



The Government of the Northwest Territories Department of Environment and Natural Resources (ENR)

Public Hearing Presentation

De Beers Canada Inc. Gahcho Kuè Project Water Licence Application MV2005L2-0015

Yellowknife, NT
May 6th - 8th, 2014



Northwest
Territories Environment and Natural Resources



Presentation Overview

- Construction/Operational Management Plans
- Waste Management
- Site Specific Water Quality Objectives
- Effluent Quality Criteria
- Aquatic Effects Monitoring Plan
- Adaptive Management/Management Response
- Closure and Reclamation
- Security
- Closing



Management Plans

- De Beers provided draft management plans with their updated water licence application.
- De Beers has identified that the management plans are key to minimizing impacts to the environment. For this reason the draft management plans must be updated and submitted for approval.
- The management plans provided are preliminary in nature and in order to be effective require additional descriptions and details related to management actions, monitoring and management response.
- Further, De Beers should be required to develop management plans for the initial phase of the project, specifically construction.



Management Plans

- Specific management plans that should be developed for the construction phase of the Gahcho Kuè Project include:
 - Dyke Construction Management Plan
 - To describe mitigations, monitoring and thresholds specific to dyke construction activities.
 - Construction Water Management Plan
 - To describe mitigations and thresholds specific to dewatering activities, such as pumping rates, downstream flow thresholds, in-line treatment systems, etc.
 - Construction Erosion and Sedimentation Plan
 - To describe mitigations measures, monitoring type and frequency, and, sedimentation thresholds within the water management pond and the downstream receiving environment.



Management Plans

Recommendations

ENR recommends that a Dyke Construction and Management Plan be submitted to the Board for approval 90 days prior to the commencement of dyke construction activities. This plan would outline the construction methods, mitigation methods, action levels, monitoring and reporting requirements related to the activities associated with each proposed dyke.

ENR recommends that a Construction Water Management Plan be submitted to the Board for approval 60 days prior to the commencement of de-watering activities.

ENR recommends that an Operational Water Management Plan be submitted to the Board for approval prior to Year 1 of operations that covers aspects of Water Management during operations including the Water Management Pond.

ENR recommends that a Closure Water Management Plan be submitted to the Board for approval prior to Year 11 of operations that covers aspects of Water Management and the refilling of Kennady Lake.



Management Plans

Recommendations

ENR recommends that a Construction Erosion and Sediment Management Plan be submitted to the Board for approval 60 days after issuance of the water licence. This Plan should contain information on specific erosion sensitive areas, measures to prevent and/or control erosion, details on linking monitoring results and mitigation, and assessment of erosion and sedimentation mitigation measures.

ENR recommends that an Operational Erosion and Sediment Management Plan be submitted to the Board for approval prior to Year 1 of operations that covers aspects of Water Management during operations including the WMP. This Plan should contain information on specific erosion sensitive areas, measures to prevent and/or control erosion, details on linking monitoring results and mitigation, and assessment of erosion and sedimentation mitigation measures.

ENR recommends that a Closure Erosion and Sediment Management Plan be submitted to the Board for approval prior to Year 11 of operations that covers aspects of Water Management and the refilling of Kennady Lake. This Plan should contain information on specific erosion sensitive areas, measures to prevent and/or control erosion, details on linking monitoring results and mitigation, and assessment of erosion and sedimentation mitigation measures.



Management Plans

Recommendations

ENR recommends that De Beers submit, as part of an Annual Report, lists of erosion susceptible areas encountered the previous year, a summary of mitigation applied at erosion sensitive areas, and a report of the performance of mitigation applied to these areas.

ENR recommends that the proponent conduct a correlation survey to verify the positive relationship between turbidity and TSS. This survey must be completed prior to the discharge of water to ensure that the receiving environment is protected.

ENR recommends that the proponent develop method detection limits for all instruments used for field measurements. ENR notes that each instrument will have individual variability potentially affecting the correlation to TSS.

ENR recommends that the proponent develop a robust Standard Operating Procedure (SOP) that includes the frequency of verifying the correlation survey, and the frequency that instrumentation will be re-calibrated against National Institute of Science and Technology (NIST) traceable standards. This SOP should be included as part of a management plan that governs the discharge of water to the environment (i.e. construction water management plan).



Waste Management & Incineration Management Plans

- The proponent has committed to working with ENR and Environment Canada to further discuss waste management concerns and issues identified for the Gahcho Kuè Project. However, there have been no formalized discussions to date.
- The proponent seems committed to looking into alternative options for waste management, however, few formal commitments have been provided prior to the submission of ENR's written intervention.
- It is anticipated that updates will be incorporated into the final Waste Management (WMP) and Incineration Management Plan (IMP).



Waste Management & Incineration Management Plans

Recommendations

ENR suggests that the proponent submit for Board approval an updated WMP and IMP within 30 days of the issuance of a LUP/WL. All technical comments should be addressed by the proponent to reduce the potential for environmental impacts from waste management. If there are any significant alterations to operations during the life of the project (i.e. design and storage of materials, alternative means of disposal etc.), ENR recommends that the Waste Management Plan and Incineration Management Plan be submitted a minimum of 60 days prior to any changes in operations for approval by the Board.

ENR recommends that the MVLWB include a requirement for stack testing for the projects incinerator to ensure that its operation is compliant with the CCME CWS standards for dioxins, furans and mercury emissions. ENR notes that the Board authorizes the WMP, thus the board is authorizing the incineration of waste in the NWT. Thus compliance testing should be incorporated into the licence as a regulatory tool at an established frequency.

ENR suggests that the MVLWB include a testing requirement for waste oil and residual ash, including analytical criteria, in the proponents water licence for the appropriate management of potentially hazardous waste.



Site Specific Water Quality Objectives

- ENR views WQO, or SSWQOs, as the “Standard for Water” which should be maintained in order to preserve the present and future integrity and uses of an aquatic ecosystem.
- De Beers has proposed Water Quality Objectives (WQO) for the Gahcho Kuè Project.
- ENR staff conducted a review of the proposed WQO for Lake N11.
- ENR has concerns with the WQO Protocol and assumptions as proposed by De Beers.
 - Specifically, pristine baseline water quality defaults to a WQO that is less protective.



Site Specific Water Quality Objectives

- Further, ENR notes using a regional value (i.e. Kirk Lake watershed) as an estimate of baseline may not provide adequate protection to the immediate receiving body (i.e. Lake N11).
 - Using a regional baseline concentration for mercury concentration may not protect against bioaccumulation and biomagnification in Lake N11.
- De Beers has also applied a hardness adjustment factor of 50 mg/L to many of the proposed predevelopment WQOs.
 - The current mean hardness in Lake N11 is 5 mg/L.
 - National guidance reference only ambient/background hardness concentrations.
- ENR maintains that the Board consider the pollution prevention principle as outlined in their Water and Effluent Policy when setting SSWQOs and EQC for the Gahcho Kuè Project.



Site Specific Water Quality Objectives

Recommendations

ENR recommends the Board use the narrative statements established by MVEIRB in Suggestion #1 and #2 when deriving SSWQOs for Lake N11, Area 8 and Kennady Lake post-closure.

ENR recommends that specific baseline values, as opposed to regional baseline values, should be used when deriving SSWQOs for Lake N11, Area 8 and Kennady Lake post-closure.

ENR recommends that the SSWQO for mercury should be set to concentrations that are within the range of naturally occurring background concentrations in Lake N11, Area 8 and Kennady Lake post-closure.

ENR recommends that the hardness concentration used for calculating hardness dependent SSWQOs should reflect the baseline hardness concentration and not the altered conditions predicted as a result of mining activities (anthropogenic sources).



Effluent Quality Criteria (EQC)

- De Beers has proposed EQC for five (5) parameters and used a dilution factor of nearly 42 times to back-calculate concentrations from their proposed WQOs.
- ENR is concerned with the completeness of the list of EQC proposed by De Beers and the proposed dilution factor.
- ENR's position is EQC for a facility should be reflective of a list of likely contaminants from each source onsite.
 - De Beers has identified the likely sources of contaminants from the Gahcho Kuè Project.
 - The five EQC proposed by De Beers do not include any of the parameters expected from saline groundwater.
- Separate EQC will also need to be developed for discharges to Area 8 (via Lake J1b).



Effluent Quality Criteria (EQC)

Recommendations

ENR recommends the Board take the approach of minimizing changes to the receiving environment as a means of minimizing environmental impacts to Lake N11, Area 8 and the downstream aquatic ecosystem when setting Effluent Quality Criteria.

ENR recommends that the Board include Effluent Quality Criteria for TDS, Chloride, Fluoride, Arsenic, and Chromium as well as Nitrate – N, Total Ammonia – N, Total Phosphorous, Total Suspended Solids (TSS), and pH for discharges to Lake N11 and Area 8.

ENR recommends that the Board use a dilution factor of 5 times when calculating Effluent Quality Criteria, to account for contaminant loading in Lake N11. At this time, ENR does not have a recommendation for Area 8.



Effluent Quality Criteria (EQC) – cont.

- De Beers stated that water will only be discharged to the environment from the water management control structures (Water Management Pond) for a period of three (3) years, limited to the open water season.
- ENR understands that De Beers intends to store the remainder of water in the Water Management Pond and other control structures within Kennady Lake for the rest of the mine life.
 - Accumulating water within the WMP will allow De Beers to operate without a water treatment plant.
- ENR is concerned that the quality of water in the Water Management Pond after a few years of operation will degrade to a point that no discharge can occur unless it is treated.
- Additionally, De Beers has requested a change in toxicity testing from Rainbow Trout to Fathead Minnow.
 - A review has identified that the two test organisms have different sensitivities to different TDS contaminants.



Effluent Quality Criteria (EQC) – cont.

Recommendations

ENR recommends that the water discharge period during operations be restricted to three years as proposed by De Beers. If any additional water is discharged later in the mine life, it must meet all EQCs and established WQOs for the immediate receiving waters.

ENR recommends the utilization of both the early life stage (ELS) rainbow trout and larval fathead minnow toxicity tests for at least one year of mine effluent discharge during operations, to determine which species would be more sensitive to TDS originating from the mine. These results would assist the Board in making a final decision with respect to this issue, in addition to input from the proponent and other stakeholders.



Aquatic Effects Monitoring Plan

- The MVEIRB EIR included a requirement for a “Follow-Up Program” which includes a requirement to follow AANDC’s 2009 AEMP Guidelines.
- The AEMP should be developed using input from all interested parties and include Traditional Knowledge – Working Group
- ENR is opposed to the exposure reference (Multiple Control Impact) design described by the proponent.
 - ENR believes that the most appropriate design for the AEMP is a Before-After, Control Impact (BACI) design.
- The AEMP must be linked to a Management Response framework.
 - The AEMP must include clear action levels and response actions.



Aquatic Effects Monitoring Plan

Recommendations

ENR recommends that De Beers Canada be required to follow the “Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories, June 2009” in the development of its Aquatic Effects Monitoring Program, action levels, and related Management Response Framework for the Gahcho Kuè Project. The AEMP should be submitted to the Board for review and approval 12 months following approval of the water licence or prior to discharge of mine water to the receiving environment.

ENR recommends that the recently formed AEMP Working Group continue to help develop an AEMP for the Gahcho Kuè Project.

ENR recommends that Action Levels be set in the AEMP for aquatic effects based upon the findings from the EIR.



Northwest
Territories Environment and Natural Resources



Aquatic Effects Monitoring Plan

Recommendations

ENR recommends that the De Beers AEMP be redesigned based upon the BACI framework in conjunction with the AEMP working group. This will ensure that effects from the project are clearly identified through the program and management actions can be appropriately implemented to mitigate potential effects to the aquatic environment.

ENR recommends that the proponent address the deficiencies associated with the Plankton baseline data. Specifically ENR recommends that De Beers modify its AEMP and other sampling programs to provide weekly/biweekly sampling for a minimum of one ice-free season. ENR's position is that this will create an understanding of;

- ***Seasonal plankton community dynamics, including any bloom formation.***
- ***Annual productivity estimates.***
- ***Trophic status, and its vulnerability to project-related impacts.***

ENR recommends that De Beers should modify its AEMP to provide for a more intensive plankton-sampling effort (e.g., three campaigns), with a shorter sampling interval (e.g., four weeks).



Adaptive Management/Management Response

- De Beers has committed to applying the principles of adaptive management to a number of operational management plans for the mine operation.
- For an adaptive management/management response strategy to be effective, it needs:
 - pre-defined action levels or thresholds; and,
 - proposed mitigation designs, policies, and practices linked to these action levels as a clear and testable starting point for adaptive management.
- ENR is of the opinion that a site-wide Adaptive Management/Management Response Framework should be developed for the mine that covers the multitude of plans under the De Beers environmental monitoring and management framework described in the Draft Adaptive Management Plan.



Adaptive Management/Management Response

Recommendations

ENR recommends that the Board require a stand-alone site-wide Adaptive Management/ Management Response Plan for approval 90 days following issuance of the water licence.

ENR recommends that the Board provide clear definitions of Adaptive Management terms such as “action level”, “management response framework”, etc. and use consistent wording within the licence when referring to the Adaptive Management Plan, Management Response Framework, etc.

ENR recommends that the Board explicitly require an Adaptive Management/ Management Response Plan for the mine. The plan should include overarching framework as well as action levels from other specific management plans, such as: Geochemistry Monitoring Plan, Dewatering Monitoring Plan, Groundwater Monitoring Plan, Air Quality Monitoring Plan, Wildlife Effects Monitoring Plan, Wildlife and Wildlife Habitat Protection Plan, Explosive Management Plan, Erosion and Sediment Management Plan, etc.



Closure and Reclamation

- De Beers has submitted a Draft Closure and Reclamation Plan as part of its water licence application.
- The plan is conceptual and should be updated based on input from Aboriginal groups, interested parties and regulators – Working Group.
- Over the course of the security review process, De Beers has identified a few areas where closure options are available to help reduce potential impacts post-closure.
- ENR has concerns with the quality of water in the Water Management Pond at closure and the amount of time required for the Water Management Pond/Kennady Lake to re-integrate into the local ecosystem under the De Beers refilling strategy.



Environment and Natural Resources



Closure and Reclamation

Recommendations

ENR recommends that a working group be established to assist De Beers in the Closure and Reclamation Planning process to help define closure options, goals, objectives and criteria.

ENR recommends that the Board require that an Interim Closure and Reclamation Plan be submitted for review and approval within one (1) year of issuance of the water licence.

ENR recommends that a key element of the closure planning process, during operations, should be to identify and develop methods to reduce the period of time required for recovery of the WMP. This should include pumping the entire contents of the WMP to Tuzo pit to reduce the time to close Kennady Lake and return it to a sustainable ecosystem.

ENR recommends that closure goals, objectives and criteria be developed for the WMP that must be met prior to, and following reconnection, with the downstream environment. These closure goals, objectives, and criteria should be developed in consultation with Aboriginal groups, interested parties, and regulators.



Reclamation Security

- There are defined legislated responsibilities regarding setting and holding reclamation security in the NWT.
- The Board ensures that an appropriate security amount is established within the water licence and land use permit authorizations, so that the cost of reclamation, including shutdown, closure and post-closure, is borne by the operator of the mine rather than the public.
- ENR staff worked with De Beers and its independent consultant, Brodie Consulting Limited, to prepare and estimate of the total reclamation liability for the Gahcho Kuè Project.
- There were a few areas of difference in the estimates submitted by De Beers and Brodie Consulting Limited.



Reclamation Security

- There were a few reasons for the different estimates:
 - The De Beers estimate was conducted in an alternate format that is somewhat different from the RECLAIM model.
 - The estimate provided by De Beers included any of the costs identified as optional costs, also referred to as closure options.
 - The estimate provided by ENR includes unit costs from the RECLAIM Model for consistency between security estimate for different operators.
 - Guiding principles included in the ENR estimate, such as; no provision for salvage or progressive reclamation.
- The two major areas of difference in the estimates were related to Waste Rock Pile and overburden storage and reworking at closure and Mobilization/Demobilization.
 - In all these two components totaled 71% of the difference.
- ENR attempted to schedule the security amounts based upon project milestones where increments to the liability would be the greatest.



Northwest
Territories Environment and Natural Resources



Reclamation Security

Recommendations

ENR recommends that the Board set the total amount of security for the Gahcho Kuè Project at \$84,471,700. This is comprised of a water related liability of \$67,608,611 and a land related liability of \$16,863,088. The water related liability should be placed within the water licence and the land related liability within the land use permit or other appropriate authorizations.

ENR recommends that the Board set the total liability associated with the Gahcho Kuè Project prior to construction at \$19,043,323. This is comprised of a water related liability of \$7,226,931 and a land related liability of \$11,816,392. This security could be scheduled over the construction period.

ENR recommends that the Board set the total liability associated with the Gahcho Kuè Project prior to mining and milling (assumed to be YR 1 of operations) at \$37,594,133. This is comprised of a water related liability of \$23,776,270 and a land related liability of \$13,817,863. The water related liability should be placed within the water licence and the land related liability within the land use permit or other appropriate authorizations.



Reclamation Security

Recommendations

ENR recommends that the Board set the total liability associated with the Gahcho Kuè Project in YR 4 (coincides with the end of mining in Hearne Pit) at \$79,690,301. This is comprised of a water related liability of \$64,489,504 and a land related liability of \$15,200,798. The water related liability should be placed within the water licence and the land related liability within the land use permit or other appropriate authorizations.



Concluding Remarks

- ENR would like to thank the MVLWB for providing the opportunity to present its technical intervention and associated recommendations.
- ENR looks forward to reviewing the draft water licence and providing closing arguments as per the MVLWB workplan.