



Gahcho Kué Diamond Mine

Water Licence Amendment MV2005L2-0015

Yellowknife, NT

September 30 – October 1, 2020

Overview

- Effluent Quality and Site-Specific Water Quality Objectives
- Area 8 Water Management
- Management and Tracking of PAG Waste Rock
- Security

EQC and SSWQO

- SSWQO should be achievable, and not be set higher than is reasonable and EQC should be set such that SSWQO are met in the receiving environment.
- De Beers requests the use of mine-influenced ambient hardness in the calculation of SSWQO.
- Using mine-influenced water hardness incrementally increases metal loading into the system. This may result in adverse effects to aquatic life.
- The GNWT believes metal parameters with hardness-dependent SSWQO should continue to be calculated using baseline hardness in the receiving environment.
- Given the model conservatism, De Beers has not demonstrated that the currently approved use of baseline hardness in the calculation of SSWQO is not consistently achievable.



EQC and SSWQO

- **GNWT recommends that Lake N11 and Area 8 baseline water hardness continue to be used in the calculation of metal parameters that have a hardness-dependent SSWQO.**
- **GNWT recommends that if additional mitigation is needed to meet SSWQOs or EQC, De Beers investigate all potential options for minewater management.**



EQC for WMP Discharge to Lake N11

- De Beers has proposed to remove fluoride, ammonia as N, total aluminum, total cadmium, total chromium and total iron from the list of currently approved EQC.
- GNWT is of the opinion that all parameters currently included in the approved list of EQC for the discharge from the WMP to Lake N11 should remain in the Water Licence.
- According to the EQC Report, these EQC are consistently achievable.
- The regulation of these parameters provides assurance that concentrations in the effluent are in accordance with the model predictions.
- This is in accordance with the objective to minimize waste to be deposited to the receiving environment (MVLWB, 2011).



EQC for WMP Discharge to Lake N11

- **GNWT recommends the EQC for fluoride, ammonia as N, total aluminum, total cadmium, total chromium and total iron remain in the Water Licence as currently authorized for the discharge from the WMP to Lake N11.**



Total Phosphorous EQC and SSWQO

- De Beers requests that the total phosphorus EQC and SSWQO in Lake N11 be maintained as currently authorized, despite the fact that total phosphorus concentrations are predicted to exceed the SSWQO in Lake N11.
- Based on De Beers' rationale, GNWT acknowledges that the predictions are believed to be conservative, and effects in the receiving environment will be monitored in accordance with the AEMP.
- As such, the EQC and SSWQO for total phosphorous should be maintained as currently authorized.

Total Phosphorous EQC and SSWQO

- **GNWT recommends the total phosphorus EQC that applies to discharge from the WMP to Lake N11 remain in the Water Licence as requested by De Beers.**
- **GNWT recommends maintaining the total phosphorus SSWQO that is currently approved for Lake N11 and Area 8, as requested by De Beers. GNWT will continue to provide feedback through the AEMP to ensure action levels and responses related to nutrient enrichment are appropriate.**



Fluoride SSWQO

- De Beers has proposed to revise the SSWQO for fluoride from 1.94 mg/L to 1.19 mg/L.
- The GNWT supports De Beers' revised proposal of a SSWQO for fluoride of 1.19 mg/L.

Fluoride SSWQO

- **GNWT recommends the SSWQO for fluoride in Lake N11 and Area 8 be revised to 1.19 mg/L.**



Cadmium EQC

- De Beers requests that the cadmium EQC for the discharge from the WMP to Lake N11 be removed from the Water Licence.
- GNWT notes that the 2020 data exceeded the existing MAC EQC, and the increasing trend observed in 2018, 2019, and 2020 is higher than site model predictions.
- The rationale provided by De Beers is insufficient to support the removal of cadmium EQC.
- Maintaining the existing cadmium EQC will ensure the SSWQO will continue to be met at the edge of the mixing zone in Lake N11.



Cadmium EQC

- **GNWT recommends that the existing cadmium EQC that applies to discharge from the WMP to Lake N11 be maintained in the amended Water Licence given the increasing trend observed in 2018, 2019, and 2020.**

Manganese EQC

- In the EQC Report, manganese is not identified as a POPC and therefore De Beers does not propose an EQC.
- Under-ice manganese concentrations in 2019 triggered a low action level for toxicological impairment in Lake N11.
- Upward trends in manganese concentrations in the WMP are predicted to continue during operations.
- GNWT notes incremental loadings of manganese into Lake N11 should be controlled until such time that the manganese source is determined.
- GNWT maintains that manganese be included as a POPC and an EQC of 0.11 mg/L be developed for WMP discharge to Lake N11.



Manganese EQC

- **GNWT recommends that total manganese be included in the list of POPC for Lake N11 and that an EQC for manganese be established at 0.11 mg/L for the discharge from the WMP to Lake N11.**

Aluminum SSWQO

- De Beers has proposed a revised SSWQO for aluminum in Area 8 and Lake N11.
- In their application, De Beers requested that the SSWQO for aluminum be updated to the USEPA (2018) guideline that considers pH, dissolved organic carbon, and hardness.
- The derivation methodologies for the USEPA criteria and CCME guidelines differ slightly in the level of protection considered and the toxicity-based statistical endpoints used to derive SSWQO.
- In response to IR #8, De Beers recalculated the USEPA criteria using statistical endpoints that are consistent with the CCME methodology.
- GNWT agrees with the revised approach for calculating the aluminum SSWQO.



Aluminum SSWQO

- **GNWT recommends the revised aluminum SSWQO calculation methodology, provided in response to IR #8 be approved for Lake N11 and Area 8. As stated in recommendation #1, baseline hardness should be used.**



Area 8 Water Management

- De Beers no longer intends to discharge water from CP1 to Area 8 during operations.
- Because the Water Licence is currently undergoing an amendment, it is the appropriate time to remove any Water Licence conditions that are no longer relevant, including those related to discharge to Area 8.
- GNWT concludes it is appropriate to remove SNP 03 in addition to SNP 04 from the Water Licence.



Area 8 Water Management

- **GNWT recommends that as the Water Licence is currently undergoing an amendment, it is the appropriate time to remove any water licence conditions that are no longer relevant.**
- **GNWT recommends that the SNP specify that discharge of water from CP1 (Area 7) to Area 8 is prohibited.**



Water Licence Condition to Track the Management of PAG Waste Rock

- GNWT sought clarification for the reporting mechanism for the quantity and location of PAG material place in the CPKMRP, should this be required.
- The Board asked the GNWT to provide language for the Water Licence for the reporting of PAG material placed and stored in each designated area.



Water Licence Condition to Track the Management of PAG Waste Rock

- **GNWT recommends that the Board revise the wording of Part B, item 10, 1. (k) (iii) as follows:**

“The monthly and annual quantities in cubic meters (m³) and tonnes (t) of Waste Rock placed in the South Mine Rock Pile, West Mine Rock pile, and **Coarse Processed Kimberlite and Mine Rock Pile**, identifying the classification of quantities of each rock type, geochemical classification and its disposal location.”



Quantifying PAG Material for Contingency Storage in the CPKMRP

- De Beers proposes to use the CPKMRP to store small amounts of PAG material, for operational flexibility.
- At the Technical Session, De Beers was unable to provide an estimated quantity of PAG material to be potentially stored in the CPKMRP.
- In their Response to Interventions, De Beers provided a table outlining potential PAG zones, timing, and quantities of PAG that could be stored in the CPKMRP.
- According to the table provided by De Beers, there is sufficient storage in the current waste rock piles to accept all of the PAG material.
- De Beers has not provided sufficient rationale for storing PAG material in the CPKMRP.



Quantifying PAG Material for Contingency Storage in the CPKMRP

- **GNWT recommends that the CPKMRP not be approved for the storage of PAG material.**



Revised Security Estimate

- The GNWT has completed an assessment of the current liability associated with the Water Licence to develop an update to the estimate of mine closure cost.
- The estimated cost of reclamation increases from \$94,653,375 to \$101,222,765 for year 11, and \$92,242,344 to \$98,651,203 for year 14.



Revised Security Estimate

- The GNWT recommends that the MVLWB set the overall security for the site (MV2005L2-0015 and MV2005C0032) at \$101,222,765.00 for Year 11, and recommends the amount held for the land liability is set at \$40,512,054 and for water liability at \$58,139,149.
- The GNWT recommends that the MVLWB set the overall security for the site (MV2005L2-0015 and MV2005C0032) at \$98,651,203.00 for Year 14, and recommends the amount held for the land liability is set at \$40,512,054 and for water liability at \$58,139,149.



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