



November and December  
2019

Environmental Update  
for SLEMA Board

January 10, 2020

# Outline

1. Mine Update
2. SNP Reports
3. Inspection Reports
4. Update of the Water Licence and Land Use Permit Review Process for Snap Lake Mine Closure
5. Environmental Agreement Update
6. SLEMA's Activities



# Acronyms

- ❑ AEMP – Aquatic Effects Monitoring Program
- ❑ ARD – Acid Rock Drainage
- ❑ DFO – Fisheries and Oceans Canada
- ❑ ECCC – Environment and Climate Change Canada
- ❑ ECM – Extended Care and Maintenance
- ❑ ENR – Department of Environment and Natural Resources, GNWT
- ❑ EQC – Effluent Quality Criterion
- ❑ GNWT – Government of the Northwest Territories
- ❑ MVEIRB – Mackenzie Valley Environmental Impact Review Board
- ❑ MVLWB – Mackenzie Valley Land and Water Board
- ❑ PK – Processed Kimberlite
- ❑ SLEMA – Snap Lake Environmental Monitoring Agency
- ❑ SNP – Surveillance Network Program
- ❑ SSWQO – Site-Specific Water Quality Objective
- ❑ TDS – Total Dissolved Solids
- ❑ WEMP – Wildlife Effects Monitoring Program
- ❑ WTP – Water Treatment Plant
- ❑ WMP – Water Management Pond



# 1. Mine Update

- ❑ The Snap Lake Mine is currently in its fourth year of Extended Care and Maintenance (ECM);
- ❑ The mine is currently under zero occupancy period and all personnel left the site on September 5th, 2019;
- ❑ Remote data collection and monitoring is set up to be carried out during the winter months for the 2019-2020 season;





## 2. SNP Reports

Monitoring of Snap Lake Mine during zero occupancy includes the following:

- Visual fuel tank inspections;
- North Pile, ditch and perimeter sump visual inspection;
- Building visual inspection;



## 2. SNP Reports

Regulatory monitoring of Snap Lake Mine during zero occupancy includes the following:

- North Pile thermistor and piezometer monitoring;
- Meteorological data downloads;
- Dam and Water Management Pond visual monitoring;
- North Pile ditch and sump visual monitoring;
- Wildlife surveillance.



## 3. Nov. & Dec.2019 GNWT Inspection

No inspection report was received during this period.



## 4. Snap Lake Mine Closure: Water Licence and Land Use Permit Review Process Update

- On November 26 & 27, 2019 a Public Hearing associated to De Beers submission of Snap Lake Water Licence and LUP Amendment – Renewal was held in Yellowknife;
- Public Hearing Interveners: Environment and Climate Change Canada (ECCC) and Government of North West Territories (GMWT)



## 5. Snap Lake Mine Closure: WL and LUP Review Process Update

□ Summary of ECCC Hearing Presentation:  
ECC deemed the following topics as unresolved:

- Water quality monitoring in mixing zones;
- Effluent quality criteria during closure;
- Nitrate effluent quality criteria



## 5. Snap Lake Mine Closure: WL and LUP Review Process Update

❑ ECC Recommended:

### AEMP Post Closure – Sampling Frequency

- De Beers provide criteria to demonstrate that a reduction in sampling frequency can be warranted;
- De Beers consider reducing water quality monitoring frequency based on results using a tiered approach



## 5. Snap Lake Mine Closure: WL and LUP Review Process Update

- ECC Final Recommended on AEMP
  - The MVLWB consider the AEMP to be reviewed following licence approval and once the final configuration of the mine is confirmed



# 5. Snap Lake Mine Closure: WL and LUP Review Process Update

## ■ Summary of ECC Final Recommendations Effluent Quality Criteria (EQC)

- the Proponent should maintain two separate lists of regulated parameters associated with the closure and the post-closure phase; and
- include all parameters under the existing licence on the EQC list for the closure phase





## 5. Snap Lake Mine Closure: WL and LUP Review Process Update

- ECC Recommended on Nitrate Effluent Quality Criteria
- the proponent consider treatment options for nitrate during closure, as necessary, to comply with the pollution preventions provisions of the Fisheries Act.



# 5. Snap Lake Mine Closure: WL and LUP Review Process Update

## ❓ NWT Recommendations:

### Final Closure & Reclamation Plan (FCRP)

- the FCRP be resubmitted for approval post-issuance of the water licence;
- the Water Licence should identify components of the FCRP;
- De Beers submission of closure cover field trials results proposed to be submitted 90 days prior to construction may result in a lower standard of closure;



# 5. Snap Lake Mine Closure: WL and LUP Review Process Update

## ■ NWT Recommendations:

### Final Closure & Reclamation Plan (FCRP)

- the MVLWB require all closure criteria and response frameworks be submitted as part of the FCRP with enough time for public review and approval;
- the MVLWB require submission of outstanding items such as: Final Landform Plan; Toxicity Testing Design Plan for the WMP; and WMP Reclamation Plan



# 5. Snap Lake Mine Closure: WL and LUP Review Process Update

## ❓ NWT Recommendations:

### Closure Criteria

- NWT expressed concern that there is not a clear link between the proposed closure criteria the closure activities and the closure objective and their subsequent relation to design and monitoring plans;



# 5. Snap Lake Mine Closure: WL and LUP Review Process Update

## ❑ NWT Recommended on Closure Criteria

- Conditions in the water licence and schedules ensure that the links to closure objectives and closure criteria are incorporated into the various phases of closure documents;



## 5. Snap Lake Mine Closure: WL and LUP Review Process Update

### ? NWT on Physical Stability Criteria:

GNWT noted that “*acceptable results of visual monitoring...*” has been included by De Beers as measurable criteria for physical stability;

- GNWT recommends that measurable Closure Criteria for Physical Stability must be included in the FCRP and in the monitoring programs to assess conditions against this criteria



## 5. Snap Lake Mine Closure: WL and LUP Update

- NWT Recommendation on Physical Stability Criteria
- for the Post-Closure Phase the inclusion of a condition in the Water Licence requiring the implementation of a site-wide physical stability monitoring plan with a response framework for each mine component;
- the water licence require the FCRP include closure criteria that will be used to assess whether the closure objectives have been met



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- NWT Recommendations on Effluent Discharge Locations
- De Beers initially proposed one mixing zone during Closure and two during Post-Closure;
- At the Technical Workshop, De Beers requested the ability to discharge from three different locations concurrently before the gravity fed collection system is in place (both ISPs and the WMP).





# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## NWT Recommended on Effluent Discharge

MVLWB regulate the deposit of waste in accordance to the **Water and Effluent Quality Management Policy (MVLWB, 2011)**.

*The deposit of waste is to be regulated such that the amount of waste deposited to the receiving environment is minimized*



# Snap Lake Mine Closure Water Licence and Land Use Permit Review Process Update

- ❑ NWT Recommended on Effluent Discharge
- **The MVLWB consider the cumulative effects of multiple effluent discharge points to Snap Lake prior to approving multiple point source discharges, including the pumping of site water to the underground**



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## □ NWT on Mixing Zone Area Size

- During operations a 200 m mixing zone was established based on operational discharge volumes;
- De Beers proposes to maintain the existing 200 m mixing zone for Closure and Post-Closure;
- The GNWT notes that mixing zone size should be reduced based on lower discharge volumes during Closure and Post-Closure relative to Operations



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## □ NWT on Mixing Zone Area Size

- Given the finite amount of nitrate in the North Pile, attenuation with time, and that the model likely over-predicted concentrations the GNWT does not support the establishment of a 200 m mixing zone Post-Closure.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- ❑ NWT recommended on Mixing Zone Area Size
- The MVLWB not approve the proposed mixing zone;
- The exact mixing zone dimensions for each effluent discharge location should be determined and included in the SNP after plume delineation studies have been completed;



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### ❓ NWT on North Pile Runoff Model Input

*The North Pile runoff input has important implications on the water quality predictions, and subsequent screening for POPCs and EQC*

- Concerns for the predicted quality of North Pile runoff input are related to the model assumptions on the quality of NP inflows



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- ❑ NWT Recommended on North Pile Runoff Model Input
- **The Snap Lake Water Quality Model for Post Closure be updated to include**
  - 1) Thermal monitoring assessments;**
  - 2) A sensitivity analysis for different scenarios for the SNP 2-2 Water Chemistry;**
  - 3) A North Pile runoff model input based on the most representative data available, with the least amount of dilution**



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### □ NWT on Toxicity Modifying Factors

- De Beers proposes to use hardness-dependent AEMP benchmarks, and thus EQC based on anthropogenically increased hardness
- **The GNWT recommends that AEMP benchmarks should be recalculated, for parameters where toxicity is affected by hardness, using ambient hardness concentrations from the beginning of Closure (prior to effluent discharge).**





# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## NWT Recommend on Toxicity Modifying Factors

- the screening process for parameters of potential concern and development of updated EQC be revised based on the updated AEMP benchmarks.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT on the Selection of Parameters Of Potential Concern – POPC (listed in the EQC)

**GNWT does not support the methodology of selection of the POPC, because:**

- The rationale included no wetlands while reducing the level of conservatism;



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## □ GNWT on the Selection of POPC

### **GNWT recommends that:**

- The MVLWB retain TPH as a regulated parameter until remediation is completed at site.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- ❑ GNWT on the DB Proposed Effluent Quality Criteria (EQC)
- DB proposes to reduce the number of parameters with EQC during Closure from 18 in the current WL to four (nitrate, TSS, pH and fecal coliforms);
- The proposed Post-Closure nitrate MAC increased from 25 mg/L to 60 mg/L and MGC increased from 50 mg/L to 80 mg/L;
- The GNWT does not support EQC for Closure and Post-Closure that are higher than during Operation;



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## ❓ GNWT on the DB Proposed EQC

The GNWT is concerned

- That the proposed benchmarks do not meet Measure 1 of the Report of EA;
- Without additional EQC, elevated concentrations of unregulated parameters may not be detected until action levels are triggered in the AEMP



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- ❑ GNWT Recommends on the DB Proposed EQC
  - The existing EQC remain in the Closure and Post-Closure licence on an interim basis until such a time as De Beers has updated models, and AEMP benchmarks, and revised the proposed EQC;
  - The MVLWB set numerical SSWQOs for TDS and constituent ions of concern for Closure and Post-Closure to ensure compliance with Measure 1 of the Report of EA



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Comments on Surface Water & Biological Monitoring

- DB proposes to remove several SNP stations during Closure and Post-Closure;
- In 2018, several SNP stations exceeded existing EQC
- The GNWT concludes that DB has not provided sufficient rationale for eliminating sites from the monitoring program.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommends on Surface Water & Biological Monitoring

- That all existing SNP stations be retained in the new water licence until sufficient evidence is provided to demonstrate whether or not high concentrations measured at the current SNP locations are indicative of a continuing trend during active closure





## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommends on Surface Water & Biological Monitoring

- That the water licence include a condition that should De Beers wish to remove a station from the SNP, a report be submitted to the MVLWB for approval that includes potential trends in metal leaching for each of the SNP sites that are proposed to be eliminated, and any previous exceedances at each station.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Comments on Uncontrolled Runoff Monitoring Stations

- De Beers discusses sediment release from uncontrolled runoff during Closure and Post-Closure but did not include runoff stations in the proposed SNP;
- The concern is that sediment release events could occur from uncontrolled runoff if stations are not established prior to site regrading;



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommends on Uncontrolled Runoff Monitoring Stations

- That Sediment and Erosion Control Plans be required for remediation activities that will occur within 150 m from Snap Lake;
- That the MVLWB require that SNP stations be determined prior to commencement of regrading at site within 100 m of Snap Lake during the Closure period



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## ❓ GNWT Recommends on Monitoring Frequency

- That the monitoring frequencies for all SNP stations that may discharge to the receiving environment be sampled every two weeks during the Closure period in order to be able to adequately assess compliance with the maximum average concentration EQCs.
- For the Post Closure period, the frequency and locations be evaluated following completion of active closure of the Mine Site



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## GNWT Recommended on AEMP

- **De Beers continue the SNP and AEMP water quality monitoring until such time that De Beers has demonstrated that closure conditions are stable and closure criteria have been consistently met**



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## ❑ GNWT Recommended on North Pile Thermal Regime

- The water licence require that the Performance Assessment Report for the North Pile include a comprehensive description on the thermal regime in the North Pile that includes predicted changes to the active layer;
- The associated monitoring program be developed with the Performance Assessment Report requirements in mind.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

- GNWT Recommended on North Pile Cover Source
- A condition in the water licence requiring that all construction material, including material to be used for the North Pile cover, be non-PAG and free of contaminants;
- Geochemical testing results be provided to the MVLWB for approval prior to using the material for remediation



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommended on Potentially Acid Generating Material

- ARD and Geochemical Characterization Plan remain as a condition in the water licence during Closure;
- De Beers submit a geochemical characterization / sampling plan for review and approval





# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## ❑ GNWT Recommended on Seepage Surveys

- Seepage surveys be retained as part of a Seepage Monitoring Program throughout the Closure period, as a condition in the Water Licence;
- Seepage Monitoring Program conducted during the closure period will determine how long, if at all, the monitoring should continue into the Post-Closure period



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommended on Financial Security and Monitoring Programs

- Financial Security Estimate be updated by De Beers based on the final SNP and AEMP, following the MVLWB's final approval of the FCRP.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommended on Revised Security Estimate

- The amount of security required for the Snap Lake mine totals \$87,520,940.00 which is split between
  - land related liability of \$39,712,564.00 and
  - water related liability of \$47,808,376.00



# 5. Snap Lake Mine Closure: WL & LUP Review Process Update

## GNWT Recommended on Phasing of Security

- Security amounts to be returned to De Beers be evaluated at the time of the request for a security adjustment;
- Pre-determined phasing of security returns should not be approved.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommended on Environmental Agreement Security

- Costs associated with Environmental Agreement Security remain until the EA is officially amended;
- Once amended, the GNWT is committed to reviewing these items to ensure their accuracy.



## 5. Snap Lake Mine Closure: WL & LUP Review Process Update

### GNWT Recommended on Interim Care & Maintenance Status

- ICM be maintained at two years, and not reduced to one as proposed by De Beers.



## 5. MVLWB's WL & LUP Review Process for Snap Lake Mine Closure Update

### Summary of DeBeers Presentation at the Public Hearing

- Final Closure and Reclamation Plan based on MVLWB Guidelines (MVLWB, 2013);
- Water management is limited to surface water ~ 2% of the water volumes managed during operations
- Constructed wetlands are not required to meet AEMP benchmarks



## 5. Update of Regulatory Process for Snap Lake WL Amendment – Renewal and LUP Amendment

- Next steps of the Review Process:
  - Stakeholders (ECCC, GNWT and SLEMA) working on the proposed WL & LUP drafts, deadline Jan 30;
  - DeBeers response to reviewers' comments on WL & LUP drafts due on Feb 7;
  - Closing arguments from interveners due on Feb 14





## 5. Update of Regulatory Process for Snap Lake WL Amendment – Renewal and LUP Amendment

- Next steps of the Review Process:
  - Closing arguments from Proponent due on Feb 21;
  - Board Decision on Application due Mid March;
  - WL send to the GNWT Minister for review End March;
  - Final decision from the Minister up to 90 days (current WL expires on June 13, 2020)



## 6. ENVIRONMENTAL AGREEMENT UPDATE

- On Dec 3, 2019 ENR – GNWT sent correspondence to stakeholders informing that it has found satisfactory the 2018 De Beers Environmental Agreement Report



## 7. SLEMA UPDATE

- ❑ SLEMA Participation on the Regulatory Process for De Beers WL amendment – Renewal and LUP amendment:
- ❑ SLEMA E.D. and Tech Advisor attended the Snap Lake Public Hearing on November 26 & 27



# 7. SLEMA Update

- ❑ SLEMA budget of \$321,079 for 2020-2021 submitted to De Beers

Budget includes:

- 1.5 Person-Year (ED part-time, EA full-time)
- One Board Meeting (Regular Members)
- One AGM (Regular & Alternate Members)
- One site visit & TK events (Elders only)
- Executive meetings as needed

