March 29, 2019

Dear Ms. Love:

Re: Water License (MV2011L2-0004) Renewal Application

De Beers Canada Inc. (De Beers) is pleased to provide our application for a renewed water license to support the closure and post-closure phases of the Snap Lake Mine (the Mine). The Mine is a former underground diamond mine located about 220 kilometers northeast of Yellowknife in the Northwest Territories.

Water Licence Renewal term-length
The current water licence, which permits the use of water and storage of waste at the Mine expires on June 13, 2020. A renewed water licence will be required to support planned activities. A term length of 15 years is requested to allow for the 8 years of planned activities associated with closure, 5 years of post-closure monitoring and 2 years for the return of securities and contingency to accommodate potential changes in project schedule. The new water licence will cover both closure and post-closure activities.

Water Licence Renewal Package
De Beers has updated all of the relevant monitoring and management plans in support of the water licence renewal application. The documents have been assembled and uploaded to the Board FTP site. Below is a listing of the supporting documents included in this package for review.

- Attachment 1: Water Licence Application Fee ($30)
- Attachment 2: Site Plan to Scale
- Attachment 3: Engagement Record
- Attachment 4: Water Licence Application Form
- Attachment 5: Draft closure water licence
- Final Closure and Reclamation Plan with the following appendices
  - A. Glossaries
  - B. Table of Concordance
  - C. Engagement
  - D. Lessons Learned and Predicted Residual Effects
  - E. Summary of Reclamation Research
  - F. Financial Security Analysis Report
  - G. Demolition Inventories and Closure Plans
  - H. North Pile Closure Design
  - I. Human Health and Ecological Risk Problem Formulation
  - J. Revegetation Plan
  - K. Geochemistry
Land Use Permit amendment
The activities proposed for the closure and post-closure phases are included in the current scope of the Land Use Permit (MV2017D0032). The current scope specifically lists development and progressive reclamation of the North Pile (item 1 v.) and progressive closure and reclamation of site components (item 1 ix). While all the planned activities at the mine fit within the scope of the permit, there are some modifications to the Mine which require an update to the land and water securities held by the Government of Northwest Territories (GNWT). An updated security estimate is included herein. This updated security estimate triggers the need to amend the land use permit. Therefore, an application for land use permit amendment will be submitted shortly.

Current Status
Snap Lake is no longer in Operations. Diamond mining ceased at the mine on December 4, 2015 when De Beers announced that the mine would be placed in temporary closure, also referred to as care and maintenance. Since that time, the mine has been managed in Extended Care and Maintenance (ECM). During ECM, De Beers evaluated options for the future of the mine, including a) selling the mine to a competent buyer, b) continuing to manage the site in extended care and maintenance, c) re-opening the mine, or d) closing the mine. While options were under consideration, De Beers continued to progressively reclaim and maintain the site, as per the Interim Closure and Reclamation plan and associated Extended Care and Maintenance Plan. Progressive reclamation activities undertaken included contouring and capping of portions of the North Pile, removal of equipment, temporary closure of the portals to the underground, de-commissioning of the process plant and other activities. After it became clear that a competent buyer could not be found, and that the mine would not be re-opened by De Beers, the decision was reached in consultation with the MVLWB and the Inspector, to allow the underground to flood with groundwater. This allowed for the cessation of pumping of mine water to the surface for treatment and discharge to Snap Lake.

Following the successful flooding of the underground, in December of 2017 notification was given to the MVLWB and Indigenous Parties that De Beers intends to transition the mine from ECM to closure and that a Final Closure and Reclamation Plan would be prepared. Mining and Milling is no longer a planned activity for the Mine. Approval of the Final Closure Plan, and issuance of the new water licence will mark the end of ECM and the initiation of the Closure Phase of the life of mine.
Closure
Planned closure activities are now entirely focused on meeting the closure objectives previously approved as part of the Interim Closure and Reclamation Plan. The North Pile will be capped and contoured to channel water toward two constructed ponds, the East Influent Storage Pond and the West Influent Storage Pond. The collection sumps currently located around the North Pile will be modified to become drainage ditches which will passively convey seepage and runoff water to the two influent storage ponds. Two wetlands will be constructed to passively treat the water from the influent storage ponds prior to discharge to Snap Lake. During the period of time when the North Pile is being capped, the perimeter water control structures are under construction and the wetlands are developing, De Beers will continue to actively treat surface water prior to discharge to Snap Lake. Once the wetlands are functioning as expected and discharge meets the effluent quality criteria, water will be allowed to flow through to Snap Lake.

As part of closure activities, the existing infrastructure, including all buildings will be demolished. Only critical infrastructure required for ongoing activities will remain during closure. Non-hazardous waste materials will be deposited in the landfill. Hazardous wastes will be shipped off-site. Roads and pads will be scarified and priority areas will be revegetated. All planned activities are described in further detail within the Final Closure and Reclamation Plan. Closure is anticipated to take 8 years. A detailed schedule of activities is provided as Figure 8 of the FCRP.

Post-Closure
Post-closure will begin when closure activities are complete and active management of waste or water is no longer required. Post-closure activities will focus on monitoring and reporting. During the Post-Closure period, De Beers will respond to any issues detected with appropriate mitigation/maintenance activities. Five years of post-closure monitoring is anticipated. We have proposed a process for the phased return of securities following the completion of closure activities and provision of evidence of acceptable performance measured against the criteria. This phased approach is described within the Final Closure and Reclamation Plan. An updated security estimate is also provided.

Engagement
De Beers has engaged extensively on closure and reclamation of Snap Lake Mine. Since the mine entered into temporary closure in December of 2015, De Beers has continued to meet our commitments for engagement as outlined in the approved Engagement Plan (De Beers 2017). We have hosted dozens of community visits, site visits, workshops, and meetings with Indigenous Parties, reviewers and regulators all with the intent of sharing our plans for Snap Lake mine, receiving comments and questions and addressing concerns. Transitioning the mine from ECM into Closure has been the primary focus of engagement for more than the past year.

Recent engagements related to the final closure of Snap Lake include TK workshops held throughout 2017 and 2018, the Reclamation Working Group meeting (Meeting #8) in November of 2018, and a water licence amendment workshop held on March 7, 2019. The proposed modifications to the North Pile Facility were presented at these occasions in increasing level of detail as plans were refined over time. All of the affected Indigenous Parties were invited to attend these sessions and attendance was excellent. Notifications were provided to all parties of the intent to renew the water licence (November 7, 2018) and amend the land use permit (March 26, 2019). A record of engagement is included with the Final Closure and Reclamation Plan.
and highlights that are directly related to the water licence renewal application are included herein. As the Mine transitions into the Closure Phase De Beers will continue to provide opportunities to our Impact Benefit Agreement (IBA) partners to work with us in closing the mine well.

Environmental Agreement
The Mine is also subject to the Environmental Agreement, an agreement between De Beers and the Minister of Indian Affairs and Northern Development (Canada), the Government of Northwest Territories, the Tlicho Government, Lutsel K‘e Dene First Nation, Yellowknife Dene First Nation, and the North Slave Metis Alliance. The Environmental Agreement was developed to address several of the recommendations in the EA decision report. The Environmental Agreement requires De Beers to submit several Environmental Monitoring and Management Plans to the Parties for review and approval. These plans have been updated over the years as required to align with site activities. They have also been updated to align with Closure and Post-Closure activities and have been provided to the Parties to the Agreement for review and approval. The Environmental Agreement plans include:

- Wildlife Effects Monitoring Plan
- Air Quality and Emissions Monitoring and Management Plan
- Vegetation Monitoring Plan
- Hydrology Monitoring Plan

Environmental Assessment
The mine was subject to a full Environmental Assessment (EA) which was conducted by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in 2003 (EA01-004). The EA was conducted on the Local Study Area, which was the footprint plus a 500m buffer, an area of 1,407 ha. The impact assessment assumed that 559.5 ha of the LSA would be lost or altered as a result of the Project (MVEIRB, 2003). About two thirds of that impacted area would be directly impacted (373ha). De Beers did not construct the West Cell of the North Pile. The directly impacted area, as of December 2018, was only about 190ha. Additional footprint associated with closure activities is expected to remain below ~218 ha, still well below what was assessed in the EA. The EA recommended that the Project be approved, subject to various measures and recommendations which are presented in the Reasons for Decision (MVEIRB, 2003). These measures and recommendations have all been addressed through work conducted during Operations.

In 2014, the Mine was subject to another Environmental Assessment (EA1314-02). This second EA was for the purpose of assessing an increase in the limits on TDS in effluent discharge during mining. The second EA was approved in 2014 and in September of 2015 an amended water licence was issued with EQC set to achieve a site specific water quality objective of 1,000 mg/L. De Beers continued operations for only another few months following that decision, at which point operations ceased. Following the transition to care and maintenance in December 2015, any effects of the mine on Snap lake have steadily decreased. Large quantities of mine water are no longer pumped to the surface and the processed Kimberlite is no longer deposited in the North Pile. The camp population has decreased substantially and with it there has been a steady decrease in general activity around the site.

De Beers anticipates an increase in activity at site during Closure as compared to ECM. The increase in activity is associated with demolition, North Pile cover, and the re-construction of the perimeter water control structures and passive wetlands. This closure activity however will be shorter in duration, and less intense than during Construction or Operations. Closure activities such as quarrying, shaping, capping, revegetating,
re-contouring of sumps, ponds and ditches, demolition and revegetation were all included as part of the Environmental Assessment. As indicated above, even with the construction of the passive water treatment systems, the overall footprint remains below the original EA predictions and within the bounds of the assessed effects.

Request for exemption from Preliminary Screening
Closure and Post-closure are planned phases in the life of the Mine that were included in the original Environmental Assessment (EA1314-02). All proposed activities associated with closure and post-closure have been included in the updated predicted residual effects assessment as part of the FCRP (Appendix D). There are no additional effects predicted as a result of closure and post-closure activities, and in fact the additional mitigation that will be implemented at the Mine will further reduce any effects from those originally predicted. As such, the activities associated with these phases should not be subject to another Environmental Assessment. This water licence application should be exempt from preliminary screening as per Schedule 1, Part 1, paragraph 2.1 of the Mackenzie Valley Resource Management Act Exemption List Regulations which states:

2.1 A development, or a part thereof, for which a permit, licence or authorization is requested that
(a) was part of a development that fulfilled the requirements of the environmental assessment process established by the Mackenzie Valley Resource Management Act; and
(b) has not been modified since the development referred to in paragraph (a) fulfilled the requirements of the environmental assessment process established by the Mackenzie Valley Resource Management Act.

The activities described within this water licence application package are part of a development that fulfills the requirements of the environmental assessments previously conducted. All activities are designed to close and reclaim the mine in order to ensure the approved objectives within the Interim Closure and Reclamation Plan, and now the Final Closure Plan, can be met. Any modifications made over the years to the methods of closure and reclamation are minor and within the bounds of the assessed impacts.

De Beers has made every effort to ensure this application is straight-forward, easy to understand, and meets the requirements for approval through the Mackenzie Valley Land and Water Board water licence application process. Should you have any questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.

Sincerely,

Sarah McLean
Environment and Permitting Manager
De Beers Canada Inc.

References:
Enclosed:
Attachment 1: Record of Payment Water Licence Application Fee ($30)
Attachment 2: Site Plan to Scale
Attachment 3: Water Licence Application Form
Attachment 4: Draft closure water licence
Attachment 5: Engagement Record
Attachment 1: Record of Payment
From: Angela Love <angela.love@mwh.com>
Sent: Tuesday, March 15, 2019 12:32 PM
To: Guyane <guyane.foss@debeersgroup.com>
Cc: Amanda Gardiner <amandag@debeersgroup.com>; Jacqueline Ho <jho@mwh.com>
Subject: De Beers - Snap Lake - Cheque for New Water Licence Application

Hi Guyane,

Thank you for submitting the cheque for the new licence application that’ll be submitted shortly for the Snap Lake mine. The receipt will be processed/mailed to you once the application is submitted as we cannot assign a file number until such time.

Please let me know if you have any questions.

Regards,
Angela

Angela Love, EP
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor, 4952 48th St. | PO Box 2120 | Yellowknife, NT | Canada | X1A 2P0
ph 867.920.7436 | fax 867.925.6510
angela.love@mwh.com | www.mvwb.com

Please note: All correspondence to the Board, including emails, letters, faxes, and attachments are public documents and may be posted to the Public Registry.
Attachment 2: Site Plan(s) to Scale
Attachment 2: Proposed Site Plan, Closure
Attachment 3: Water Licence Application Form
APPLICATION FOR A NEW WATER LICENCE, AMENDMENT OF LICENCE, OR RENEWAL OF LICENCE.

1. Name and Mailing Address of Applicant
   Sarah McLean
   De Beers Canada Inc.
   Suite 300 – 1601 Airport Road NE
   Airport Corporate Center
   Calgary, Alberta, Canada T2E6Z8
   Telephone: 403-930-0991 ext.2784
   Fax: N/A

2. Address of Head Office in Canada if Incorporate
   De Beers Canada Inc.
   Suite 300 – 1601 Airport Road NE
   Airport Corporate Center
   Calgary, Alberta, Canada T2E6Z8
   Telephone: 403-930-0991 ext.2784
   Fax: N/A

3. Location of Undertaking (describe and attach a map, indicating watercourses and location of any proposed waste deposits).
   Location: 110º 52' 00"
   Site map to meet the requirements of the application is included with the cover letter.
   Site maps are included throughout the application.

4. Description of Undertaking (describe and attach plans)
   Snap Lake was an underground diamond mine. As of December 4, 2015, the mine entered into Care & Maintenance. In December of 2017, De Beers announced its intent to enter into final closure of the Mine. De Beers is applying for a water licence to support the closure and post-closure phases of the mine life. Closure activities are described in detail in the Final Closure and Reclamation Plan enclosed. A complete list of all updated documents is included within the cover letter.
   Closure activities include quarrying, capping and contouring of the north pile, construction of influent storage ponds and passive wetlands, water collection, treatment, and management; waste management, use of water, deposit of waste, operation of an airstrip, landfill, camp and associated facilities, demolition of buildings, re-vegetation etc.

5. Type of Undertaking.
   1. Industrial
   2. Mining and Milling X
   3. Municipal
   4. Power
   5. Agriculture
   6. Conservation
   7. Recreation
   8. Miscellaneous

6. Water Use
   To obtain water X
   To cross a watercourse
   To divert water X
To modify the bed or bank of a watercourse X
To alter the flow of, or store water X

Other (describe): Water will continue to be used for the purposes of the domestic use at the camp, dust control, water treatment, and other industrial uses.

7. Quantity of water involved (litres per second, litres per day or cubic meters per year), including both quantity to be used and quantity to be returned to source.

Snap Lake Mine is currently licensed for 188,000 m³/year. De Beers Canada Inc. is requesting no changes to the existing license at this time. The full details regarding management of water are provided within the updated Water Management Plan included as part of this application.
8. Waste deposited (quantity, quality, treatment and disposal)

A Waste Management Plan for the proposed activities is to be developed in accordance with the Board’s Guidelines for Developing a Waste Management Plan (accessible at www.mvlwb.com) and submitted as an attachment to the application form. A template for this Plan is provided in the Guidelines. Applications for a municipal licence do not need to include a Waste Management Plan as this information is required under the Operation and Maintenance Plan.

In addition, applicants are referred to the Board’s Water and Effluent Quality Management Policy (accessible at www.mvlwb.com) to understand the Board’s approach to managing the deposit of waste into the receiving environment through enforceable terms and conditions set in water licences.


9. Other persons or properties affected by this Undertaking (give name, mailing address and location). Attach a list if necessary.

As assessed by the Mackenzie Valley Environmental Impact Review Board in 2003 and 2014. Primary communities include Lutsel K’e, Dettah, N’Dilo, Rae/Edzo, Gameti, Whati, Wekweeti, and Yellowknife (including the NSMA population).

<table>
<thead>
<tr>
<th>Aboriginal Group</th>
<th>Community</th>
<th>Contact</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| Yellowknife Dene First Nation | N’Dilo, Dettah | Chief Ernest Betsina | P.O. Box 2514, Yellowknife, NT X1A 2P8  
www.ykdene.com  
Dettah Office:  
Phone: (867) 873-4307  
Fax: (867) 873-5969  
N’Dilo Office:  
Phone: (867) 873-8951  
Fax: (867) 873-8545 |
| Lutsel K’e Dene First Nation | Lutsel K’e | Chief Darryl Boucher-Marlowe | P.O. Box 28  
Lutsel K’e NT X0E 1A0  
Phone: (867) 370-3051  
Fax: (867) 370-3010 |
| Tlicho | Behchoko/Rae/Edzo | Grand Chief George Mackenzie | P.O. Box 412  
Behchoko, NT X0E 0Y0  
Phone: (867) 392-6381  
Fax: (867) 392-6389  
www.tlicho.ca |
| | Behchoko | Chief Clifford Daniels,  
(867) 392-6385 | P.O. Box 412  
Behchoko, NT X0E 0Y0  
Phone: (867) 392-6381  
Fax: (867) 392-6389  
www.tlicho.ca |
| | Whati | Chief Alfonz Nitsiza,  
(867) 573-3012 | P.O. Box 92  
Whati, NT X0E 1P0  
Phone: (867) 573-3012  
Fax: (867) 573-3075  
www.tlicho.ca |
| | Gameti | Chief David Wedawin,  
(867) 997-3080 | P.O. Box 104  
Gameti, NT X0E 1R0  
Phone: (867) 997-3074  
Fax: (867) 997-3097  
www.tlicho.ca |
| | Wekweeti | Chief Charlie Football,  
(867) 713-2511 | P.O. Box 34  
Wekweeti, NT X0E 1W0  
Phone: (867) 713-2511  
Fax: (867) 713-2064  
www.tlicho.ca |
| North Slave Metis Alliance | Yellowknife | Bill Enge, President | P.O. Box 2301  
32 Melville Dr.  
Yellowknife, NT X1A 2P7  
Phone: (867) 873-9176  
Fax: (867) 699-7442  
genral@nsma.net |
10. **Predicted environmental impacts of Undertaking and proposed mitigation.**

As part of the response to this section, a spill contingency plan for the proposed activities is to be developed in accordance with INAC’s *Guidelines for Spill Contingency Planning, April 2007* (accessible at [http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf](http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf)). This plan is to be submitted as an attachment to the application form.

The Environmental Impacts were assessed by the Mackenzie Valley Environmental Impact Review Board as part of the original Environmental Impact Assessment (EA01-004). Environmental management plans, including the Final Closure and Reclamation Plan, have been updated to align with closure and post-closure and have been included in the application and to address all environmental effects.

11. **Contractors and sub-contractors (names, addresses and functions).** Attach a list if necessary.

Deton Cho Corporation - site operations;
Scarlet Security - Security Service;
Imperial Oil Ltd - Supply of Fuel & Lubricants;
Bouwa Whee Catering - Yellowknife, NT - Camp Catering & Janitorial;
Sandvik - Yellowknife, NT - Maintenance Services;
Golder Associates - Yellowknife, NT - Environmental & Geotechnical;
Arktis Solutions Inc. - Yellowknife, NT - Environmental Services;
Tire North - Maintenance Services;
Tli Cho Logistics - Yellowknife, NT - Maintenance Services;
Tli Cho Landtran Transport Ltd. - Yellowknife, NT - Winter Road Construction;
Orica - Yellowknife, NT - Explosive Manufacturing;
Ryfan Electric - Maintenance Services;
Finning - Richmond, BC - Maintenance Services;
Frontline Medicis Inc. - Yellowknife, NT - Medical Services;
Trinity Helicopters - Yellowknife, NT - Transportation Services;
Great Slave Helicopters - Yellowknife, NT - Transportation Services;
Summit Air - Yellowknife, NT - Transportation Services; and
First Air - Yellowknife, NT - Transportation Services

12. **Studies undertaken to date.** Attach a list if necessary.

Please see the MVLWB registry for Snap Lake which includes information on the many studies carried out under the approved Water License and Land Use permit. In addition, De Beers updated the management plans associated with the mine, and conducted several studies including a Human Health and Ecological Risk Assessment and Effluent Quality Criteria re-evaluation in support of the Final Closure and Reclamation Plan and updated water licence.

13. **Proposed time schedule.**

Start Date = June 14, 2020
End Date = June 13, 2035

Name (print): Sarah McLean  
Signature: [Signature]
Title (print): Environment and Permitting Manager  
Date: March 29, 2019

Please make all cheques payable to “Receiver General of Canada”

**FOR OFFICE USE ONLY**

Application Fee Amount: $30  
Receipt No: __________

Water Use Deposit Amount: $___________  
Receipt No: __________
Type A Water Licence MV2011L2-0004  
De Beers Canada Inc. – Snap Lake Project

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Part A: Scope and Definitions
Part B: General Conditions
Part C: Conditions Applying to Security Requirements
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Part H: Conditions Applying to Contingency Plans
Part I: Conditions Applying to Closure and Reclamation
Part J: Conditions Applying to Modifications

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Schedule 3: Construction
Schedule 4: Waste Management
Schedule 5: Water and Wastewater Management
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Part A: Station Description and Monitoring Requirements
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Figure 2: Surveillance Network Program stations (2 of 3)
Figure 3: Surveillance Network Program stations (3 of 3)

Annex B: Table of Items Requiring Submission

Annex C: Table of Revision History
Part A: Scope and Definitions

1. Scope:
   a) This Licence entitles the Licensee to use Water, dewater the underground mine for the purpose of diamond mining, and to dispose of Waste from mining and milling and associated uses of Water at the Snap Lake Diamond Project Site (63°35'30" N, 110°52'00" W) including:
      i. Extraction of Waste Rock and ore from the Snap Lake Diamond Mine;
      ii. Development and operation of site facilities (including the airstrip);
      iii. Storage of fuel;
      iv. Development of the North Pile Facility, including the deposition of Processed Kimberlite;
      v. Progressive reclamation of the North Pile Facility;
      vi. Construction of site roads and laydown areas;
      vii. Quarrying of materials from specified areas;
      viii. Construction and maintenance of a winter ice road;
      ix. Water collection and treatment facilities, and
      x. Use of Water for processing and domestic purposes.

      These activities are described in submissions to the Mackenzie Valley Land and Water Board, including, but not limited to:
      xi. The Consolidated Project Description, submitted by the Licensee on November 24, 2003 (shown specifically in Figures 3 and 5);
      xii. The Water Licence Renewal Application, submitted by the Licensee on June 8, 2011;
      xiii. Any approved amendment applications submitted by the Licensee, up to and including the November 2014 Amendment Application; and

      If any discrepancy or conflict results from reference to the submissions in subparagraphs (xi) to (xiv) the contents of the more recent document shall prevail.

   b) This Licence is issued subject to the conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Commissioner in Executive Council under the Act, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.

   c) The Licensee shall take every reasonable precaution to protect the environment.

   d) In conducting its activities under this Licence, the Licensee shall make best efforts to consider and incorporate any scientific and Traditional Knowledge that is made available to the Licensee.

   e) Compliance with the terms and conditions of this Licence does not relieve the Licensee from responsibility for compliance with the requirements of all applicable, federal, territorial and municipal legislation.
2. Definitions:

**Acid Rock Drainage** - the production of acidic leachate, Seepage or drainage from underground workings, ore piles, Waste Rock, Processed Kimberlite, or overburden that can lead to the release of metals to groundwater or surface water during the life of the Project and after closure.


**Action Level** - a predetermined qualitative or quantitative trigger which, if exceeded, requires the Licensee to take appropriate actions including, but not limited to: further investigations, changes to operations, or enhanced mitigation measures and reporting of same.

**Analyst** - an Analyst designated by the Minister under subsection 65(1) of the Act.

**Annual Loading** - total mass of a contaminant that is discharged to Snap Lake during a calendar year.

**Aquatic Effects Monitoring Program (AEMP)** - a monitoring program designed to determine the short- and long-term effects in the Receiving Environment resulting from the Project; to evaluate the accuracy of impact predictions; to assess the effectiveness of planned impact mitigation measures; to identify additional impact mitigation measures to reduce or eliminate environmental effects; and as further described in Part G, item 1.

**Average Annual Loading** - the sum of annual loads divided by the number of years for which annual loads are calculated.

**Best Available Technology** - the most effective and economically achievable technology.

**Board** - the Mackenzie Valley Land and Water Board established by subsection 99(1) of the *Mackenzie Valley Resource Management Act*.

**Coarse Processed Kimberlite** - the material, generally 1.5 mm to 6 mm in diameter, rejected from the process plant after the recoverable diamonds have been extracted.

**Construction** - any activities undertaken to construct or build any component of, or associated with, the Project.

**Constructed wetlands** - the partially vegetated water control structures that receive water from the Influent Storage Ponds and actively remove nitrate through de-nitrification.


**Discharge** - the direct or indirect release of any Water or Waste to the Receiving Environment.

**Domestic Waste** - all solid Waste generated from the accommodations, kitchen facilities, and all other site facilities, excluding Processed Kimberlite and Waste Rock.

**Engagement Plan** - a document, developed in accordance with the Board’s June 2013, *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, that clearly describes proposed engagement activities during the life of the Project.
Engineered Structures - any structure or facility related to Water Use or the deposit of Waste that is designed and approved by a Professional Engineer.

Environmental Assessment - for the purpose of this Licence, the totality of the Mackenzie Valley Environmental Impact Review Board Public Registry for Water Licence Applications MV2001L2-0002 and MV2011L2-0002, and subsequent amendments, which underwent Environmental Assessment EA01-004 and Environmental Assessment EA1314-02.

Fine Processed Kimberlite - the material, generally <0.125 mm in diameter, rejected from the process plant after the recoverable diamonds have been extracted.

Grits Processed Kimberlite - the material, generally between 0.125 mm and 1.5 mm in diameter, rejected from the process plant after the recoverable diamonds have been extracted.

Groundwater - all Water below the ground surface.

Inspector - an Inspector designated by the Minister under subsection 65(1) of the Act.

Interim Closure and Reclamation Plan - the current version of the plan developed in accordance with this Licence and the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada’s November 2013 Guidelines for the Closure and Reclamation of Advances Mineral Exploration and Mine Sites in the Northwest Territories and approved by the Board, including the Abandonment and Restoration Plan approved under Licence MV2001L2-0002.

Influent Storage Pond – includes the east and west influent storage ponds which receive and store water from the North Pile Facility

Licensee - De Beers Canada Inc.

Major Storm Event - equal to or greater than a one (1) in five (5) year rain storm event.

Maximum Average Concentration - the running average of any four (4) consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the Surveillance Network Program.

Maximum Grab Concentration - a concentration of a parameter listed in the Licence that cannot be exceeded in any one (1) grab sample.

Metal Leaching - the production of leachate under neutral or alkaline conditions by Seepage or drainage from underground workings, ore piles, Waste Rock, tailings, or overburden, in either disturbed or undisturbed conditions, that could lead to the release of metals to groundwater and surface water during the life of the Snap Lake Diamond Project and after closure.

Minewater - Groundwater or any Water that is pumped or flows out of any underground workings.

Mine Plan - refers to the document that describes actual underground mining activities of drilling and blasting, Waste Rock removal, kimberlite extraction, Groundwater control, and backfilling, including the sequencing of the development.

Minister - a duly appointed member of the Executive Council who is responsible for the Waters Act or the department responsible for administering that Act.

Modification - in respect of a structure, means a change, other than an expansion, that does not alter the purpose or function of that structure.

Commented [MS3]: The scope of the proposed water license does not include mining.
North Pile - the North Pile Waste Rock and Processed Kimberlite Storage Facility which is comprised of the containment basins and the engineered structures designed to store and contain the Processed Kimberlite and other waste materials, as identified in the Final Closure Plan (2019) Consolidated Project Description Figure 3: Snap Lake Diamond Project Overall Site Plan (November 24, 2003).

North Pile Facility - includes the North Pile and any other stockpiles of ore or Waste Rock associated with the Project as well the passive treatment system.

North Pile Perimeter Water Control Structures - the ditches and sumps that convey water away from the North Pile.

North Pile Management Plan - the current version of the plan approved by the Board in accordance with Part E, item 7 of this Licence and includes references to the Ore Storage, Waste Rock, Processed Kimberlite Management Plan approved under Water Licence MV2001L2-0002.

Paste - a non-segregating, non-bleeding mixture with a high solids content, Water, and possibly cement and/or other additives that is pumped or hauled by truck from the process plant and placed in either the North Pile or underground workings. The solids content may consist of Coarse, Grits, and Fine fractions of Processed Kimberlite.

Passive Treatment System - includes the North Pile Perimeter Water Control Structures, the Influent Storage Ponds (east and west) and the constructed wetlands.

Potentially Acid Generating Rock - any rock that has the capability to produce acidic leachate, Seepage, or drainage.

Processed Kimberlite - the material rejected from the process plant after the recoverable minerals have been extracted.

Professional Engineer - a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG) in accordance with the Engineering and Geoscience Professions Act, S.N.W.T. 2006, c.16, or amendments, as a Professional Engineer, and whose principal field of specialization is appropriate to address the components of the project at hand.

Professional Geoscientist - a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG) in accordance with the Engineering and Geoscience Professions Act, S.N.W.T. 2006, c.16, or amendments, as a Professional Geoscientist, and whose principal field of specialization is appropriate to address the components of the project at hand.

Project - the Snap Lake Diamond Project as described in Part A, item 1 of this Licence.

Receiving Environment - the aquatic environment that receives any Water or Waste released from the Project.

Regulations - the Regulations promulgated pursuant to section 63 of the Act.

Response Framework - a systematic approach to responding when the results of a monitoring program indicate that an Action Level has been reached.

Response Plan - a part of the Response Framework that describes the specific actions to be taken by the Licensee in response to reaching or exceeding an Action Level.
Seepage - includes any Water or Waste that passes through or escapes from any structure designed to contain, withhold, divert, or retain the Water or Waste.

Sewage - includes all toilet Wastes and greywater.

Sewage Treatment Plant - the Engineered Structures that are designed to contain and treat Sewage produced at the Project.

Significance Threshold - a level of environmental change in any monitored parameter which, if reached, would result in significant adverse effects. These thresholds should be consistent with the findings of the Environmental Assessments of the Project.

Slurry - a mixture of Fine Processed Kimberlite and Water that exhibits liquid-like characteristics and has a lower solids content relative to Paste. It is pumped from the process plant and placed in the North Pile.

Surveillance Network Program - the totality of the sampling requirements detailed in Annex A of this Licence.

Traditional Knowledge - the cumulative, collective body of knowledge, experience, and values built up by a group of people through generations of living in close contact with nature. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual, and political change.

Unauthorized Discharge - is a release or Discharge of any Water or Waste not authorized under this Licence.

Waste - any Waste as defined by section 1 of the Act.

Wastewater - the Water that is generated by site activities or originates on site that requires treatment or any other Water management activity.

Waste Rock - all rock materials that are produced and unprocessed throughout the life of the Project.

Water(s) - any Waters as defined by section 1 of the Act.

Water Management Pond - the impoundment that was used for the disposal of Processed Kimberlite during the exploration phase but during operations is being used for temporary storage of Water and Waste and as a contingency Water storage area for the Water Treatment Plant effluent.

Water Use - a use of Water as defined by section 1 of the Act.

Water Use Fee - the fee for the use of Water set out in the Regulations promulgated under section 63 of the Act.

Water Quality Objective - a numerical concentration or narrative statement that has been established to support and protect the designated uses of water at a specified site.

Water Supply Facilities - the Engineered Structures that are required for extraction, storage, treatment, and distribution of Water as shown in Figure 4 - Snap Lake Diamond Project Overall Site Plan (Consolidated Project Description, 2003).

Water Treatment Plant - the Engineered Structures, including the reverse osmosis module, that are designed to collect and actively treat Wastewater produced from this Project.
Part B:  General Conditions

1. The Licensee shall ensure a copy of this Licence is maintained on site at all times.

2. All information submitted to the Board for this Licence must be submitted in a form acceptable to the Board.

3. The Water Use Fee shall be paid by the Licensee annually, in advance of any Water Use, in accordance with the Mackenzie Valley Land and Water Board’s March 2013, Water Use Fee Policy.

4. The Licensee shall operate in accordance with plans, programs, and studies approved pursuant to the conditions of this Licence and with any revisions to the plans, programs, and studies as may be made from time to time pursuant to the conditions of this Licence and as approved by the Board.

5. The Licensee shall follow plans approved under Licence MV2011L2-0002 unless and until a new or updated plan has been approved by the Board.

6. All revised management plans and monitoring programs shall be submitted to the Board, for approval, at least sixty (60) days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan or program and shall be accompanied by a brief summary of the changes made to the plan or program. Revised plans referred to in Part B, item 17 [Engagement Plan]; Part E, item 2 [Waste Management Plan]; Part E, item 7 [North Pile Management Plan]; Part E, item 10 [Acid Rock Drainage and Geochemical Characterization Plan]; Part F, item 6 [Water Management Plan]; Part F, item 17 [Total Dissolved Solids Mitigation Implementation Plan]; Part H, item 1 [Spill Contingency Plan]; and Part H, item 2 [Emergency Response Plan] shall be presented in a format consistent with the Mackenzie Valley Land and Water Board’s Standard Outline for Management Plans.

7. The Licensee shall submit to the Board an Annual Water Licence Report no later than March 31 of the year following the calendar year reported, which shall be in accordance with Schedule 1, item 1.

8. The Surveillance Network Program and Schedules annexed to this Licence form an integral part of this Licence.

9. The Licensee shall comply with the Surveillance Network Program, which is annexed to and forms part of this Licence, and any changes to the Surveillance Network Program as may be made from time to time by the Board.

10. The Licensee shall comply with the Schedules, which are annexed to and form part of this Licence, and any changes to the Schedules as may be made from time to time by the Board.

11. The Conditions, Schedules, the Surveillance Network Program, and any compliance dates specified in this Licence may be changed at the discretion of the Board. If any date for the submission of a plan, report, or program falls on a weekend or holiday, the plan, report, or program shall be submitted on the following business day.

12. Meters, devices, or other such methods used for measuring the volumes of Water used and Waste Discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.

Commented [MS5]: This TDS Mitigation Plan is no longer needed as we no longer discharge water from the underground to the surface.
13. The Licensee shall maintain, to the satisfaction of an Inspector, the signs necessary to identify the stations of the Surveillance Network Program.

14. All references to policies, guidelines, codes of practice, statutes, regulations or other authorities shall be read as a reference to the most recent versions, unless otherwise denoted.

15. All information submitted to the Board, as required by this Licence, shall:
   a) Be in accordance with the Mackenzie Valley Land and Water Board’s March 2012, Document Submission Standards; and
   b) Include a section within each submission which identifies where the pertinent requirements of this Licence are addressed.

16. By March 1, 2016, the Licensee shall submit to the Board, for approval, an Engagement Plan.

17. The Licensee shall act in accordance with the approved Engagement Plan and shall review the Plan annually and make any necessary revisions to reflect changes in operations, or as directed by the Board. Revised Plans shall be submitted in accordance with Part B, item 85.
Part C: Conditions Applying to Security Requirements

1. The Licensee shall post and maintain a security deposit in accordance with Schedule 2, item 1.

2. The security deposits required under Part C, item 1 shall be in a form acceptable to the Minister and shall be maintained until such time as it is fully or partially refunded by the Minister pursuant to section 35 of the Act.

3. Upon receiving a request from the Board, the Licensee shall submit to the Board a revised mine reclamation liability estimate utilizing the current version of RECLAIM or another method acceptable to the Board.

4. The Licensee shall maintain such further or other security amounts as may be required by the Board based on estimates of current mine reclamation liability in accordance with Part C, item 3, or based on such other information as may be available to the Board.

5. Reductions to the security deposit may be approved by the Board based on estimates of current mine reclamation liability in accordance with Part C, item 3 or based on such other information as may be available to the Board.

6. If the amount of the security deposit is revised by the Board as described under Part C, item 4, the Licensee shall post the revised amount with the Minister within ninety (90) days of the Board giving notice of the revised amount.
Part D: Conditions Applying to Construction

1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to prevent escape of Wastes to the Receiving Environment.

2. The Licensee shall maintain Construction records for all Engineered Structures and make them available upon request from the Board or an Inspector.

3. Upon request from the Board, the Licensee shall submit to the Board a revised schedule for Construction and mine development.

4. The Licensee shall ensure that all Engineered Structures intended to contain, withhold, divert, or retain Water or Wastes, and which meet the definition of a dam under the Dam Safety Guidelines, are designed, constructed, and maintained to meet or exceed the Dam Safety Guidelines.

5. A minimum of ninety (90) days prior to the start of Construction of any phase of the North Pile, the Licensee shall submit to the Board, a Final Detailed Design Report, Construction drawings and specifications, and a Quality Control Plan stamped by a Professional Engineer. The Final Detailed Design Report shall be in accordance with Schedule 3, item 1.

6. A minimum of ninety (90) days prior to the start of Construction of any Engineered Structures intended to contain, withhold, divert, or retain Water or Wastes not included in the North Pile system referred to in Part D, item 5, the Licensee shall submit to the Board, a Final Detailed Design Report, Construction drawings and specifications, and a Quality Control Plan stamped by a Professional Engineer. The Final Detailed Design Report shall be in accordance with Schedule 3, item 2.

7. The Licensee may commence Construction of structures referred to in Part D, items 5 and 6, and other related Engineered Structures, provided the following requirements are met:
   a) The Licensee has notified the Board and an Inspector in writing of the proposed Construction activities at least thirty (30) days prior to beginning the activities;
   b) Such activities do not place the Licensee in contravention of either the Licence or the Act;
   c) The Board has not, during the thirty (30) days following notification of the proposed Construction activities, informed the Licensee that review of the proposal will require more than thirty (30) days;
   d) The Board has not rejected the proposed Construction activities; and
   e) An Inspector has authorized the proposed Construction activities and provided a letter of notification to the Board.

8. Construction of Engineered Structures for which all the conditions referred to in Part D, item 7 have not been met, may be carried out only with written approval from the Board.

9. A minimum of forty-eight (48) hours prior to the commencement of Construction of the Engineered Structures identified in Part D, items 5 and 6, the Licensee shall provide written notification to the Board and an Inspector. Notification shall include the name and contact information for the Construction superintendent.

10. The Licensee shall ensure that all Construction of Engineered Structures, identified in Part D, items 5 and 6 will be supervised and field checked by a Professional Engineer.

11. Within ninety (90) days of the completion of the Construction of any structures referred to in Part D, items 5 and 6, the Licensee shall submit to the Board, a Geotechnical Engineering Report prepared
by a Professional Engineer. This shall include as-built drawings, documentation of field decisions that deviate from the Final Detailed Design Report, and any data used to support these decisions.
Part E: Conditions Applying to Waste Management

Waste Management Plan

1. The Licensee shall submit to the Board by January-June 31, 2014, for approval, a Waste Management Plan in accordance with the Mackenzie Valley Land and Water Board’s March 2011 Guidelines for the Development of a Waste Management Plan. The Plan shall:

a) Describe how all Waste streams associated with the Project are handled, including references to other plans as necessary;

b) Describe in detail the process for handling any Waste stream not specifically described in another management plan including, but not limited to, the hydrocarbon-contaminated soils; and

c) Incorporate the Domestic Waste and Sewage Plan as well as the Hazardous Waste Management Plan as previously approved under MV2001L2-0002.

2. The Licensee shall act in accordance with the approved Waste Management Plan and shall review the Plan annually and make any necessary revisions to reflect changes in operations, or as directed by the Board. Revised Plans shall be submitted in accordance with Part B, item 6.5 of this Licence.

Inspections of Structures

3. The Licensee shall ensure that all Engineered Structures designed to contain, withhold, retain, or divert Water or Waste are inspected annually by a Professional Engineer and, where appropriate, a Professional Geoscientist, during the summer months and following any unforeseen extreme events (such as earthquakes, flooding, cracks, sinkhole formation, etc.), in accordance with the applicable Final Detailed Design Report, as-built drawings and specifications, and management and monitoring plans required by this Licence. The results of the annual inspection shall be reported as follows:

a) Within sixty (60) days of completing the inspection, the Licensee shall submit to the Board a Field Inspection Report, prepared by a Professional Engineer, and/or where applicable, a Professional Geoscientist. The Report shall include a covering letter from the Licensee outlining an implementation plan to respond to all recommendations in the Report; and

b) The Professional Engineer’s, and/or where applicable, Professional Geoscientist's, full Geotechnical and Geochemical Inspection Report shall be in accordance with Schedule 4, item 1, and be submitted to the Board as part of the Annual Water Licence Report referred to in Part B, item 7 of this Licence.

4. The Licensee shall provide written notification to an Inspector a minimum of two (2) weeks prior to the Professional Engineer's and/or Professional Geoscientist's annual inspection(s) referred to in Part E, item 3.

5. The Licensee shall maintain all structures designed to contain, withhold, retain, or divert Water or Waste in a manner consistent with the Geotechnical Engineering Report referred to in Part D, item 11 of this Licence, the geotechnical and geochemical reports referred to in Part E, item 3, the approved North Pile Management Plan referred to in Part E, item 7, and the approved Acid Rock Drainage and Geochemical Characterization Plan referred to in Part E, item 10 so as to prevent the escape of Waste. Weekly Annual inspections of these structures shall be conducted and the records of these inspections shall be kept for review as requested by an Inspector. The Licensee shall perform more frequent inspections at the request of an Inspector.

Commented [MS7]: Date may need to be adjusted

Commented [MS8]: Could this term be qualified perhaps requiring the inspector to have cause?
The North Pile

6. The Licensee shall construct, operate, and maintain the North Pile Facility to design specifications such that:

a) Impacts to the Receiving Environment are prevented or minimized through the use of appropriate mitigation measures, monitoring, and follow-up actions;

b) Conditions for eventual closure and reclamation of the North Pile Facility are optimized;

c) Monitoring of the North Pile Facility is sufficient to ensure that:

i. Performance design criteria are met, as described in the Final Detailed Design Report referred to in Part D, item 5; and

ii. Changes in the operation and management of the North Pile Facility, including any necessary additional mitigations, are identified; and

d) A Response Framework is in place to ensure that the Licensee will take appropriate actions if Action Levels, as defined in the North Pile Management Plan, are exceeded.

7. The Licensee shall act in accordance with the approved North Pile Management Plan and shall review the Plan annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations or monitoring. Revised Plans shall:

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

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

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

8. The Licensee shall perform a risk assessment of the North Pile Facility to evaluate the adequacy of current operational procedures and monitoring efforts to ensure that impacts to the Receiving Environment are prevented or minimized. Results of the risk assessment shall be submitted to the Board by September 15, 2012, accompanied by recommendations for changes to the management of the North Pile Facility and a schedule of implementation.

Acid Rock Drainage and Geochemical Characterization

9. The Licensee shall submit to the Board by January 31, 2013, for approval, an update of the Acid Rock Drainage and Geochemical Characterization Plan. The Plan shall:

a) Describe how the Licensee shall assess and manage potential acid/alkaline/neutral rock drainage and metal leaching at the Snap Lake Project during the construction and operation phases;

b) Satisfy the requirements of Schedule 4, item 3; and

c) Be in accordance with current best practices such as the 2009 MEND (Mine Environment Neutral Drainage) Report 1.20.1 Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials, and current iterations of the INAP (International Network for Acid Prevention) GARD (Global Acid Rock Drainage) Guide.

10. The Licensee shall act in accordance with the approved Acid Rock Drainage and Geochemical Characterization Plan and shall review the Plan annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations or monitoring. Revised plans shall be in accordance with Part B, item 6 of this Licence.

Commented [MS9]: This item was closed-off and not relevant to the new water licence. Risk assessments were conducted as part of the development of the Final Closure Plan and North Pile Management Plan.
11. The Licensee shall conduct Seepage surveys of all Waste storage areas, including the constructed kimberlite ore stockpile, the North Pile Facility and the Water Management Ponds in accordance with Schedule 4, item 4.

Part F: Conditions Applying to Water and Wastewater Management

Water Intake

1. The total quantity of fresh Water withdrawn from Snap Lake and used by the Project shall not exceed one hundred and eighty-eight thousand (188,000) cubic metres (m³) annually.

2. The Licensee shall install meters for all structures used to withdraw Water or Discharge Waters or Waste to the satisfaction of an Inspector.

3. The Licensee shall construct and maintain the Water intake with a fish screen designed to prevent impingement and/or entrapment of fish. The fish screen shall be in accordance with the best practices outlined in the Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guidelines (1995).

Water Management Plan

4. The Licensee shall manage Water and Wastewater with the objective of minimizing the impacts of the Project on the quantity and quality of Water in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up actions.

5. The Licensee shall submit to the Board by October 1, 2013, for approval, an update of the Water Management Plan. The Plan shall describe how the Licensee is meeting the objectives listed in Part F, item 4 and be in accordance with Schedule 5, item 1.

6. The Licensee shall act in accordance with the approved Water Management Plan and shall review the Plan annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations or monitoring. Revised Plans shall be submitted in accordance with Part B, item 6.5 of this Licence and describe how the Licensee is meeting the objectives described in Part F, item 4.

7. The results of monitoring conducted under the approved Water Management Plan referred to in Part F, item 6, shall be reported in the Annual Water Licence Report referred to in Part B, item 7.5 of this Licence.
### Effluent Quality Criteria – Discharges from Water Treatment Plants: Passive Treatment Systems

8. Effluent quality criteria (EQC) requirements:

a) All Water or Waste from the Project that enters the Receiving Environment, including all Discharges from Surveillance Network Program stations 02-17b, 17c (permanent Water treatment plant: passive treatment system) and 02-17d (temporary Water treatment plant: passive wetland treatment system), shall meet the following effluent quality criteria:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Average Concentration</th>
<th>Maximum Grab Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Dissolved Solids (TDS)</td>
<td>960</td>
<td>1253</td>
</tr>
<tr>
<td>Suspended</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Ammonia as N</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>0.35</td>
<td>0.6</td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>1225</td>
<td>1730</td>
</tr>
<tr>
<td>Total Suspended Sediments</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>Ammonia as N</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Nitrite as N</td>
<td>0.35</td>
<td>0.6</td>
</tr>
<tr>
<td>Nitrate as N</td>
<td>1225</td>
<td>1730</td>
</tr>
<tr>
<td>Total Phosphorous</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Aluminum</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total Arsenic</td>
<td>0.003</td>
<td>0.03</td>
</tr>
<tr>
<td>Total Chromium</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Total Copper</td>
<td>0.003</td>
<td>0.008</td>
</tr>
<tr>
<td>Total Lead</td>
<td>0.005</td>
<td>0.01</td>
</tr>
<tr>
<td>Total Nickel</td>
<td>0.05</td>
<td>0.1</td>
</tr>
<tr>
<td>Total Zinc</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Extractable Petroleum Hydrocarbons – F1 Fraction (C6-C10)</td>
<td>4.6</td>
<td>n/a</td>
</tr>
<tr>
<td>Extractable Petroleum Hydrocarbons – F2 Fraction (C11-C16)</td>
<td>2.4</td>
<td>n/a</td>
</tr>
<tr>
<td>Faecal Coliforms</td>
<td>10 CFU/100mL*</td>
<td>20 CFU/100mL*</td>
</tr>
</tbody>
</table>

* CFU - Colony-forming units

b) Any Water or Waste from the Project that enters the Receiving Environment shall have a pH between 6.0 and 9.0, except surface runoff, which shall have a pH between 5.0 and 9.0;

c) Part F, item 8(b) does not apply at Surveillance Network Program Stations 02-04, 02-07, 02-08, or 02-09;

d) The Discharge shall be managed to prevent the appearance of any visible film from the Discharge on the surface of Snap Lake in the vicinity of the outfall; and

Commented [MS11]: During the past many years of monitoring, there has been no concern with visible films on the surface of Snap Lake.
e) The Licensee shall ensure that the effluent discharged to Snap Lake shall not be acutely toxic to aquatic life, using protocols described in the Surveillance Network Program annexed to this Licence.

9. The pH of the final effluent discharged to Snap Lake at Surveillance Network Program stations 02-17 and 02-17b shall be managed as necessary by the Licensee to prevent acute toxicity caused by ammonia in the final effluent discharged. Adjustment of the pH shall be made only when necessary to prevent acute ammonia toxicity and shall not result in a pH in the final effluent below the ambient pH of Snap Lake at any time.

10. Prior to discharging to the Receiving Environment, the Licensee shall direct all Water or Waste from the Project that does not meet the effluent quality criteria specified under Part F, item 8 to the Water Treatment Plant or Water Management Pond or the Underground. An Inspector may authorize the diversion of Water to an alternate location if necessary. The Licensee shall notify the Board in writing, within twenty-four (24) hours of this authorization being granted.

Plans, Reports and Studies – Treated Effluent

11. The Licensee shall submit to the Board by January 31, 2013, for approval a Plume Characterization Study to assess the performance of the outfall diffuser installed in 2011 and the distribution of the diffuser plume in Snap Lake under a variety of conditions (including under ice in late winter).

12. A minimum of ninety (90) days prior to recommencement of mine operations, the Licensee shall submit to the Board, for approval, a Strontium Response Plan that satisfies the requirements of Schedule 5, item 2.

13. A minimum of ninety (90) days prior to recommencement of mine operations, the Licensee shall submit to the Board, for approval, a Nitrogen Response Plan that satisfies the requirements of Schedule 5, item 3.

14. If not approved by the Board, the Plans referred to in Part F, item 12 [Strontium Response Plan] and Part F, item 13 [Nitrogen Response Plan] shall be revised and resubmitted as directed by the Board.

15. The Licensee will re-evaluate the Best Available Technology for treatment of the effluent discharged to Snap Lake and submit their findings at the request of the Board.

16. A minimum of ninety (90) days prior to recommencement of mine operations, the Licensee shall submit to the Board, for approval, a Total Dissolved Solids Mitigation Implementation Plan. The Plan shall:

   a) Describe how the Licensee shall design and implement mitigation measures for the control of total dissolved solids in the Discharge to meet the requirements of Measure 2 of the Environmental Assessment EA1314-02;
   b) Be in accordance with Schedule 5, item 4; and
   c) Be presented in a format consistent with the Mackenzie Valley Land and Water Board’s Standard Outline for Management Plans.

17. The Licensee shall act in accordance with the approved Total Dissolved Solids Mitigation Implementation Plan referred to in Part F, item 16, and shall review the Plan annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations or monitoring. Revised plans shall be submitted in accordance with Part B, item 6 of this Licence.
18. Within ninety (90) days following recommencement of mine operations, and every three (3) months thereafter, or as otherwise directed by the Board, the Licensee shall submit to the Board a **Total Dissolved Solids Mitigation Implementation Report**, which shall be in accordance with Schedule 6, Item 6.
Part G: Conditions Applying to the Aquatic Effects Monitoring

1. The Aquatic Effects Monitoring Program (AEMP) shall meet the following objectives and satisfy the requirements in Schedule 6, item 1 of this Licence:

   a) To determine the short- and long-term effects of the Project on the receiving environment;
   b) To test the predictions made in the Environmental Assessments or in other submissions to the Board regarding the impacts of the Project on the Receiving Environment;
   c) To evaluate whether the Project is being operated such that Measure 1 of Environmental Assessment EA1314-02 is being met;
   d) To assess the efficacy of mitigation measures that are used to minimize the effects of the Project on the Receiving Environment;
   e) To identify the need for additional mitigation measures to reduce or eliminate Project-related effects on water resources; and
   f) To provide an early warning system where the results of aquatic monitoring are used to prevent or avoid adverse environmental effects through a Response Framework and regular evaluation of the AEMP.

2. The Licensee shall submit to the Board by June 31, 2020, a minimum of six (6) months prior to recommencement of mine operations, and every four (4) years thereafter, for approval, an update to the Aquatic Effects Monitoring Program (AEMP) Design Plan. The updated AEMP Design Plan shall satisfy the requirements of Schedule 6, item 2 of this Licence.

3. The Licensee may at any time propose updates to the AEMP Design Plan referred to in Part G, item 2, for approval by the Board.

4. The Licensee shall review and update the AEMP Design Plan referred to in Part G, item 2 as necessary to reflect directives from the Board. Updated Plans shall be submitted to the Board for approval.

5. A minimum of six (6) months prior to recommencement of mine operations, and then every four (4) years thereafter, the Licensee shall submit to the Board, for approval, an Aquatic Effects Re-evaluation Report, that meets the following objectives and satisfies the requirements of Schedule 6, item 3 of this Licence:

   a) To describe the Project-related effects on the Receiving Environment as measured from Project inception and compared against predictions from the Environmental Assessments;
   b) To update predictions of Project-related effects on the Receiving Environment based on monitoring results obtained since Project inception; and
   c) To propose, if necessary, updates to the AEMP design with supporting rationale including, but not limited to, the updated effect predictions.

6. The Licensee shall submit to the Board, by May 1, for approval, an AEMP Annual Report that shall include information relating to data collected in the preceding calendar year and that satisfies the requirements of Schedule 6, item 4 of this Licence.

7. If any Action Level as defined in the approved AEMP Design Plan is exceeded, the Licensee shall notify the Board within thirty (30) days of when the exceedance is detected. The Licensee shall also submit to the Board, for approval, an AEMP Response Plan, which shall satisfy the requirements of Schedule 6, item 5 of this Licence. The AEMP Response Plan shall be submitted within three (3) months of the notification, unless otherwise directed by the Board.

Commented [MS18]: The licencee no longer contemplates a recommencement of mine operations. Clause 3 covers the Licensee for any changes we’d like to make from time to time. A distinct clause requiring submission on a certain date is not needed.
8.7. The Licensee shall update the AEMP Response Plan referred to in Part G, item 7 as directed by the Board.

9.8. If not approved by the Board, the plans referred to in Part G, item 2 [AEMP Design Plan], Part G, item 5 [Aquatic Effects Re-evaluation Report], and Part G, item 7 [AEMP Response Plan] shall be revised and resubmitted in accordance with directives from the Board.

10. By June 3, 2015, the Licensee shall submit to the Board, for approval, a special study plan for the collection of supplemental monitoring data necessary to determine the seasonal and spatial variability of the baseline aquatic conditions downstream of Snap Lake, up to and including Mackay Lake, to ensure that Measure 1(d) of the Environmental Assessment EA1314-02 is adhered to (Downstream Watercourses Special Study Plan). The Plan shall meet the following objectives and satisfy the requirements in Schedule 6, item 6:
   a) To determine the range of natural variability for total dissolved solids and constituent parameters downstream of Snap Lake;
   b) To identify final sampling locations downstream of Snap Lake;
   c) To describe how the information from this study will be used in the AEMP to assess conformity with Measure 1(d) of Environment Assessment EA1314-02; and
   d) To determine the frequency and method for updating the downstream lakes model.

11. Within ninety (90) days of the completion of the Downstream Watercourses Special Study Plan referred to in Part G, item 10, the Licensee shall submit a Downstream Watercourses Special Study Report to the Board, for approval. The Report shall meet the requirements of Schedule 6, item 7.

12. The Licensee shall submit to the Board by December 31, 2015, an updated water quality model for the waterbodies downstream of Snap Lake, up to and including Mackay Lake. At a minimum, the model should be updated to satisfy the requirements in Schedule 6, item 8.

Commented [MS19]: This study was completed and is no longer required as part of the new water licence.
Part H: Conditions Applying to Contingency Plans

1. The Licensee shall act in accordance with the approved Spill Contingency Plan and shall review the Plan annually, or as requested by an Inspector or as directed by the Board, and make any necessary revisions to reflect changes in operations and updates to technologies, chemicals, or fuels. Revised plans shall be in accordance with Indian and Northern Affairs Canada’s 2007 Guidelines for Spill Contingency Planning and Part B, item 6.5 of this Licence.

2. The Licensee shall act in accordance with the approved Emergency Response Plan and shall review the Plan annually, or as requested by an Inspector or as directed by the Board, and make any necessary revisions to reflect changes in operations. Revised plans shall be submitted in accordance with Part B, item 6.5 of this Licence.

3. If, during the term of this Licence, a spill or an Unauthorized Discharge of Waste occurs or if such a discharge is foreseeable, the Licensee shall:
   a) Implement the Spill Contingency Plan and the Emergency Response Plan referred to in Part H, items 1 and 2, respectively;
   b) Report the incident immediately via the 24-hour Spill Reporting Line (867) 920-8130, in accordance with the instructions contained in the Spill Report form NWT 1752/0593; and
   c) Report each spill and Unauthorized Discharge, including descriptions of causes, response actions and any changes to procedures to prevent similar occurrences in the future, to the Board within thirty (30) days after initially reporting the event.
Part I: Conditions Applying to Closure and Reclamation

1. 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.

2.1. 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.

3.2. The Licensee shall, submit to the Board, by January 31, 2020 a minimum of twenty-four (24) months prior to the end of operations, for approval, a Final Closure and Reclamation Plan.

4.3. The Licensee shall act in accordance with the approved Final Closure and Reclamation Plan and shall submit revisions to the Plan as directed by the Board.

Commented [MS20]: The Final Closure and Reclamation Plan is submitted as part of the water licence application package. Continuation of the ICRP is no longer contemplated. We will work under the FCRP.
Part J: Conditions Applying to Modifications

1. The Licensee may, without written approval from the Board, carry out Modifications to the Water supply and Waste disposal facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
   a) The Licensee has notified the Board and an Inspector in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
   b) The Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days;
   c) The Board has not rejected the proposed Modifications; and
   d) An Inspector has authorized the proposed Modifications and provided a letter of notification to the Board.

2. Modifications for which all the conditions referred to in Part J, item 1 have not been met, may be carried out only with written approval from the Board.

3. Within ninety (90) days of the completion of any Modifications to Engineered Structures, the Licensee shall provide to the Board as-built drawings and specifications.

Signed on behalf of the Mackenzie Valley Land and Water Board

Mavis Cil-Michaud, Chair

Tanya Lantz, Witness
Schedules
Attached to Water Licence MV2011L2-0004
De Beers Canada Inc. – Snap Lake Project

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Schedule 1

Part B – Annual Water Licence Report

1. The Annual Water Licence Report referred to in Part B, item 7 of this Licence shall include, but not be limited to, the following information:

   **Quantities and Measurements Reporting on Water and Waste**

   a) Monthly and annual quantities in cubic metres (m³) of Water removed from Snap Lake;
   b) Monthly and annual quantities in cubic metres (m³) of all Discharges from the permanent and temporary (if applicable) Water Treatment Plant;
   c) Monthly and annual quantities in cubic metres (m³) of treated Sewage effluent from the Sewage Treatment Plant and any temporary Sewage Treatment Plant, if applicable;
   d) Monthly and annual quantities in cubic metres (m³) of Water pumped into the North Pile Facility, including the volume of the liquid fraction of the Slurry and/or Paste;
   e) Monthly and annual quantities in cubic metres (m³) of Water reporting to the sumps from the North Pile Facility;
   f) Monthly and annual quantities in cubic metres (m³) of Water pumped from the Mine and the Water Management Pond to the permanent and temporary (if applicable) Water Treatment Plants;
   g) Monthly and annual quantities in cubic metres (m³) of Water and Wastewater pumped into the Water Management Pond and Influent Storage Ponds;
   h) Monthly elevations of Water in Snap Lake during the open Water season;
   i) Monthly elevations of Water in the Water Management Pond during the open water season and a stage volume curve for the pond;
   j) The annual quantities in cubic metres (m³) of Processed Kimberlite and Paste placed as underground backfill;
   k) The annual quantities in cubic metres (m³) of each of Fine, Grits, and Coarse Processed Kimberlite or Paste placed in the North Pile Facility;
   l) Annual quantities in cubic metres (m³) of Waste Rock placed in the North Pile Facility, identifying the classification of quantities of each rock type (non-acid generating and potentially-acid generating Waste Rock);
   m) Tabular summaries of all data and information generated during the previous calendar year under the Surveillance Network Program, should be presented in excel or an electronic and printed format acceptable to the Board, and shall include graphical summaries of parameters with effluent quality criteria referred to in Part F of this Licence for the points of compliance (Surveillance Network Program sites 02-17c and 02-17d).

Commented [TE21]: All discharges to the environment will need to be quantified, so this list should include either measurements (preferred) or estimates for monthly and annual quantities in cubic meters (m³) of discharges from the passive wetland treatment system to Snap Lake.

Commented [MS22]: Not required as volume of seepage water will be captured with the monthly and annual water collected in the Water management Pond or Influent Storage Ponds.

Commented [MS23]: We will not be at the site in the winter. The water level also does not change materially during the winter months.

Commented [MS24]: No longer contemplating this activity

Commented [MS25]: No longer contemplating this activity

Commented [MS26]: No longer contemplating this activity

Commented [MS27]: No longer contemplating this activity
Management Plans and Activities

q) A summary of engagement activities conducted in accordance with the approved Engagement Plan, referred to in Part B, items 16 and 17 of this Licence, undertaken during the previous calendar year, including a brief description of activities planned for the forthcoming year;

r) A summary of Construction Reclamation activities conducted in accordance with Part D of this Licence, undertaken during the previous calendar year, and an updated Mine Plan;

s) A summary of activities conducted in accordance with the approved Waste Management Plan, referred to in Part E, items 1 and 2 of this Licence, undertaken during the previous calendar year, including a summary of updates or changes to the process or facilities required for the management of Water and Wastewater;

u) A summary of all work carried out under the approved North Pile Management Plan conducted in accordance with Part E, items 6 and 7 of this Licence, undertaken during the previous calendar year including:
   i. A summary of materials deposited to the North Pile Facility including an updated map or diagram showing the location of the deposited materials;
   ii. A summary and interpretation of monitoring results, including any Action Level exceedances;
   iii. A description of actions taken in response to any Action Level exceedances under the Response Framework; and
   iv. A summary of investigations or activities related to Paste deposition including an updated schedule for Paste deposition underground and in the North Pile;

w) A summary of the results of any monitoring, including the Seepage Surveys referred to in Part E, item 11, conducted in accordance with the approved Acid Rock Drainage and Geochemical Characterization Plan, referred to in Part E, items 9 and 10 of this Licence, undertaken during the previous calendar year;

x) A summary of all work carried out in accordance with the approved Water Management Plan, referred to in Part F, items 5 and 6 of this Licence, undertaken during the previous calendar year, including:
   i. updates or changes to the process or facilities required for the management of Water and Wastewater;
   ii. interpretation of monitoring results including any Action Level exceedances;
   iii. A description of actions taken in response to any Action Level exceedances under the Response Framework;
   iv. a mean monthly and annual water balance evaluation for the mine site and North Pile; and
   v. A comparison of monitoring results to the predictions of the groundwater and site Water models, including the results of any model calibrations and/or updates that were conducted;

Commented [MS27]: These programs are no longer relevant.
Spills and Unauthorized Discharges

y) A summary of any activities conducted in accordance with the approved Spill Contingency Plan and Emergency Response Plan referred to in Part H of this Licence, during the previous calendar year;

z) A list and description for all Unauthorized Discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, and summary of the circumstances and follow-up action taken, and status (i.e. open or closed), in accordance with the reporting requirements referred to in Part H, item 3 of this Licence;

aa) An outline of any spill training and communications exercises carried out during the previous calendar year;

Other Reporting Requirements

bb) A progress report on any studies or plans, including Response Plans, as requested by the Board during the previous calendar year and a brief description of any future studies planned by the Licensee;

eee) Any other details on Water Use or Waste disposal requested by the Board by November 1 of the year being reported;

ddd) A summary of activities carried out to implement the measures and suggestions as identified by the Minister in the Report of Environmental Assessment EA1314-02;

eee) A table detailing all commitments made during Environmental Assessment EA1314-02 and any subsequent regulatory processes, with descriptions of how each commitment is being, or has been, met;

ff) A summary of the calibration and status of the meters and devices referred to in Part B, item 12 of this Licence;

ggg) A list of submissions made to the Board during the previous calendar year; and

hh) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector during the previous calendar year.
Schedule 2

Part C – Security Requirements

1. Pursuant to section 35 of the Act and section 11 of the Waters Regulations, the Licensee shall post and maintain a security deposit totaling $27,844,664.00.
Schedule 3

Part D – Construction

1. The Final Detailed Design Report for the North Pile referred to in Part D, item 5 of this Licence shall include, but not be limited to, the following information:

   a) The results of all geotechnical investigation data for the North Pile footprint relevant to the current construction phase, including the results of a comprehensive delineation program to characterize soil, rock, ground ice, and ground temperature conditions to the depth expected to be affected by the proposed Engineered Structures, beneath the footprint of all containment and runoff control structures;
   b) Seepage analyses;
   c) Geothermal analyses;
   d) Stability analyses;
   e) Detailed instrumentation and monitoring plans;
   f) Key design and performance parameters;
   g) Action Levels; and
   h) Actions to be taken in the event that Action Levels are exceeded.

2. The Final Detailed Design Report for structures designed to contain, withhold, retain, or divert Water or Waste, not included in the North Pile system, as referred to in Part D, item 6 shall include, but not be limited to, the following information:

   a) Measures for managing all Water seepage and/or discharge to Snap Lake during construction and/or operation of any structures designed to contain, withhold, retain, or divert Water or Waste;
   b) Action Levels which are to be incorporated into the North Pile Management Plan or the Water Management Plan, as appropriate; and
   c) The results of all geotechnical investigation data, design analyses, key monitoring parameters, and threshold exceedance values, and detailed plans for instrumentation and inspection.
Schedule 4

Part E – Waste Management

1. The Geotechnical and Geochemical Inspection Report referred to in Part E, item 3(b) of this Licence shall include, but not be limited to, the following information:

   a) Documentation of the inspection locations and methodologies;
   b) The results of the inspection and all problems identified;
   c) Remedial measures recommended and suggested; and
   d) The status of any remedial measures recommended in the previous year’s report with an explanation regarding any recommendations not implemented.

2. The North Pile Management Plan referred to in Part E, item 7 of this Licence shall include, but not be limited to, the following:

   a) Information regarding operation and management:
      i. A summary, with appropriate maps or diagrams, of the North Pile Facility and all the Waste streams that report to it;
      ii. A schedule of estimated ore to be mined, and Processed Kimberlite and Waste rock to be produced, divided by rock type, tonnage, and destination, for the duration of this Licence;
      iii. A complete description of the operational procedures and geometric sequencing options for depositing waste rock and Processed Kimberlite in the North Pile for each year of operation of the current Licence duration;
      iv. A complete description, including site maps to scale, of the proposed kimberlite ore stockpile area and North Pile; 
      v. A description of the geochemical criteria for management and placement of potentially acid generating Waste Rock including linkages to the Acid Rock Drainage and Geochemical Characterization Plan referred to in Part E, items 9 and 10 of this Licence;
      vi. A description of operational procedures related to the deposition of paste into the North Pile;
      vii. A description of Water management procedures for the North Pile Facility including:
         a. An identification of all potential sources of drainage from each storage site and the distance to the downstream receiving environment;
         b. A detailed description, including a map or diagram, of the structures intended to contain, withhold, divert, or retain Water or Wastes related to the North Pile Facility and their predicted performance in terms of flow, capacity, and Water quality parameters; 
         c. A summary of proposed contingency measures for controlling runoff and seepage Water volume, routing, and quality; and
         d. A summary of any linkages to activities described in the Water Management Plan;
      viii. Any other information required to describe how the North Pile Facility will be managed and operated such that the objectives referred to in in Part E, Item 6 of this Licence will be met;
b) Information regarding monitoring including:

   i. Details and rationale for monitoring of geotechnical stability, thermal characterization, seepage quality and quantity, and run-off for all components of the North Pile Facility including:

      a. Monitoring locations, types of instrumentation used, and frequency of monitoring, including a site map to scale; and

      b. Predicted performance values based on expected facility design;

   ii. Linkages to other monitoring programs required in the Licence; and

   iii. Any other information about the monitoring that will be performed to meet the objectives referred to in Part E, item 6 of this Licence;

c) Information about responses to monitoring results:

   i. A description of the Response Framework that will be implemented by the Licensee to link the results of monitoring to those corrective actions necessary to ensure that the objectives listed in Part E, item 6 of this Licence are met including:

      a. Definitions, with rationale for Action Levels applicable to the performance of the North Pile Facility with respect to geotechnical stability, thermal characteristics, seepage quality and quantity, and run-off; and

      b. For each Action Level, a description of how exceedances of the Action Level will be assessed and generally which types of actions may be taken if the Action Level is exceeded.

3. The Acid Rock Drainage and Geochemical Characterization Plan referred to in Part E, items 9 and 10 of this Licence shall include, but not be limited to, the following information:

   a) A characterization of all representative rock types, (geology and mineralogy of typical rock units), mined or otherwise used, including the anticipated quantities of each rock type;

   b) An assessment of the potential for acidic, neutral or alkaline drainage and for metal leaching from the kimberlite ore stockpile and North Pile Facility both during operation and after closure;

   c) Description of estimated loadings and change in receiving water chemistry and the internal contaminant loading balance from each source, and description of how results of seepage surveys will be incorporated;

   d) A geochemical characterization of material to be used for construction and reclamation;

   e) A rationale describing how the sampling plan and sampled materials are representative of the materials to be mined or otherwise used; and

   f) A description of the proposed means for preventing, monitoring, and managing Acid Rock Drainage and Metal Leaching including a map or diagram of monitoring locations.

4. Seepage surveys referred to in Part E, item 11 of this Licence shall be conducted on all Waste storage areas, including the constructed kimberlite ore stockpile, the North Pile Facility, and the Water Management Pond on the following basis:

   a) Sampling of detected seepages a minimum of twice per year (once during early summer freshet thaw and again in late summer or fall); additional monitoring should be conducted as soon as practicable following Major Storm Events;

   b) Each seepage survey shall include sampling at a reference location in an unaffected area;

   c) The monitoring plan shall include Action Levels for parameters of concern to trigger additional sampling or other activities;
d) Testing in the field shall include measurements of field pH, temperature, flow, conductivity, and observations of the physical properties of the seepage;

e) Laboratory analysis of each sample shall include major ions, total suspended solids, total dissolved solids, pH, total metals, and dissolved metals; and

f) Results should be assessed in the context of design predictions and in conjunction with monitoring results for the thermal and hydrological performance of the containment and Water management system as part of the Acid Rock Drainage and Geochemical Monitoring Report.
Schedule 5

Part F – Water and Wastewater Management

1. The Water Management Plan referred to in Part F, items 5 and 6 of this Licence shall include, but not be limited to, the following:

   a) Information regarding Water and Wastewater management:

      i. A summary, with appropriate maps or diagrams, of the components of the Water management system and all the Water and Waste Water streams that report to it;
      ii. A description of the process and facilities intended for the purposes of obtaining fresh Water from Snap Lake for use at the Project;
      iii. The process and facilities for the collection and management of surface runoff generated on site;
      iv. The process and facilities for the collection and management of any Wastewater resulting from mining activities;
      v. Details of the final hydraulic design of all Water management structures and Water balance estimates on a monthly basis for each year of the proposed Licence;
      vi. A summary of the results of the groundwater and site water models, including Water quality and quantity predictions; and
      vii. Any other information required to describe how Water and Wastewater will be managed such that the objectives referred to in Part F, item 4 of this Licence will be met;

   b) Information regarding monitoring including:

      i. Details of monitoring, including a rationale for each component of the Water management system;
      ii. Linkages to other monitoring programs required in this Licence; and
      iii. Any other information about the monitoring that will be performed to meet the objectives referred to in Part F, item 4 of this Licence;

   c) Information about responses to monitoring results:

      i. A description of how groundwater and site Water monitoring results will be compared to modeling predictions for Water quality and quantity, including the frequency for calibrating and updating the groundwater and site water models; and
      ii. A description of the Response Framework that will be implemented by the Licensee to link the results of monitoring to those corrective actions necessary to ensure that the objectives referred to in Part F, item 4 of this Licence are met including:

         a. Definitions, with rationale for Action Levels applicable to the performance of the Water Management Pond with respect to geotechnical stability, thermal characteristics, seepage quality and quantity, and run-off; and
         b. For each Action Level, a description of how exceedances of the Action Level will be assessed and generally which types of actions may be taken if the Action Level is exceeded.

Commented [MS30]: Mining is no longer contemplated
2. The Strontium Response Plan referred to in Part F, item 12 of this Licence shall include, but not be limited to, the following information:
   a) A quantitative description of strontium sources and forms of strontium in the effluent stream from different mine activities;
   b) A review of potential mitigation and treatment technology to establish the feasibility and costs of reducing strontium loading to Snap Lake from the Project;
   c) Recommendations and supporting rationale for an appropriate Water Quality Objective for strontium in Snap Lake which is derived from toxicity testing conducted by the Licensee and/or published toxicology studies; and
   d) Recommendations for further actions to be taken in response to increasing levels of strontium in Snap Lake and a timeline for implementation.

3. The Nitrogen Response Plan referred to in Part F, item 13 of this Licence shall include, but not be limited to the following information:
   a) A description of current nitrogen (i.e., nitrate and ammonia) sources and management including:
      i. An assessment and quantification of sources of nitrogen loadings to Minewater;
      ii. A description of current practices for minimizing the amount of nitrogen in the Minewater;
      iii. A summary of ongoing investigations into improvements to Minewater and/or explosives management that would reduce nitrogen loadings; and
      iv. Any other information necessary to describe issues related to minimizing the nitrogen loadings to the receiving environment;
   b) A description of the ecological implications of nitrogen loadings to the Receiving Environment;
   c) A discussion of options for reducing the amount of nitrogen in the final effluent discharged to Snap Lake in order to achieve the lowest practical effluent quality criteria at the site; and
   d) Recommendations for improvements to Minewater or explosives management and monitoring to be implemented through the Water Management Plan and a schedule for implementation.

4. The Total Dissolved Solids Mitigation Implementation Plan referred to in Part F, item 16 of this Licence shall include, but not be limited to the following information:
   a) A description of the ecological implications of total dissolved solids loadings to the Receiving Environment;
   b) A description of total dissolved solids sources and management including:
      i. An assessment and quantification of sources of total dissolved solids loading to Minewater;
      ii. A description of source control measures for total dissolved solids loadings to the underground;
      iii. A description of the treatment of Minewater to remove total dissolved solids;
      iv. A description of any other methods used to manage the total dissolved solids concentrations in the effluent (e.g., dilution);
      v. A description of the capacity of the treatment system relative to the range of predicted flows from the underground, including quantification of the contingency capacity in the system;

Commented [MS31]: Maintenance of a strontium response plan is not required for the new water licence. See EOC re-eval and AEMP.

Commented [MS32]: A nitrogen response plan is no longer required. Quantities of explosives (ammonium nitrate) to be used are minor. Seepage from the North Pile will be collected and treated either actively or passively to remove nitrogen. The management of this treatment is described in the North Pile Management Plan and Water Management Plan.
vi. A summary of ongoing investigations into improvements to Minewater management or treatment that would reduce total dissolved solids loadings; and

vii. Any other information necessary to describe issues related to minimizing the total dissolved solids loadings to the receiving environment;

c) A description of the sources of monitoring data that will confirm that the objectives of the Total Dissolved Solids Mitigation Implementation Plan, required by Part F, item 16 of this Licence, are being met; and

d) A description of contingencies if the management methods described as per Schedule 5, item 4(b) become inadequate to consistently meet the effluent quality criteria for total dissolved solids referred to in Part F, item 8 of this Licence.

5. The Total Dissolved Solids Mitigation Implementation Report referred to in Part F, item 18 of this Licence shall include information regarding the progress and performance of mitigation measures for total dissolved solids, including, but not limited to, the following information:

a) A summary of the total dissolved solids mitigation measures implemented during the reporting period, including information on the installation and commissioning of any new total dissolved solids mitigation measures;

b) A description of and schedule for the total dissolved solids mitigation measures that will be implemented during the upcoming reporting period;

c) An analysis of the performance of total dissolved solids source control efforts and any other total dissolved solids mitigation measures implemented during the reporting period;

d) A comparison of monitored and predicted flows from the underground, including a graph of the monitored and predicted flows over the reporting period;

e) A comparison of total dissolved solids concentrations in the effluent and at the edge of the mixing zone to predicted concentrations, including a graph of the monitored and predicted concentrations for the reporting period, and of the predicted concentrations for the upcoming reporting period;

f) Tracking of the ionic composition of total dissolved solids over the reporting period;

g) A list of toxicity testing completed as per the Surveillance Network Program requirements during the reporting period, including the corresponding results and a description of any actions taken in response to the results;

h) A summary of the progress of ongoing investigations into improvements in Minewater management or treatment that would reduce total dissolved solids loadings; and

i) Any other information required to describe the performance of total dissolved solids mitigation measures during the reporting period.

Commented [MS33]: This Plan is no longer required as groundwater, the source of the higher TDS water, is no longer pumped to the surface.

Commented [MS34]: See comment above
Schedule 6

Part G – Aquatic Effects Monitoring

1. Monitoring conducted under the Aquatic Effects Monitoring Program (AEMP) referred to in Part G, item 1 of this Licence shall include, but not be limited to, the following:
   a) Monitoring for the purpose of measuring Project-related effects on the following components of the Receiving Environment:
      i. Water quality;
      ii. Sediment quality;
      iii. Fish health;
      iv. Fish population, and year class strength and community composition using standard methods;
      v. Contaminant levels in fish flesh due to changes in Water quality in Snap Lake and/or the NE Lake;
      vi. The taste of fish, to be completed with the communities, due to changes in Water quality in Snap Lake;
         a. The benthic invertebrate community due to changes in Water or sediment quality; and
         b. The communities of zooplankton and phytoplankton due to changes in Water quality.
   b) Monitoring the following as indicators of nutrient enrichment in Snap Lake:
      i. Total phosphorus, dissolved phosphorus and orthophosphate, nitrate, nitrite, ammonia, and total kjeldahl nitrogen (TKN); and
      ii. Chlorophyll a and algal biomass and species composition of the phytoplankton community;
   c) Monitoring to verify or assess the predictions from the Environmental Assessments relating to the trophic and dissolved oxygen status of Snap Lake including monitoring of:
      i. Dissolved oxygen concentrations in profiles at deep portions (i.e., >8 m) of Snap Lake in open water;
      ii. Deep water benthic invertebrate community, including abundance, biomass, and species diversity;
      iii. Concentrations of total phosphorus, orthophosphate, and dissolved phosphorus in mine effluent on a regular basis and in Snap Lake in open water under ice in April/May and in early summer;
      iv. Concentration of chlorophyll a in Snap Lake in early summer after the loss of ice cover and in midsummer open water; and
      v. Algal biomass and species composition in midsummer open water. The monitoring should include measures of cyanobacteria biomass and species composition and cyanotoxins in the event that algal community compositions shift to favour cyanobacteria;
   d) Monitoring, toxicity testing or other special studies necessary to confirm the adequacy of the site-specific Water Quality Objectives that have been adopted for the Receiving Environment; and
   e) Procedures to minimize the impacts of the AEMP on fish populations and fish habitat.
2. The **AEMP Design Plan** referred to in Part G, item 2 of this Licence shall include, but not be limited to, the following information:

   a) A conceptual site model that describes the pathways of potential effects from the Project to the aquatic ecosystem and their relationships to the ecological characteristics within the receiving environment. The conceptual site model should be based on updated effect predictions and other information from the Aquatic Effects Re-Evaluation Report; it should also clearly define testable hypotheses for the AEMP as well as a justification of assessment and measurement endpoints;

   b) A description of the AEMP sampling and analysis plan required to satisfy the objectives referred to in Part G, item 1 of this Licence and incorporate the specific monitoring requirements referred to in Schedule 6, item 1. The sampling and analysis plan shall include:
   
   i. The variables, sample media, monitoring protocols, Quality Assurance/Quality Control (QA/QC) procedures, statistical design criteria, including a description of sampling frequencies for each parameter that ensure both accurate characterization of short-term variability, the collection of sufficient data to establish long-term trends, and a method to conduct trend analysis;

   ii. A description of procedures to analyze and interpret data collected for each component including a procedure to integrate the results of individual monitoring components such as a weight-of-evidence analysis;

   iii. The QA/QC procedures which will ensure that any future changes in monitoring protocols will be calibrated to initial monitoring protocols and data sets so that continuity, consistency, validity, and applicability of monitoring results will be maintained. This program shall also explicitly describe the measures that will be taken to identify and address any information deficiencies;

   iv. A complete description of how the Sampling Plan for total dissolved solids, calcium and chloride, as approved under Licence MV2001L2-0002 has been incorporated into the AEMP;

   v. A description of how relevant Surveillance Network Program monitoring will be incorporated into the AEMP; and

   vi. A description of the area to be monitored including maps showing all sampling and reference locations as well as the overall predicted zone of influence of the Project (i.e., predicted zone of influence of mining operations, mineral exploration, or any other disturbance activities);

   c) A description of the approaches to be used to evaluate and adjust the AEMP;

   d) A summary of how Traditional Knowledge has been collected and incorporated into the AEMP, as well as a summary of how Traditional Knowledge will be incorporated into further studies relating to the AEMP;

   e) A description of how Snap Lake and downstream lake monitoring results will be compared to modeling predictions for Water quality and quantity, including the frequency for calibrating and updating the Snap Lake and downstream lake models;

   f) A description of any additional toxicity testing or other special studies necessary to confirm, under current and future predicted effluent concentrations, the adequacy of the site-specific Water Quality Objectives that have been adopted to protect the Receiving Environment;
g) A description of an AEMP Response Framework that will link the results of the AEMP to those actions necessary to ensure that Project-related effects on the Receiving Environment remain within an acceptable range. The Response Framework shall include:

i. A summary of how the AEMP will assess conformity with Measure 1(d) of Environment Assessment EA1314-02, 44 km downstream of Snap Lake, within Mackay Lake;

ii. Definitions, with rationale, for Significance Thresholds and tiered Action Levels applicable to the aquatic Receiving Environment of the Project and with consideration of Measure 1 of Environmental Assessment EA1314-02; and

iii. For each Action Level:
   a. A description of the rationale including, but not limited to, a consideration of the predictions and conclusions of the Environmental Assessments as well as AEMP results to date;
   b. A description of how exceedances of Action Levels will be assessed; and
   c. A general description of what types of actions may be taken if an Action Level is exceeded;

h) A description of the Annual AEMP Report format;

i) A plain language description of the program objectives, methodology, and interpretative framework; and

j) A summary of changes to AEMP design since the last approved design and a rationale for the changes.

3. The Aquatic Effects Re-evaluation Report referred to in Part G, item 5 of this Licence shall include, but not be limited to, the following information:

a) A review and summary of AEMP data collected to date including a description of overall trends in the data and other key findings of the monitoring program;

b) An analysis that integrates the results of individual monitoring components (e.g., Water quality, sediment, fish health, etc.) to date and describes the overall ecological significance of the results;

c) A comparison of measured Project-related aquatic effects to predictions made during the Environmental Assessments and an evaluation of any differences and lessons learned;

d) Updated predictions of Project-related aquatic effects or impacts from the time of writing to the end of mine life based on AEMP results to date and any other relevant operational monitoring data;

e) A plain language summary of the major results of the above analyses and a plain language interpretation of the significance of those results;

f) Recommendations, with rationale, for changes to Action Levels;

g) Recommendations, with rationale, for changes to any aspect of the AEMP Design Document; and

h) Any other information required to meet the objectives referred to in Part G, item 5 of this Licence, or as requested by the Board.

Commented [MS35]: This has been completed. Further studies at MacKay Lake are not proposed.
4. The **AEMP Annual Report** referred to in Part G, item 6 of this Licence shall include, but not be limited to, the following information:

   a) A plain language summary of the major results obtained in the preceding calendar year and a plain language interpretation of the significance of those results;
   b) A summary of activities conducted under the AEMP, including any special studies associated with the AEMP;
   c) An update of the Project development activities and any accidents, malfunctions, or spills within the report timeframe that could influence the results of the AEMP;
   d) Tabular summaries of all data and information generated under the AEMP in an electronic and printed format acceptable to the Board;
   e) An interpretation of the results, including an evaluation of any identified environmental effects that occurred as a result of the Project;
   f) An analysis that integrates the results of individual monitoring components collected in a calendar year and describes the ecological significance of the results;
   g) A comparison of monitoring results to Snap Lake and downstream lakes model predictions, including the results of any model calibrations and/or updates that were conducted;
   h) A comparison of monitoring results to Action Levels as set in the AEMP Design Plan;
   i) An evaluation of the overall effectiveness of the AEMP to date;
   j) Recommendations for refining the AEMP to improve its effectiveness as required; and
   k) Any other information specified in the approved AEMP Design Plan referred to in Part G, item 2 of this Licence, or that may be requested by the Board before November 1 of any year.

5. The **AEMP Response Plan** referred to in Part G, item 7 of this Licence shall contain the following information for each parameter that has been reported in the AEMP Annual Report to have exceeded an Action Level:

   a) A description of the parameter, its relation to Significance Thresholds and the ecological implication of the Action Level exceedance;
   b) A summary of how the Action Level exceedance was determined and confirmed;
   c) A description of likely causes of the Action Level exceedance and potential mitigation options if appropriate;
   d) A description of actions to be taken by the Licensee in response to the Action Level exceedance including:
      i. a justification of the selected action which may include a cost/benefit analysis;
      ii. a description of timelines to implement the proposed actions;
      iii. a projection of the environmental response to the planned actions, if appropriate;
      iv. a monitoring plan for tracking the response to the actions, if appropriate; and
      v. A schedule to report on the effectiveness of actions and to update the AEMP Response Plan as required; and
   e) Any other information necessary to assess the response to an Action Level exceedance or that has been requested by the Board.
6. The Downstream Watercourses Special Study Plan referred to in Part G, item 10 of this Licence shall contain the following information:
   a) A description of how quantitative baseline water quality, quantity and flow data will be collected;
   b) A description of the study monitoring locations, with rationale and consideration for addressing spatial variability;
   c) A list of monitoring parameters, which shall include, but not be limited to, total dissolved solids and its constituents;
   d) The schedule and timing for sample collection, with rationale and consideration for addressing seasonal variability;
   e) The timeline for completion of the study;
   f) A discussion of statistical power of the proposed Plan;
   g) An explanation of how the Plan will inform the downstream lakes model;
   h) Any other information necessary to meet the objectives referred to in Part G, item 10 of this Licence; and
   i) A discussion of linkages between the Plan and the AEMP.

7. The Downstream Watercourses Special Study Report referred to in Part G, item 11 shall contain, but not be limited to, the following information:
   a) All relevant baseline data collected including, but not limited to, data collected as per Part G, item 11 of this Licence;
   b) A discussion of how downstream data was evaluated to determine whether it has been influenced by the Project to date;
   c) A statistical analysis of the data to, at a minimum, describe the baseline mean, median, and 95th percentile concentrations for each parameter at each monitoring location;
   d) A description of variances within each season and how these variances have been accounted for in the statistical analysis required in Schedule 6, item 7(b);
   e) Identification of final sampling locations downstream of Snap Lake up to and including the outlet of Mackay; and
   f) The method and frequency for updating the downstream lakes model.

8. The water quality model referred to in Part G, item 12, shall be updated, at a minimum, to include the following:
   a) Include model nodes for King Lake (upstream and downstream stations) and the inlet to Mackay Lake (e.g., located in the embayment at the mouth of the Lockhart River, within 100 m of the mouth of the river);
   b) Include predictions of TDS and constituent ions of concern at each of the existing and recommended model nodes; and
   c) Include lower and upper bounds for the water quality predictions by incorporating additional flow estimates (e.g., 10th and 90th percentile outflows) during baseline and operations.

Signed on behalf of the Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

Tanya Lantz, Witness

Commented [MS36]: This has been completed. Additional downstream watercourse studies are not proposed.
Annexes
Annexed to Water Licence MV2011L2-0004
De Beers Canada Inc. – Snap Lake Project

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Annex A: Surveillance Network Program
    Part A: Station Description and Monitoring Requirements
    Part B: Flow and Volume Measurements
    Part C: Other Monitoring Requirements
    Part D: Reporting Requirements
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    Figure 2: Surveillance Network Program stations (2 of 3)
    Figure 3: Surveillance Network Program stations (3 of 3)

Annex B: Table of Items Requiring Submission

Annex C: Table of Revision History
Annex A – Surveillance Network Program (SNP)

Part A: Station Description and Monitoring Requirements

1. The location of sampling stations and specific monitoring requirements are as follows:

SNP station Quick Reference Table

<table>
<thead>
<tr>
<th>SNP station #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02-01</td>
<td>Final Minewater collection sump, underground</td>
</tr>
<tr>
<td>02-02</td>
<td>North Pile drainage collection ditch north of Water Management Pond</td>
</tr>
<tr>
<td>02-02b</td>
<td>East Influent Storage Pond</td>
</tr>
<tr>
<td>02-02c</td>
<td>West Influent Storage Pond</td>
</tr>
<tr>
<td>02-03</td>
<td>Core facilities area collection ditch east of the center of Water Management Pond</td>
</tr>
<tr>
<td>02-04.1</td>
<td>Uncontrolled surface runoff at culvert on north side of center of airstrip</td>
</tr>
<tr>
<td>02-04.2</td>
<td>Uncontrolled surface runoff at culvert on north side of western end of airstrip</td>
</tr>
<tr>
<td>02-04.3</td>
<td>Uncontrolled surface runoff at culvert on north side of airstrip</td>
</tr>
<tr>
<td>02-05</td>
<td>Uncontrolled surface runoff at Bulk Sample Mine Rock Pad</td>
</tr>
<tr>
<td>02-06</td>
<td>Uncontrolled surface runoff at Quarry Site on south side of North Pile</td>
</tr>
<tr>
<td>02-07.1</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond downstream of explosive magazine</td>
</tr>
<tr>
<td>02-07.2</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west of small Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-07.3</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west side of small Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-08</td>
<td>Uncontrolled surface runoff at Winter Access Road</td>
</tr>
<tr>
<td>02-09</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area, pond north of Bulk Emulsion Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-09.2</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area, pond downslope and north-northeast from Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-09.3</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area, downslope from SNP 02-09</td>
</tr>
<tr>
<td>02-09.4</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area, base of Ammonium Nitrate Pad Sump, south of Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-09.5</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area, pond downslope of Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>02-10</td>
<td>Any other points where observable flow to Snap Lake or Inland Lake 5 (IL5) is observed</td>
</tr>
<tr>
<td>02-11</td>
<td>Seepage monitoring well downgradient from Water Management Pond Dam 1, near Snap Lake shoreline</td>
</tr>
<tr>
<td>02-12</td>
<td>Seepage monitoring well downgradient from Water Management Pond Dam 1</td>
</tr>
<tr>
<td>02-13</td>
<td>Seepage monitoring well downgradient from Water Management Pond Dam 2</td>
</tr>
<tr>
<td>02-14</td>
<td>Water Management Pond (stilling well near the pumphouse)</td>
</tr>
<tr>
<td>02-15</td>
<td>Water Intake from Snap Lake</td>
</tr>
<tr>
<td>02-16i</td>
<td>Replaced by 02-16j</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>02-16j</td>
<td>Sewage effluent from Sewage Treatment Plant, prior to mixing with Water Treatment Plant effluent.</td>
</tr>
<tr>
<td>02-17</td>
<td>Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake. In conditions where greater capacity is needed, 02-17 can be used as it represents the effluent from the temporary water treatment plant.</td>
</tr>
<tr>
<td>02-17b</td>
<td>Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake. Under normal conditions 02-17b is used which measures the permanent water treatment plant.</td>
</tr>
<tr>
<td>02-17c</td>
<td>Discharge from East Passive wetland system to Snap Lake</td>
</tr>
<tr>
<td>02-17d</td>
<td>Discharge from West Passive wetland system to Snap Lake</td>
</tr>
<tr>
<td>02-18</td>
<td>Monitoring stations in the main basin of Snap Lake that are used to calculate a whole lake average concentration of Total Dissolved Solids.</td>
</tr>
<tr>
<td>02-19</td>
<td>Sewage discharge from the temporary Sewage Disposal Facility</td>
</tr>
<tr>
<td>02-20d</td>
<td>In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser.</td>
</tr>
<tr>
<td>02-20e</td>
<td>In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser.</td>
</tr>
<tr>
<td>02-20f</td>
<td>In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser.</td>
</tr>
<tr>
<td>02-20g</td>
<td>In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser.</td>
</tr>
<tr>
<td>SNP 02-20h,j</td>
<td>Mixing Zone Stations (from East Passive Wetland) within Snap Lake</td>
</tr>
<tr>
<td>SNP 02-20j,k</td>
<td>Mixing Zone Stations (from West Passive Wetland) within Snap Lake</td>
</tr>
<tr>
<td>02-21</td>
<td>Outlet from Snap Lake flowing into the Lockhart River System</td>
</tr>
<tr>
<td>02-22</td>
<td>Diffuser construction</td>
</tr>
<tr>
<td>02-23</td>
<td>Water intake construction</td>
</tr>
<tr>
<td>02-24</td>
<td>Snap Lake sites in close proximity to fisheries compensation works. Corresponds to AEMP stations SNAP08, and SNAP29 (Water intake).</td>
</tr>
</tbody>
</table>
### SNP station 02-01:

<table>
<thead>
<tr>
<th>Description:</th>
<th>Final Minewater collection sump, underground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>N 7052640, E 0506400</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Continuously by in-line monitoring during active pumping operations</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Flow, temperature, pH, conductivity, turbidity</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Operational Monitoring: 1) Initially, the weekly results were used to develop regression relationships between conductivity and TDS, and between turbidity and TSS, to allow for continuous estimates to be made for the in-line monitoring; 2) To determine amount and quality of Minewater collected from the underground mine and prior to entering the Water Management Pond. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.</td>
</tr>
<tr>
<td>Status:</td>
<td>Active</td>
</tr>
</tbody>
</table>
### SNP station 02-02:

<table>
<thead>
<tr>
<th>Description</th>
<th>North Pile drainage collection ditch north of Water Management Pond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>N 7052663, E 0506400</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td><em>Weekly during spring freshet and Heavy Rainfall events</em></td>
</tr>
<tr>
<td><strong>Monthly - Every two weeks during freshet, during periods of flow, and/or ice free conditions when pumping</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Flow, temperature, pH, conductivity, turbidity</td>
</tr>
<tr>
<td></td>
<td>TSS, turbidity</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Operational Monitoring; during construction and operations Closure monitoring to evaluate the quantity and quality of all seepage and runoff coming from the North Pile Facility</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active during Closure; Inactive during Post-Closure</td>
</tr>
</tbody>
</table>

### SNP 02-02b:

<table>
<thead>
<tr>
<th>Description</th>
<th>East Influent Storage Pond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once annually</td>
</tr>
<tr>
<td><strong>Monthly during discharge</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², ICP-MS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴</td>
</tr>
<tr>
<td><strong>Elevation (masl) to calculate Volume (m³)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Closure monitoring to evaluate the quantity and quality of seepage and runoff coming from the North Pile Facility and collected in the influent storage pond.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active once water is routed to the pond</td>
</tr>
<tr>
<td>Description:</td>
<td>West Influent Storage Pond</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Location:</td>
<td></td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Once annually</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², ICP-MS scan³ (total and dissolved), temperature, TDS</td>
</tr>
<tr>
<td>Elev (mash) to calculate Volume (m³)</td>
<td></td>
</tr>
<tr>
<td>Rationale:</td>
<td>Closure monitoring to evaluate the quantity and quality of seepage and runoff coming from the North Pile Facility and collected in the influent storage pond.</td>
</tr>
<tr>
<td>Status:</td>
<td>Active once water is routed to the pond</td>
</tr>
</tbody>
</table>

**SNP station 02-03:**

<table>
<thead>
<tr>
<th>Description:</th>
<th>Core facilities area collection ditch east of the center of the Water Management Pond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>N 7052640, E 0506400</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Continuously by in-line monitoring during pumping operations</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Flow, temperature, pH, conductivity, turbidity</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Operational Monitoring; during construction and operations to evaluate runoff from core facilities. To provide information about the geochemical stability/rate of</td>
</tr>
</tbody>
</table>

Commented [MS37]: Many years of monitoring during construction and operations have occurred at this site. There is no evidence of acid generation, which was the primary reason for monitoring this site. Additional monitoring for acid generation is not warranted.
**SNP stations 02-04.1; 02-04.2; and 02-04.3:**

**Description:** Uncontrolled surface runoff at culvert on north side of airstrip; three (3) locations

**Location:** More than one location; 02-04.1: N 7051774, E 0504790; 02-04.2: N 7051744, E 0504456; 02-04.3: N 7051775, E 0504680

**Sampling Frequency:** Twice per week during spring freshet; Daily during heavy rainfall events if measurable flow is present

**Sampling Parameters:** Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴

**Rationale:** Operational Monitoring; during construction and operations to evaluate the composition of the uncontrolled runoff from the airstrip for physical and/or chemical weathering of rock placed to construct the airstrip. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Monitoring Characterization Report.

**Status:** Active

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Commented [MS38]: Many years of monitoring during construction and operations have occurred at this site. There is no evidence of acid generation, which was the primary reason for monitoring this site. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure. Additional monitoring for acid generation is not warranted at the airstrip.

---

**SNP station 02-05:**

**Description:** Uncontrolled surface runoff at Bulk Sample Mine Rock Pad

**Location:** N 7053192, E 0506838

**Sampling Frequency:** Twice per week during spring freshet; Daily during heavy rainfall events if measurable flow is present

**Sampling Parameters:** Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴

**Rationale:** Operational Monitoring; during construction and operations to evaluate runoff from the BSMRP that was constructed in 1999. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.

**Status:** Active

---

Commented [MS39]: After more than a decade of monitoring, there is no evidence of acid generation. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure. Additional monitoring for acid generation is not warranted.
### SNP station 02-06:

<table>
<thead>
<tr>
<th>Description</th>
<th>Uncontrolled surface runoff at Quarry Site on south side of North Pile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>De Beers will provide coordinates in the event of sampling uncontrolled runoff.</td>
</tr>
<tr>
<td>Sampling Frequency</td>
<td>Twice per week during spring freshet. Daily during heavy rainfall events if measurable flow is present.</td>
</tr>
<tr>
<td>Sampling Parameters</td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴</td>
</tr>
<tr>
<td>Rationale</td>
<td>Operational Monitoring; during construction and operations. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.</td>
</tr>
<tr>
<td>Status</td>
<td>Active</td>
</tr>
</tbody>
</table>

### SNP stations 02-07.1, 02-07.2 and 02-07.3:

<table>
<thead>
<tr>
<th>Description</th>
<th>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant; three (3) locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>More than one location: 02-07.1: Pond downstream of explosive magazine, N 7052373, E 0504205; 02-07.2: Pond west of small AN Pad, N 7052338, E 0503820; 02-07.3: Pond west side of small AN Pad, N 7052420, E 0503820</td>
</tr>
<tr>
<td>Sampling and Analysis Frequency</td>
<td>Twice per week during spring freshet. Daily during heavy rainfall events if measurable flow is present.</td>
</tr>
<tr>
<td>Sampling Parameters</td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴</td>
</tr>
<tr>
<td>Rationale</td>
<td>Operational Monitoring; during construction and operations to evaluate potential spills of ammonium nitrate from trucks using the road. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.</td>
</tr>
<tr>
<td>Status</td>
<td>Active</td>
</tr>
</tbody>
</table>
SNP station 02-08:

<table>
<thead>
<tr>
<th>Description</th>
<th>Uncontrolled surface runoff at Winter Access Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>De Beers will provide coordinates in the event of sampling uncontrolled runoff.</td>
</tr>
<tr>
<td>Sampling Frequency</td>
<td>Twice per week during spring freshet</td>
</tr>
<tr>
<td>Sampling Parameters</td>
<td>Turbidity, TSS, pH, conductivity, major ions, nutrients, CCMS scan (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX</td>
</tr>
<tr>
<td>Rationale</td>
<td>Operational Monitoring; during construction and operations.</td>
</tr>
<tr>
<td>Status</td>
<td>Active</td>
</tr>
</tbody>
</table>

**Commented [MS42]:** There will not be a winter access road in most years, and even on those years when there is, there is no reason to monitor surface runoff. Monitoring of previous winter roads has not resulted in any surface water quality concerns.

SNP stations 02-09, 02-09.2, 02-09.3, 02-09.4, and 02-09.5:

<table>
<thead>
<tr>
<th>Description</th>
<th>Uncontrolled surface runoff and standing water at Emulsion Plant Area; five (5) locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>More than one location: 02-09: Pond north of Bulk Emulsion Ammonium Nitrate Pad, N 7052816, E 0503604; 02-09.2: Pond downslope and north-northeast from Ammonium Nitrate Pad; 02-09.3: Downslope from SNP station 02-09, N 7052924, E 0503555; 02-09.4: Base of Ammonium Nitrate Pad Sump, south of Ammonium Nitrate Pad; 02-09.5: Pond downslope of Ammonium Nitrate Pad</td>
</tr>
<tr>
<td>Sampling Frequency</td>
<td>Twice per week during spring freshet</td>
</tr>
<tr>
<td>Sampling Parameters</td>
<td>Turbidity, TSS, pH, conductivity, major ions, nutrients, CCMS scan (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX</td>
</tr>
<tr>
<td>Rationale</td>
<td>Operational Monitoring; during construction and operations to evaluate the water quality of uncontrolled runoff at the former ammonium nitrate storage pad. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.</td>
</tr>
<tr>
<td>Status</td>
<td>Active</td>
</tr>
</tbody>
</table>

**Commented [MS43]:** These stations were used to monitor uncontrolled surface runoff and standing water at the Emulsion Plant to evaluate water quality due to surface runoff over AN, and for acid rock drainage from construction of the pad itself.
### SNP station 02-10:

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Any other points where observable flow to Snap lake or Inland Lake 5 (IL5) is observed.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>De Beers will provide coordinates in the event of sampling uncontrolled runoff.</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Twice per week during spring freshet  Daily during heavy rainfall events if measurable flow is present</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴ Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Operational Monitoring; during construction and operations to evaluate quality of runoff into the Receiving Environment.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active</td>
</tr>
</tbody>
</table>

---

### SNP station 02-11:

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Seepage monitoring well downgradient from Water Management Pond Dam 1, near Snap Lake shoreline.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>N 7052303, E 0506501</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Monthly  Quarterly when water is present</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Water level Turbidity, TSS, pH, conductivity, major ions¹, nutrients², CCMS scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Operational Monitoring; during construction and operations to evaluate dam performance.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active</td>
</tr>
</tbody>
</table>

---

*Commented [MS44]: Patterns of surface runoff at Snap Lake are well established and controlled and well monitored via other SNP stations.*

*Commented [MS45]: The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted.*
### SNP station 02-12:

- **Description:** Seepage monitoring well downgradient from Water Management Pond Dam 1
- **Location:** N 7052303, E 0506501
- **Sampling Frequency:** Monthly, Quarterly when water is present
- **Sampling Parameters:** Water level, Turbidity, TSS, pH, conductivity, major ions*, nutrients*, CCMS scan* (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX*  
- **Rationale:** Operational Monitoring; during construction and operations
- **Status:** Active

Commented [MS46]: The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted.

### SNP station 02-13:

- **Description:** Seepage monitoring well downgradient from Water Management Pond Dam 2
- **Location:** N 7052321, E 0506512
- **Sampling Frequency:** Monthly, Quarterly when water is present
- **Sampling Parameters:** Water level, Turbidity, TSS, pH, conductivity, major ions*, nutrients*, CCMS scan* (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX*  
- **Rationale:** Operational Monitoring; during construction and operations
- **Status:** Active

Commented [MS47]: The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted.
### SNP station 02-14:

<table>
<thead>
<tr>
<th>Description:</th>
<th>Water Management Pond <em>(stilling well near the pumphouse)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>N 7052620, E 0506480</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Continuously when pumping to the Water Treatment Plant</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Flow</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Operational Monitoring; during construction and operations. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report. Closure monitoring to monitor water quality in the water management pond</td>
</tr>
<tr>
<td>Status:</td>
<td>Active during closure, inactive during post-closure.</td>
</tr>
</tbody>
</table>

### SNP station 02-15:

<table>
<thead>
<tr>
<th>Description:</th>
<th>Water Intake from Snap Lake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>N 7053276, E 0506515</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Monthly, if extracting water from Snap Lake</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>E. coli, Major Ions, nitrate, TDS (measured and calculated(^10))</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Operational Closure Monitoring; during construction and operations to evaluate safety of drinking water and amount of water withdrawal.</td>
</tr>
<tr>
<td>Status:</td>
<td>Active during Closure; inactive during Post-closure.</td>
</tr>
</tbody>
</table>
SNP station 02-16j:

<table>
<thead>
<tr>
<th>Description:</th>
<th>Sewage effluent from Sewage Treatment Plant, prior to mixing with Water Treatment Plant effluent (Surveillance Network Program station 1735-10 under “B” license – N1L2-1735)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SNP station 02-16, as referred to in Licence MV2001L2-0002, was removed from the Surveillance Network Program and replaced by 16i (Nov. 15, 2007). The only change to sampling requirements is to change the frequency of sampling from every six (6) days to once a week to harmonize with outgoing flights from the Snap Lake Mine Site (change approved by Board on December 3, 2009). SNP station 02-16i was replaced by 02-016j on May 26, 2015 to reflect relocation of the Sewage Treatment Plant. This station is used to monitor grey water discharge from the sewage treatment plant.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Continuously, by in-line monitoring during periods of operation</td>
<td>Once every two weeks on alternate dates during pumping operations</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Flow, pH, temperature, conductivity, turbidity</td>
<td>Biological oxygen demand (BOD), Nutrients², Total Oil and Grease, TSS, E. Coli, Faecal Coliforms</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Operational Closure monitoring: to evaluate whether sewage has been adequately treated before discharge mixing with other Waste streams in the Water Management Pond.</td>
<td></td>
</tr>
<tr>
<td>Status:</td>
<td>Active during Closure; Inactive during Post-Closure.</td>
<td></td>
</tr>
<tr>
<td><strong>SNP stations 02-17 and 02-17b:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong> Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake. Under normal conditions, Surveillance Network Program station 02-17b is used which measures the permanent Water Treatment Plant. In conditions where greater capacity is needed, Surveillance Network Program station 02-17 can be used as it represents the effluent from the temporary Water Treatment Plant.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Location:** More than one location:  
02-17: N 7052420, E 0506618;  
02-17b: N 7052727, E 0506761 |
| **Sampling Frequency:** Continuously, by in-line monitoring during periods of flow  
Daily, on-site, in line during periods of flow  
Every six (6) days  
Every two weeks when discharging to Snap Lake  
Quarterly  
Monthly during periods of discharge |
| **Sampling Parameters:** Flow, pH, temperature, conductivity, turbidity  
Electrical Conductivity  
TDS (measured and calculated), Nutrients, TSS, Turbidity, Conductivity, Chloride, Calcium, Faecal coliforms, extractable petroleum hydrocarbons, any metal parameter that has an EQC  
Acute and chronic toxicity tests  
pH, Major Ions, CCMS scan (total only and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX, E. Coli, Total Oil and Grease, biological oxygen demand (BOD), dissolved oxygen |
| **Rationale:** Water Licence Compliance Monitoring during closure. Discontinue during Post-closure because discharge will not occur at this location during Post-closure construction and operations. |
| **Status:** 02-17: Inactive  
02-17b: Active during Closure, inactive during Post-closure |
### SNP station 02-17c:

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Discharge from East Passive Wetland to Snap Lake main basin. Monitoring to characterize the quality of water from the passive wetland system to Snap Lake.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>Outflow from the passive wetland treatment system to Snap Lake</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once monthly during discharge (June, July, August)</td>
</tr>
<tr>
<td></td>
<td>Once annually during discharge</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TDS (measured and calculated), nutrients, TSS, pH, conductivity, major ions, CCMS scan (total only), biological oxygen demand (BOD)</td>
</tr>
<tr>
<td></td>
<td>Acute and chronic toxicity tests</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>To evaluate water quality from the North Pile that is treated in the passive wetland treatment system then passively draining to Snap Lake. To compare against EQC.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active once the passive wetland system is discharging to Snap Lake</td>
</tr>
</tbody>
</table>

### SNP station 02-17d:

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Discharge from West Passive Wetland to northwest arm of Snap Lake. Monitoring to characterize the quality of water from the passive wetland system (and coming from PS5) to Snap Lake.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>Outflow from the passive wetland treatment system to Snap Lake</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once monthly during discharge (June, July, August)</td>
</tr>
<tr>
<td></td>
<td>Once annually during discharge</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TDS (measured and calculated), nutrients, TSS, pH, conductivity, major ions, CCMS scan (total only), biological oxygen demand (BOD)</td>
</tr>
<tr>
<td></td>
<td>Acute and chronic toxicity tests</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>To evaluate water quality from the North Pile that is treated in the passive wetland treatment system then passively draining to Snap Lake.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active once the passive wetland system is discharging to Snap Lake</td>
</tr>
</tbody>
</table>

### SNP station 02-18:

| **Description:** | Monitoring stations in the main basin of Snap Lake that are used to calculate a whole lake average concentration of Total Dissolved Solids. The eight (8) stations that make up Surveillance Network Program station 02-18 include:  
|------------------|----------------------------------------------------------------------------------------------------------------------------------|
|                  | - three (3) monitoring stations located near the diffuser outfall (Surveillance Network Program stations 02-20d, 02-20e, 02-20f);  
|                  | - one (1) AEMP station at the outlet of Snap Lake (SNAP08); and,  
|                  | - four (4) additional AEMP stations located throughout the main basin of Snap Lake (SNAP03, SNAP05, SNAP06, SNAP11A).  
|                  | The method for calculating the whole lake average concentrations of TDS is |

Commented [MS48]: The volume of water being discharged to Snap Lake in closure and post-closure is a fraction of what it was during Operations. Monitoring has demonstrated a decrease in the whole lake average concentration of TDS in the main basin of Snap Lake since operations ceased in 2015. This decline is predicted to continue. The Aquatic effects monitoring program will continue to report on aquatic health including water quality in Snap Lake.
described in Section D, item 2 of Annex A of this Licence (below).

<table>
<thead>
<tr>
<th>Location:</th>
<th>See attached map</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Two samples during the ice-free period (early summer (July) and late summer (August/September))</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Samples taken from the depth of maximum conductivity or the mid-depth if no gradient present; measurements of temperature, dissolved oxygen, pH, and conductivity, TDS (measured and calculated(^{10})), chloride, calcium, nitrate</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>During operations, to establish the whole lake average concentrations of TDS in the main basin of Snap Lake.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active: 02-20d, 02-20e, 02-20f</td>
</tr>
</tbody>
</table>
**SNP station 02-19:**

<table>
<thead>
<tr>
<th>Description:</th>
<th>Sewage discharge from the temporary Sewage Disposal Facility (Surveillance Network Program station 1735-10 under 'B' Licence, N1L2-1735). This station was removed from the Surveillance Network Program and replaced with 16i (Nov 15, 2007).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>More than one location: 02-19: N 7052840, E 0506330; 02-19b: N 7052736, E 0506112</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Monthly</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>pH, BOD, oil and grease, Faecal Coliforms, TSS</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Previously a Water Licence compliance monitoring point under MV2001L2-0004.</td>
</tr>
<tr>
<td>Status:</td>
<td>Inactive</td>
</tr>
</tbody>
</table>

Commented [MS49]: Discharge from the Sewage Treatment Plant is already monitored at SNP 02-16j
**SNP station 02-20:**

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>In Snap Lake, 3-2 stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser (Surveillance Network Program SNP 02-20d, e, and 02-20f).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>More than one location: 02-20d: N 7052845, E 0507414; 02-20e: N 7052607, E 0507158; 02-20f: N 7052949, E 0507316; 02-20g: N 7053089, E 0507501</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once annually during ice-cover conditions, and monthly during discharge.</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>At the depth of maximum conductivity: measurements of temperature, dissolved oxygen, pH, and conductivity. Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated10), TSS, pH, conductivity, major ions1, nutrients2, BOD, ICP-MS/MS CMS scan1 (total and only dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX4, E Coli, total oil and grease. If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Snap Lake Operational Closure Monitoring. To evaluate whether Water Quality Objectives are being met at the edge of the mixing zone.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active: SNP 02-20d, 02-20e, 02-20f</td>
</tr>
</tbody>
</table>
**SNP station 02-20h, i:**

<table>
<thead>
<tr>
<th>Description:</th>
<th>In Snap Lake main basin, two stations located on the edge of the mixing zone 200m from the East wetland discharge location.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td></td>
</tr>
<tr>
<td>Sampling</td>
<td>Once annually</td>
</tr>
<tr>
<td>Frequency:</td>
<td>Once annually</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated(^7)), nutrients(^2), TSS, pH, conductivity, major ions(^1), CCMS scan(^3) (total only), biological oxygen demand (BOD) If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Once the passive wetland treatment system is established to confirm that water quality within Snap lake, at the edge of the mixing zone is acceptable.</td>
</tr>
<tr>
<td>Status:</td>
<td>Active during discharge from the passive wetland.</td>
</tr>
</tbody>
</table>

**SNP station 02-20j, k:**
<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>In Snap Lake main basin, two stations located on the edge of the mixing zone 200m from the West wetland discharge location.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once annually</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated), nutrients, TSS, pH, conductivity, major ions, CCMS scan (total only), biological oxygen demand (BOD) If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Once the passive wetland treatment system is established to confirm that water quality within Snap lake, at the edge of the mixing zone is acceptable.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active during discharge from the passive wetland.</td>
</tr>
</tbody>
</table>

**SNP station 02-21:**

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Outlet from Snap Lake flowing into the Lockhart River System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>N 7053958, E 0511872</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once per year (i.e. September)</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TSS, TDS (calculated), pH, conductivity, CCMS scan (total and dissolved), total mercury, total arsenic, nutrients, major ions</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Snap Lake Operational Monitoring; during construction and operations.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active</td>
</tr>
</tbody>
</table>

**SNP station 02-22:**

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>Diffuser construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>n/a</td>
</tr>
</tbody>
</table>

Commented [MS50]: The volume of water to be discharged on an annual basis to Snap Lake is a fraction of Operational volumes and poses no concern for flow at the outlet. This station will continue to be monitored as part of the AEMP.

Commented [MS51]: No longer needed. Diffuser is already constructed and in place.
<table>
<thead>
<tr>
<th>Sampling Frequency:</th>
<th>Quarterly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Parameters:</td>
<td>TSS and turbidity, in the vicinity of this station, in a pattern and frequency to be established by the Department of Fisheries and Oceans (DFO)</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Fisheries Authorization Monitoring; during construction for the diffuser and effluent pipeline in Snap Lake</td>
</tr>
<tr>
<td>Status:</td>
<td>Inactive</td>
</tr>
</tbody>
</table>

**SNP station 02-23:**

<table>
<thead>
<tr>
<th>Description:</th>
<th>Water intake construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>n/a</td>
</tr>
<tr>
<td>Sampling Frequency:</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Sampling Parameters:</td>
<td>TSS and turbidity, in the vicinity of this station, in a pattern and frequency to be established by the Department of Fisheries and Oceans (DFO)</td>
</tr>
<tr>
<td>Rationale:</td>
<td>Fisheries Authorization Monitoring; during construction for the water intake link in Snap Lake</td>
</tr>
<tr>
<td>Status:</td>
<td>Inactive</td>
</tr>
</tbody>
</table>

Commented [MS52]: No longer needed. Water intake is constructed.
**SNP station 02-24:**

<table>
<thead>
<tr>
<th>Description:</th>
<th>Snap Lake sites in close proximity to fisheries compensation works. Corresponds to AEMP stations SNAP05 (artificial reef area), and SNAP29 (Water intake).</th>
</tr>
</thead>
</table>
| Location:   | More than one location:  
SNAP05: N 7052958, E 0508376  
SNAP29: N 7053378, E 0506563 |
| Sampling Frequency: | Samples taken at 1 metre depth intervals once during ice-covered conditions, and twice during open water conditions. |
| Sampling Parameters: | Specific Conductivity |
| Rationale: | Operational Monitoring. This monitoring, originally required under the Fisheries Authorization (SC00196), is reported in Annual AEMP Report; however, more frequent reporting of results (i.e., through monthly Surveillance Network Program reports) is desirable as these results will give an early warning of increased TDS levels near the outlet and fisheries compensation locations. |
| Status: | Active |

**Footnotes:**

1. Major ions shall include the following parameters: Magnesium (Mg), Fluoride (F), Calcium (Ca), Chloride (Cl), Alkalinity, Hardness, Sulphate (SO4^2-), Sodium (Na), Potassium (K), Total Dissolved Solids (TDS).

2. Nutrients shall include the following parameters: Ammonia (NH3), Nitrite (NO2-N), Nitrate (NO3-N), Total Kjeldahl Nitrogen (TKN), total Phosphorus (P), dissolved Phosphorous (P), Orthophosphate (PO4^3-), Total Dissolved Organic Carbon (TDODC).

3. Collision Cell Inductively Coupled Plasma Mass Spectrometry (CCMS) or equivalent shall include at a minimum, the following parameters: Aluminum (Al), Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Cobalt (Co), Copper (Cu), Chromium (Cr), Cesium (Cs), Iron (Fe), Lead (Pb), Lithium (Li), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Rubidium (Rb), Selenium (Se), Strontium (Sr), Titanium (Ti), Thallium (Tl), Uranium (U), Vanadium (V), Zinc (Zn). Total metals shall be analyzed in an unfiltered sample and dissolved metals shall be analyzed after passing an unpreserved sample through a 0.45 micron filter.

4. BTEX shall include the following parameters: Benzene, Toluene, Ethylene, Xylene.

5. Acute and chronic toxicity tests for Surveillance Network Program station 02-17b shall include: (a) Acute lethality to rainbow trout Oncorhyncus mykiss (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13); (b) Acute lethality to the cladoceran crustacean Daphnia magna (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/14); and (c) Chronic toxicity to the cladoceran Ceriodaphnia dubia (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/21), and (d) Chronic toxicity to the alga Pseudokirchneriella subcapitata (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/25).

6. Main Basin of Snap Lake: DBCMI's whole-lake model for TDS concentration does not include the Northwest Arm of Snap Lake, as the Northwest Arm is physically isolated from mixing with the rest of the lake. The model predicts concentrations of TDS for the main basin of Snap Lake.

7. Chronic toxicity tests for Surveillance Network Program station 02-20 shall include: (a) Chronic toxicity to the cladoceran crustacean Ceriodaphnia dubia (as per Environment Canada’s Environmental Protection Series Biological Test Method EPS/1/RM/21) and (b) Chronic toxicity to the alga Pseudokirchneriella subcapitata (as per Environment Canada’s Environmental Protection Series Biological Test Method EPS/1/RM/25).

8. Sampling at Surveillance Network Program station 02-20g will commence only after the installation of the second permanent diffuser is complete.

Commented [MS53]: No longer needed, volume of water drastically reduced and TDS no longer a concern.
9 Annual toxicity tests for Surveillance Network Program station 02-20 shall be conducted in accordance with Environment Canada’s Methods EPS/1/RM/28 (Rainbow Trout) and EPS/1/RM/22 (Fathead Minnow).

10 Total dissolved solids (calculated) shall be calculated as per the American Public Health Association’s Standard Methods for the Examination of Water and Wastewater, 21st Edition (2005):

$$\text{TDS}_{\text{cal}} \text{ (mg/L)} = (0.6 \times \text{Total Alkalinity as CaCO}_3) + \text{Na}^+ + \text{Mg}^+ + \text{K}^+ + \text{Ca}^{2+} + \text{SO}_4^- + \text{Cl}^- + \text{NO}_3^- + \text{F}^- + \text{SiO}_3^{2-}$$

2. The location of sampling sites is subject to approval of an Inspector.

3. More frequent sample collection may be required at the request of an Inspector.

4. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association’s (APHA) Standard Methods for the Examination of Water and Wastewater at the time of analysis, or by such other methods approved by an Analyst.

5. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific analyses to be performed or as approved by an Analyst.

6. A Quality Assurance/Quality Control Plan (QA/QC Plan) which includes both field and laboratory requirements shall be submitted to an Analyst, for approval, not less than sixty (60) days in advance of any sampling conducted.

7. The Licensee shall act in accordance with the approved QA/QC Plan and shall review the Plan annually or as directed by the Board and make any necessary revisions to reflect changes in operations. Revisions to the Plan shall be submitted to an Analyst, for approval.

8. If the Quality Assurance and Quality Control Plan is not approved by the Analyst, the Licensee shall revise the Plan according to the Analyst’s direction and re-submit it to the Analyst for a decision.

**Part B: Flow and Volume Measurements**

1. All flow and volume measurements shall be measured and recorded continuously (i.e., using electronic data storage chips or equivalent) during periods of flow or pumping and reported on a monthly basis in cubic metres (m³) as per Part D, item 1 of this Annex:

   a) The daily volume of water pumped from Snap Lake for all purposes (Surveillance Network Program station 02-15);

   b) The daily volume of water pumped from the Water Management Pond (Surveillance Network Program station 02-14);

   c) The daily volume of water pumped from the Mine Water Sump to the Water Treatment Plant (Surveillance Network Program station 02-01);

   d) The daily volume of water pumped from the controlled runoff sites (Surveillance Network Program stations 02-02 and 02-03) to the Water Treatment Plant;

   e) The daily volume of water discharged from the sewage treatment plant to the main outfall (Surveillance Network Program station 02-16);
The daily volume of water discharged from the combined outfall from the Water Treatment Plant and the Sewage Treatment Plant to Snap Lake (Surveillance Network Program station 02-17);

h) Volumes of solids (in tonnes) and liquid wastes (in cubic metres) discharged to the North Pile;

i) The daily volume of paste backfill (in tonnes and cubic metres) pumped to the underground mine workings for disposal;

j) Continuously at the Snap Lake Outflow (Surveillance Network Program station 02-21) during the ice free period; and

k) Spot measurements of flow will be made at the small tributary to Snap Lake referenced by the Licensee in Table 10-1 of the September 2003 Proposed Hydrology Monitoring Program during periods of observable flow.

2. The following water level measurements shall be made and recorded:

a) Continuous Monthly water level in Snap Lake during periods of occupancy; and

b) Water levels in monitoring wells at Surveillance Network Program stations 02-11, 02-12 and 02-13 whenever water is present during water quality sampling.

Part C: Other Monitoring Requirements

1. The Licensee shall measure and record the following meteorological data during periods of occupancy:

a) Precipitation, measured and recorded in hourly and daily totals;

b) Evaporation, as calculated from the parameters listed below with hourly and daily averages;

c) Wind speed at approximately 2.0 metres above the water surface, including daily minima and maxima;

d) Wind direction on an hourly basis and air temperature at approximately 0.75 and 2.0 metres above the water surface, including daily minima and maxima;

e) Relative humidity at approximately 0.75 and 2.0 metres above the water surface;

f) Water temperature at one (1) and two (2) metre depths below surface;

g) Net solar radiation over the water surface; and

h) Water level.

Weather data for evaporation calculations shall be measured and recorded at a site on Snap Lake near mine operations and away from any manmade structures.

2. The Licensee shall submit to the Board, for approval, the location, methods and frequency for measuring and recording the meteorological data identified in Part C, item 1(a) of this Annex.

3. The methods and frequency referred to in Part C, item 1(a) of this Annex shall be implemented as and when approved by the Board.

4. The quantity of ore processed shall be measured daily, recorded in tonnes and reported monthly as per Part D, item 1 of this Annex.

5. The volumes of solids, measured daily, in tonnes, and Liquid Wastes, measured daily in cubic metres, which are discharged to the North Pile shall be recorded and reported monthly as per Part D, item 1 of this Annex.
6. The volume of paste backfill, measured in tonnes and cubic metres pumped to the underground mine workings for disposal, shall be measured daily and recorded and reported monthly as per Part D, item 1 of this Annex.

Part D: Reporting Requirements

1. The Licensee shall, within thirty (30) days following the month being reported, submit to the Board and an Inspector, in electronic and printed formats acceptable to the Board, all data and information required by the Surveillance Network Program, including the results of the approved QA/QC program and any interpretive comments and calculations. Monthly Surveillance Network Program Reports should also include:

   a) For parameters regulated under Part F, item 8 of this Licence, graphs showing trends in parameter concentrations in the effluent compared to Effluent Quality Criteria over the past two years; and

   b) For total dissolved solids, a whole lake average concentration should be calculated as per Part D, item 2 of this Annex from quarterly measurements made at Surveillance Network Program station 02-18 and a graph showing trends the whole lake average TDS concentration.

2. The whole lake average concentration of TDS shall be calculated and reported as follows:

   a) For the purposes of reporting the whole lake average total dissolved solids, calculated total dissolved solids concentrations (i.e. calculated based on ionic constituent concentrations) shall be used; and

   b) The total dissolved solids concentration at each individual station within Surveillance Network Program station 02-18 to be used in the calculation shall be either collected at the point of highest concentration gradient, or if no gradient exists, samples will be taken from the mid depth. The whole lake average concentration shall be the mean of the average concentrations from eight (8) stations within Surveillance Network Program station 02-18.

3. The Licensee shall determine the relationship between chloride (as measured on-site) and total dissolved solids (as measured/calculated in a laboratory) in effluent from SNP station number 17b. A report detailing the correlation between on-site measurements of chloride and total dissolved solids concentrations reported from an accredited laboratory shall be filed with the Board within two (2) months of the issuance of this Licence.

4. The Licensee shall update the correlation required in Part D, item 3 of this Annex at the request of the Inspector or the Board.

5. Upon request from the Board or an Inspector, the Licensee shall provide weekly reports of daily on-site chloride measurements and estimates of total dissolved solids in the effluent to the Inspector.
Figure 2: SNP Station (2 of 3)
Annex B – Table of Items Requiring Submission

This table summarizes the information the Licensee is required to submit as per the Water Licence conditions.

<table>
<thead>
<tr>
<th>Part of WL</th>
<th>Item</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Water Use Fee</td>
<td>- Annually, prior to Licence anniversary date</td>
</tr>
<tr>
<td>B</td>
<td>Annual Water Licence Report</td>
<td>- Annually, on each March 31</td>
</tr>
<tr>
<td>B</td>
<td>Engagement Plan</td>
<td>- Within 4 months of issuance of the amendments associated with the December 2013 Amendment Application</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Annual review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- As directed by the Board</td>
</tr>
<tr>
<td>C</td>
<td>Security Deposit</td>
<td>- Prior to placement of Processed Kimberlite in West Cell of North Pile</td>
</tr>
<tr>
<td>C</td>
<td>Revised Mine Reclamation Liability Estimate</td>
<td>- Upon request of the Board</td>
</tr>
<tr>
<td>C</td>
<td>Revised Mine Reclamation Liability Amount</td>
<td>- 90 days following notice of revision</td>
</tr>
<tr>
<td>D</td>
<td>Update the schedule for Construction and mine development</td>
<td>- Upon request of the Board</td>
</tr>
<tr>
<td>D</td>
<td>Final Detailed Design Report</td>
<td>- 90 days prior to Construction</td>
</tr>
<tr>
<td>D</td>
<td>Notifications to Board and an Inspector prior to Construction</td>
<td>- 30 days prior to Construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 48 hours prior to Construction</td>
</tr>
<tr>
<td>D</td>
<td>Geotechnical Engineering Report</td>
<td>- 90 days following Construction</td>
</tr>
<tr>
<td>E</td>
<td>Waste Management Plan</td>
<td>- January 31, 2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Annual review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- As directed by the Board</td>
</tr>
<tr>
<td>E</td>
<td>Field Inspection Report</td>
<td>- Report and implementation plan to be submitted 60 days from date of each inspection</td>
</tr>
<tr>
<td>E</td>
<td>Geotechnical and Geochemical Inspection Report</td>
<td>- Include with the Annual Water Licence Report, on each March 31</td>
</tr>
<tr>
<td>E</td>
<td>Notification to an Inspector of Annual Inspection</td>
<td>- 2 weeks prior to Annual Inspection</td>
</tr>
<tr>
<td>E</td>
<td>North Pile Management Plan</td>
<td>- 90 days prior to construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Annual review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- As directed by the Board</td>
</tr>
<tr>
<td>E</td>
<td>Risk Assessment – North Pile</td>
<td>- September 15, 2012</td>
</tr>
<tr>
<td>E</td>
<td>Acid Rock Drainage and Geochemical Characterization Plan</td>
<td>- January 31, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Annual review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- As directed by the Board</td>
</tr>
<tr>
<td>E</td>
<td>Seepage Surveys</td>
<td>- Include results with the Annual Water Licence Report, on each March 31</td>
</tr>
<tr>
<td>F</td>
<td>Water Management Plan</td>
<td>- October 1, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Annual review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- As directed by the Board</td>
</tr>
<tr>
<td>F</td>
<td>Plume Characterization Study</td>
<td>- January 31, 2013</td>
</tr>
<tr>
<td>Column</td>
<td>Plan Description</td>
<td>Frequency/Time Period</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>F</td>
<td>Strontium Response Plan</td>
<td>July 31, 2016</td>
</tr>
<tr>
<td>F</td>
<td>Nitrogen Response Plan</td>
<td>July 31, 2016</td>
</tr>
<tr>
<td>F</td>
<td>Total Dissolved Solids Mitigation and Implementation Plan</td>
<td>July 31, 2016</td>
</tr>
<tr>
<td>F</td>
<td>Total Dissolved Solids Mitigation and Implementation Report</td>
<td>October 30, 2015</td>
</tr>
<tr>
<td>G</td>
<td>AEMP Design Plan</td>
<td>November 1, 2015</td>
</tr>
<tr>
<td>G</td>
<td>Aquatic Effects Re-evaluation Report</td>
<td>November 1, 2017</td>
</tr>
<tr>
<td>G</td>
<td>AEMP Annual Report</td>
<td>Annually, by each May 1</td>
</tr>
<tr>
<td>G</td>
<td>AEMP Response Plan</td>
<td>Notification within 30 days from the time the Action Level exceedance is detected</td>
</tr>
<tr>
<td>G</td>
<td>Downstream Watercourses Special Study Plan</td>
<td>June 3, 2015</td>
</tr>
<tr>
<td>G</td>
<td>Downstream Watercourses Special Study Report</td>
<td>90 days following completion of Special Study</td>
</tr>
<tr>
<td>H</td>
<td>Spill Contingency Plan</td>
<td>Annual review</td>
</tr>
<tr>
<td>H</td>
<td>Emergency Response Plan</td>
<td>Annual review</td>
</tr>
<tr>
<td>H</td>
<td>Detailed Spill and Unauthorized Discharge Report</td>
<td>Within 30 days of each spill and Unauthorized Discharge</td>
</tr>
<tr>
<td>I</td>
<td>Interim Closure And Reclamation Plan</td>
<td>Every 3 years following approval</td>
</tr>
<tr>
<td>I</td>
<td>Annual Closure and Reclamation Plan Progress Report</td>
<td>Annually, by each April 30</td>
</tr>
<tr>
<td>I</td>
<td>Final Closure And Reclamation Plan</td>
<td>24 months prior to the end of operations</td>
</tr>
<tr>
<td>J</td>
<td>Written notifications to Board and an Inspector for Modifications</td>
<td>60 days prior to carrying out Modification</td>
</tr>
<tr>
<td>J</td>
<td>Modification As-built Report</td>
<td>90 days following completion of Modification</td>
</tr>
<tr>
<td>SNP</td>
<td>Quality Assurance/Quality Control Plan</td>
<td>60 days prior to the collection of SNP samples</td>
</tr>
<tr>
<td>SNP</td>
<td>Surveillance Network Program Report</td>
<td>Monthly</td>
</tr>
<tr>
<td>SNP</td>
<td>Meteorological Data</td>
<td>Submit for approval</td>
</tr>
<tr>
<td>SNP</td>
<td>Chloride: TDS relationship</td>
<td>Within 2 months of issuance</td>
</tr>
<tr>
<td>SNP</td>
<td></td>
<td>Update as requested by the Board or Inspector</td>
</tr>
<tr>
<td>SNP</td>
<td></td>
<td>Weekly reports upon request</td>
</tr>
</tbody>
</table>

Commented [MS4]: Will require updating
### Annex C – Table of Revision History

**Table 1: Updates and changes that have been made to the Water Licence*.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location of change</th>
<th>Description of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 17, 2014</td>
<td>Annex A: Surveillance Network Program</td>
<td>SNP station 02-20 Early Life Stage Test (ELS): The ELS test for Trout was reduced to the 7 day egg only test. The 7 day Fathead minnow test was added. Proponent is required to conduct both tests annually.</td>
</tr>
<tr>
<td>December 16, 2014</td>
<td>Body of Licence: Part F, item 9a</td>
<td>Two-year extension for effluent limits for nitrate, chloride and fluoride from January 1, 2015 to January 1, 2017. Changes only made to page 16 of body of Licence and footer.</td>
</tr>
<tr>
<td>March 30, 2015</td>
<td>Body of Licence: Amendments associated with November 2014 Amendment Application and Environmental Assessment EA1314-02</td>
<td>- An EQC for TDS was added to Part F, item 9; - Chloride was removed from Part F, item 9; - Part F, item 13 was removed – whole lake average for TDS; - TDS Mitigation Implementation Report was added to Part F, item 20; - Downstream Baseline Special Study was added to Part G, items 13-15; and - Various administrative updates were made.</td>
</tr>
<tr>
<td>Signed by Minister on September 10, 2015 and Confirmation sent to De Beers on September 16, 2015 (Board meeting June 8, 2015)</td>
<td>Amendments associated with December 2013 Amendment Application and Environmental Assessment EA1314-02</td>
<td>- An EQC for TDS was set to achieve a site-specific water quality objective of 1,000 mg/L (Part F); - The whole-lake average compliance limit for TDS was removed; - EQC for ammonia, nitrite, nitrate, fluoride and arsenic were revised; - EQC for chloride and sulphate were removed and regulated indirectly as components of TDS; - Annual loading limits for phosphorous, ammonia, and nitrate were revised; and - Several conditions were revised for clarity or consistency with operations.</td>
</tr>
<tr>
<td>November 19, 2015</td>
<td>SNP 02-17B</td>
<td>Daily In house chloride reading changed to Daily In-Line Conductivity reading</td>
</tr>
<tr>
<td>February 18, 2016</td>
<td>Body of Licence: Part B, item 16; Part F, item 12; Part F, item 13; Part F, item 16; Part F, item 18; Part G, item 2; Part G, item 5.</td>
<td>Updated compliance dates based on request due to suspension of operations.</td>
</tr>
<tr>
<td>Date</td>
<td>Details</td>
<td>Updates</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>June 22, 2016</td>
<td>SNP updates to reflect Extended Care and Maintenance submission April 20, 2016.</td>
<td>Updated the following SNP stations: 02-01, 02-02, 02-03, 02-15, 02-16i, 02-17, 02-17b, 02-18, 02-20, and 02-21</td>
</tr>
<tr>
<td>September 8, 2016</td>
<td>SNP updates to reflect 2013 AEMP Design Plan - Update for Extended Care and Maintenance.</td>
<td>Updated the following stations: 02-18, 02-20, 02-21, and 02-24, and SNP Part D, item 2.</td>
</tr>
<tr>
<td>January 11, 2018</td>
<td>SNP update to reflect change in sampling frequency for parameters: Biological oxygen demand (BOD), Nutrients², Total Oil and Grease, TSS, E. Coli, faecal coliforms</td>
<td>Updated the following station: 02-16j</td>
</tr>
<tr>
<td>June 20, 2018</td>
<td>Schedule 2, condition 1 updated to reflect the 2018 Financial Security Estimate Reports (V1-3) submitted by De Beers.</td>
<td>Security changed from $39,066,247.00 to $27,844,664.00</td>
</tr>
</tbody>
</table>

*The condition numbers referred to in previous revisions of the Licence may have changed with updates made to subsequent Licences.*
Attachment 5: Engagement Record
Attachment 5: Engagement Record

A record of engagement specifically related to closure and post-closure is provided as an appendix to the Final Closure and Reclamation Plan. The FCRP engagement record is entirely applicable to the water licence renewal as well. Below is a summary of additional engagement conducted specifically related to the water licence renewal application to further support and supplement the ongoing engagement record for Snap Lake Mine.

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Parties</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov-07, 2018</td>
<td>Letter</td>
<td>DKNF, LKDFN, NSMA, YKDFN, NWTMN, TG</td>
<td>Notice of intent to apply for a water licence renewal at Snap Lake Mine. No comments or concerns received.</td>
</tr>
<tr>
<td>Dec-10, 2018</td>
<td>SLEMA Board Meeting</td>
<td>SLEMA Board Meeting including Greg Empson, Chair Noel Drybones Johnny Weyallon James Marlowe Adrian D'Hont Beth Keats Arnold Enge, Treasurer (by phone), Philippe di Pizzo (Executive Director) Sonia Aredes (Environmental Analyst)</td>
<td>Presentation by GNWT Inspector, Update presentation by De Beers including highlighting updates to the Air Quality and Emissions Monitoring and Management Plan and the Wildlife Effects Monitoring Plan as well as Site update, plans for submission of FCRP and water licence renewal.</td>
</tr>
<tr>
<td>Dec-21, 2018</td>
<td>Letter</td>
<td>MVLWB, SLEMA, NSMA, LKDFN, YKDFN, DKNF, NWTMN, TG</td>
<td>Request for extension of submission of the FCRP to March 29, 2019</td>
</tr>
<tr>
<td>Date</td>
<td>Type</td>
<td>Participants</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Feb-1, 2019</td>
<td>Draft Plan</td>
<td>NSMA, TG, YKDFN, LKDFN, GNWT, MVLWB, INAC, SLEMA</td>
<td>Submission of the draft Air Quality and Emissions Monitoring and Management Plan for review through the Environmental Agreement.</td>
</tr>
<tr>
<td>Feb-12, 2019</td>
<td>Draft Plan</td>
<td>NSMA, TG, YKDFN, LKDFN, GNWT, MVLWB, INAC, SLEMA</td>
<td>Submission of the draft Wildlife Effects Monitoring Plan for review through the Environmental Agreement.</td>
</tr>
<tr>
<td>Feb-15, 2019</td>
<td>Letter</td>
<td>DFO, DFKN, ECC, ENR-Wildlife, ENR-WRD, LKDFN, MVLWB, SLEMA, NWTMN, TG, YKDFN</td>
<td>Invitation to participate in a workshop on the water licence renewal application for closure and post closure.</td>
</tr>
<tr>
<td>Feb-15, 2019</td>
<td>Meeting</td>
<td>SLEMA, GNWT</td>
<td>Meeting to discuss the draft Air Quality and Emissions Monitoring and Management Plan.</td>
</tr>
<tr>
<td>Feb-28, 2019</td>
<td>Comments</td>
<td>GNWT, SLEMA</td>
<td>Provision of GNWT and SLEMA comments on the draft Air Quality and Emissions Monitoring and Management Plan to De Beers.</td>
</tr>
<tr>
<td>Date</td>
<td>Type</td>
<td>Participants</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>---------------</td>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mar-6, 2019</td>
<td>Meeting</td>
<td>SLEMA, GWNT</td>
<td>Meeting to discuss the draft Air Quality and Emissions Monitoring and Management Plan, Dust monitoring as part of the Vegetation Monitoring Plan</td>
</tr>
<tr>
<td>Mar-8, 2019</td>
<td>Responses</td>
<td>SLEMA, GWNT</td>
<td>Provision of De Beers responses to comments received on the draft Air Quality Emissions Monitoring and Management Plan</td>
</tr>
<tr>
<td>Mar-25, 2019</td>
<td>Draft Plan</td>
<td>NSMA, TG, YKDFN, LKDFN, GNWT, MVLWB, INAC, SLEMA</td>
<td>Submission of the draft Hydrology Monitoring Plan for review through the Environmental Agreement and request to cease monitoring of hydrology under separate cover.</td>
</tr>
</tbody>
</table>
Chief Louis Balsillie  
Deninu Kue First Nation  
Fort Resolution NT, XOE OMO  
By email: admin@dkfn.ca

November 7, 2018

Dear Chief Balsillie:

Re: Notification to apply for a Water License at the Snap Lake Mine

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.

De Beers recently presented an overview of the final closure plan for Snap Lake, including a detailed discussion of the proposed criteria at the Reclamation Working Group, hosted by the Mackenzie Valley Land and Water Board (Working Group Meeting #8). The session was well attended by Aboriginal Parties, government reviewers, and regulators. The presentation that was delivered is available on the MVLWB registry under license number MV2011L2-0004. If you would like a copy of the presentation, please reach out to contacts in bold, below.

As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Rosy Bjornson, DKFN
    Kierney Leach, MVLWB
    Michelle Peters, DBCI
Chief Darryl Boucher-Marlowe  
Łutsel K’e Dene First Nation  
By email: chief.lkdfn@gmail.com

November 7, 2018

Dear Chief Boucher-Marlowe:

Re: Notification to apply for a Water License at the Snap Lake Mine

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.

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As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Lauren King, LKDFN
    Kierney Leach, MVLWB
    Michelle Peters, DBCI
President Bill Enge  
North Slave Métis Alliance  
Yellowknife, NT  
By email: billenge@nsma.net  

November 7, 2018  

Dear Mr. Enge:  

Re: Notification to apply for a Water License at the Snap Lake Mine  

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.  

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.  

De Beers recently presented an overview of the final closure plan for Snap Lake, including a detailed discussion of the proposed criteria at the Reclamation Working Group, hosted by the Mackenzie Valley Land and Water Board (Working Group Meeting #8). The session was well attended by Aboriginal Parties, government reviewers, and regulators. The presentation that was delivered is available on the MVLWB registry under license number MV2011L2-0004. If you would like a copy of the presentation, please reach out to contacts in bold, below.  

As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.  

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Nicole Goodman, NSMA
    Kierney Leach, MVLWB
    Michelle Peters, DBCI
November 7, 2018

Dear Mr. Bailey:

Re: Notification to apply for a Water License at the Snap Lake Mine

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.

De Beers recently presented an overview of the final closure plan for Snap Lake, including a detailed discussion of the proposed criteria at the Reclamation Working Group, hosted by the Mackenzie Valley Land and Water Board (Working Group Meeting #8). The session was well attended by Aboriginal Parties, government reviewers, and regulators. The presentation that was delivered is available on the MVLWB registry under license number MV2011L2-0004. If you would like a copy of the presentation, please reach out to contacts in bold, below.

As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Ursula Vogt, NWTMN
    Kierney Leach, MVLWB
    Michelle Peters, DBCI
Dear Grand Chief Mackenzie:

Re: Notification to apply for a Water License at the Snap Lake Mine

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.

De Beers recently presented an overview of the final closure plan for Snap Lake, including a detailed discussion of the proposed criteria at the Reclamation Working Group, hosted by the Mackenzie Valley Land and Water Board (Working Group Meeting #8). The session was well attended by Aboriginal Parties, government reviewers, and regulators. The presentation that was delivered is available on the MVLWB registry under license number MV2011L2-0004. If you would like a copy of the presentation, please reach out to contacts in bold, below.

As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Kierney Leach, MVLWB
    Michelle Peters, DBCI
Chief Edward Sangris & Chief Ernest Betsina
Yellowknives Dene First Nation
Yellowknife, NT
By email: esangris@ykdene.com & ebetsina@ykdene.com

November 7, 2018

Dear Chief Sangris and Chief Betsina:

Re: Notification to apply for a Water License at the Snap Lake Mine

De Beers Canada Inc. (De Beers) is currently managing the Snap Lake Mine under Water License MV2011L2-0004. This letter is to notify your organization that De Beers intends to apply for a new Type A Water License, as the current license will expire on June 13, 2020.

Snap Lake is currently in Extended Care & Maintenance, with the intention to move into final closure within the next few years. The new water license will be applicable to Extended Care & Maintenance, Active Closure, and the Post-Closure Monitoring periods. De Beers remains committed to not allowing changes to water quality that could adversely affect the drinkability of the water, the fish communities, or the ability to eat the fish in the downstream from Snap Lake.

De Beers recently presented an overview of the final closure plan for Snap Lake, including a detailed discussion of the proposed criteria at the Reclamation Working Group, hosted by the Mackenzie Valley Land and Water Board (Working Group Meeting #8). The session was well attended by Aboriginal Parties, government reviewers, and regulators. The presentation that was delivered is available on the MVLWB registry under license number MV2011L2-0004. If you would like a copy of the presentation, please reach out to contacts in bold, below.

As part of the water licence application process, De Beers will provide updated plans that are fit for the extended care and maintenance, active closure and post-closure monitoring periods. De Beers will fully address any potential environmental effects within the updated management plans to ensure our commitments to environmental excellence and to our Aboriginal partners are maintained.

The application will be subject to a review process as normally undertaken by the MVLWB. If you have any further questions, comments, or require further clarification, please contact me by email Sarah.McLean@debeersgroup.com or by phone at 867-688-9227.
Sincerely,

Sarah McLean,
Environment and Permitting Manager
De Beers Canada Inc.

Cc: Kierney Leach, MVLWB
    Michelle Peters, DBCI
December 21, 2018

Kierney Leach
Regulatory Officer
Mackenzie Valley Land and Water Board
4922 - 48th Street
Yellowknife, NT. X1A 2P6

Dear Ms. Leach:

RE: Request for extension on Submission of the Final Closure and Reclamation Plan (FCRP) for Snap Lake Mine (MV2011L2-0004/2017D0032)

De Beers Canada Inc. (De Beers) notified the MVLWB on December 14, 2017 of our intent to close Snap Lake Mine and prepare a Final Closure and Reclamation Plan for submission in 2019. The Mackenzie Valley Land and Water Board (the Board) provided De Beers with a deadline of January 30, 2019 for submission of the FCRP as part of their decision letter on amendment to the Land Use Permit (2017D0032) issued on June 20, 2018.

De Beers has been working diligently to prepare the FCRP to meet the deadline of January 30, 2019. We have not only prepared the technical aspects, such as the final cover and reclamation designs, but also have conducted several engagements with Indigenous partners, including multiple traditional knowledge workshops, reclamation working group technical sessions and community update sessions. A record of these engagements will be provided as part of the FCRP along with appendices describing the more technical aspects of the FCRP.

Implementation of the FCRP as designed will require significant investment by De Beers. Prior to submission of this Plan, De Beers requires internal investment approval as well as technical review by the Anglo American Closure team. Technical review of the Plan and subsequent investment decisions are scheduled for January–February 2019. This Board’s schedule for submission of the FCRP does not leave De Beers with sufficient time to accommodate that review and decision prior to submission. De Beers cannot make external commitments for closure that have not been internally approved through this process and therefore a submission of the FCRP on January 30, 2019 is not possible.

De Beers respectfully requests an extension on the submission deadline for the FCRP of 58 days, to March 29, 2019. This extension will allow us to prepare an FCRP which is internally approved and therefore less likely to require adjustment by De Beers through the process.

Thank you again for your consideration of our request. Should you have any further questions or require further discussions, I can be reached at sarah.mclean@debeersgroup.com or at (867) 688-9227.
Sincerely,

Sarah McLean  
Environment and Permitting Manager  
De Beers Canada Inc.

Cc: Michelle Peters, DCBI  
    Chris Hotson, MVLWB  
    Shin Shiga, NSMA  
    Grace Mackenzie, TG  
    Lauren King, LKDFN  
    Joanne Black, YKDFN  
    Rosy Bjornson, DKFN  
    Ursula Vogt, NWTMN  
    Philippe di Pizzo, SLEMA
February 15, 2019

Mark D’Aguiar  
Fisheries Protection Biologist  
Fisheries and Oceans Canada  
Yellowknife, Northwest Territories

Dear Mr. D’Aguiar:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. We would like to request the submission of the name of the participant by email no later than February 26, 2019 so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.

Kind regards,

Colleen Prather, Ph.D., P.Biol.  
Regulatory Specialist  
De Beers Canada Inc.
February 15, 2019

Chief Louis Balsillie
Deninu Kue First Nation
P.O. Box 1899
Fort Resolution NT, XOE OMO

Dear Chief Balsillie:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The purpose of this letter is to request the participation of up to two members of your community in the workshop. De Beers suggests the participation of a staff member from your land and environment office to provide technical participation, as well as one (1) community member to share a community perspective and traditional knowledge where possible.

Your community will be responsible for arranging and paying for travel, accommodations, honoraria (for the community representative only) and per diems (meals and incidentals) for representatives to travel from their community to Yellowknife. Please provide the names of representatives and a cost estimate for pre-approval ahead of the workshop. De Beers will reimburse the community for these expenses upon receipt of an invoice. Please include receipts as attachments to the invoice.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. Please provide the names of participants and cost estimate by email no later than February 26, 2019 so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Rosy Bjornson, DKFN
February 15, 2019

Gabriel Bernard-Lacaille  
Senior Environmental Assessment Coordinator  
Environment and Climate Change Canada  
5019 52nd St. P.O. Box 2310  
Yellowknife, Northwest Territories, X1A 2P7

Dear Mr. Bernard-Lacaille:

**Re: Snap Lake Mine Water Licence Renewal Workshop**

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on **March 7, 2019** to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. We would like to request the submission of the name of the participant by email no later than **February 26, 2019** so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.

Kind regards,

Colleen Prather, Ph.D., P.Biol.  
Regulatory Specialist  
De Beers Canada Inc.
February 15, 2019

Andrea Patenaude  
Wildlife Division  
Department of Environment and Natural Resources  
Government of the Northwest Territories  
5th floor, Scotia Centre, PO Box 1320  
Yellowknife, NT X1A 2L9

Dear Ms Patenaude:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine. The purpose of this letter is to invite the participation of the Government of the Northwest Territories – Wildlife Division in this workshop.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. We would like to request the submission of the names of participants (max 2) by email no later than February 26, 2019 so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.

Kind regards,

Colleen Prather, Ph.D., P.Biol.  
Regulatory Specialist  
De Beers Canada Inc.
February 15, 2019

Nathen Richea  
Water Resources Division  
Government of the Northwest Territories  
PO Box 1320  
5102-50 Ave  
Yellowknife, Northwest Territories  
X1A 3S8

Dear Mr Richea:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine. The purpose of this letter is to invite the participation of the Government of the Northwest Territories – Water Resources Division in this workshop.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. We would like to request the submission of the names of participants (max 2) by email no later than February 26, 2019 so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.

Kind regards,

Colleen Prather, Ph.D., P.Biol.  
Regulatory Specialist  
De Beers Canada Inc.
February 15, 2019

Chief Darryl Boucher-Marlowe
Lutsel K’e Dene First Nation
PO Box 28
Lutsel K’e, NT, X0E 1A0

Dear Chief Boucher-Marlowe:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The purpose of this letter is to request the participation of up to two members of your community in the workshop. De Beers suggests the participation of a staff member from your land and environment office to provide technical participation, as well as one (1) community member to share a community perspective and traditional knowledge where possible.

Your community will be responsible for arranging and paying for travel, accommodations, honoraria (for the community representative only) and per diems (meals and incidentals) for representatives to travel from their community to Yellowknife. Please provide the names of representatives and a cost estimate for pre-approval ahead of the workshop. De Beers will reimburse the community for these expenses upon receipt of an invoice. Please include receipts as attachments to the invoice.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. Please provide the names of participants and cost estimate by email no later than February 26, 2019 so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.

Colleen Prather
Director - Government Relations
De Beers Canada Inc.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Wildlife, Lands & Environment Manager, LKDFN
February 15, 2019

Kierney Leach
Mackenzie Valley Land and Water Board
PO Box 2130
Yellowknife, Northwest Territories
X1A 2P6

Dear Ms Leach:

**Re: Snap Lake Mine Water Licence Renewal Workshop**

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on **March 7, 2019** to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine. The purpose of this letter is to invite the participation of the Mackenzie Valley Land and Water Board staff in this workshop.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The workshop will be held in Yellowknife from 8:30-4:30 pm. An agenda, including the location, and the workshop presentation will be provided following confirmation of your attendance. We would like to request the submission of the names of participants (max 3) by email no later than **February 26, 2019** so that we can make the necessary arrangements for catering and space etc.

If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at [Colleen.Prather@debeersgroup.com](mailto:Colleen.Prather@debeersgroup.com).

Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.
February 15, 2019

Bill Enge, President
North Slave Métis Alliance
30 Melville Drive
Yellowknife NT X1A 2P7

Dear Mr. Enge:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The purpose of this letter is to request the participation of up to two members of your community in the workshop. De Beers suggests the participation of a staff member from your land and environment office to provide technical participation, as well as one (1) community member to share a community perspective and traditional knowledge where possible.

Your community will be responsible for arranging and paying for travel, accommodations, honoraria (for the community representative only) and per diems (meals and incidentals) for representatives to travel from their community to Yellowknife. Please provide the names of representatives and a cost estimate for pre-approval ahead of the workshop. De Beers will reimburse the community for these expenses upon receipt of an invoice. Please include receipts as attachments to the invoice.

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If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Shin Shiga, NSMA
February 15, 2019

Garry Bailey, President
NWT Métis Nation
PO Box 720
Fort Smith NT, X0E 0P0

Dear Mr. Bailey:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The purpose of this letter is to request the participation of up to two members of your community in the workshop. De Beers suggests the participation of a staff member from your land and environment office to provide technical participation, as well as one (1) community member to share a community perspective and traditional knowledge where possible.

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If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Ursula Vogt, NWTMN
February 15, 2019

Philippe di Pizzo
Snap Lake Environmental Monitoring Agency
5120 49th Street, 3rd Floor
P.O. Box 95, Yellowknife, NT X1A 1P8

Dear Mr. di Pizzo

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6, 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

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If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Sonia Aredes, Environmental Analyst, SLEMA
February 15, 2019

Violet Camsell-Blondin
Manager, Lands Regulation
Department of Culture & Lands Protection
Tlicho Government
Box 412
Behchoko, NT   X0E OY0

Dear Ms. Camsell-Blondin

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

The purpose of this letter is to request the participation of up to two members of your community in the workshop. De Beers suggests the participation of a staff member from your land and environment office to provide technical participation, as well as one (1) community member to share a community perspective and traditional knowledge where possible.

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If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.
February 15, 2019

Chief Edward Sangris & Chief Ernest Betsina
Yellowknives Dene First Nation
Box 2514
Yellowknife, NT
X1A 2P8

Dear Chiefs Sangris and Betsina:

Re: Snap Lake Mine Water Licence Renewal Workshop

De Beers Canada Inc. (De Beers) is hosting a one day workshop in Yellowknife on March 7, 2019 to discuss the upcoming Type A Water Licence renewal application for the Snap Lake Mine.

This workshop will build upon the Snap Lake Working Group workshop held on November 6 2018 where the Final Closure Plan for Snap Lake was presented and discussed. The objective of this second workshop is to present and discuss the proposed treatment wetland, updates to water model predictions, effluent quality criteria, and the aquatic effects monitoring plan. Input received will be reviewed and incorporated where possible into the Water Licence renewal application.

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If you have any questions regarding this matter please contact me at (403) 464-2596 or via email at Colleen.Prather@debeersgroup.com.
Kind regards,

Colleen Prather, Ph.D., P.Biol.
Regulatory Specialist
De Beers Canada Inc.

Cc: Director, Land & Environment, YKDFN
MEETING AGENDA

Date: March 7, 2019
Time: 8:30 am- 4:30 pm
Location: Explorer Hotel, Katimavik A, 4825 – 49th Ave Yellowknife, NT
Conference Line 1-888-322-4689 Participant Code: 96520843
Subject: Workshop for Snap Lake Mine, Type A Water Licence Renewal

<table>
<thead>
<tr>
<th>Time</th>
<th>AGENDA ITEM</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>8:30</td>
<td>Coffee and Greetings</td>
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<tr>
<td>8:45</td>
<td>Welcome and Introductions</td>
<td>All</td>
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<tr>
<td>9:00</td>
<td>Final Closure Plan</td>
<td>Sarah McLean</td>
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<td></td>
<td>• Planning Process</td>
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<td></td>
<td>• Mine Closure Objectives</td>
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<tr>
<td>9:30</td>
<td>The North Pile and Water Control Structures</td>
<td>Sean Whitaker</td>
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<td></td>
<td>• North Pile Engineered Cover</td>
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<td>• North Pile Water Management</td>
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<td></td>
<td>• Passive Wetlands Treatment System</td>
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<tr>
<td>12:00</td>
<td>Lunch (sandwiches and drinks provided)</td>
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<tr>
<td>1:00</td>
<td>Water Quality Modelling and Effluent Quality Criteria</td>
<td>Alison Snow</td>
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<td>2:00</td>
<td>Monitoring</td>
<td>Michelle Peters (SNP)</td>
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<td>• Surveillance Network Program</td>
<td>Alison Humphries (AEMP)</td>
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<td></td>
<td>• Aquatic Effects Monitoring Program</td>
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<td>4:00</td>
<td>Summary and Closing Comments</td>
<td>All</td>
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<td>4:30</td>
<td>Adjourn</td>
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Breaks will be scheduled in the morning and in the afternoon with coffee and snacks.
# De Beers

## Snap Lake Mine Water Licence Renewal

AEMP, EQC, Wetland Design

March 7, 2019

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<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Email</th>
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<tbody>
<tr>
<td>Sarah McLean</td>
<td>De Beers</td>
<td><a href="mailto:sarah.mclean@gmail.com">sarah.mclean@gmail.com</a></td>
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<tr>
<td>Sean Whitgher</td>
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<tr>
<td>Shawn Taylor</td>
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<td><a href="mailto:shawn.taylor@debeersgroup.com">shawn.taylor@debeersgroup.com</a></td>
</tr>
<tr>
<td>SONIA ARECES</td>
<td>SLEMA</td>
<td>Environmetanal. analyst.sk.ca</td>
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<tr>
<td>Bill Pain</td>
<td>GNWTR-ENR</td>
<td><a href="mailto:Bill.pain@gnwtr.enr.gov.ca">Bill.pain@gnwtr.enr.gov.ca</a></td>
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<tr>
<td>Laura Malone</td>
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<tr>
<td>Jamie Steele</td>
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<tr>
<td>Anne Wilson</td>
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<td><a href="mailto:anne.wilson@canada.ca">anne.wilson@canada.ca</a></td>
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<tr>
<td>Johnie Huskey</td>
<td>Tlicho Govt</td>
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<td>Charles Hiserman</td>
<td>Tlicho Govt</td>
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<tr>
<td>Lauren King</td>
<td>LKDFN</td>
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<tr>
<td>Sally Wong</td>
<td>DFO</td>
<td><a href="mailto:sally.wong@dfg-wpg.gc.ca">sally.wong@dfg-wpg.gc.ca</a></td>
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<tr>
<td>Jacqueline Ho.</td>
<td>MVLWB</td>
<td><a href="mailto:Jacqueline.Ho@MVLWB.com">Jacqueline.Ho@MVLWB.com</a></td>
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<tr>
<td>Amanda Law</td>
<td>MVLWB</td>
<td><a href="mailto:amanda.law@MVLWB.com">amanda.law@MVLWB.com</a></td>
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<tr>
<td>LeeAnn Malley</td>
<td>GNWTR-ENR</td>
<td><a href="mailto:leann-malley@gov.nt.ca">leann-malley@gov.nt.ca</a></td>
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<tr>
<td>Johnny Wayallum</td>
<td>SLEMA</td>
<td><a href="mailto:Johnny.Wayallum@gnwtr.enr.gov.ca">Johnny.Wayallum@gnwtr.enr.gov.ca</a></td>
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<td>Colleen Prather</td>
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<tr>
<td>Alison Humphries</td>
<td>Golder</td>
<td><a href="mailto:Alison.Humphries@golder.com">Alison.Humphries@golder.com</a></td>
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<tr>
<td>Alison Snow</td>
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Meeting: Snap Lake Mine Water Licence Renewal Workshop
Date: March 7, 2019
Location: Explorer Hotel, Yellowknife
Note Taker: Colleen Prather

Sections of the Meeting (from the agenda):
- Regulatory update
- FCRP overview
- Mine Closure Objectives
- North Pile Engineered Cover
- North Pile Water Management
- Passive Treatment System
- WQ Modelling and EQC
- SNP
- AEMP

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<tr>
<th>Speaker</th>
<th>Question/Comment</th>
<th>DBC Response</th>
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<td>Q (from Sarah) – Introduction and what would you like to get out of this meeting/ or what are you interested in?</td>
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<tr>
<td>In person</td>
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<tr>
<td>LeeAnn Malley (ENR-assessment)</td>
<td>Learn more about passive wetland</td>
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<td>Angela Love (MVLWB)</td>
<td>gain understanding of FCRP/WL/monitoring</td>
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<td>Jacqueline Ho (MVLWB)</td>
<td>passive wetlands</td>
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<td>Sally Wong (DFO)</td>
<td>passive wetland and any fish in area</td>
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<td>Lauren King (LKDFN)</td>
<td>interested in full package</td>
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<td>Johnny Weyallon (SLEMA)</td>
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<td>Charlie Nitsiza (TG)</td>
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<td>Joline Husky (TG)</td>
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<tr>
<td>Anne Wilson (ECCC)</td>
<td>interested in all closure aspects, WQ</td>
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<td>Russell Wykes (ECCC)</td>
<td>passive wetland</td>
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<td>Tim Heron (NWTMN)</td>
<td>interested in peoples opinion</td>
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<td>Stefany Bulmer (NSMA)</td>
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<td>Jamie Steele (GNWT-Lands)</td>
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<tr>
<td>Laura Malone (ENR-WRD)</td>
<td>new to WRD, get up to speed, wetlands</td>
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<tr>
<td>Bill Pain (ENR-WRD)</td>
<td>interested in all aspects</td>
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<tr>
<td>Sonia Aredes (SLEMA)</td>
<td>passive wetland</td>
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<td>Shawn Taylor, Sean Whitaker, Sarah McLean, Michelle Peters, Colleen Prather (DB)</td>
<td>interested in hearing from participants, any concerns, questions</td>
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<td>Alison Humphries, Alison Snow (Golder)</td>
<td>interested in hearing comments, questions</td>
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<td>On the phone</td>
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<tr>
<td>Phillip di Pizzo (SLEMA)</td>
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<td>Barry Zadjlik (consultant to ENR)</td>
<td>interested in monitoring</td>
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<td>Jamie Vangulck (Arktis)</td>
<td>interested in general comments</td>
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<td>Lara Fletcher (consultant to ENR)</td>
<td>NP closure, stability</td>
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<td>Eric Blumenstein (Golder)</td>
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Safety share – be aware of changing conditions (snow, ice, and light) during your daily activities

**Sarah McLean: Introduction/FCRP overview sections**

| Lauren King | i. Slide 10: What is technically viable?  
| ii. Will this make it self-sustaining site? | **i.** Must be able to construct it so it is stable; it has to be possible  
|  
| ii. e.g., given by Sean – portal closure to meet WSCC standards, technically competent but not self-sustaining. Technically viable does not necessarily mean it will be a self-sustaining ecosystem. The solution or closure activity must be technically possible, and also returned to a self-sustaining ecosystem. The two elements of technical viability and ecosystem self-sustainability are both part of the goal. |  |

| Anne Wilson | Slide 18 to 19:  
Will there be implementation of additional mitigation if required? | This slide shows a high level overview of the process; this figure does not include everything/every step (e.g., review by the board - which will occur). |
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| Lee Anne Malley      | Success indicators - will they be discussed or presented in the application?     | Sean Whitaker  
All are in the plan – to be submitted in about 2 weeks  
All objectives have criteria with success factors  
Go to the individual design packs – monitoring, success criteria identified in each pack  
Sarah McLean  
Not every single success indicator will be in the tables within the FCRP; but the details are in the management/monitoring plans |
| Tim Heron            | Slide 19: Final/ complete security concern  
How much of that will stay with government for long-term monitoring?  
Does not want to see another Giant Mine | Sarah McLean  
The security estimate has been updated and includes provisions for long-term post-closure monitoring  
The government will hold those funds for long-term monitoring  
Proposing a staged return of securities; recognizing that the government may need to hold some securities  
Jamie Vangulck  
De Beers is following MVLWB process for determining securities; following GNWT policy |
| Laruen King          | If North Pile is determined to be stable after 3-years, would securities be returned? | Yes, with the provision that the government may hold security funds for long-term monitoring |

**Sean Whitaker: North Pile Engineered Cover**

| Lauren King          | i. What is 2% grading  
ii. What is the North Pile covered in?  
iii. What aspect of water quality has to improve to not need the wetland? | i. Just a slight gradient to make water flow in the required direction (analogous to picking up a corner of a pool table)  
ii. Covered in non-acid generating kimberlite and crushed run-of-mine rock or granite from site. |
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<td>iv. Are the cells of the North Pile lined?</td>
<td>iii. Nitrate – the only remaining parameter of concern, as derived in the EQC re-evaluation is nitrate. If nitrate levels decrease more quickly than expected, sufficient to meet the EQC, then the wetland will not be constructed. Nitrate in the piles comes from the blasting activity associated with underground mining, as well as a spill of ammonia nitrate that occurred in year 2008.  &lt;br&gt; iv. No</td>
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<td>Jacqueline Ho</td>
<td>Will the application have a map with all cells labelled?</td>
<td>Yes</td>
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<td>Lara Fletcher</td>
<td>For erosion protection and transition – is this all crushed rock?</td>
<td>Yes. Identified in the design pack along with source of material (slide 27)</td>
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<td>Angela Love</td>
<td>i. Will the cover of the North Pile be vegetated?</td>
<td>i. No – we are not going to actively re-vegetate but we won’t prevent vegetation from growing</td>
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<td>ii. Source of material – in the application slide 3, there was a geochemical review.</td>
<td>ii. Yes, ARD program goes back to 2008</td>
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<td>iii. If sourced from specific laydown areas, did you document and categorize how the land was used?</td>
<td>iii. Yes, material has been characterized and documented as per the land use, spills, etc. that may have occurred at those locations.</td>
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<td>iv. Slide 26: Cover thickness 2 m (0.3m, 1.4 m, and 0.3 m) – material – will this be kimberlite or granite?</td>
<td>iv. Geochemical studies confirmed that the kimberlite and PK is non-acid generating. This will be used for cover materials</td>
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<td>v. With respect to vegetation cover, are you concerned about root penetration into the cover?</td>
<td>v. Follow-up clarification: No. Kimberlite is actually a fairly good growing medium. Studies at other mine sites has indicated plants can safely grow in kimberlite without risk of harm to the plants themselves or wildlife.</td>
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| Lee Anne Malley    | i. Available quantity estimates, slide 27. What are the contingencies if run out of material available on site?  
ii. Slide 24: What are the topographic differences from pre-mine to today; and why sloping to two gravity drainage areas (ponds and wetlands) and not one? | i. Conservative estimates of required material. These quantities are available on-site for this design.  
ii. Topography is higher in East influent pond so can’t passively flow from west influent to east influent. Increasing the elevation of sump 3 to make it flow the correct direction. The detailed design pack has all topographic lines  
Follow-up commentary by Sarah McLean regarding bigger picture of water movement – shedding of water off the pile, collect seepage, and then convey water to the influent ponds. Perimeter water control structures are a re-design of the sumps to allow water to flow by gravity |
| Tim Heron          | Slide 24: Too busy of a slide for a public presentation. Add some colour or big arrows to demonstrate flow. Add labels  
Slide 32 is ok. But also consider adding an aerial photo | Blue arrows are on slide 32 but we will make the arrows bigger  
De Beers will modify figures for future public meetings with photos, arrows, etc. |
| Lauren King        | Why are you proposing to not revegetate the North Pile?                                                                                                                                                               | If added an organic layer, it would just wash off. Adding a coarse layer on top to prevent erosion. We are proposing vegetation areas (e.g., camp) but just not on the North Pile. Expect some vegetation will grow on the covered North Pile but not designing it for full vegetation. We are vegetating other areas. |
| Joline Huskey      | i. What is the back-up plan if gravity drainage does not happen (e.g., seepage accumulates instead of flows to influent ponds)  
ii. How are you making the area safe for wildlife if not vegetating the North Pile? | i. Seepage: Planning for seepage continually; designing perimeter ditch to move seepage. We will continue to monitor to ensure flow is moving as expected during the Closure period and will implement mitigation measures as required to ensure gravity drainage is occurring. |
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<td>iii. Experience from Diavik – a ponded area formed in the middle of the PKC (processed kimberlite) facility. Trying to understand if ponds will form within the North Pile. Concern that caribou crossing the North Pile may get caught in the influent ponds (e.g., if a former processed kimberlite facility). It appears that this area will take a longtime (many generations) to return to “natural” conditions (e.g., vegetation succession).</td>
<td>ii. The North Pile will be made safe with the engineered cover design. It will be trafficable, in other words wildlife will be able to safely travel across it. Wildlife and bird use: Committed to entire site becoming a self-sustaining ecosystem that is safe. Expect the wetlands to vegetate. Objective is to ensure facility is safe for wildlife to travel across the North Pile or the site. Vegetating other areas of the site rather than the North Pile.</td>
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<td>iv. Starting to see invasive species in the north. Concerned that re-vegetation and use of fertilizers, seeds, etc, may encourage invasive species.</td>
<td>iii. Clarification – the North Pile will not be covered in new kimberlite – it will be covered in rock. We are designing this so the surface will shed water (we don’t want ponded water). We are designing this so that seepage will emerge to the conveyance channels. Caribou could bed down on the top of the covered facility without risk of harm. The vegetation plan describes steps to take to encourage re-vegetation (e.g., prepare the surface; may apply fertilizer in high-priority areas). We are seeing pioneering species coming back in some areas; eastern slopes with vegetation.</td>
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<td>iv. De Beers harvested some native seeds, but also in contact with northern nurseries, for use in the re-vegetation. Type of species targeted are native to the area, selected because they grow in the area/traditional uses. Follow-up clarification: Vegetation monitoring will continue throughout Closure. Identification of species is a key component of this monitoring plan. De Beers will not intentionally introduce exotic species and will put controls in place to ensure they are not accidentally introduced.</td>
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<tr>
<td>Tim Heron</td>
<td>General comment around the medicinal nature of the plants. Even if we replant the medical plant species, are they safe for medicinal use?</td>
<td>No comment</td>
</tr>
<tr>
<td>Charlie Nitsiza</td>
<td>Elders will want to go to the site, look at the North Pile, and understand how the water moves and flows.</td>
<td>Always welcome site visitors. We can look at dates for site visits. Need to remember that the site will not look like the drawings for closure as it is currently in care and maintenance. We have not yet covered the North Pile, removed the buildings, or actively revegetated the site. These are planned activities.</td>
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<tr>
<td><strong>Sean Whitaker: North Pile Water Management System</strong></td>
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<td>No questions</td>
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<td><strong>Sean Whitaker: Passive Treatment System</strong></td>
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<td>Jacqueline Ho</td>
<td>How will nitrogen in the water improve over time?</td>
<td>There is a certain mass of nitrogen that was added (from spill, residual from blasting) and is now stored within the North Pile. This Nitrogen leaves the North Pile via seepage water. This seepage water is collected and treated either through Active treatment in the reverse Osmosis treatment facility (closure) or passively through the wetlands (post-closure). The wetlands remove nitrogen through biological de-nitrification to the atmosphere.</td>
</tr>
<tr>
<td>Angela Love</td>
<td>Other than a wetland/natural processes, is there a way that nitrogen will decrease over time?</td>
<td>In the pile – there is only so much mass of nitrogen. Every year some comes out of the pile. The wetland system has been designed to accommodate and manage the finite source of nitrogen that will come out of the pile. It is designed based on the currently known</td>
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<td>Lara Fletcher</td>
<td>i. If the wetlands are not required, are the influent storage ponds still required?</td>
<td>i. Yes. We need to build the storage ponds for dam safety. Need to contain the water so it flows “responsibly”. We expect could be up to 30 years for nitrate to decrease in seepage water.</td>
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<td>ii. What is the current reverse osmosis plant treating for?</td>
<td>ii. Nitrate and to meet Type A water licence criteria. This is being used in combination with the total suspended solids (TSS) treatment plant (the reverse osmosis plant receives water after the TSS treatment plant). This is the current active treatment and that will continue to be used until the wetland is mature.</td>
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<tr>
<td>Lee Anne Malley</td>
<td>Slide 40: Are these the effluent quality criteria (EQC) to be applied only after the wetland is being used or from the start of closure</td>
<td>The EQC re-evaluation indicates no EQC are needed during closure because we have the RO plant on site. The EQC re-evaluation indicates that the only EQC required is for post-closure and it is for nitrate.</td>
</tr>
<tr>
<td>Jacqueline Ho</td>
<td>What are the current TSS levels in the water licence?</td>
<td>12 and 17 mg/L</td>
</tr>
<tr>
<td>Bill Pain</td>
<td>What is the timeframe to have the wetlands operational?</td>
<td>Operational from day 1 however functionality, or ability to de-nitrify, will increase as plants (and microbes) mature. There will be some active management of pipes etc. in the early years. We anticipate that wetlands will be functioning as designed in 5-10 years after construction.</td>
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<td>Bill Pain</td>
<td>Discharge from east wetland. Is there a constructed spillway?</td>
<td>Yes. Spillway on slide 32</td>
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</table>
| Lara Fletcher    | i. Is the west influent pond the existing water management pond? It looks like it will capture most of the water?  
ii. Will we be using active treatment until the wetlands are mature? | i. Most of the seepage volume goes to the west pond and most of the surface water shedding goes to the east pond  
ii. If the wetlands are not mature and water at the outlet is not compliant, will pump the water back to the storage pond. Continue this approach until water quality improves or wetlands are mature. The RO plant can also be used to actively treat during this time and water can also be pumped to the underground. |
| Lauren King      | i. How and when will you decide if wetlands need to be constructed?  
ii. How long for the wetlands to establish and before they are able to denitrify | i. Before submit construction drawings to water board will review available data (2018, 2019, and 2020 data; untreated seepage). Will evaluate the amount of seepage, quality of the seepage. Possible that east wetland may not be required (water quality is better in the east sumps). Further clarification: We believe both wetlands are required and are planning to build them beginning as early as 2020. If data collected prior to construction indicates otherwise, we will not build them. Construction timelines are dependent on approval timelines by the Board.  
ii. The earliest potential timeframe has been given by the engineers as 2 years, however for Snap Lake, given the short growing season, we believe this is unrealistic. It is understood that the wetlands will improve each year in terms of functionality. We anticipate it will take between 5 to 10 years to mature to the point where there are de-nitrifying at the rate required to meet the EQC. |
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<tr>
<th>Speaker</th>
<th>Question/Comment</th>
<th>DBC Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacqueline Ho</td>
<td>Will the ponds be able to handle extreme wet years?</td>
<td>Yes. Storage capacity has been designed for 1 in 200 year event. If there is even more water, it will go over the spillway in order to maintain the integrity of the engineered structure. This water will spill over to Snap Lake – but remember this large volume of water would come from precipitation/snowmelt and would be low in nitrogen as a result.</td>
</tr>
<tr>
<td>Lauren King</td>
<td>Proposed monitoring criteria for seepage?</td>
<td>Minimum of five years after the wetland is functioning (ca. 2032)</td>
</tr>
</tbody>
</table>
| Angela Love        | Clarify timeline on wetland construction, wetland maturation, and when will achieve the nitrate at edge of wetland  
Can you reference studies on how long it would take the wetland to mature | We can control the timing of wetland construction and influence the wetland maturation through direct planting and seeding, however we cannot fully control the maturation of vegetation. Time will be required for that aspect. The goal is to source local, mature plants for transplanting as a means to encourage wetland functioning and wetland maturation. |
<p>| Alison Snow        |                                                                                   |                                                                                                                                             |
| Bill Pain          | Slide 52: Where did the nitrate numbers come from in this figure?                 | The nitrate concentrations in the figures on Slide 52 are predicted values from the Site water quality model.                                                                                                     |
| Barry Zadjlik      | Slide 52: Is it possible to see the 2018 data used for calibration; can it be provided electronically? | The 2018 data were not part of the model calibration, but we did compare the model results to the 2018 monitoring data. The data will be provided with the application and it will be provided electronically.                           |
| Barry Zadjlik      | Do you have predicted concentrations for Snap Lake?                              | Predicted total dissolved solids concentrations in Snap Lake are provided on Slide 56. See slide 52 – if were to discharge this concentration of nitrate, nitrate in Snap Lake would be above the benchmarks. If reduce discharge concentrations to 25 |</p>
<table>
<thead>
<tr>
<th>Speaker</th>
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</thead>
<tbody>
<tr>
<td>Lara Fletcher</td>
<td>Slide 54, North Pile runoff – what is included in this source term?</td>
<td>Models have included a seepage term from the North Pile.</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>With the regrading of the North Pile, do you see future seepage from the North Pile to Snap Lake as a possibility?</td>
<td>We maintained a seepage rate from the North Pile to Snap Lake for the duration of the model simulation. We are assuming that the sumps do not capture all of the seepage from the North Pile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In the site model, we assume that 50% of the precipitation that hits the North Pile becomes runoff and 50% of the precipitation becomes seepage. Both the runoff and seepage are captured by the North Pile sumps.</td>
</tr>
<tr>
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<td></td>
<td>In the model, we assume that nitrate concentrations from the North Pile are constant for the first 30 years. After 30 years, nitrate source terms decrease.</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>Slide 56: would have expected a step-change at post-closure. Why no step-change?</td>
<td>There is no step change because of residence time in Snap Lake (which is approximately 10 to 13 years). Concentrations in Snap Lake have started to decrease, but there is not a step-change drop. The Snap Lake model accounts for ambient concentrations (i.e., mine influenced water quality). The model simulation starts in July 2003, accounts for Operations, and ends in January 2050.</td>
</tr>
<tr>
<td>Anne Wilson</td>
<td>If no discharge criteria for the reverse osmosis treatment plant (and closure period), how will know when to stop discharging if there is an upset condition?</td>
<td>Using the reverse osmosis plant for freshet and then pump the remaining water and brine reject underground. There is the ability to pump water underground.</td>
</tr>
<tr>
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<td>Reverse osmosis plant treats nitrate, all total dissolved solids related constituents, and other constituents such as metals.</td>
</tr>
<tr>
<td>Speaker</td>
<td>Question/Comment</td>
<td>DBC Response</td>
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<td>Monitoring water regularly during discharge – we can set internal warnings as to when to stop discharge to the lake and divert to the underground(e.g., use percentile of the modeled future predictions)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follow-up clarification – Should the RO plant be non-functional during Closure, we have several options for managing water:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) Hold the water – we have significant capacity on site for water storage on an annual basis. It is reasonable to expect that the RO plant could be fixed within an annual discharge period.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Pump the water U/G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Request emergency discharge</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>i. Where is the variability in the model coming from? Meteorological inputs?</td>
<td>i. See slide 52 – concentrations vary over the year due to meteorological inputs. Used the 95th percentile of the output on Slide 52 during Post-closure to determine EQCs (slide 61)</td>
</tr>
<tr>
<td></td>
<td>ii. Will sensitivity analyses be included with the end of March package?</td>
<td>ii. Not in the March package; results to be available during the process</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>i. Timeframe over which average and maximum EQC apply?</td>
<td>i. As per the water licence, average from four samples</td>
</tr>
<tr>
<td></td>
<td>ii. If you are not actively on-site during post-closure, how will you collect four samples/weekly samples during discharge?</td>
<td>ii. Will check back in the application</td>
</tr>
<tr>
<td>Anne Wilson</td>
<td>What is the AEMP benchmark in Snap Lake and the size of the mixing zone</td>
<td>10 mg/L (max), 2.93 mg/L, SSWQO that varies with hardness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixing zone with 200 m radius</td>
</tr>
<tr>
<td>Speaker</td>
<td>Question/Comment</td>
<td>DBC Response</td>
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<tr>
<td>Barry Zadjlik</td>
<td>i. There are various ways to come up with benchmarks or EQC - use impairment approach, or background concentration approach. In a post-closure environment, perhaps should be reverting to background concentration approach</td>
<td>i. Currently using toxicity data (so use impairment approach). Overtime, Snap Lake will return to concentrations that reflect natural runoff, so moving toward bac</td>
</tr>
<tr>
<td></td>
<td>ii. Comment that 50 mg/L of TDS is not background (that would be more around 10 to 15 mg/L)</td>
<td>ii. From 2014 EA, Measure Suggestion – MVLWB water licence reasons for decision required a closure objective that Snap Lake would return to below 500 mg/L in within 5 years of suspending operations</td>
</tr>
<tr>
<td>Bill Pain</td>
<td>How will EQC be brought into the next water licence</td>
<td>EQC not needed during closure, only post-closure</td>
</tr>
<tr>
<td></td>
<td>Note – ENR will push to see EQC in the water licence</td>
<td>De Beers is open to discussion around this topic</td>
</tr>
<tr>
<td><strong>Michelle Peters:</strong> Surveillance Network Program</td>
<td></td>
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<tr>
<td>Anne Wilson</td>
<td>What parameters to be monitored and frequency?</td>
<td>Will be included in the application</td>
</tr>
<tr>
<td>Anne Wilson</td>
<td>I couldn’t find your SNP reports on the registry. Are you still filing those?</td>
<td>Yes, however they are much different then they used to be. We now discuss the activities occurring at site, which is limited to the remote monitoring. During periods of discharge, of course we’ll report on that as per usual in the SNP.</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>i. Will there be monitoring to confirm there are no diffuse losses from the North Pile?</td>
<td>i. This is not something that has been done during operations. The aquatics program is conducted to look at water quality and biota within Snap Lake as supporting evidence of potential effects/changes from direct/indirect discharges to Snap Lake.</td>
</tr>
<tr>
<td></td>
<td>ii. During operations, diffusion from North Pile is relatively insignificant as compared to direct effluent discharge; this may change during closure/post-closure</td>
<td>ii. Currently cannot even sample groundwater because standpipes are frozen. The assumed direct discharge to SL is very small. Our AEMP monitoring work has not shown any measurable</td>
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<tr>
<td>Speaker</td>
<td>Question/Comment</td>
<td>DBC Response</td>
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<tr>
<td><strong>Alison Humphries:</strong> Aquatic Effects Monitoring Program</td>
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<td>indication of direct inputs. Thus modelling is likely conservative relative to reality.</td>
</tr>
<tr>
<td>Barry Zadjlik</td>
<td>Post-closure sampling in the mixing zone; modeling shows predicted variability in the discharge. How to capture the variability if only sample once in the mixing zone? Should consider sampling more frequently in post-closure (when the wetlands are discharging)</td>
<td>Propose to sample during the discharge period only, and early in the discharge, when water quality is potentially worst.</td>
</tr>
<tr>
<td>Jacqueline Ho</td>
<td>Slide 76: sediment stations listed for post-closure; do you intend to monitor sediments? What would trigger sediment monitoring? An exceedance of a TSS benchmark?</td>
<td>Proposing to monitor sediments only if triggered. Will continue monitoring TSS at all WQ stations during Closure and Post-closure to identify patterns in TSS. No TSS AEMP benchmark for the lake. During the development of EQC, TSS was not identified as a parameter of potential concern, however, an EQC, which is based on typical limits for Mines in the region, was proposed because discharges from constructed wetlands can sometimes have higher TSS than traditional treatment systems due to natural processes (e.g., plants die and slough off within the wetland). TSS concentrations within Snap Lake have typically been below detection limits.</td>
</tr>
<tr>
<td>Bill Pain</td>
<td>Suggestion, perhaps add a GANTT of monitoring programs Slide 77 – will monitoring cease after 3 years in post-closure?</td>
<td>Proposing to cease monitoring after three years of post-closure monitoring if data collected during closure (Closure expected to be 8 years) plus 3 years of post-closure indicate water quality is improving and there are no longer any effects to the aquatic ecosystem</td>
</tr>
<tr>
<td><strong>Summary – any last comments or questions</strong></td>
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<tr>
<td>Angela Love</td>
<td>Brine being put underground; how long will that continue?</td>
<td>Brine is generated from the reverse osmosis treatment plant; once that treatment stops, no more brine</td>
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<tr>
<td>Speaker</td>
<td>Question/Comment</td>
<td>DBC Response</td>
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<td>In 2018, the reverse osmosis plant was used for about 5 weeks (during the freshet/discharge period). Reverse osmosis treatment will continue to be used as long as required however it must be understood that operation of the RO plant comes at a high energy cost. Fuel is burned in order to operate that facility, emissions are generated etc.</td>
</tr>
<tr>
<td>Anne Wilson</td>
<td>Outside of freshet, how often is the TSS plant used separate from the RO plant?</td>
<td>TSS plant was used to manage water in the water management pond; this water was discharged to the underground</td>
</tr>
<tr>
<td>Jacqueline Ho</td>
<td>What is the difference between success indicators and criteria?</td>
<td>Success indicators are the sub-components of the Criteria. They indicate if we are on a trajectory toward successfully achieving the criteria or not. If we are not hitting those success indicators, then perhaps mitigation or an alternative strategy must be applied. Success indicators form the body of evidence that will be needed for the Board to determine if SL has achieved the criteria or not.</td>
</tr>
<tr>
<td>Anne Wilson</td>
<td>Are the SNP reports being filed?</td>
<td>Yes; SNP reports are still filed</td>
</tr>
<tr>
<td></td>
<td>The upcoming freshet – will it be RO treatment only, RO/TAA, or just TSS? (want to get an understanding of the water quality</td>
<td>Treatment plants being used depend on the quality of the influent</td>
</tr>
</tbody>
</table>
DE BEERS CANADA INC.,
SNAP LAKE MINE
WATER LICENCE RENEWAL WORKSHOP

Yellowknife/March 7, 2019

PUBLIC PRESENTATION
Objective: to present and have discussion on key aspects of Snap Lake Mine closure with all Parties ahead of planned submission of the water licence renewal application.

Key Aspects: North Pile capping and closure, water control structures including the wetlands, effluent quality criteria, Aquatic Effects Monitoring Program
REGULATORY UPDATE

- Underground mine 2008-2015
- Extended care and maintenance since 2016
- Proposing to begin closure activities in 2020
- Water licence
  - Current mining and milling licence expires in June of 2020
  - A renewed water licence is required
  - MVLWB determined that a class A water licence is needed
  - Renewed water licence for closure and post-closure activities
  - Water licence review process anticipated to take ~10 months
- Final Closure and Reclamation Plan (FCRP)
  - Required by March 29, 2019
  - Approval is required prior to implementation of closure activities
  - FCRP is the guiding management plan for all closure/post-closure activities
  - FCRP builds on the previously approved ICRP
- Water Licence and FCRP, along with all supporting documents will be submitted together
- Closure is a phase in the life of Snap Lake Mine
- Closure will begin following approval of the FCRP and issuance of the new water licence, anticipated in Q1 2020
**WATER LICENCE APPLICATION TABLE OF CONTENTS**

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<th>Complete</th>
<th>Consistent</th>
<th>Comprehensive</th>
<th>Closure &amp; Post-Closure</th>
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<tr>
<td>• Water Licence Application Form</td>
<td>• Final Closure and Reclamation Plan with the following appendices</td>
<td></td>
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<tr>
<td>• Site Plan</td>
<td>- Tech Memo - Snap Lake Closure - Geochemistry Review</td>
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<tr>
<td>• Fee</td>
<td>- North Pile Closure Cover Feasibility &amp; Detailed Design</td>
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<tr>
<td>• Engagement Record</td>
<td>- North Pile Closure Cover Design - Closure Cover Alternatives Analysis</td>
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<tr>
<td>• Draft closure water licence with proposed SNP Program</td>
<td>- North Pile Constructed Wetland Alternatives Evaluation</td>
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<tr>
<td>• Effluent Quality Criteria Report for Closure and Post-closure</td>
<td>- North Pile Passive Treatment Systems Detail Design</td>
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<tr>
<td>• Aquatic Effects Re-evaluation Report</td>
<td>- North Pile Surface Water Management for Closure - Detailed Design</td>
<td></td>
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<tr>
<td>• AEMP Design Plan for Closure and Post-Closure</td>
<td>- Revegetation Plan Design</td>
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<tr>
<td>• Engagement Plan</td>
<td>- Snap Lake Mine Post-Closure Problem Formulation (HHERA)</td>
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<tr>
<td>• Spill Contingency Plan</td>
<td>- Closure design for Mine Openings to Surface</td>
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<tr>
<td>• Emergency Response Plan</td>
<td>- Reclaim Security Update</td>
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<tr>
<td>• Waste Management Plan</td>
<td>• Air Quality and Emissions Monitoring and Management Plan</td>
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<tr>
<td>• Water Management Plan</td>
<td>• Wildlife Monitoring Plan</td>
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</tr>
<tr>
<td>• North Pile Management Plan</td>
<td>• Final Closure and Reclamation Plan with the following appendices</td>
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- Tech Memo - Snap Lake Closure - Geochemistry Review
- North Pile Closure Cover Feasibility & Detailed Design
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- North Pile Passive Treatment Systems Detail Design
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- Revegetation Plan Design
- Snap Lake Mine Post-Closure Problem Formulation (HHERA)
- Closure design for Mine Openings to Surface
- Reclaim Security Update

• Air Quality and Emissions Monitoring and Management Plan
• Wildlife Monitoring Plan
CLOSURE PLANNING PROCESS FOR SNAP LAKE MINE

• 2004 Environmental Assessment
  - Closure and reclamation planning began with submission of the Abandonment and Restoration Plan
• 2008 Operations Began
  - Closure and Reclamation Plans have been updated as required during the mine life to incorporate new information
  - Closure Objectives for the site were approved by the Mackenzie Valley Land and Water Board (November 2012)
  - Interim Closure and Reclamation Plan (ICRP) was approved by the MVLWB (January 2014)
• 2015 Operations Ended
• 2016 Care and Maintenance Began
  - Extended Care and Maintenance Plan appended to the ICRP was approved by the MVLWB (March 2016)
  - Intent to close the mine was announced (December 2017)
• 2018 Final Closure preparations
  - Final closure criteria, closure designs, and Final Closure and Reclamation Plan (FCRP) developed
  - The draft FCRP, closure criteria and closure activities were presented and reviewed at the Working Group (November 2018)
• 2019 Final Closure Plan & Water Licence to be submitted
  - FCRP and Water Licence Renewal to be submitted to the MVLWB (March 2019)
• 2020 Closure Begins
CLOSURE PLANNING TIMELINE

Closure
Objectives Approved by MVLWB

ICRP Approved by MVLWB

TK Closure Workshops
De Beers Announces Intent to Close Snap Lake Mine

Refine closure criteria, closure designs, FCRP and Water Licence Application materials

Community Meetings, Site Visits

Working Group, TK Workshops, Community Workshops

Update FCRP and Water Licence Application

Water Licence Application and FCRP Submission
Regulatory Review

Water Licence Renewal/Closure Workshop

Closure Objectives Approved by MVLWB

De Beers Announces Intent to Close Snap Lake Mine

Refine closure criteria, closure designs, FCRP and Water Licence Application materials

Community Meetings, Site Visits

Working Group, TK Workshops, Community Workshops

Update FCRP and Water Licence Application

Water Licence Application and FCRP Submission
Regulatory Review

Water Licence Renewal/Closure Workshop
Engagement is ongoing

- De Beers has implemented the approved Engagement Plan throughout operations and extended care and maintenance.
- Engagement includes:
  - Site Visits
  - Workshops
  - Community Visits
  - Participation in SLEMA
  - Fish Tasting
- Since December 2015, engagement has focussed on the temporary (ECM) or permanent closure of Snap Lake Mine
- Key engagements that informed the w.l. and FCRP include:
  - TG TK Closure Workshops
  - NSMA TK Closure Workshops
  - LKDFN TK Workshop
  - Closure Working Groups
  - Multiple site visits, community visits, and meetings

Tlicho Government TK workshop on Snap Lake Closure, Nov.7, 2018
FEEDBACK HAS BEEN INCORPORATED INTO THE PLAN

• Importance of establishing **minimum timeframes for monitoring** against closure criteria – so that monitoring may continue for an additional period if warranted

• Need for clarity regarding use of **Qualified Professionals** and the basis for their recommendations

• Identification of appropriate benchmarks for closure criteria

• Importance of slopes, landform and rock cover design for **wildlife safety**

• Consideration of percent cover and timeframes for **revegetation** of priority areas

• Need for additional information regarding wetland vegetation species composition

• Need for **robust water quality predictions, monitoring** programs and management plans – this is the focus of the current workshop

• **Feedback** is incorporated into the FCRP with a concordance table describing how and where in the document.

Tlicho Government TK workshop on Snap Lake Closure, Nov.7, 2018
FCRP is based on MVLWB guidance documents

**Overall closure goal:** To return the site and affected areas around the Mine to technically viable and, where practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities.

- **Key closure principles:**
  - Physical stability
  - Chemical stability
  - No long-term active care
  - Compatibility with land use in surrounding areas

- **Incorporates stakeholder feedback** received through TK workshops, WG sessions, and community visits
- **Builds upon closure design concepts** developed in ICRP v3.2, and includes:
  - Description of site closure conditions and summary of options and engineering design
  - Post-closure monitoring plans
  - Integrated schedule of activities
  - Approach to post-closure site assessment

**SMART closure criteria** have been developed
# OBJECTIVES BASED APPROACH TO CLOSURE PLANNING

**MVLWB Approved**

**Provided in FCRP**

Provided in FCRP; incorporates feedback from Nov meeting

<table>
<thead>
<tr>
<th>Closure Objective</th>
<th>What is the best closure objective for a particular mine component? Is the objective achievable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure Options</td>
<td>Which of the closure options will <strong>best</strong> achieve the closure objective?</td>
</tr>
<tr>
<td>Selected Closure Activity</td>
<td>What is the best way to implement the selected closure activity?</td>
</tr>
<tr>
<td>Closure Criteria</td>
<td>What is the best way to measure whether the selected closure activity meets the closure objective?</td>
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</tbody>
</table>
MINE CLOSURE OBJECTIVES
CATEGORIES AND COMPONENTS FOR CLOSURE

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
SEVEN SITE WIDE (SW) OBJECTIVES

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.
INFRASTRUCTURE (I) OBJECTIVES

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.
NORTH PILE (NP) OBJECTIVES

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.
UNDERGROUND (UG) OBJECTIVES

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.
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.
**Objective (NP2):** Physically stable PK containment areas to limit risk of failure that would affect safety of people or wildlife

**Criteria:** Acceptable results, as identified in NP1 of visual monitoring for deformation and degradation for a minimum of 3 years post-closure as part of the geotechnical inspections completed and signed off by a professional engineer.
NORTH PILE ENGINEERED COVER
OUTLINE

• Engineered Cover Design Objectives and Criteria
• Cover Detailed Design
• Available Borrow Areas
Design Objectives

• Isolate waste material
• Resist wind and water erosion
• Promote runoff and some limitation of infiltration
• Safe access and egress for wildlife
• Demolition (landfill) waste storage in minimal number of cells

Design Criteria

• 3H:1V west perimeter embankment regrade
• Nominal 2% top surface gradient
DETAILED DESIGN
NORTH PILE ENGINEERED COVER
### Detailed Design
#### North Pile Engineered Cover

<table>
<thead>
<tr>
<th>Grading</th>
<th>3H:1V west perimeter embankment regrade</th>
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<tbody>
<tr>
<td></td>
<td>Nominal 2% top surface gradient</td>
</tr>
<tr>
<td>Landfill Waste Capacity</td>
<td>114,000 m$^3$</td>
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<tr>
<td></td>
<td>Starter Cell deposited PK movement:</td>
</tr>
<tr>
<td></td>
<td>- Excavate Cell 2</td>
</tr>
<tr>
<td></td>
<td>- Place in Cell 3</td>
</tr>
<tr>
<td></td>
<td>Starter Cell waste placement:</td>
</tr>
<tr>
<td></td>
<td>- Cell 1 (existing landfill)</td>
</tr>
<tr>
<td></td>
<td>- Cell 2</td>
</tr>
<tr>
<td>Flow Conveyance</td>
<td>West Cell 1 outlet, toward west influent storage pond</td>
</tr>
<tr>
<td></td>
<td>East Cell 5 outlet, toward east influent storage pond</td>
</tr>
</tbody>
</table>
# DETAILED DESIGN

## NORTH PILE ENGINEERED COVER

<table>
<thead>
<tr>
<th>Cover Profile (top down)</th>
<th>Landfill waste, dark grey areas:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 m thickness (total)</td>
</tr>
<tr>
<td></td>
<td>0.3 m erosion protection cover</td>
</tr>
<tr>
<td></td>
<td>1.4 m erosion protection or transition</td>
</tr>
<tr>
<td></td>
<td>0.3 m transition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deposited PK, medium grey areas:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 0.6 m thickness (total), medium grey</td>
</tr>
<tr>
<td>Up to 0.3 m erosion protection cover</td>
</tr>
<tr>
<td>Nominal 0.3 m transition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Embankment/Rib Berm, light grey areas:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3 m thickness (total)</td>
</tr>
<tr>
<td>0.3 m erosion protection cover</td>
</tr>
</tbody>
</table>
## AVAILABLE BORROW AREAS:
### NORTH PILE ENGINEERED COVER

<table>
<thead>
<tr>
<th>ID</th>
<th>Borrow Area</th>
<th>Location</th>
<th>Primary Use</th>
<th>Available Quantity Estimate (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crusher stockpile</td>
<td>west of North Pile</td>
<td>erosion protection cover material</td>
<td>11,200(a)</td>
</tr>
<tr>
<td>2</td>
<td>Explosive management bunker</td>
<td>west of East Cell</td>
<td>erosion protection cover material</td>
<td>1,700</td>
</tr>
<tr>
<td>3</td>
<td>Laydown area</td>
<td>southeast of North Pile</td>
<td>erosion protection cover material and/or transition material</td>
<td>256,000(b)</td>
</tr>
<tr>
<td>4</td>
<td>Organic stockpile</td>
<td>former AN storage facility</td>
<td>riprap</td>
<td>29,400(c)</td>
</tr>
<tr>
<td>5</td>
<td>SP5 quarry</td>
<td>north of East Cell, Cell 1</td>
<td>erosion protection cover material and/or transition material</td>
<td>68,200</td>
</tr>
<tr>
<td>6</td>
<td>West Cell divider dyke</td>
<td>North Pile West Cell</td>
<td>erosion protection cover material</td>
<td>81,000(d)</td>
</tr>
</tbody>
</table>

(a) Quantity provided by De Beers
(b) Quantity assumes 80% of total available volume will be suitable
(c) Quantity assumes 20% of total available volume will be suitable
(d) Quantity assumes 100% of total available volume will be suitable
NORTH PILE WATER MANAGEMENT
OUTLINE

• Design Objectives and Criteria
• General Layout
• Detailed Design
Design Objectives

- Collect North Pile drainage (surface runoff and seepage) and convey it to the passive treatment systems
- Provide gravity conveyance
- To be physically stable over the long-term
- To not pose a risk to wildlife land use and meet closure criteria and 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

- 3H:1V slopes to be used where commensurate with engineering
- Convey the peak flow from the 200-year, 24-hour event plus snowmelt (Environmental Design Flood event) to the passive treatment facilities, while providing 0.3 m of freeboard
- Safely pass the probable maximum precipitation 24-hour event plus snowmelt (Inflow Design Flood event), without compromising the water management structures
The following Perimeter Water Control Structures are considered for the closure of the North Pile:

- Cell 5 Outlet Channel
- North Perimeter Ditch (existing Sump 4 area)
- South Perimeter Ditch (existing Sump 1 and 2 area)
- West Cell Divider Dyke Ditch
GENERAL LAYOUT
NORTH PILE WATER MANAGEMENT
DETAILED DESIGN – CELL 5 OUTLET CHANNEL
NORTH PILE WATER MANAGEMENT
DETAILED DESIGN – NORTH PERIMETER DITCH
NORTH PILE WATER MANAGEMENT
DETAILED DESIGN – SOUTH PERIMETER DITCH
NORTH PILE WATER MANAGEMENT

SECTION 1

SECTION 2

SECTION 3

SECTION 1

JULY 2017 EXISTING GROUND
0.3 m THICK RIPRAP Ddr = 150 mm
0.3 m THICK TRANSITION
1V 3H
0.3 m THICK EROSION PROTECTION (SEE NOTE 3)

COMMON FILL
0.3 m THICK EROSION PROTECTION (SEE NOTE 3)
FINISHED GRADE
ASSUMED BEDROCK SURFACE

ELEVATION (m)
470
467
465
462
460
1%
DETAILED DESIGN – SOUTH PERIMETER DITCH
NORTH PILE WATER MANAGEMENT

SECTION 2

SECTION 3
PASSIVE TREATMENT SYSTEM
OUTLINE

• Modelling Output
• Design Criteria
• Constructed Wetland for Nitrate Removal
• Full Site Layout
• West Passive Treatment System
• East Passive Treatment System
• Summary
MODELLING OUTPUT
PASSIVE TREATMENT SYSTEM

• Site Model
  • North Pile Hydrologic (Flow Quantity) Model Outputs
  • North Pile Water Quality Model Outputs
• Snap Lake Water Quality Model Outputs
• Downstream Lake Water Quality Model Outputs
• Used to Establish Design Water Quantity, Influent Water Quality, and Effluent Quality Criteria
DESIGN CRITERIA – WATER QUALITY
PASSIVE TREATMENT SYSTEM

Influent Nitrate Concentrations:

West Passive Treatment System
• 95th Percentile Flow weighted average influent NO$_3$ = 68.3 mg/L as N

East Passive Treatment System
• 95th Percentile Flow weighted average influent NO$_3$ = 72.8 mg/L as N

<table>
<thead>
<tr>
<th>Parameter Of Potential Concern</th>
<th>Effluent Quality Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Average Concentration</td>
</tr>
<tr>
<td>Nitrate, as N (mg/L)</td>
<td>25</td>
</tr>
<tr>
<td>Total suspended solids (mg/L)</td>
<td>15</td>
</tr>
<tr>
<td>pH</td>
<td></td>
</tr>
</tbody>
</table>
The rate of nitrate reduction is related to the water temperature and the effect that has on microbial activity:

<table>
<thead>
<tr>
<th>Design Flow</th>
<th>Unit</th>
<th>West PTS</th>
<th>East PTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>at 5 °C water temperature</td>
<td>m³/day</td>
<td>&lt; 2,156</td>
<td>&lt; 2,286</td>
</tr>
<tr>
<td>at 10 °C water temperature</td>
<td>m³/day</td>
<td>&lt; 4,300</td>
<td>&lt; 4,500</td>
</tr>
</tbody>
</table>

In addition to design flows, post-closure dam risk classification for CDA and Anglo CCS requires design to manage Environmental Design Flood (1:200-year return period), 24-hour duration used for conveyance structure and monthly wet condition used for storage capacity.

RO plant to remain onsite and operational until wetlands will achieve the design EQC (water monitoring will be required).
CONSTRUCTED WETLAND FOR NITRATE REMOVAL
PASSIVE TREATMENT SYSTEM

• What does a free water surface constructed wetland look like?
• Heavily planted vegetated zones, 0.3-1.0 m deep
• Open water zones allow for evenly distributed flow through the vegetated zones and minimize plugging and short-circuiting
• Will freeze solid in winter

Photo: Gary Austin, 2012. University of Idaho

Photo: Balch, 2015.
Alberta Onsite Wastewater Management Association
CONSTRUCTED WETLAND FOR NITRATE REMOVAL
PASSIVE TREATMENT SYSTEM

- Principal components of the nitrogen cycle in wetlands

FULL SITE LAYOUT
PASSIVE TREATMENT SYSTEM
West Influent Storage Pond and West Free Water Surface Constructed Wetland
EAST PASSIVE TREATMENT SYSTEM
PASSIVE TREATMENT SYSTEM

East Influent Storage Pond and East Free Water Surface Constructed Wetland
SUMMARY
PASSIVE TREATMENT SYSTEM

• Two wetlands are required due to topography and desire to achieve gravity flow paths
• North Pile surface water and seepage will be captured by the Perimeter Water Control Structures
• Perimeter Water Control Structures will convey water to the Influent Storage Ponds
• Influent Storage Ponds will convey water to the Wetlands
• Wetlands will treat for nitrate, reducing it from an average of ~70 mg/L to 25 mg/L
• WTP/RO to remain functional until wetland is performing as required
WATER QUALITY MODELLING & EFFLUENT QUALITY CRITERIA (EQC)
OUTLINE

- Models and model assumptions
- Site model and results
- Snap Lake model and results
- Downstream Lakes model and results
- Effluent quality criteria
THREE LINKED MODELS

• Site model
• Snap Lake model
• Downstream Lakes model

MODEL ASSUMPTIONS

• Extended Care and Maintenance
  - Modular WTP/RO unit operational

• Closure
  - Buildings decommissioned, North Pile covered, modular WTP/RO unit operational, passive treatment systems constructed and functioning

• Post-closure
  - The modular WTP/RO unit decommissioned, effluent from passive treatment systems meets EQC
  - Passive treatment systems were not included in the Site model

WTP/RO – Water treatment plant, Reverse osmosis; EQC - Effluent quality criteria
GoldSim

- Predict water quantities and qualities of six main components
- Calibrated to monitoring data from 2016 and 2017

**ECM AND CLOSURE**

**POST-CLOSURE**

[Evaluation Diagram]

WTP/RO – Water treatment plant, Reverse osmosis; ECM - Extended Care and Maintenance; WECA - Western embankment catchment area
Concentrations in the North Pile sumps are predicted to decrease in Post-closure because water in the sumps is no longer managed and the sumps fill to their maximum volume before overflowing.

Figures on the right show predicted nitrate concentrations during the open-water season in Sump 3 and Sump 5 in ECM, Closure, and Post-closure.
SITE MODEL RESULTS - LOADING
WATER QUALITY MODELLING & EFFLUENT QUALITY CRITERIA

- A substantial decrease in loading to Snap Lake from Operations to ECM, Closure and Post-closure
  - Operations: 90,000 kg N/yr
  - Closure: 130 kg N/yr
  - Post-closure: 7,800 kg N/yr

- Figures on the right show:
  - nitrate loading to Snap Lake from the WTP in Operations
  - the modular WTP/RO unit in ECM and Closure
  - Sump 3 and Sump 5 in Post-closure
SNAP LAKE MODEL
WATER QUALITY MODELLING & EFFLUENT QUALITY CRITERIA

- Three-dimensional model
- Predict parameter concentrations at various locations throughout Snap Lake
- Calibrated to in-lake monitoring data from 2004 to 2017

ECM AND CLOSURE

POST-CLOSURE

WTP/RO = Water treatment plant/Reverse osmosis; ECM = Extended Care and Maintenance
SNAP LAKE MODEL GRID AND POST-CLOSURE MIXING ZONE
WATER QUALITY MODELLING & EFFLUENT QUALITY CRITERIA
SNAP LAKE MODEL RESULTS
WATER QUALITY MODELLING & EFFLUENT QUALITY CRITERIA

- Water quality in Snap Lake is predicted to improve due to:
  - Decrease in effluent volume
  - Treatment provided by the modular WTP/RO unit during ECM and Closure
  - Natural inflows

- Parameter concentrations are predicted to remain below AEMP benchmarks

AEMP - Aquatics effects monitoring program; ECM - Extended Care and Maintenance; SNP - Surveillance Network Program; WTP/RO - Water treatment plant/Reverse osmosis
• GoldSim
• Predict TDS concentrations at Node 22 in MacKay Lake
• Calibrated to monitoring data from 2005 to 2017 (depending on the lake)
CONCENTRATIONS OF TDS ARE PREDICTED TO PEAK:
- Lac Capot Blanc outlet in 2023
- DSL8 in 2026
- KING01 in 2027
- King River in 2028
- Node 22 in 2028

AT NODE 22 IN MACKAY LAKE:
- Measure 1(d) states that “No Total Dissolved Solids or its constituent ions from Snap Lake Mine effluent will be detectable, relative to the range of natural variability, at the inlet to MacKay Lake, 44 km downstream of Snap Lake.”
- An Acceptable Limit was established in the Downstream Watercourses Special Study Report (Golder 2017) to assess conformity with Measure 1(d)
- Predicted TDS concentrations were below the Acceptable Limit to meet Measure 1(d)
IDENTIFICATION OF PARAMETERS OF POTENTIAL CONCERN CLOSURE

- WTP/RO unit will be operational until passive water treatment systems are achieving design criteria
- EQC are not proposed for the WTP/RO unit:
  - Parameter concentrations in the discharge are below AEMP benchmarks
  - Parameter concentrations already reflect the lowest concentrations achievable by the available technology
IDENTIFICATION OF PARAMETERS OF POTENTIAL CONCERN POST-CLOSURE

- Outflow from Sump 3 and Sump 5 only discharges to Snap Lake
- After the three screening steps, one POPC was identified for the Sump 3 and Sump 5 outflows to Snap Lake:
  - Nitrate

AEMP - Aquatics effects monitoring program; ECM = Extended Care and Maintenance; EQC - Effluent quality criteria; POPC - Parameter of potential concern; WTP/RO - Water treatment plant/Reverse osmosis
Proposing the EQC summarized below

- Increase the total suspended solids limits
- Continue to specify that the discharge be pH-regulated and non-acutely toxic
- Implement a nitrate EQC that is expected to be achievable through passive treatment mitigation

<table>
<thead>
<tr>
<th>POPC</th>
<th>Effluent Quality Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Average Concentration</td>
</tr>
<tr>
<td>Nitrate, as N (mg/L)</td>
<td>25</td>
</tr>
<tr>
<td>Total suspended solids (mg/L)</td>
<td>15</td>
</tr>
<tr>
<td>pH</td>
<td>6.5 to 9.0</td>
</tr>
</tbody>
</table>

EQC - Effluent quality criteria
SURVEILLANCE NETWORK PROGRAM (SNP)
The objective of the SNP is to detail sampling and monitoring requirements related to conditions and required by the Licence.

SNP stations are listed in the water licence Annex A:
- Where, when and what must be sampled.

The current water licence has 36 stations, 6 are inactive and 30 active.

For the next water licence, De Beers is recommending to:
- Add stations; or
- Retain stations; or
- Eliminate stations.

Rationale is provided for each of these changes in the application.

Closure and Post-Closure SNP is focused on intakes, discharges, and the receiving environment.
Operational stations no longer relevant in Closure or Post-Closure and therefore recommended for removal

<table>
<thead>
<tr>
<th>Station</th>
<th>Description</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNP 02-03</td>
<td>Collection ditch</td>
<td>Does not exist in new closure design</td>
</tr>
<tr>
<td>SNP 02-04-02-09</td>
<td>Uncontrolled surface runoff at various sites</td>
<td>No WQ concerns at these sites</td>
</tr>
<tr>
<td>SNP 02-09.4, 02-09.5</td>
<td>Downslope ammonia nitrate pad</td>
<td>No WQ concerns at this site</td>
</tr>
<tr>
<td>SNP 02-10</td>
<td>Observable flow to snap lake or inland lake</td>
<td>Activities in that area have ceased</td>
</tr>
<tr>
<td>SNP 02-11, 02-12, 02-13</td>
<td>Seepage monitoring wells</td>
<td>Does not exist in new closure design</td>
</tr>
<tr>
<td>SNP 02-18</td>
<td>Snap lake stations for whole lake tds</td>
<td>U/G water no longer pumped to surface</td>
</tr>
<tr>
<td>SNP 02-19</td>
<td>Discharge from temporary sewage disposal facility</td>
<td>Sewage monitored at SNP 02-16j</td>
</tr>
<tr>
<td>SNP 02-21</td>
<td>Snap lake outflow</td>
<td>Will continue in the AEMP</td>
</tr>
</tbody>
</table>
# SURVEILLANCE NETWORK PROGRAM

Proposed SNP Stations to be retained in Closure and/or Post Closure

<table>
<thead>
<tr>
<th>Station</th>
<th>Description</th>
<th>Closure</th>
<th>Post-closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNP 02-02</td>
<td>North Pile Drainage collection ditch north of Water Management Pond</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-02b</td>
<td>East Influent Storage Pond</td>
<td>*Active</td>
<td>Active</td>
</tr>
<tr>
<td>SNP 02-02c</td>
<td>West Influent Storage Pond</td>
<td>*Active</td>
<td>Active</td>
</tr>
<tr>
<td>SNP 02-14</td>
<td>Water Management Pond</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-15</td>
<td>Water Intake from Snap Lake</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-16j</td>
<td>Sewage Treatment Plant Effluent</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-17b</td>
<td>Final Combined Water Treatment Plant and Sewage Treatment Plant Effluent</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-17c</td>
<td>Discharge from East Passive wetland system to Snap Lake</td>
<td>n/a</td>
<td>*Active</td>
</tr>
<tr>
<td>SNP 02-17d</td>
<td>Discharge from West Passive wetland system to Snap Lake</td>
<td>n/a</td>
<td>*Active</td>
</tr>
<tr>
<td>SNP 02-20defg</td>
<td>Mixing Zone Stations (from Diffuser) within Snap Lake</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>SNP 02-20h,i</td>
<td>Mixing Zone Stations (from East Passive Wetland) within Snap Lake</td>
<td>n/a</td>
<td>* Active</td>
</tr>
<tr>
<td>SNP 02-20j,k</td>
<td>Mixing Zone Stations (from West Passive Wetland) within Snap Lake</td>
<td>n/a</td>
<td>*Active</td>
</tr>
</tbody>
</table>

* = new station
SURVEILLANCE NETWORK PROGRAM: CLOSURE & POST-CLOSURE
AQUATIC EFFECTS MONITORING PROGRAM (AEMP)
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 stressors from the Mine to the aquatic environment decrease, and water quality and biota show positive responses, the extent and complexity of the AEMP can decrease.
## AQUATIC EFFECTS MONITORING PROGRAM (AEMP) – CHANGES

<table>
<thead>
<tr>
<th>Component</th>
<th>Operations</th>
<th>ECM</th>
<th>Closure</th>
<th>Post-closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Toxicity</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sediment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Plankton</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Benthos</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Fish Health</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Fish Community</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fish Tasting</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Downstream Program</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Special Studies</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Site Changes
- No Ore Development
- Short-term Variable Discharge
- Reduced Discharge Volume
- Lower Contaminant Loadings

### Site Changes
- Occasional RO Treatment

### AEMP Changes
- Sediment and biological: one program if data trending towards baseline and within Normal Range

### Site Changes
- North Pile Cover
- Passive Treatment
- No Infrastructure
- Lower Contaminant Loadings

### AEMP Changes
- WQ, Toxicity – stop after 3 years if WQ stabilizes
- Downstream – stop if TDS at LCB Outlets and Node 22 stable
- Sediment and Biological – no programs unless triggered
- Fish Tasting – no program
## AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

### Water Quality - Snap Lake at the Mixing Zone

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Timing</th>
<th>Number of Stations</th>
<th>Sample Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure</td>
<td>Annually</td>
<td>Monthly during discharge (open-water)</td>
<td>Main Basin: 2</td>
<td>Depth of maximum conductivity, or mid-depth if no conductivity gradient is present</td>
</tr>
<tr>
<td></td>
<td>Once every 3 years</td>
<td>1 ice-cover</td>
<td>Main Basin: 2</td>
<td></td>
</tr>
<tr>
<td>Post-closure</td>
<td>Annually, until water quality in Snap Lake has stabilized or concentrations are decreasing</td>
<td>1 open-water</td>
<td>Main Basin: 2 (SNP 02-20h and SNP 02-20i) NWA: 2 (SNP 02-20 and SNP 02-20k)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once within the first three years of Post-closure</td>
<td>1 ice-cover</td>
<td>Main Basin: 2 NWA: 2</td>
<td></td>
</tr>
</tbody>
</table>

### Water Quality - Snap Lake Beyond the Mixing Zone and Northeast Lake

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Timing</th>
<th>Number of Stations</th>
<th>Sample Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure</td>
<td>Annually</td>
<td>1 open-water</td>
<td>Main Basin: 5 NWA: 2 (1 field measurements only) NEL: 4 (1 field measurements only)</td>
<td>Depth of maximum conductivity, or mid-depth if no conductivity gradient is present</td>
</tr>
<tr>
<td></td>
<td>Once every 3 years</td>
<td>1 ice-cover</td>
<td>Main Basin: 5 NWA: 2 (1 field measurements only) NEL: 4 (1 field measurements only)</td>
<td></td>
</tr>
<tr>
<td>Post-closure</td>
<td>Annually, until water quality in Snap Lake has stabilized or concentrations are decreasing</td>
<td>1 open-water</td>
<td>Main Basin: 3 (SNAP08, SNAP06, SNP 02-20e) NWA: 1 (SNAP29)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once within the first three years of Post-closure</td>
<td>1 ice-cover</td>
<td>Main Basin: 3 NWA: 1 NEL: 4 (1 field measurements only)</td>
<td></td>
</tr>
</tbody>
</table>
## AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

### Water Quality - Downstream

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Timing</th>
<th>Number of Stations</th>
<th>Sample Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure</td>
<td>Annually</td>
<td>1 ice-cover (+1 open-water at LCB outlets)</td>
<td>LCB outlets: 2</td>
<td>Surface at watercourse stations and mid-depth at MacKay Lake stations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KING01: 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MacKay Lake: 2</td>
<td></td>
</tr>
<tr>
<td>Post-closure</td>
<td>Annually, until downstream TDS concentrations have stabilized or are decreasing</td>
<td>1 ice-cover</td>
<td>LCB outlets: 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KING01: 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MacKay Lake: 2</td>
<td></td>
</tr>
</tbody>
</table>
# AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

## Toxicity – Snap Lake

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Timing</th>
<th>Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure</td>
<td>Annually</td>
<td>Once during discharge</td>
<td>SNP 02-20e, SNP 02-20f</td>
</tr>
<tr>
<td>Post-closure</td>
<td>Annually</td>
<td>Once during discharge</td>
<td>SNP 02-20h, SNP 02-20i, SNP 02-20j, SNP 02-20k</td>
</tr>
</tbody>
</table>

## Sediment – Snap Lake and Northeast Lake

<table>
<thead>
<tr>
<th>Period</th>
<th>Frequency</th>
<th>Timing</th>
<th>Program Design</th>
<th>Additional Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure</td>
<td>One close-out program</td>
<td>Once during discharge</td>
<td>Following ECM</td>
<td>Discontinued SNP sampling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Discontinued 2-cm core sampling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diffuser sampling using Ekman grab and Tech-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ops Corer</td>
</tr>
<tr>
<td>Post-closure</td>
<td>No program unless</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>triggered by water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>quality and/or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>toxicity results</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### BIOLOGICAL PROGRAMS – PLANKTON, BENTHOS, FISH
### AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

#### Closure

<table>
<thead>
<tr>
<th>Component</th>
<th>Program Design</th>
<th>Frequency</th>
<th>Lakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plankton</td>
<td>Following ECM</td>
<td>One program - if plankton community is within normal range and returning to baseline conditions, no additional programs</td>
<td>Snap Lake and Northeast Lake</td>
</tr>
<tr>
<td>Benthic Invertebrates</td>
<td>Following ECM</td>
<td>One program - if benthic invertebrate community is within normal range and returning to baseline conditions, no additional programs</td>
<td>Snap Lake and Northeast Lake</td>
</tr>
<tr>
<td>Fish</td>
<td>Following ECM</td>
<td>One program - if fish health parameters within normal range and returning to baseline conditions, no additional programs</td>
<td>Snap Lake and Lake 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large-bodied fish programs removed (fish tissue, fish community)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish tasting, if requested by community members</td>
<td></td>
</tr>
</tbody>
</table>

**Post-Closure**
- No biological monitoring planned
- Low Action Level trigger and Response Framework used to re-open programs
SUMMARY
AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

• Robust – fit for purpose AEMP
• Previous study items addressed (e.g., downstream lakes)
• Program design sensitive to change
• Strength – consistency with Operations and ECM AEMP Designs
# AEMP SUMMARY
## AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

<table>
<thead>
<tr>
<th>Closure</th>
<th>Post-Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td>Annual for first three years</td>
</tr>
<tr>
<td>• WQ</td>
<td>• WQ</td>
</tr>
<tr>
<td>• Toxicity</td>
<td>• Toxicity</td>
</tr>
<tr>
<td>• Downstream</td>
<td>Annual until WQ stabilizes</td>
</tr>
<tr>
<td></td>
<td>• Downstream</td>
</tr>
<tr>
<td>At least once</td>
<td>Triggered programs</td>
</tr>
<tr>
<td>• Sediment</td>
<td>• Sediment</td>
</tr>
<tr>
<td>• Plankton</td>
<td>• Plankton</td>
</tr>
<tr>
<td>• Benthos</td>
<td>• Benthos</td>
</tr>
<tr>
<td>• Small-bodied fish</td>
<td>• Small-bodied fish</td>
</tr>
<tr>
<td>Removed</td>
<td>No change from Closure</td>
</tr>
<tr>
<td>• Large-bodied fish</td>
<td></td>
</tr>
<tr>
<td>• Fish Tasting (unless community requests)</td>
<td></td>
</tr>
</tbody>
</table>
SUMMARY OF SNAP LAKE CLOSURE

- Snap Lake Mine is moving into Closure beginning with the approval of the water licence and FCRP
- Water is no longer pumped from the underground to the surface
- Key aspects of Closure include:
  - Demolition, re-vegetation of priority areas
  - North Pile cover and re-contouring
  - North Pile Perimeter Water Control Structures re-design
  - Passive Wetland Treatment System
- Monitoring will continue throughout Closure and Post-Closure
  - AEMP is adjusted to align with closure and post-closure
  - EQC re-evaluation was completed
  - All Environmental Management Plans updated for closure/post-closure (Air, Veg, Wildlife, Spill)
THANK YOU