July & August 2020 Environmental Update for SLEMA Board

September 1, 2020

Outline

1. Mine Update
2. SNP Reports
3. Geotechnical Inspection Report
4. GNWT Inspection Report
5. Update on Snap Lake Mine Water Licence Programs & Reports
6. Environmental Agreement Update
7. 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
- SNP – Surveillance Network Program
- 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 on Extended Care and Maintenance (ECM);
- All personnel left the site on September 5th, 2019 and returned on April 22, 2020 resuming Care & Maintenance activities at site;
- During this period, two SNP Reports were submitted by DeBeers for June and July 2020.

2.SNP REPORTS FOR JUNE & JULY.

- Waste Management at Site:

  - Glass jars, tin cans, and most food related plastic containers are washed and stored until they can be shipped off site;

  - Waste wood products and cardboard are burned in the authorized pit as per Land Use Permit MV2017D0032;

2.SNP REPORTS FOR JUNE & JULY.

- Waste Management at Site:

  - Waste Management Area staff ensures that waste is handled as per the approved operational procedures for waste handling.

- One reportable spill occurred in June at the Diffuser line of SNP 0217b. During testing and discharging the pipeline came apart.

2.SNP REPORTS FOR JUNE AND JULY

- The July 2020 SNP Report shows Faecal Coliforms as 21CFU/100mL at SNP 02-17b. Therefore, Faecal Coliform was above the EQC limits;
- The presence in water samples of Faecal Coliforms is used as an indicator of water quality, and more specificallym possible fecal contamination from humans or animals
- DeBeers has informed that the reported excess is under investigation

2.SNP REPORTS FOR JUNE & JULY.

- The Sewage Treatment Plant (STP) operated for 30 day(s) in the month of June, and for 31 days in the month of July.
- Monitoring included:
  - Fuel tank inspections
  - Air Quality
  - SNP
  - ARD Bog Sampling
  - Perimeter Sump Sampling
  - Monthly North Pile, ditch and perimeter sump monitoring

2.SNP REPORTS FOR JUNE AND JULY

- Monitoring included (cont.):

- Wildlife Surveillance Audits
- Building Inspection
- Dam and Water Management Pond
- North Pile ditch and sump
- Collection of data from on-site Piezometers and Thermistors.

2.SNP REPORTS FOR JUNE AND JULY

- Monitoring included (cont.):

- On June 14, SNP monitoring according to the recently approved MV2019L2-0004 Water Licence, started;
- Under the new Licence, the number of SNP monitoring stations required to be sampled for water quality has changed;
- Of those stations to be sampled, the stations related to the Influent Storage Ponds are not going to be sampled until construction and commission of the Influent Storage Ponds

2.SNP REPORTS FOR JUNE AND JULY

- Monitoring included (cont.):

- SNP stations required to be sampled are presented in Table 2;
- New approved Effluent Quality Criteria (EQC) is presented in Table 3.

2.SNP REPORTS FOR JUNE AND JULY

- Table 1: Water Management at the Mine Site

MONTH	Freshwater Pumped (m3)	Sewage (m3)	Treated Effluent Discharged to SL (m3)
Jan	0	0	0
Feb	0	0	0
March	0	0	0
Apr	132	0	0
May	1,781	126	0
June	1,494	155	26,124
July	1,406	149	143,825
TOTAL	4,813	430	169,949

2. SNP Reports for June and July 2020

Fig 1: SNP Sampling Stations

2. SNP Reports for June & July 2020

- Table 2: SNP stations required to be sampled for Water Quality as per MV2019L2-0004 (NEW)

SNP Station	June	July
02-02 North Pile drainage collection ditch	Y	Y
02-02b East Influent Storage Pond	N	N
02-02c West Influent Storage Pond	N	N
02-05 Uncontrolled s.r. at Bulk Sample Mine Rock Pad	Y	Y
02-06 Uncontrolled surface runoff (s. r.) at Quarry Site	Y	Y
02-11Seepage well down gradient from Dam 1 near Snap Lake shoreline	N	N
02-14 Water Management Pond	Y	Y
02-15 Water Intake from Snap Lake	Y	Y
02-16i Sewage Discharge from Sewage Treatment Plant prior to mixing with Water Treatment Plant Effluent	Y	Y
02-17b Final Combined WTP, WTP Monthly Rolling Average and Daily Inline Chloride and Measured TDS of Effluent	Y	Y

2. SNP Reports for June & July 2020

- Table2: SNP stations required to be sampled for Water Quality as per MV2019L2-0004 (NEW)

SNP Station	June	July
2-17c Discharge from East Influent Storage Pond to Snap Lake main basin. Monitoring to characterize the quality of Water from the East Influent Storage Pond to SL	N	N
2-17d Discharge from West Influent Storage Pond to Northwest arm of SL. Monitoring to characterize the quality of water from the West Influent Storage Pond to SL	N	N
2-20d, 2-20e, 2-20f Snap Lake on the edge of the mixing zone around the diffuser (3 stations at 200 meters from diffuser)	Y	Y
2-20h,I In SL main basin, two stations located on the edge of the mixing zone 200 m from the East Influent Storage Pond discharge location	N	N
2-20j,k in Northwest arm of SL, two stations located on the edge of the mixing zone 200m from the West Influent Storage Pond discharge location	N	N

Y: yes, sampled N: no sampled

2. SNP Reports for June & July 2020

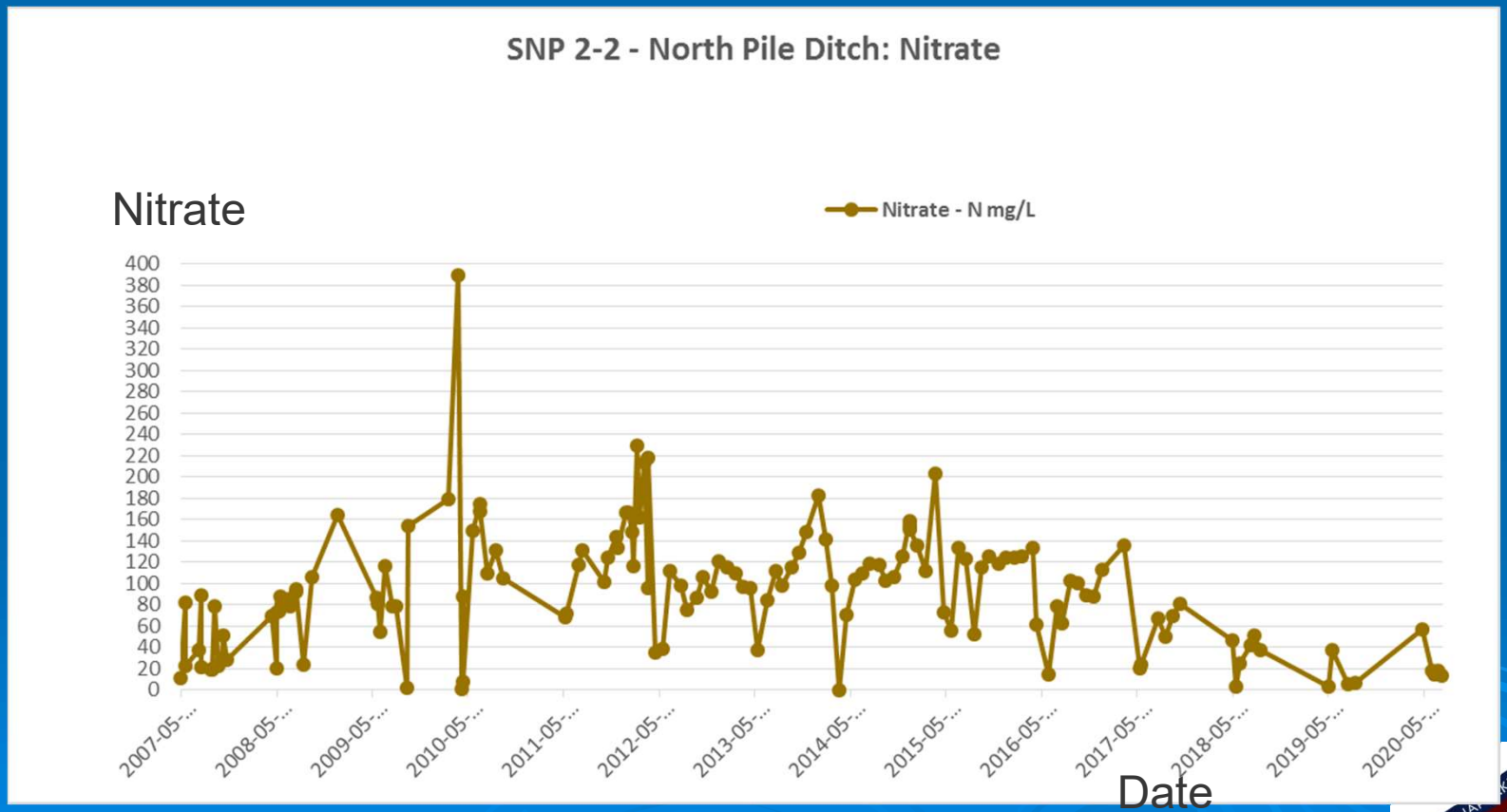
- Table3: Effluent Quality Criteria (EQC) as per MV2019L2-0004 (NEW)

Parameter	Maximum Average Concentration	Maximum Grab Concentration
Nitrate – N (mg/L)	60	80
Total Suspended Solids (mg/L)	15	25
Total Petroleum Hydrocarbons (mg/L)	-	5
Faecal Coliforms	10 CFU/100mL	20 CFU/100mL

And pH between 6 - 9

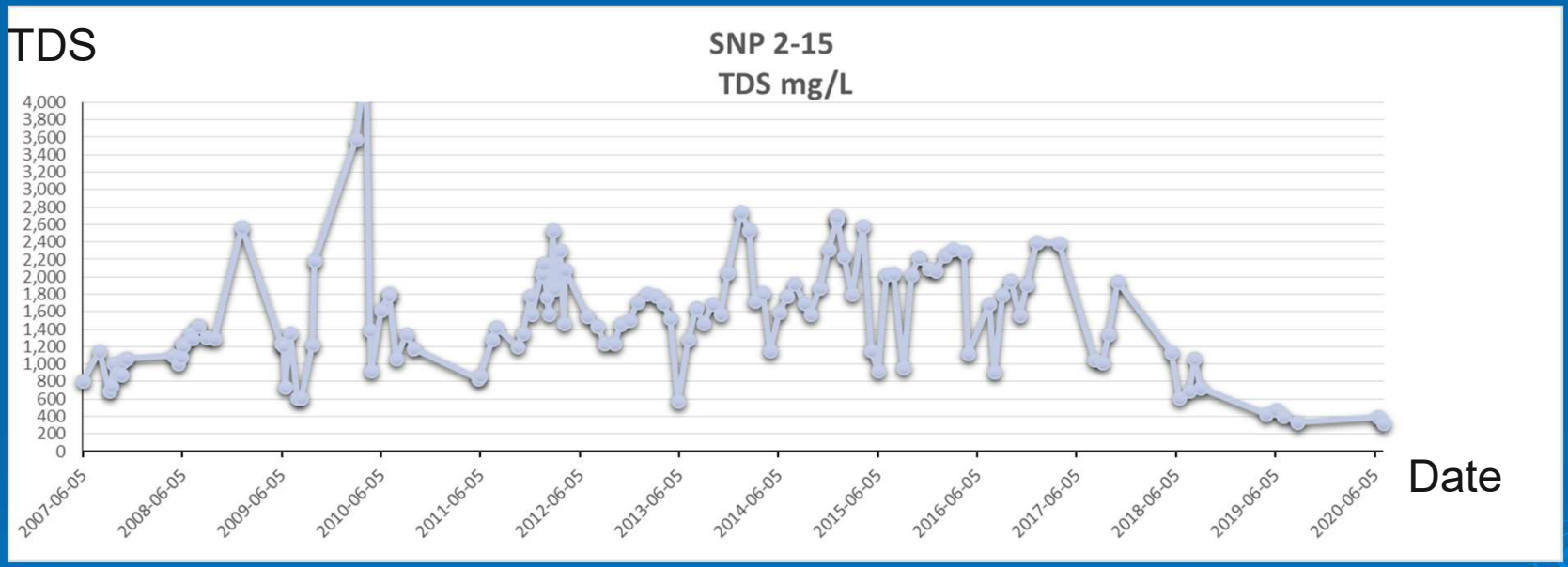
2. SNP Reports for April & May 2020

- Graph 1: Nitrate in SNP02-02 North Pile Collection Ditch, Data 2007-2020



2. SNP Reports

- Graph 2 TDS at SNP 02-15 Snap Lake Water Intake, Data from 2007 to 2020



3. Geotechnical Inspection

- **Regulatory Annual Geotechnical Inspection of Engineered Structures**:

From July 14 to July 17, 2020 an onsite geotechnical inspection was conducted by the Engineer of Record (EOR) ;

The Geotechnical Inspection was conducted as per Part F, Condition #11 of the Water Licence;

3. Geotechnical Inspection

- **Regulatory Annual Geotechnical Inspection of Engineered Structures:**

The Geotechnical Inspection included:

- North Pile Starter Cell perimeter embankments
- North Pile East Cell perimeter embankments
- Mitigation and maintenance pre-planning/risk assessment

3. Geotechnical Inspection

- **Regulatory Annual Geotechnical Inspection of Engineered Structures (Cont.):**

  - Instrumentation location and protection
  - North Pile Perimeter water control structures review
  - IL6 ditch review
  - WMP Dam 1 and Dam 2 inspection

A Geotechnical Inspection Report will be provided to the Board and the Inspector within 60 days of the completion of the inspection.

4. GNWT Inspector Reports

- **August 18 GNWT Inspection Report**

An Inspection of the Snap Lake Diamond Mine Project was conducted by Inspector Joe Heron on August 18, 2020;

The following areas were inspected:

- North Pile & North Pile Perimeter Sumps
- Water Management Pond
- Water & Sewage Treatment Plants
- Fuel Storage & Transfer Facilities
- Waste Transfer Area & Landfill
- Spill NT-NU 2020176

4. GNWT Inspector Reports

- **August 18th GNWT Inspection Report:**

- The Inspector was notified as per Water Licence MV2019L2-0004 Part B, Condition #22 of an exceedance of faecal coliforms at SNP 02-17b that occurred during the July 28, 2020 sampling;
- The Inspector noted that non-compliance is currently under investigation by the Licensee as sampling downstream at SNP 02-16i showed faecal coliforms were within the licenced EQC limits in both the in-house and lab sample results;

4. GNWT Inspector Reports

- August 18th Inspection Report:

  - Also, the Inspector requested to be notified by the Licensee of the findings of the investigation when the findings become available.

  - No major concerns were reported by the Inspector regarding the inspected facilities

4. GNWT Inspector Reports

- North Pile Inspection:
  - On the North Pile, thermistors were installed in two locations to monitor ground temperatures and covered over with rock to protect them from the elements (Photos #1 & #2).
  - In addition to the installation of the thermistors, the Starter Cell perimeter embankments on the North Pile were buttressed with rock to ensure their stability (Photo#3).

4. GNWT Inspector Reports

Photo 1: Thermistors used to measure ground temperatures have been installed and covered over with rock on the North Pile to protect from the weather elements.

4. GNWT Inspector Reports

Photo 2: A look at addition thermistors that have been installed in the northwest area of the North Pile.

4. GNWT Inspector Reports

Photo 3: An example of reinforced embankments on the North Pile cells.

4. GNWT Inspector Reports

- North Pile Inspection:

  - Areas on the North Pile, such as roadways, were re-sloped to ensure proper drainage and to prevent the pooling of water.

  - Other additional drainage structures were re-established such as the drainage culverts into the cells as seen in Photo #4.

4. GNWT Inspector Reports

Photo 4: Survey points within a cell on the North Pile. As seen, the majority of the water has been pumped out of the cells and culverts have been re-established to promote proper drainage.

4. GNWT Inspector Report

- North Pile Inspection:
  - As seen in Photo #5, the majority of water within the containment cells on the North Pile was pumped out and down into the North Pile sumps.
  - The pumping of water from the North Pile sump system to the Water Management Pond was ongoing and continued until the seasonal closure of the mine.
  - No concerns were noted regarding the pumping of water from the cells or the structural work that was completed during the Summer Season 2020 at the Snap Lake Mine North Pile

4. GNWT Inspector Reports

Photo 5: Pumps were set up along the North Pile perimeter and were pumping water down into the North Pile sump system.

4. GNWT Inspector Reports

- North Pile Inspection:
  - Water from the North Pile sumps (Photos #6-#11) continued to be pumped out as much as possible prior to the seasonal mine shutdown with water reporting to the Snap Lake Mine Water Management Pond.

  - The North Pile sump stationary pumps were being shut down for the winter season and portable pumps were being prepared for removal and staging for the winter (Photo #12).

4. GNWT Inspector Reports

- North Pile Inspection:

No concerns were noted regarding the North Pile sump pumping and pump staging activities at the Snap Lake Mine during the seasonal shutdown

4. GNWT Inspector Reports

Photo 6: A mobile pump was set-up at the North Pile Sump #1 and was pumping water clear of the sump to ensure over-winter capacities.

4. GNWT Inspector Reports

Photo 7: As seen here, the majority of the water within the North Pile Sump #1 was pumped out.

4. GNWT Inspector Reports

Photo 8: Water levels within Sump #2 were minimal and capacity was made available for the Winter & Spring freshet 2021.

4. GNWT Inspector Reports

Photo 9: Looking east at Sump #3. The sump was pumped clear of water.

4. GNWT Inspector Reports

Photo 10: Looking west at the Sump #4 pumphouse and sump.

4. GNWT Inspector Reports

Photo 11: Looking west at Sump #5.

4. GNWT Inspector Reports

Photo 12: Equipment such as frost fighters and pumps were being staged indoors at the Mechanical Shop #2.

4. GNWT Inspector Reports

- **Water Management Pond (WMP)**
  - The pumping of water from the WMP continued up until the seasonal closure of the Mine to ensure there is capacity available through the winter season and spring freshet 2021 (Photos #13 & #14).
  - The staff gauge at the WMP was tipped over and was re-installed and surveyed into place prior to the seasonal closure of the mine as per Water Licence MV2019L2-0004 Part B, Condition #17.

4. GNWT Inspector Reports

- **Water Management Pond**
- Properly installed staff gauges within the North Pile sumps and the WMP allows for the remote winter visual monitoring of water volumes and helps to identify actions that may be triggered by water levels with the Snap Lake Mine water management system.

- **No additional concerns were noted by the Inspector regarding water the Snap Lake Mine WMP.**

4. GNWT Inspector Reports

Photo 13: Looking north at the mine Water Management Pond. The pond was being pumped clear to ensure capacity over-winter.

4. GNWT Inspector Reports

Photo 14: Looking west along the WMP containment dyke and cameras that will be used for the winter monitoring program.

4. GNWT Inspector Reports

- **Water & Sewage Treatment Plants**
  - Water that is pumped from the mine WMP reports to the Water Treatment Plant (WTP) and is either discharged to the underground when capacities allow (Photo #15) or is treated prior to discharge via a diffuser into Snap Lake.
  - Sewage is treated and sampled prior to reporting to the WMP.
  - All treated water and sewage at is required to meet Effluent Quality Criteria (EQC's) prior to discharge into the receiving environment.

4. GNWT Inspector Reports

Photo 15: Water levels in the underground are monitored at this FAR access vent.

4. GNWT Inspector Reports

- **Water & Sewage Treatment Plants**
  - As seen in Photos #16-#21, the shutdown of the mine water treatment system was well underway. As part of the shutdown, the reverse osmosis plant was decommissioned for the season and the water treatment system was being prepared for over-winter storage.
  - Water lines onsite were also being blown clear of water and no concerns were noted by the Inspector regarding the seasonal shutdown.

4. GNWT Inspector Reports

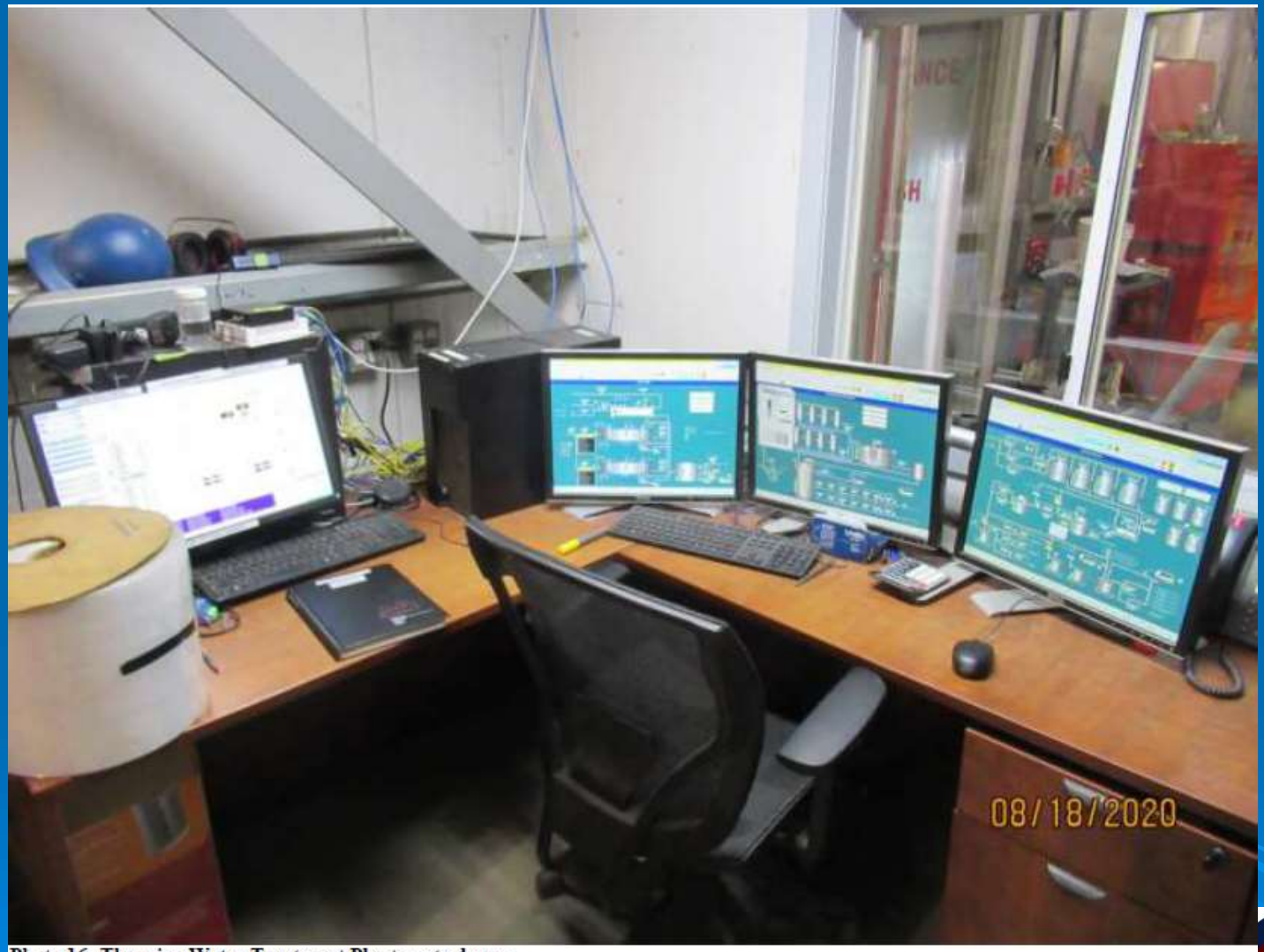


Photo 16: The mine Water Treatment Plant control area.

4. GNWT Inspector Reports

Photo 17: Crews were pressure washing the WTP disc filters prior to disassembly.

4. GNWT Inspector Reports

Photo 18: The disc filters will be removed and staged for the winter once they are cleaned with pressurized water.

4. GNWT Inspector Reports

Photo 19: The filters have been removed from the reverse osmosis filtration unit as part of the seasonal shutdown.

4. GNWT Inspector Reports

Photo 20: The RO unit filters and other components of the water treatment system being prepared for over-winter storage.

4. GNWT Inspector Reports

Photo 21: Water reports to these pressure filters, then to the pH tank and is eventually is discharged into Snap Lake.

4. GNWT Inspector Reports

- **Fuel Storage & Transfer Facilities**
- During the June 18, 2020 inspection it was noted secondary containment structures onsite required maintenance to ensure adequate capacities were available in the event of fuel spills.
- As seen in Photos #22-#30, sumps within the fuel tank berms, at the fuel transfer stations and secondary containment structures were being pumped out on a regular basis with a vacuum truck.

4. GNWT Inspector Reports

- **Fuel Storage & Transfer Facilities**
  - The pumped water was then trucked to and disposed of at the mine WMP prior to being pumped underground or treated and disposed of into Snap Lake.
  - It appeared hydrocarbon staining was kept to a minimum and no concerns were noted by the Inspector regarding the maintenance of fuel containment storage and transfer facilities onsite

4. GNWT Inspector Reports

Photo 22: Water from the 12 million litre fuel tanks was being pumped out from the berm sump.

4. GNWT Inspector Reports

Photo 23: Secondary containment structures have been pumped clean of water at this fuel farm transfer station.

4. GNWT Inspector Reports

Photo 24: Water was being actively pumped out of the sump within the 330,000 L fuel storage tank facility.

4. GNWT Inspector Reports

Photo 25: The 330,000 L fuel transfer facility was being prepared for the seasonal over-winter shutdown.

4. GNWT Inspector Reports

Photo 26: Water from this sump at the transfer station in Photo #25 was sucked out via vacuum truck and transported to the mine WMP.

4. GNWT Inspector Reports

Photo 27: The remaining water from this tank berm will be sucked out with a vacuum truck and brought to the WMP.

4. GNWT Inspector Reports

Photo 28: The lines of active drums must be properly diapered with hydrocarbon absorbent matting prior to the seasonal shutdown.

4. GNWT Inspector Reports

Photo 29: Hydrocarbons from the mine generator station were being drained and put into totes and will be staged for the winter.

4. GNWT Inspector Reports

Photo 30: Water from within the berm of the tank seen in Photo #29 was sucked out with a vac truck and deposited into the mine WMP.

4. GNWT Inspector Reports

- **Waste Transfer Area & Landfill**
- At the waste transfer area, final burns within the camp incinerators was ongoing (Photos #31 & #32).
- The mine burn pit was shut down for the season and was restored for the winter season (Photo #33).
- Ash and waste metals that are collected from the incinerators and the burn pit are placed into the ash bin (Photo #34).
- Once full, the ash in the bin is tested to ensure its suitability for disposal at the mine landfill (Photo #35).

4. GNWT Inspector Reports

- **Waste Transfer Area & Landfill**
- Waste that is not deemed acceptable for deposit into the landfill is containerized, labelled and staged prior to shipment offsite and disposal at an approved facility (Photos #36 - #38).
- No concerns were noted by the Inspector regarding the waste management activities occurring at the Snap Lake Mine
- It appeared hydrocarbon staining was kept to a minimum and no concerns were noted by the Inspector regarding the maintenance of fuel containment storage and transfer facilities.

4. GNWT Inspector Reports

Photo 31: Crews were conducting final burns of burnable waste at the mine incinerators.

4. GNWT Inspector Reports

Photo 32: Water from within the incinerator fuel tanks will be sucked out with a vacuum truck and deposited into the mine WMP.

4. GNWT Inspector Reports

Photo 33: As seen here, the mine burn pit operations were complete for the season and the area was restored until next season.

4. GNWT Inspector Reports

Photo 34: Ash from the mine incinerators is deposited into this ash bin prior to testing and disposal.

4. GNWT Inspector Reports

Photo 35: It appeared only acceptable materials were being placed into the mine landfill.

4. GNWT Inspector Reports

Photo 36: Materials within the WTA lined berm were properly labeled and containerized.

4. GNWT Inspector Reports

Photo 37: Properly containerized and labeled waste at the mine WTA that is awaiting transfer offsite disposal at approved facilities.

4. GNWT Inspector Reports

Photo 38: Staged hydrocarbons adjacent to the mine generator building that will be used for necessary over-winter operations.

4. GNWT Inspector Reports

- **Spill NT-NU 2020176**
- On June 11, 2020 a spill of treated Effluent occurred near the diffuser discharge ramp area and was recorded as Spill NT-NU 2020176.

- The water discharge line was repaired and it appeared the water diversion berms on the ramp were re-established as per the Inspectors instructions during the June 18, 2020 inspection (Photos #39 & #40).

4. GNWT Inspector Reports

- **Spill NT-NU 2020176**

- The lake water quality was not affected by the event and no further concerns were noted by the Inspector regarding the spill;
- It seemed the mitigative measures undertaken by the Licensee were in compliance with Water Licence MV2019L2-0004 Part H, Condition #5.
- Spill NT-NU 2020176 was closed by the Inspector on the NT-NU Spill Line database.

4. GNWT Inspector Reports

Photo 39: The repaired water discharge line at the NT-NU 2020176 spill site.

4. GNWT Inspector Reports

Photo 40: This berm that was previously washed away in parts has been completely restored.

4. GNWT Inspector Report

- **INSPECTOR CONCLUSION**

- Overall, Closure & Maintenance activities at the Snap Lake Mine appeared to be in compliance with Water Licence MV2019L2-0004 conditions and associated plans.

- The Inspector received notification on August 26, 2020 about the final over-winter preparations made at the Snap Lake Mine.

4. GNWT Inspector Report

- **INSPECTOR CONCLUSION**

- The Inspector appreciates the efforts undertaken by the Licensee to ensure proper communication channels were kept open and the water licence compliance issues were discussed in a timely manner.
- The Licensee should ensure the Inspector is notified of the re-commencement of seasonal operations during the Spring 2021 as per Water Licence MV2019L2-0004 Part B, Condition #17.

5. Update on Snap Lake Mine Water Licence Programs & Reports

Aquatic Effects Monitoring Program (AEMP) Response Framework for drinking water

- In December 2019, De Beers notified the MVLWB of a Low Action Level Trigger for manganese in drinking water:

- In compliance with Water Licence condition G, item 7, De Beers provided an AEMP Response Plan in March 2020:

5. Update on De Beers Snap Lake Mine WL

AEMP Response Framework for drinking water

- The response plan was sent out for public review; comments were received from ECCC, GNWT-ENR, GNWT-Lands, SLEMA, and the MVLWB;

- The MVLWB requested De Beers submit revisions to the Manganese Response Plan

- The revised Manganese Response Plan was resubmitted in May 2020

5. Update on De Beers Snap Lake Mine WL

<u>AEMP Response Framework for drinking water</u>

On July 28, MVLWB issued a letter to DB with the following directions:

- The Board directs De Beers to revise the AEMP Response Plan, version 2, to provide a trigger of implementing the mitigation measures that would be used prior to exceeding the significance threshold (exceeding the Health Canada drinking water guidelines);

5. Update on De Beers Snap Lake Mine WL

<u>AEMP Response Framework for drinking water</u>

On July 28 MVLWB issued a letter to DB with the following directions (Cont.):

- The Board directs De Beers to consider GNWT-ENR comment ID-4 and recommendation for bi-weekly sampling during closure of the Snap Lake Mine and incorporate that in the submission of the AEMP Design Plan under Licence MV2019L2-0004.

5. Update on De Beers Snap Lake Mine WL

AEMP Response Framework for drinking water

On August 31, the Board issued a letter informing that the requested information was received by the Board on August 27, 2020, after which Board staff confirmed concordance;

The AEMP Response Plan Version 3 is considered approved.

6. Update of Environmental Agreement

No updates related to the EA

7. SLEMA ACTIVITIES UPDATE

- 1) SLEMA Review of the SNP monthly reports

SLEMA reviewed monthly SNP reports submitted by DeBeers and found them sound and according to the regulatory requirements, with no major issues.

- 2) SLEMA is currently working on the review of the Data and Reports previously submitted by the DeBeers (AEMP and SNP Reports) to ensure consistency between info submitted and discussed and in order to gather the background information to be consulted during the coming review of the plans and programs