SLEMA August 2011 Environmental Update

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August 31, 2011

Outline

1. Mine Update
2. Inspection Update
3. Regulator Update
4. Stakeholders' Update
5. Reviews

Acronyms

- AANDC – Aboriginal Affairs and Northern Development Canada (previous INAC – India and Northern Affairs Canada)
- AEMP – Aquatic Effects Monitoring Program
- ARD – Acid Rock Drainage
- DFO – Fisheries and Oceans Canada
- EC – Environment Canada
- ENR – Department of Environment and Natural Resources, GNWT
- GNWT – Government of the Northwest Territories
- MVLWB – Mackenzie Valley Land and Water Board
- PK – Processed Kimberlite
- SLEMA – Snap Lake Environmental Monitoring Agency
- SNP – Surveillance Network Program
- TDS – Total Dissolved Solids
- WEMP – Wildlife Effects Monitoring Program
- WTP – Water Treatment Plant
- WMP – Water Management Pond

1.1 Mine Update – July 2011

- Production rate: 72.5 % of its capacity (70,807 tonnes of kimberlite processed)
- 3,553 m^3 of water withdrawn from Snap Lake
- 758,375 m^3 of treated water discharged into Snap Lake
- 63,419 tonnes of coarse reject and 52,276 m^3 of slimes deposited in the North Pile
- 4 spills (1 reportable)
- Water sampled in 8 monitoring stations
  - The monthly average for all parameters met compliance except
    - Nitrate at SNP 02-17 (Temporary Water Treatment Plant) on July 1-10
    - Nitrate and ammonia at SNP 02-09.4 and SNP 02-09.5 (at the base of the AN sump)
- Construction and grubbing of the East Cell continued

1.2 Response to Inspector Concerns Raised during the July Inspection

- Dated July 21, 2011
- Elevated Nitrate in the WMP
  - Currently testing nitrate levels in house to facilitate the management of higher nitrates in the water.
  - Also investigating options for mitigating elevated nitrate levels
- Elevated copper at the pond located near Connor's laydown area
  - will be retested to confirm results and trends. If confirmed, a mitigation plan will be developed

1.3 Notice of Commencement of Work

- Dated August 9, 2011
- The commencement of work for the replacement of the diffuser and outfall at Snap Lake Mine is on August 12, 2011

1.4 Response to Review's Comments on Water Licence Renewal

- Dated August 18, 2011
- 115 pages of comment response table provided

2. Inspection Update

- INAC Inspector – Tracy Covey
- Water Licence Inspection
  - August 3-4, 2011
- Land Use Permit Inspection
  - August 3-4, 2011

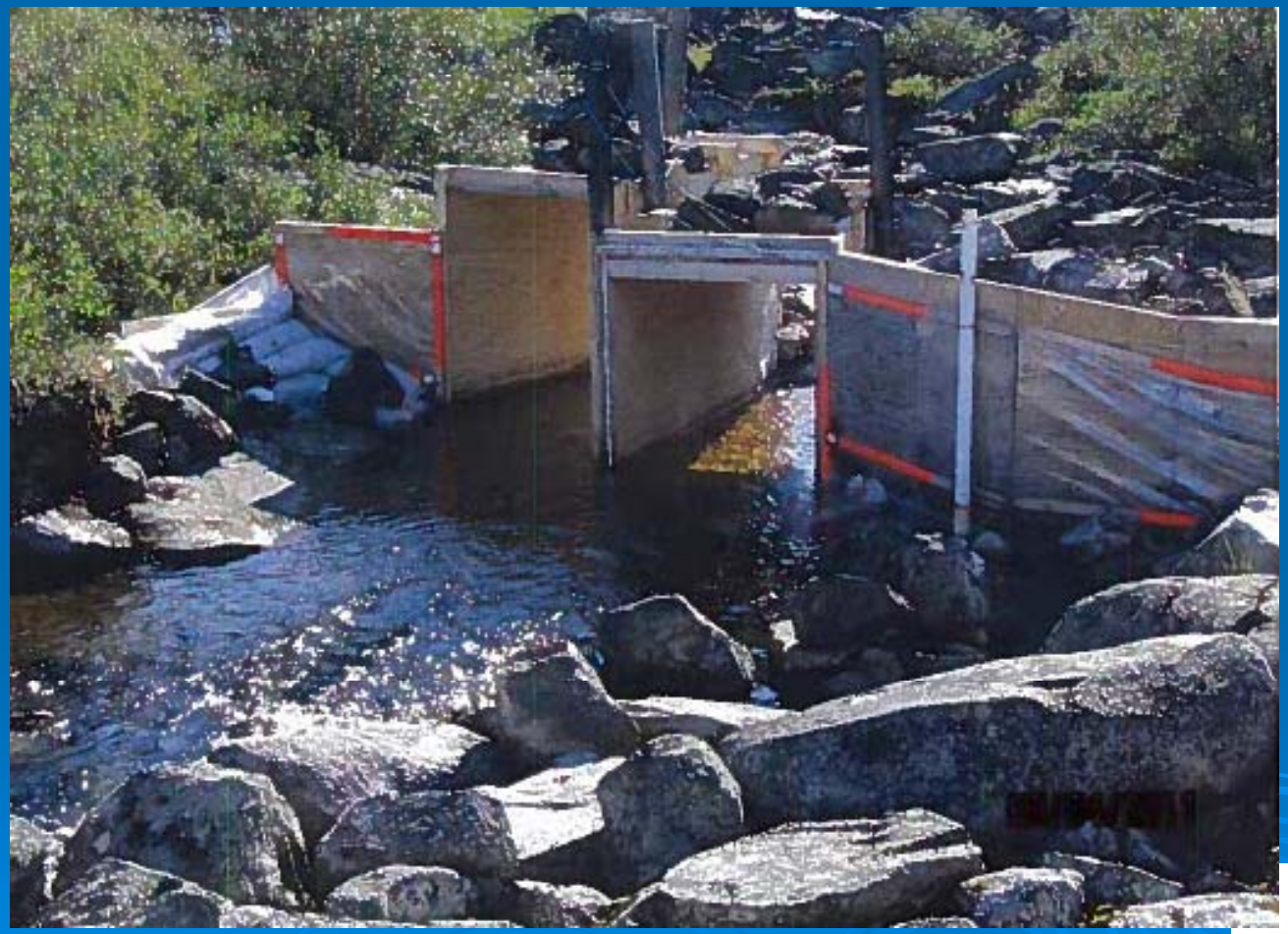
2.1 Water Licence Inspection

- August 3-4, 2011
- Inspected the drilling program, water management, waste management, AEMP and Closure and Reclamation Plan
- Environmental risks identified
  - Elevated Copper at SNP 02-05 for at least two consecutive months (exceeding uncontrolled runoff criteria)
    - A mitigative plan must be submitted to the MVLWB/Inspector by September 30
- Environmental risks identified in previous inspections remains
  - Reclamation status report
  - Elevated ammonia situation at the historic AN storage pad

Section of Pipe and Weights for the Diffuser Replacement Project

The sump at the AN Pad remains a potential source of future ammonia contamination

The flume for flow measurement at one of the two outlets of Snap Lake



2.2 LUP Inspection

- Dated, 2011
- Inspected the North Pile, drilling program, wildlife monitoring, waste management, and fuel storage
- No environmental risk noted but
  - Concerns remain about the reporting requirements on the status of reclamation

De Beers was directed to remove scattered wood, plastic, and waste from the snow dump area

Bull caribou was observed entering the Starter Cell

Fuel berm established around the newly relocated Helicopter Pad

3. Regulator Update

- MVLWB
  - On August 3, 2011, requested De Beers respond to the reviewer comments for the Water Licence Renewal Application
    - Due on August 12
  - On August 5, requested De Beers to respond further questions in order to follow the requirements of the Water and Effluent Quality Management Policy
    - Due on August 26

3. Regulator Update

- MVLWB
  - On August 18, decided that the Snap Lake Mine is exempt from the preliminary screening provisions of the Mackenzie Valley Resource Management Act
  - On August 18, 2011, accepted De Beers Adaptive Management Plan
    - Through the current water licencing renewal process, the requirement outlined for the Plan will be assessed

4. Stakeholders' Update

- DFO
- The Northwest Territory Metis Nation (NWTMN)
- GNWT/ENR

4.1 DFO

- DFO retained Dr. Scannell to review the Work Plan for the Total Dissolved Solids Study by Golder Associates
  - Dr. Scannell replied on May 30, 2011
    - Concerned that there are no tests that address toxicity of TDS to fish in the Plan
    - Quoted one study by Stekoll et al (2003) that
      - For short (24- to 96-hour) exposures, fertilization was the most sensitive stage to TDS exposure.
      - Fertilization rates were reduced in concentrations of TDS as low as 250 ppm (mg/L)

4.2 NWTMN

- Requested an extension of two weeks for the water licence application review on August 18, 2011
  - MVLWB response
    - Due date for review was July 28, De Beers responded to reviewers' comments on August 18
    - Next comment period would be the intervention stage, in preparation for the public hearing

4.3 GNWT/ENR

- On August 26, 2011, the Department of Environment and Natural Resources verified attendance at the Technical Session to be held on September 14-16
- Additionally, ENR did not intend to formally intervene in the Water Licence renewal process

5. Reviews

- 2011 DO Monitoring Report
- 2011 TDS Monitoring Report
  - Submitted on July 28, 2011
- Site-specific Nitrate Toxicity Evaluation
  - Technical memorandum prepared by Golder Associates for De Beers Snap Lake Mine on August 31, 2011
- Toxicity Analysis Reports in July 2011
  - Submitted on August 31, 2011

5.1 2011 DO Monitoring Report

- Dissolved Oxygen (DO)
- Submitted on July 28, 2011
- The monitoring confirmed that the concentrations of DO in Snap Lake were at levels considered healthy for fish and other aquatic organisms
  - With the exception of two locations within the northwest arm, where low DO concentrations has been observed since 2007
- Overall, DO concentrations in Snap Lake do not appear to have decreased as a result of Mine water discharge
  - In 2011, increases rather than reductions in bottom DO concentrations were observed around the diffuser relative to Northeast Lake

Comments from the Environmental Analyst

- No concerns are raised

5.2 2011 TDS Monitoring Report

- Total Dissolved Solids (TDS)
- Submitted on July 28, 2011
- Monitoring during the 2010 open-water period and the 2011 ice-covered period confirmed that the concentrations of TDS near the fish habitat compensation structures, and throughout Snap Lake, were below 350 mg/L
- The maximum TDS concentrations measured near the fish habitat compensation structures and throughout Snap Lake were 213 mg/L and 246 mg/L, respectively

Comments from the Environmental Analyst

- No concerns are raised

5.3 Site-specific Nitrate Toxicity Evaluation

- Technical memorandum prepared by Golder Associates for De Beers Snap Lake Mine on August 31, 2011
- The Canadian water quality guidelines (WOGs) for nitrate (NO_3^-) is 2.93 mg/L (as N, CCME 2003)
- Updated water quality model predicted the exceedance of the CCME WOG as early as 2016
  - **2011 predictions (as high as 4.2-4.4 mg/L)** > 2.93 mg/L (CCME 2003 WOG)
- Evaluation was triggered to determine
  - Reach levels of potential environmental concern?
    - If so, operational changes required?

Conclusion of Golder's Literature Review

Protection of aquatic life	Amphibian	Invertebrate	Fish
Nitrate Threshold, mg/L (as N)	30	30	6.25

- 2.93 mg/L (CCME 2003 WOG) < **2011 predictions (4.2-4.4 mg/L) < 6.25 mg/L (site-specific WOG)**
- The increase of TDS over the operational life of the Mine (when nitrate concentrations are expected to increase) will be associated with an increase in water hardness
- Toxicity test results show convincingly that the **toxicity** to invertebrate, including early life stage toxicity to salmonids, **is ameliorated with increasing hard**

Comments from the Environmental Analyst

- The technical memorandum present valuable information on nitrate toxicity assessment
- No further comments

5.4 Toxicity Analysis Reports in July 2011

- Received on August 31, 2011
- Water Treatment Plant (WTP) effluent samples taken on July 12 and Temporary Water Treatment Plant (TWTP) effluent samples taken on July 31 were tested
  - By HydroQual Laboratories Ltd. (Calgary) during July and August
- Standard biological test methods used
- 4 analysis reports for each samples submitted
  - Algae, Ceriodaphnia, Trout, and Daphania
  - No negative effects occurred

5.4 Toxicity Analysis Reports in July 2011

- The reports provide adequate information about the toxicity assessment of water samples
  - No evidence of Western Science about negative effects of mine operation on tested species
- No concerns from the Environmental Analyst, SLEMA