



# Dec. 2018 and Jan. 2019 Environmental Update for SLEMA Board

January 30, 2019

# Outline

1. Mine Update
2. Reports
3. Regulators' Update
4. Aboriginal Update
5. Stakeholders' Update
6. Agency's Activities
7. Case Study: the Polaris Mine



# 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
- INAC – Indigenous and Northern Affairs Canada (formerly Aboriginal Affairs and Northern Development Canada [AANDC])
- 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 remains in suspended operations (Extended Care and Maintenance) and Zero Occupancy period;
- The “Zero occupancy” period started in October 2018 and is scheduled to extend until March 2019;
- 0 m<sup>3</sup> of water withdrawn from Snap Lake



## Slide 4

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**pdp1**

to check ECM starting date

philippe di pizzo, 2018-11-28

# 1. Mine Update

- Zero occupancy started on September 29 and continues to present day;
- No water use or wastewater discharge at site was reported;
- No water sampling reported;



# 1. Mine Update

- No treated water was discharged into Snap Lake
- No spill reported
- Monitoring performed as per approved Surveillance Network Program (SNP) for Care and Maintenance



## Slide 6

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**pdp1**

to check ECM starting date

philippe di pizzo, 2018-11-28

## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct.-Nov. and Nov.-Dec./2018

- Oct. – Nov SNP Report submitted on November 30, 2018;
- Nov. – Dec SNP Report submitted on December 31, 2018.



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct.-Nov. & Nov.-Dec./2018

Monitoring at Snap Lake Mine included the following:

- Fuel tank inspections;
- Monthly North Pile, ditch and perimeter sump monitoring;



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018

- North Pole Thermistor and Piezometer monitoring;
- Dams and Water Management Pond monitoring;
- Main camp building Inspection;
- Meteorological data downloads;



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018

The following remote monitoring has been conducted in November and December for the North Pole Facility and Water Management Pond Dams\*:

- The perimeter sumps, WMP and 12M L tank farm were monitored continuously through remote monitoring cameras;
- Weekly photos were provided to the Inspector and are included in the SNP report;

\*  
Golder, 2018



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018

- A contingency plan to allow de-icing to lower the sump or WMP water levels based on inspection is in place;
- Remote monitoring of the East Cell instrumentation and site specific weather data is ongoing.



## 2. Reports

- 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018
- Issues with the remote monitoring cameras
  - On Nov 2, 2018 ice/snow formed on the cameras monitoring PS3 and PS4;
  - A response crew was mobilized to site to remove the ice and increase the warm up time;
  - Photos showed significant improvement at PS3 and minor improvement at PS4.



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018

- On November 27th, 2018 ice/snow formed on all of the camera lenses.
- Mitigation measures were investigated and mobilization to Snap Lake mine was scheduled for December 7, 2018 and completed on December 10, 2018 due to weather issues.



## 2. Reports

- 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018
- The December 19 mobilization to the Mine for Monthly Campaign and manual frost/snow removal from cameras was cancelled and rescheduled for Jan 3



## 2. Reports

### ➤ 2.1 De Beers SNP Report - Oct. - Nov. & Nov. - Dec./ 2018

- De Beers staff mobilized to site on the following dates
- October 19, 2018;
- November 14 & 23, 2018;
- December 10, 2018.

Visits were aimed to perform visual inspection to water control structures and manual maintenance (cleaning) of remote cameras monitoring.



## ➤ 2.1 De Beers SNP Report - Oct. & Nov.


Water Control Structure	Photos				
	Week 5 Oct 28-Nov 3, 2018	Week 6 Nov 4-10, 2018	Week 7 Nov 11-17, 2018	Week 8 Nov 18-24, 2018	Week 9 Nov 25-Dec 1, 2018
Perimeter Sump 1					
Perimeter Sump 2					
Perimeter Sump 3					
Perimeter Sump 4					

Fig 1. Site photos taken by remote monitoring cameras for the Oct. – Nov. SNP Report



## ➤ 2.1 De Beers SNP Report - Oct. & Nov.















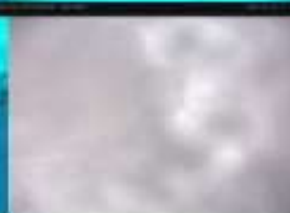
Water Control Structure	Photos				
	Week 5 Oct 28-Nov 3, 2018	Week 6 Nov 4-10, 2018	Week 7 Nov 11-17, 2018	Week 8 Nov 18-24, 2018	Week 9 Nov 26-Dec 1, 2018
Perimeter Sample 5					
Water Management Pond					
Fuel Tank					

Fig 2. Site photos taken by remote monitoring cameras for the Oct. – Nov. SNP Report



## ➤ 2.1 De Beers SNP Report - Nov. – Dec.


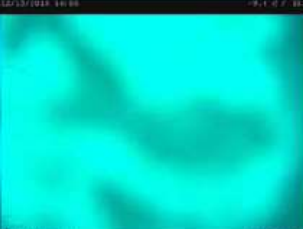





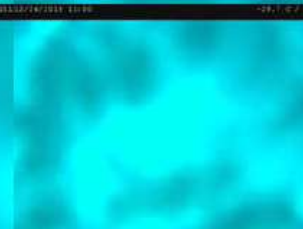
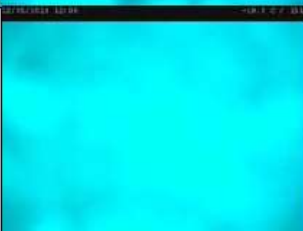







Water Control Structure	Photos			
	Week 10 Dec 2-8, 2018	Week 11 Dec 9-15, 2018	Week 12 Dec 16-22, 2018	Week 13 Dec 23-29, 2018
Perimeter Sump 1				
Perimeter Sump 2				
Perimeter Sump 3				
Perimeter Sump 4				

Fig 3. Site photos taken by remote monitoring cameras from the Nov. – Dec. SNP Report



## ➤ 2.1 De Beers SNP Report – Nov. – Dec.













Water Control Structure	Photos			
	Week 10 Dec 2-8, 2018	Week 11 Dec 9-15, 2018	Week 12 Dec 16-22, 2018	Week 13 Dec 23-29, 2018
Perimeter Sump 5				
Water Management Pond				
Fuel Tank				

Fig 4. Site photos taken by remote monitoring cameras from the Nov. – Dec. SNP Report



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

- Inspector: Tracy Covey
- Inspected Water Licence conditions and practices at site
- No environmental risk was noted during the field inspection



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

- Inspection of Water Supply Facility:  
No environmental concerns reported;  
The potable WTP was inactive and scheduled to remain inactive until the camp reopens;  
All water supply lines / pipelines were reportedly drained/blown out prior deactivation;  
All the chemicals associated with the WTP are stored in the historic WTP, which has concrete floor



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

- Inspection of Waste Disposal Facility:

No environmental concerns reported;

The Water Management Pond elevation remained very low and showed no signs of recent seepage inflow;

Two sumps were noted to have received some seepage inflow since the last inspection (October, 2018)



## ➤ 2.2 November 23, 2018 Inspection Report

### ➤ Remote monitoring and Water Licence(WL) compliance :

- De Beers has been submitting weekly records of remote inspection (images) of the Water Management Pond, sumps, and the 12 million liter tank farm;



## ➤ 2.2 November 23, 2018 Inspection Report

### ➤ Remote monitoring and WL compliance:

- Fogging and icing up of remote camera lenses have caused many losses of images at the sumps;
- Image quality has been poor and intermittent but compliant with the requirement to determine ice level at the sump at least once a month;



## ➤ 2.2 November 23, 2018 Inspection Report

### ➤ Remote monitoring and WL compliance:

The initial monthly submission of Remote Monitoring Reports was attached as an appendix of the SNP Report;

The Report failed to satisfy the directions given on August 16, 2018, shortcomings are:

- *“The Report vaguely reports issues with remote camera, so there is uncertainty when cameras where effective”;*



## ➤ 2.2 November 23, 2018 Inspection Report

- Remote monitoring and WL compliance:
  - The Inspector recommends a detailed discussion for each facility remotely monitored (sump/ WMP/ fuel tank farm, etc.), such as:
  - Outlining when cameras were not capable of taking adequate images;
  - The cause of image quality issues;
  - Number of days per month when cameras didn't achieve effective monitoring objectives;
  - Mitigation measures taken;



## ➤ 2.2 November 23, 2018 Inspection Report

- Remote monitoring and WL compliance:
  - The Inspector recommends:
  - For each remotely monitored facility, a summary on “*how De Beers has met the EOR recommendations and how weekly inspections as per part E 5 were conducted*” should be provided.



## ➤ 2.2 November 23, 2018 Inspection Report

- Remote monitoring and WL compliance:
  - The Inspector notes:
  - *“it does appear that monitoring has been as per requirements established in the Monitoring Response Frameworks for North Pole Facility and Water Management Pond Dams and the EOR letter of June 11, 2018”.*



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

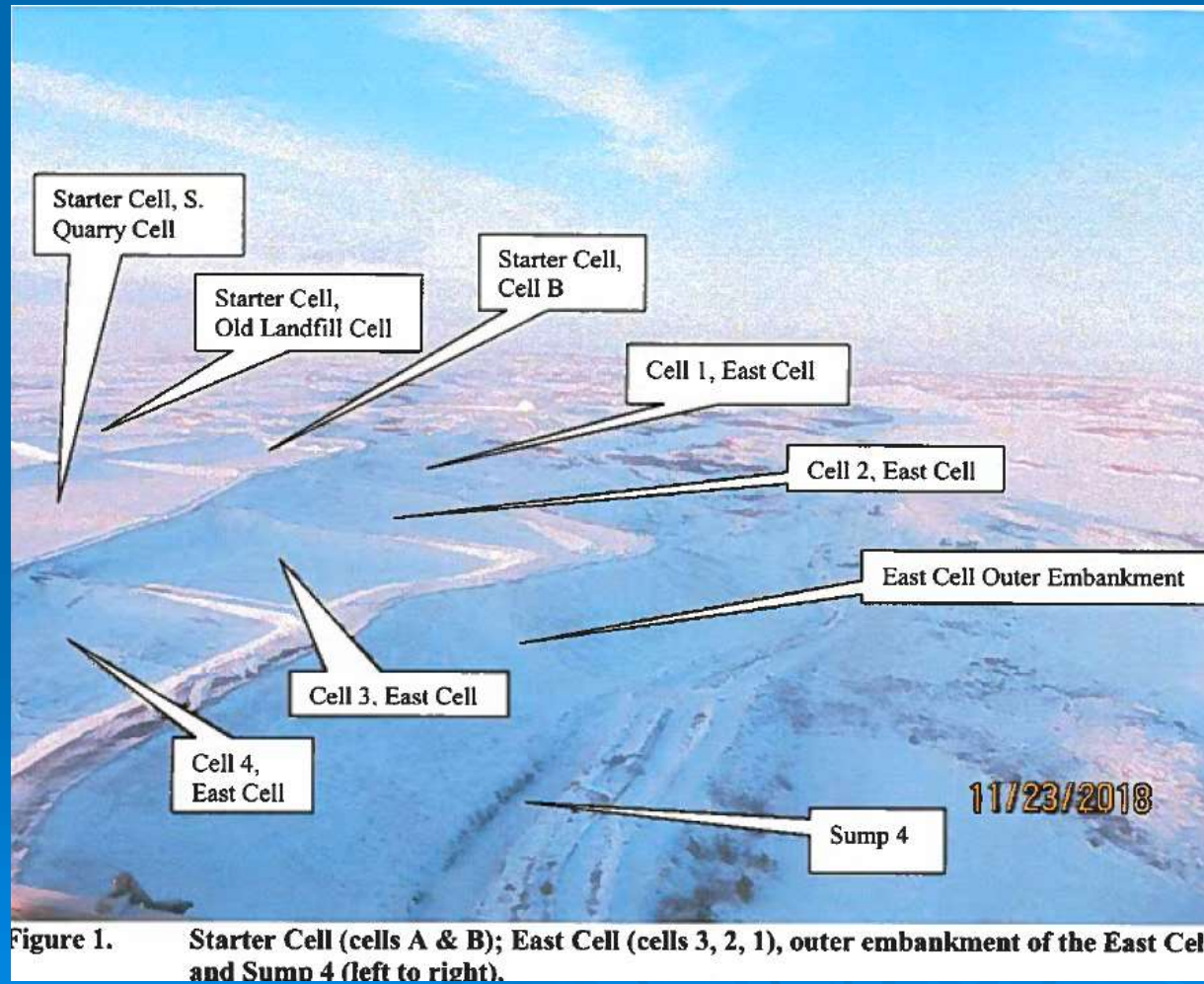


Figure 1. Starter Cell (cells A & B); East Cell (cells 3, 2, 1), outer embankment of the East Cell, and Sump 4 (left to right).



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

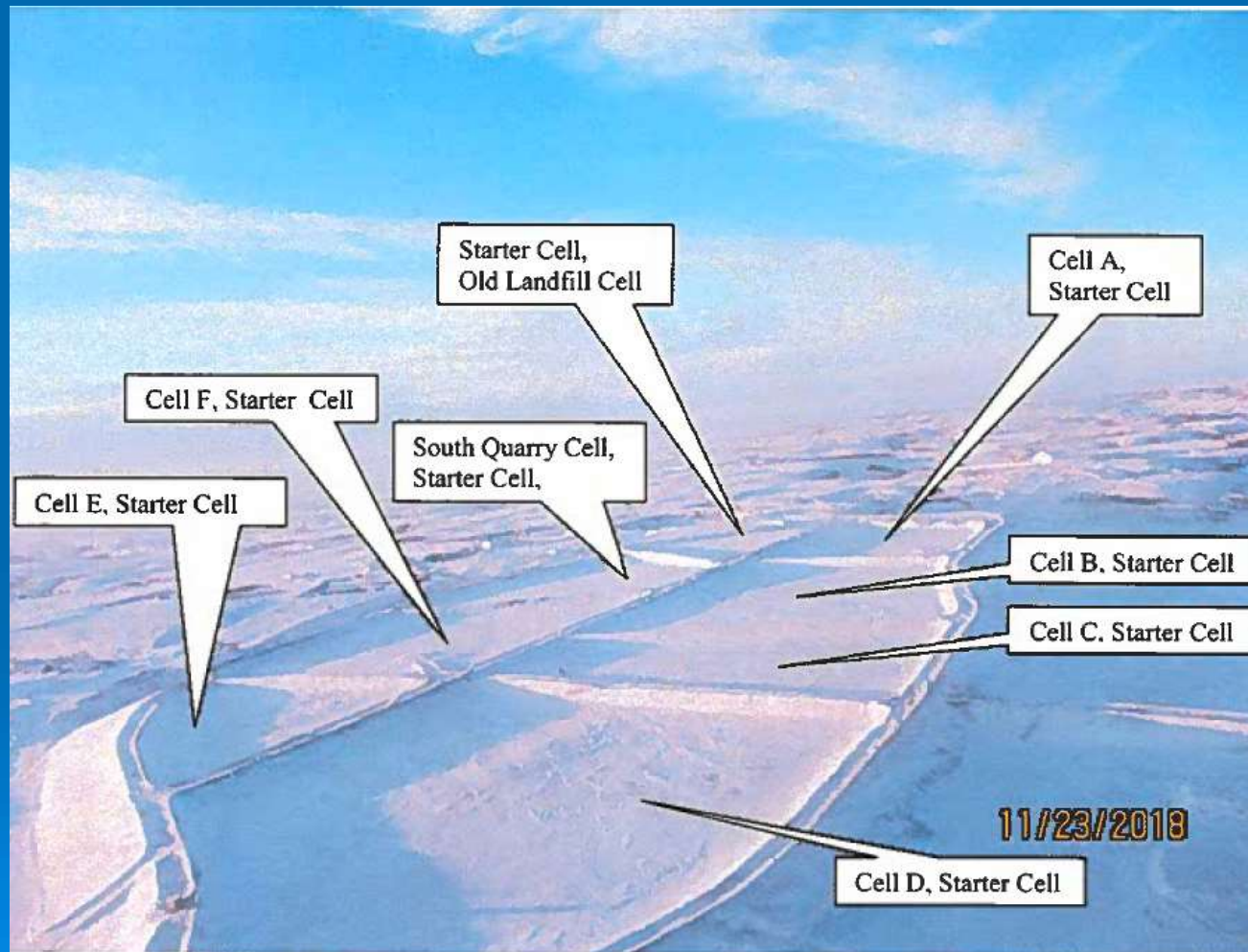


Figure 2. Starter Cell



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

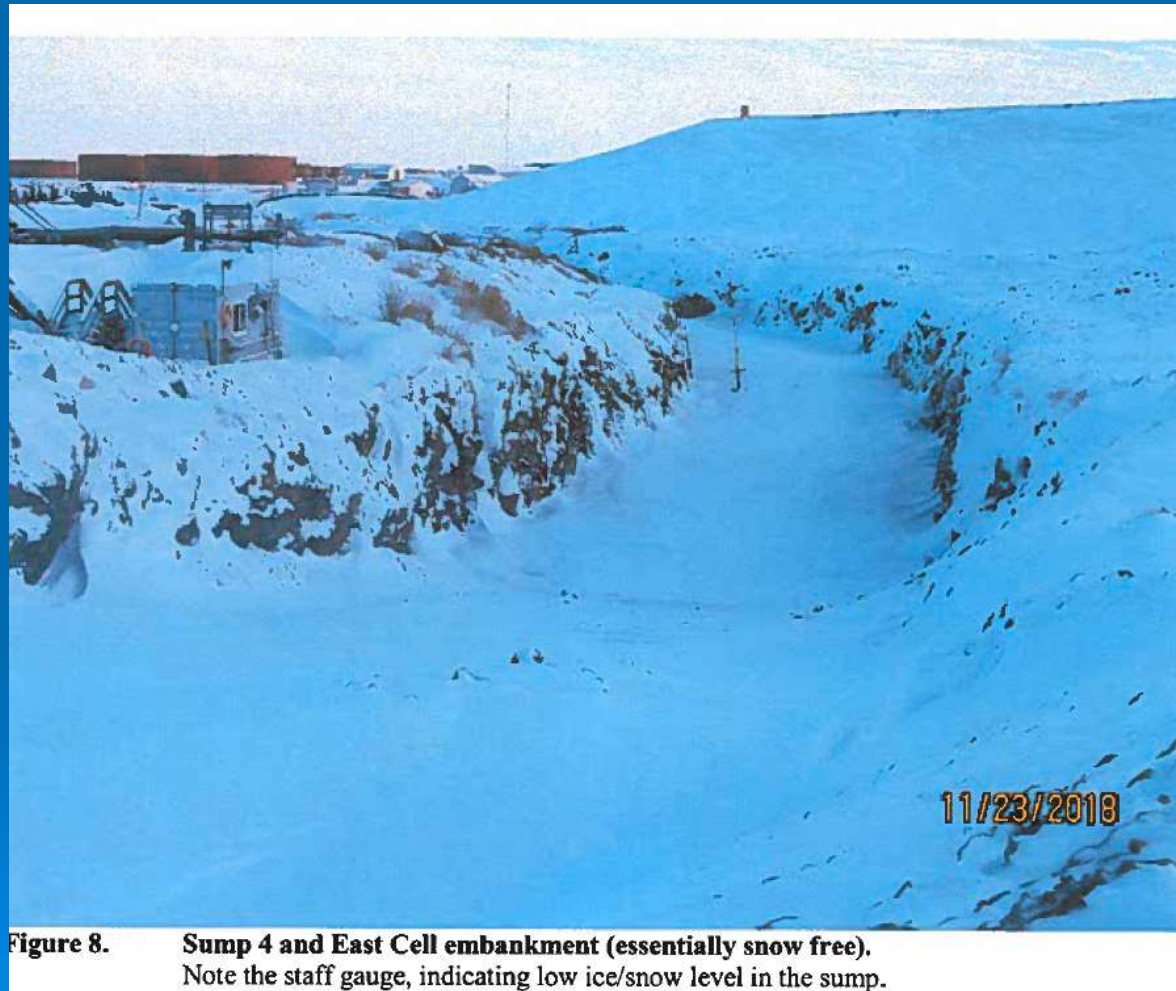


**Figure 5.** Seepage inflow into Sump 5 (foreground).  
East Cell, Cell 2 Embankment background).



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report



**Figure 8.** Sump 4 and East Cell embankment (essentially snow free).  
Note the staff gauge, indicating low ice/snow level in the sump.



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report

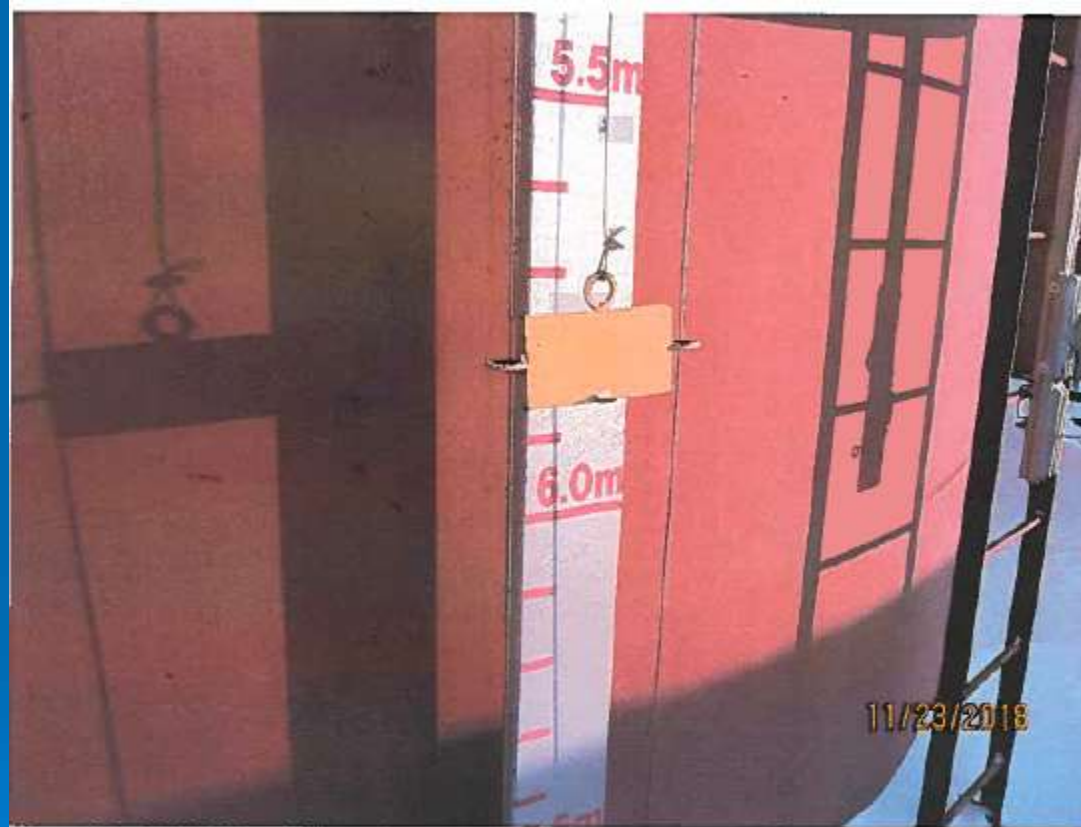


Figure 10. Dam 1 (basically snow free).



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report



**Figure 12. 333,000 L tank (empty).** Most of the tanks in the 330,000 L tank farm are empty. At least 4 of the 12 tanks contain significant volumes of diesel (as indicated by the external gauge). The tank above was storing approximately 5800 L of diesel (as indicated by the external gauge).



## 2. Reports

### ➤ 2.2 November 23, 2018 Inspection Report



**Figure 14. Dust Collection Hut.**  
The hut was powered up and working at the time of the inspection.



### 3. Regulators' Update – MVLWB

- Extension on the submission date of the Final Closure and Reclamation Plan
- On December 21, 2018 De Beers submitted a letter to the MVLWB requesting an extension until March 29, 2019 on the submission of the Snap Lake Final Closure and reclamation Plan (FCRP);
- On January 17, 2019 MVLWB granted the extension;
- FCRP to be submitted by March 29, 2019



## 4. Aboriginal Update

### ➤ Tlicho (TK) Workshop Snap Lake

- Held on November 7, 2018;

Tlicho Elders expressed their concerns, asked questions to De Beers staff and proposed, between others, to include the traditional knowledge to FCP;



## 4. Aboriginal Update

- Tlicho (TK) Workshop Snap Lake
  - Tlicho Elders proposed further meetings, site visits and community meetings;
  - *“It would be useful to talk to and have our own Tlicho gathering on how we would like to close the mine”;*



## 4. Aboriginal Update

### ➤ Tlicho (TK) Workshop Snap Lake

A second meeting was held in YK on December 17<sup>th</sup> and 18<sup>th</sup>, 2018;

Discussions were based on the feed back from the communities based on the traditional knowledge;



## 4. Aboriginal Update

### ➤ Tlicho (TK) Workshop Snap Lake

*“During this meeting the staff of TG’s Lands Regulation Division and the Tłıchǫ elders discussed De Beers’ Closure and Reclamation Plan as well as the comments made by the North Slave Metis Alliances (NSMA) and the Łutsel K’e Dene First Nation on TK questions”*



## 4. Aboriginal Update

- Tlicho (TK) Traditional Knowledge applied to the Snap Lake Mine FCRP
- Comments from the November and December 2018 Workshop held in Yellowknife were submitted to MVLWB on January 21, 2019;
- SLEMA E.D. also forwarded the Report to De Beers *“for their consideration and incorporation into their Snap Lake FCRP as and where they see it fit”*



## 4. Aboriginal Update

- Tlicho (TK) Traditional Knowledge applied to the Snap Lake Mine FCRP were aimed to answer:
- Will physical and chemical criteria support the necessary future use and aesthetics conditions post-closure?
- What is the necessary future use (types of activities at site in the future)?



## 4. Aboriginal Update

- What amount of time land users would stay at site post-closure?
- What time of year land users would visit site post-closure (overwinter travel, caribou migration as examples)?
- What plant types and areas are important to be safe for wildlife?



## 4. Aboriginal Update

- How to ensure long term physical stability of mine areas and drainage pathways?
- What landscape features to avoid that increase threat of predation or harm to wildlife?
- What are the priority areas for revegetation?



## 5. Stakeholders' Update

### ➤ ENR

- On October 3, 2018 De Beers requested to ENR to approve an adjustment on the Air Quality Monitoring frequency in order to consider the Extended Care and Maintenance period;
- On December 5, 2018 ENR answered that the adjustment cannot be supported at this time;



## 5. Stakeholders' Update

- ENR with respect to the FCRP
  - The proposed modifications will have to be considered on the context of the FCRP and associated management plans; and recommends that:
  - *“the FCRP reflect current air quality monitoring considerations to uphold the expectations of clause 6.3 h of the Agreement”*. In addition,



## 5. Stakeholders' Update

- ENR with respect to the FCRP
  - ENR understands *that the plans needing updates in relation to the clause 6.2 (Closure Phase) of the Agreement are the Air Quality and Emissions Management and Monitoring Plan and the Wildlife Management Plan;*
  - Updates plans should be developed with SLEMA, GNWT or others as per Clause 6.3 of the Agreement.



## 5. Stakeholders' Update

- ENR request for comments on the 2017 EAAR
- On Nov. 23, 2018 ENR requested comments for the 2017 Snap Lake Mine Environmental Agreement Annual Report (EAAR);
- Deadline for comments was set on January 3, 2019



## 6. Agency's Activities

- On December 10, 2018 was held the SLEMA Board Annual General Meeting;
- On December 17 and 18 SLEMA ED attended the Tlicho (TK) Workshop on Snap Lake and traditional knowledge applied to mine closure



## 6. Agency's Activities

- On December 18, 2018 SLEMA submitted its review of the 2017 EAAR (the Report);
- The Report was found to meet the requirements of the Agreement;



## 6. Agency's Activities

- In addition, SLEMA pointed out with respect to the air quality monitoring practices during 2017:
- Particulate monitoring was reduced to a single station; and
- This only station was relocated near to the communications tower;



## 6. Agency's Activities

- SLEMA pointed out :
- The reduction in the number of monitoring stations, from two stations to one, requires confirmation from data analysis:
- if there is correlation between data, a unique monitoring station is acceptable. Otherwise, two stations would still be required. ; and



## 6. Agency's Activities

- SLEMA pointed out :
- The two previous PM<sub>2.5</sub> monitoring stations off site (by the airstrip and the emulsion plant) were placed following GWNT and ECCC's advice on locations;
- They were "identified as areas of potentially higher off-site particulate concentrations by dispersion modelling predictions"



## 6. Agency's Activities

- SLEMA pointed out :
- These locations were intended to be permanent;
- Also, SLEMA agrees with the statement made previously by De Beers that “*Permanent locations produce consistent data suitable for comparison purposes over time*”\*.

\*

Snap Lake Mine 2017 Air Quality Meteorological Monitoring and Emissions Report, dated March 2018



## 6. Agency's Activities

- SLEMA recommends:
- De Beers update the air modeling to:

Reflect the current status of care and maintenance and provide guidance for the air quality trend in the future under various scenarios (mine reopen, extended care and maintenance, and permanent closure);



## 6. Agency's Activities

- SLEMA recommends:
- De Beers update the air modeling to:

Analyze the impacts of the relocation of SHARP monitoring from the Emulsion Plant to the Communications Building and demonstrate that the monitoring data from the Communications Building can reliably be extrapolated to the monitoring data from the Emulsion Plant.



## 6. Agency's Activities

- SLEMA recommends:
- De Beers provide data analysis that justify the reduction in the number of stations, in other words, that the data from one of the monitoring stations is redundant and that monitoring data of PM2.5 can reliably be represented from one station data.



## 7. Case Study: Polaris Mine Closure

- The Polaris Mine is an underground zinc-lead mining property, operated and majority owned by TeckCominco Limited (Teck);
- The mine is situated at about 75°N and 97°W on Little Cornwallis Island (“LCI”) in Nunavut;
- The Polaris Mine occupies a total of about 962 hectares of land;
- The mine operated over a 21-year period, during which approximately 21 million tonnes of ore was processed;



## 7. Case Study: Polaris Mine Closure

- The average ore quality was approximately 13% zinc and 4% lead;
- Production ended in September 2002;
- Main mine components included in Teck's Decommissioning and Reclamation Plan ("D&R Plan") for the Polaris Mine were:
  - Underground mine with 4 portals;
  - Three quarries;
  - Garrow lake tailings impoundment;



## 7. Case Study: Polaris Mine Closure

- Main mine components included in Teck's D&R Plan for the Polaris Mine were:
- Major surface infrastructure: process barge, dock, accommodation building, power supply facility, etc.;
- Petroleum and chemical storage areas;
- Fresh water intake from Frustration Lake;
- Four landfills.



## 7. Case Study: Polaris Mine Closure

- Conditions related to Security as per Water Licence NWB1POL0311(2003-2011)
- The total amount of security under the Licence was set on \$37 Million
- The primary purpose of the Board's security requirement is "...to prevent, counteract, mitigate or remedy any resulting adverse effect on persons, property or the environment..."



## 7. Case Study: Polaris Mine Closure

- The amount of security posted was subjected to four conditions :
- First, in advance of the December 31, 2003 and December 31, 2004 deadlines but no later than ninety days before these deadlines, Teck can apply for a corresponding credit of the amount due, on account of: (a) progressive reclamation and corresponding reduction in security; and (b) other offsetting credits due to any security amount required in the interim by DIAND for land lease security deposit;



## 7. Case Study: Polaris Mine Closure

- All of which is subject to four conditions that follow:
- Second, there shall be a quarterly review by the Board of the amount of the security deposit and the work performed, which will be adjusted based on that review, if supported by the evidence at that time;



## 7. Case Study: Polaris Mine Closure

- All of which is subject to four conditions that follow:
- Third, on the motion of any party based upon reasonable notice, and with proof that Teck is failing to perform the restoration of the site as licensed, the full amount of the remaining security deposit shall be required immediately.



## 7. Case Study: Polaris Mine Closure

- All of which is subject to four conditions that follow:
- Four, at no time shall the security be less than the value required to remobilize and reconstitute the Garrow Lake Dam.



## 7. Case Study: Polaris Mine Closure

- This Licence was subsequently amended in 2009 upon the request of then Licensee Teck Cominco Ltd. to reduce the security under the Licence
- From \$33,700,000 to \$3,539,000 in order to reflect the completion of a number of site reclamation activities



## 7. Case Study: Polaris Mine Closure

- Water Licence NWB1POL0311 (2003-2011) was renewed in 2015 as NWB 1AR-POL1531 set to expire in 2031;
- In the 2015 Application, Teck sought a reduction of reclamation security to \$1,324,000;
- The Board accepted that the security requirements under the Expired Licence should be amended in the Renewed and Amended Licence as agreed to by Teck and AANDC;
- The amount of security required to be posted was \$1,565,000



## 7. Case Study: Polaris Mine Closure

- Water Licence NWB1POL0311(2003-2011) was renewed in 2015 as NWB 1AR-POL1531;
- *The Board also noted that, “as is typical for most Type “A” licences, if monitoring data indicates that additional security is required to support additional monitoring, reclamation or remediation that was not included in the security assessment supporting the Application, the Board may, upon notice, revisit the security amount fixed by the Board at this time”.*

