



June 22, 2016

File: MV2011L2-0004

Mr. Sean Whitaker
De Beers Canada Inc.
Suite 300, 5120-49th St.
YELLOWKNIFE NT X1A 1P8

Email: Sean.whitaker@debeersgroup.com

Dear Mr. Whitaker:

**Changes to the Surveillance Network Program for the Extended Care and Maintenance Plan – Approval
De Beers Canada Inc. (De Beers) – Snap Lake Mine**

The Mackenzie Valley Land and Water Board (MVLWB or the Board) met on June 22, 2016 to review your requested changes to the Surveillance Network Program (SNP) of Water Licence MV2011L2-0004. This request was submitted April 20, 2016, as part of the Extended Care and Maintenance Plan (ECMP). The ECMP was submitted in accordance with Section 7 of the Interim Closure and Reclamation Plan (Version 3.2) which is required as part of Part I, item 1 of Water Licence (Licence) MV2011L2-0004.

The Board hereby approves the updated Surveillance Network Program as attached. De Beers shall adhere to commitments made in their responses to reviewer comments dated June 2, 2016.

The full cooperation of De Beers is anticipated and appreciated. If you have any questions or concerns, please contact Kierney Leach at (867) 766-7470 or email kleach@mvlwb.com.

Yours sincerely,

A handwritten signature in black ink, appearing to read "F. M. Adlem", is written over a light blue horizontal line.

Floyd Adlem
MVLWB A/Chair

Attachments:

- Water Licence with updated Surveillance Network Program
- Reasons for Decision

Copied to: Distribution List



MACKENZIE VALLEY LAND AND WATER BOARD
WATER LICENCE

Amendment – September 16, 2015

Pursuant to the Mackenzie Valley Resource Management Act and Regulations, the Mackenzie Valley Land and Water Board, hereinafter referred to as the Board, hereby grants to:

De Beers Canada Inc.
(Licensee)

of #300 5120 – 49th Street, Yellowknife, Northwest Territories X1A 1P8
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert, or otherwise use water subject to the restrictions and conditions contained in the Northwest Territories Waters Act and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence number: MV2011L2-0004
Licence type: A
Water Management Area: Northwest Territories 01
Location: Snap Lake, Northwest Territories
Purpose: Water Use and Waste Disposal
Description: For a Mining and Milling Operation
Quantity of water not to be exceeded: 188,000 cubic metres (m³) per year
Effective date of Licence: June 14, 2012
Expiry date of Licence: June 13, 2020

This Licence, issued and recorded at Yellowknife, includes and is subject to the annexed conditions.

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Mackenzie Valley Land and Water Board

Chair

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Witness

Approved by

[Handwritten signature]
Minister of Environment and Natural Resources

**Type A Water Licence MV2011L2-0004
De Beers Canada Inc. – Snap Lake Project**

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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, including the deposition of Processed Kimberlite;
 - v. Progressive reclamation of the North Pile;
 - 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
- xiv. The Post-Environmental Assessment Information Package submitted by the Licensee on November 28, 2014.

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.

Act - the *Waters Act*, S.N.W.T. 2014, c.18.

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.

Dam Safety Guidelines - the *Canadian Dam Association's (CDA) Dam Safety Guidelines (DSG), 2007*. The scope and applicability of the *Dam Safety Guidelines* referred to in this Licence is presented in Section 1 of the *Dam Safety Guidelines*.

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.

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.

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 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.

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.

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 that are designed to collect and 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 MV2001L2-0002 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 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.

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 6.

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 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 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 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 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 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 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.

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 a minimum of ninety (90) days prior to the commencement of the construction of each phase of the North Pile Facility. Revised Plans shall:
 - a) Describe how the Licensee is meeting the objectives listed in Part E, item 6;
 - b) Satisfy the requirements of Schedule 4, item 2 of this Licence; and
 - c) Be in accordance with Part B, item 6 of this Licence.
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.
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 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 of this Licence.

Effluent Quality Criteria – Discharges from Water Treatment Plants

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 (permanent Water treatment plant) and 02-17 (temporary Water treatment plant), shall meet the following effluent quality criteria:

Parameter	EQC (mg/L)		Average Annual Loading Limit (kg/yr)
	Maximum Average Concentration	Maximum Grab Concentration	
Total Dissolved Solids (TDS) (calculated)	960	1253	n/a
Total Suspended Sediments	7	14	n/a
Ammonia as N	10	20	208,000
Nitrite as N	0.35	0.6	n/a
Nitrate as N	12	17	250,000
Total Phosphorous	n/a	n/a	229
Fluoride	1.3	2.0	n/a
Total Aluminum	0.1	0.2	n/a
Total Arsenic	0.003	0.01	n/a
Total Chromium	0.01	0.02	n/a
Total Copper	0.003	0.006	n/a
Total Lead	0.005	0.01	n/a
Total Nickel	0.05	0.1	n/a
Total Zinc	0.01	0.02	n/a
Extractable Petroleum Hydrocarbons – F1 Fraction (C6-C10)	4.6	n/a	n/a
Extractable Petroleum Hydrocarbons – F2 Fraction (C11-C16)	2.1	n/a	n/a
Faecal Coliforms	10 CFU/100mL*	20 CFU/100mL*	n/a

* 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
- 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. 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 5, item 5.

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 30, 2016, 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.

8. The Licensee shall update the AEMP Response Plan referred to in Part G, item 7 as directed by the Board.
9. 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.

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 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 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. 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. The Licensee shall, submit to the Board, a minimum of twenty-four (24) months prior to the end of operations, for approval, a **Final Closure and Reclamation Plan**.
4. 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.

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



Floyd Adlem, A/Chair



Amanda Gauthier, Witness

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

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- Schedule 1: Annual Water Licence Report
- Schedule 2: Security Requirements
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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 Plants;
- 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;
- h) Monthly and annual estimates and measurements of precipitation and runoff;
- i) Monthly elevations of Water in Snap Lake during the open Water season;
- j) Monthly elevations of Water in the Water Management Pond and a stage volume curve for the pond;
- k) The annual quantities in cubic metres (m³) of Processed Kimberlite and Paste placed as underground backfill;
- l) The annual quantities in cubic metres (m³) of each of Fine, Grits, and Coarse Processed Kimberlite or Paste placed in the North Pile Facility;
- m) 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);
- n) The annual quantities in cubic metres (m³) of other solid Waste placed in the North Pile;
- o) The annual quantities in cubic metres (m³) of Waste Rock placed for construction activities, including a diagram showing where it was placed, and identification of the classification of quantities by each rock type (non-acid generating or potentially-acid generating rock);
- p) 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 02-17 and 02-17b);

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** 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;
- t) A **Geotechnical and Geochemical Inspection Report**, referred to in Part E, item 3(b) of this Licence, for the inspection undertaken during the previous calendar year;
- 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;
- v) 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;
- w) 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;
- x) Modification activities conducted in accordance with Part J of this Licence, undertaken during the previous calendar year;

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;
- cc) Any other details on Water Use or Waste disposal requested by the Board by November 1 of the year being reported;
- dd) 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;
- ee) 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;
- gg) 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 security on the schedule set out below and once achieved, shall maintain a security deposit totaling \$39,066,247.00:
 - a) Security currently maintained \$36,917,856.00.
 - b) Prior to placement of Processed Kimberlite into the West Cell of the North Pile, the Licensee shall have posted and shall maintain an additional security deposit of \$2,148,391.00 to address the estimated increase in total Water related liability resulting from development of the West Cell.

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. The process and facilities for the treatment and Discharge of treated effluent from the Snap Lake Diamond Project to Snap Lake;
 - vi. 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;
 - vii. A summary of the results of the groundwater and site water models, including Water quality and quantity predictions; and
 - viii. 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.

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;

- 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 of 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.

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 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; and
 - v. Algal biomass and species community composition for phytoplankton in Snap Lake in midsummer. 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.

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



Floyd Adlem, A/Chair



Amanda Gauthier, Witness

Annexes
Annexed to Water Licence MV2011L2-0004
De Beers Canada Inc. – Snap Lake Project

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Annex B: Table of Items Requiring Submission

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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

SNP station #	Description
02-01	Final Minewater collection sump, underground
02-02	North Pile drainage collection ditch north of Water Management Pond
02-03	Core facilities area collection ditch east of the center of Water Management Pond
02-04.1	Uncontrolled surface runoff at culvert on north side of center of airstrip
02-04.2	Uncontrolled surface runoff at culvert on north side of western end of airstrip
02-04.3	Uncontrolled surface runoff at culvert on north side of airstrip
02-05	Uncontrolled surface runoff at Bulk Sample Mine Rock Pad
02-06	Uncontrolled surface runoff at Quarry Site on south side of North Pile
02-07.1	Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond downstream of explosive magazine
02-07.2	Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west of small Ammonium Nitrate Pad
02-07.3	Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west side of small Ammonium Nitrate Pad
02-08	Uncontrolled surface runoff at Winter Access Road
02-09	Uncontrolled surface runoff and standing water at Emulsion Plant Area; pond north of Bulk Emulsion Ammonium Nitrate Pad
02-09.2	Uncontrolled surface runoff and standing water at Emulsion Plant Area; pond downslope and north-northeast from Ammonium Nitrate Pad
02-09.3	Uncontrolled surface runoff and standing water at Emulsion Plant Area; downslope from SNP 02-09
02-09.4	Uncontrolled surface runoff and standing water at Emulsion Plant Area, base of Ammonium Nitrate Pad Sump, south of Ammonium Nitrate Pad
02-09.5	Uncontrolled surface runoff and standing water at Emulsion Plant Area, pond downslope of Ammonium Nitrate Pad
02-10	Any other points where observable flow to Snap Lake or Inland Lake 5 (IL5) is observed.
02-11	Seepage monitoring well downgradient from Water Management Pond Dam 1, near Snap Lake shoreline
02-12	Seepage monitoring well downgradient from Water Management Pond Dam 1
02-13	Seepage monitoring well downgradient from Water Management Pond Dam 2
02-14	Water Management Pond (stilling well near the pumphouse)
02-15	Water Intake from Snap Lake
02-16i	Replaced by 02-16j
02-16j	Sewage effluent from Sewage Treatment Plant, prior to mixing with Water Treatment Plant effluent

02-17	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.
02-17b	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.
02-18	Monitoring stations in the main basin of Snap Lake that are used to calculate a whole lake average concentration of Total Dissolved Solids
02-19	Sewage discharge from the temporary Sewage Disposal Facility
02-20d	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
02-20e	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
02-20f	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
02-20g	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
02-21	Outlet from Snap Lake flowing into the Lockhart River System
02-22	Diffuser construction
02-23	Water intake construction
02-24	Snap Lake sites in close proximity to fisheries compensation works. Corresponds to AEMP stations SNAP05, and SNAP29 (Water intake).

SNP station 02-01:

Description:	Final Minewater collection sump, underground		
Location:	N 7052640, E 0506400		
Sampling Frequency:	Continuously by in-line monitoring during active pumping operations	Weekly during active pumping operations	Monthly during active pumping operations
Sampling Parameters:	Flow, temperature, pH, conductivity, turbidity	pH, turbidity, total dissolved solids (TDS) (calculated ¹⁰), total suspended solids (TSS), total ammonia, chloride, calcium	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	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.		
Status:	Active		

SNP station 02-02:

Description:	North Pile drainage collection ditch north of Water Management Pond		
Location:	N 7052663, E 0506400		
Sampling Frequency:	Continuously by in-line monitoring during pumping operations	Weekly during spring freshet and Heavy Rainfall events	Monthly during freshet, during periods of flow, and/or ice free conditions
Sampling Parameters:	Flow, temperature, pH, conductivity, turbidity	TSS, turbidity	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , ICP-MS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations to evaluate the quantity and quality of all seepage and runoff coming from the North Pile Facility. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.		
Status:	Active		

SNP station 02-03:

Description:	Core facilities area collection ditch east of the center of the Water Management Pond This station was inactivated in 2010 but recommended for reactivation during the 2011/2012 Licence renewal process.		
Location:	N 7052640, E 0506400		
Sampling Frequency:	Continuously by in-line monitoring during pumping operations	Weekly during spring freshet and heavy rainfall events	Monthly during freshet, during periods of flow, and/or ice free conditions
Sampling Parameters:	Flow, temperature, pH, conductivity, turbidity	TSS, turbidity	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations to evaluate runoff from core facilities. To provide information about the geochemical stability/rate of weathering of the rock used for construction at the site.		
Status:	Active		

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 ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
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	

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 ions ¹ , nutrients ² , CCMS S scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
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	

SNP station 02-06:

Description:	Uncontrolled surface runoff at Quarry Site on south side of North Pile	
Location:	De Beers will provide coordinates in the event of sampling uncontrolled runoff.	
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 ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.	
Status:	Active	

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

Description:	Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant; three (3) locations	
Location:	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	
Sampling and Analysis Frequency:	Twice per week during spring freshet	Daily during heavy rainfall events if measurable flow is present
Sampling Parameters:	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	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.	
Status:	Active	

SNP station 02-08:

Description:	Uncontrolled surface runoff at Winter Access Road	
Location:	De Beers will provide coordinates in the event of sampling uncontrolled runoff.	
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 ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations.	
Status:	Active	

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

Description:	Uncontrolled surface runoff and standing water at Emulsion Plant Area; five (5) locations	
Location:	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	
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 ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	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.	
Status:	Active	

SNP station 02-10:

Description:	Any other points where observable flow to Snap lake or Inland Lake 5 (IL5) is observed.	
Location:	De Beers will provide coordinates in the event of sampling uncontrolled runoff.	
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 ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations to evaluate quality of runoff into the Receiving Environment.	
Status:	Active	

SNP station 02-11:

Description:	Seepage monitoring well downgradient from Water Management Pond Dam 1, near Snap Lake shoreline.	
Location:	N 7052303, E 0506501	
Sampling Frequency:	Monthly	Quarterly when water is present
Sampling Parameters:	Water level	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations to evaluate dam performance.	
Status:	Active	

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 ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations	
Status:	Active	

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 ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations	
Status:	Active	

SNP station 02-14:

Description:	Water Management Pond (stilling well near the pumphouse)		
Location:	N 7052620, E 0506480		
Sampling Frequency:	Continuously when pumping to the Water Treatment Plant	Weekly when pumping to the Water Treatment Plant	Quarterly
Sampling Parameters:	Flow	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons,	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴
Rationale:	Operational Monitoring; during construction and operations. Data from this station is evaluated as part of the Acid Rock Drainage and Geochemical Characterization Monitoring Report.		
Status:	Active		

SNP station 02-15:

Description:	Water Intake from Snap Lake		
Location:	N 7053276, E 0506515		
Sampling Frequency:	Monthly, if extracting water from Snap Lake	Quarterly, if extracting water from Snap Lake	Annually, if extracting water from Snap Lake
Sampling Parameters:	<i>E. coli</i> , Major Ions, nitrate, TDS (measured and calculated ¹⁰)	Microbial Pathogens (<i>Gardia</i> , <i>Cryptosporidium</i> , and total heterotrophic plate count)	Turbidity, TSS, pH, conductivity, major ions ¹ , nutrients ² , CCMS scan ³ (total and dissolved), total mercury, total arsenic
Rationale:	Operational Monitoring; during construction and operations to evaluate safety of drinking water and amount of water withdrawal.		
Status:	Active		

SNP station 02-16j:

Description:	<p>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)</p> <p>Surveillance Network Program 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.</p>		
Location:	n/a		
Sampling Frequency:	Continuously, by in-line monitoring during periods of operation	Once a week on alternate dates during pumping operations	Annually if in operation
Sampling Parameters:	Flow, pH, temperature, conductivity, turbidity	Biological oxygen demand (BOD), Nutrients ² , Total Oil and Grease, TSS, <i>E. Coli</i> , Faecal Coliforms	CCMS scan ³ (total and dissolved), total mercury, total arsenic
Rationale:	Operational monitoring: to evaluate whether sewage has been adequately treated before mixing with other Waste streams in the Water Management Pond.		
Status:	Active		

SNP stations 02-17 and 02-17b:

Description:	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.				
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 when discharging to Snap Lake	Quarterly	Monthly
Sampling Parameters:	Flow, pH, temperature, conductivity, turbidity	Electrical Conductivity	TDS (measured and calculated ¹⁰), Nutrients ² , TSS, Turbidity, Conductivity, Chloride, Calcium, Faecal coliforms, extractable petroleum hydrocarbons, any metal parameter that has an EQC	Acute and chronic toxicity tests ⁵	pH, Major Ions ¹ , CCMS scan ³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX ⁴ , <i>E. Coli</i> , Total Oil and Grease, BOD, dissolved oxygen
Rationale:	Water Licence Compliance Monitoring during construction and operations.				
Status:	02-17: Inactive 02-17b: Active				

SNP station 02-18:

Description:	<p>Monitoring stations in the main basin of Snap Lake that are used to calculate a whole lake average concentration of Total Dissolved Solids. ⁶ The ten (10) stations that make up Surveillance Network Program station 02-18 include:</p> <ul style="list-style-type: none"> • 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, • five (5) additional AEMP stations located throughout the main basin of Snap Lake (SNAP03, SNAP05, SNAP06, SNAP09, SNAP11A). <p>The method for calculating the whole lake average concentrations of TDS is described in Section D, item 2 of Annex A of this Licence (below).</p>	
Location:	See attached map	
Sampling Frequency:	Two samples during the ice-free period (late summer and prior to ice-up)	Sample during the period of ice cover (immediately prior to ice out)
Sampling Parameters:	<p>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 calculated¹⁰), chloride, calcium, nitrate</p>	<p>At one (1) metre intervals from surface to one (1) metre above bottom: measurements of temperature, dissolved oxygen, pH, and conductivity, TDS (measured and calculated¹⁰), chloride, calcium, nitrate</p>
Rationale:	During operations, to establish the whole lake average concentrations of TDS in the main basin of Snap Lake.	
Status:	<p>Active: 02-20d, 02-20e, 02-20f Inactive: 02-20g</p>	

SNP station 02-19:

Description:	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).		
Location:	More than one location: 02-19: N 7052940, E 0506330; 02-19b: N 7052736, E 0506112		
Sampling Frequency:	Monthly	Every six (6) days	Annually
Sampling Parameters:	pH, BOD, oil and grease, Faecal Coliforms, TSS	Biological oxygen demand (BOD), Nutrients ² , Total Oil and Grease, TSS, <i>E. Coli</i> , Faecal Coliforms	CCMS scan ³ (total and dissolved), total mercury, total arsenic
Rationale:	Previously a Water Licence compliance monitoring point under MV2001L2-0004.		
Status:	Inactive		

SNP station 02-20:

Description:	In Snap Lake, 3 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 02-20d, e, and f).			
Location:	More than one location: 02-20d: N 7052845, E 0507411; 02-20e: N 7052607, E 0507158; 02-20f: N 7052949, E 0507316; 02-20g: N 7053089, E 0507501			
Sampling Frequency:	Monthly (during safe ice conditions and during open water)	Once annually during ice-free period and once annually during ice-cover	Surficial sediment sample once annually.	Once yearly ⁹
Sampling Parameters:	<p>At the depth of maximum conductivity: measurements of temperature, dissolved oxygen, pH, and conductivity</p> <p>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 scan³ (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX⁴, <i>E. Coli</i>, total oil and grease</p> <p>If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.</p>	At depth of maximum conductivity (or mid-depth if no conductivity peak is observed) for chronic toxicity tests ⁷	Total metals (strong acid digestion), total organic carbon	<p>An early life stage (egg) toxicity test with the rainbow trout <i>Oncorhynchus mykiss</i>. The test shall be run with 100% effluent only and no dilutions.</p> <p>A 7-day test of Larval Growth and Survival Using Fathead Minnows (<i>Pimephales promelas</i>).</p>
Rationale:	Snap Lake Operational Monitoring; to evaluate whether Water Quality Objectives are being met at the edge of the mixing zone.			
Status:	Active: SNP 02-20d, 02-20e, 02-20f Inactive: SNP 02-20g ⁸			

SNP station 02-21:

Description:	Outlet from Snap Lake flowing into the Lockhart River System
Location:	N 7053958, E 0511872
Sampling Frequency:	Once per year (ie September)
Sampling Parameters:	Turbidity, TSS, TDS (calculated ¹⁰), pH, conductivity, CCMS scan ³ (total and dissolved), total mercury, total arsenic, nutrients ² , major ions ¹
Rationale:	Snap Lake Operational Monitoring; during construction and operations.
Status:	Active

SNP station 02-22:

Description:	Diffuser construction
Location:	n/a
Sampling Frequency:	Quarterly
Sampling Parameters:	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)
Rationale:	Fisheries Authorization Monitoring; during construction for the diffuser and effluent pipeline in Snap Lake
Status:	Inactive

SNP station 02-23:

Description:	Water intake construction
Location:	n/a
Sampling Frequency:	Quarterly
Sampling Parameters:	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)
Rationale:	Fisheries Authorization Monitoring; during construction for the water intake link in Snap Lake
Status:	Inactive

SNP station 02-24:

Description:	Snap Lake sites in close proximity to fisheries compensation works. Corresponds to AEMP stations SNAP05 (artificial reef area), and SNAP29 (Water intake).
Location:	More than one location: SNAP05: N 7052958, E 0508376; SNAP29: N 7053378, E 0506563
Sampling Frequency:	Samples taken at 1 metre depth intervals for April/May, July, August, and September.
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 (SO₄²⁻), Sodium (Na), Potassium (K), Total Dissolved Solids (TDS).

² Nutrients shall include the following parameters: Ammonia (NH₃), Nitrite (NO₃-N), Nitrate (NO₂-N), Total Kjeldahl Nitrogen (TKN), total Phosphorus (P), dissolved Phosphorous (P), Orthophosphate (PO₄³⁻), Total Organic Carbon (TOC)

³ Collision Cell Inductively Coupled Plasma Mass Spectrometry (CCMS) 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 *Oncorhynchus 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 IRM/14); (c) Chronic toxicity to the cladoceran crustacean *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.

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).

¹⁰Total 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)*:

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

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 (ie., 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) Spot measurements of flow made during sampling at uncontrolled runoff sites (Surveillance Network Program stations 02-04 through 02-10);
 - f) The daily volume of water discharged from the sewage treatment plant to the main outfall (Surveillance Network Program station 02-16);

- g) 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 water level in Snap Lake; 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:
- 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 ten (10) 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 1: SNP stations (1 of 3)

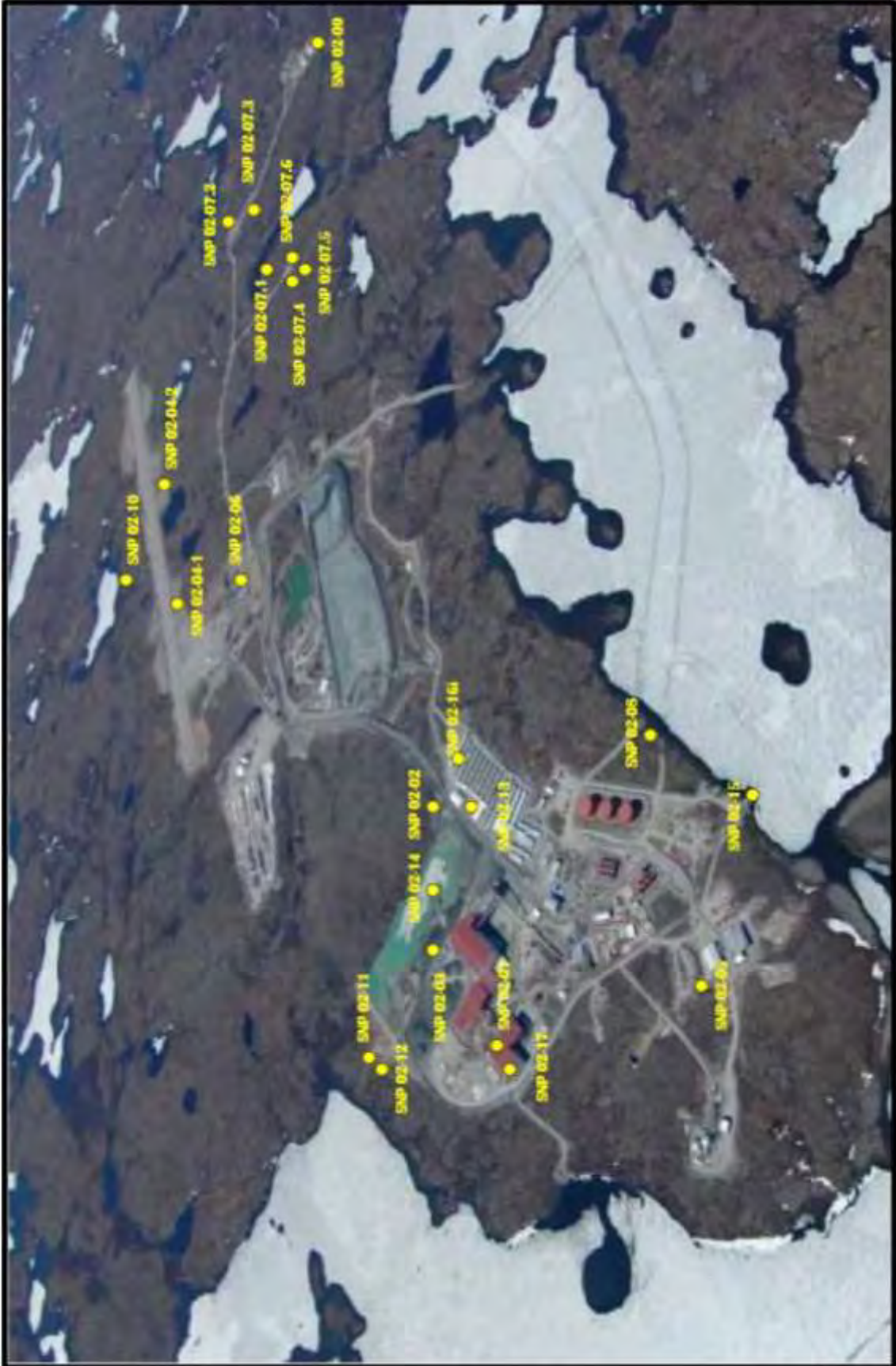
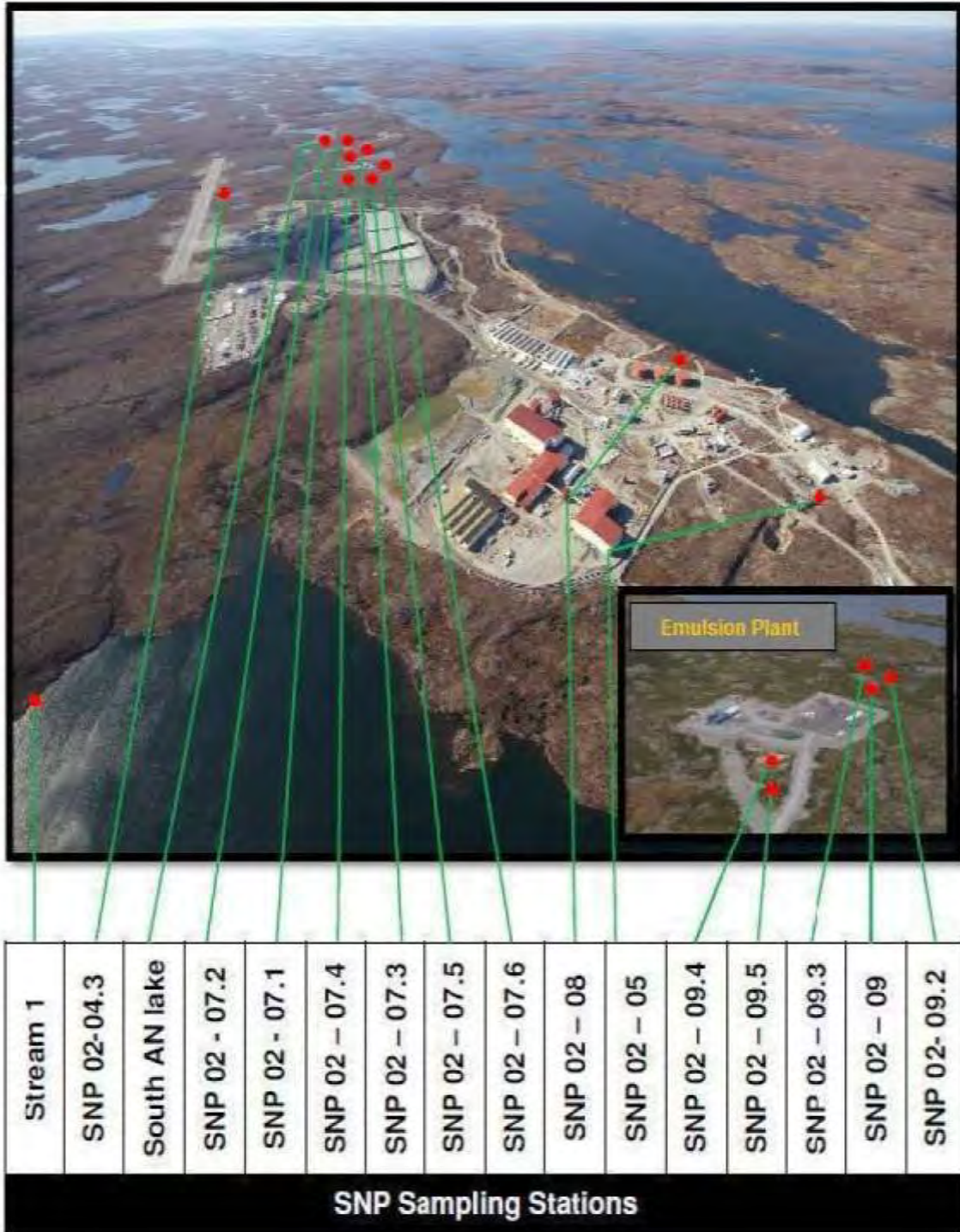


Figure 2: SNP Station (2 of 3)



Annex B – Table of Items Requiring Submission

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

Part of WL	Item	Date
B	Water Use Fee	- Annually, prior to Licence anniversary date
B	Annual Water Licence Report	- Annually, on each March 31
B	Engagement Plan	- Within 4 months of issuance of the amendments associated with the December 2013 Amendment Application - Annual review - As directed by the Board
C	Security Deposit	- Prior to placement of Processed Kimberlite in West Cell of North Pile
C	Revised Mine Reclamation Liability Estimate	- Upon request of the Board
C	Revised Mine Reclamation Liability Amount	- 90 days following notice of revision
D	Update the schedule for Construction and mine development	- Upon request of the Board
D	Final Detailed Design Report	- 90 days prior to Construction
D	Notifications to Board and an Inspector prior to Construction	- 30 days prior to Construction - 48 hours prior to Construction
D	Geotechnical Engineering Report	- 90 days following Construction
E	Waste Management Plan	- January 31, 2014 - Annual review - As directed by the Board
E	Field Inspection Report	- Report and implementation plan to be submitted 60 days from date of each inspection
E	Geotechnical and Geochemical Inspection Report	- Include with the Annual Water Licence Report, on each March 31
E	Notification to an Inspector of Annual Inspection	- 2 weeks prior to Annual Inspection
E	North Pile Management Plan	- 90 days prior to construction - Annual review - As directed by the Board
E	Risk Assessment – North Pile	- September 15, 2012
E	Acid Rock Drainage and Geochemical Characterization Plan	- January 31, 2013 - Annual review - As directed by the Board
E	Seepage Surveys	- Include results with the Annual Water Licence Report, on each March 31
F	Water Management Plan	- October 1, 2013 - Annual review - As directed by the Board
F	Plume Characterization Study	- January 31, 2013

F	Strontium Response Plan	- July 31, 2016 - As directed by the Board
F	Nitrogen Response Plan	- July 31, 2016 - As directed by the Board
F	Total Dissolved Solids Mitigation and Implementation Plan	- July 31, 2016 - Annual review - As directed by the Board
F	Total Dissolved Solids Mitigation and Implementation Report	- October 30, 2015 - Every 3 months thereafter or as otherwise directed by the Board
G	AEMP Design Plan	- November 1, 2015 - November 1, 2017 - Every 4 years thereafter
G	Aquatic Effects Re-evaluation Report	- November 1, 2017 - Every 4 years thereafter
G	AEMP Annual Report	- Annually, by each May 1
G	AEMP Response Plan	- Notification within 30 days from the time the Action Level exceedance is detected - Within 3 months of notification
G	Downstream Watercourses Special Study Plan	- June 3, 2015
G	Downstream Watercourses Special Study Report	- 90 days following completion of Special Study
H	Spill Contingency Plan	- Annual review - As directed by the Board
H	Emergency Response Plan	- Annual review - As directed by the Board
H	Detailed Spill and Unauthorized Discharge Report	- Within 30 days of each spill and Unauthorized Discharge
I	Interim Closure And Reclamation Plan	- Every 3 years following approval - As directed by the Board
I	Annual Closure and Reclamation Plan Progress Report	- Annually, by each April 30
I	Final Closure And Reclamation Plan	- 24 months prior to the end of operations - Upon request of the Board
J	Written notifications to Board and an Inspector for Modifications	- 60 days prior to carrying out Modification
J	Modification As-built Report	- 90 days following completion of Modification
SNP	Quality Assurance/Quality Control Plan	- 60 days prior to the collection of SNP samples - Annual Review - As directed by the Board
SNP	Surveillance Network Program Report	- Monthly
SNP	Meteorological Data	- Submit for approval
SNP	Chloride: TDS relationship	- Within 2 months of issuance - Update as requested by the Board or Inspector - Weekly reports upon request

Annex C – Table of Revision History

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

Date	Location of change	Description of change
July 17, 2014	Annex A: Surveillance Network Program Surveillance Network Program station 02-20	<u>SNP station 02-20 Early Life Stage Test (ELS):</u> 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.
December 16, 2014	Body of Licence: Part F, item 9a	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.
March 30, 2015	Body of Licence: Amendments associated with November 2014 Amendment Application and Environmental Assessment EA1314-02	<ul style="list-style-type: none"> - 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.
Signed by Minister on September 10, 2015 and Confirmation sent to De Beers on September 16, 2015 (Board meeting June 8, 2015)	Amendments associated with December 2013 Amendment Application and Environmental Assessment EA1314-02	<ul style="list-style-type: none"> - 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.
November 19, 2015	SNP 02-17B	- Daily In house chloride reading changed to Daily In-Line Conductivity reading
February 18, 2016	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.	- Updated compliance dates based on request due to suspension of operations.

June 22, 2016	SNP updates to reflect Extended Care and Maintenance submission April 20, 2016.	- 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
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* The condition numbers referred to in previous revisions of the Licence may have changed with updates made to subsequent Licences.



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YELLOWKNIFE NT X1A 2P6
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Reasons for Decision

Issued pursuant to section 72.25 of the *Mackenzie Valley Resource Management Act*

Water Licence Application	
Preliminary Screener	MVLWB
Reference/File Number	MV2011L2-0004
Applicant	De Beers Canada Inc. – Snap Lake Mine
Submission/Project	Extended Care and Maintenance Plan – Surveillance Network Program

Decision from Mackenzie Valley Land and Water Board Meeting of

June 22, 2016

Background

Extended Care and Maintenance Plan

On April 20, 2016, De Beers submitted an Extended Care and Maintenance Plan, for Board approval. This was made in accordance with Section 7 of the Interim Closure and Reclamation Plan (Version 3.2) which is required as part of Part I, item 1 of Water Licence (Licence) MV2011L2-0004. This Plan proposes the flooding of the mine workings and suspension of associated dewatering operations in order to minimize environmental impacts and reduce costs, with the goal of future re-opening. This also included updates to the Surveillance Network Program (SNP).

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

Meetings

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

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

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

Pubic Review

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

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

De Beers responded on June 2, 2016.

Security

The GNWT currently holds \$39,066,247.00 in reclamation security for the Snap Lake Mine for this Licence.

Decision

After reviewing the submissions of the Applicant, the written comments received by the Board and the Staff Report prepared for the Board, the Board, having due regard to the facts and circumstances, the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and Regulations made thereunder, has decided to approve the Surveillance Network Program updates for the Extended Care and Maintenance phase for Water Licence (Licence) MV2011L2-0004.

SIGNATURE

Mackenzie Valley Land and Water Board



Floyd Adlem
MVLWB A/Chair

June 22, 2016

Date