permafrost aggradation into the waste materials, etc. Without the analysis being completed, it is De Beers opinion that it is premature to conclude that PK deposition method will have a &quot;direct bearing on the closure option, activity, criteria and performance monitoring&quot;. De Beers accepts AANDC perspective and will integrate this recommendation into the proposed research plan. Post deposition piezometers/ thermistors will be install on the cells.</td>
<td>Appropriate response. Without the completed research to clarify uncertainties of the various types of paste and associated closure methods, it is difficult for De Beers to respond until these have been clarified. However as research results are gathered, the different closure methods will have to be identified and discussed.</td>
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<td>7</td>
<td>Section 4 Project Description - 4.4.2.1 North Pile and 4.4.2.2 Underground Mine</td>
<td><strong>Comment(s):</strong> The section describes that over the mine life it is estimated that 1.8 Mt of waste rock and 23 Mt of PK will be produced. As per the mine plan, DeBeers is to deposit nearly half of the PK produced by the mine into the underground as backfill. In 2012, 1.29 Mt of PK was deposited into the North Pile as the deposit of PK as backfill had yet to begin. <strong>Recommendation(s):</strong> AANDC recommends that DeBeers include the anticipated date for the deposit of PK as underground backfill in this section of the ICRP. Also, DeBeers should describe if there are any consequences from an operational standpoint if PK is not deposited underground as backfill for the remainder of the mine life. AANDC recommends that DeBeers prepare a schedule, similar to Figure 4.4 that outlines the schedule and total anticipated volume of PK deposited underground for the remainder of the mine life. This schedule should be included in the ICRP.</td>
<td>Sep 19: An update regarding on paste activities and deposition was provided within De Beers' Aug 30, 2013 submission to the MVLWB titled &quot;Snap Lake Mine De Beers Canada Inc. Follow Up to Starter Cell Raise Request Water Licence #MV2011L2-0004&quot;. Research in regards to underground paste deposition is currently being completed and an anticipated date for deposit cannot be provided at this time. Information on paste research has been proposed to be discussed Quarterly at the Snap Lake update meeting. The quantity of paste deposited is incorporated into the Water License Annual report and duplicating the information in this report is unnecessary.</td>
<td>The February 2014 Feasibility Study should provide some insight into these concerns.</td>
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<td>8</td>
<td>Section 4 Project Description - 4.4.2.3 Infrastructure - Water Management System</td>
<td>This section does not include any description of the water management issues and water storage issues encountered at the mine site over the past few years. The section states, “Effective water management strategies at the Snap Lake Mine have been developed to minimize impacts to the aquatic environment from the Project.” There is no reference to the recent modeling that suggests that inflows into the underground are expected to reach 56,000 m³/day by the end of operations which is a drastic increase (nearly double) from previous inflow rate estimates.</td>
<td>Sep 19: De Beers Canada Inc. agrees to add quarry sequencing as a research item in the closure plan. The quarrying is presently planned within the West Cell footprint. Existing gravel laydowns could be considered as a granular resource source during final reclamation; however, this option has not been considered in the ICRP.</td>
<td>Completed. Cover borrow materials and landfill sequencing are described in Section 5.3.2 of the FCRP.</td>
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<td>9</td>
<td>Section 4 Project Description - 4.4.2.3 Infrastructure - Quarries</td>
<td>AANDC is concerned with the sequencing of PK deposition which is expected to cover all quarries including the quarry in the West Cell; however, that quarry is also intended to provide the source material for the closure cover for any PK deposited in the West Cell. AANDC assumes that cover material will be extracted from the quarry and then stockpiled until it is required for construction of the cover. This should be clearly explained in the plan. However, if an alternate approach is contemplated it should be explained in the ICRP.</td>
<td>Sep 19: De Beers Canada Inc. agrees to add quarry sequencing as a research item in the closure plan. The quarrying is presently planned within the West Cell footprint. Existing gravel laydowns could be considered as a granular resource source during final reclamation; however, this option has not been considered in the ICRP.</td>
<td>Completed. Cover borrow materials and landfill sequencing are described in Section 5.3.2 of the FCRP.</td>
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<td>10</td>
<td>Section 4 Project Description - 4.4.2.3 Infrastructure - Landfarm</td>
<td>Comment(s): The section states that a lined landfarm currently exists at the mine and is located within the North Pile area. The cell is designed to bioremediate any hydrocarbon impacted materials and soil. Operation of the landfarm has not occurred to date. Recommendation(s): AANDC recommends that the ICRP include a schedule and anticipated volumes of hydrocarbon impacted soil expected during the remaining operation of the mine. This data should be based on information from previous years. This data would be used to determine the amount of available construction material and or cover material that may be available at the end of operations after successful bioremediation.</td>
<td>Sep 19: De Beers currently ships hydrocarbon contaminated soil off site instead of treatment within the on-site landfarm. De Beers can provide in the revised ICRP a summary of quantity of contaminated soil shipped off-site, which may provide a rough basis for the yearly quantity generated during operations. It is unknown if the operations quantity would be similar to closure quantity, but nonetheless will provide a reasonable yearly approximation.</td>
<td>Appropriate response. The waste management plan should explain or reference how the hydrocarbons are dealt with on site.</td>
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<td>11</td>
<td>Table 5.4 Closure Objectives, Criteria, Measurements, Research</td>
<td>Comment(s): All objectives and criteria presented here require follow-up monitoring. See comment above about post-closure monitoring. Recommendation(s): AANDC recommends that this table include a column for monitoring which could include type, frequency and length.</td>
<td>Sep 19: See response to AANDC review comment #3.</td>
<td>This should be included in the next version of the ICRP, which will deal with criteria.</td>
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<td>12</td>
<td>Table 5.4 Closure Objectives, Criteria, Measurements, Research</td>
<td>Comment(s): Table headings are incorrect on subsequent pages. Recommendation(s): AANDC recommends the table be updated.</td>
<td>Sep 19: Tables will be updated in the revised ICRP.</td>
<td>Appropriate response</td>
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<td>13</td>
<td>Table 5.4 Closure Objectives, Criteria, Measurements, Research - North Pile</td>
<td>Comment(s): AANDC is aware that the objectives included in the Table were approved by the MVLWB and recommended for inclusion in v. 3.2 of the ICRP. However, the closure objectives for the North Pile do not include impacts to water such as seepage, leachate and or runoff. This Sep 19: It is De Beers’ understanding that water quality from the North Pile is addressed within the following site wide closure objective (SW3) - Surface runoff and seepage water quality that is safe for people, vegetation, aquatic life, and wildlife. An additional</td>
<td>De Beers’ interpretation of the Objectives is correct.</td>
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<td>renders the objectives for the North Pile incomplete (only requires a cover and physical stability). DeBeers has correctly mentioned the uncertainty regarding the reclamation of the North Pile, in particular the starter Cell because of the high water content. This will undoubtedly lead to seepage issues and delay permafrost aggradation in the pile. <strong>Recommendation(s):</strong> AANDC recommends that beyond the PK cover and physical stability requirement for the North Pile, an additional objective be required related to chemical stability. This objective could include criteria such as thermal, geochemical, water content/% saturation, runoff quality, seepage quality, geochemical, etc.</td>
<td>objective, as recommended by AANDC, is therefore not necessary.</td>
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<td>14</td>
<td>Table 5.7 - Closure Objectives, Closure Activity, Options Considered, Research</td>
<td><strong>Comment(s):</strong> In some instances only a few words are provided regarding alternative closure activities and options for each closure objective. <strong>Recommendation(s):</strong> AANDC recommends that the ICRP clearly describe the alternative Closure Activities and Options for all the mine components in the event that testing or analyses indicate that the preferred option can not be implemented.</td>
<td>Sep 19: A description of closure options and activities for specific mine components is provided in Section 5.2.4 of the ICRP.</td>
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<td>15</td>
<td>Section 5.2.4.1 North Pile</td>
<td><strong>Comment(s):</strong> The section describes the anticipated rock cover thickness proposed for the North Pile which may include PAG and PK material. The proposed cover thickness for PAG material is at least 4 m and the cover thickness proposed for PK material is 0.5 m of 250 mm minus material. There is no mention of proposed cover type and thickness over the landfill and landfarm areas. AANDC assumes that the cover for the PK material would need to be crushed in order to meet the specification. However, a thicker cover could be placed that would reduce this handling/crushing requirement. AANDC notes that</td>
<td>Sep 19: Reclamation research on cover material thickness and gradation commenced in 2010 and has been reported in annual reports to the MVLWB. Research continues on the topic of cover material specifications and performance as outlined in Appendix E, Section 3.2 of the ICRP.</td>
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<td>the section states that rock cover thickness and material gradation were not evaluated at this time. AANDC also notes that reclamation research is proposed to help address specifics regarding cover material and thickness. AANDC expects that settlement may occur for PK depositional areas, particularly those with high water content. <strong>Recommendation(s):</strong> AANDC recommends that reclamation research occur immediately to determine the type and source of cover material and cover thickness. This would ensure that proper specifications are in place for progressive reclamation proposed for each cell of the North Pile.</td>
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<td>16</td>
<td>Appendix E - Reclamation Research Plans</td>
<td><strong>Comment(s):</strong> Throughout the reclamation research plan overview sections, descriptions and results of research conducted since 2010 have been included and or referenced (specifically revegetation, north pile and underground research). Some of these reports have not been referenced at the end of the research plan section. Many of these reports are not available to reviewers. <strong>Recommendation(s):</strong> AANDC recommends that research pertaining to reclamation be made available to reviewers. Any future reclamation research results should be provided to reviewers as part of Annual Reclamation Status Reports.</td>
<td>Sep 19: De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation research and relevant closure information, in addition to, providing specific reclamation reports as an Appendix. Note, that not all research has a report associated with its completion; for example, on site experiences and observations help fill research gaps, but may not have a formal report that can be provided as an Appendix.</td>
<td>De Beers response is sufficient provided they provide all referenced material in the Appendices. In the past not all references were made available.</td>
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<td>17</td>
<td>Appendix E - Reclamation Research Plan - 2.2 Revegetation</td>
<td><strong>Comment(s):</strong> A potential research topic could include vegetation of fine PK areas particularly as an alternative to a rock cover in zones prone to ponding or instability (sinking rock cover due to water content). <strong>Recommendation(s):</strong> AANDC recommends that this be included in the Reclamation Research Plan.</td>
<td>Sep 19: De Beers in partnership with various consultants does and will research various alternatives for closure.</td>
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<td>Appendix E - Reclamation Research Plan - 2.3 Development of Closure Criteria</td>
<td>Comment(s): Research for the development of closure criteria is welcomed. The type and results of the research must be included as part of the Annual Reclamation Status Reports. <strong>Recommendation(s):</strong> AANDC recommends that closure criteria be developed for all mine components and that the criteria are measurable.</td>
<td>Sep 19: De Beers will complete closure criteria to satisfy each closure objective. Development of closure criteria is a planned research activity (Appendix E, Section 2.3). Criteria will be developed, where possible, to be measurable. De Beers completes closure status updates annually as per the land lease and water licence. It is typical that the annual reporting summarizes the findings of reclamation and relevant closure information, in addition to, providing specific reclamation reports as an Appendix.</td>
<td>This is certainly the intent of the criteria. This will be covered in depth during the next version of the ICRP (Version 4.0).</td>
<td>Complete. Closure criteria are provided for each objective in Section 5.2.3 and Section 9 of the FCRP.</td>
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<td>19</td>
<td>Appendix E - Reclamation Research Plan - 3 North Pile</td>
<td>Comment(s): There are many topics outlined in the North Pile research plan concerning areas of uncertainty. However the objectives presented only cover closure covers and physical stability. Chemical stability objectives for the North Pile have not been included in the ICRP. The research pertaining to the Starter Cell is critically important and understanding the geotechnical and geochemical conditions is extremely important to AANDC as well since, depending upon when paste is produced, conditions in the starter cell may represent conditions in the North Pile as a whole. Further, AANDC views thermal monitoring within the Starter Cell and the East Cell as being of equal value. <strong>Recommendation(s):</strong> AANDC recommends that the Starter Cell research be initiated immediately and that results be provided to the Board and reviewers annually.</td>
<td>Sep 19: Reclamation research into the North Pile closure performance has commenced and findings will be reported in the annual report to the MVLWB. The structure of Appendix E is arranged to have primary headings correspond to the reclamation objectives. North Pile research includes aspects of uncertainty beyond closure cover and physical stability, and does include thermal and water quality aspects.</td>
<td>Appropriate response</td>
<td>Complete. Studies of North Pile thermal and water quality are summarized in Section 5.3.2 and detailed in Appendix H; updated water quality studies have been provided with the Water Licence application.</td>
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<td>20</td>
<td>Appendix E - Reclamation Research Plan - 4 Underground Mine</td>
<td>Comment(s): AANDC has concerns with potential leaching of contaminants from the backfilled PK which is to be placed underground. There is little discussion of this concern in the body of the ICRP. In Section 3.3.5 - Acid/Alkaline Rock Drainage - Metal Leaching Potential, analysis</td>
<td>Sep 19: De Beers will review language in the draft ICRP and where possible, strengthen the language in the revised ICRP regarding potential leaching of metals from paste backfill and linkages with groundwater inflow/outflow from the underground mine. Regular review and</td>
<td>Annual closure Progress Report will be submitted by April 30, 2014. Pursuant to Part I Item 3.</td>
<td>Updated. PK paste deposition in the underground is no longer a planned operation. See AANDC #5 for FCRP updates.</td>
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<td>conducted by DeBeers indicated that leachate from paste backfill is alkaline and can contain a limited number of elevated metals (e.g. aluminum, copper and lead). The underground reclamation research plan outlines this area of uncertainty and includes a task to test backfill blends prior to the release of the next version of the ICRP in 2016. Recommendation(s): AANDC recommends that the leaching of metals from paste backfill be discussed within the body of the ICRP. This potential, coupled with the recent inflow predictions warrants further description. AANDC recommends that the results of the paste backfill research and testing be included in annual progress reports. The ICRP suggests that backfilling of PK is to begin in the near future.</td>
<td>meetings have been suggested by De Beers with the regulators where updates will be given. Annual reports would also include paste progress. Findings from the reclamation research will be reported in the annual report to the MVNW. Please refer to response to AANDC Item #7 for paste backfill update.</td>
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<td>21</td>
<td>Appendix E - Reclamation Research Plan - 5.2 Disposal of Contaminated Soils and Sediment</td>
<td>Comment(s): There is an entire reclamation research task associated with handling and disposing of hydrocarbon contaminated soil. AANDC is unclear why this poses such an area of concern for DeBeers as they currently have a lined contaminated soil remediation area at the site. The facility should be used to clean any contaminated soils that occur during the remainder of operations. These materials could be stockpiled for use as construction or cover material after they have been successfully remediated (appropriate criteria are achieved). Recommendation(s): AANDC recommends that DeBeers initiate the operation of the lined contaminated material remediation facility and stockpile remediated material for future construction and remediation.</td>
<td>Sep 19: De Beers acknowledges AANDC’s review comment and will consider when the landfarm becomes operational. It is also important to understand that the landfarm will need to move when the West Cell construction commences.</td>
<td>This response does not really fit with comment 10, which states that hydrocarbon is shipped off site. It is my understanding that De Beers does not intend to commission the landfarm. It is not directly related to the material being presented to the Board. Nonetheless it does warrant clarification. Can De Beers clarify what their current and future plans are for the Landfarm? This can be done by revising upcoming reports such as Waste Man Plan.</td>
<td>Updated, See AANDC #10 for comments. De Beers’ approved Waste Management Plans address hydrocarbon contaminated soil management during operation and C&amp;M. See proposed Waste Management Plan for closure description of landfarm operations. See Appendix D.4 Financial Security Analysis for updated quantities of contaminated soil for management at closure.</td>
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<td>Closure Objective - Underground Flooding (UG1)</td>
<td>Comment(s): It is not clear how the unknowns related to the objective of UG1 will be addressed by the reclamation research looking at post-closure groundwater conditions. The objective deals with surface waters, while the research deals with groundwaters. Recommendation(s): EC recommends that the unknowns related to UG1 are clarified and that it is further elaborated how the research in Section 4.1 of the Reclamation Research Plan will address these unknowns.</td>
<td>Sep 19: Further clarification will be provided in the revised ICRP.</td>
<td>Comment noted and will look for future updates.</td>
<td>Updated. See Section 5.2.3 for updated criteria. UG1 is not a chemical criteria, and this topic is addressed within UG2 objective. SW3 address surface water (Snap Lake) water quality.</td>
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<td>Topic 1: Mine Water Management - General Comment</td>
<td>Comment(s): As part of all components identified in the ICRP, there is a lack of information on how the civil works, post-closure, will be designed to meet the pre-mining natural landscape. There does not appear to be an overall site wide model on how each remedial option will affect the water quality/water drainage over the entire site for site wide objective (SW2). The proponent indicates that it will update the water model as more information becomes available through on-site monitoring and research activities (Appendix E) however there is little mentioned on how remedial activities will affect the water balance model, and overall mine drainage (slopes, direction of flow, fate within the watershed, etc.). Recommendation: None</td>
<td>Sep 19: As the mining activities progress water quality and quantity modelling and sampling will continue and be adjusted in line with actual results. A site wide water quality model was completed as part of the De Beers’ environmental assessment. At that time, site-wide water quality predictions at closure were provided that accounted for the various individual mine components. An updated site wide water quality model was completed in 2011 titled “Snap Lake Mine Site Water Quality” (Golder, 2011) which focuses on the operation phase of the mine. This type of site-wide model will require updating for closure conditions at a future date, either when required to facilitate closure planning, or prior to final closure. In the revised ICRP, De Beers will reinforce the</td>
<td>In the recent Amendment Application (December 20, 2013) a site wide water balance model was submitted. De Beers will have to incorporate any changes into future versions of the ICRP.</td>
<td>Completed. See Section 5.3.2 and Appendix L of the FCRP for a description of closure water management and treatment. Updated water modeling studies and a proposed Water Management Plan have been submitted with the March 2019 Water Licence application.</td>
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<td>Topic 2: North Pile - General Comments - All Sections of the ICRP</td>
<td>Comment(s): The proponent indicates that permafrost will be used through aggradation to reduce water seepage, however it also indicates that it is designed to work in a thawed environment ensuring physical stability. In the design and closure option the water treatment plant will be operated until water quality meets the required criteria, however all water is anticipated to be encapsulated within the permafrost regime. In addition, the proponent indicates that there is elevated parameters in sediment pore water (pH, NO₂, Al, Cr(IV)) and impacts to fish food organisms (Cr, Cu and Al) these elements will also be present within the North Pile as Acid Rock Drainage (ARD) and within the Process Kimberlite (PK) and in all waste deposited into the facility. In the event of poor aggradation, these elements will continue to leach into the environment. There is no indication that an alternate design will be considered. The proponent has not geochemically classified the PK slurry that is being deposited within the North Pile. The MEND Cold Regions Cover System Design Technical Guidance Document (AANDC 2012) should be consulted as the final rock cover design is established to provide guidance for development of the cells. Incinerator Waste/Sewage Waste is deposited into the North Pile however it will only be contained by aggraded permafrost and may be free flowing until encapsulation. The proponent indicates that the North Pile is anticipated to meet water quality targets two years after closure, however the study for permafrost aggradation has not progressed as language in the appropriate section to note the above information.</td>
<td>Sep 19: 1) Reclamation research is proposed to update the longer term thermal regime within the North Pile and to assess the water quality at closure that comes from the North Pile (Appendix E, Section 3.1 of the ICRP). At the current time, De Beers considers the proposed remedial option to be suitable for the Snap Lake Mine. In the event that the research suggests that the current plan for managing seepage waters is not adequate, then alternative remedial options will be considered. 2) De Beers will include further details regarding the geochemistry of the PK within the revised ICRP. Further, additional details regarding freezing point depression will also be provided in the revised ICRP. 3) Closure criteria for the North Pile are to be developed prior to the next update to the ICRP (i.e., in about 3 years’ time). Criteria for the North Pile cover, such as those proposed in the MEND document will be considered further during the development of the closure criteria. De Beers agrees that the MEND document provides valuable technical information to guide cover closure planning and will add this reference to the revised ICRP. 4) The implications of the waste material type deposited within the North Pile on the thermal regime within the North Pile will be added as a specific question to answer as part of the North Pile Closure Performance (Water Quality) Reclamation Research Plan (Appendix E, Section 3.1). 5) The two year timeframe for water quality was based on predictive modeling of water quality from the North Pile as presented during De Beers'</td>
<td>Appropriate response</td>
<td>Update. Permafrost aggradation in the North Pile, landfill design and thermal monitoring is discussed in Section 3.2.5 and Appendix H of the FCRP. Water quality modeling and an updated closure water management plan are provided in Section 5.3.2 of the FCRP. A review of geochemistry for the site is provided in Appendix K of the FCRP.</td>
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<td>anticipated and a slurry has been used instead of the proposed paste.</td>
<td>Recommendation(s): 1) In the event that permafrost does not aggrade as anticipated for the North Pile or is shown to be warming during post-closure monitoring, please provide further rationale that the only remedial option is to treat seepage/accumulated pore water until it meets discharge targets or alternatively provide secondary remedial options to amend the North Pile design; 2) The proponent should define the geochemical makeup of the PK slurry and include a description of the PK within the document. It should also be noted in the PK discussion whether the PK is causing freezing point depression and whether it will affect the aggradation of permafrost (i.e. Chlorides, major ions, etc.); 3) In the North Pile design, please reference the MEND Cold Regions Cover System Design technical Guidance Document (AANDC 2012) as it provides technical guidance for closure and design in northern climates. The proponent should highlight how its design will meet the limitations identified in the guidance document and ensure that the design will meet the 100 year estimate for closure; 4) As there will be a landfill within the North Pile trench the proponent must provide evidence that the deposited material will not become a source of contamination in the future. Please provide evidence that the contaminants (including degradation of machinery, tires, sewage, etc.) will be encapsulated by the North Pile design, and that if aggradation does not proceed as anticipated that the PK slurry lifts and rock cover will ensure encapsulation; and 5) As there are on-going studies to ensure aggradation of Environmental Assessment. Specific reference to this study will be added to the revised ICP</td>
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<td>3</td>
<td>Topic 3: Permafrost Conditions - Groundwater and Talik Under Snap Lake</td>
<td><strong>Comment(s):</strong> The underground surface features are said to be in a talik, however loading onto the groundwater regime is mentioned only briefly as DeBeers does not anticipate geochemical loading although potential ARD has been identified. It has been noted that groundwater conditions have been greater than anticipated with the current second diffuser being required due to a greater than 36,000 m³/day influx with a maximum estimate of 56,000 m³/day influx. <strong>Recommendation(s):</strong> 1) Please provide evidence that the groundwater upon mine flooding will be encapsulated (or limited) within the underground or provide closure designs (options) for how contaminants will be limited within the mine (hydraulic barriers, passive water treatment etc.); and 2) Please clarify if DeBeers has updated its water balance to include the new estimates for mine flooding. The proponent should also provide a rationale on how this influx of water that was not anticipated will affect the groundwater regime and the influx into the watershed.</td>
<td>Sep 19: 1) understanding the complex groundwater flow systems is difficult. Research is ongoing to understand inflows throughout mine life and as this research area is refined, research will progress on post closure groundwater quality/quantity and to research how to limit contaminants entering groundwater. 2) De Beers is currently revising the underground, site and lake models in preparation for the Water License amendment application to be submitted in December 2013.</td>
<td>As noted above this updated modeling was provided as part of their December 20, 2013 Amendment Application which is available on the registry.</td>
<td>Updated underground, site and lake models for care and maintenance were provided as part of the April 20, 2017 Extended Care and Maintenance Plan. Updated site and lake models for closure and post-closure have been provided with the March 2019 Water Licence application.</td>
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<td>4</td>
<td>Topic 4: Table 5.4/5.5/5.6 Closure Objectives</td>
<td><strong>Comment(s):</strong> When a reclamation research option(s) are not presented, it is difficult to navigate the text as there are no references to sections of the ICRP or Appendix E; Site Wide Objective (SW2) - There is no mention of having civil works developed to re-establish pre-mining drainage. <strong>Recommendation(s):</strong> 1) Consider revising the table to include references to the background information for ease of use; 2) Please refer to Mine Water Management general comments.</td>
<td>Sep 19: 1) Not all closure objectives have an associated reclamation research plan, as such a cross-reference cannot be provided. 2) Please see response GNWT-ENR review comment #1.</td>
<td>Noted</td>
<td>n/a</td>
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<td>5</td>
<td>Topic 5: Underground Mine Sections 5.2.4.2/5.2.5.2</td>
<td><strong>Comment(s):</strong> The proponent does not indicate how its backfilling concept design will mitigate water management, as a result of the talik the groundwater has the capacity to freely flow into the surrounding drainage basin. The proponent does not indicate how it will ensure final stability of bulkheads, drifts and adits. Surface water infiltration has not been addressed in the closure option and not addressed as an overall model for the site; <strong>Recommendation</strong> Recommendation(s): 1) Please clarify or highlight under Appendix E how the underground water management post-closure will meet the future water quality targets; 2) Please provide preliminary stabilization methods on how the proponent intends to ensure underground stability. The proponent has only highlighted that 50% of processed PK will be pasted and used for in-filling the underground. Please provide the rationale on how this will be used and how it will ensure underground stability post-closure; 3) Please clarify and describe how civil works will be established to direct water away from the underground, and how this will fit into the current mine water management model. In addition please clarify how this potential activity will relate to the pre-mining natural</td>
<td>Sep 19: 1) De Beers suggests that this item be discussed in future iterations of the closure plan and be included as a research item. 2) Due to the room and pillar mining method, paste does not need to be structural to ensure long term stability. 3) The closure plan has not been developed to a stage where these specific details can be provided. Closure condition water routing will be further considered prior to end of operations. In general, water could be directed away from audits/portals through appropriate ditching or through the use of swales to promote drainage away from the underground entrance. Further, the audits/portals will be capped to limit physical access by humans and wildlife, the cap will likely also provide some restriction for water ingress to the underground. 4) The site wide water quality model presented in De Beers' Environmental Assessment considered the chemical loading from the underground flooded mine to surface water quality. Potential impacts to surface water quality were based on this analysis. Reclamation research is planned to assess the geochemical loading from the underground flooded mine to surface water and potential impacts.</td>
<td>Appropriate response. These topics can be discussed during future iterations of the ICRP.</td>
<td>Updated. Underground mine is currently flooded at the approval of the Inspector.</td>
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<td>6</td>
<td>Topic 6: Infrastructure Section 5.2.4.3</td>
<td>Comment(s): Roadways and the airstrip will be removed as per the ICRP however there is no mention of a design for water management that will return the mine to a pre-development state.</td>
<td>Sep 19: The closure plan has not been developed to a stage where these specific details can be provided. Closure condition water routing will be further considered prior to end of operations. In general, water could be directed through appropriate ditching or through the use of swales. De Beers is committed to satisfying the MVLWB approved closure objectives as specified in the ICRP. The specific objectives referenced by the reviewer are encompassed by within the MVLWB approved closure objectives.</td>
<td>Appropriate response</td>
<td>n/a</td>
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<td>7</td>
<td>Topic 7: Water Management</td>
<td><strong>Comment(s):</strong> The Water Management Plant (WMP) will be layered with non-potentially acid generating (PAG) rock to prevent erosion of sediment, however there is no mention if the sediment will be a potential contaminant into the future; and . The sediment has been indicated to be a potential source of contamination (pore water and therefore sediment Section 8.3.4.3). <strong>Recommendation(s):</strong> 1) Please clarify and provide comment on how the rock cover will provide a stable condition limiting the movement of sediment contaminants; and 2) If the proposed cover cannot meet the objectives stated in the Mine Reclamation Guidelines of the Northwest Territories (INAC 2007) for contaminated soils (which include sediments) then the proponent should provide alternate remedial options to address the mobility of sediment contaminants.</td>
<td>Sep 19: 1) The closure plan has not been developed to a stage where these specific final design aspects can be provided. This information will be developed during the final engineering design and addressed in a final ICRP. 2) If during further engineering it is realized that a rock cover is not a viable technique to limit mobility of sediment, an alternative will be sought. It is De Beers’ opinion that a rock cover is a viable option and further contingency/alternative planning is not warranted at this time.</td>
<td>This will be addressed and discussed as the level of detail increases in future versions of the ICRP.</td>
<td>Updated. The WMP will now be re-developed as part of the passive water treatment system, as described in Section 5.3.2 of the FCRP. Soil remediation is described in Section 5.3.1 of the FCRP.</td>
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<td>8</td>
<td>Topic 8: Surface Facilities</td>
<td><strong>Comment(s):</strong> Hazardous materials are identified as being removed and stored in a lined waste transfer facility. All piping was stated as being flushed and cleaned for disposal in the North Pile however there are no water capture systems mentioned, also there is no mention on how water discharged to the environment will meet regulatory guidelines and criteria. All hazardous waste should be accounted for within the sites waste management plans, and remedial options should build upon the current waste management plans for closure. <strong>Recommendation(s):</strong> 1) Please provide more information on where the lined waste transfer facility will be located and information on the design. In addition, soil testing upon final decommissioning of the transfer facility should be completed to ensure that the liner integrity was maintained; 2) The proponent does not provide any information on where the water transfer facility will be located; and 3) The proponent states that the “waste management plans” are not provided.</td>
<td>Sep 19: 1) The closure plan has not been developed to a stage where the location of the lined hazardous storage area is known. This information will be developed as part of the final ICRP. De Beers agrees that upon decommissioning, an assessment of the decommissioned area is needed to ensure that reclamation criteria are achieved. 2) The closure plan has not been developed to a stage where the execution of this reclamation task is known. De Beers can commit that flushing will occur within zones where there is containment of the water and therefore not uncontrolled release to the environment. 3) Any modifications, or development of new, environmental management plans will be completed prior to commencement of reclamation and will be tailored to satisfy</td>
<td>This will be addressed and discussed as the level of detail increases in future versions of the ICRP.</td>
<td>Updated. See Section 5.3.1 of this FCRP and Appendix I for criteria associated with soil reclamation. The demolition execution plan that the contractor follows will contain information pertaining to execution of water management based on local site conditions. Any water released will achieve closure criteria. The demolition execution plan will include environmental management plans that must be followed at closure. Environmental management plans have been updated for closure conditions; these have been submitted for MVLWB review with the March 2019 Water Licence Application.</td>
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<td>indicate how it will capture water from the flushing of on-site systems. Please provide information and clarify how the proponent intends to ensure that no contaminants are released into the environment or commit to developing a standard work practice and detailed design for the final ICRP; and 3) Please highlight how the environmental management plans currently in place at site will be adapted for closure purposes.</td>
<td>applicable regulations, permits, and approved plans.</td>
<td>Sep 19: The closure plan has not been developed to a stage where the execution of this reclamation task is known. De Beers commits to ensuring capture of all water so there is no uncontrolled release to the environment. Specific plans for execution will be developed prior to commencement of reclamation.</td>
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<td>9</td>
<td>Topic 9: Process Facilities</td>
<td>Comment(s): It is stated that all facilities will be washed out with high pressure hoses removing all hazardous materials, however there is no mention of a water capture system. Recommendation(s): 1) Please describe and clarify how DeBeers intends to capture all water used for decommissioning process facilities ensuring it meets discharge requirements. The proponent should highlight how it intends to ensure that no contaminants are released into the environment or commit to developing a standard work practice and detailed design for the final ICRP.</td>
<td>Sep 19: The closure plan has not been developed to a stage where the execution of this reclamation task is known. De Beers commits to ensuring capture of all water so there is no uncontrolled release to the environment. Specific plans for execution will be developed prior to commencement of reclamation.</td>
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<td>10</td>
<td>Topic 10: Solid Waste Facilities</td>
<td>Comment(s): It is indicated that solid waste will be disposed of in the North Pile and that lifts of PK will be utilized however the containment properties of the PK slurry are not defined or if the entrapment of solid waste will be entirely by permafrost; and the landfill liner is proposed to be removed and cut-up and the area will be re-graded, however no mention of delineation of the area under the liner for PHC contamination is mentioned. Recommendation(s): 1) Please define how all solid waste will be encapsulated (mechanically and chemically) within the PK lifts; and</td>
<td>Sep 19: 1) The solid waste will be capped with cover material to separate the waste from the environment. The cap over the solid waste will need to address similar design aspect as the cap used over the PK. The thermal regime and water quality from the North Pile is a focus of the Reclamation Research Plan - see response to GNWT-ENR review comment #2 for additional details. 2) De Beers agrees that upon decommissioning that an assessment of the decommissioned area is needed to ensure that reclamation criteria are achieved. Criteria will be developed prior to issuance of the next version of the ICRP (i.e., 3 years’ time). Criteria</td>
<td>Appropriate response.</td>
<td>Completed. See Section 5.2.3 of this FCRP for I3 that pertains to the objective and criteria for soil.</td>
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<td>Delineation of soil under the liner is required as the containment system may have had failures. The proponent should include a commitment of delineation under the landfarm to ensure that no contaminated soils remain post-closure.</td>
<td>specific to this topic will aim to address closure objective 11 - Preventing remaining infrastructure from contaminating land or water.</td>
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| 11 | Topic 11: Section 6.3 Completed Progressive Reclamation | Comment(s): For the emulsion plant area, it is stated that no further remedial activities are planned, however only assessments were conducted at the Site. 
Recommendation(s): 1) Please clarify and demonstrate how the area is no longer an area of environmental concern as no remedial activities were conducted only studies; 2) In the table please provide the major conclusions of each study and identify if this is an area of environmental concern (for ease of reference); and 3) The fate of the water must also be determined; dilution with active melt is not an appropriate remedial technique if water has been shown to be impacted. | Sep 19: 1) Remedial action about the emulsion plant was completed in 2012 and reported to the MVLWB as part of the 2012 Annual Closure and Reclamation Plan Progress Report (see Appendix A for specific reports). Based on the work completed, it is concluded that no further remedial action is necessary. 2) A summary of the progressive reclamation is provided in Section 3.0 of the 2012 Annual Closure and Reclamation Plan Progress Report. The reports that document the Environmental Assessment and sampling activities undertaken are provided in Appendix A of the annual report. 3) The reports provided in Appendix A of the 2012 Annual Closure and Reclamation Plan Progress report provide perspective on water quality post reclamation. Further, De Beers maintains the SNP stations, as defined in the water licence that monitors water quality from the emulsion plant area. | | Appropriate response |
| 12 | Topic 12: Section 7.2.9 Waste Management | Comment(s): The proponent indicates that all non-hazardous waste and incineration ash will be deposited within the North Pile. DeBeers has stated in its Domestic and Sewage Waste Plan that the following materials will be deposited within the landfill: a) non-recyclable plastics; b) conveyor belts; c) tires; d) motors, v-belts; e) piping and fittings; f) rebar; g) building and bulk debris (furniture, cladding, carpeting, drywall, insulation); h) incinerator ash; i) scrap metals; j) dewatered sewage sludge; and, k) empty cement and lime bags. | Sep 19: The Incinerator ash (composite samples) is tested on a quarterly basis as per Environment Canada's specifications. The samples have consistently met the standards for disposal as set. Since the installation of the new incinerators, there has not been enough ash generated to send away for a sample but it is expected to be the same or better quality as a result of the fact that 1) the new incinerators are new and better technology than the older ones, and 2) the waste streams for incineration did not change or increase at all. | | Appropriate response. |

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<td>13</td>
<td>Topic 13: Hydrology</td>
<td><strong>Comment(s):</strong> In Section 8.3.4.1 the proponent indicates that the duration of effects would be limited to the operations phase and would be reversible within a 3 year timeline, however an overall mine water management plan has not been developed (or provided in the ICRP) to direct flow around and away from the underground; and . In Section 8.3.4.2 there is no mention of contaminant deposition (NO2, Al, Cu, Cr, TDS etc.) into Snap Lake, this is only mentioned under the aquatic systems habitat. <strong>Recommendation(s):</strong> 1) Because of the talik indicated to be under Snap Lake, there is a potential route for water movement as the mine floods (through ARD and PK backfill). Further study on how this will affect Snap Lake’s</td>
<td>Sep 19: 1) Please refer to De Beers' response to GNWT-ENR review comments #1 and #5. 2) Predicted residual impacts and full discussion on the analysis completed is provided in the Project Environmental Assessment Report (De Beers, 2002).</td>
<td>Appropriate response, GNWT-ENR comments 1 and 5 provide additional information.</td>
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<td>14</td>
<td>Topic 14: Fish Health</td>
<td>The proponent indicates that discharges of treated effluent to Snap Lake will cease and are expected to be reversible within 30 years, however it is unknown if the North Pile will meet discharge criteria and/or if the permafrost will aggrade as designed.</td>
<td>1) This is premature to state that it will be reversible until the North Pile design is finalized and a loading model is completed as the mine continues to expand. Please provide further rationale and clarify how DeBeers determined that impacts would be negligible. 2) Please provide further rationale and clarify how DeBeers determined that impacts to NL5 and NL6 Lakes from elevated sediment (pH, nitrate, aluminum and hexavalent chromium) and fish food(chromium, copper and aluminum) were rated as low.</td>
<td>Sep 19: 1) The 30 year timeframe was based on a site-wide water quality model that accounts for the loadings from the North Pile. The site-wide water quality model and the associated impact assessment were presented in the Project Environmental Assessment Report (De Beers, 2002). 2) The impact assessment findings for NL5 and NL6 were presented in the Project Environmental Assessment Report (De Beers, 2002).</td>
<td>Appropriate response, additional modeling has been conducted as part of the Dec 20 2013 amendment application.</td>
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<td>7</td>
<td>General File</td>
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| 1  | Section 1, Plain Language Summary, Pg 8. | **Comment(s):** The category “Site Wide”, first used here but occurring repeatedly throughout the report, does not include a clear definition. Does “Site Wide” refer to the 550ha total land lease area of Snap Lake?  
**Recommendation(s):** The NSMA recommends refining the definitions of the site categories to include the full area of mine impact. The NSMA encourages De Beers to ensure that the goal of leaving a positive legacy goal is given priority when considering pre and post-mine conditions, and including the broad extent of mine influences is critical to meeting this goal. | Sep 19: Impacts to the land leased area from the mine are addressed and mitigated as appropriate. | Noted | n/a         |
| 2  | Section 5.1.4.1 North Pile, Pg 85. | **Comment(s):** The NSMA believes that it is impossible for De Beers to “leave a positive legacy behind” when, as stated “revegetation of the North Pile surface materials is not proposed, primarily due to an expected lack of available surface materials to support active revegetation efforts, promoting natural revegetation remains a potential option to aid in erosion control of surface materials”.  
**Recommendation(s):** The NSMA believes that finding a suitable way to encourage revegetation of the North Pile should be viewed as critically important to meeting the goal of “positive legacy” and that this requires further integration into the ICRP. | Sep 19: Revegetation research is a planned activity (see Appendix E, Section 2.2) and acknowledge NSMA's view that the North Pile should be considered a priority area to further assess as part of the planned research. | Appropriate Response | Updated.  
Section 5.3.1 and Appendix J in the FCRP outline revegetation plans, priority areas and research. The North Pile is not planned to be revegetated. Appendix C provides a summary of how Traditional Knowledge provided by communities has been incorporated in the FCRP, including revegetation. |
| 3  | Section 5.2.4 Table 5.7, Pg 80. SW4-6. | **Comment(s):** Regarding closure objectives SW4, SW5, and SW6, there are no details provided on appropriate slope grades to encourage the safe passage for Caribou and other wildlife. | Sep 19: Research regarding wildlife use of the site and safe passage is an identified uncertainty that reclamation research aims to fill through further community engagement and | These will be set out as criteria in future versions of the ICRP with input from reviewers and research. | Completed.  
Wildlife access and egress has been included as a design objective for the North Pile and for site-wide landform |
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<td>Section 5.2.4 Table 5.7, Pg 80. SW7.</td>
<td><strong>Recommendation(s):</strong> The NSMA recommends an explicit statement that the North Pile slopes will not be sloped at a grade obtrusive to the passage of migrating Caribou herds and other wildlife. Research should be conducted in this area if it has not been already.</td>
<td>Traditional Knowledge (Appendix E, Section 2.1).</td>
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<td><strong>Comment(s):</strong> Regarding the statement that &quot;[a] combination of two revegetation approaches may be employed&quot;, it is unclear if this means that a combination of these will be employed, or if it is possible only surface preparation will be used. <strong>Recommendation(s):</strong> The NSMA seeks clarification on these methods and encourages priority be given to active revegetation methods while CRP development continues. Effective revegetation is critical to mitigating unnecessarily enduring impacts as per De Beers Sustainable Development Policy (2009) which states the goal of &quot;reducing long term environmental and community impacts&quot;, as well as in Section 2.1.2 with the goal to &quot;leave a positive legacy behind&quot;.</td>
<td>Sep 19: Without further reclamation research De Beers cannot conclude that both reclamation approaches will be applied; however, it is likely that both natural recovery and active revegetation will both be employed.</td>
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<td>Completed. Both passive revegetation and active revegetation have been included in the FCRP, as described in Section 5.3.1 and Appendix J.</td>
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<td>5</td>
<td>Section 3.2.1 Topography and Surface Hydrology, Pg 27.</td>
<td><strong>Comment(s):</strong> A description of the physical environment of the northwest peninsula of Snap Lake is given, however no description/quantification is provided of the number of streams re-routed or affected due to the mine itself. <strong>Recommendation(s):</strong> The NSMA requests that this section include the number of streams or wetlands that were affected, with a map, to better understand what may be required post-closure to manage surface runoff and restore the land.</td>
<td>Sep 19: Inland lakes and streams affected by the project were discussed in the project EA. No fish bearing lakes were impacted and only one stream (stream 27) was affected by the project. This stream was compensated as per DFO specifications and is now closed. Connectivity will not be re-established post closure.</td>
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<td>Section 5.2.5 Table 5.7, Pg 82.11; Surface Facilities, Pg 98.</td>
<td>Comment(s): Regarding the selected closure activity statement that “[a]ll potentially hazardous material and/or contaminant sources will be removed from remaining infrastructure. All non-hazardous debris will be disposed of within the North Pile.” Recommendation(s): The NSMA seeks additional statements from De Beers on how items are labeled “non-hazardous” or “inert” and within what established criteria this has been determined applicable over the long term. Additionally, the NSMA requests that sampling be conducted post-burial in the trench area to ensure that the non-PAG granitic rock is working as an effective cap. Additionally clarification on the purpose of the PAG granitic rock usage should also be included.</td>
<td>Sep 19: At closure, non-hazardous and inert items will be consistent with the types outlined in De Beers approved Waste Management Plan for operations. Monitoring the performance of the cover system and seepage water quality from the North Pile (including landfill trench area) will be completed post-closure. The materials deposited in the trench will be covered with non-PAG rock (not PAG rock). The main purpose of the cover aims to separate the environment from the waste and control water infiltration.</td>
<td>Appropriate response.</td>
<td>n/a</td>
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Yellowknives Dene First Nation

| 1  | General File | Comment (doc) (Submitted after Due Date) YKDFN comments Recommendation | See reviewer comments section of the Staff Report. | n/a |
## Summary of Closure Commitments

### 2016 Annual Closure and Reclamation Plan Progress Report Closure Commitments

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<thead>
<tr>
<th>ID</th>
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<th>ICRP v4 Status</th>
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<tr>
<td>1</td>
<td>General File</td>
<td>Comment (doc) ECCC Comments Cover Letter Recommendation</td>
<td>Noted.</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Appendix I - Closure Criteria</td>
<td>Closure Objective SW3</td>
<td>June 14: The reviewer’s comment is reasonable and De Beers will consider it further within the next version of the ICRP v4.</td>
<td>Acceptable response.</td>
<td>Completed Addressed within SW3 objective and criteria. See Section 5.2.3 of this FCRP.</td>
</tr>
<tr>
<td>3</td>
<td>Appendix I - Closure Criteria</td>
<td>Closure Objective UG1/UG2</td>
<td>June 14: De Beers does not agree with the reviewers comment that “water from the underground does not spill over” is a physical stability component for the underground. The mine will remain physically stable. For final closure of the underground will be capped as dictated by the Mine Health and Safety Act/Regulations. Should water spill onto surface in the interim, De Beers does agree that management of the underground water must be properly managed. De Beers is of the opinion that if underground water contacts the surface, it would be considered surface water and/or run-off and captured within SW3 objective.</td>
<td>Acceptable response.</td>
<td>Completed Addressed within SW3 objective and criteria. See Section 5.2.3 of this FCRP.</td>
</tr>
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<td></td>
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<td>account for physical and chemical stability issues associated with water in the underground overflowing.</td>
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<td><strong>Fisheries and Oceans Canada</strong></td>
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<td>1</td>
<td>General</td>
<td>Comment: DFO has reviewed the Snap Lake 2016 Annual Closure and Reclamation Plan Progress Report in accordance with its mandate and has no comments at this time. Recommendation: Not applicable.</td>
<td>June 14: Acknowledged</td>
<td>Noted.</td>
<td>n/a</td>
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<td><strong>Environment and Natural Resources</strong></td>
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<tr>
<td>10</td>
<td>General File</td>
<td>Comment (doc) ENR Letter with Comments and Recommendations</td>
<td></td>
<td>Noted.</td>
<td>n/a</td>
</tr>
<tr>
<td>1</td>
<td>Topic 1: Buildings</td>
<td>Comment: Section 2.1 contains a list of buildings that may be decommissioned in 2017 which notably includes the environment shop and fish cleaning station. It isn’t clear if these buildings will still be required for monitoring requirements included in the Water Licence and Aquatic Effects Monitoring Program or if these buildings will be required during active closure, and in the case of fish cleaning station, for monitoring following initial closure. Recommendation: 1) ENR requests that De Beers provide an outline of what the role of these areas was previously and confirm that the environment shop and fish cleaning station are no longer required for monitoring efforts (currently and at closure).</td>
<td>June 14: De Beers will manage its infrastructure to minimize its footprint during Care and Maintenance while still being able to perform all required monitoring. Only obsolete or buildings not required for re-starting the operation will be considered for removal from the mine as a component of progressive reclamation (laydowns, Old C dorm as examples). Decommissioning for the purpose of the ACRPPR building list, De Beers will be removing all hazardous materials from identified buildings, and securing them for long term care and maintenance which includes turning off associated power.</td>
<td>Acceptable response.</td>
<td>Completed Addressed in Section 6 of this FCRP.</td>
</tr>
<tr>
<td>2</td>
<td>Topic 2: Sediment Assessment</td>
<td>Comment: Section 5.4.2 notes that the sediment assessment for the Water Management Pond and North Pile sumps and ditches (included in the appendices) will be used to support the selection of an appropriate closure method and criteria for these areas. Timelines associated with these next steps are not clear. As well, the section is titled “Disposal of Contaminated Soils and Sediments”. As the final closure method of these areas is unknown, a more appropriate title may be</td>
<td>June 14: The timing for development of the closure methods will be included in the next version of the ICRP v4. The water management structures (sumps, ditches, and water management pond), and any sediments within, are considered within the Infrastructure objectives category, specifically I3. Proposed criteria for I3 were included in the 2016 ACRPPR, and based on reviewer feedback,</td>
<td>Acceptable response.</td>
<td>Completed. Closure of the WMP and the North Pile sumps and ditches is described in Appendix L of the FCRP. Management of contaminated materials is described in Sections 5.2.3 and 5.3.1.</td>
</tr>
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<td>3</td>
<td>None</td>
<td>None</td>
<td>June 14: De Beers notes ENRs recommendation and in the future will include a section titled “Management of Contaminated Soils and Sediment”.</td>
<td>Acceptable response.</td>
<td>n/a</td>
</tr>
<tr>
<td>4</td>
<td>Topic 3: Securities</td>
<td>Comment: The report notes that no change in security is being sought by De Beers at this time. An updated security estimate will be provided in conjunction with the finalization of the ICRP v4 in January 2018.</td>
<td>June 14: As required, De Beers will submit an updated financial security estimate to the Board by January 30, 2018.</td>
<td>Acceptable response.</td>
<td>Completed. Security was updated in March 2019. See Section 10 of this FCRP.</td>
</tr>
<tr>
<td>5</td>
<td>Topic 4: Interim Closure and Reclamation Plan</td>
<td>Comment: Section 9 outlines revisions that will be made to the ICRP in January 2018. ENR will provide detailed comments on any ICRP revisions during that time.</td>
<td>June 14: Acknowledged</td>
<td>Noted.</td>
<td>n/a</td>
</tr>
<tr>
<td>6</td>
<td>Topic 5: Closure Criteria SW3</td>
<td>Comment: Approved closure objective SW3 is stated as follows: “Surface runoff and seepage quality that is safe for people, vegetation, aquatic life and wildlife” However, the proposed closure criteria related to SW3 for chemical stability is limited solely to water quality objectives in Snap Lake. While protection of the aquatic habitat in Snap Lake is important, ENR notes that the closure objective is related specifically to “surface runoff</td>
<td>June 14: The reviewer’s comment is reasonable and De Beers will consider it further within the next version of the ICRP v4.</td>
<td>Acceptable response.</td>
<td>Completed. The closure criteria for SW3, provided in Section 5.2.3 of the FCRP, include reference to SSWQOs for Snap Lake and EQCs for the site effluent. Closure criteria have been developed to provide improved</td>
</tr>
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<td>7</td>
<td>None</td>
<td>Comment: None</td>
<td></td>
<td>Acceptable response.</td>
<td>De Beers proposes the definition of safe: Safe is generally defined as “not likely to cause harm or injury”.</td>
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<tr>
<td>8</td>
<td>Topic 6: Closure Criteria I3</td>
<td>Comment: Based on discussion at the technical workshop on May 30th, it is ENR’s understanding that the sediments currently being assessed in the Water Management Pond, as well as ditches and sumps on site, will be included in under this category (I3) as well. It isn’t clear as to the criteria that will be applied to these areas and whether these areas will remain submerged. Recommendation: 1) ENR requests that De Beers confirm that sediments on-site will be included under closure objective I3 related to contaminated soils and waste disposals.</td>
<td>June 14: Section 5.2.5.3 of the ICRP v3 contains a description of the closure activities associated with the sumps and water management pond. ICRP v3 states these areas will be covered with non-PAG rock. No controls</td>
<td>Acceptable response.</td>
<td>Completed.</td>
</tr>
<tr>
<td>9</td>
<td>None</td>
<td>Comment: None</td>
<td></td>
<td>Acceptable response.</td>
<td>Refer to comment #8 for sediment criteria. See Section 5.3.2 of the FCRP for discussion regarding closure</td>
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and seepage quality” and as such criteria should be established for those immediate areas of the site and not the receiving body. ENR has previously, and once again, raises concern over the reliance on the term “safe” in closure objectives and criteria as the term is too vague to describe the degree of remediation (i.e. human health risk assessments vs. protection of aquatic life or aquatic ecosystem protection - which will factor in a degree of chronic toxicity). 

Recommendation: 1) ENR recommends that the closure criteria for SW3 under ‘chemical stability’ be included to include water quality for surface runoff and seepage water quality at the site.

June 14: The closure objectives have been approved by the MVLWB and a change to the wording is not considered necessary. The level of safety is addressed in the selection of the closure criteria.

Acceptable response.
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| 1  | Section 2.1 - Closure time variances | **Comment:** In this section, it states that the length of temporary closure "may be up to 3 years or more dependent on market conditions" at which time one of the options for De Beers in final closure of the Snap Lake Mine.  
**Recommendation:** If the final closure of the mine begins in 2020, how many additional years of research or planning does De Beers estimate it would have to do in order to finalize the Closure Plan and begin active reclamation? | June 14: De Beers as it evaluates the asset will ensure that all research is complete prior to mine closure. Should final closure be considered, a complete final reclamation plan will be provided to the Board as dictated by the licence. | Noted. | n/a |
| 2  | Section 4, Table 5: Summary of progressive reclamation activities | **Comment:** This section states that the "design of a rock cover for the Starter Cell of the North Pile commenced in 2013 and was advanced to the 50% design stage in 2014." Reclamation Research Plan 3.2 in V3.2 of the currently approved ICRP states that the Starter Cell Rock Cover 100% design should have been completed by 2016.  
**Recommendation:** Please describe the reasons in the schedule slippage of the Starter Cell Rock Cover design. When will this design be completed? | June 14: In 2014, De Beers sought approval to complete a raise to the Starter Cell and therefore a final cover design was deferred to a later date to accommodate the longer operation of the Starter Cell. To date, the Starter Cell has not reached its PK disposal capacity. De Beers requires flexibility in their operation of the mine and timing for completion of research. In this case there was a contemplated change in design and operation of the North Pile that resulted in a deferral of a planned research activity. An updated RRP will be presented in the next version of the ICRP. However it is up to De Beers on what research to carry out. As the licensee De Beers will ensure that prior to final closure all designs are finalized. | Noted. | Completed,  
The detailed design for the North Pile engineered cover is provided in Appendix H of the FCRP. |
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| 3  | Section 8, Closure planning timelines | **Comment:** In this section, it states that "engagement with stakeholders as well as technical and economic evaluations in 2017 will continue to optimize extended care and maintenance activities."
**Recommendation:** Please describe or give examples of how De Beers will "optimize extended care and maintenance activities" and why these activities should take precedence over reclamation research including engagement. This is especially important to understand given the number of proposed closure criteria that rely on additional engagement and acquiring TK (e.g., SW1, SW4, SW6, I3). |
|     |       | June 14: As described in the approved Snap Lake Mine Care and Maintenance Plan, De Beers will complete technical and economic evaluations of the care and maintenance activities for an extended period to ensure viable options remain for the mine. This included an assessment of partially and fully flooding the underground mine. De Beers does not agree with the reviewer's comments that care and maintenance activities take precedence over reclamation research or engagement. De Beers will ensure that the mine is managed consistent with the licence, and optimization of care and maintenance will be conducted in conjunction with reclamation research. Appendix 1 of the ACRPR includes a description of the future research and engagement that is needed to support the selection of closure criteria. An updated RRP will be presented in the next version of the ICRP. |
|     |       | **Noted.** |
|     |       | **Reclamation research conducted for each component is provided in the appendices of the FCRP. Engagement activities specific to closure and reclamation are described in Section 2.4 and Appendix C.** |

| 4  | Closure Criteria - SW3 | **Comment:** The criteria for chemical stability states that "In-lake site specific water quality objectives to be proposed at a future date prior to Final Closure Plan". |
|     |       | **Recommendation:** As discussed at the workshop, there is no reason to wait prior to developing In-lake SSWQOs for Snap Lake. In most cases, the Board has already assigned SSWQO for Snap Lake in the Reasons for Decision for the last several water licence proceedings. Again as discussed at the workshop, De Beers should be working on performing the modelling necessary to calculate what seepage quality will be necessary to meet SSWQOs for Snap Lake at closure. |
|     |       | June 14: Acknowledged. De Beers will consider this further in the next version of the ICRP v4. |
|     |       | **Acceptable response.** |
|     |       | **Completed.** |
|     |       | See SW3 objective and criteria within Section 5.2.3 of this FCRP. |

De Beers Canada Inc.
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</table>
| 5  | Closure Criteria - SW5 | **Comment:** The criteria for Future Use and Aesthetics states that revegetation targets will be defined through research.  
**Recommendation:** When will De Beers finalize the revegetation targets? | June 14: Appendix 1 of the ACRPPR states that "Targets will be defined through research and proposed prior to final closure plan as a component of the revegetation closure criteria document"; | Noted. | Completed. Section 5.2.3 of this FCRP provides criteria for objective SW7. |

**Snap Lake Environmental Monitoring Agency**

| 1  | General File | Comment [doc](doc) SLEMA Comments on the 2016 Closure Progress Report Recommendation | | | |

| 2  | Section 2.1, pages 4 to 5, non-essential buildings | **Comment:** A list of select non-essential buildings to be decommissioned is provided, but no figures showing the buildings’ location are presented.  
**Recommendation:** It will be helpful to provide figures of buildings location for reviewers to understand the decommissioning schedule. | June 14: Appendix II of the Snap Lake Mine Care and Maintenance Plan includes a figure of the building locations. | Acceptable response. | n/a |

| 3  | Section 2.1, page 5, decommissioning vs. removal | **Comment:** It is noticed that process complex is listed as non-essential building. It is also stated that "removal of non-essential buildings is a typical progressive reclamation activity". Will the process complex be put to sleep or removed from the Mine? "Removal" is used interchangeably as "Decommissioning" in the report. However, there appear to be different ways of disposing of buildings for decommissioning, as described in the Snap Lake Mine 2017 Community Update (page 4), "(N)on-essential infrastructure and services will be secured and "put to sleep" or modified to conserve energy and maintenance requirements. Any infrastructure that will deteriorate over time will be removed from the Mine".  
**Recommendation:** For the list of non-essential buildings, it will be helpful to clarify what will be secured and put to sleep, what will be modified to conserve energy and maintenance requirements, and what else will be removed from the Mine. It will be even better to visualize them as De Beers did for the Snap Lake Mine | June 14: De Beers will manage its infrastructure to minimize its footprint during Care and Maintenance while still being able to perform all required monitoring. Only obsolete or buildings not required for re-starting the operation will be considered for removal from the mine as a component of progressive reclamation (laydowns, Old C dorm as examples). Also any equipment that may deteriorate or need replacing prior to re-starting the operation will be considered for removal. It is De Beers that will make this assessment for the operation.  
Decommissioning for the purpose of the ACRPPR building list, De Beers will be removing all hazardous materials from identified buildings, and securing them for long term care and maintenance which includes turning off associated power. | Acceptable response. | Completed Addressed in Section 6 of this FCRP. |
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<td><strong>Closure Sequence in the Snap Lake Mine 2017 Community Update</strong> (pages 35 to 50).</td>
<td>June 14: Acknowledged. De Beers thanks SLEMA for this recommendation.</td>
<td>Acceptable response.</td>
<td>n/a</td>
</tr>
<tr>
<td>4</td>
<td>Appendix I, Closure Criteria, page 21, in general</td>
<td><strong>Comment:</strong> Slater Environmental Consulting (SEC) reviewed the closure criteria for the Diavik Diamond Mine on behalf of the Environmental Monitoring Advisory Board (EMAB). The following link is SEC’s review document for De Beers’ reference. <a href="https://www.emab.ca/sites/default/files/16-06-15-ddmi-closure-criteria-review-emabv2.pdf">https://www.emab.ca/sites/default/files/16-06-15-ddmi-closure-criteria-review-emabv2.pdf</a> <strong>Recommendation:</strong> The review approach SEC adopted and some specific comments SEC made, in SLEMA’s opinion, may also apply to the review of the Snap Lake Mine’s closure criteria. It is recommended that De Beers take efforts to answer the following review questions while refining the closure criteria for the coming ICRP Update due in January 2018: 1. Effective Indicators: For each objective, do the criteria rely on indicators that are relevant for evaluating the desired outcome, and are there indicators to address all important facets of the desired outcome? 2. Measurable: Is the performance of indicators measurable, and can results be verified independently? 3. Thresholds: Do the criteria for each objective establish thresholds that define acceptable performance conditions for the closure objective and its associated valued components? 4. Timely Response: Will monitoring of performance with respect to closure criteria allow for timely response to any failure to achieve closure objectives?</td>
<td>June 14: Acknowledged. De Beers thanks SLEMA for this recommendation.</td>
<td>Acceptable response.</td>
<td>Completed. See Section 5.2.3 and Section 9 of this FCRP for updated closure criteria.</td>
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**De Beers Canada Inc.**
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<td>criteria are important monitoring methods, but they appear not to define what conditions must be met. <strong>Recommendation:</strong> It is recommended that De Beers propose more specific and clear criteria for closure performance. If the description (inspection/assessment) listed in the Appendix I is inevitable, references are requested for the evaluation criteria used by the qualified person or professional engineer in their assessment or inspection.</td>
<td>June 14: Acknowledged. De Beers will consider this further in the next version of the ICRP v4.</td>
<td>Acceptable response.</td>
<td>Completed. See SW3 objective and criteria within Section 5.2.3 of this FCRP, and water quality modeling studies provided with the March 2019 Water Licence Application.</td>
</tr>
<tr>
<td>6</td>
<td>Appendix I, Closure Criteria, page 23</td>
<td><strong>Comment:</strong> Chemical Stability Criterion for SW3 is said to be proposed at a future date. However, the site-specific objectives for in-lake water quality were well discussed during the Water Licence Amendment Application Processes (Dec 2013 and Nov 2014). <strong>Recommendation:</strong> The SSWQOs described in the Water Licence Amendment Decision by the MVLWB could be considered. In addition, no acute and chronic toxicity for specific aquatic life should be considered for SW3 during the closure criteria refinement process.</td>
<td>June 14: Acknowledged. De Beers will consider this further in the next version of the ICRP v4.</td>
<td>Acceptable response.</td>
<td>Completed. See Section 5.2.3 of the FCRP for updated closure criteria.</td>
</tr>
<tr>
<td>7</td>
<td>Appendix I, Closure Criteria, page 25</td>
<td><strong>Comment:</strong> Environmental Site Assessment is referred to for I1, but no specific criteria are proposed. <strong>Recommendation:</strong> CCME Guideline for soil should be considered for I1 during the closure criteria refinement process.</td>
<td>June 14: Acknowledged. De Beers will consider this further in the next version of the ICRP v4.</td>
<td>Acceptable response.</td>
<td>Completed. See Section 5.2.3 of the FCRP for updated closure criteria.</td>
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