JAN – FEB 2023
Snap Lake Closure Activities Update
for SLEMA Board

March 2023

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
- SNP – Surveillance Network Program
- TDS – Total Dissolved Solids
- WEMP – Wildlife Effects Monitoring Program
- WTP – Water Treatment Plant

Outline

1. Mine Update
2. SNP Reports
3. Water Management
4. Monitoring
5. Site Inspections
6. Incidents at Site
7. Updates on the WL and LUP
8. Environmental Agreement Update
9. SLEMA's Activities

1. Mine Update

- Snap Lake Mine has been in Extended Care and Maintenance since December 4, 2015

- On March 1, 2022, De Beers began activities associated with the Closure Phase, as described in the Final Closure and Reclamation Plan and as authorized by the corresponding Land Use Permit and Water Licence MV2019L2-0004

- On that date, MetNuna JV assumed care and control of the Mine

2. SNP Reports

- Mine closure and reclamation activities reported during Dec 2022 and Jan 2023 are:

- Excavation of the Water Management Pond including the following:
  - Hauled sediment to Cell 1/Cell 2
  - Hauled organic material to organic stockpile
  - Stockpiled oversize/clean boulders at the quarry
  - Placement of common rockfill material within the Water Management Pond
- Hauling of crusher feed from the South Ditch to the screener
- Grading and sloping of South Ditch

2. SNP Reports

- Mine closure and reclamation activities reported during Dec. 2022 and Jan 2023 (Cont.)

  - Bedrock cleaning and formwork assembly within North Ditch
  - Screener generation of erosion protection material
  - Demolition/processing of the 12-million-liter tank farm
  - Removal and storage of hazardous materials from decommissioned buildings
  - Ongoing demolition/processing of overland pipe

2. SNP Reports

- Mine closure and reclamation activities reported during Dec. 2022 and Jan 2023 (Cont.)

  - Blasting in the South Ditch
  - decommissioning materials preparation for winter road backhaul
  - Removing salvage items from Water Treatment Plant and preparing the building for demolition
  - Preparing demolition waste for landfill placement

3. Water/ Waste Management at Site

- Fresh water is routinely extracted from Snap Lake
- The Sewage is collected and treated by the Sewage Treatment Plant
- Since October, there has no been discharge of Effluent from the Water Treatment Plant to Snap Lake

3.1 Water & Wastewater Management at Site

2022 SUMMARY OF MONTHLY QUANTITIES OF WATER AND WASTEWATER MANAGED AT SITE:

Water/	Jan m3	Feb m3	Mar m3	Apr m3	May m3	Jun m3	Jul m3	Aug m3	Sep m3	Oct m3	Nov m3	Dec m3
Fresh water (Snap L)	577	485	785	672	828	876	784	956	888	6,804	911	460
Sewage	165	315	333	190	385	417	411	463	24,525	525	542	383
Effluent disch	-	-	-	-	42	61,321	76,333	29,206	24,525	-	-	-
Water Pumped Under ground									5,719	21,674		

3.1 Water & Wastewater Management at Site

2023 SUMMARY OF MONTHLY QUANTITIES OF WATER AND WASTEWATER MANAGED AT SITE:

Water/	Jan m3	Feb m3	Mar m3	Apr m3	May m3	Jun m3	Jul m3	Aug m3	Sep m3	Oct m3	Nov m3	Dec m3
Fresh water (Snap L)	707											
Sewage	225											
Effluent to Snap Lake	-											
Water to Under ground	-											
Ww to North Pile	30											

Ww: wastewater

3.2 Waste Management at Site

2022 WASTE MANAGEMENT: Summary of Monthly Waste Quantities

Waste Type	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Domestic (Incinerated at site)	1,669 Kg	2,014 Kg	2,220 Kg	1795 Kg	3,255 kg	4,397 kg	2,504 kg	2,078 kg	1,437 kg
Domestic & Industrial (to landfill)	5,145 Kg	2,510 Kg	2,129 Kg	1,411 (t)	2,980 kg	3,560 kg	262,57 kg	302	3,305 kg
Hazardous (sent offsite)							3.02 m3		

3.2 Water/Waste Management at Site

2023 WASTE MANAGEMENT: Summary of Monthly Waste Quantities

Waste	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Set	Oct	Nov	Dec
Domestic (Incinerated at site)	2.44 t											
Domestic & Industrial (to landfill)	1.6 t											
Hazardous (sent offsite)	-											
Solids to the North P.	2 m^3											

4. Water Monitoring

Fig 1: SNP Sampling Stations

4. Water Monitoring

2022 SUMMARY OF WATER MONITORING COMPLETED

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
02-02 North Pile	N	N	N	N	N	✓	✓	✓	✓	✓	N	N
02-05 Run off Rock Pad	N	N	N	N	✓	N	N	✓	✓	N	N	N
02-06 Runoff Quarry	N	N	N	N	✓	N	N	N	N	N	N	N
02-11 WMP Dam	N	N	N	N	N	N	N	N	N	N	N	N
02-14 WMP	N	N	N	N	N	✓	✓	✓	✓	✓	N	N

✓= Sampled

4. Water Monitoring

2022 SUMMARY OF WATER MONITORING COMPLETED

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
02-15 Water Intake	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
02-16i Sewage Effluent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
02-17b Treated Effluent	N	N	N	N	✓	✓	✓	✓	✓	N	N	N
02-20d 02-20e 02-20f Diffuser Stations	N	N	N	✓	N	✓	✓	✓	✓	N	N	N

✓ = sampled

4. WATER MONITORING

2022 TDS RESULTS AT SNAP LAKE MIXING ZONES:

	TDS mg/L					
MONTH/ STATION	Apr	May	Jun	Jul	Aug	Sep
SNP 02-20d	252	N	196	197	198	193
SNP 02-20e	257	N	196	266	218	194
SNP 02-20 f	252	N	197	215	196	196

4. WATER MONITORING

TDS IN SNAP LAKE:

- Pre-mining conditions values of TDS in Snap Lake:

  Median 15mg/L

  Maximum 70 mg/L

- Acceptable Limits for TDS in Snap Lake during operations:

First 350 mg/L of TDS and then

684 mg/L of TDS in Snap Lake

- The current Water Licence does not include a TDS limit for Snap Lake

4. WATER MONITORING

TDS IN SNAP LAKE:

TDS results from Snap Lake Monitoring Stations SNP 2-20 d, e and f are presented in the next graphs

Monitoring Stations

SNP 2-20d, SNP 2-20e, and SNP 2-20f

are in Snap Lake, located at 200 m from the diffuser where the effluent is discharged, on the edge of the mixing zone around the diffuser

4. WATER MONITORING

TDS IN SNAP LAKE:

Under-ice conditions result in higher TDS because chemicals are more concentrated due to the freeze-up of the water

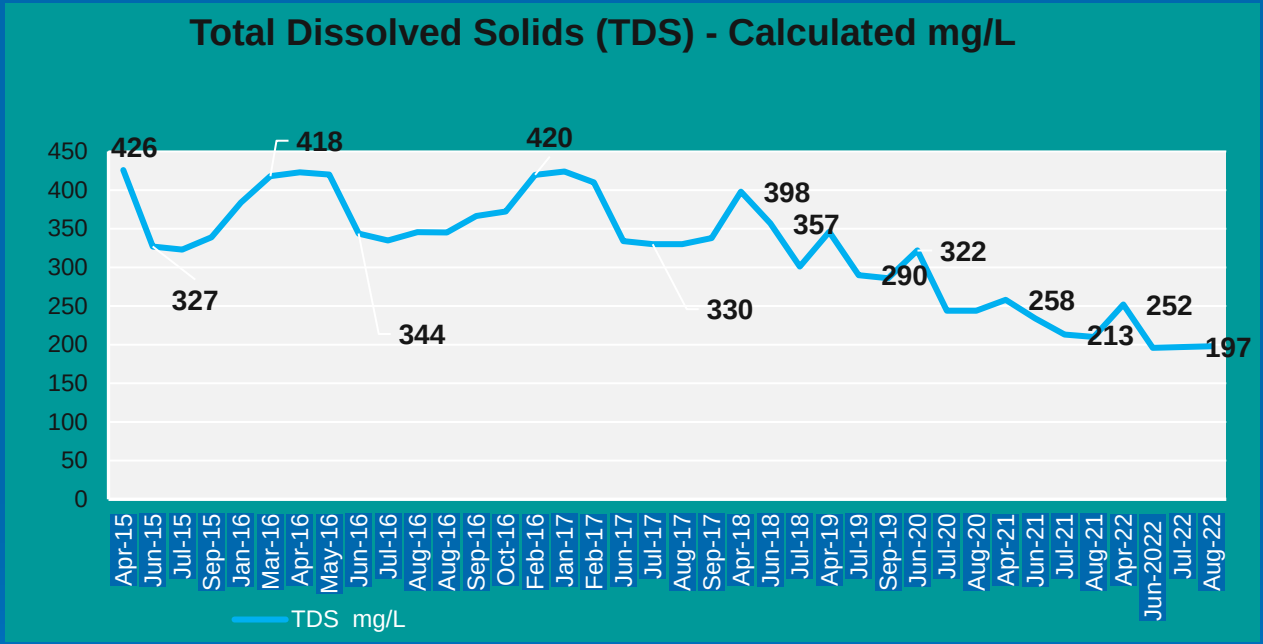
Therefore, it is always recommendable comparing data in the same condition

i.e., under-ice data from one year to another year under-ice data as well as comparing open-water data from one year to another open-water data

TDS data from 2015, the year that the Mine entered Care and Maintenance, up to 2022 show a decrease of TDS in Snap Lake as follows:

4. WATER MONITORING

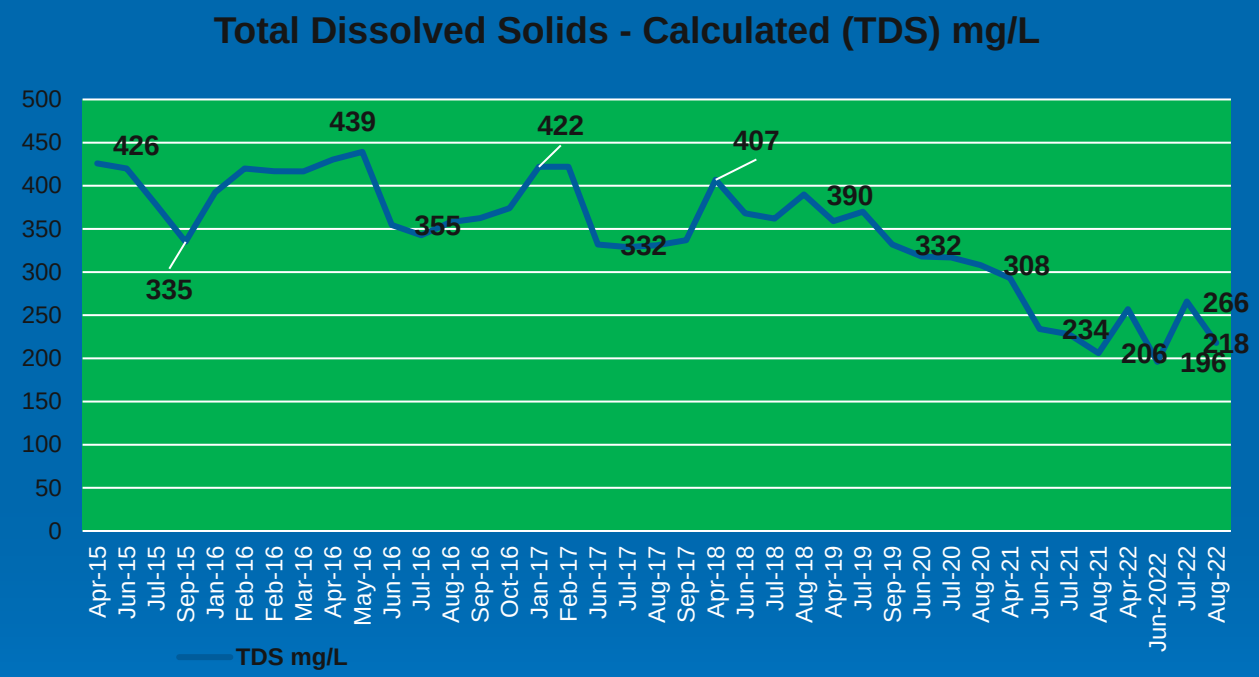
TDS RESULTS AT SNP 2-20d



SNP2-20d	Apr-15	Apr-22
TDS mg/L	426	252

4. WATER MONITORING

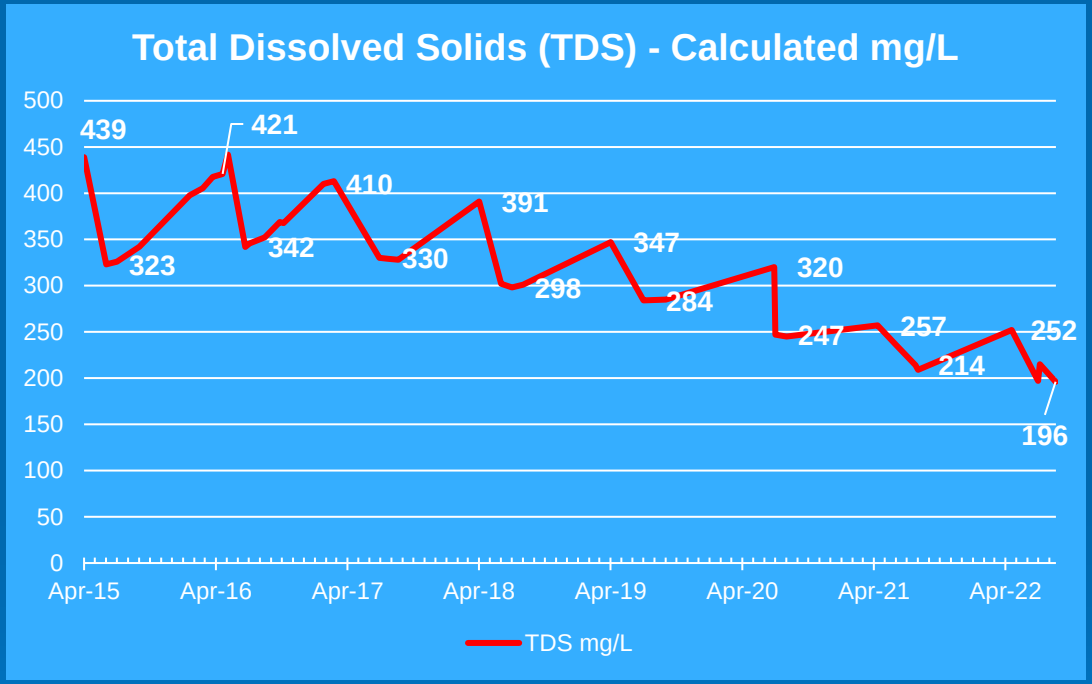
TDS RESULTS AT SNP 2-20e



SNP2-20e	Apr-15	Apr-22
TDS mg/L	426	257

4. WATER MONITORING

TDS RESULTS AT SNP 2-20f



SNP2-20f	Apr-15	Apr-22
TDS mg/L	439	252

5.1 Jan 30 Water Licence Inspection

On Jan 30, 2023, the following areas were inspected by Inspector Tom Bradbury, Resource Management Officer III

- Waste Storage Areas
- Perimeter Sumps/Construction
- Snow Dumps
- Laydown 1
- Crusher Area

There was one minor concern noted during the inspection

5.1 Jan 30 Water Licence Inspection

The following is a summary of the Inspector's Report

Waste Management Area

- No leaks or hydrocarbon staining were observed during inspection of the area
- All material will be removed via the winter road in March

Temporary Hazardous Waste Area

- All material will be removed via the winter road in March
- Totes and drums continue to be well organized with proper labels
- The previously identified drum that was leaking was removed and there is no further evidence of staining in the location.
- No issues noted during the inspection

5.1 Jan 30 Water Licence Inspection

Crusher

- The crusher is no longer in operation and has been shut down since mid-December

Water Management Pond (WMP)

- Construction at the WMP (Photo 3) involved sediment removal as part of the redesign for the east Influence Storage Pond (ISP). There was a much larger volume of sediment to be removed than originally anticipated
- Sediment removal created holes which are being in-filled
- Channel is being sloped as per design (7:1)
- The floor of the channel is approximately 15 metres in width (Photo 4)

5.1 Jan 30 Water Licence Inspection

Perimeter Sumps/Cells

- Former SP4
- Dental concrete continues to be poured using tarps and Herman Nelson heaters (Photo 5)
- Former SP1
- Being in-filled
- Finished blasting for connectivity to East Influent Storage Pond/Water Management Pond (Photo 6)
- Blasting mats are placed as a safety measure to avoid projectiles (Photo 7)

5.1 Jan 30 Water Licence Inspection

Winter Road

- Previously, Nuna notified that construction of the spur road could start on January 31, however, at the time of inspection construction had not begun
- Profiling was to begin the week of January 30
- All equipment will be equipped with immediate spill response and fire extinguishers
- Approximately 10 personnel will work on the winter road
- All water withdrawal will be recorded daily
- The spur road to Snap Lake is currently only expected to be in use through the month of March 2023
- There are approximately 200 loads of material expected to be removed from the mine site via the Winter Road

5.1 Jan 30 Water Licence Inspection

Tank Farms

- There are 12 remaining fuel tanks of 330,000L (Photo 8)
- Of those 12, only 4 will remain in use
- There is a total of 1 million litres of fuel currently on site
- 3.5 million litres of fuel is expected via winter road
- There is a 500,000L tank that is solely dedicated to the powerhouse

Building Demolition

- There are several grey tanks yet to be demolished and buried (Photo 9)
- There are very few structures left to be demolished that are not necessary for current operations

5.1 Jan 30 Water Licence Inspection

Laydown 1

- This area is historically a storage yard for equipment
- It consists of a multitude of equipment that is currently being re-used, shipped out or disposed of on site
- Approximately 50% of the material will be buried at site
- There were several small patches of staining from various vehicles parked in this location (Photos 10&11)
- The spill pads being used to capture leakages must be changed out more frequently and be available for use when vehicles are idling short term, as well as long term (Photo 12)

Snow Dumps

- No issues at the snow dump locations

5.1 Jan 30 Water Licence Inspection

1 – Temporary Waste Management Area – Materials are well organized

2 – Temporary WMA – All materials stored in this location are awaiting removal via winter road

5.1 Jan 30 Water Licence Inspection

3 – Water Management Pond – Sediment removal and contouring slopes

4 – WMP– Sediment removal and contouring slopes

5.1 Jan 30 Water Licence Inspection

5 – Former SP4 - Dental concrete pour

6 – Former SP 1 – Blasting has concluded

5.1 Jan 30 Water Licence Inspection

7 – Former SP 1 – Blasting mats

8: Fuel Tank Farm 330,000L tanks only 4 will remain in use

5.1 Jan 30 Water Licence Inspection

9: Tanks to be demolished and buried

10: Laydown 1 - Hydrocarbon staining #1

5.1 Jan 30 Water Licence Inspection

11: Laydown 1 - Hydrocarbon staining #2

12: Laydown 1 – Absorbent pads need to be changed out and used more frequently

5.1 Jan 30 Water Licence Inspection

13 – Miscellaneous

5.1 Jan 30 Water Licence Inspection

14 & 15 – Miscellaneous

5.2 Jan 30 Land Use Permit (LUP) Inspection

An inspection of the De Beers Snap Lake Mine Mining Exploration LUP was conducted by Inspector Tom Bradbury on January 30, 2023
The inspection was carried out to ensure operating conditions of the Land Use Permit are being adhered to

Winter road construction activities had not yet begun during the time of the inspection
Ice profiling was scheduled to occur January 31, 2023. Profiling was to begin at the typical entry area to the mine site (Photo 1) while working back toward the Tibbitt to Contwoyto Winter Road

5.2 Jan 30 - Land Use Permit (LUP) Inspection

The Snap Lake spur road is expected to be in use during the month of March only to transport various materials from site as part of the Closure and Reclamation phase

Approximately 3.5 million litres of fuel is expected to be transported to site

One minor concern was noted during the site inspection pertaining to hydrocarbon staining in the parking area of Laydown 1

Various fluids were observed on the ground where vehicles are typically parked (Photos 2-4). It is common for spill pads to be stapled to boards and placed under vehicles to catch any leakage (Photo 5) but there needs to be more frequent placement and regular disposal of the pads for both short term and long term parked vehicles, as per condition 68 of the LUP.

5.2 Jan 30 - Land Use Permit (LUP) Inspection

1. Access to Snap Lake from Spur Road

2. Hydrocarbon Staining in Parking Area of Laydown 1

5.2 Jan 30 - Land Use Permit (LUP) Inspection

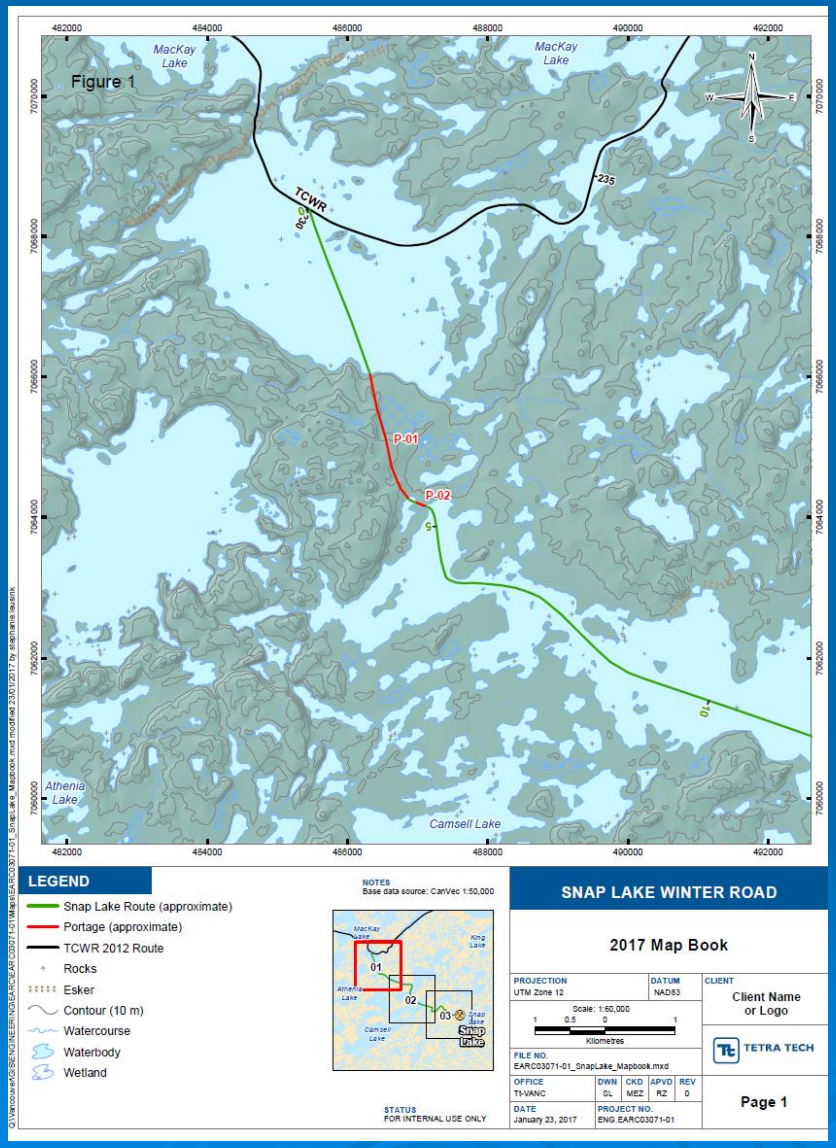
3. Hydrocarbon Staining in Parking Area of Laydown 1

4. Hydrocarbon staining in the Parking Area of Laydown 1

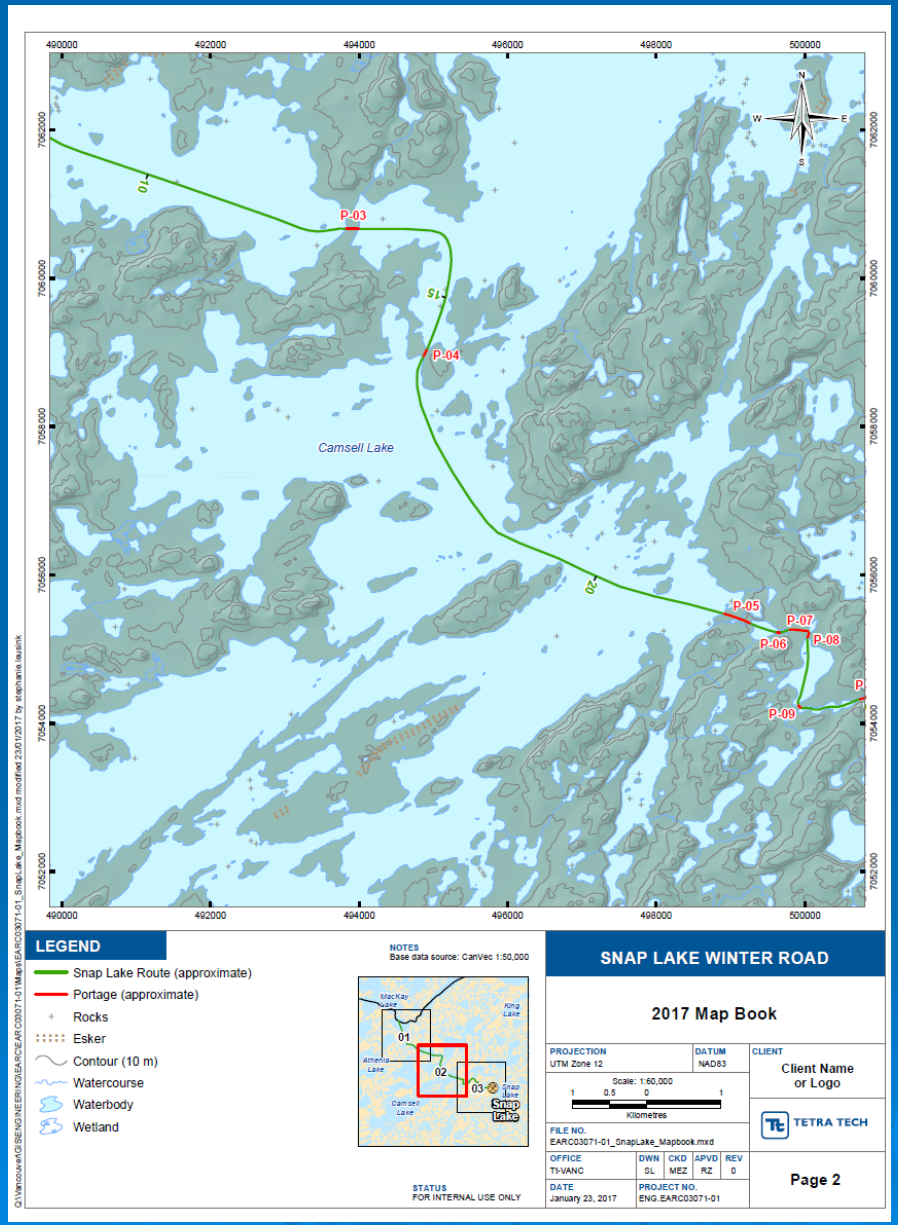
5.2 Jan 30 - LUP Inspection

5. Spill Pads Must Be Used and Replaced More Frequently

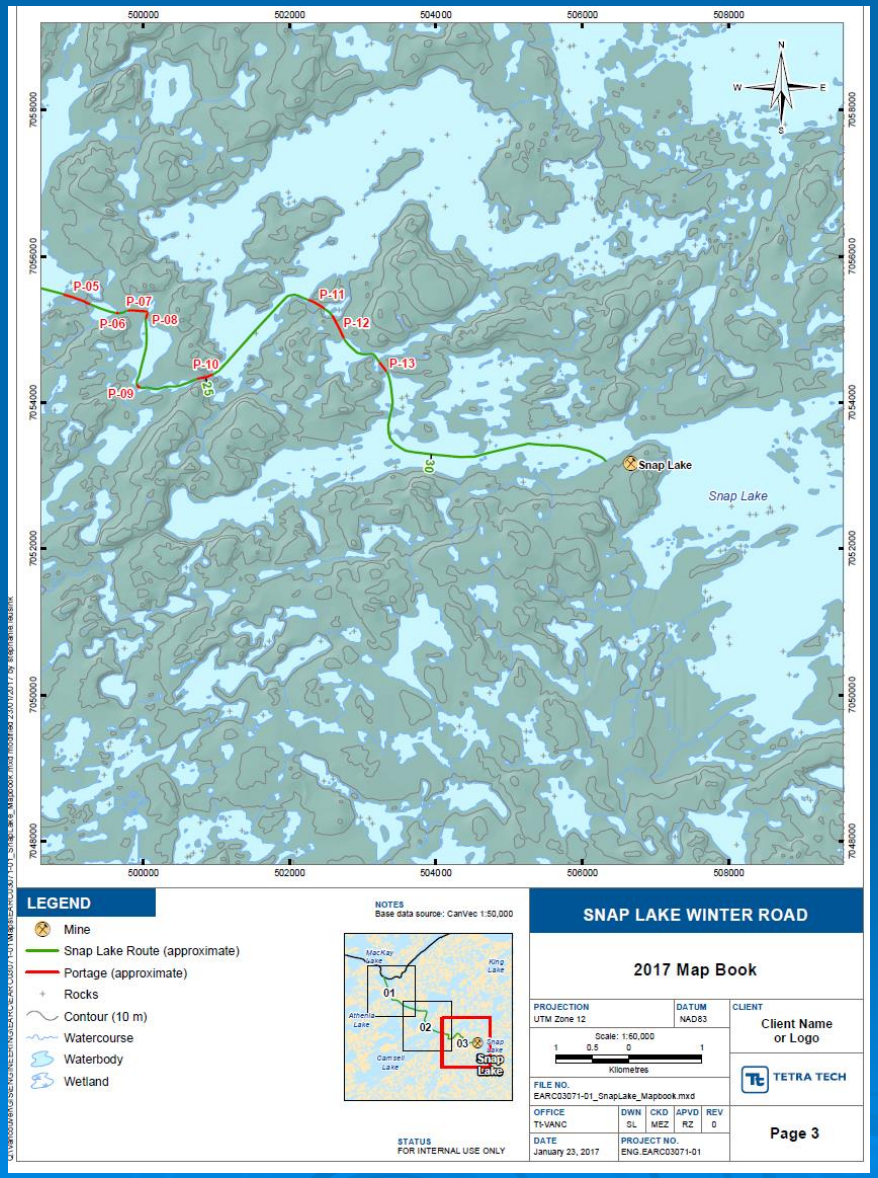
5.2 Jan 30 - LUP Inspection



5.2 Jan 30 - LUP Inspection



5.2 Jan 30 - LUP Inspection



5.3 Feb 22 - Water Licence Inspection

On Feb 22, 2023, the following areas were inspected by Inspector Tom Bradbury, Resource Management Officer III

- Waste Storage Areas
- Perimeter Sumps/Construction
- Snow Dumps
- Laydown 1
- Fuel Transfer

There were no concern reported during the inspection

5.3 Feb 22 - Water Licence Inspection

Waste Management Area

- No leaks or hydrocarbon staining were observed during inspection of the area
- All material will be removed via the winter road in March (Photo 1)

Temporary Hazardous Waste Area

- All material stored in this area will be removed in March via the winter road (Photo 2-3)
- No issues noted during the inspection

5.3 Feb 22 - Water Licence Inspection

East Influent Storage Pond (ISP)

- The channel has been designed with a flat bottom and 7:1 sloping for the walls
- At the time of inspection outcrops of rock were being broken to ensure channel bottom and sloping were to design (Photo 4)
- Blasting is not needed, as the method being conducted is more efficient.

5.3 Feb 22 - Water Licence Inspection

Tank Farms

- The remainder of fuel tanks in the tank farm are 12 x 330,000L
- Of the 12 remaining tanks only 4 will remain in use.
- 3.5 million litres of fuel expected via winter road.
- On March 4, 2023 Nuna Logistics personnel provided notification that 200,000L of fuel had been delivered to site.
- Module 43 will be the only offloading location for fuel delivery during the winter road (Photo 6)
- Module 31 is not in use and is awaiting deconstruction and disposal (Photo 7)
- Spill kits and drip trays were present. Nuna personnel are to ensure spill kits are fully stocked in the event of a spill and that drip trays should be cleaned of snow and ice to ensure maximum capacity (Photo 8)

5.3 Feb 22 - Water Licence Inspection

Perimeter Sumps/Cells, Inland Lake 6

- Blasting is being conducted to slope area to design (Photo 5)

Laydown 1

- Drip trays were placed under the parked vehicles in the logistics area, as per the request of the Inspector (Photo 9)
- There was no staining observed in the area
- Trays or boards with absorbents need to be placed under vehicles parked for longer than 2 hours
- Some of the material stored at the laydown was being prepared for transport off site. Material is being weighed before transport (Photo 10)

5.3 Feb 22 - Water Licence Inspection

1 TWMA: Materials prepared for transport off site

2 TWMA: All materials stored in this location are awaiting removal via winter road

TWMA: Temporary Waste Management Area

5.3 Feb 22 - Water Licence Inspection

3. TWMA: All materials stored in this location are awaiting removal via winter road

4. East Influent Storage Pond: Earthworks regarding sloping

TWMA: Temporary Waste Management Area

5.3 Feb 22 - Water Licence Inspection

5. IL6 Ditch: Blasting occurring to slope to design

6. Module 43: Fuel transfer area

5.3 Feb 22 - Water Licence Inspection

7 . Module 31, Former fuel transfer area : Awaiting deconstruction and disposal

8. Fuel Transfer Module 43: Spill kits and drip trays

5.3 Feb 22 - Water Licence Inspection

9. Laydown 1: Drip catchment implemented

10. Laydown 1: Some material will be weighed before transport off site via winter road

5.4 Feb 22 - LUP Inspection

An inspection of the De Beers Type A Land Use Permit MV2017D032 for Mining Exploration was

conducted by Inspector Tom Bradbury on February 22, 2023

According to the Inspector, Nuna Logistics personnel conducting work associated with the Mining Exploration program were taking the proper steps necessary to minimize impacts to the land use area

5.4 Feb 22 - LUP Inspection

Fuel Farm Loading Module 43 will be used for the transfer of fuel to site from the winter road (Photo 8)

Snow has been cleared, spill kits are in place, and drip trays are present

Nuna personnel informed the Inspector that the first fuel delivery could arrive as early as February 25 or soon after.

Fuel Farm Loading Module 31 is not in use and will be dismantled (Photo 9)

Approximately 30 caribou were observed near and around

Portage 1 (Photo 10)

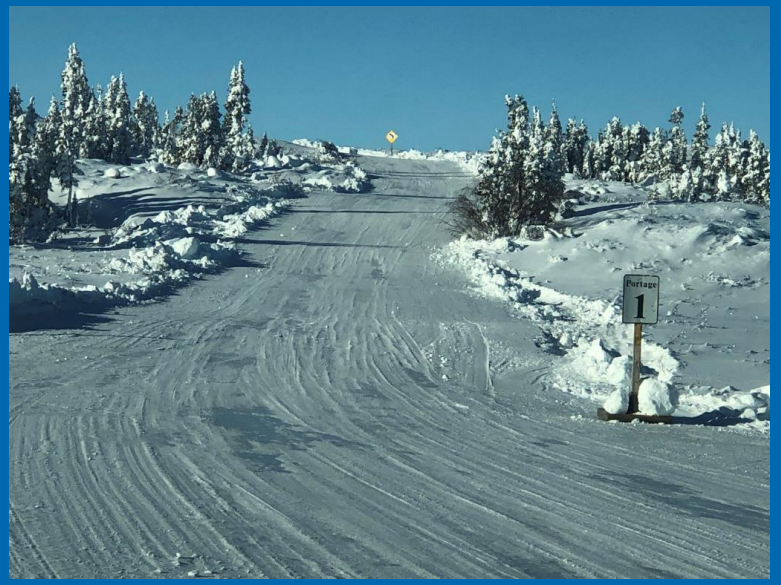
5.4 Feb 22 - LUP Inspection

1. Snap Lake Spur Road. Portage 7 signage

2. Snap Lake Spur Road. Excellent Conditions. Signage placement.

5.4 Feb 22 - LUP Inspection

3. Spur Road. Portage 2 signage



4. Spur Road. Portage 1. Steep incline

5.4 Feb 22 - LUP Inspection

5. Absorbents for potential leaks

6. Absorbents for potential leaks

5.4 Feb 22 - LUP Inspection

7. Absorbents for potential leaks

8. Fuel transfer area for trucks coming off the winter road

5.4 Feb 22 - LUP Inspection

9. Former fuel transfer area. To be decommissioned

10. Portage 1 Area. Caribou

6. Incidents at Site

No spills were reported during the period of Dec 2022 – Jan 2023

Table: Summary of Reportable Spills for 2022

Date	Substance	Volume	Location	NWT Spill #
April 7	Diesel Exhaust Fluid	400 L	Laydown 1	2022121
April 16	Sewage	20 L	New STP	2022133
June 19	Hydraulic Fluid	250L	Quarry	2022291
August 2	Effluent (untreated)	tbd	SP3	2022400
August 3	Sewage	30 liters	Sewage TP	2022405
Aug & Sep days	Noncompliant Effluent discharged		SNP 02-17b)	2022505

7. MVLWB Regulatory Updates

MVLWB's Approval of Extension Request for the Aquatic Effects Monitoring Program (AEMP) Design Plan Version 1.3 and Final Closure and Reclamation Plan (FCRP) Version 1.3

The MVLWB approved DeBeers request to extend the submission deadlines of AEMP Design Plan Version 1.3 and FCRP Version 1.3 for Snap Lake Mine

The Board approved the extension requests for both submissions until May 19, 2023

8. Environmental Agreement Update

- **DeBeers' Request to Cease the Snap Lake Hydrology Monitoring Program**

On Jan 6, 2023, SLEMA responded an ENR-GNWT's request for comments on De Beers' proposal to cease the Snap Lake Mine Hydrology Monitoring Program (HMP)

In its response, SLEMA noted that it agreed with De Beers and the ENR that the HMP might be discontinued without impacting the ability to detect and adaptively manage Snap Lake Mine's adverse effects on the environment

8. Environmental Agreement Update

- DeBeers' Request to Cease the Snap Lake Hydrology Monitoring Program

The HMP is a requirement of the Snap Lake Environmental Agreement, items 7.1b and 7.2g

HMP's main components are to monitor

1)lake inflow/outflow and water levels, and

2)meteorology

De Beers proposes to discontinue Snap Lake inflow and outflow monitoring and the water level monitoring of North Lake, Northeast Lake, and 1999 Reference Lake

8. Environmental Agreement Update

- DeBeers' Request to Cease the HMP (Cont.)

The water level monitoring of Snap Lake is included in the AEMP, and the meteorology monitoring is captured in the AQEMMP, and given that:

- no decreasing or increasing trends in North Lake and Northeast Lake water levels have been observed to date
- And changes in Snap Lake water levels are similar to those of the nearby lakes

8. Environmental Agreement Update

- DeBeers' Request to Cease the HMP (Cont.)
  - The main contributing factor of mine influence on surface hydrology is groundwater recharge
  - In the current conditions, the groundwater recharge to the underground workings is minimal
  - Finally, the magnitude of the on-site closure and post-closure activities is not anticipated to significantly increase mine-related influences on local hydrology relative to the periods during EC&M or operations

9. SLEMA ACTIVITIES

- **SLEMA 2021-2022 Annual Report**

On Jan 27, the Snap Lake Environmental Monitoring Agency's 2021-2022 Annual Report was published

The Report can also be found in our website

http://slema.ca/wpcontent/uploads/2023/01/SLEMA-Annual-Report-2021-22.pdf

9. SLEMA ACTIVITIES

- **FCRP Revegetation Criteria Meetings**

In advance of the meetings first with TK Panel and then with DeBeers to discuss the SW7-3a Closure Revegetation Criteria, a Zoom meeting was held by SLEMA staff on Jan 26

The attendants were Heather Bears, Zoetica Environmental Research Services, and Beth Keats, Trailmark

9. SLEMA ACTIVITIES

FCRP Revegetation Criteria: Traditional Knowledge Panel Meeting

On February 27, 2023, SLEMA TK Panel, staff and DeBeers met to hear recommendations from the TK Panel on

- The revegetation of the former Snap Lake Mine area
- And the role of SLEMA representatives in the final landscape inspections

9. SLEMA ACTIVITIES

FCRP Revegetation Criteria: Traditional Knowledge Panel Meeting

TK Panel recommended to restore the land as close as possible to the pre-development conditions