# De Beers Canada Mining Inc.
# March 2018 Water Licence Amendment
# Water Licence MV2005L2-0015

Yellowknife, NT

July 25-26, 2018

Government of
Northwest Territories

# Presentation Overview

- Introduction
- EQCs and SNP
- Waste Rock Mine Pile Expansion
- Closure and Liabilities
- Water Usage
- Other

# Effluent Quality Criterion – Lake N11

Chloride

- De Beers has requested an increase to the chloride EQC.
- The current EQC will no longer be achievable however SSWQOs will still be maintained in the receiving environment.
- There may be some uncertainties related to chloride loadings.

# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with the proposed increase for chloride EQCs to 300 mg/L maximum average and 515 mg/L maximum grab. However, if monitoring results indicate that the chloride concentration exceed 120 mg/L at the edge of the mixing zone, the EQCs will need to be reduced accordingly.***

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# Effluent Quality Criterion – Lake N11

Fluoride

- De Beers has requested an increase to EQC for fluoride.
- The current EQC will no longer be achievable.
- De Beers has proposed an updated SSWQO of 1.5 mg/L (CDWQG) which will be met in the receiving environment should the increase to EQC be approved.

# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with the proposed increase in EQC for fluoride to 1.5 mg/L maximum average and 3.0 mg/L maximum grab.***

***GNWT supports De Beers' proposed fluoride SSWQO of 1.5 mg/L.***

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# Effluent Quality Criterion – Lake N11

Sulphate

- De Beers has requested a decrease to EQC for sulphate and water quality predictions indicate that this decrease is achievable.

***Recommendation:***

***GNWT has no concern with the proposed reduction of the EQC for sulphate to 100 mg/L maximum average and 155 mg/L maximum grab.***

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# Effluent Quality Criterion – Lake N11

Nitrate

- De Beers has requested an increase to EQC for nitrate.
- De Beers has proposed a hardness-adjusted SSWQO similar to that which has been proposed for Ekati.
- Modeling predicts that the SSWQO will be met in the receiving environment should the increase to EQC be approved.

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# Effluent Quality Criterion – Lake N11

Nitrate

- GNWT is opposed to the use of anthropogenically-induced hardness.
  - There are scientific uncertainties related to hardness-adjusted SSWQOs.
  - Hardness adjusted EQC/SSWQO are contrary to waste minimization principles in Water and Effluent Management Policy.
- GNWT understands nitrate is a by-product of blasting, and source control can be effective.

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# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT is concerned that the nitrate increase relies upon anthropogenically induced hardness. However, the GNWT could support the requested increase provided De Beers reconfirmed its efforts to reduce nitrate in the WMP and continued progress on addressing blast residue as part of the nitrate response plan.***

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# Effluent Quality Criterion – Lake N11

Ammonia

- De Beers has requested a decrease to EQC for ammonia and water quality predictions indicate that this decrease is achievable.

***Recommendation:***

***GNWT has no concern with the proposed reduction in EQC for ammonia.***

# Effluent Quality Criterion – Lake N11

Phosphorus

- De Beers has requested a decrease to the EQC for phosphorus.
- However, temporary exceedances of the phosphorus SSWQO are anticipated during under-ice periods.
- Phosphorus and nitrate work together to support growth in aquatic plants, they have the potential to impact trophic status.

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# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concerns with the reduction in EQC for phosphorus. GNWT will continue to provide feedback through the AEMP to ensure phosphorus and nitrate concentrations and nutrient enrichment action levels and responses are appropriate.***

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# Effluent Quality Criterion – Lake N11

Aluminum

- De Beers has requested an increase to EQC for aluminum.
- The current EQC will no longer be achievable however SSWQOs will still be maintained in the receiving environment.

# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with the proposed increase of the EQC for aluminum to 0.23 mg/L maximum average and 0.35 mg/L maximum grab.***

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# Effluent Quality Criterion – Lake N11

Chromium

- De Beers had originally requested an increase to the maximum grab EQC for chromium.
- Based on discussions, it was determined by De Beers that the requested increase was no longer necessary.

# Effluent Quality Criterion – Lake N11

Copper

- De Beers has requested an increase to the EQC for copper.
- The current EQC may no longer be achievable however SSWQOs will still be maintained in the receiving environment.

# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with the proposed increase to the EQC for copper of 0.004 mg/L maximum average and 0.007 mg/L maximum grab.***

# Effluent Quality Criterion – Lake N11

Iron

- De Beers has requested an increase to the EQC for iron.
- The current EQC will no longer be achievable however SSWQOs will still be maintained in the receiving environment.

# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with the proposed increase to the EQC for iron to 0.6 mg/L maximum average and 1.0 mg/L maximum grab***

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# Effluent Quality Criterion – Lake N11

Molybdenum, Nickel and Uranium

- De Beers has requested that the EQCs for Mo, Ni and U be removed from the Water Licence.
- Conclusions from the EQC Report indicate that based on projected concentrations, EQCs are not necessary for these parameters.

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# Effluent Quality Criterion – Lake N11

***Recommendation:***

***GNWT has no concern with De Beers' request to remove molybdenum, nickel and uranium from the EQC list at this time. Concentrations should still be collected as part of the SNP.***

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# Discharging Beyond Year 4 – Lake N11

- De Beers indicated that there was interest in discharging beyond Year 4.
- An IR was issued at the technical session to confirm that EQCs and SSWQOs would be achievable.
- The response indicated that several parameters would exceed EQCs as well as SSWQOs.

# Discharging Beyond Year 4 – Lake N11

***Recommendation:***

***Given that multiple parameters are predicted to be above EQC and SSWQO, GNWT recommends that approval of Year 5 discharge not be granted at this time.***

# Effluent Quality Criteria – Area 8

- There was discussion about the addition of EQC in the event that WMP water was stored in Area 7 as a contingency.
- De Beers proposed that copper would be the sole EQC for run-off water in Area 7, and has also proposed a set of EQC to be used in the event that the contingency storage is implemented.

# Effluent Quality Criteria – Area 8

- GNWT's position is that one set of EQC which are protective and achievable will provide administrative efficiency, additional clarity to the Inspector, and provide operational flexibility to De Beers.

# Effluent Quality Criteria – Area 8

***Recommendation:***

***ENR recommends that a single set of EQC be included in the Water Licence that is applicable to all discharges from Area 7 into Area 8. These are noted in Table 2 of De Beers June 20th response, as follows:***

| Parameters of Potential Concern | Effluent Quality Criteria | |
|---|---|---|
| | Maximum Average Concentration | Maximum Grab Concentration |
| Chloride, mg/L | 100 | 200 |
| Fluoride, mg/L | 1 | 2 |
| Nitrate, mg N/L | 4 | 8 |
| Total phosphorus, mg P/L | 0.009 | 0.018 |
| Total aluminum, mg/L | 0.083 | 0.17 |
| Total cadmium, mg/L | 0.00004 | 0.00008 |
| Total chromium, mg/L | 0.001 | 0.002 |
| Total copper, mg/L | 0.002 | 0.003 |

mg/L = milligrams per litre; N = nitrogen; P = phosphorus.

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# Effluent Quality Criteria – Area 8

Copper

- De Beers is anticipating that the SSWQO for copper will be slightly exceeded at the edge of the mixing zone in Area 8.
- GNWT notes that the EIR accounted for slight exceedances of the copper benchmark and did not identify significance.

# Effluent Quality Criteria – Area 8

Copper

- GNWT notes that copper exceedances will be small, occuring during a short period in winter.
- GNWT notes that predictions are believed to be conservative and may not be realized.
- Conditions in Area 8 will be monitored as part of the AEMP.

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# Effluent Quality Criteria – Area 8

***Recommendation:***

***GNWT is concerned that copper may exceed the SSWQO in Area 8. The GNWT could support the EQC for copper provided that De Beers continue to review copper concentrations and evaluate effects via the AEMP.***

***GNWT will continue to provide review feedback through the AEMP regarding copper and appropriate action levels and management response actions.***

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# Effluent Quality Criteria – Area 8

Phosphorus

- De Beers is anticipating that the SSWQO for phosphorus will be slightly exceeded at the edge of the mixing zone in Area 8 during under-ice periods.
- GNWT refers to previous discussions on phosphorus relating to Lake N11.

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# Effluent Quality Criteria – Area 8

***Recommendation:***

***GNWT will continue to provide feedback through the AEMP to ensure phosphorus and nutrient enrichment action levels and responses are appropriate for Area 8.***

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# Surveillance Network Program (SNP)

SNP-02 and SNP-04

- De Beers has requested an amendment to conditions relating to pre-discharge sampling locations and approvals.
- GNWT has reviewed the proposal and recommended alternate wording to ensure discharge waters are protective of the receiving environment.

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# Surveillance Network Program (SNP)

**Recommendation:**

***GNWT recommends the following re-wording of condition Part G, Item 29 of the Water Licence proposed by De Beers:***

> ***"The Licensee shall provide water sampling results to an Inspector from the SNP stations ~~currently active within the~~ closest to the intake location in the Water Management Pond or Area 7 to determine the ability for the water to meet Effluent Quality Criteria during discharge to N11or Area 8 no later than five (5) days prior to any planned Discharge to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector."***

***GNWT recommends that the monitoring results provided to the Inspector prior to discharge should include all parameters for which applicable EQC exist, as well as any required toxicity testing outlined in the Water Licence.***

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# Surveillance Network Program (SNP)

Location of SNP-04

- De Beers had originally referenced that SNP-04 would require relocation.
- Based on discussions, it is GNWT's understanding that this relocation is no longer required.

# Surveillance Network Program (SNP)

SNP-07

- De Beers had originally proposed that an EQC for faecal coliforms be added to discharge into Lake N11 and Area 8.
- Upon discussion, it was clarified that this was not required and that faecal coliforms would be regulated from the sewage treatment plant.

# Expansion of the West Mine Rock Pile

Storage of PAG Material

- Through the process, there were questions from GNWT regarding the long-term management of PAG material and whether it would be impacted by the expansion of the WMRP.
- De Beers confirmed that PAG material will continue to be managed in a manner similar to that which is previously approved.

# Expansion of the West Mine Rock Pile

Water Management

- GNWT requested clarification from De Beers regarding seepage management from the WMRP during closure.
- De Beers outlined various options to deal with eventualities regarding undesirable seepage water quality.
- GNWT will continue to provide recommendations on this area through the closure planning process.

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# Closure

Security

- If approved, the WMRP expansion will have implications on the amount of reclamation security required for site.
- De Beers was required to submit an updated security estimate subsequent to GNWT's intervention submission.
- GNWT is actively participating in the security review process with the Board and De Beers.

# Closure

Progressive Reclamation of Area 7

- GNWT requested if the use of Area 7 for flow augmentation inhibits its progressive reclamation potential.
- De Beers responded that it is not anticipated that this amendment will inhibit the potential to restore Area 7 earlier in mine life.

# Closure

Kennady Lake

- GNWT requested information regarding whether the additional permanent loss of Kennady Lake area would have any implications on establishing a functioning aquatic ecosystem post-closure.
- De Beers responded that the surface area has been reduced by 20.1% but will still be a medium-sized lake that can support a fish assemblage post-closure.

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# Water Use

Water Use Increase

- De Beers has requested that annual water use be increased from 27,000 $m^3$/year to 45,000 $m^3$/year.
- De Beers provided supplemental information to GNWT alleviating any concerns regarding potential impacts.

# Water Use

***Recommendation:***

***GNWT has no concern with De Beers request to increase annual water use to 45,000 $m^3$/year from Area 8.***

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# Water Use

Discharge Limits into Lake N11

- De Beers had originally requested that annual water discharge limits into Lake N11 from the WMP be changed from the anniversary year to a calendar year.
- Upon discussion and a subsequent IR, De Beers noted that they no longer require the change provide there is some flexibility around Year 5 discharge and additional testing is not required on the WL anniversary date.

# Water Use

Discharge Limits into Lake N11

- GNWT does not see any additional benefit of sampling on the WL anniversary date as requirements to monitor prior to and at the end of discharge, as well as weekly monitoring, already exist.
- Regarding discharge into Year 5, ENR references recommendations previously in the regard.

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# Water Use

***Recommendation:***

***GNWT supports De Beers request that additional sampling not be required on the anniversary date of the Water Licence. Regular monitoring should occur during discharge periods.***

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# Other Amendments

Modification

- De Beers has requested that the definition of modification be amended to include expansion.
- Similar to other processes, GNWT's position remains that expansions may cause changes to the scope or the footprint of the mine which may require an amendment. As such, they cannot be processed as a modification.

# Other Amendments

***Recommendation:***

***GNWT recommends that the definition not be changed.***

# Thank You