



Ms. Angela Love
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th FLOOR, 4922 48th ST.
PO BOX 2130
YELLOWKNIFE, NT X1A 2P6

Dear Ms. Love:

Re: Snap Lake Water License Renewal (MV2019L2-0004) and Land Use Permit Amendment (MV2017D0032) Applications- GNWT Response to Undertakings

Thank you for your Undertaking Request dated November 29, 2019 related to the De Beers Canada Inc. Water Licence renewal (MV2019L2-0004) and Land Use Permit amendment (MV2017D0032) applications. Below please find the Government of the Northwest Territories' (GNWT) response to Undertakings #5 and #6.

Undertaking # 5

GNWT to provide an updated security estimate, in an Excel spreadsheet and as a PDF, to account for the updated security estimate that is due to be submitted by De Beers on December 16, 2019, per Undertaking #2. This is to include the proposed scenario of no constructed wetlands. A concordance table shall also be included that identifies the updates and the locations.

The GNWT contracted Brodie Consulting Ltd. (BCL) to review De Beers' updated financial security estimate. The updated security estimate was submitted by De Beers in response to Mackenzie Valley Land and Water Board (MVLWB) Undertaking #2 resulting from the Public Hearing held November 26 and 27, 2019.

The GNWT and BCL have reviewed De Beer's December 16, 2019 response to Undertaking #2 which includes an updated RECLAIM estimate with two (2) estimate scenarios (influent storage ponds and passive wetland treatment system included; and influent storage ponds included but no wetlands) and has provided a response to De Beers.

The following table summarizes the recommendations for additions to De Beers 2019 Financial Security Estimate outlined in BCL’s memo. Please refer to the attached memorandum by BCL for further details about the cost estimate.

Table 1. Summary of Recommended Revisions to De Beers Snap Lake Mine Financial Security Estimate

Reference Number	Description	Amount		Difference
		De Beers	GNWT	
Ref #1	Organics stockpile – increase quantity to be used in revegetation	\$152,545	\$524,790	\$372,245
Ref #2	Monitoring costs – increase labour rate	\$8,344,055	\$8,535,999	\$191,944
Ref #3	Maintain ICM ¹ at two years	\$1,707,209	\$3,439,985	\$1,719,992
Ref #4	Constructed Wetlands Amendments – include with Scenario 1 with additional information required from De Beers	-	-	-
Ref#5	SNP ² and AEMP ³ – update financial security estimate to reflect final plans following approval	-	-	-
	Total Security Scenario 1	\$80,287,612	\$83,152,933	\$2,874,321
	Total Security Scenario 2	\$71,081,458	\$73,946,780	\$2,865,322

¹ ICM – Interim Care and Maintenance

² SNP – Surveillance Network Program

³ AEMP – Aquatic Effects Monitoring Program

For Scenario 1, the estimate with the wetlands, the GNWT recommends that De Beers split the land and water liability at \$40,060,885 for the Land Use Permit and \$43,092,049 for the Water Licence, where a total final security to be held would be \$83,152,933.

For Scenario 2, the estimate with no wetlands, the GNWT recommends that De Beers split the land and water liability at \$42,155,802 for the Land Use Permit and \$31,790,978 for the Water Licence, where a total final security to be held would be \$73,946,780.

Undertaking # 6

GNWT to provide clarification on triggers in the proposed Water Licence that could be used to initiate the Plume Delineation Study and a second set of Effluent Quality Criteria (EQC).

A plume delineation study should be completed in the first open water season following the approval of the Reclamation Completion Reports for the North Pile (minus the landfill area) and all water management structures. This approach is also being proposed as criterion 1 for initiating a second set of EQC.

By conducting the Plume Delineation Study soon after all activities that could impact effluent quality are complete, the study will reflect water quality and, possibly, discharge rates that are the worst case (i.e. closest to the Influent Storage Pond (ISP) construction phase) for the Post-Closure period.

The trigger for setting a second set of EQC that will apply to the Post-Closure period should consider the completion of closure activities, the policy to minimize the deposition of waste (MVLWB/GNWT, 2017), and the principle of no long-term active care (MVLWB/AANDC, 2013). To reflect these considerations, the GNWT believes the trigger should be comprised of the following criteria:

Criterion 1: The Reclamation Completion Reports for the North Pile minus the landfill area and all water management structures have been approved by the Mackenzie Valley Land and Water Board.

Fulfilling this criterion would ensure that all activities associated with the North Pile (minus the landfill area which will need to remain open until the end of reclamation), the ISPs, and the Water Management Pond (WMP) are complete (e.g. blasting or excavating) as they could impact water quality. This criterion also defines a clear end point that does not leave room for interpretation.

AND

Criterion 2: Once criterion 1 is achieved, measured water quality parameters (total suspended solids (TSS), nitrate, total phosphorous, and cobalt) have demonstrated stable or decreasing trends for at least two open water seasons.

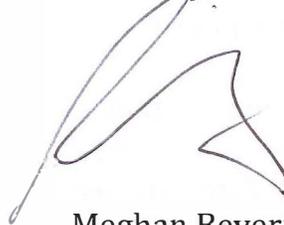
A large list of parameters for which this criterion must be met is unnecessary as most analysts are predicted to be well below Aquatic Effects Monitoring Program (AEMP) benchmarks. The GNWT is therefore recommending those parameters predicted to be within at least 50% of AEMP benchmarks for perimeter sumps 3 and 5 be used in criterion 2. The GNWT is recommending TSS be included to confirm erosion and sedimentation issues from closure activities are not ongoing.

Once criterion 1 is satisfied, concentrations are expected to decrease due to reduced weathering and leaching, and only small-scale variation in effluent quality is expected due to changes in precipitation. That variation will oscillate around a mean that is decreasing due to natural attenuation. For this reason, GNWT is of the opinion that two open water seasons should be sufficient to demonstrate stability of effluent water quality in the absence of on-site physical disturbances.

Meeting criterion 2 provides assurance that site conditions are suitable to transition into Post-Closure and that the effluent water quality is sufficiently understood to set long-term Post-Closure EQCs.

If you have any questions or concerns, please contact Mr. Rick Walbourne, Manager, Regulatory Assessment, at Rick_Walbourne@gov.nt.ca or 867-767-9180 ext. 53113.

Sincerely,

A handwritten signature in black ink, appearing to read 'Meghan Beveridge', with a stylized flourish at the end.

Meghan Beveridge
A/Director
Water Monitoring and Management
Environment and Natural Resources

- c. Mr. Nathen Richea
A/Assistant Deputy Minister
Environment and Climate Change
Environment and Natural Resources

Attachment:

Review of DeBeers Snap lake Mine Final Closure and Reclamation Plan Updated
Financial Security Estimate – Public Hearing Undertaking #2, Brodie Consulting Ltd.
January 20, 2020

References:

Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern
Development Canada. 2013. Guidelines for the Closure and Reclamation of
Advanced Mineral Exploration and Mine Sites in the Northwest Territories.

Mackenzie Valley Land and Water Board and Government of the Northwest
Territories. 2017. MVLWB / GNWT Guidelines for Effluent Mixing Zones.



MEMORANDUM

DATE: January 20, 2020

TO: Bill Pain; GNWT – ENR

FROM: Lara Fletcher, P. Eng. (BC, NT/NU)

SUBJECT: Review of DeBeers Snap Lake Mine Final Closure and Reclamation Plan
Updated Financial Security Estimate - Public Hearing Undertaking #2

1 INTRODUCTION

Government of Northwest Territories Department of Environment and Natural Resources (GNWT) has contracted Brodie Consulting Ltd. (BCL) to review De Beers' updated financial security estimate. The updated security estimate was submitted by De Beers in response to Mackenzie Valley Land and Water Board (MVLWB) Undertaking #2 resulting from the Public Hearing held November 26 and 27, 2019. Undertaking #2 required De Beers to update the security estimate to "account for the updates made throughout this proceeding."

De Beers response was provided as a memo prepared by Arktis Solutions¹ as well as updated RECLAIM estimates Excel files for the following two scenarios:

- Scenario 1 - Influent storage ponds and passive wetland treatment system included. De Beers' contingency closure option; and
- Scenario 2 - Influent storage ponds included but no wetlands. De Beers' preferred closure option.

The previous version of the security estimate for Scenario 1 was developed by Arktis in March 2019² to support the Water Licence (MV2019L2-004) and Land Use Permit (MV2017D0032) application to the MVLWB for final closure. A revised security estimate was also developed to reflect the option of no wetlands in July 2019³.

2 COMMENTS

GNWT provided recommendations regarding the security estimate for the mine in their Interventions⁴. De Beers responded to the Interventions⁵ and agreed with a number of the

¹ ARKTIS, 2019. RECLAIM Update for Closure of the Snap Lake Mine - Response to MVLWB Final Intervention Recommendations. Memorandum prepared for De Beers Canada Inc. December 11.

² ARKTIS, 2019. Snap Lake Mine 2019 Financial Security Estimate. March.

³ De Beers, 2019. Technical Session (July 16 to 18, 2019) Information Request Responses - Snap Lake Water Licence (MV2019L2-004) Application and Final Closure and Reclamation Plan. August.

⁴ GNWT, 2019. Technical Intervention for De Beers Canada Mining Inc. Snap Lake Diamond Mine Water Licence Renewal, MV2019L2-0004. October.

recommendations. The updated security estimates submitted by De Beers as Undertaking #2 reflect those of the recommendations that De Beers agreed to, as well as two other adjustments. A summary of all of the adjustments made are clearly described in Table 1 of Arktis' memo¹.

Only the recommendations that GNWT presented in the Interventions that De Beers did not agree to are repeated in the following sections of this memo. These recommendations have essentially been repeated from the memorandum prepared by BCL⁶ which was submitted as Appendix C of GNWT's Interventions. Some additional context, as well as tracking of the back and forth, has been added.

2.1 USE OF ORGANICS STOCKPILE FOR REVEGETATION (REFERENCE #1)

The Revegetation Plan⁷ indicates that there is approximately 130,100 m³ of salvaged material in the Organics Stockpile. In a more recent memo provided by De Beers on September 3, 2019⁸, the quantity is said to have been estimated at approximately 147,000 m³ with approximately 20% to 30% made up of boulders. That means that there is approximately 103,000 m³ - 118,000 m³ of non-boulder material in the stockpile available for revegetation.

According to the Revegetation Plan approximately 29,911 m³ of overburden is required to place a layer of 0.2 m thickness over the areas identified as Active-OFS (overburden-fertilizer-seed). That is only 25% to 29% of the amount stockpiled. The Revegetation Plan is currently for surplus organics to be left in place and revegetated.

In contrast, De Beers indicated during the technical session that as much as possible of the organic stockpile would be utilized for revegetation, whether for increasing the areas that the material will be spread, or increasing the depth in areas that it is planned for use (Technical Session Transcripts - Day 1, p.220).

In terms of the recommendation made in GNWT's Interventions to increase the quantity in the financial security estimate, De Beers responded that the organics stockpile constitutes one possible source of material for reclamation activities that has already been accounted for in the security estimate. Therefore, if the cost to use organics for revegetation is increased, the quantity should come out of other line items.

BCL disagrees for the following reasons:

- The line items that De Beers identify as possibly being sourced from the organics stockpile include rock cover, erosion protection, transition material and common fill (except Sheet Bldgs and Equip" Line 200 which includes 14,834 m³ of cover material for concrete foundations). However, organic material would: a) mostly not meet the specifications for rip rap, erosion protection and transition materials. Except for the larger rock fragments that have already been excluded from the volume estimate above;

⁵ De Beers, 2019. Snap Lake Water Licence (MV2019L2-0004) Application and Final Closure Plan - Response to Interventions. October.

⁶ BCL, 2019. Review of DeBeers Snap Lake Mine 2019 Final Closure and Reclamation Plan Appendix F Financial Security Estimate. October 3.

⁷ Arktis, 2019. Arktis Solutions Inc., 2019. De Beers Canada Inc., Snap Lake Mine Revegetation Plan. March 1. Appendix J of De Beers Final Closure and Reclamation Plan.

⁸ De Beers, 2019. Water Licence (MV2019L2-0004) Application and Final Closure and Reclamation Plan. Security Memo to GNWT. September 3.

and b) even if it met specifications for common fill, it is expected to be more valuable as revegetation substrate than as common fill if other sources of common fill are available.

- De Beers also suggests that organics will be required for the Constructed Wetlands (CWTS) if they are to be constructed. However, a) De Beers is proposing the CWTS as a contingency only and b) it has also been suggested that a source of organics could come from stripping the ISP and CWTS footprints and that estimates of material available from these areas have been very conservative. I.e. there is likely more than the estimated quantity available (Technical Session Transcripts - Day 1, p.213). A follow up memo provided by De Beers on September 12, 2019⁹ indicated that there was also organic material available from the West Cell Divider Dyke.

The topic was again raised during the Public Hearing and De Beers responded that the company was hesitant to make a commitment to use all of the material in the organics stockpile but rather, the company "will use what they can to close and reclaim the site appropriately with material that is appropriate from the overburden stockpile" (Public Hearing Transcripts - Day 1, p.128).

BCL recommends that if the plan is to utilize the organic stockpile to enhance revegetation, then the basis of the security estimate be the assumption that all the organic material be used for this purpose. We see no reason for why only a portion would be used and do not agree with De Beers accounting of its use in other line items of the estimate. The quantity of organic material in line 201 of worksheet "Buildings and Equipment" would then be increased from 29,911 m³ to 102,900 m³ (147,000 m³ less 30%). The result is an increase from \$152,545 to \$524,790, a difference of \$372,245.

Recommendation

It is recommended that the quantities included in the security estimate reflect all organics that are available in the organics stockpile being used to improve revegetation of disturbed areas. This is an increase from 29,911 m³ to 102,900 m³ and a resultant increase in direct costs of \$372,245.

2.2 MONITORING COSTS (REFERENCE #2)

De Beers has maintained a labor rate of \$36.00/hour used for air quality, vegetation, wildlife, SNP and AEMP monitoring, which BCL has recommended is too low. BCL's rationale for a higher rate was that in the event of a company's insolvency it can be assumed that government would contract out environmental monitoring, and that even for a junior environmental technician the rate is expected to be more than \$36/hour.

BCL understands De Beers Response to Intervention for this topic, which was generally that the unit cost applied to the field services component of monitoring was for an environmental technician (i.e. De Beers selected the default unit cost for an environmental technician). Whereas the analysis and reporting component of the monitoring was based on the assumption that it would be completed by a qualified professional and therefore a higher rate was used for that component. BCL does not disagree on this point. However, we maintain that the rate used in the estimate should reflect a realistic rate for a contracted environmental monitor carrying out field services.

⁹ De Beers, 2019. Water Licence (MV2019L2-0004) Application and Final Closure and Reclamation Plan. Security Memo to GNWT. September 12.

Recommendation

It is recommended that the hourly rate that forms the basis of environmental monitoring field services be increased. Either by using the RECLAIM unit cost for an environmental coordinator (\$74.16/hour) or adding or changing the unit cost for an environmental technician. This increase in rate results in an increase in security of \$191,944. However, the difference may be more substantive should the SNP and AEMP change from that proposed by De Beers as it is understood that these plans have not yet been approved (see Section 2.5).

2.3 INTERIM CARE AND MAINTENANCE (REFERENCE #3)

Between the 2018 Financial Security Estimate¹⁰ and the 2019 Estimate, De Beers reduced the period of Interim Care and Maintenance (ICM) included in the security estimate from two years to one.

In GNWT's Interventions, GNWT recommended that a two year ICM phase be maintained in the security estimate based on the rationale that in the event a company abandons a mine, provisions for ICM are intended to cover the period of time between GNWT assuming responsibility for the site and the time when actual site closure could begin. The time required would be for: transfer of ownership of the site, finalizing the closure and reclamation plan and cost estimate, conducting procurement activities to retain reclamation contractors, and mobilizing to the site (which at Snap Lake must consider the logistics of ice road access). Given the current status of the Snap Lake mine GNWT is of the opinion that a minimum provision of 2 years should be included in the security estimate to allow for these steps to be executed.

De Beers response to GNWT's Intervention included the following:

The ICM period was reduced to account for the additional closure planning that has occurred to date, including: engagement with stakeholders, submission of a final closure and reclamation plan, advancement of engineering design to final closure, advancement of management plans to final closure, submission of a final closure water licence and land use permit applications to the MVLWB, and participation in the MVLWB application review process since April 1 2019. MVLWB decision on the application is scheduled for early 2020 and final decision from the GNWT Minister is anticipated mid June 2020.

The GNWT position that a 2 year ICM period does not appear to consider De Beers advancements in closure planning or work to obtain a WL and LUP for final closure [sic].

Recommendation

GNWT maintains the position that the period of ICM included in the financial security estimate be 2 years and not reduced to 1 year as proposed by De Beers. This adds \$1,719,992 to the costs for ICM. The difference incorporates the monitoring cost recommendation described in Section 2.2.

¹⁰ Arktis, 2018. Arktis Solutions Inc., 2018. De Beers Canada Inc. Snap Lake Mine 2018 Financial Security Estimate. April 16, 2018. Report prepared for De Beers Canada Inc.

2.4 CONSTRUCTED WETLANDS AMENDMENTS (REFERENCE #4)

Section 5.1 of the North Pile Passive Treatment Systems Detailed Design¹¹ states that:

Locally sourced organic soil and plants are required to the extent possible so that a minimum of non-native plants or materials are introduced to the Northwest Territories. However, due to limited soil availability, the majority of soil may need to be brought from off site and must be in compliance with the non-native species requirements under the Northwest Territories Wildlife Act.

Whereas the security estimate is based on the assumption that organic soil is assumed to be available onsite. Based on discussion during the meeting of August 26, the technical session (Technical Session Transcripts Day 1 p.214), and De Beers memos of September 3 and September 12, it is understood that De Beers expects there to be sufficient quantities of material available on site for construction of the wetland. The memo from September 12 indicates that there may be a deficit of approximately 30,000 m³ of high quality soil but that:

The low quality organic material will be improved with a soil amendment. De Beers is currently investigating and evaluating the benefits of various types of soil amendments to determine the best option for the Snap Lake Mine.

Recommendation

As there has been some discrepancy as to whether sufficient quantities of material having the required material properties is available on site, and that costs to amend low quality organic material will depend on the quantities and source of amendments, it is recommended that De Beers identify the likely types of soil amendments, what quantity would be required, and costs if needed to be brought from off-site. If the decision is made to have Scenario 1 as the Water Licence and Land Use Permit security, these costs should be added.

2.5 SNP AND AEMP

Section 6 of GNWT's Interventions provided recommendations for SNP and AEMP stations and frequency that is different than what has been proposed by De Beers. As such, what forms the basis of De Beers Financial Security Estimate for monitoring would also be different. It was recommended in GNWT's Interventions that the security estimate be updated to reflect a final SNP and AEMP.

De Beers responded to GNWT's Intervention that "*the security estimate is not expected to change as a result of minor changes to the SNP or AEMP programs*".

BCL has not quantified GNWT's recommendations in terms of differences in frequency, duration, number of stations, and associated costs and therefore cannot comment on the magnitude of expected costs differences. Instead, it is reiterated that once the SNP and AEMP have been finalized the security estimate be updated to reflect the final plans.

Recommendation

It is recommended that the security estimate reflect the final approved SNP and AEMP.

¹¹ Golder Associates, 2019. North Pile Passive Treatment Systems Detailed Design. Snap Lake Mine. March 21. Appendix L.2 of Appendix L of FCRP.

3 SUMMARY

The following table summarizes the recommendations that have been made for additions to De Beers 2019 Financial Security Estimate. The result is an increase in security from what has been proposed by De Beers. Of those that have been quantified in this memo, none are specific to Scenario 1 or 2.

Table 1. Summary of Recommended Revisions to De Beers Snap Lake Mine Financial Security Estimate

Reference Number	Description	Amount		Difference
		De Beers	GNWT	
Ref #1	Organics stockpile - increase quantity to be used in revegetation	\$152,545	\$524,790	\$372,245
Ref #2	Monitoring costs - increase labor rate	\$8,344,055	\$8,535,999	\$191,944
Ref #3	Maintain ICM at 2 years	\$1,707,209	\$3,439,985	\$1,719,992
Ref #4	Constructed Wetlands Amendments - include with Scenario 1 with additional information required from De Beers	-	-	-
Ref#5	SNP and AEMP - update financial security estimate to reflect final plans following approval	-	-	-
	Total Security Scenario 1	\$80,287,612	\$83,152,933	\$2,874,321
	Total Security Scenario 2	\$71,081,458	\$73,946,780	\$2,865,322

Table 2. Comparison of Total Costs, Land Liability and Water Liability for Scenario 1 and Scenario 2.

	De Beers			GNWT		
	Total Costs	Land Liability	Water Liability	Total Costs	Land Liability	Water Liability
Including Wetland (Scenario 1)	\$80,287,612	\$39,831,442	\$40,456,170	\$83,152,933	\$40,060,885	\$43,092,049
No Wetland (Scenario 2)	\$71,081,458	\$42,083,834	\$28,993,624	\$73,946,780	\$42,155,802	\$31,790,978